# Lower White River Biodiversity Management Area (BMA) Stewardship Plan

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# Introduction

**The Areas**

Chapters I to VI comprise the Stewardship Plan for conserving the Lower White River Biodiversity Management Areas (BMA) as a whole, which extends through unincorporated Pierce County. King County, Muckleshoot Indian Tribal lands, and multiple cities (see map below). Chapters VII to XI are specific to where BMAs extend into the four cities of Buckley, Pacific, Auburn, and Sumner, and into King County, and those governmental jurisdictions have contributed to the overall Stewardship Plan. Chapter XI, describing Muckleshoot tribal lands, remains in its November 2015 draft status.

Clearly, conserving the rich native biodiversity enjoyed in the Lower White River BMA will be the collaborative work of multiple jurisdictions and multiple communities.

**The terminology**

Biodiversity has been defined as the existence of a wide variety of plant and animal species in their natural environments. Maintaining biodiversity is economically valuable because it provides breathable air, drinkable water, food, pollution and pest control, and resilience after natural catastrophes, such as floods and drought.

Biodiversity planning is a method used to identify land areas that provide for a biologically diverse representation of species. This planning method considers long-term ecosystem health and establishes a goal of maintaining adequate habitat to ensure the continued viability of a diversity of species within an ecoregion. Forest, riparian, and wetland habitats provide a full suite of ecosystem services vital to human health and livelihood besides a diversity of species.

Currently fish and wildlife planning methods consist of migratory routes and point locations of species of concern. What is missing is connecting the routes and points together that provide the necessary habitat to sustain all species, not just the rare and endangered ones.

**The benefits of biodiversity planning:**

- Protects remaining high-quality land cover important for fish and wildlife;
- Implements Growth Management Act requirements for Habitat Conservation Areas;
- Provides regional connectivity network for fish and wildlife dispersal and migration;
- Establishes proactive approach to help avoid future listings under ESA;
- Includes all habitat types not just point specific habitats such as wetlands, streams, endangered species locations;
- Increases resilience in the face of catastrophic events of weather, geologic movement, and disease.

**The history of biodiversity planning in Pierce County**

Pierce County's biodiversity planning efforts started with identifying a "Biodiversity Network," that is, the "best of the best" for habitat and breadth of native biodiversity along with their connecting corridors. Ultimately, the network included 16 biologically rich areas and was integrated into Pierce County's Comprehensive Plan Open Space Corridors Maps for fish and wildlife, in 1999 and updated in 2004. At that time a "Pierce County Biodiversity Assessment" was produced which provided policy and programmatic recommendations to assist planners in the planning processes and determine appropriate conservation measures.

Residents in each BMA may qualify for tax incentives as authorized by RCW 84.34 as these lands are likely rated as "high priority" for conservation. Furthermore, a BMA can be the basis for more protective zoning, as is the case in the Gig Harbor, Key Peninsula, and Graham Community Plan Areas. The Rural Sensitive Resource Zone (RSR) zone is regulatory and requires low density, low impact development and required clustering to accommodate environmental features on the land.

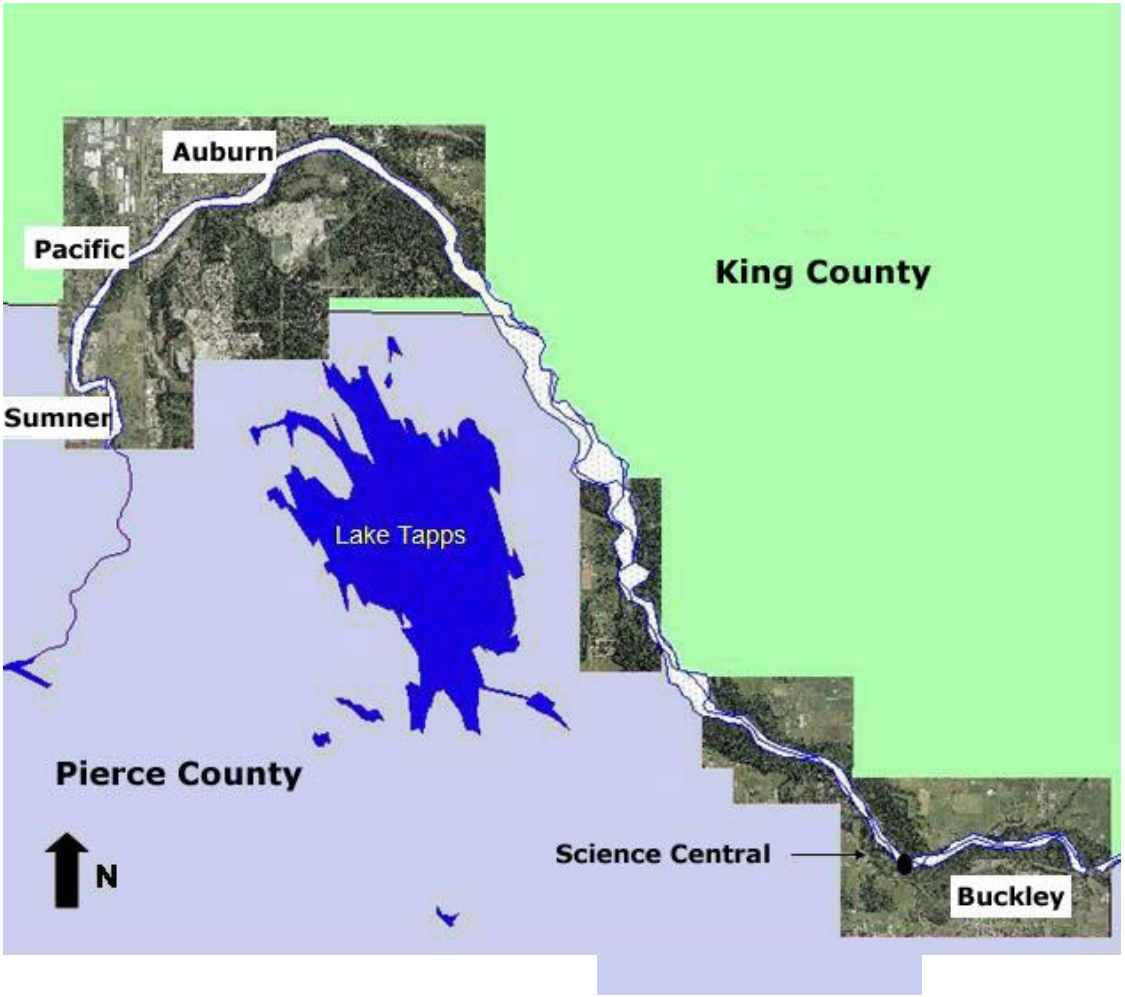
Work to maintain biodiversity within the Biodiversity Network began with area citizens and jurisdictions. The goal was (and continues) to develop a long-term stewardship plan for each of the 16

areas. A consistent template for these plans was envisioned to facilitate coordination and communication of Conservation Strategies across BMAs in the Biodiversity Network. The Pierce County Biodiversity Alliance (PCBA) has thus far overseen the writing of two plans: the *Crescent Valley BMA Stewardship Plan* (Gig Harbor), and *the Lower White River BMA Stewardship Plan* (this document, revised from a 2009 draft).

The Crescent Valley BMA falls almost completely within unincorporated Pierce County and is a community of resident property owners. The stewardship Action Plan for the 3-mile long watershed was written during a year-long series of workshops with property owners. The Crescent Valley Alliance, a community group formed by property owners, has undertaken the actions identified in the plan and joined the PCBA.

**The responsibility for stewardship actions in the Lower White River**

The Lower White BMA crosses seven jurisdictions with mostly absentee property owners and large tracts of jurisdiction (public) or business-owned property. With the absence of an easily identifiable citizen group, the *Lower White River BMA Stewardship Plan* was developed with major input from the planning staffs of the various jurisdictions. Since each jurisdiction is unique and autonomous, a separate chapter was provided for each, again following a consistent template to facilitate collaboration across jurisdictions. It is assumed that the jurisdictions will play a major leadership role in coordinating strategies and actions identified. However, it is clear that citizens will play an equally important role so that a section for both jurisdictional and citizen actions is provided.



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**Frequently Used Acronyms**

APD – Agriculture Production District
BMA – Biodiversity Management Area
BWH – Backyard Wildlife Habitat
CLC – Cascade Land Conservancy
CVA – Crescent Valley Alliance
COI – Community of Interest
CWH – Community Wildlife Habitat
FLWR – Friends of the Lower White River
GIS – Geographic Information System
KCCD – King County Conservation District
NWF – National Wildlife Federation
PCBA – Pierce County Biodiversity Alliance
PCCD – Pierce County Conservation District
PHS – Priority Habitats of Species
PSAT – Puget Sound Action Team
PWU – Pierce County Public Works and Utilities
RM – River Mile
SMA – Shoreline Management Act
SMP – Pierce County Shoreline Master Program
SMR – Pierce County Shoreline Management Regulations
SYH – Schoolyard Habitats
TNC – The Nature Conservancy
TPCHD – Tacoma Pierce County Health Department
URS – URS Consulting
WDFW – Washington Department of Fish and Wildlife
WSU – Washington State University – Pierce County Cooperative Extension Office

# Chapter I - Background

## Creation of a Biodiversity Plan for Pierce County

The Washington Growth Management Act requires each of the state's 39 counties and their cities to address open space and environmentally sensitive areas in their comprehensive plans. Pierce County's open space planning process includes land areas with the greatest fish and wildlife biological diversity or "biodiversity." The planning method used to identify these biodiversity areas is called "GAP analysis."

GAP analysis is a process of identifying core habitat areas that contain the highest level of species richness and representation remaining across the landscape. The GAP analysis methodology uses the mapping technologies of satellite imagery and the Geographical Information System (GIS) to create a current vegetation map. From that, distribution of wildlife species is derived and areas of high biodiversity are identified. The map is refined or "ground-truthed" with any and all known plant community and wildlife occurrences from Washington Department of Fish and Wildlife's (WDFW) Priority Habitats and Species and Streamnet databases; the Department of Natural Resources' Heritage and Sensitive Plant Species databases; county natural resource inventories; and local expert biological opinion. This process identified core habitat areas that, along with a surrounding ¼ mile buffer area, provided the framework for the creation of biodiversity management areas (BMAs). BMAs were then connected, often along watercourses, and the resulting coverage became the Biodiversity Network. This information was subsequently incorporated into Pierce County's Comprehensive Plan Open Space Corridors Map.

In January 2000, the first Biodiversity Plan for Pierce County was published[1]. The habitat types represented in the Pierce County Biodiversity Network include lowland riparian areas and wetlands, deciduous hardwoods, oak savannahs and prairies, deciduous old-growth forests, and alpine peaks and meadows. Many of these habitats contain imperiled species including Chinook Salmon, Western Gray Squirrel, Bald Eagle, Spotted Owl, Grizzly Bear, Gray Wolf, and Western Pond Turtle. In addition, the Pierce County GAP analysis was conducted using watershed boundaries, rather than jurisdictional boundaries; as a result the Pierce County Biodiversity Network extends into the adjacent counties of King, Kitsap, Thurston, Lewis and Yakima.

In 2003, Pierce County began a finer level assessment of lands within the Biodiversity Network to provide a groundtruthing of the original network. This assessment included detailed review of each BMA and connecting corridors through the use of recent orthophotography and site visits conducted by a WDFW biologist. The predicted species lists were also updated to add all predicted species including butterflies, introduced species, and known salmonid presence. The result of this assessment was unilateral removal of the ¼ mile buffer placed around the core habitat polygons, re-alignment of all the connecting corridors along watercourses, and a decision to refine the boundaries of each of biologically rich areas to ensure property lines were not bisected and habitats necessary for the long-term survival of the species based on local watersheds were included. The final revised Biodiversity Network identifies 16 biologically rich areas. This was done to connect corridors that cover 267,784 acres of land (Figure 1 – Pierce County's Revised BMA network) and 41 percent of the salmonid-bearing streams (Figure 2 – Salmonids). In 2004, the County Council adopted the Pierce County Biodiversity Network Assessment Report[2], and modified the County's Comprehensive Plan Open Space Corridors Map to reflect this revised data set.

[1] Pierce County GAP Application Pilot Project: A Biodiversity Plan for Pierce County, Washington, January 2000.
[2] Pierce County Biodiversity Network Assessment, August 2004.

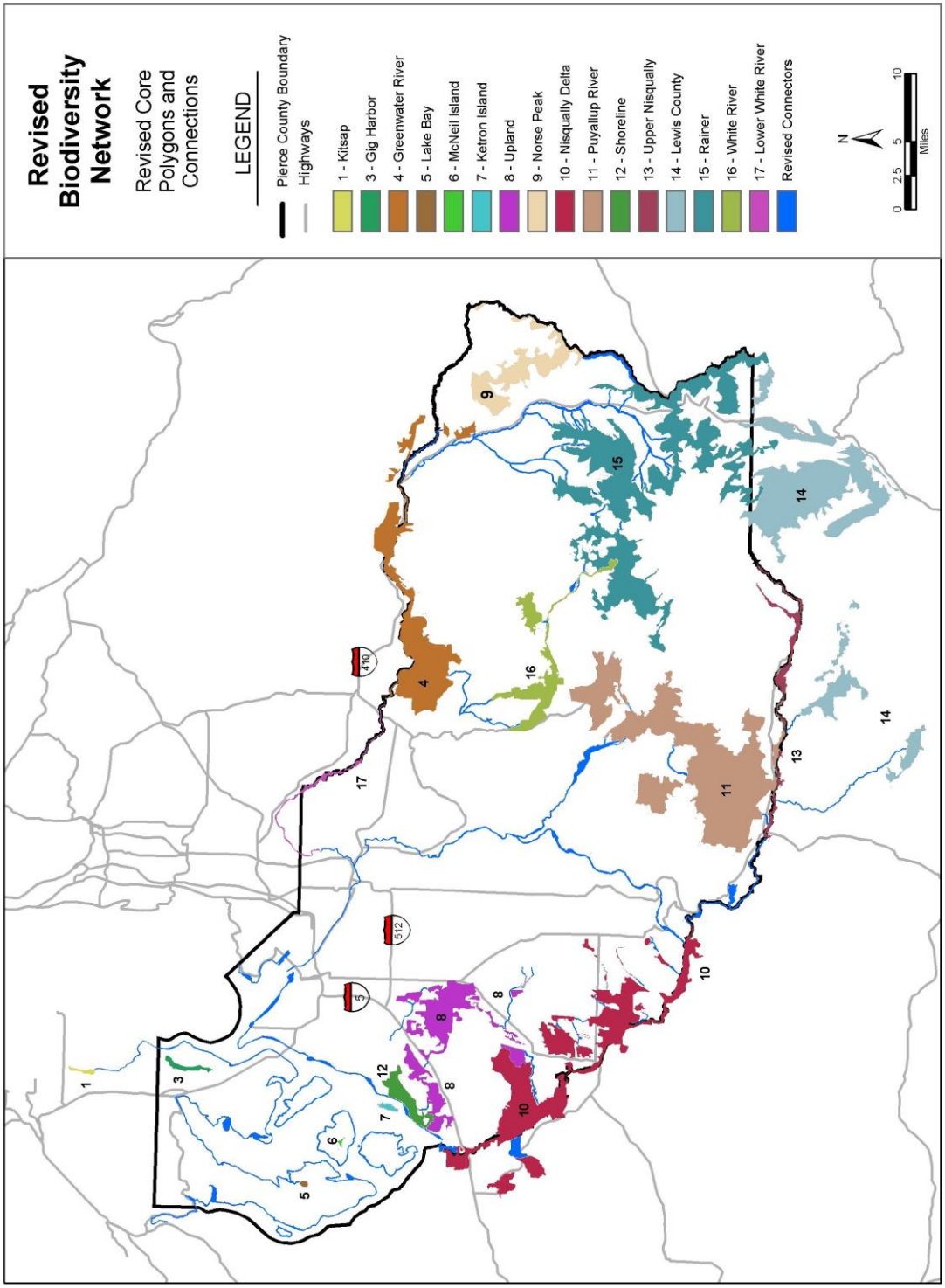


Figure 1. Revised BMA network

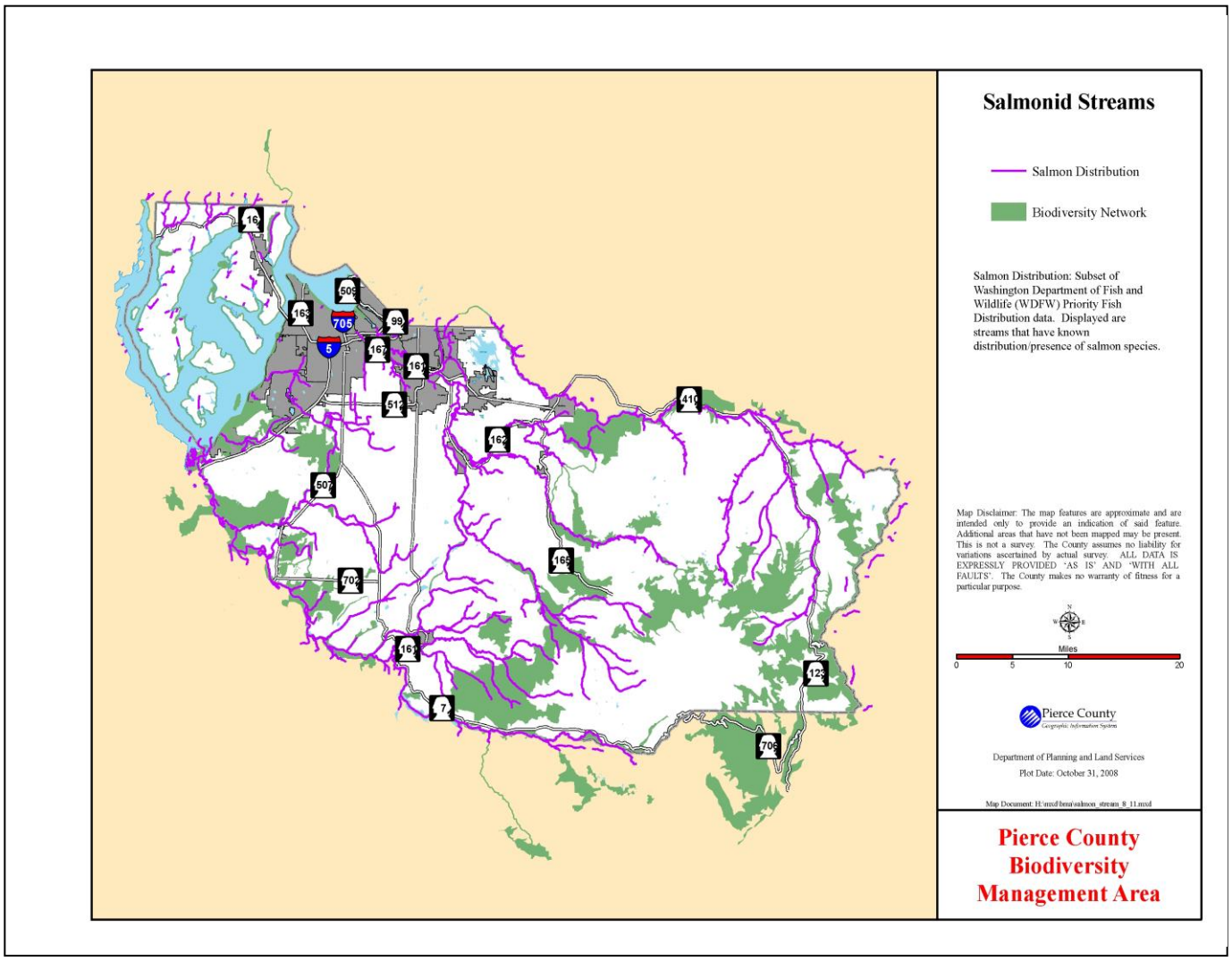


Figure 2. Salmonid presence

In June 2015, another aerial survey was made along the LWR BMA and compared with 2008 aerials. The BMA riparian area showed little change, although the quality of the habitat was not assessed. Previous stream segment surveys along the Lower White River and Lake Tapps Sub-basins as part of Pierce County's White River Basin Plan outlining 100 and 500 year flood zones, ranked streams aquatic habitat and riparian corridor "poor" or "fair" along reaches below Auburn. Good/fair reaches were found in unincorporated areas between Auburn and Buckley.

## Implementation Strategies for the Biodiversity Network at a County and City Level

Since adoption of the first Pierce County Biodiversity Plan, the County has been using this biodiversity information in relation to land use planning in a variety of ways. The Biodiversity Network coverage has been integrated into the County's Comprehensive Plan Open Space Corridors map. This map has been considered in many community planning processes and within those plans has served as the basis for the creation of lower density zones and the establishment of habitat conservation based design standards, such as Low Impact Development (LID) techniques and minimum native vegetation retention. In addition, Pierce County regulations have been changed to recognize lands within the Biodiversity Network as a high priority for various incentive programs such as the Conservation Futures Program and Current Use Assessment Program.

Because the Biodiversity Network was created using watershed rather than political boundaries, King, Pierce, Kitsap, Mason, Thurston, Lewis, and Yakima counties are being notified of the Network and of opportunities to work together for the protection of biodiversity. To date, King and Pierce County Executives have signed a declaration authorizing cooperation among staff on significant projects affecting shared boundary natural resources including the Lower White River. King County Water and Land Resources Division provided information inserted within this report (i.e., current zoning and shoreline environments, demographics, etc.) and in their chapter under projects and proposals.

This multi-pronged implementation strategy is putting emphasis on proactive conservation of multiple species, rather than on reactive restoration of individual threatened or endangered species. This approach helps guide county and city planners in directing more intense development away from identified bio-rich lands and can also guide private and public land conservation purchases or easements and restoration actions.

However, while some progress has been made at a countywide planning level, landscape scale planning documents often fail to implement on-the-ground land use actions that serve to promote long-term conservation in bio-rich areas. Thus, the ultimate strategy for implementation is to work directly within each BMA with community groups or individual landowners over time. Efforts include: conducting detailed inventories of the predicted species and habitat; re-evaluating the BMA boundaries at a local watershed scale–making sure not to bisect property lines or missing critical features not obvious at the countywide scale the BMA was created; meeting with local jurisdictions and property owners to ascertain potential stresses to the system and sources of stress–collectively referred to as "threats"; identifying a set of conservation strategies to abate these threats; and developing a set of prioritized actions to reduce or eliminate threats and restore habitat areas.

## Pierce County Biodiversity Alliance (PCBA)

In order to accomplish the preservation of biodiversity within Pierce County's Biodiversity Network, a group of dedicated individuals who are interested in preserving long-term the biodiversity of Pierce County formed an alliance. The Pierce County Biodiversity Alliance (PCBA) is comprised of a unique set of stakeholders, representing governmental, academic, and non-profit agencies. Alliance members include Pierce County government; University of Washington - Cooperative Fish and Wildlife Unit; *NatureMapping* Program; NatureMapping Foundation; Washington Department of Fish and Wildlife; Metro Parks Tacoma; Tahoma Audubon Society; Friends of Pierce County; Pierce County Conservation District; Point Defiance Zoological Society; U.S.G.S. – National GAP Program; University of Puget Sound; National Wildlife Federation; Crescent Valley Alliance; Puyallup River Watershed Council; and Forterra. In 2015, the PCBA received funding from the Russell Foundation's 10-year Puyallup River

Watershed Initiative. The PCBA members were part of the Initiative's Biodiversity Community of Interest (COI) for one year in order to complete this document, the *Lower White River BMA Stewardship Plan*, and provide biodiversity educational materials to the other COIs. Other COIs include Forest Lands, Active Transportation, Environmental Education, Industrial Stormwater, Social and Environmental Justice, Just and Healthy Food System, and Economic Development. The COIs have multiple partners that cross into other COIs, thus taking advantage of opportunities where single COI may not have access.[3]

The main emphasis of the PCBA is non-regulatory in nature and instead focuses on public outreach to property owners within the Pierce County Biodiversity Network, providing education and incentive programs to maintain the habitats and biological diversity. The PCBA vision is to establish biological survey and monitoring programs; facilitate the development of locally derived habitat conservation plans that will, ideally, provide detailed information on habitat quality and species presence/viability. The effort will identify threats and develop threat abatement strategies including restoration opportunities, and priorities for conservation and land acquisition for each BMA. During this process, PCBA hopes to foster community groups that can work together towards long-term implementation of conservation strategies.

PCBA advocates responsible land use and measures success when each BMA and connecting corridor retains ecological function. The community's land-use objectives ~~as~~ should be outlined in their adopted County or City Comprehensive Plan or in their community plan. Any Biodiversity Stewardship Plans adopted by Pierce County are considered a supporting plan to the Comprehensive Plan.

**Project Description and Public Participation**

The Lower White River BMA is a Puget Sound lowland environment that includes the local jurisdictions Buckley, Auburn, Pacific, and Sumner on the Pierce-King county border. The White River joins the Puyallup River in Sumner, and flows into Puget Sound at Commencement Bay in Tacoma. The BMA covers 1,593.27 acres/2.49 square miles of which 941.39 acres/1.47 square miles are within Pierce County. Ten miles of the Lower White River[4] (River Miles [RM] 14 to 24) are within the BMA. The river supports several documented salmonid species including Chinook (Federally Threatened, State Candidate), Chum, Coho, Pink, and Steelhead. In particular, the White River Spring Chinook population is considered a priority population in Puget Sound.

On April 29, 2006, a public tour of three sites within the Lower White River (Figure 3) was hosted by the Puyallup River Watershed Council to begin publicizing the biological importance of the Lower White River. In June 2006, the PCBA conducted an intensive 24-hour species verification survey (referred to as a "bioblitz") and community outreach efforts on private lands within the Lower White River BMA. Three sets of teams covered three areas: Buckley, lands east of the Muckleshoot tribal lands, and Auburn/Pacific. The Washington Biodiversity Council[5] selected the PCBA's work beginning in the Lower White River BMA as one of their two pilot projects and provided funding for the bioblitz. An EPA grant funded the April, 2007, 12-hour bioblitz in three areas in Auburn and Pacific not adequately sampled in 2006: City of Pacific's Riverside Park, City of Auburn's Game Farm, and Pierce County Water Program's property. Many of the volunteers who were trained for the first bioblitz held in 2005 of the Crescent Valley BMA were the leaders for the 2006 Lower White River bioblitz. These volunteers were trained at a *NatureMapping* workshop on data collection protocols[6]. Additional *NatureMapping* workshops in 2007

[3] The Puyallup Watershed Initiative website http://www.pwi.org/

[4] The sections of the Lower White River that did not qualify as a BMA were designated as a connecting corridor.

[5] The Washington Biodiversity Council's website http://www.landscope.org/washington/partners/biodiversity_council/

[6] The *NatureMapping* Program trains teachers and citizens to conduct wildlife and habitat assessments, using standardized protocols and methodology, for integration into a statewide biological survey. Data were previously housed at

were conducted in preparation for the 2007 bioblitz. There were direct mailings to all property owners within the BMA for each of the three above mentioned events (Figures 3-5) and follow-up telephone contacts. The events also received media coverage through the Tacoma News Tribune, Auburn Reporter, Courier-Herald, and a Rainier Cable broadcast on the local government channel. Beginning in the afternoon of June 2, 2006, bioblitz participants, led by a Department of Fish and Wildlife staff biologist, utilized the *NatureMapping* Program's NatureTracker data collection and global positioning software to precisely identify where birds, mammals, amphibians, reptiles, insects, aquatic insects, and plants were found and accurately document which species. The Marion Grange on Old Buckley Hwy served as science central headquarters in 2006 and the Auburn Game Farm was science central in 2007. [Five private landowners allowed access to their private property in 2006.] A total of 80 volunteers–including taxonomic experts, 5 high school students, and 10 landowners in 2006, and 39 volunteers in 2007–observed 84% of the predicted bird species, 88% of the predicted amphibians, 52% of the predicted mammals, 60% of the predicted reptiles, 5 fish species, 207 invertebrate samples, and 276 plant species.

The information gathered from the field surveys established a benchmark of current species located within the Lower White River BMA and will also contribute to long-term monitoring activity. Species observations recorded during this monitoring will be used to evaluate whether biodiversity conservation strategies are having positive and successful results. Landowners may also use this information when enrolling in Pierce County's Current Use Assessment tax incentive program or making application for a land acquisition using Conservation Futures funding.

The Puyallup River Watershed Council and Pierce County Biodiversity Alliance (PCBA) invite you to learn from the experts about the dynamics of the Lower White River Corridor watershed. Come view the White River as it meanders through hardwood forests home to eagle, osprey, and bear. View elk wintering grounds, amphibian breeding ponds, and more. Learn how responsible land use decisions can combat the threats to biodiversity and retain ecological function while achieving a community's land use objectives. Learn about opportunities for volunteer tax-reduction programs.

1. Site 1: Auburn Game Farm Park – Encompasses ~72 acres of park and open space along the White River, the park is a unique mix of untapped wildlands within an urbanized environment. After an introduction to biodiversity by Michelle Tirhi, state wildlife biologist and PCBA member, we'll search for many species of birds, fish and wildlife. Aaron Nix, Environmental Protection Mgr with the City of Auburn, will discuss Auburn's comprehensive environmental plan and explain his role in helping keep these types of places special in Auburn.

2. Site 2: River Trail Walks – Don Johnson, a private landowner in the Lower White River, will lead a wildlife walk down the river trail where we will seek out beaver, elk beds, and other elk sign. Michelle Tirhi will talk about the upcoming BioBlitz on June 2nd and 3rd where landowners can become biologists for the day participating in frog trapping to eagle nest counts.

Site 3: Wetlands Complex – This is an area where red-legged frogs and wetland dependent birds, especially several species of flycatchers nest. Tony Fuchs, staff biologist from Puget Sound Energy (PSE), will discuss the dynamics of the wetland complex, including the water regime, beaver modifications, and habitats. Chip Nevins, Conservation Director for Cascade Land Conservancy, will talk about plans to acquire a 10 mile stretch (~3,000 acres) of undeveloped PSE-owned land straddling both sides of the White River to preserve it for future generations.

Vans depart from Auburn Game Farm Wilderness Park
Saturday, April 29th 1-4 PM
**RSVP required to reserve your seat on the van**
**Phone 253-863-1860 or ltburgess3@msn.com**

Figure 3. Mailing Notice for April 29th Preview Tour in Lower White River BMA

Dear Lower White River Resident:

As a resident of the Lower White River, you know that it's a special place filled with natural beauty and wildlife. This area was recently recognized as a unique place that sustains healthy populations of fish, mammals, birds, reptiles, and amphibians. Pierce County Biodiversity Alliance (PCBA) needs **YOUR** help to better understand the wildlife that lives in the Lower White River watershed.

**As a land owner in the Lower White River, you may qualify for a property-tax reduction while you help Washington wildlife.** By granting access for a one-day wildlife inventory in the Lower White River watershed, you could become eligible for your county's open-space tax-reduction program. If wildlife were found on your property, a wildlife assessment would increase your tax break and add points to your application. Join Fish and Wildlife biologists and volunteers for a day of fun as they create wildlife assessments of the area.

Pierce County Biodiversity Alliance, in cooperation with the University of Washington, Washington Department of Fish and Wildlife, Metro Parks Tacoma, Puyallup River Watershed Council, Friends of Pierce County, Pierce County Conservation District, Point Defiance Zoological Society, U.S.G.S. National GAP Program, and National Wildlife Federation, will be conducting a wildlife inventory known as a "**Bioblitz" from 3:00 p.m. Friday, June 2nd through 3:00 p.m. Saturday, June 3rd.** We are asking you and other property owners for your participation to help make this event a success.

**Please note:** This inventory is intended for scientific information gathering purposes only and landowners participating in the Bioblitz are under no further obligation or restriction to land-use on their property. The inventory will involve a visual tally of observed wildlife and every effort will be made to avoid impacting any natural or man-made features on the property. Everyone participating in this event is insured, so there is no liability to property owners. Landowners are encouraged but not required to accompany biologists during the inventory.

To participate in the **Bioblitz** of the Lower White River, or if you have questions, please complete the attached form or respond to Michelle Tirhi by email at tirhimjt@dfw.wa.gov or by telephone at 253-813-8906.

Michelle Tirhi
Pierce County Biodiversity Alliance
25644 44th Ave. S.
Kent, WA 98032

Figure 4. Mailing Notice for June 2006 Bioblitz Event in Lower White River BMA

Greetings:

Please join the Pierce County Biodiversity Alliance for BioBlitz 2007: Lower White River – Part 2. Many of you participated in last year's BioBlitz. It was a very fun event and quite successful in terms of wildlife and habitat inventory. An overview is provided at: http://www.naturemappingfoundation.org/natmap/projects/bma/lower_white_river/.

Formally designated the Lower White River Biodiversity Management Area (BMA), this region is an incredible mix of habitat. Dominated by riparian hardwood, the habitat also includes abundant wetlands, flood channels, seeps, and grasslands. Because of the size of the survey area, there is a need for several BioBlitz events.

This year's BioBlitz will focus on filling in the gaps from last year's event. We will be surveying sites that are more urban, but still important to the wildlife that live there. Additionally, we will be targeting several species that we believe should be found in the BMA but were not recorded during last year's survey. The BioBlitz will occur on Saturday, April 21 from 6:00am to 6:00pm. Team leads will do some additional surveys before and after. Taxa that will be surveyed include: mammal, bird, amphibian, reptile, invertebrate, fish, and plant.

Also this year, in conjunction with the survey work, we will host a special event commemorating Earth Day which will highlight the biological diversity of the Lower White River area. We will be inviting the public and members of the media to Science Central for the latter part of the day to heighten their awareness of the natural world and offer ways to help support biodiversity in their own backyard.

So, the 2007 BioBlitz has three objectives. First, to continue to validate the species predicted to inhabit the area based on modeling conducted as part of our larger Pierce County Biodiversity Network Project. Second, to engage community members in discovering the biological richness of the region. Third, to have a great field day for all participants in one of Western Washington's most scenic areas.

This is an intensive event and our team participants work hard documenting as many species as possible against the clock. The members of the Pierce County Biodiversity Alliance and Puyallup River Watershed Council thank you in advance for your assistance. What a great way to do something meaningful for Earth Day! Please indicate your interest by filling out the attached Participation form and sending it to me as soon as possible. Please contact me if you need additional information. Thank you!

Michele Cardinaux
BioBlitz 2007 Coordinator
1919 S. Tyler Street
Tacoma, WA 98405
(253) 591-6439
michele@tacomaparks.com

**Pierce County Biodiversity Alliance (PCBA)**
*Dedicated to conserving the biodiversity of Pierce County, Washington*

Figure 5. Mailing Notice for April 2007 Bioblitz Event in Lower White River BMA

A community meeting was held in November 8, 2006, to present the results of the June bioblitz to the residents in the Lower White River BMA and solicit their help developing long-term biodiversity conservation strategies for this area. The PCBA led a total of four community meetings over four months using the same approach to develop community stewardship plans. Unfortunately, bad weather and flooding reduced public attendance. Those that did attend were personnel representing multiple jurisdictions within the BMA and did not need to be educated about conservation planning and terminology. It was decided that the meetings should be postponed until a draft plan was developed and presented to the jurisdictions. The meeting agendas and meeting summaries are attached as Appendix 1.

**Implementation of the Lower White River BMA Stewardship Plan**

The Lower White River BMA stewardship planning process includes developing implementation measures to conserve biodiversity within each jurisdiction included in the BMA. These measures may include: property owner enrollment in county tax reduction incentive programs (Current Use Assessment - Public Benefits Rating System) or permanent dedication or purchase of properties as open space (Conservation Futures Program); restoration of native vegetation in areas of degraded habitat (Landowner Incentive Programs, WDFW's and National Wildlife Federation's Backyard Wildlife Sanctuary Programs, and/or Pierce County Conservation District's Stream Team); and education on acceptable riparian/wetland land management. Because local jurisdictions may have additional implementation measures that can be applied to their local communities, Chapters VII –XII lists these and further measures. Those jurisdictions also have and will customize proposed action steps for community review.

It should be noted that the Lower White River is not a separate entity, but part of the Biodiversity Network continuum between the White River BMA and the Puget Sound via the Puyallup River. The cities of Sumner and Buckley fall within the Lower White River BMA and along the connectors, therefore their stewardship efforts extend into the Network.

As stated above, the PCBA's vision is to foster a network of community groups that can work together towards implementation of long-term conservation strategies outlined in the *Stewardship Plan*. One group that has formed is the Friends of the Lower White River (FLWR) that will be pursuing funding opportunities to complete action items. To that end the FLWR adopted the following Mission Statement:

> *Our mission is to protect the biodiversity and health of the Lower White River Basin and its communities through education; supporting scientific research; fostering citizen participation in government; and by buying, and holding in trust for the public good, critical areas, aquatic and riparian wildlife habitats, and other lands of ecological significance.*

One action within the *Stewardship Plan* is the certification of individual backyard wildlife habitats, either individually through the Washington Department of Fish and Wildlife (WDFW) and/or the National Wildlife Federation (NWF), or as a community to become certified with the NWF. The Crescent Valley Alliance (CVA) was formed by local citizens and they helped write their own Biodiversity Stewardship Plan as part of the PCBA's Gig Harbor/Crescent Valley BMA implementation pilot project. In 2008, CVA aimed to garner 50 certified backyard habitats as one of their short-term stewardship action plans and registered for the National Wildlife Federation's Community Habitat Program.

**National Wildlife Federation - Community Wildlife Habitat Program Certification**

National Wildlife Federation's community education programs help homeowners, students, community leaders, and businesses get involved in biodiversity conservation. A continuous flow of materials from NWF helps communities preserve, restore and create landscapes that sustain a multitude of wildlife and native plants in backyards, workplaces, places of learning, and other community spaces. NWF offers training, workshops, print and online resources, and recognition through a formal certification process. To certify a habitat through NWF, individuals must provide local wildlife with four basic elements: food, water, cover and places for wildlife to raise their young. To date there are 8,516 Certified Wildlife Habitat sites, 187 Schoolyard Habitats (SYH) in Washington. Homeowners in the Lower White River can certify their property with NWF to join the network of people creating a corridor for wildlife.

The Community Wildlife Habitat (CWH) program is critical to NWF's work in the Puget Sound as it takes the basic elements of the Certified Wildlife Habitat program from the individual backyard to multiple locations throughout a community. Once a community is engaged and interested in taking action to promote healthy habitat, they form a habitat team and, with guidance from NWF staff, set achievable goals that reflect the size and needs of the community. When goals are met, they become formally registered as a Community Wildlife Habitat site. The CWH certification system is points-based and each community earns a certain amount of points that fall within five categories (Registration, Habitat Certification, Education, Community Projects, and Administrative Goals). Communities start as "Registered" and work towards "Certified."

There are twelve "Registered" CWH's in the Puget Sound area including Crescent Valley, Bonney Lake, Edgewood, Brier, Burien, Friday Creek, Mercer Island, Newcastle, Poulsbo, Queen Anne, Redmond and NW Seattle. "Certified" Community Wildlife Habitats in Washington State grew from two (Tukwila and Camano Island) in 2009 to fifteen (adding Alki, Lake Forest Park, Bainbridge Island, Bellingham, Edmonds, Fidalgo Island/Anacortes, Kirkland, Mukilteo, Sammamish, Shoreline, Skagit Valley, Surrey Downs, and Whidbey Island) in 2015.

On average, communities spend three to five years completing their certification goals, during which time a dedicated number of residences, schools and businesses become certified as wildlife friendly habitats. Community groups also design and implement an array of locally relevant, habitat-related projects within their communities. Projects include (but are not limited to): stream cleanups, invasive plant removal and native habitat restoration, plant and wildlife rescue, after-school ecology programs, the creation of educational outreach materials and community-sponsored events such as the Tukwila Backyard Wildlife Fair and the Lake Forest Park Dig It! Green Fair.

The Crescent Valley Alliance founding members encourage residents within the BMA to certify their own yards and to join their efforts to maintain a NWF Schoolyard Habitat as a demonstration wildlife garden. Three key components are needed to become a Certified Community Wildlife Habitat site. The first is on an emotional level: *"(Registering) causes us to hold ourselves accountable for what we do, and it's created a very emotional, meaningful connection to our land. There is a sense of accomplishment and a feeling that we have done something good for the world and for our kids."—Lucinda Wingard*

The second component is educational. Residents within the BMA signing up for backyard habitat certification through the Crescent Valley Alliance are learning what is in their "Biodiversity Stewardship Plan" and how they can play a role as stewards. The third component is benefiting from a Pierce County incentive program. Some BMA residents applied for and receive up to 25% reduction on their property taxes.

# Chapter II - Lower White River BMA Overview

## General Description of Lower White River BMA

The Lower White River BMA is located along the White River west of the Greenwater River BMA and is approximately 1,593 acres in size. This BMA is located within the Puget Trough ecoregion[7] (Region 7) and the Puget Sound Douglas-fir vegetation zone (Zone 31). The primary driver habitat for this BMA is riparian habitat (code 533) dominated by hardwood trees and small shrubs. The entire BMA is located within the Puyallup-White River Watershed WRIA 10 (Watershed Resource Inventory Area). Figure 6 depicts the BMA boundary overlaid on ortho-photography mapping of the surrounding area.

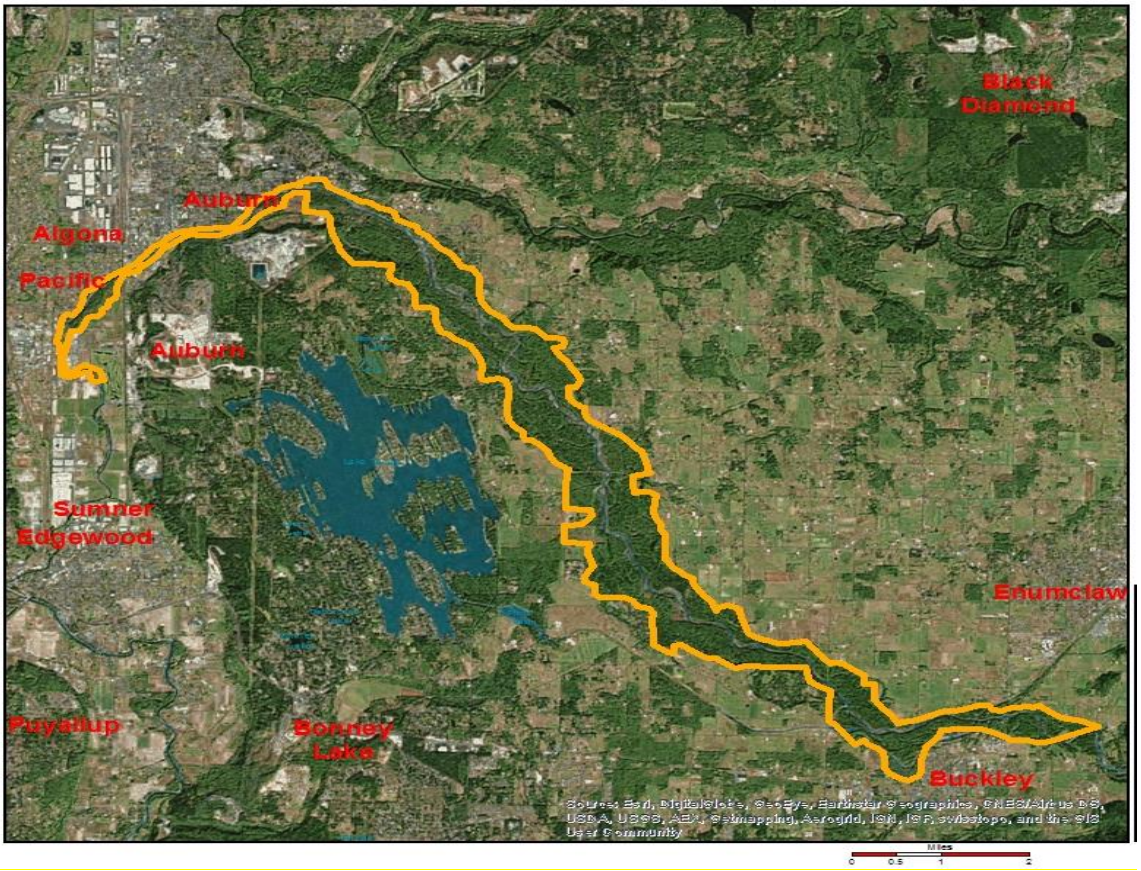


Figure 6. Lower White River BMA

The White River demarcates King County's southern geo-political boundary. Multiple jurisdictions are present in the BMA in King County including the cities of Auburn, Pacific, and Enumclaw and the Muckleshoot Indian Tribe. King County owns some lands within those other jurisdictions. Additionally, the portion of the BMA that stretches from the Muckleshoot Reservation east to the terminus of the Lower White River BMA is all unincorporated King County. The actual area covered by the BMA that lies within the jurisdiction of unincorporated King County is very limited.

[7] Washington Gap Analysis Project Volume 1 – Landcover of Washington State defines ecoregions as contiguous geographic areas of similar climate and geologic history and vegetation zones as areas in which moisture, temperature, and other environmental parameters combine to create conditions that favor similar vegetation communities. 1997.

The White River Basin Plan Characterization Report[8] contains the following general description of the physical and biological characteristics of the watershed basin, which also provides a good representation of the Lower White River, as follows:

*The White River Basin is divided into 10 sub-basins. The Lower White Sub-basin was established based on the transition from the Cascade foothills to the Puget Sound Lowlands. This sub-basin drains 52 square miles of the plateau formed by the Osceola mudflow and landforms associated with the last glacial advance in the region. The White River flows for 22.5 miles in the sub-basin, dropping in altitude from 620 to 39 feet at the confluence with the Puyallup River. Flooding in the Lower White River Basin is a natural phenomenon that has been mitigated by means of engineered structures (dams and levees). The river flows unconstrained until it reaches Mud Mountain Dam at RM 29.6. The dam, which began operation in 1948, is operated by the U.S. Corps of Engineers to control flooding in the lower Puyallup floodplain. (The Corps of Engineers co-located the Mud Mountain Dam fish passage facility which is a trap and haul program at the Puget Sound Energy (PSE) Diversion Dam. This facility consists of a fish trap, fish ladder and truck transfer facility to load and haul upstream migrants. The transfer process involves trucking the fish to a release point 10 miles upstream and 4 miles above Mud Mountain dam. The Corps of Engineers re-initiated ESA consultation with the National Marine Fisheries Service because the continued maintenance of the existing barrier structure constitutes an impact on listed species that was not considered in the 2007 Biological Opinion)*[9]

*Pierce County maintains a system of flood control levees along the White River. According to the 2005 Capital Improvement Program (CIP), prepared by Surface Water Management, only 6 percent (1,840 of 29,209 linear feet of levee) on the White River levee system currently provides 100-year flood protection. There are 4,551 acres in 100-year flood zone and an additional 459 acres in the 500-year flood zone. Specific areas with flooding issues include the Red Creek area just downstream of the dam, Muckleshoot Tribe fish hatchery, Buckley Meadows subdivision, Sumner golf course, residences near the intersection of 8th Street and 138th Avenue East and the Sumner sewage treatment plant.*

*Before 1906, the White River flowed north from Auburn to join the Green River and ultimately discharged into Seattle's Elliott Bay. In 1906, a debris jam blocked the channel of the White River and diverted all the floodwaters away from King County down the Stuck River and south into the Puyallup River. The debris dam was replaced by a permanent diversion wall located at the game farm park in Auburn.*

*Stream flow in the White River is affected by the Lake Tapps diversion near Buckley. Diverted water is stored in Lake Tapps and eventually returned to the White River via the Deiringer Canal. Lake Tapps was built to create storage for the PSE White River hydroelectric project, which came on line in 1912 and suspended operations in January 2004. Approximately 2.5 miles of earthen dikes and embankments were built around four small natural lakes to create the current Lake Tapps. The dikes are maintained to control flooding. A diversion dam on the White River at RM 24.3 is used to fill the lake. Flooding in November 2006 damaged the structure and spawning salmon had difficulty using the adjacent fish ladder in the fall of 2007. Spawning salmon are trapped at the fish ladder and trucked approximately 5 miles upstream of Mud Mountain Dam.*

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7 "White River Basin Plan" Pierce County Public Works and Utilities Department – Surface Water Management Division, November, 2013.

[9] US Army Corps of Engineers, Seattle District website http://www.nws.usace.army.mil/Missions/CivilWorks/ProgramsandProjects/Projects/MudMountainDamFishPassage.aspx

Significant native riparian vegetation exists within the Lower White River riparian corridor despite continued development encroaching from western Pierce and King Counties. The river running through Sumner, Pacific, and Auburn has been channelized in many locations. The cities of Sumner, Auburn, and Buckley are partially located within the floodplain of the river. The floodplain width is variable, ranging from less than 100 to 1,000 feet. The *bankfull width* (maximum width the stream attains and is typically marked by a change in vegetation or other geological features) ranges from 80 to 500 feet, but the *bankfull depth* (the average depth measured at the dominant channel-forming flow) is more consistent and averages 5.5 feet throughout the river. Flood control levees on the White River extend upstream to RM 11.5 but are maintained only to RM 9.4. Segments of the White River have been identified by the Puyallup Tribe as Critical Fishery Rivers and Streams (Pierce County Critical Areas- Type F1: Title 18E40.060B), mandating 150-foot buffers.

When the boundary lines were drawn around the Lower White River BMA, the current river channel was included, but much of the riparian area (including the floodplain) was not. However, that was an oversight due to scale of the original GAP polygons, and the BMA should be changed to include riparian areas, including at a minimum, the entire floodplain. With that said, the changes to the landscape and cities along the river limit the boundary lines extending very far from the river.

From an ecological standpoint, the river cannot be separated from its floodplain. These areas are tightly interconnected, and these connections contribute to biodiversity. The floodplain contains substantial physical diversity, including a mosaic of semi-aquatic habitats, complex micro-topography, and patchy concentrations of moisture and nutrients. The physical diversity of the floodplain is supported by riverine processes such as periodic flooding, channel migration, and sediment deposition. Similarly, the floodplain contributes to the diversity of the river by providing wood and sediment to the channel. These are the raw materials for building instream habitats and for creating new floodplains. The physical diversity that results from these interactions supports high levels of species diversity in the river, as well as in the floodplain. For example, where the river is rich with wood from the floodplain, the channels are split into multiple threads with abundant cover, pools, edges, and gravels that support diverse communities of fish and insects. Where the floodplain is connected to the river, there is abundant habitat for raptors, songbirds, shorebirds, and waterfowl, as well as small and large mammals, reptiles, and amphibians. Floodplains also support high levels of plant diversity, owing to the variable patterns of moisture and resources, and wide distribution of protected refuges. In addition, riparian areas contribute substantially to biodiversity by providing habitat for plants and animals that are not commonly found in uplands.

The Lower White River BMA is narrow and, in fact, does not fully occupy the extent of the historic floodplain in which it lies due to development along the river. That portion of the BMA in unincorporated King County is even smaller and more limited. However, King County's Flood Hazard Management Plan 2013 update to remove and set back levees, restore riparian buffer, and connect the river to its historical floodplain habitat merits examination of the BMA boundary in these areas. All of that area is either active river channel or adjacent riparian forest. King County maintains levees and revetments along the lower White River within the cities of Pacific and Auburn. The river through these reaches is channelized and disconnected from its historic floodplain.

The Setback Levee Feasibility study for the Puyallup, Carbon and White Rivers by Pierce County in 2008 listed 32 sites. There were six sites on the White River. Pacific Park project on the west side of the river is underway with King County in the City of Pacific. King County and other partners will also improve the right bank of the river with construction set to begin in 2018. The other five sites in the study

are north of the City of Sumner, which increases the importance of maintaining riparian habitat for flood control in Sumner.

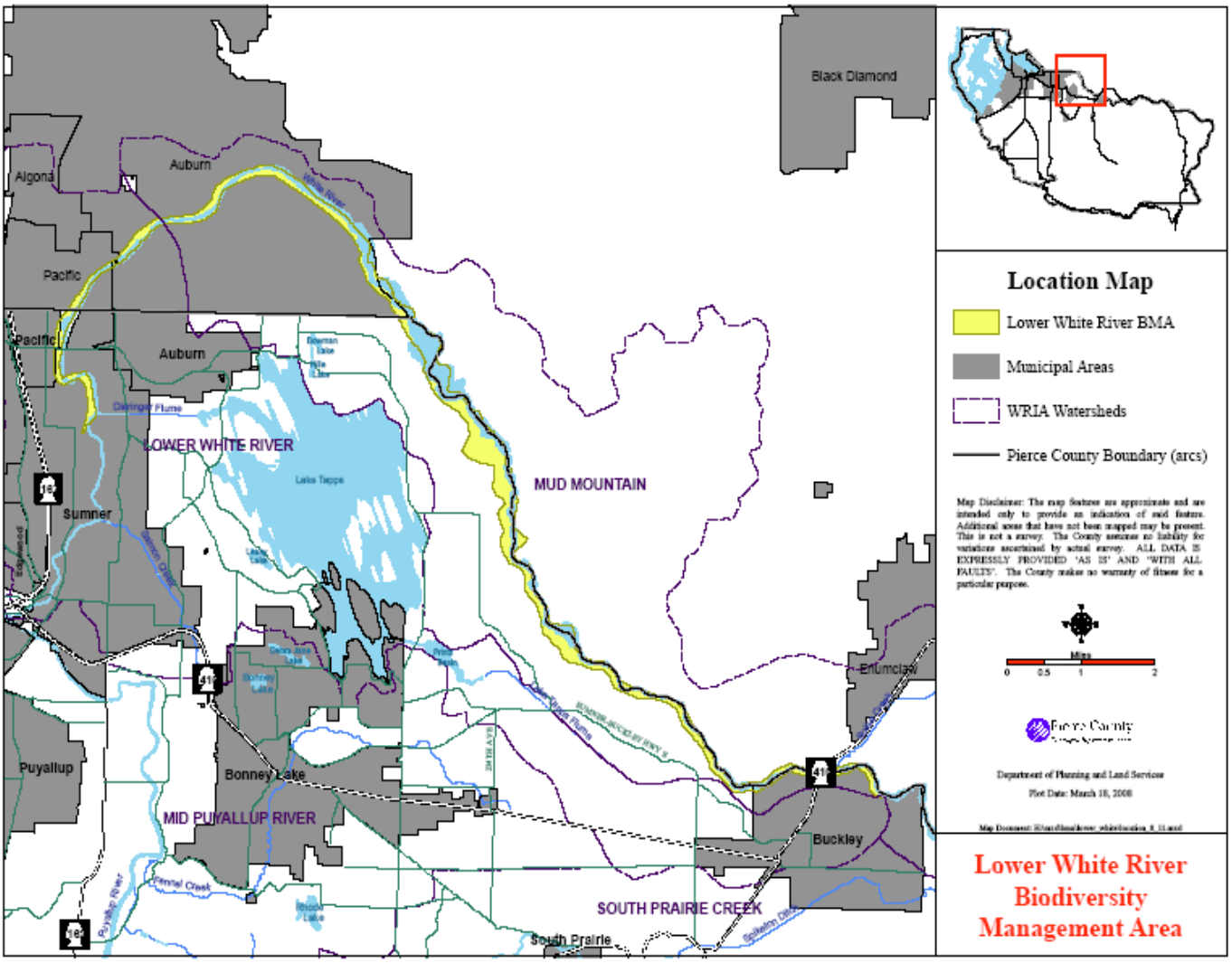



Figure 7. Lower White River BMA Location Map

Current land use is a combination of resource use, residential, civic, vacant, and limited industrial and commercial land use around Sumner, Pacific, and Buckley. In King County, land use is mostly agriculture, tribal lands, and residential around Pacific and Auburn.

**Fish and Wildlife Resources**

Predicted Wildlife Species (F = federal, S = state, T = threatened, M = monitor, C = candidate, Co = of concern)

The Pierce County Biodiversity Assessment provides a detailed list of predicted species for each of the 16 biodiversity management areas in the Biodiversity Network. The Painted Turtle is the only trigger species identified for this BMA. There are 6 predicted species listed as at-risk, 16 state or federal listed species and 18 Priority Habitats of Species PHS species. The predicted listed species include the Red-

Legged Frog (FCo), Western Toad (FCo, SC), Bald Eagle (FT, ST), Great Blue Heron (SM), Green Heron (SM), Olive-sided Flycatcher (FCo), Osprey (SM), Turkey Vulture (SM), Vaux's Swift (SC), Willow Flycatcher (FCo), Fisher (FCo, SE), Long-eared Myotis (FCo, SM), Long-legged Myotis (FCo, SM), Pacific Water Shrew (SM), Townsend's Big-eared Bat (FCo, SC), and Yuma Myotis (FCo). A total of 6 amphibians, 85 birds, 46 mammals, and 5 reptiles were predicted (see Table 1 next pages – Predicted and Confirmed Wildlife and Fish Species).

The Lower White River supports three salmonid species that are listed as threatened under the Endangered Species Act: Puget Sound Chinook, Puget Sound steelhead, and Coastal-Puget Sound bull trout. The Lower White River is particularly important to Chinook recovery because it is the only population of spring Chinook in south Puget Sound. The Lower White River also supports Pink, Chum, Coho, and Sockeye[10] salmon, as well as Cutthroat trout. The mouth of Boise Creek falls within the BMA on the King County side. Boise Creek supports Chinook, Coho, and Pink salmon, Steelhead, Bull trout, and Cutthroat trout.

8 Gustafson, R.G., T.C. Wainwright, G.A. Winans, F.W. Waknitz, L.T. Parker, and R.S. Waples. 1997. Status review of sockeye salmon from Washington and Oregon. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-33, 282 pp.

## TABLE 1 - PREDICTED AND CONFIRMED WILDLIFE AND FISH SPECIES FOR THE LOWER WHITE RIVER BMA

| PREDICTED SPECIES Note: Species observed but not predicted are italicized | Bioblitz 2006 Survey | Bioblitz 2007 Survey |
|---|---|---|
| **AMPHIBIANS** | | |
| Bullfrog[7,8] | X | |
| Ensatina | X | |
| Long-toed salamander | X | |
| Northwestern salamander | X | |
| Pacific treefrog (Chorus frog) | X | |
| Red-legged frog [3] | X | |
| Roughskin newt | X | |
| Western toad [3,6] | X | |
| **BIRDS** | | |
| American bittern [2] | | |
| American coot | | |
| American crow | X | X |
| American dipper | | |
| American goldfinch | X | |
| *American kestrel* | X | |
| American robin | X | X |
| Bald eagle [3,4,6] | X | X |
| Band-tailed pigeon [4] | X | |
| *Bank swallow* | X | |
| Barn swallow | X | |
| Barred owl[8] | X | |
| Belted kingfisher | X | X |
| Bewick's wren | X | X |
| Black-capped chickadee | X | X |
| Black-headed grosbeak | X | |
| Black-throated gray warbler | X | |
| Blue-winged teal | | |
| Brewer's blackbird | X | |
| Brown creeper[8] | X | X |
| Brown-headed cowbird | X | |
| Bushtit | X | |
| California quail | | |
| Canada goose | X | X |
| Cedar waxwing | X | X |
| Chestnut-backed chickadee[8] | X | X |
| Cinnamon teal | | |
| Cliff swallow | X | |
| Common barn-owl | X | |

| PREDICTED SPECIES Note: Species observed but not predicted are italicized | Bioblitz 2006 Survey | Bioblitz 2007 Survey |
|---|---|---|
| **BIRDS (Cont'd)** | | |
| Common merganser | X | X |
| Common nighthawk | X | |
| Common raven | X | |
| Common snipe | | |
| Common yellowthroat | X | |
| Cooper's hawk [2] | X | |
| Dark-eyed junco[8] | X | X |
| Downy woodpecker | X | X |
| European starling[7] | X | |
| Evening grosbeak | X | |
| Gadwall | | |
| Glaucous-winged gull[8] | | X |
| Golden-crowned kinglet[8] | X | |
| Great blue heron [3,4,6] | X | X |
| Great horned owl | | |
| Green heron (Green-backed) [3] | X | X |
| Green-winged teal | | |
| Hairy woodpecker[8] | X | |
| Hooded merganser [4] | | |
| House finch | X | |
| House sparrow[7] | X | |
| House wren | | |
| Hutton's vireo | X | |
| Killdeer | X | |
| Lazuli bunting | X | |
| Macgillivray's warbler | X | |
| Mallard | X | X |
| Marsh wren | X | |
| Mourning dove[8] | X | |
| Northern flicker | X | X |
| Northern harrier | | |
| Northern oriole | | |
| Northern rough-winged swallow | X | |
| Northern shoveler | | |
| Olive-sided flycatcher [3] | X | |
| Osprey [3] | | X |
| Pacific slope flycatcher (Western) | X | |
| Pied-billed grebe [4] | | |
| Pileated woodpecker[6,8] | X | X |

## TABLE 1 - PREDICTED AND CONFIRMED WILDLIFE AND FISH SPECIES

| PREDICTED SPECIES Note: Species observed but not predicted are italicized | Bioblitz 2006 Survey | Bioblitz 2007 Survey |
|---|---|---|
| **BIRDS (Cont'd)** | | |
| Pine siskin[8] | X | |
| Purple finch | X | |
| Red-breasted nuthatch[8] | X | X |
| Red-breasted sapsucker | X | X |
| Red-eyed vireo | X | |
| Red-tailed hawk | X | X |
| Red-winged blackbird | X | X |
| Rock dove | X | |
| Ruddy duck | | |
| Ruffed grouse | | |
| Rufous hummingbird | X | X |
| Savannah sparrow | X | X |
| Song sparrow | X | X |
| Sora | | |
| Spotted sandpiper [4] | X | |
| Spotted towhee (Rufous-sided) | X | X |
| Steller's jay | X | |
| Swainson's thrush | X | |
| Townsend's warbler[8] | | X |
| Tree swallow | X | X |
| Turkey vulture[3] | X | X |
| Vaux's swift [3,4,6] | X | |
| Violet-green swallow | X | X |
| Warbling vireo | X | |
| *Western meadowlark* | X | |
| Western screech-owl | | X |
| Western tanager[8] | X | |
| Western wood-pewee | X | |
| White-crowned sparrow | X | X |
| Willow flycatcher [3] | X | X |
| Wilson's warbler | X | |
| Winter wren[8] | X | X |
| Wood duck [4] | X | |
| Yellow warbler[2] | X | X |
| Yellow-rumped warbler[8] | X | X |

| PREDICTED SPECIES Note: Species observed but not predicted are italicized | Bioblitz 2006 Survey | Bioblitz 2007 Survey |
|---|---|---|
| **MAMMALS** | | |
| Beaver | X | X |
| Big brown bat [4] | X | |
| Black bear | | |
| Black rat[7] | | |
| Black-tailed deer [4] | X | X |
| Bobcat | X | |
| California myotis [4] | X | |
| Coast mole | | X |
| Coyote | X | X |
| Creeping vole | | |
| Deer mouse | X | X |
| Douglas squirrel | X | |
| Dusky (Montane) shrew | | |
| Eastern cottontail[7] | X | X |
| Eastern gray squirrel[7] | X | X |
| Elk[8] | X | |
| Ermine | | |
| Fisher [2,3,4] | | |
| Hoary bat | X | |
| Little brown myotis [4] | X | |
| Long-eared myotis [3,4] | | |
| Long-legged myotis [3,4] | | |
| Long-tailed (Forest) deer mouse | X | |
| Long-tailed vole | | |
| Long-tailed weasel | X | |
| Mink [4] | | X |
| Mole spp. | X | |
| Mountain beaver | X | |
| Mountain lion [7] | X | |
| Muskrat | X | X |
| Northern flying squirrel | | |
| Norway rat[7] | X | X |
| Nutria[7] | X | |
| Pacific jumping mouse | X | |
| Pacific water shrew [3] | | |
| Porcupine | | |

# TABLE 1 - PREDICTED AND CONFIRMED WILDLIFE AND FISH SPECIES

| PREDICTED SPECIES Note: Species observed but not predicted are italicized | Bioblitz 2006 Survey | Bioblitz 2007 Survey |
|---|---|---|
| **MAMMALS (Cont'd)** | | |
| Raccoon | X | X |
| Red fox | | |
| River otter | X | X |
| Shrew-mole | | |
| Shrew spp. | X | |
| Silver-haired bat [2] | | |
| Southern red-backed vole | | |
| Spotted skunk | | |
| Striped skunk | | |
| Townsend's big-eared bat [2,3,4] | | |
| Townsend's chipmunk[8] | X | |
| Townsend's mole | | X |
| Townsend's vole | X | |
| Vagrant shrew | | |
| Virginia opossum[7] | X | X |
| Vole spp. | X | |
| Yuma myotis [3,4] | X | |
| **REPTILES** | | |
| Common garter snake [1] | X | X |
| *Northwestern garter snake* | X | |
| Northern alligator lizard | X | X |
| Painted turtle | | |
| Rubber boa | | |
| Western terrestrial garter snake | X | |
| **FISH** | | |
| *Prickly sculpin* | X | |
| *Sculpin spp.* | X | |
| *Speckled dace* | X | |
| *Western brook lamprey* | X | |

*Footnote:*

(1) - Trigger Species - Species that needed additional mapped land cover units to ensure representation within the network

(2) - At-Risk - Washington Gap Analysis Project (WAGAP) selected species considered to be most as risk of continued or future population declines due to human activities

(3) - Listed (State or Federal) - Species listed as State endangered, threatened, sensitive, candidate or monitor, as well as species listed or proposed for listing by the U.S. Fish and Wildlife Service

(4) - PHS - a species defined as priority under the WDFW Priority Habitats and Species (PHS) Program

(5) - Included based on species significance under the WDFW PHS/Heritage database, although not predicted to occur

(6) - Included in the Washington Comprehensive Wildlife Conservation Strategy list

(7) - Current supporting location data

(8) - Washington Comprehensive Wildlife Conservation Strategy (2005) species recommended for monitoring

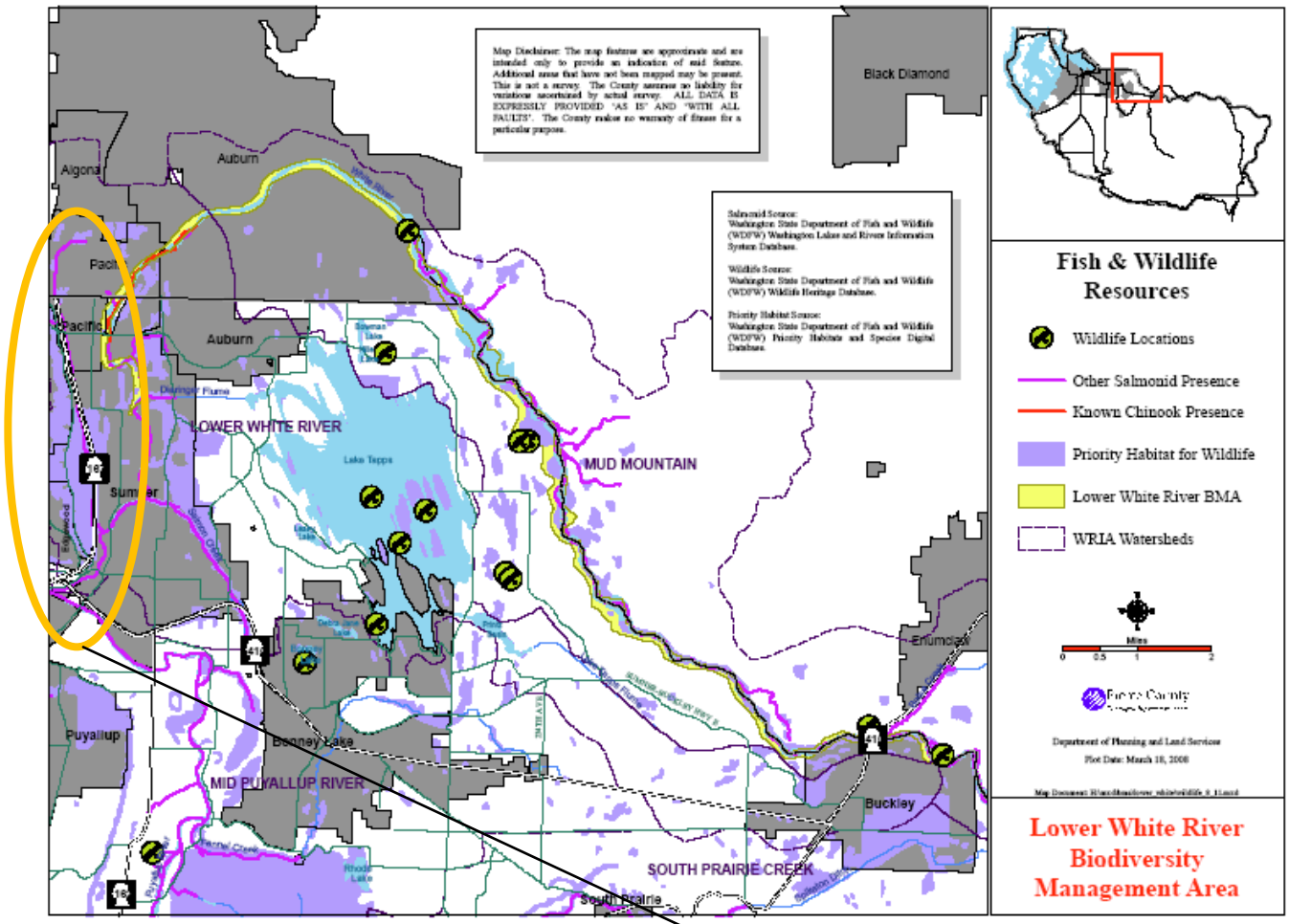
Confirmed Fish and Wildlife Species and Habitats

The WDFW Heritage data indicates point locations within the BMA for the following species: Bald Eagle (FT, ST), Great Blue Heron (SM), Vaux's Swift (SC), and Western Brook Lamprey (FCo). The WDFW Priority Habitat of Species (PHS) data designates this area as priority habitat for fish resources and small waterfowl. The Pierce County fish presence maps identify several anadromous fish species within the rivers and stream systems in this BMA including Chinook (FT, SC), Chum, Coho, Pink, and Steelhead.

The King County Wildlife Habitat Network, mapped in the County's Comprehensive Plan, runs through the BMA. The Wildlife Habitat Network is protected in the King County Critical Areas Ordinance as a Wildlife Habitat Conservation Area (WHCA). Other WHCAs include the nest and designated buffer areas around the nest of certain species, including Bald Eagle, Osprey, Red-tailed Hawk, and Great Blue Heron. Although the White River Hatchery nest has not been surveyed since 2002, there have been uncon-firmed reports of a new nest location in that area. On the Pierce County side of the BMA, there are multiple locations of Osprey, Bald Eagle and Great Blue Heron nests near the river and they use the river and Lake Tapps as forage habitat. (Figure 8).

Figure 8 – Bald Eagle, Osprey, Great Blue Heron nest sites

During the bioblitz event of June 2006, a variety of species were identified and confirmed within the Lower White River BMA within Pierce County (Table 1 – Predicted and Confirmed Wildlife and Fish Species). Confirmed terrestrial vertebrate species in the Lower White River BMA include 8 amphibian species, 80 bird species, 30 mammal species, and 4 reptile species. Additional species from each group were confirmed during the follow-up bioblitz in June 2007. A confirmed cougar sighting was reported by the Muckleshoot Tribal biologist within the BMA, although he was not involved in the bioblitz.



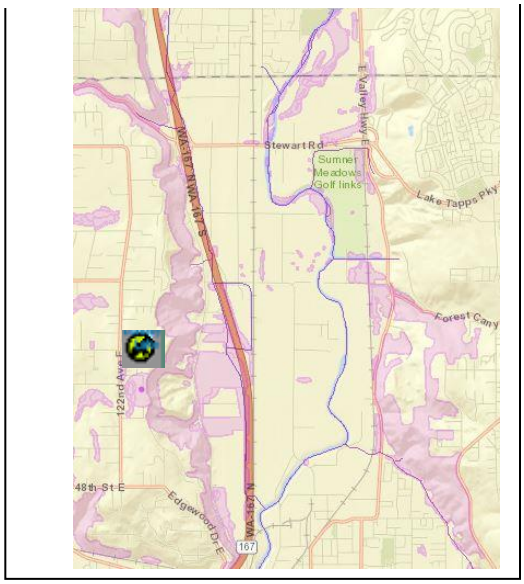




Figure 9. Fish and Wildlife Resources Map

The White River is identified as riparian habitat according to WDFW Priority Habitat and Species Program, and also medium quality riparian salmon habitat. Fall Chinook salmon (FT, SC), Spring Chinook salmon, Coho salmon, Fall Chum salmon, Pink salmon, Sockeye salmon, Bull trout (FT, SC), and Winter Steelhead (FT) fish species have been verified and/or known to occur in the stretch of the White River contained within the LWR BMA[11]. In addition, the draft White River Basin Plan[6] includes anadromous runs of Steelhead and coastal Cutthroat trout. Resident coastal Cutthroat trout and Bull trout also are present. Fall-run Chinook, Chum, and Pink salmon spawning occurs primarily below the diversion dam; Steelhead trout and spring-run Chinook salmon primarily spawn above Mud Mountain Dam, outside of the BMA. Coho salmon and coastal Cutthroat trout spawn and rear primarily in tributary streams throughout the basin. Bull trout

[11] Salmon and Steelhead Habitat Inventory and Assessment Program, http://nwifc.org/about-us/habitat/sshiap/)

spawning occurs only in snowmelt-fed tributaries in the upper White River Basin above Mud Mountain Dam. The Muckleshoot Indian Tribe operates the White River Hatchery and the Puyallup Tribe operates four spring Chinook acclimation ponds located in the upper White River basin.

Confirmed Invertebrate Species

There are 27 confirmed butterfly species[12] within the Lower White River BMA. The following four butterflies are state-listed: Hydaspe Fritillary (SM), Juba Skipper (SM), Purplish Copper (SM), and Sonora Skipper (SM). The remaining butterfly species include: Anise Swallowtail. Cabbage White, Clodius Parnassian, Echo Blue, Large Wood Nymph, Lorquin's Admiral, Monarch, Mustard White, Mylitta Crescent, Orange Sulphur, Pale Tiger Swallowtail, Pine White, Red Admiral, Ringlet, Sara Orange Tip, Satyr Anglewing, Silvery Blue, Two Banded Checkered Skipper, Western Brown Elfin, Western Meadow Fritillary, Western Tailed Blue, Western Tiger Swallowtail, and Woodland Skipper.

The health of an aquatic ecosystem depends on the health of all its biological components, not just commercially or culturally important species such as salmon. Fish species are supported by the phytoplankton, zooplankton, insects, plants, bacteria, and fungi also inhabiting the waterway.

*Benthic* (bottom dwelling) invertebrates are effective indicators of the health of watercourses and watersheds. The term "benthic invertebrates" include animals such as aquatic insects (mayflies and stoneflies), snails, clams, crayfish, and aquatic worms. These species represent a diversity of morphological, ecological, and behavioral adaptations to surrounding natural environments (i.e. they have co-evolved with their surrounding ecosystems to preferred locations)[13]. Many factors can affect the types of benthic invertebrates in a system including riparian conditions, thermal regimes, discharge patterns, light penetration, channel gradients, sediment conditions, water, sediment chemistry, and channel stability which is linked to the quantity and size of large woody debris (LWD). Each location along the watercourse continuum will contain a variety of habitats, such as riffles, pools, sloughs, bars, and backwaters, which differ in respect to substrate type and stability, current velocity, and water depth. Each location in the watercourse has a range of natural conditions that, when coupled with environmental requirements of the invertebrate species, determine whether a given organism can live in a particular habitat at a particular point.

These patterns of species distribution are affected by

- events that alter the landscape (e.g. wild fires, logging, earthquakes, agriculture, volcanic eruptions, and urbanization) or
- modify hydrologic conditions (changes in evapotranspiration and runoff or construction of reservoirs and irrigation diversions);
- actions that modify habitats (e.g., snagging operations, channel dredging, sedimentation); and
- inadvertent conditions that add toxic chemicals or that elevate nutrient or organic loads.

Organisms vary in their tolerance of degradation caused by human actions: some require clean, clear water while others occupy a wide range of conditions (i.e. generally tolerant of the effects caused by human alterations) [14]. As the natural environment is altered by human activities, changes start to occur in the type of benthic invertebrate species that inhabit a waterway Those less tolerant to human alterations

[12] Washington State Butterfly Atlas

[13] Cuffney, T.F., Gurtz, M.E., and Meador, M.R., 1993, Methods for collecting benthic invertebrate samples as part of the National Water-Quality Assessment Program: U.S. Geological Survey Open-File Report 93-406, 66 p.

[14] "Restoring Life in Running Waters," James R. Karr and Ellen W. Chu, 1998 and "Biological Assessment: Using Biology to Measure the Health of Watersheds," James R. Karr.

begin to disappear and others that are more tolerant appear more abundantly or replace other species altogether. Some of the more tolerant species can be vectors for disease. In an effort to understand the health of a particular waterway (e.g. creek, stream, river) benthic invertebrate samples are collected at various intervals along the reach to assess the quality of the system. Species are typically categorized in groups including:

- Group 1 - those organisms which are generally pollution intolerant and signify excellent to good water quality including riffle beetle, stonefly, caddisfly, mayfly, and snail;
- Group 2 – those organisms that exist in a wide range of water quality conditions including cranefly, dragonfly, crayfish, sowbug, filtering caddisfly, blackfly, scud, and dobsonfly; and
- Group 3 – those organisms that are generally tolerant of pollution and whose presence generally indicates fair to poor water quality conditions including midge, pouch snail, and aquatic worm.

During the bioblitz event of June 2006, 98 terrestrial and 16 benthic invertebrate species were recorded. Eleven of the terrestrial invertebrates were non-native. Ten more terrestrial species were identified in the April 2007 bioblitz (see Table 2). The benthic sample size was too small to assess the overall water quality of the Lower White River, however it was also found to support at least some taxa that are relatively intolerant to pollution. This indicates that general water quality in the river is relatively good.

**TABLE 2 - CONFIRMED TERRESTRIAL AND AQUATIC INVERTEBRATES FOR THE LOWER WHITE RIVER BMA**

| | Order | Family | Genus/Species | Common |
|---|---|---|---|---|
| Ants | Hymenoptera | Formicidae | *sp. 1* | Moss Ant |
| Bees | Hymenoptera | Apidae | *Bombus sp.* | |
| Beetles | Coleoptera | Carabidae | *Carabus nemoralis* | Carabid Beetle |
| Beetles | Coleoptera | Carabidae | *Cicindela oregano* | Tiger Beetle |
| Beetles | Coleoptera | Carabidae | *Harpalini sp.* | Black Ground Beetle |
| Beetles | Coleoptera | Carabidae | *Nubius sp.* | |
| Beetles | Coleoptera | Carabidae | *Scaphinopus sp.* | Small Slug Killer |
| Beetles | Coleoptera | Chrysomelidae | *Altica ambiens* | Alder Flea Beetle |
| Beetles | Coleoptera | | *Cicindela depressula* | Ground Beetle |
| Beetles | Coleoptera | | *Scaphinotus angusticollis* | Ground Beetle |
| Beetles | Coleoptera | | *Cychrus tuberculatus* | Ground Beetle |
| Beetles | Coleoptera | | *Nebria piperi* | Ground Beetle |
| Beetles | Coleoptera | | *Nebria eschscholtsii* | Ground Beetle |
| Beetles | Coleoptera | | *Nebria gyenhali* | Ground Beetle |
| Beetles | Coleoptera | | *Nebria crassicornis* | Ground Beetle |
| Beetles | Coleoptera | | *Diplous aterrimus* | Ground Beetle |
| Beetles | Coleoptera | | *Loricara decimpucatata* | Ground Beetle |
| Beetles | Coleoptera | | *Harpalus carbonatus* | Ground Beetle |
| Beetles | Coleoptera | | *Harpalus seclusus* | Ground Beetle |
| Beetles | Coleoptera | | *Harpalus affinis* | Ground Beetle |
| Beetles | Coleoptera | | *Pterostichis algidus* | Ground Beetle |
| Beetles | Coleoptera | | *Pterostichus creniculus* | Ground Beetle |
| Beetles | Coleoptera | | *Pterostichus herculeanus* | Ground Beetle |
| Beetles | Coleoptera | | *Bembidion platinoides* | Ground Beetle |
| Beetles | Coleoptera | | *Acupalpus* | Ground Beetle |
| Beetles | Coleoptera | | *Trechus obtusus* | Ground Beetle |
| Beetles | Coleoptera | | *Tachys* | Ground Beetle |
| Beetles | Staphylidae | Osoriinae | | Rove Beetle |
| Butterflies/Moths | Lepidoptera | Arctiidae | *Tyria jacobaeae* | Cinnabar Moth |
| Caddisflies | Trichoptera | Brachycentusidae | *Brachycentridae* | |
| Caddisflies | Trichoptera | | *Rhyacophila* | Caddisfly |
| Caddisflies | Trichoptera | | *Lepidostoma* | |
| Centipede | Myriopoda | Lithobiidae | *sp. 1* | Centipede |
| Crustacean | Crustacea | Ligiidae | *Ligidium gracile* | Isopod |
| Dragonflies | Odonata | Libellulidae | *Libellula forensis* | Eight Spotted Skimmer |
| Flies | Diptera | Chironomidae | *Chironomidae* | |
| Flies | Diptera | Simuliidae | *Simuliidae* | |
| Flies | Diptera | Tipulidae | *Tipula* | |
| Flies | Diptera | | *Chelifera* | |
| Leafhoppers | Hemiptera | | | Tree Hopper |
| Mayflies | Ephemeroptera | Baetidae | *Baetis tricaudatus* | |
| Mayflies | Ephemeroptera | Heptageniidae | *Cinygmula* | |
| Mayflies | Ephemeroptera | | *Ephemerellidae* | |
| Mayflies | Ephemeroptera | | *Ameletus* | |
| Mayflies | Ephemeroptera | | *Caudatella hystrix* | |
| Mayflies | Ephemeroptera | | *Epeorus longimanus* | |

**TABLE 2 - CONFIRMED TERRESTRIAL AND AQUATIC INVERTEBRATES FOR THE LOWER WHITE RIVER BMA**

| | Order | Family | Genus/Species | Common |
|---|---|---|---|---|
| Millipedes | Diplopoda | Parajulidae | *sp. 1* | Millipede |
| Millipedes | Diplopoda | Parajulidae | *sp. 2* | Millipede |
| Mollusks | Gastropoda | Arionidae | *Arion ater* | European Black Slug |
| Mollusks | Gastropoda | Pupillidae | | Minute snail |
| Mollusks | Gastropoda | Sminthuridae | *sp. 1* | Snail |
| Sawflies | Hymenoptera | | | Wood Sawfly |
| Snails & Slugs | Gastropoda | Agriolimacidae | *Deroceras reticulaturm* | Grey Field Slug |
| Snails & Slugs | Gastropoda | Arionidae | *Ariolimax columbianus* | Pacific Banana Slug |
| Snails & Slugs | Gastropoda | Arionidae | *Arion intermedius* | Hedgehog Arion |
| Snails & Slugs | Gastropoda | Arionidae | *Arion rufus* | Chocolate Arion |
| Snails & Slugs | Gastropoda | Arionidae | *Arion subfuscus* | |
| Snails & Slugs | Gastropoda | Arionidae | *Prophysaon vanattae* | Scarletback Tailchropper |
| Snails & Slugs | Gastropoda | Bradybaenidae | *Monadenia fidelis* | Pacific Sideband |
| Snails & Slugs | Gastropoda | Corychiidae | *Carychium occidentale* | Western Thorn |
| Snails & Slugs | Gastropoda | Daubebariidae | *Oxychilus alliarius* | Garlic Glass-snail |
| Snails & Slugs | Gastropoda | Euconulidae | *Euconulus fulvus* | Brown Hive |
| Snails & Slugs | Gastropoda | Gastrodontidae | *Striatura pugentensis* | Northwest Striate |
| Snails & Slugs | Gastropoda | Haplotrematidae | *Ancotrema sportella* | Beaded Lancetooth |
| Snails & Slugs | Gastropoda | Haplotrematidae | *Haplotrtema vancouverense* | Robust Lancetooth |
| Snails & Slugs | Gastropoda | Helicidae | *Cepaea nemoralis* | Grow Snail |
| Snails & Slugs | Gastropoda | Helicidae | *Cornu aspersum* | Grown Garden Snail |
| Snails & Slugs | Gastropoda | Limacidae | *Limax maximus* | Giant Garden Slug |
| Snails & Slugs | Gastropoda | Polygyridae | *Allogona townsendiana* | Oregon Forest Snail |
| Snails & Slugs | Gastropoda | Polygyridae | *Cryptomastix devia* | Puget Oregonian |
| Snails & Slugs | Gastropoda | Polygyridae | *Cryptomastix germana* | Pygmy Oregonian |
| Snails & Slugs | Gastropoda | Polygyridae | *Vespericola columbianus* | Northwest Hesperian |
| Snails & Slugs | Gastropoda | Pristilomatidae | *Pristiloma stearnsii* | Striate Tightcoil |
| Snails & Slugs | Gastropoda | Vertiginidae | *Columella edentula* | Toothless Column |
| Snakeflies | Raphidioptera | | *sp. 1* | Snakefly |
| Spiders | Araneae | Agelenidae | *Agelenopsis sp. 1* | Funnel web spiders |
| Spiders | Araneae | Agelenidae | *Calymmaria sp. 1* | Funnel web spiders |
| Spiders | Araneae | Agelenidae | *Cicurina pusilla* | Funnel web spiders |
| Spiders | Araneae | Agelenidae | *Cicurina sp. 1* | Funnel web spiders |
| Spiders | Araneae | Agelenidae | *Cryphoeca exlineae* | Funnel web spiders |
| Spiders | Araneae | Agelenidae | *Cybaeus sp.* | Funnel web spiders |
| Spiders | Araneae | Amaurobiidae | *Callobius pictus* | Spider |
| Spiders | Araneae | Amaurobiidae | *Callobius sp. 1* | Spider |
| Spiders | Araneae | Araneidae | *Araneus sp. 1* | |
| Spiders | Araneae | Araneidae | *Cyclosa conica* | |
| Spiders | Araneae | Clubionidae | *Clubiona sp. 1* | |
| Spiders | Araneae | Clubionidae | *Phruotimpus borealis* | |
| Spiders | Araneae | Dictynidae | *Dictyna sp. 1* | Spider |
| Spiders | Araneae | Gnaphosidae | *Zelotes fratris* | Ground spiders |
| Spiders | Araneae | Hahniidae | *Hahnia cinerea* | Dwarf sheet spider |
| Spiders | Opiliones | Ischyropsalididae | *Hesperonemastoma modestum* | Harvestmen |
| Spiders | Opiliones | Ischyropsalididae | *Sabacon occidentalis* | Harvestmen |

| TABLE 2 - CONFIRMED TERRESTRIAL AND AQUATIC INVERTEBRATES FOR THE LOWER WHITE RIVER BMA | | | | |
|---|---|---|---|---|
| | **Order** | **Family** | **Genus/Species** | **Common** |
| Spiders | Araneae | Linyphiidae | *Ceratinella sp. 1* | Sheeweb weavers |
| Spiders | Araneae | Linyphiidae | *Entelecara acuminata* | Sheeweb weavers |
| Spiders | Araneae | Linyphiidae | *Lepthyphantes zibus* | Sheeweb weavers |
| Spiders | Araneae | Linyphiidae | *Neriene litigiosa* | Sheeweb weavers |
| Spiders | Araneae | Linyphiidae | *Wubana pacifica* | Sheeweb weavers |
| Spiders | Araneae | Lycosiadae | *Pardosa dosuncata* | Wolf spiders |
| Spiders | Araneae | Lycosiadae | *Pardosa vancouveri* | Wolf spiders |
| Spiders | Araneae | Lycosiadae | *Tarentula kochii* | Wolf spiders |
| Spiders | Opiliones | Phalangiidae | *Leptobunus sp. 1* | Harvestmen |
| Spiders | Opiliones | Phalangiidae | *Paraplatybunus triangularis* | Harvestmen |
| Spiders | Araneae | Salticidae | *Calticus scenicus* | |
| Spiders | Araneae | Salticidae | *Evarcha proszynskii* | |
| Spiders | Araneae | Salticidae | *Neon reticulatus* | |
| Spiders | Araneae | Salticidae | *Phanias albeolus* | Jumping spiders |
| Spiders | Araneae | Tetragnathidae | *Metellina curtisi* | |
| Spiders | Araneae | Tetragnathidae | *Tetragnatha laboriosa* | |
| Spiders | Araneae | Theridiidae | *Enoplognatha ovata* | |
| Spiders | Araneae | Theridiidae | *Theridion bimaculatum* | |
| Spiders | Araneae | Theridiidae | *Theridion sexpunctatum* | |
| Spiders | Araneae | Theridiidae | *Theridion simile* | |
| Spiders | Araneae | Theridiidae | *Theridion tinctum* | |
| Spiders | Araneae | Theridiidae | *Theridion varians* | |
| Spiders | Araneae | Thomisidae | *Misumena vatia* | Crab spiders |
| Spiders | Araneae | Thomisidae | *Ozyptila pacifica* | Crab spiders |
| Spiders | Araneae | Thomisidae | *Philodromus dispar* | Crab spiders |
| Spiders | Araneae | Thomisidae | *Philodromus josemitensis* | Crab spiders |
| Spiders | Araneae | Thomisidae | *Xysticus pretiosus* | Crab spiders |
| Stoneflies | Plecoptera | Chloroperlidae | *Sweltsa* | |
| True bugs | Hemiptera | | | True bug |
| True bugs | Heteroptera | Miridae | | Plant bug |
| Worms | Oligochaeta | | *sp. 1* | |
| Worms | Oligochaeta | | | Earth worms |

## Confirmed Plant Species

During the bioblitz event of June 2006, plant specialists collected a variety of native and introduced plant species within the Lower White River BMA. A complete listing of 184 native plants is detailed in Table 3. Table 4 provides a list of 98 non-native/introduced plant species.

| TABLE 3 - 2006, 2007 LOWER WHITE RIVER BIOBLITZ PLANT INVENTORY | | |
|---|---|---|
| **Common name** | **Scientific name** | **Plant family** |
| Big-leaf maple | *Acer macrophyllum* | Aceraceae |
| Vine maple | *Acer circinatum* | Aceraceae |
| American waterplantain | *Alisma plantago-aquatica* | Alismataceae |
| Cow parsnip | *Heracleum lanatum* | Apiaceae |
| Sweet cicely | *Osmorhiza chilensis* | Apiaceae |
| Water parsley | *Oenanthe sarmentosa* | Apiaceae |
| Western sweet-cicely | *Osmorhiza occidentalis* | Apiaceae |
| Devil's club | *Oplopanax horridum* | Araliaceae |
| Wild ginger | *Asarum caudatum* | Aristolochiaceae |
| Coltsfoot | *Petasites frigidus* | Asteraceae |
| Composite sp. | *Composite sp.* | Asteraceae |
| Douglas' sagewort | *Artemesia douglasiana* | Asteraceae |
| Hawksbeard sp. | *Crepis sp.* | Asteraceae |
| Pearly everlasting | *Anaphalis margaritacea* | Asteraceae |
| Suksdorf's sagewort | *Artemesia suksdorfii* | Asteraceae |
| White-flowered hawkweed | *Hieracium albiflorum* | Asteraceae |
| Yarrow | *Achillea millifolium* | Asteraceae |
| Cascade Oregongrape | *Berberis nervosa* | Berberidaceae |
| Tall Oregongrape | *Berberis aquifolium* | Berberidaceae |
| Vanilla leaf | *Achlys triphylla* | Berberidaceae |
| Hazelnut | *Corylus cornuta* | Betulaceae |
| Red alder | *Alnus rubra* | Betulaceae |
| Forget-me-not | *Myosotis sylvatica* | Boraginaceae |
| Small-flowered forget-me-not | *Myosotis laxa* | Boraginaceae |
| American wintercress | *Barbarea orthoceras* | Brassicaceae |
| Bittercress | *Cardamine sp.* | Brassicaceae |
| Field pepperweed | *Lepidium campestre* | Brassicaceae |
| Little Western bittercress | *Cardamine hirsuta* | Brassicaceae |
| Spring beauty | *Cardamine pulcherrima* | Brassicaceae |
| Spring whitlow-grass | *Draba verna* | Brassicaceae |
| Butterflybush | *Buddleja davidsonii* | Buddlejaceae |
| Different-leaved water-starwort | *Callitriche heterophylla* | Callitrichaceae |
| Pond water-starwort | *Callitriche stagnalis* | Callitrichaceae |
| Common snowberry | *Symphoricarpos albus* | Caprifoliaceae |
| Creeping snowberry | *Symphoricarpos mollis* | Caprifoliaceae |
| Orange honeysuckle | *Lonicera ciliosa* | Caprifoliaceae |
| Red elderberry | *Sambucus racemosa* | Caprifoliaceae |
| Twinberry | *Lonicera involucrata* | Caprifoliaceae |
| Twinflower | *Linnaea borealis* | Caprifoliaceae |
| Crisped starwort | *Stellaria crispa* | Caryophyllaceae |
| Munchkin chickweed | *Moenchia erecta (Kozloff)* | Caryophyllaceae |
| Northern starwort | *Stellaria calycantha* | Caryophyllaceae |
| Pacific dogwood | *Cornus nuttallii* | Cornaceae |
| Red-osier dogwood | *Cornus stolonifera* | Cornaceae |
| Pacific stonecrop | *Sedum divergens* | Crassulaceae |
| Spearleaf stonecrop | *Sedum lanceolatum* | Crassulaceae |
| Western red cedar | *Thuja plicata* | Cupressaceae |
| Dewey's sedge | *Carex deweyana* | Cyperaceae |
| Henderson's sedge | *Carex hendersonii* | Cyperaceae |

| TABLE 3 - 2006, 2007 LOWER WHITE RIVER BIOBLITZ PLANT INVENTORY | | |
|---|---|---|
| **Common name** | **Scientific name** | **Plant family** |
| Sawbeak sedge | *Carex stipata* | Cyperaceae |
| Sedge | *Carex sp.* | Cyperaceae |
| Slough sedge | *Carex obnupta* | Cyperaceae |
| Small-flowered bulrush | *Scirpus microcarpus* | Cyperaceae |
| Woolgrass | *Scirpus cyperinus* | Cyperaceae |
| Common horsetail | *Equisetum arvense* | Equisetaceae |
| Giant horsetail | *Equisetum telmateia* | Equisetaceae |
| Scouring rush | *Equisetum hyemale* | Equisetaceae |
| Water horsetail | *Equisetum fluviatile* | Equisetaceae |
| Bearberry | *Arctostaphylos uva-ursi* | Ericaceae |
| Pacific madrone | *Arbutus menziesii* | Ericaceae |
| Pink wintergreen | *Pyrola asarifolia* | Ericaceae |
| Red huckleberry | *Vaccinium parvifolium* | Ericaceae |
| Salal | *Gaultheria shallon* | Ericaceae |
| Single-flowered indian pipe | *Monotropa uniflora* | Ericaceae |
| American vetch | *Vicia americana* | Fabaceae |
| Clover | *Trifolium sp.* | Fabaceae |
| Miniature lotus | *Lotus micranthus* | Fabaceae |
| Tiny vetch | *Vicia tetrasperma* | Fabaceae |
| Two-color lupine | *Lupinus bicolor* | Fabaceae |
| Vetch sp. | *Vicia sp.* | Fabaceae |
| Black oak | *Quercus sp.* | Fagaceae |
| Bleeding heart | *Dicentra formosa* | Fumariaceae |
| Western corydalis | *Corydalis scouleri* | Fumariaceae |
| Coast black gooseberry | *Ribes divaricatum* | Grossulariaceae |
| Gummy gooseberry | *Ribes lobbii* | Grossulariaceae |
| Prickly currant | *Ribes lacustre* | Grossulariaceae |
| Red-flowered currant | *Ribes sanguinium* | Grossulariaceae |
| Mock-orange | *Philadelphus lewisii* | Hydrangeaceae |
| Pacific waterleaf | *Hydrophyllum tenuipes* | Hydrophyllaceae |
| Small-flowered nemophila | *Nemophila parviflora* | Hydrophyllaceae |
| Daggerleaf rush | *Juncus ensifolius* | Juncaceae |
| Field woodrush | *Luzula campestris* | Juncaceae |
| Rush sp. | *Juncus sp.* | Juncaceae |
| Slender rush | *Juncus tenuis* | Juncaceae |
| Small-flowered woodrush | *Luzula parviflora* | Juncaceae |
| Soft rush | *Juncus effusus* | Juncaceae |
| Cooley's hedge-nettle | *Stachys cooleyae* | Lamiaceae |
| Hedge nettle | *Stachys sp.* | Lamiaceae |
| Self-heal | *Prunella vulgaris* | Lamiaceae |
| Great duckweed | *Spirodela polyrhiza* | Lemnaceae |
| Water lentil | *Lemna minor* | Lemnaceae |
| Clasping-leaved twisted-stalk | *Streptopus amplexifolius* | Liliaceae |
| False lily-of-the-valley | *Maianthemum dilatatum* | Liliaceae |
| False Solomon's seal | *Smilacina racemosa* | Liliaceae |
| Hooker fairy-bell | *Disporum hookeri* | Liliaceae |
| Star-flowered Solomon's seal | *Smilacina stellata* | Liliaceae |

| TABLE 3 - 2006, 2007 LOWER WHITE RIVER BIOBLITZ PLANT INVENTORY | | |
|---|---|---|
| **Common name** | **Scientific name** | **Plant family** |
| White trillium | *Trillium ovatum* | Liliaceae |
| Oregon ash | *Fraxinus latifolia* | Oleaceae |
| Privet sp. | *Liquistrium sp.* | Oleaceae |
| Enchanter's nightshade | *Circaea alpina* | Onagraceae |
| Evening primrose | *Oenothera biennis* | Onagraceae |
| Fireweed | *Epilobium angustifolium* | Onagraceae |
| Rattlesnake-plantain | *Goodyera oblongifolia* | Orchidaceae |
| Oregon oxalis | *Oxalis oregana* | Oxalidaceae |
| California poppy | *Eschcholzia californica* | Papaveraceae |
| 2 needle pine | *Pinus sp.* | Pinaceae |
| Douglas fir | *Pseudotsuga menziesii* | Pinaceae |
| Grand fir | *Abies grandis* | Pinaceae |
| Lodgepole pine | *Pinus contorta* | Pinaceae |
| Sitka spruce | *Picea sitchensis* | Pinaceae |
| Western hemlock | *Tsuga heterophylla* | Pinaceae |
| Annual bluegrass | *Poa annua* | Poaceae |
| Blue wild rye | *Elymus glaucus* | Poaceae |
| Brome sp. | *Bromus sp.* | Poaceae |
| Common brome | *Bromus vulgaris* | Poaceae |
| Hairy brome | *Bromus commutatus* | Poaceae |
| Mannagrass | *Glyceria sp.* | Poaceae |
| Nodding trisetum | *Trisetum cernuum* | Poaceae |
| Northern mannagass | *Glyceria borealis* | Poaceae |
| Pacific brome | *Bromus pacificus* | Poaceae |
| Roughstalk bluegrass | *Poa trivialis* | Poaceae |
| Water foxtail | *Alopecurus geniculatus* | Poaceae |
| Western fescue | *Festuca occidentalis* | Poaceae |
| Bracken | *Pteridium aquilinum* | Polypodiaceae |
| Deer fern | *Blechnum spicant* | Polypodiaceae |
| Lady fern | *Athyrium filix-femina* | Polypodiaceae |
| Licorice fern | *Polypodium glycyrrhiza* | Polypodiaceae |
| Maidenhair fern | *Adiantum pedatum* | Polypodiaceae |
| Oak fern | *Gymnocarpium dryopteris* | Polypodiaceae |
| Spreading wood-fern | *Dryopteris austriaca* | Polypodiaceae |
| Sword fern | *Polystichum munitum* | Polypodiaceae |
| Candyflower | *Montia siberica* | Portulacaceae |
| Miner's lettuce | *Montia perfoliata* | Portulacaceae |
| Water chickweed | *Montia fontana* | Portulacaceae |
| | *Montia parvigez (Kozloff)* | Portulacaceae |
| Broadleaved starflower | *Trientalis latifolia* | Primulaceae |
| Baneberry | *Actaea rubra* | Ranunculaceae |
| Little buttercup | *Ranunculus uncinatus* | Ranunculaceae |
| Cascara | *Rhamnus purshiana* | Rhamnaceae |
| Baldhip rose | *Rosa gymnocarpa* | Rosaceae |
| Black hawthorn | *Crataegus douglasii* | Rosaceae |

| TABLE 3 - 2006, 2007 LOWER WHITE RIVER BIOBLITZ PLANT INVENTORY | | |
|---|---|---|
| **Common name** | **Scientific name** | **Plant family** |
| Blackcap | *Rubus leucodermis* | Rosaceae |
| Cherry | *Prunus sp.* | Rosaceae |
| Coastal strawberry | *Fragaria chiloensis* | Rosaceae |
| Field strawberry | *Fragaria virginiana* | Rosaceae |
| Goatsbeard | *Aruncus sylvester* | Rosaceae |
| Hardhack | *Spiraea douglasii* | Rosaceae |
| Indian plum | *Oemlaria cerasiformus* | Rosaceae |
| Large-leaved avens | *Geum macrophyllum* | Rosaceae |
| Nootka rose | *Rosa nutkana* | Rosaceae |
| Ocean spray | *Holodiscus discolor* | Rosaceae |
| Ornamental rose | *Rosa sp.* | Rosaceae |
| Pacific crabapple | *Malus fusca* | Rosaceae |
| Pacific ninebark | *Physocarpus capitatus* | Rosaceae |
| Pacific silverweed | *Potentilla pacifica* | Rosaceae |
| Pear | *Pyrus communis* | Rosaceae |
| Salmonberry | *Rubus spectabilus* | Rosaceae |
| Serviceberry | *Amelanchier alnifolia* | Rosaceae |
| Sour cherry | *Prunus cerasus* | Rosaceae |
| Thimbleberry | *Rubus parviflorus* | Rosaceae |
| Western lady's mantle | *Alchemilla occidentalis* | Rosaceae |
| Western lady's mantle | *Aphanes arvensis* | Rosaceae |
| Wild blackberry | *Rubus ursinus* | Rosaceae |
| Wild strawberry | *Fragaria vesca* | Rosaceae |
| Cleavers | *Galium aparine* | Rubiaceae |
| Fragrant bedstraw | *Galium triflorum* | Rubiaceae |
| Black cottonwood | *Populus trichocarpa* | Salicaceae |
| Hooker's willow | *Salix hookeriana* | Salicaceae |
| Pacific willow | *Salix lasiandra* | Salicaceae |
| Quaking aspen | *Populus tremuloides* | Salicaceae |
| Scouler willow | *Salix scouleriana* | Salicaceae |
| Sitka willow | *Salix sitchensis* | Salicaceae |
| Willow | *Salix sp.* | Salicaceae |
| Fringecup | *Tellima grandiflora* | Saxifragaceae |
| Leafy miterwort | *Mitella caulescens* | Saxifragaceae |
| Youth-on-age | *Tolmiea menziesii* | Saxifragaceae |
| American brooklime | *Veronica americana* | Scrophulariaceae |
| Purslane speedwell | *Veronica peregrina* | Scrophulariaceae |
| Thyme-leaf speedwell | *Veronica serpyllifolia* | Scrophulariaceae |
| Water speedwell | *Veronica anagallis-aquatica* | Scrophulariaceae |
| Black nightshade | *Solanum nigrum* | Solanaceae |
| Common cattail | *Typha latifolia* | Typhaceae |
| Stinging nettle | *Urtica dioica* | Urticaceae |
| Stream violet | *Viola glabella* | Violaceae |

| TABLE 4 - 2006, 2007 LOWER WHITE RIVER BIOBLITZ PLANT INVENTORY (* NON-NATIVE/INTRODUCED PLANTS) | | |
|---|---|---|
| **Common name** | **Scientific name** | **Plant family** |
| Sugar maple | *Acer saccharum** | Aceraceae |
| Daffodil | *Narcissus pseudonarcissus** | Amaryllidaceae |
| Chervil | *Anthriscus scandicina** | Apiaceae |
| Poison hemlock | *Conium maculatum** | Apiaceae |
| English holly | *Ilex aquifolium** | Aquifoliaceae |
| English ivy | *Hedera helix** | Araliaceae |
| Bull thistle | *Circium vulgare** | Asteraceae |
| Canada thistle | *Circium arvense** | Asteraceae |
| Common burdock | *Arctium minus** | Asteraceae |
| Common groundsel | *Senecio vulgaris** | Asteraceae |
| Common tansy | *Tanacetum vulgare** | Asteraceae |
| Dandelion | *Taraxacum officinale** | Asteraceae |
| European daisy | *Bellis perennis** | Asteraceae |
| Field sowthistle | *Sonchus arvensis** | Asteraceae |
| Hairy cat's-ear | *Hypochaeris radicata** | Asteraceae |
| Nipplewort | *Lapsana communis** | Asteraceae |
| Ox-eye daisy | *Chrysanthemum leucanthemum** | Asteraceae |
| Spotted knapweed | *Centaurea maculosa** | Asteraceae |
| Tansy ragwort | *Senecio jacobaea** | Asteraceae |
| Wall lettuce | *Lactuca muralis** | Asteraceae |
| Common forget-me-not | *Myosotis scorpioides** | Boraginaceae |
| Yellow & blue forget-me-not | *Myosotis discolor** | Boraginaceae |
| Common mustard | *Brassica campestris** | Brassicaceae |
| Hedge mustard | *Sisymbrium officinale** | Brassicaceae |
| Pepper weed | *Lepidium campestre** | Brassicaceae |
| Shepherd's purse | *Capsella bursa-pastoris** | Brassicaceae |
| Teesdalia | *Teesdalia nudicaulis** | Brassicaceae |
| Thale cress | *Arabidopsis thaliana** | Brassicaceae |
| Common chickweed | *Stellaria media** | Caryophyllaceae |
| Mouse-ear chickweed | *Cerastium vulgatum** | Caryophyllaceae |
| Sticky chickweed | *Cerastium viscosum** | Caryophyllaceae |
| Field morning-glory | *Convolvulus arvensis** | Convolvulaceae |
| Teasel | *Dipsacus sylvestris** | Dipsacaceae |
| Birdsfoot trefoil | *Lotus corniculatus** | Fabaceae |
| Black medic | *Medicago lupulina** | Fabaceae |
| Common vetch | *Vicia sativa** | Fabaceae |
| Cow vetch | *Vicia cracca** | Fabaceae |
| Everlasting peavine | *Lathyrus latifolius** | Fabaceae |
| Least hop clover | *Trifolium dubium** | Fabaceae |
| Red clover | *Trifolium pratense** | Fabaceae |
| Scot's broom | *Cytisus scoparius** | Fabaceae |
| Tiny vetch | *Vicia hirsuta** | Fabaceae |
| White clover | *Trifolium repens** | Fabaceae |
| White sweet-clover | *Melilotus alba** | Fabaceae |
| Cut-leaf geranium | *Geranium dissectum** | Geraniaceae |
| Dovefoot geranium | *Geranium molle** | Geraniaceae |
| Filaree | *Erodium cicutarium** | Geraniaceae |
| Stinky Bob | *Geranium robertianum** | Geraniaceae |

| TABLE 4 - 2006, 2007 LOWER WHITE RIVER BIOBLITZ PLANT INVENTORY (* NON-NATIVE/INTRODUCED PLANTS) | | |
|---|---|---|
| **Common name** | **Scientific name** | **Plant family** |
| Horse chestnut | *Aesculus hippocastaneum** | Hippocastanaceae |
| Klamath weed | *Hypericum perforatum** | Hypericaceae |
| Toad rush | *Juncus bufonius** | Juncaceae |
| Creeping Charlie | *Glecoma hederacea** | Lamiaceae |
| Red dead-nettle | *Lamium purpureum** | Lamiaceae |
| Grape hyacinth | *Muscari botryoides** | Liliaceae |
| Spanish squill | *Hyancinthoides hispanica** | Liliaceae |
| Hops | *Humulus lupulus** | Moraceae |
| Watson's willow-herb | *Epilobium cilatum** | Onagraceae |
| Watson's willow-herb | *Epilobium cilatum watsonii** | Onagraceae |
| Common plantain | *Plantago major** | Plantaginaceae |
| English plantain | *Plantago lanceolata** | Plantaginaceae |
| Barren fescue | *Festuca bromoides** | Poaceae |
| Bulbous bluegrass | *Poa bulbosa** | Poaceae |
| Common velvet grass | *Holcus lanatus** | Poaceae |
| Early hairgrass | *Aira praecox** | Poaceae |
| English ryegrass | *Lolium perenne** | Poaceae |
| Fowl bluegrass (meadow grass) | *Poa palustris** | Poaceae |
| Italian ryegrass | *Lolium multiflorum** | Poaceae |
| Kentucky bluegrass | *Poa pratensis** | Poaceae |
| Orchard grass | *Dactylis glomerata** | Poaceae |
| Quack grass | *Agropyron repens** | Poaceae |
| Rat-tail fescue | *Festuca myuros** | Poaceae |
| Reed canarygrass | *Phalaris arundinacea** | Poaceae |
| Silver hairgrass | *Aira caryophyllea** | Poaceae |
| Soft brome | *Bromus mollis** | Poaceae |
| Sweet vernalgrass | *Anthoxanthum odoratum** | Poaceae |
| Tall fescue | *Festuca arundinacea** | Poaceae |
| Bohemian knotweed | *Polygonum 1. bohemicum** | Polygonaceae |
| Broad-leaved dock | *Rumex obtusifolius** | Polygonaceae |
| Japanese knotweed | *Polygonum cuspidatum** | Polygonaceae |
| Sheep sorrel | *Rumex acetocella** | Polygonaceae |
| Sour dock | *Rumex crispus** | Polygonaceae |
| Creeping buttercup | *Ranunculus repens** | Ranunculaceae |
| Meadow buttercup | *Ranunculus acris** | Ranunculaceae |
| English hawthorn | *Crataegus monogyna** | Rosaceae |
| European mountain-ash | *Sorbus aucuparia** | Rosaceae |
| Evergreen blackberry | *Rubus laciniatus** | Rosaceae |
| Himalayan blackberry | *Rubus discolor** | Rosaceae |
| Japanese rambler rose | *Rosa multiflora** | Rosaceae |
| Ornamental/cultivated Apple | *Pyrus malus** | Rosaceae |
| Sweet cherry | *Prunus avium** | Rosaceae |
| White poplar | *Populus alba** | Salicaceae |
| Common mullein | *Verbascum thapsus** | Scrophulariaceae |
| Common speedwell | *Veronica officinalis** | Scrophulariaceae |

| TABLE 4 - 2006, 2007 LOWER WHITE RIVER BIOBLITZ PLANT INVENTORY (* NON-NATIVE/INTRODUCED PLANTS) | | |
|---|---|---|
| **Common name** | **Scientific name** | **Plant family** |
| Field veronica | *Veronica arvensis** | Scrophulariaceae |
| Foxglove | *Digatalis purpurea** | Scrophulariaceae |
| Ivy-leaved speedwell | *Veronica hederifolia** | Scrophulariaceae |
| Moth mullein | *Verbascum blattaria** | Scrophulariaceae |
| Bittersweet nightshade | *Solanum dulcamara** | Solanaceae |

## Demographics, Land Use (e.g. how the land is being utilized) and Growth Potential

It has been recognized that land use and human activities are the primary driver of native habitat loss through introduction of exotic species, environmental degradation, and increased runoff and pollutants. These effects are exacerbated in urbanizing landscapes such as in Pierce and King Counties where changes are both rapid and permanent. As such, a discussion of the current land use trends within the Lower White River BMA is essential to understanding impacts to the feasibility of retaining native biodiversity within this area. The data and tables below reflected current conditions in 2009. After reviewing aerial photography in 2015, it was decided not to re-calculate exact acreage due to anticipated changes in current and future land use potential, including: 1) the nominal changes within the Lower White River BMA, 2) future changes due to levee work around the City of Pacific through 2019, and 3) changes in each of the jurisdictions' updated Shoreline Management Plans (2014) and the White River Water Basin Plan (2013). The White River Basin Plan[15] projects future land use to continue as resource use except in the Upper White River Subbasin, where vacant land is projected to develop as residential. Current residential development is limited to 29% of the Upper White River Subbasin. Current commercial land use in the Lower White River Subbasin is estimated to be 2.4% and industrial use 0.4%. Commercial and industrial land use at full build out is projected to increase to 4.1% and 2.2% respectively.

Existing Land Use and Population - Pierce - 2013

There were 94 individual properties (tax parcels) located within the Lower White River BMA and according to year 2000 census data approximately 302 people lived within the BMA. Land use on the Pierce County side of this BMA is predominately for utilities (Puget Sound Energy - 12%). The rest of the breakdown is parks/open space (5%), industrial (3%), low density single-family residential (2%), natural resources (2%) and commercial (.2%). Approximately 16% of the BMA is vacant land (i.e., no building on the parcel), 10% water bodies, and 11% classified as unknown. The remaining 41% are lands within King County. (see Figure 10 for Existing Land Use Pierce and King County - 2013)

Existing Land Use and Population - King - 2013

The properties along the White River in unincorporated King County in and adjacent to the BMA are nearly all owned by Puget Sound Energy and all in riparian/floodplain forest (Table 5). Land use on the King County side of this BMA is predominately low density single-family residential (47%) with a few family farms (7%). Approximately ¼ of the BMA (24%) is vacant land. (see Figure 10 for Existing Land Use Pierce and King County – 2013)

[15] White River Basin Plan, Pierce County Public Works and Utilities Department – Surface Water Management Division, November, 2013.

**Table 5. Land Ownership in the Lower White River BMA within King County (2009)**

| Land Owner | Acres within BMA |
|---|---|
| King County | 5.4 |
| State of Washington-DNR | 2.1 |
| Puget Sound Energy | 60.1 |
| Other Private Ownership | 15.3 |
| Total | 82.9 |

Table 6 provides a breakdown of existing land use on these parcels by categories such as residential, commercial, industrial, civic, and vacant lands. Note that the figures for King County are for geographic King County, meaning that they are not all in King County government's jurisdiction.

| TABLE 6 – EXISTING LAND USES IN THE LOWER WHITE RIVER BMA | | | | | |
|---|---|---|---|---|---|
| **Land Use** | **Acreage (Pierce/King)** | | **Total Parcels** | | **% of the BMA** |
| Single-Family | 19.76 | 387.99 | 10 | 103 | 1.24% |
| Mobile Homes | 6.70 | 92.92 | 6 | 23 | 0.42% |
| **Total Residential** | **26.46** | **480.91** | **16** | **126** | **1.66%** |
| | | | | | |
| **Commercial** | **3.20** | **-** | **5** | **-** | **0.20%** |
| | | | | | |
| **Industrial** | **41.05** | **26.03** | **14** | **1** | **2.58%** |
| | | | | | |
| **Transportation/Communication/Utility** | **194.40** | **1.75** | **15** | **2** | **12.20 %** |
| | | | | | |
| **Education** (includes schools) | **-** | **7.91** | **-** | **1** | **-** |
| | | | | | |
| **Public & Quasi-Public Facility** (churches) | **-** | **7.73** | **-** | **1** | **-** |
| | | | | | |
| **Parks, Open Space, Recreation** | **74.26** | **34.43** | **9** | **3** | **4.66%** |
| | | | | | |
| **Natural Resource** | | | | | |
| Mining/Quarry/Ore | - | 2.84 | - | 3 | |
| Forestry | 24.91 | - | 5 | - | 1.56% |
| Agriculture | - | 0.05 | - | 1 | |
| **Total Natural Resource** | **24.91** | **2.89** | **5** | **4** | **1.56%** |
| | | | | | |

| TABLE 6 – EXISTING LAND USES IN THE LOWER WHITE RIVER BMA | | | | | |
|---|---|---|---|---|---|
| **Land Use** | **Acreage (Pierce/King)** | | **Total Parcels** | | **% of the BMA** |
| **Vacant** | **252.22** | | **30** | | **15.83 %** |
| Vacant Single Family | | 328.75 | | 68 | |
| Vacant Multi-Family | | 3.92 | | 4 | |
| Vacant Commercial | | 69.10 | | 4 | |
| Vacant Industrial | | 0.01 | | 1 | |
| | | | | | |
| **Water Body River/Creek/Stream*** | **155.07** | **.97** | **12** | **1** | **9.73%** |
| | | | | | |
| **Unknown** | **169.82** | **-** | **n/a** | **-** | **10.67 %** |
| **TOTAL LOWER WHITE RIVER AREA** | **1,593.27** | | | | **100%** |

* Rivers are considered waters of the state and are not put into parcels. The acreage of Water is higher, but these numbers represent the amount of area in the BMA based within legal parcels.

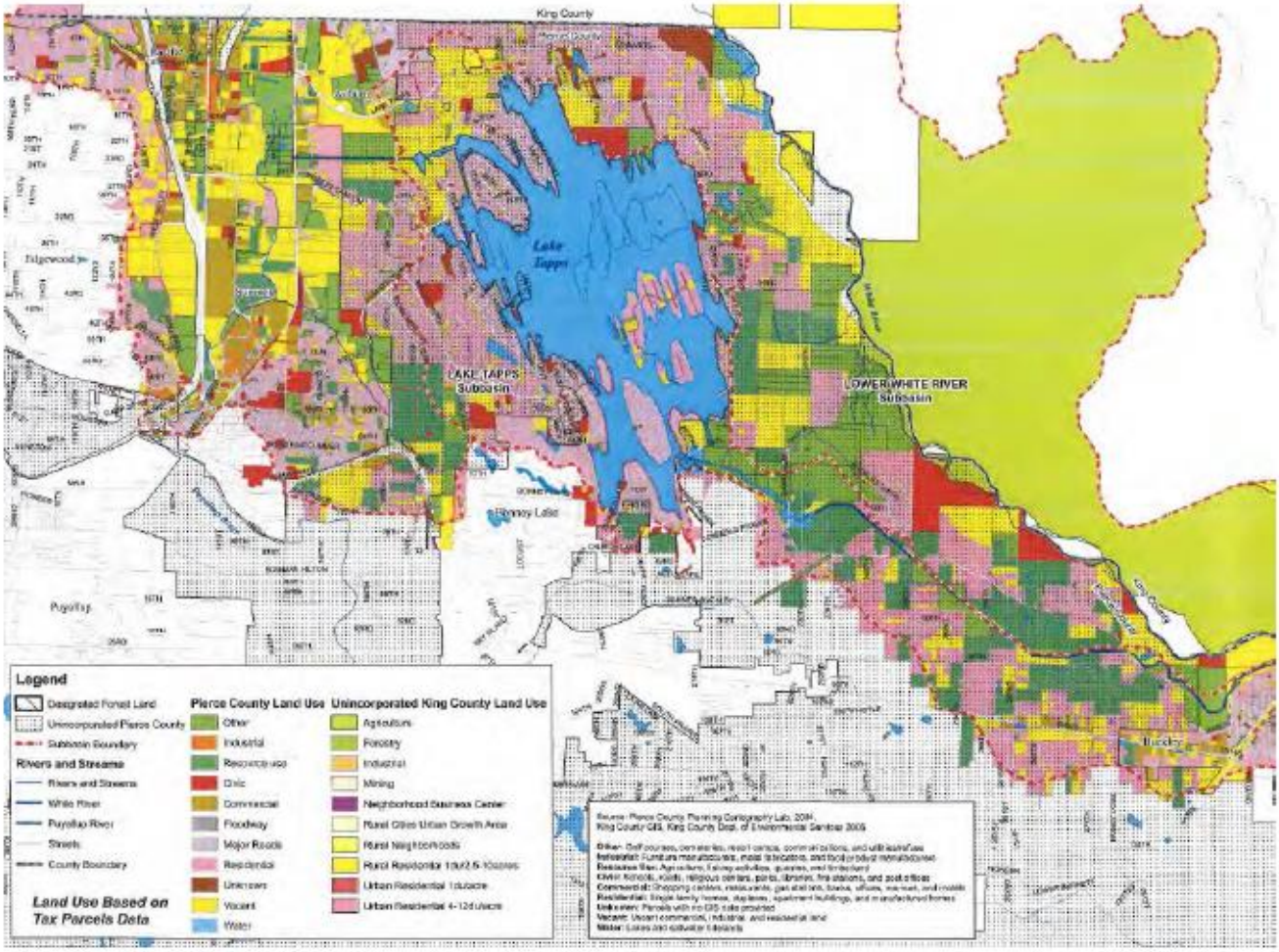



Figure 10 – Existing Land Use Pierce and King County (2013)

As of 2016, there are 27 properties located within or partially within the BMA that are publicly owned by local, state, and tribal governments. A comparison of 2009 and 2015 showed three changes in ownership listed below. The Muckleshoot Tribe owns five properties containing 66 acres within the BMA. Pierce County owns approximately 40 acres of BMA land on 5 parcels. The City of Pacific owns 26 acres within their City Park. The City of Buckley owns 10 parcels totaling almost 250 BMA acres. Segregation and/or merging of 10 "parent" properties occurred in 2010. Cascade Water Alliance now owns two of the "children" properties after the merge. The City of Sumner owns 6 parcels for a total of 9 acres within the BMA. Sumner also went through segregation and/or merging with four of the six parcels in 2009 and again in 2013. Cascade Water Alliance now owns one of the "children" properties after the 2009 segregation and the City of Sumner continues to own the rest of the parcels for the 2009 and all of the 2013 segregation and merging. **Table 7** provides a breakdown of publicly owned lands within the Lower White River BMA in Pierce County.

There are 23 properties located within or partially within the BMA within geographic King County that are publicly owned (Table 8). Of these, only three properties are owned by King County, totaling approximately 16 acres are within King County's jurisdiction.

Current Zoning and Shoreline Environments

*Zoning*

On the Pierce County side, very small portions of the Lower White River BMA are located within Pacific (14 acres), Sumner (78 acres), and Buckley (69 acres) and the remaining area is located in unincorporated Pierce County. Within unincorporated Pierce County, the BMA is predominately zoned Rural 10 (R10) and Employment Centers (EC). A small portion of one parcel is zoned Agricultural Resource Land (ARL). One change that was considered in the 2015 Pierce County Comprehensive Plan Update would have added over 53,000 acres of property to Agricultural Resource Lands. The County Council referred the issue, how to change the ARL criteria, for further study. (Figure 11 – Pierce County Zoning Map, page 38.)

The Rural 10 zone allows for densities of 1 dwelling unit (du) per 10 acres with a bonus density of 2 du/10 acres when 50% of the property is set aside as permanent open space. Lot sizes within the R10 zone must be a minimum of 1 acre in size. Employment Centers allow a wide variety of industrial uses with some limited commercial uses. The ARL is a resource lands zone that allows densities of 1 du/10 acres with minimum lot sizes of 10 acres. Table 9 provides a breakdown of the zones that apply within the BMA.

Lands in the BMA, as it is currently drawn, in unincorporated King County (and outside the Muckleshoot Indian Reservation) are within either the Agriculture Production District (APD) or are in RA-10 zoning (Table 10). The zoning in the APD is A-35: Agricultural, 1 dwelling unit per 35 acres. The zoning in RA-10 has a 10-acre minimum parcel size, except for smaller parcels that were already established when zoning was established. (Figure 12 – King County Zoning Map, page 39.)

Figure 13, on the same page is an aerial photograph with parcels overlaid in the same area outlined in Figure 12, showing that the landscape still matches the zoning regulations.

| TABLE 7 – LOWER WHITE RIVER BMA PUBLIC LANDS (PIERCE & KING COUNTY) | | | | |
|---|---|---|---|---|
| **Parcel Number** | **Total Area** | | **Area Within BMA Only** | |
| | **# Parcels** | **Acres** | **# Parcels** | **Acres** |
| ***Pierce County*** | | | | |
| 0520022011 | 1 | 12.40 | 1 | 12.29 |
| 0520123001 | 1 | 9.70 | 1 | 0.11 |
| 0420012003 | 1 | 25.98 | 1 | 25.29 |
| 0420013047 | 1 | 8.16 | 1 | 2.37 |
| 4495400422 | 1 | 2.52 | 1 | 0.42 |
| **Total Pierce County** | **5** | **58.76** | **5** | **40.48** |
| ***City of Buckley*** | | | | |
| Parcels listed below ** | | | | |
| **Total City of Buckley** | **10** | **249.825** | **10** | **249.825** |
| ***City of Sumner*** | | | | |
| 0420121012 | 1 | 1.01 | 1 | 0.61 |
| 0420014059 | 1 | 10.89 | 1 | 7.24 |
| 0420014058 * | 1 | 104.86 | 1 | 0.05 |
| 0420121003 * | 1 | 5.25 | 1 | 0.29 |
| 0420121011 * | 1 | 4.74 | 1 | 0.96 |
| 0420121010 * | 1 | 9.84 | 1 | 0.06 |
| **Total City of Sumner** | **6** | **136.59** | **6** | **9.21** |
| ***Muckleshoot Tribe*** | | | | |
| 0520023008 | 1 | 39.32 | 1 | 36.94 |
| 0520023012 | 1 | 3.20 | 1 | 0.13 |
| 0520023010 | 1 | 10.37 | 1 | 10.01 |
| 0520023002 | 1 | 16.16 | 1 | 6.80 |
| 0520024000 | 1 | 19.17 | 1 | 12.41 |
| **Total Muckleshoot Tribe** | **5** | **88.22** | **5** | **66.29** |
| **City of Pacific (King)** | | | | |
| 3621049077 | 1 | 26.40 | 1 | 26.40 |
| **Total City of Pacific** | **1** | **26.40** | **1** | **26.40** |
| **TOTAL** | **27** | **559.795** | **27** | **392.205** |

*** - Parcels were segregated/merged**

**** - Buckley owned Parcels:**

**0620332001,0620333008,0620334002,0620343001,0620344015,0620344013, ,0620354000,0619032062,0619032063,061903264**

**Table 8. Lower White River BMA Public Lands within Geographic King County.**

| **Public Agency** | **Acres within BMA** |
|---|---|
| King County | 251.3 |
| City of Auburn | 210.1 |
| City of Pacific | 2.2 |
| United States-BIA | 36.9 |
| Grand Total | 500.6 |

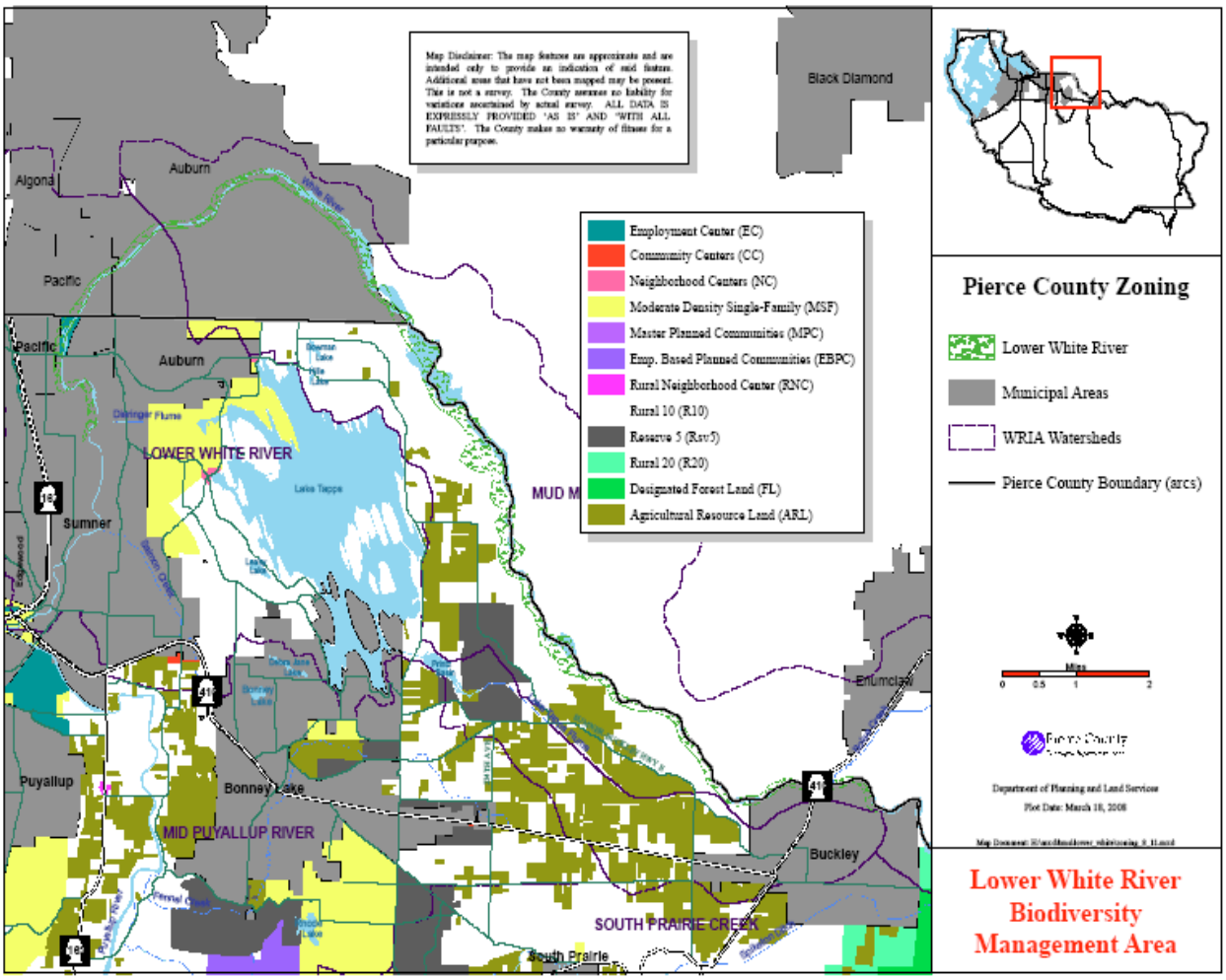



Figure 11. Pierce County Zoning Map (2009)

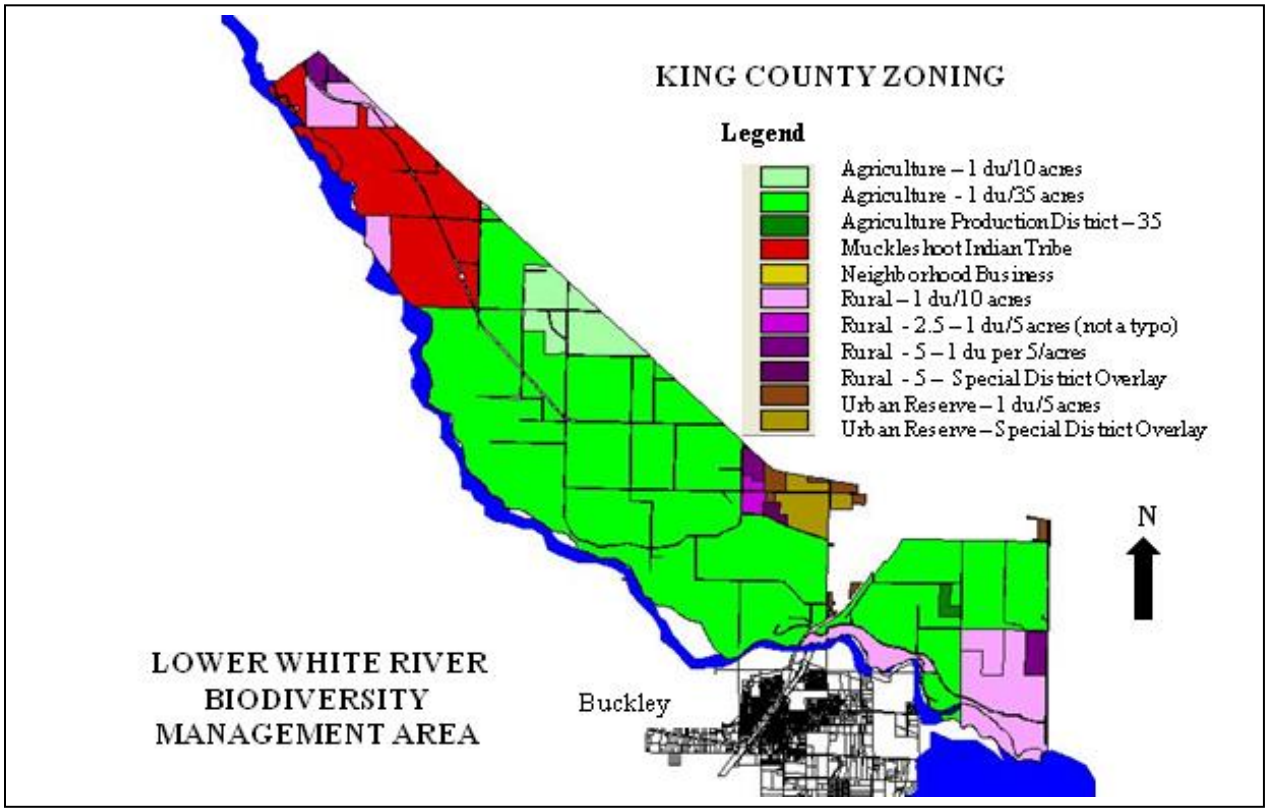



Figure 12. King County Zoning Map (2009)

Figure 13. King County Parcel Map near Buckley (2015)

| TABLE 9 - PIERCE COUNTY ZONING CLASSIFICATIONS WITHIN THE LOWER WHITE RIVER BMA (2009) | | |
|---|---|---|
| **Zones** | **Acreage** | **Percent of BMA** |
| ***Urban Zones (unincorporated Pierce County)*** | | |
| EC | 33.00 | 3.51% |
| **Total Urban** | **33.00** | **3.51%** |
| | | |
| *Rural Zones* | | |
| R10 | 747.14 | 79.37% |
| **Total Rural** | **747.14** | **79.37%** |
| | | |
| *Natural Resource Zones* | | |
| ARL | 0.04 | 0.00% |
| **Total Natural Resource** | **0.04** | **0.00%** |
| | | |
| **Total Pierce County Unincorporated** | **780.18** | **82.88%** |
| | | |
| *Pierce County Incorporated* | | |
| City of Buckley | 69.46 | 7.38% |
| City of Pacific | 13.80 | 1.46% |
| City of Sumner | 77.95 | 8.28% |
| **Total Pierce County Incorporated** | **161.21** | **17.12%** |
| | | |
| **TOTAL PIERCE COUNTY** | **941.39** | **100%** |

**Table 10. Zoning Classifications within the Lower White River BMA in Geographic King County.**

| Zoning Classification | Acres in BMA |
|---|---|
| A-35 (Agricultural Production District) | 109.57 |
| RA-10 (Rural, 10-acre minimum parcel size) | 83.17 |
| MIT (Muckleshoot Reservation; their zoning applies) | 175.02 |
| Grand Total | 367.76 |

*Shoreline Environments*

The Washington State Shoreline Management Act (SMA) provides for the management of water bodies or watercourses identified as "Shorelines of the State." Areas under jurisdiction of the SMA include water courses with a mean annual flow of 20 cubic feet per second (cfs), lakes greater than 20 acres in size and the shorelines of Puget Sound. All lands within 200 feet of the ordinary high water mark, and associated wetlands and floodplains, fall within the jurisdiction of Shorelines of the State. The Pierce County Shoreline Management Program (SMP) and companion Shoreline Management Regulations (SMRs) designate Shorelines of the State into five types of environments including Urban, Residential Rural, Rural, Conservancy, and Natural. These environments are similar to zoning designations allowing different land uses, densities and activities ranging from the most intensive uses (Urban) to very limited uses (Natural).

The Puyallup River, White (Stuck) River and Lake Tapps are considered shorelines of statewide significance per Revised Code of Washington (RCW) 90.58.030(2)(e). The majority of the shorelines within the BMA are classified as Rural, Urban, and Conservancy. The classification of Rural shoreline in Pacific and Buckley allows for areas which are presently used for intensive agricultural and recreation purposes or for those areas having the potential of supporting intensive agricultural and recreational development. This classification is intended to protect agricultural land from urban expansion, restrict intensive development along undeveloped shorelines, and encourage preservation of open spaces. A small section at the west tip of the BMA in Sumner is classified as Urban. Urban shorelines are areas of high intensity land use including residential, commercial and industrial development. These areas are presently subjected to intensive use pressure as well as those areas planned to accommodate urban expansion. However, Sumner must determine an appropriate designation to replace the Urban environment since it is not an established designation per Ecology Guidelines. Most of the river from the Muckleshoot tribe south towards Buckley is classified as Conservancy Environment, which allows for low density residential, outdoor recreation and low intensity agricultural and forestry uses. (Figure 14 -Shorelines Environment Map).

The shoreline in this area within King County is designated as either Natural or Rural shoreline in the 2004 Shoreline Management Master Program. Shorelines were re-designated during an update of the program during 2007-2008, and the new Shoreline Master Program designations include High Intensity, Residential, Rural, Conservancy, Resource, Forestry, Natural, and Aquatic. King County shorelines along the White River in this area are designated Resource Shoreline because they are within the Agricultural Production District (APD). A small area outside the APD near Buckley is designated Conservancy Shoreline. According to the code, the Resource shoreline designation is applied to allow for mining and agricultural uses on lands that have been designated under the Growth Management Act as agricultural land of long-term commercial significance or mineral resource lands. The Conservancy designation is applied to protect and conserve the shoreline for ecological, public safety, and recreation purposes. It includes areas with important ecological processes and functions, valuable historic and cultural features, flood and geological hazards, agricultural and mineral resource lands, and/or recreational opportunities. Residential areas can be designated as Conservancy shorelines. (Figure 15 – Shoreline Designations Map).

*Open Space Corridors*

Pierce County identifies land areas most desirable for open space purposes (Figure 16 - Open Space Corridors Map). These areas represent the highest priority for conservation including creeks, wetlands, and fish and wildlife habitat areas. The Lower White River BMA is included within the County's Open Space Corridor map because of its status as a biodiversity management area and because of the White River. Identified open space corridor areas may be used as the basis to apply for special zoning that

provides greater environmental protection and less density. For example, Pierce County has applied a Rural Sensitive Resource (RSR) zone in rural areas (i.e. at least 50% of a parcel must fall within the open space corridor) and a Residential Resource (RR) zone in urban areas. In addition, extra points under Pierce County's Current Use Assessment and Conservation Futures Programs are awarded to properties located within the open space corridor. All of these new environmentally sensitive zones were created as a result of the BMA work.

Future Growth Potential

Figure 17 – Potential Development Map indicates the parcels of land in 2009 located within the Lower White River BMA that have a potential to subdivide and create additional lots. Each of these parcels is represented with an ID number. Table 8 provides a list of these parcels and indicates the parcel acreage, the potential total lots, and the potential additional number of lots that may be possible given the Rural 10 zones provision that a maximum of two dwelling units per 10 acres is allowed if 50% of the property is set aside as open space. Given the County's provision for rounding up to the next whole number for anything greater than .5, any parcel of land greater than 7.5 acres would be able to subdivide. Of the 37 parcels of land within the Lower White River BMA, there are currently 33 parcels that could be subdivided with no bonus density for a potential total of 275 additional new lots. If landowners used the bonus density, those parcels could be subdivided for a potential total of 308 additional new lots. A review of the parcels in 2015 show four parcels marked with an * were segregated/merged into new lot sizes. Puget Sound Energy sold three parcels to the City of Buckley and two to Cascade Water Alliance. No other changes took place.

Figure 18 – Potential Property Acquisition in the White River Floodplain Map is part of the White River Basin Plan, Vol. 1 adopted November 26, 2013. With the issues of flooding along the White River, this potential property acquisition map influenced part of *Pierce County's 2020 Sustainability Goals*[16] - **Climate Change Resilience** to

1. Continue to partner with cities, local Tribes, the agricultural community and recreation community to compete for Floodplains by Design dollars at the State level.
2. Reduce flood risk to buildings by elevating 20 low and at risk buildings to freeboard standards or by removing them from the floodplain.

There could be additional development potential within the incorporated cities given what their zoning is and what the development provisions are for those zones. The segregation and merging of parcels in the cities of Buckley and Sumner in 2009 and again in 2013 may either increase additional development potential or provide more protection to the shoreline of the Lower White River. If developed, each of these lots could support a new residence, associated driveways, and accessory structures along the river on the Pierce County side. Of the White River Basin, the Lower White River sub-basin has the highest percentage (14%) of impervious surface, with a projected increase to 20% if future conversion of open space to residential and commercial uses proceeds on new lots within the Lower White River BMA. Therefore, any property acquisition along the river by Pierce County would minimize the conversion of open space.

[16] Pierce County Sustainability 2020 Plan website http://www.co.pierce.wa.us/index.aspx?NID=2058

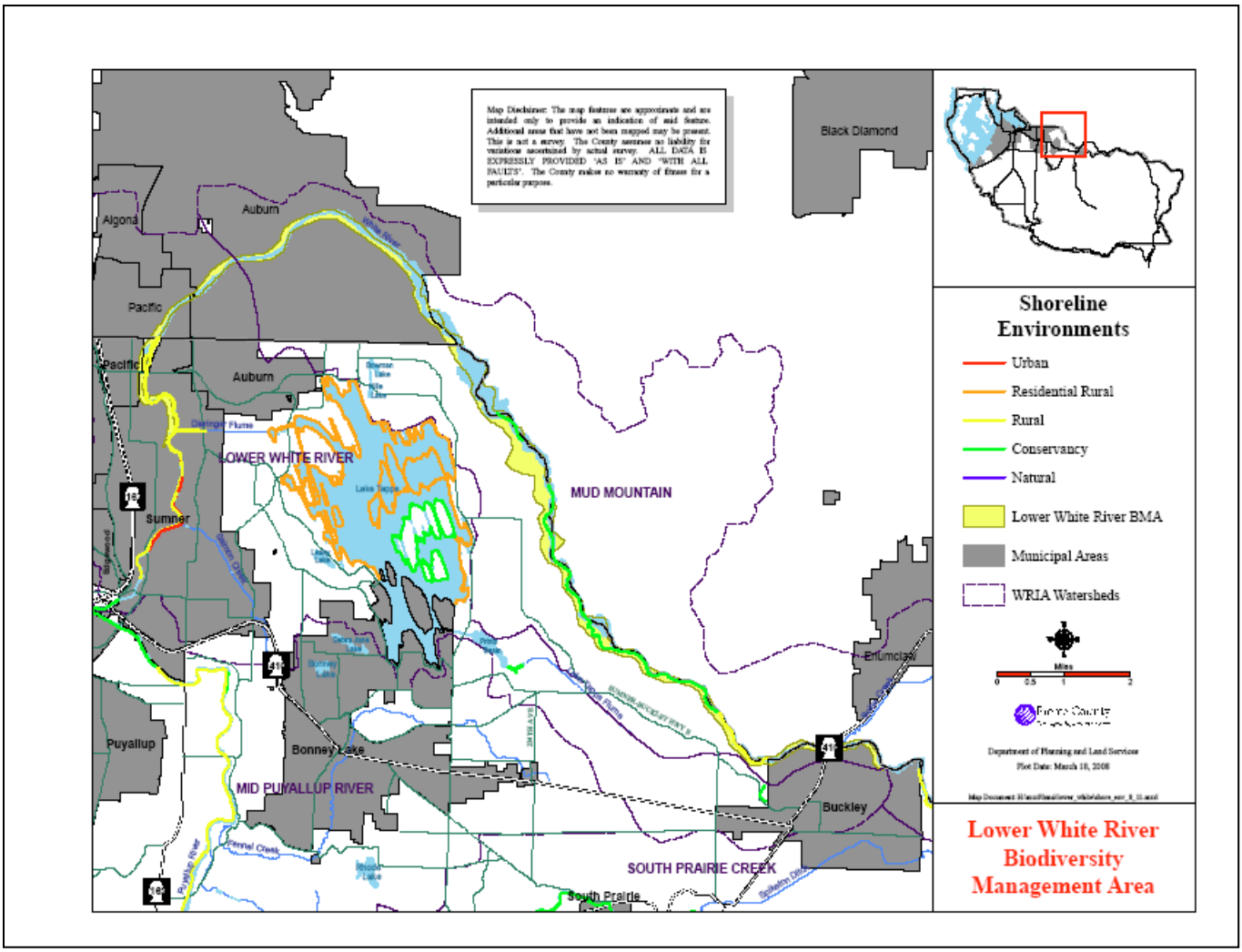



Figure 14. Shoreline Environments Map – Pierce County

Over 260 towns, cities, and counties are required to comprehensively update their Shoreline Master Programs. Most local programs have not been fully updated in over 30 years. As of spring 2016, Pierce County's SMP remained in state agency review. King County's SMP was completed in January, 2013.

The cities located within the Lower White River have completed their plans:

- Auburn - May, 2009
- Pacific - March, 2013
- Buckley - June, 2013
- Sumner - December, 2014

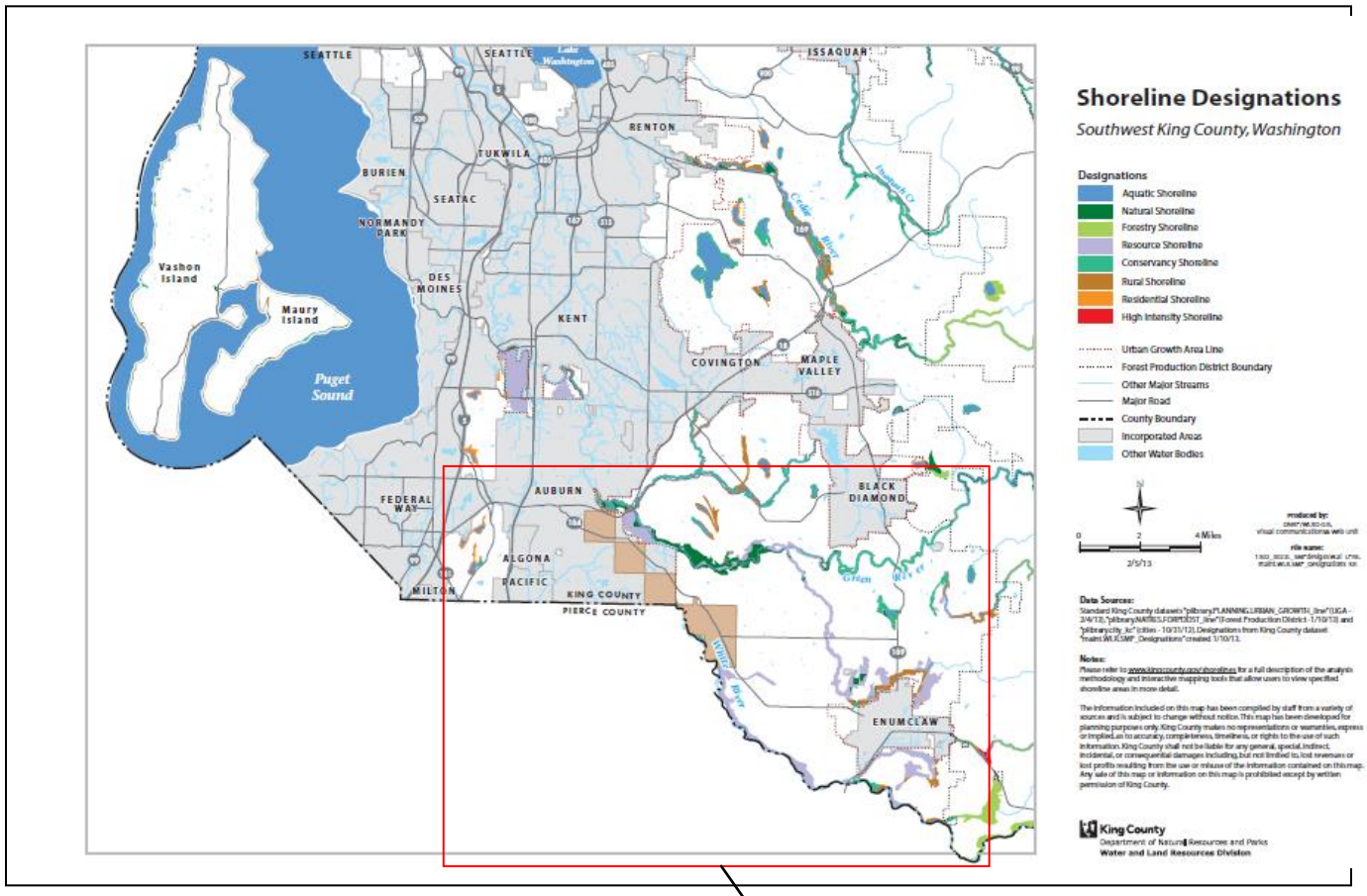
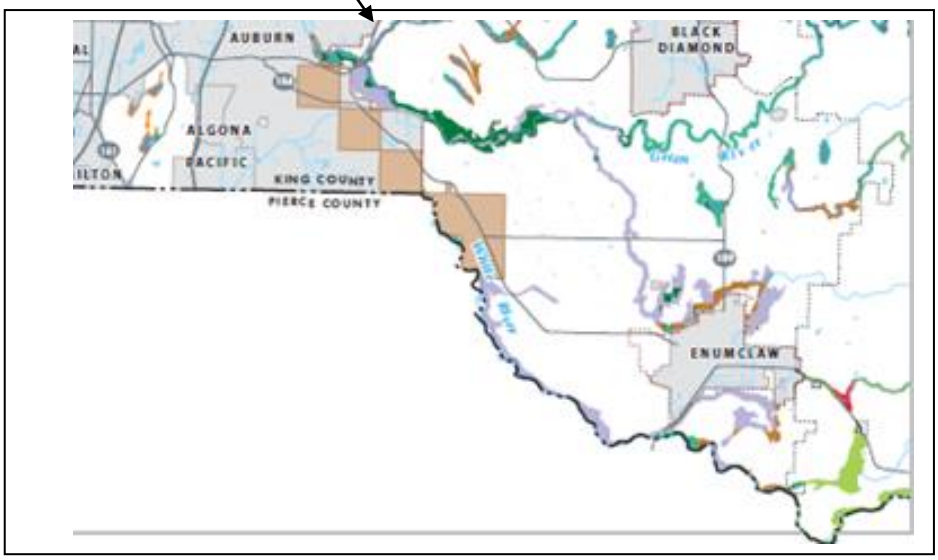



Figure 15. Shoreline Designations Map – King County



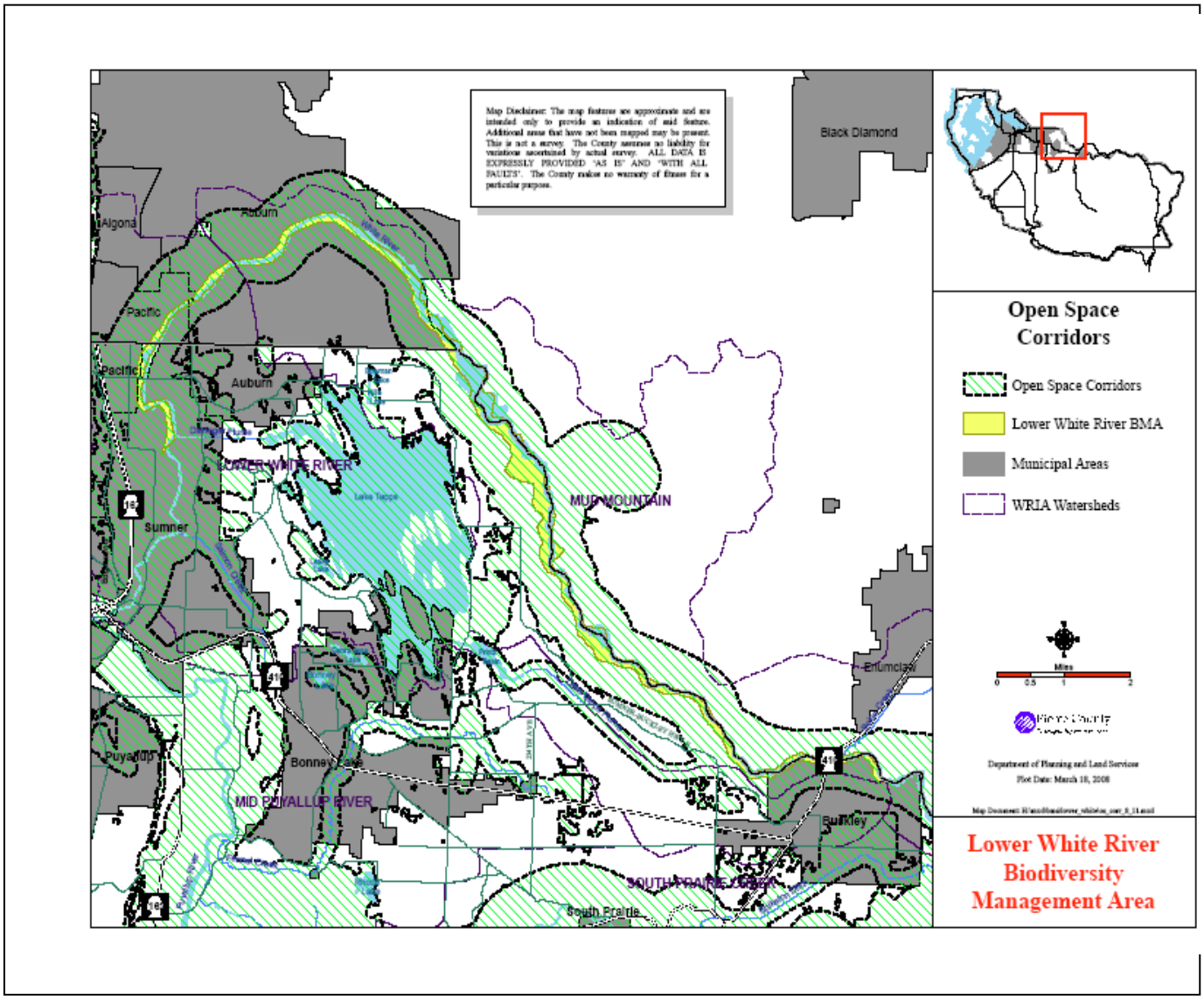



Figure 16. Open Space Corridor Map

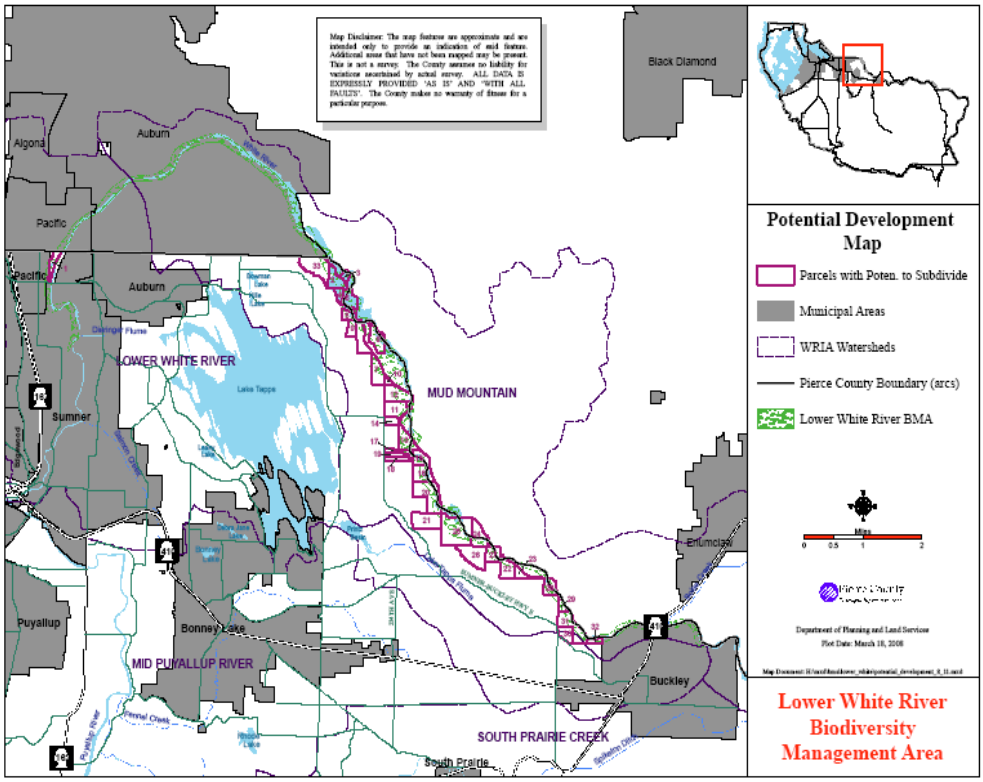



Figure 17. Potential Development Map – Pierce County

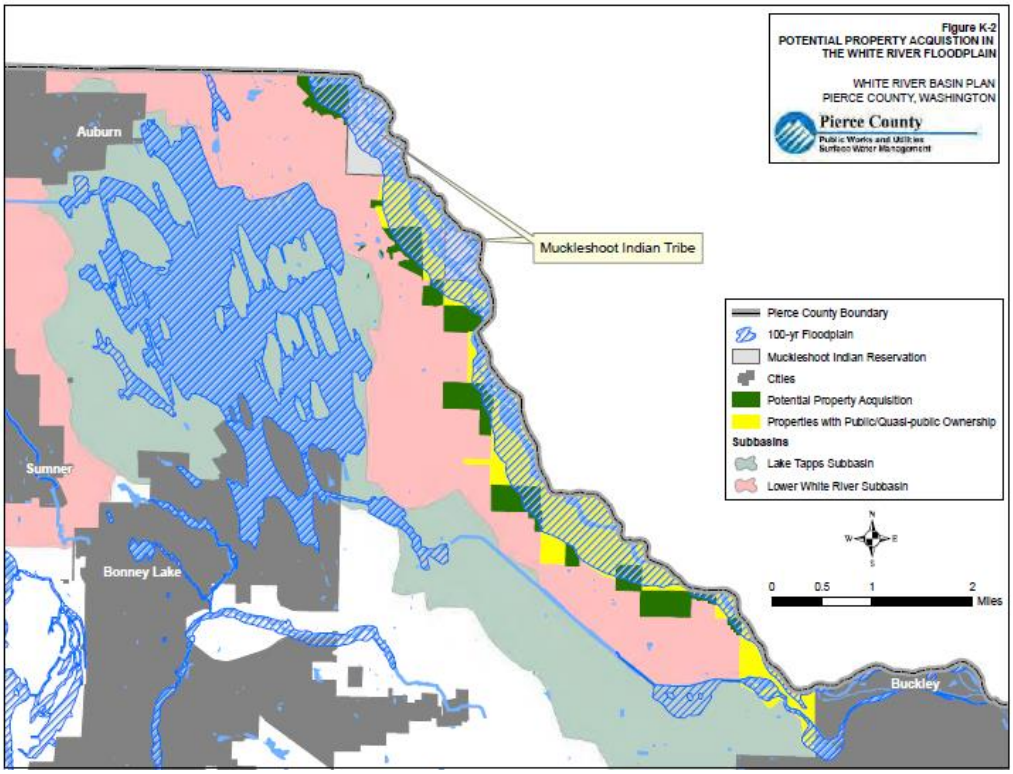



Figure 18. Potential Property Acquisition in the White River Floodplain

| TABLE 11 – DEVELOPMENT POTENTIAL WITHIN LOWER WHITE RIVER BMA (PIERCE COUNTY UNINCORPORATED) | | | | |
|---|---|---|---|---|
| **Map ID #** | **Parcel #** | **Acreage** | **Potential # of Total Lots[1]** | **Potential # of Additional Lots** |
| 1 | 0420012003 | 25.20 | 5 | 4 |
| 2 | 0520022001 | 38.00 | 7 | 7 |
| 3 | 0520022011 | 10.78 | 2 | 1 |
| 4 | 0520023002 | 14.00 | 2 | 1 |
| 5 | 0520023007 | 17.50 | 3 | 2 |
| 6 | 0520023008 | 23.95 | 4 | 3 |
| 7 | 0520111000 | 115.85 | 23 | 22 |
| 8 | 0520111001 | 34.75 | 6 | 5 |
| 9 | 0520112012 | 25.75 | 5 | 4 |
| 10 | 0520123001 | 10.00 | 2 | 1 |
| 11 | 0520132000 | 58.90 | 11 | 10 |
| 12 | 0520132002 | 61.70 | 12 | 11 |
| 13 | 0520133000 | 51.30 | 10 | 9 |
| 14 | 0520133004 | 20.00 | 4 | 3 |
| 15 | 0520241000 | 32.90 | 6 | 5 |
| 16 | 0520241001 | 54.00 | 10 | 9 |
| 17 | 0520242021 | 20.00 | 4 | 3 |
| 18 | 0520242022 | 20.00 | 4 | 3 |
| 19 | 0520242023 | 20.00 | 4 | 3 |
| 20 | 0520244000 | 108.95 | 21 | 20 |
| 21 | 0520251001 | 80.20 | 16 | 15 |
| 22 | 0620293000 | 57.92 | 11 | 10 |
| 23 | 0620293001 | 20.00 | 4 | 3 |
| 24 | 0620301000 | 35.00 | 7 | 6 |
| 25 | 0620302000 | 127.80 | 25 | 24 |
| 26 | 0620303001 | 85.25 | 17 | 16 |
| 27 | 0620304000 | 40.00 | 8 | 7 |
| 28 | 0620321001 | 25.00 | 5 | 4 |
| 29 | 0620332000 * | 45.00 | 9 | 8 |
| 30 | 0620333001 * | 30.00 | 6 | 5 |
| 31 | 0620333002 * | 120.00 | 24 | 23 |
| 32 | 0620334000 * | 65.00 | 13 | 12 |
| 33 | 7001480280 | 90.32 | 18 | 17 |
| | | | | |
| **TOTALS** | | **1,585.02** | **308** | **275** |

1 – The number of total lots is based on maximum development potential in cases where the property owner utilizes the bonus density of 2 dwelling units per 10 acres with 50% of the parcel set aside as open space.

(Future Growth Potential, continued)

Because of the zoning in this area of unincorporated King County, only five parcels that intersect the BMA (and outside the MIT Reservation) could potentially be subdivided (Table 12).

Table 12. Development Potential within Lower White River BMA (King County Unincorporated)

| PIN | Zoning | Present Use | Acres | No. possible lots |
|---|---|---|---|---|
| 1120059001 | RA10 | Vacant (Single-family) | 41.75 | 4 |
| 2420059001 | A35 | Vacant (Single-family) | 71.54 | 2 |
| 1120059002 | RA10 | Vacant (Single-family) | 34.75 | 3 |
| 3520069024 | RA10 | Farm | 35.26 | 3 |
| 2420059002 | A35 | Vacant (Single-family) | 71.64 | 2 |

**Impacts of Growth and Development on Habitat and Species Presence**

Future growth potential on the lands in unincorporated King County is somewhat limited by regulatory protections offered to critical areas present within the BMA. The entire BMA in King County is within a Critical Aquifer Recharge Area (CARA) and a seismic hazard area, and much of it is within an erosion hazard area. Portions of the BMA that are along the valley wall are within the slide hazard area. The BMA is also located within the 100-year floodplain of the White River.

The Lower White River BMA will only remain rich in species diversity if care is given to maintaining large enough habitat areas for species viability and good quality habitat conditions, including corridors for safe movement between primary and seasonal habitats. Stressors to habitat include a variety of factors such as:

- Fragmentation in habitat below the threshold for species viability due to land development, removal of vegetation, and roads;
- Actions that change the hydrology within the watershed and specifically within the floodplain which especially affects amphibians, fish species, and wetland plant species;
- Species mortality caused by vehicular traffic on roads and predation by non-native animals (cats, dogs, bullfrogs, non-native fish, etc.);
- Conversion of native vegetation to non-native and invasive plant species; and
- Other human actions that cause species mortality or negatively impact habitat, such as poaching or water-/ air-quality changes.

Stressors to the Lower White River BMA are discussed in greater detail in Chapter III. In addition, the fate of the Puget Sound Energy (PSE) properties along the White River (totaling 2,500 acres) will play a critical role for the long-term protection of biodiversity within the Lower White River BMA. Negotiations between PSE and Forterra and other parties were initiated in 2006 to preserve this land. Most of the PSE properties were inventoried in the 2006 LWR Bioblitz. A report was prepared for Forterra identifying which parcels had the greatest potential for long-term conservation. A 2015 review of the parcel ownership shows that PSE remains the landowner.

**Pierce County Regional Trails Maps and Plans**[17]

In the summer of 2008, Pierce County began a planning process to improve its existing trail system and prepare for future population growth, implementing a key recommendation and project identified in the Parks, Recreation, and Open Space (PROS) Plan. The intent of the regional trail system is to provide recreational opportunities, promote healthier lifestyles, create connections to major developed areas and destinations, and enhance non-motorized transportation options throughout the county.

The Regional Trails Plan is a continuation of the PROS Plan process. Through the PROS planning effort, the public indicated a need for trail facilities for both recreation and transportation purposes. Key findings from the recreation questionnaire indicated that trails are popular among Pierce County residents.

Since then, much progress has been made to develop a regional trail system (Figure 19– Pierce County Regional Trails Map) and identify opportunities to continue the regional trail expansion (Figure 20 – Pierce County Trail Connection Opportunities).

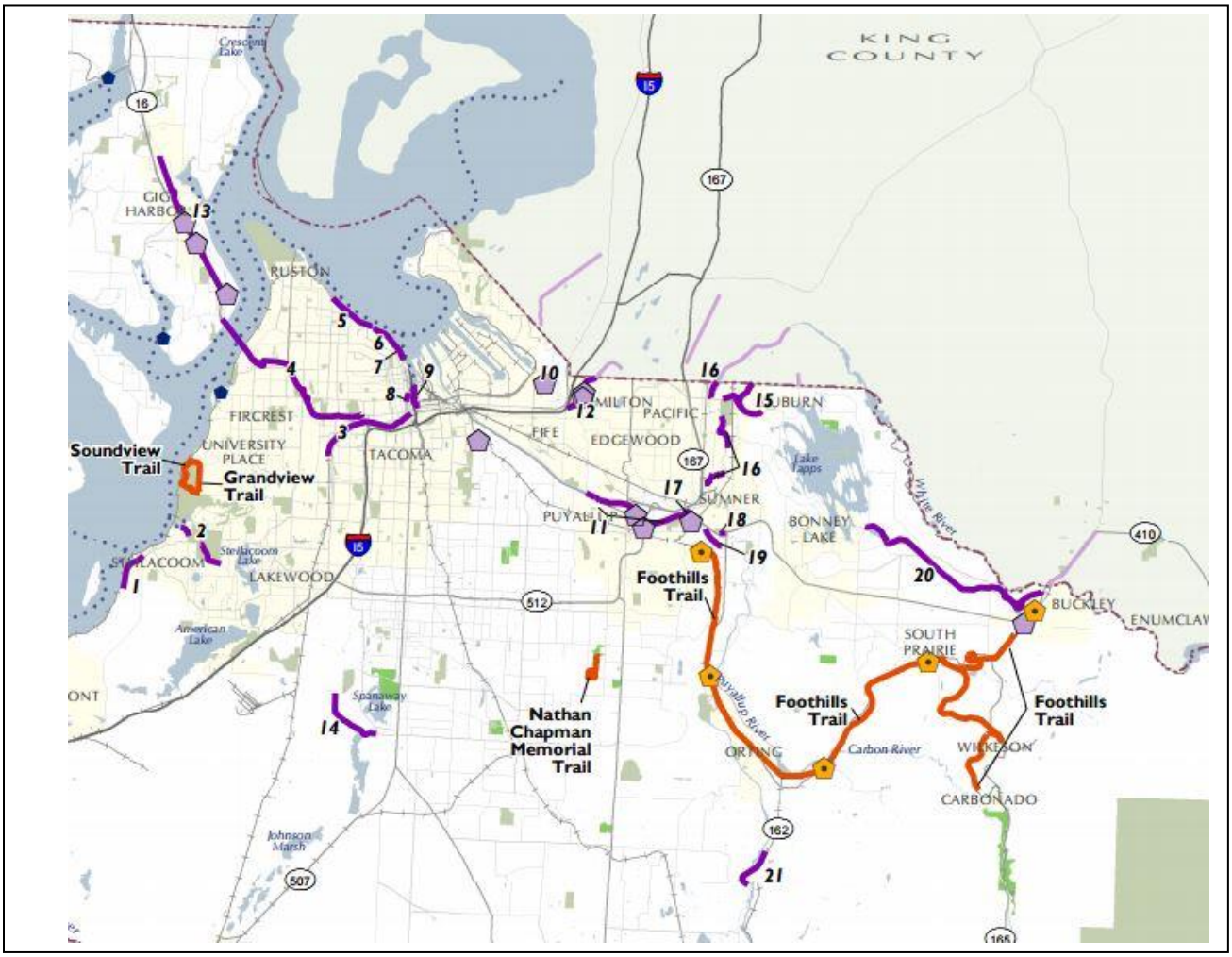
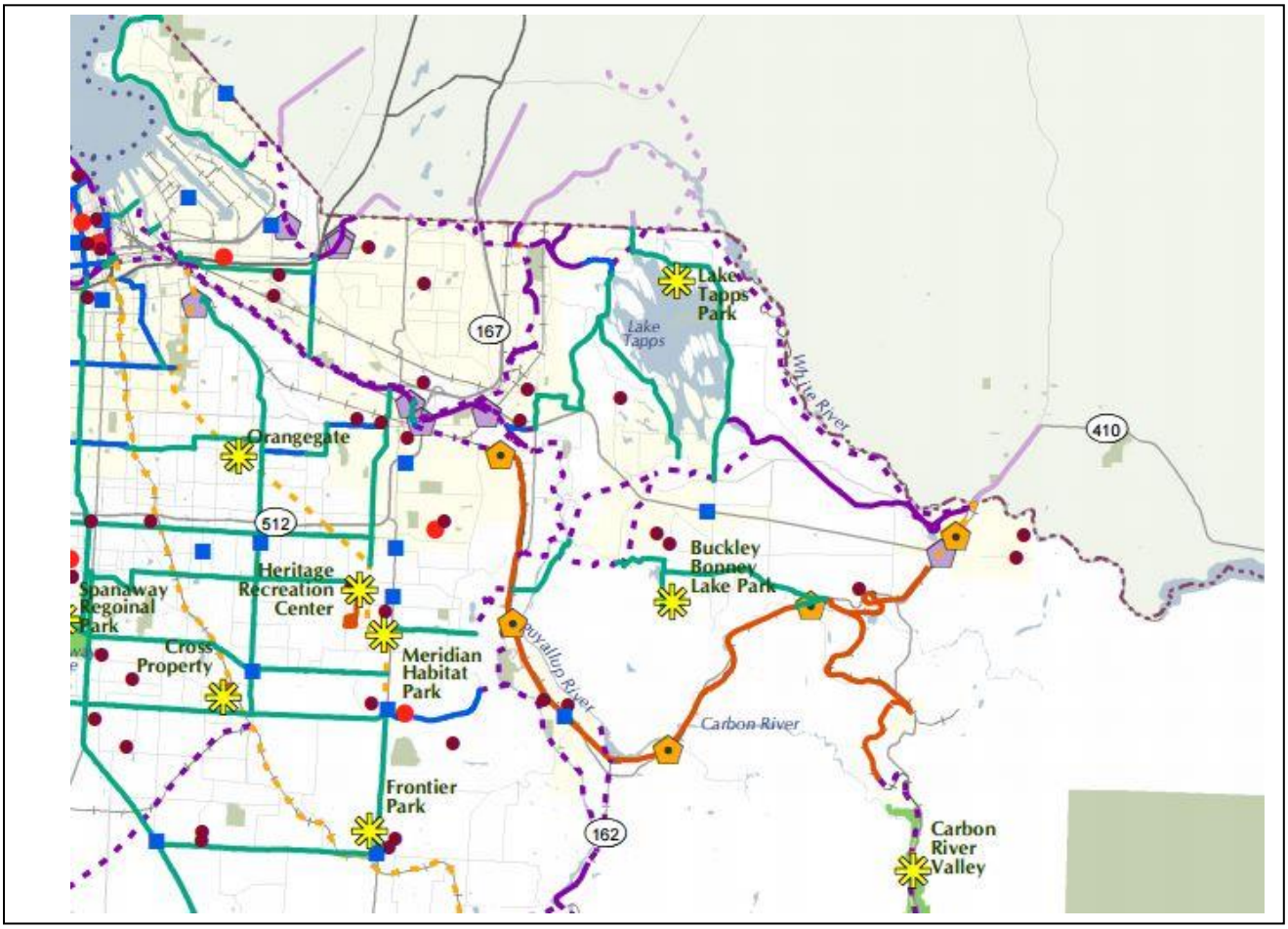



Figure 19. Pierce County Regional Trails Map

[17] Pierce County Park and Recreation Open Space Plan. Chapter 7.1 http://www.co.pierce.wa.us/DocumentCenter/View/2895



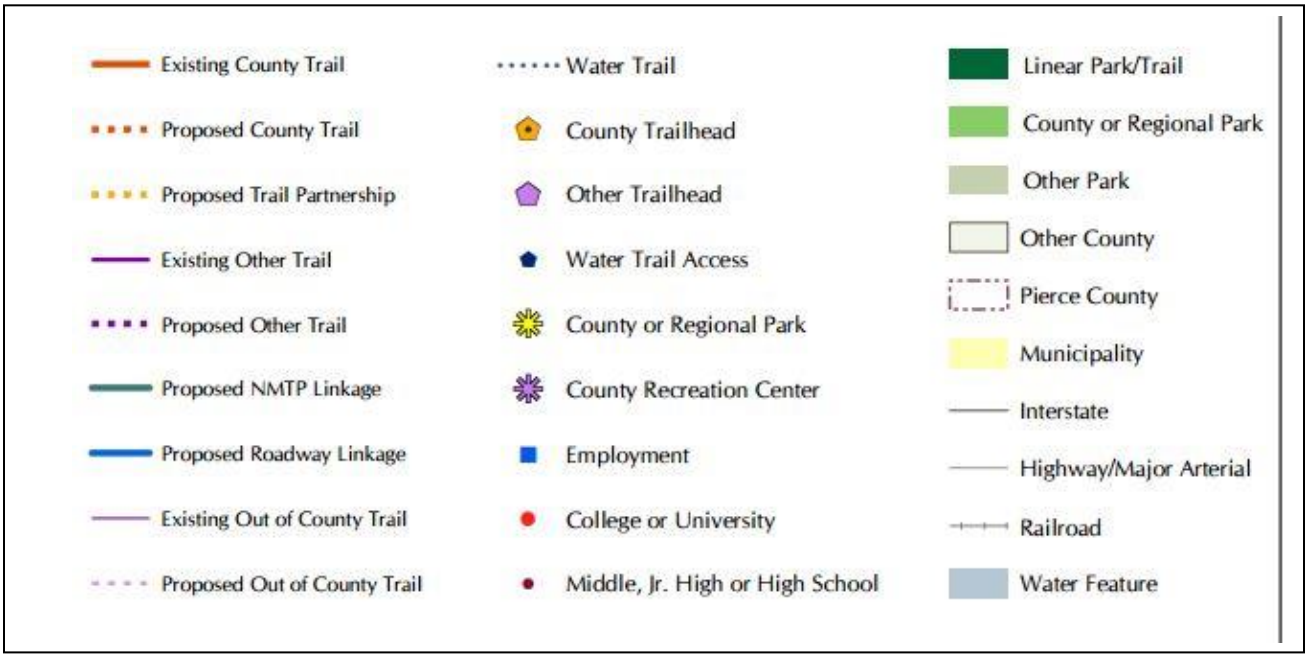




Figure 20. Pierce County Trail Connections Opportunities

# Chapter III - Conservation Targets and Threats

## Overview of Conservation Targets and Threats

At a landscape level, "conservation targets" (systems) may include ecological systems, ecological communities, species, and other important natural resources. Ecological systems share common ecological processes (e.g., hydrology), environmental features (e.g., soil types), or environmental conditions (e.g., precipitation). Ecological communities have common or co-occurring features such as species or natural vegetation types. Other important factors in determining conservation targets include groundwater recharge, forest reserves, etc.[18]

Each conservation target has key ecological attributes that ensure the proper functioning of that system's occurrence in a landscape over the long-term. Key ecological attributes consist of 1) size, 2) condition (i.e., measure of the composition, structure and biotic interactions that characterize the occurrence), 3) ecological processes (e.g., hydrologic regimes, fire regimes, other natural disturbances), and 4) connectivity of target species to habitats and resources including dispersal or migration routes.

In an ideal situation, intact and properly functioning conservation targets are not significantly stressed. Stresses to a conservation target result in degradation and impairment of key ecological attributes and occur in a variety of ways, both from human impacts and other natural factors. The source(s) of the problem is what causes the stress to occur. Collectively, stresses and sources of stress are referred to as "threats" to the system.

In the Lower White River BMA several conservation targets were selected to represent the key ecological functions occurring throughout the area. These conservation targets include

- Lower White River
- Tributaries, wetlands, and oxbows
- Conifer/deciduous mixed forest areas.

Each of these conservation targets provides the systems that collectively create the rich variety of habitats necessary to foster a high level of biodiversity in that BMA. A detailed description of each conservation target and the threats to these systems follows. Conservation strategies to abate these threats are discussed in Chapter IV.

## Lower White River

General Description of the Lower White River

The Lower White River riparian corridor is dominated by riparian habitat with an over-story of hardwood and hardwood/conifer trees. The BMA begins in the north-end of Sumner and continues northwards through the cities of Pacific and Auburn. Riverfront property just north of Pacific City Park in Auburn (east end of 3rd Ave SE) has resulted in some removal of native riparian vegetation. The dominant hardwood forest along this stretch of the river consists of willows, red alder, black cottonwood, black hawthorn, bigleaf maple, and Pacific dogwood. The BMA then continues through Auburn Game Farm

[18] The concept of identification of conservation targets and key ecological attributes, threats (stresses and sources of stress), and threat abatement strategies (referred to here as "conservation strategies" to abate threats) is derived from The Nature Conservancy (TNC) 5-S conservation action planning methodology. However, this method has been adapted to acknowledge the fact that the BMA was already identified utilizing the GAP methodology and as such the conservation targets were selected based on review of the key ecological attributes within the BMA.

Wilderness Park. This is an area dominated by native vegetation with a mix of hardwood and conifer trees with western hemlock, western redcedar, and Douglas fir the dominant conifers. Hazelnut, salmonberry, red elderberry, red osier dogwood, and invasive Himalayan and evergreen blackberries are the dominant shrubs. One small section of the White River Trail System, near the riverfront, has also had native vegetation removed. Stuck River Drive may also impede movement of some species, however this is a minor road with little traffic. As the BMA continues eastward through Muckleshoot Indian Reservation and into eastern Pierce County, it continues to be dominated by riparian, deciduous/conifer vegetation in a non-fragmented arrangement (i.e., mostly undeveloped).

Water Quality of White River

Pierce County does not monitor water quality along the Lower White River. The White River Basin Plan's efforts to analyze water quality selected five sites in 2005-2006. Two gaging stations, one at Salmon Springs in Sumner and Stream 51 near Bonney Lake collected flow data over the same time frame. Neither the water quality sampling sites or gaging stations were within the LWR BMA. The White River mainstem was surveyed by URS Consultants in the fall of 2004. Reach observations were summarized by reach lengths, physical features and overall aquatic and riparian conditions. Reach observations that fell within or near the LWR BMA are included with the individual jurisdictional breakout in this plan. In 2008, the water quality was assessed for the White River Basin waterbodies. All the waterbodies were considered polluted requiring TMDL (Total Maximum Daily Load) plan. The Lower White River TMDL requirement was for fecal coliform, pH, and temperature primarily along the incorporated portions of the river.

The Basin Plan ranked and prioritized stream reaches and selected 73 sites. Riparian integrity is considered high if >70% of the corridor has an intact riparian zone wider than 100 ft., and <10% of the corridor is <35 ft., and there are <3 breaks (road crossings) in the corridor per stream mile. Streams meeting these conditions have greater potential for maintaining natural ecological functions. The Plan indicates that as of 2006:

- 4% of the White River riparian corridor was in "good" condition,
- 59% was in "fair" condition, and
- 37% was in "poor" condition.

Of the 21 sites sampled within the LWR BMA,

- 5% were in "good" condition,
- 86% in "fair" condition, and
- 10% were in "poor" condition.

The Ecosystems Diagnosis and Treatment (EDT) model rates the quality, quantity, and diversity of habitat along a stream relative to the needs of fish such as Coho or Chinook salmon. The method describes how the fish would rate conditions in a stream based on current scientific understanding of their needs. Aquatic habitat EDT rankings indicated 16% is in good condition, 37% in fair condition, and 47% in poor condition. Within the BMA, 33% of aquatic habitat is in good condition, 43% aquatic habitat is in fair condition, and 24% aquatic habitat is in poor condition.

As part of Pierce County's Sustainability 2020 Plan, the water quality goal is to increase stream quality to a reported grade of B in at least one watershed by 2020, with all others reaching a minimum of C+. [19] A number of streams are selected each year as part of Pierce County's "Raise the Grade"[20] program to improve water quality. To date, none of the streams flow into the Lower White River have been selected.

[19] Pierce County Sustainability 2020 Plan website http://www.co.pierce.wa.us/index.aspx?NID=3389#water
[20] Pierce County's "Raise The Grade" program http://www.piercecountywa.org/raisethegrade

Development Along the River

Puget Sound Energy and Mud Dam have restricted or prohibited development along the White River, which has contributed to the continued biodiversity of this important riparian corridor and its designation as ecoregionally significant[21].

**Tributaries, Wetlands, and Oxbows**

The Lower White River watershed is a complex hydrologic system with wetlands and multiple tributaries feeding into this wetland/riparian system from the Upper White River. The wetland and riparian systems provide a rich habitat for a variety of fish, reptiles, amphibians, mammals and bird species. Certain wildlife species, such as pond breeding amphibians, are very dependent on the hydrology of an area such as this for their life cycle needs.

Private homes, farms, and light industry are located near the tributaries and the condition of the streams depends to a large extent on how individual developers and owners have treated the riparian corridor, which in most cases has resulted in poor to fair condition.

Wetlands filter excess nutrients, chemicals, and sediments from excess runoff. They help keep groundwater clean, store flood waters, and provide habitat for aquatic species and wildlife that use the water. Wetlands may dry up in the summer, or they may be saturated year round. Wetlands generally support plants adapted to wet areas but are able to tolerate dry spells.

Oxbows plus buffer zones can be useful and environmentally sound measures for flood control. Other flood control measures may have a detrimental effect on salmon habitat, specifically dikes that impair connections between rivers and their flood plains, which would normally supply large woody debris, fine organic matter, and dissolved nutrients to the drainage network. Oxbows retain those characteristics that are important habitat elements, providing refuge and food sources for the riverine community. Re-channeling or braiding of the streams may be necessary to restore oxbows.

King County has allocated Capital Improvement funds for the White River flood damage repair at Stuck River Drive. Both King Floodplain management and Pierce County Surface Water Management have purchased land along the BMA between Pacific and Auburn for the purpose of flood control. Pierce County has analyzed the feasibility of levee setbacks and the White River at six locations between RM 2.6 and 5.1.

Riparian habitat or buffer zones along the river can contribute many benefits to the river it abuts. Shade cools the water; organic and woody debris provide nutrients to river inhabitants. Vegetation roots protect and stabilize the banks while providing shelter and habitat. The riparian zone contributes to a high water table, increased storage capacity for water flow, and higher late-summer stream flows. On the other hand, lawns, agricultural areas adjacent to the river, non-native vegetation, and impervious surfaces contribute none of these benefits and, indeed, degrade the quality and quantity of the river itself.

[21] Flobert, J., M. Goering, G. Wilhere, C. MacDonald, C. Chappell, C. Rumsey, Z. Ferdana, A. Holt, P. Skidmore, T. Horsman, E. Alverson, C. Tanner, M. Bryer, P. Iachetti, A. Harcombe, B. McDonald, T. Cook, M. Summers, D. Rolph. 2004. Willamette Valley-Puget Trough-Georgia Basin Ecoregional Assessment, Volume One: Report. Prepared by The Nature Conservancy with support from The Nature Conservancy of Canada, Washington Department of Fish and Wildlife, Washington Department of Natural Resources (Natural Heritage and Nearshore Habitat programs), Oregon State Natural Heritage Information Center and the British Columbia Conservation Data Centre.

**Forest – Conifer/Deciduous Mixed Forest**

The Lower White River BMA contains a patchwork of lowland conifer/deciduous forest interspersed with wetlands, riparian areas, pastures, and parcels developed for single family residential and commercial uses. Along the adjacent lands, the forest cover transitions to a continuous conifer/deciduous forest habitat. The Muckleshoot Tribe and Puget Sound Energy have left much of the forest surrounding the river intact. Forested areas provide connectivity between the different habitat patches and also serve to maintain hydrologic cycles within a watershed. Best available science indicates that 65% forest cover within an urban watershed provides high quality hydrological function for wetland water level fluctuation and stream hydrology[22]. The Lower White River BMA currently has at least 65% forest cover, and more if the riparian areas along the floodplain are included. These forest areas are a necessary component in the lifecycles of many terrestrial native species. Each species has its own unique needs for habitat patch size. This size increases for mammals and birds, which have a sensitivity to patch size, and is very important for pond-breeding amphibians and native fish species that utilize the stream, wetland, and lake systems in the watershed and BMA. It will be crucial to work with each jurisdiction to maintain or increase forest cover for the persistence of native biodiversity.

**Threats to Conservation Targets**

The main threats that are or may potentially be occurring to conservation targets include:

- Habitat conversion and fragmentation due to development, removal of native vegetation, and roads–specifically, potential development of the Puget Sound Energy properties;
- Poor water quality caused by residential use of fertilizers, domestic animal waste, septic tank leakage, spraying of herbicides along public roads, and road runoff;
- Loss of pools, large woody debris (LWD), and riparian vegetation due to development and channelization of the river;
- Introduction of invasive, exotic, non-native species including plant and wildlife species (e.g., bullfrogs, Japanese knotweed, Himalayan blackberry);
- Fish passage blockage from culverts;
- Wildlife movement blockages from roads, driveways, and fencing;
- Erosion and damage of riparian habitat from dikes/levees along cities of Buckley, Pacific, and Sumner;
- Predation of wildlife by cats and dogs, and illegal hunting;
- Water fluctuations due to storm drains redirecting water flow into the river and not into wetlands, dikes, and stormwater runoff from development projects;
- Pollution caused by dumping of trash and debris into or near the river, and warehouse parking lot runoff; and
- Non-permitted (illegal) discharge dumped directly into the river.

[22] Booth, D.B., 2000. Forest Cover, Impervious-Surface Area, and the Mitigation of Urbanization Impacts in King County, Washington, Prepared for King County Water and Land Resources Division.

# Chapter IV - Conservation Strategies

## Overview of Conservation Strategies

To achieve long-term health of a conservation target, threats must be abated to ensure viable, functioning systems. There are two approaches to lessen the stress and enhance or maintain the viability of the conservation target. The first is to abate the sources that are causing the stresses, under the assumption that the stress will subside if the source is removed. The second is to directly abate the stresses that may persist after the source is removed. Conservation strategies are developed and implemented to 1) abate the critical sources of stress (i.e., threat abatement) and 2) directly restore altered key attributes of the systems (i.e., restoration).

Threat abatement may involve a number of approaches including direct actions (e.g., removal of a culvert blocking a creek) or indirect actions involving public education and outreach (e.g., educating property owners on the negative impacts of removing native vegetation that provides habitat). Direct restoration actions may include replanting native vegetation that is appropriate to the underlying soils and indigenous plant communities that historically thrived in a given location.[23] Often indirect actions are needed in anticipation of such projects.

In the Lower White River BMA planning process each of the conservation targets described in the previous chapter were reviewed in detail and potential threats identified. During this process Lower White River jurisdictions also identified conservation strategies to ascertain the level or severity of a potential threat, to directly abate known threats, or to identify restoration opportunities where degradation has occurred. Some threats applied to multiple conservation targets and as such the conservation strategies have been grouped under the following categories, which have been stated as a positive outcome:

- Reduce Habitat Conversion and Fragmentation (due to development and human activity)
- Enhance Water Quality and Quantity
- Eliminate Invasive and Introduced Species
- Remove Fish and Wildlife Movement Blockages
- Manage Flooding
- Control Erosion and Siltation
- Reduce Predation by domestic cats and dogs and Poaching of Native Species
- Reduce or Eliminate Pollution Within the LWR BMA

The discussion below provides recommended conservation strategies for each stress and source of stress to the conservation targets.

## Reduce Habitat Conversion and Fragmentation

<u>Source of Stress: Development, Vegetation Removal, and Deforestation</u>

*Conservation Strategies*

1. Adjust the Lower White BMA boundary as evidence presents itself (and reviewed by all jurisdictions) to better represent areas necessary for the long-term persistence of native aquatic species, birds, mammals, amphibians, and reptiles.

[23] TNC 5-S conservation action planning methodology.

a. Work with all appropriate jurisdictions to adopt the Lower White River BMA Stewardship Plan and companion amendments to the Lower White River BMA boundary.
b. Integrate the revised Lower White River BMA boundary into the Pierce County Comprehensive Plan Open Space Corridors Map.
c. Foster natural floodplain processes by preserving and creating conveyance areas (levee removal and/or setback) to accommodate flood waters.
d. Integrate the revised Lower White River BMA boundary into the King County Levee Projects along the river.
e. Continue to acquire lands to reduce fragmentation along the river.
f. Apply the Rural Sensitive Resource zoning to the tax parcels located within the revised Open Space Corridors Map at the county level.

2. Utilize Low Impact Development (LID) techniques within the BMA.
   a. Work with the Counties, Pierce and King Conservation Districts, and other interested agencies to educate property owners on LID techniques.
   b. Work with the Counties, Cities of Buckley, Auburn, Pacific, Sumner, and State Agencies to promote the use of LID on public properties.

3. Continue to apply native vegetation retention practices to environmentally sensitive areas within BMA.
   a. Work with the County and local jurisdictions during their review of development proposals. Ask that the design of projects maintain native vegetation, wetlands, and shorelines and that the mitigation efforts are appropriate and relevant to the development impacts.
   b. Ask that enforcement of violations of existing regulations receive a higher priority. Work with the County and City Councils to provide adequate staffing resources for this purpose.

4. Provide increased education and outreach to property owners, developers, and real estate agents regarding impacts of vegetation removal on fish and wildlife habitat. Help community groups organize with their city or county for stewardship actions.
   a. Provide landscape consultation and on-going workshops (with guest speakers) to homeowners.
   b. Provide homeowners with literature on how to be a shoreline steward.
   c. Create realtor packets with materials on shoreline stewardship to be given to new residents of shoreline properties.
   d. Present community projects at realty offices to get them to pass out realtor packets and educate on unique ecological characteristics of the communities.
   e. Alert developers about community projects and how they can play a role in promoting the quality of the community's landscape (and homes) through selective cutting and brush removal.
   f. Create homeowner information packets that describe the location and importance of wildlife corridors. Include in these packets all certified backyard habitats/sanctuaries to help inspire people to get involved.
   g. Use social media to inform and educate property owners.

5. Participate in local land use advisory meetings regarding proposed developments that affect the BMA.
   a. Landowners who live within or are interested in a development that is located within jurisdictional boundaries of a city should attend City Planning Commission meetings to provide input into development proposals. Those who live within the jurisdictional boundaries of unincorporated Pierce or King County may attend Land Use Advisory Commission or County Planning Commission meetings.

b. Request notification by the City or County of any development proposals within or adjacent to the BMA.
c. Create a phone tree (and post agency numbers of enforcement for community) to contact community members when a proposed development is being reviewed by the City or County.
d. Advocate for conditions that eliminate or minimize threats to the conservation targets.
e. Work with developers to achieve a "win-win" solution (e.g., utilizing density bonus for open space, locating open space areas in relation to the BMA and adjacent wildlife habitat areas for enhanced "livability" in the area).

6. Consider application of special zoning that provides for greater environmental protection and less density (i.e., the RSR zoning–through a Comprehensive Plan amendment process or adoption of a new Community Plan–or the city equivalent of downzoning) in LWR BMA areas located in unincorporated rural portions of Pierce and King Counties.
   a. Ask that LID and other environmentally sensitive design techniques be used within the LWR BMA areas.
   b. Ask for a review of additional habitat areas for inclusion within the BMA when jurisdictions next update the White River Basin Plan.

7. Work with the counties, cities, and developers to locate open space set-aside areas in contiguous tracts or within contiguous conservation easements. Advocate they be located to promote connectivity and proximity to the conservation targets.
   a. Identify the best locations for designated open space areas during the development proposal review process.
   b. Create a transition area of native plants/vegetation between developed and non-developed areas.
   c. Make a high priority the open space set-aside areas along tributaries and the White River.
   d. Advocate for open space dedications adjacent to the BMA as a first priority whenever new development in forested areas is proposed.
   e. Establish connectivity and habitat zones around wetlands and White River and adjacent forest areas which provide habitat.
   f. Refer to the Washington Department of Fish and Wildlife (WDFW) landscape planning document[24] for guidance to help maintain fish and wildlife habitat including:
      i. how to maintain habitat connectivity within the BMA and adjacent habitat areas through corridors and permeable landscape mosaics;
      ii. how to proactively address wildlife and road issues by routing traffic through less sensitive wildlife areas, by locating development with road placement and traffic intensity issues with wildlife in mind, and by providing connectivity linkages across roads that intersect habitat patches or corridors;
      iii. how to rectify existing road conditions that cause wildlife mortality at important crossing areas such as in connective corridors, or amphibian crossing locations, through road and wildlife planning approaches;
      iv. how to maintain larger habitat areas to support development sensitive species;
      v. how to preserve rare landscape elements and associated species and connected areas with critical habitats;
      vi. how to retain large contiguous or connected areas that contain priority habitats and species;

[24] Schuett-Hames, J.P., J.M. Azerrad, M.J. Tirhi, B. Vadas Jr., C.L. Sato, C.W. May, J.L. Hayes, J.E. Jacobson, J.P. Carleton, and G.F. Wilhere. 2009. Landscape Planning for Washington's Fish and Wildlife: Managing for Biodiversity in Developing Areas. Washington Department of Fish and Wildlife. Olympia, WA, pp. 163. http://wdfw.wa.gov/publications/00023/wdfw00023.pdf

vii. how to preserve large habitat areas and sensitive locations through land use planning mechanisms like outright purchase, purchase of development rights, conservation easements, and transfer of development rights;
viii. how to maintain natural hydrologic conditions and minimize surface runoff using low-impact site design principles and the retention of natural forest and wetland cover throughout the watershed;
ix. how to protect water quality using a combination of innovative treatment BMPs and aggressive, comprehensive source controls;
x. how to maintain watershed processes (e.g., delivery and routing of water, sediment, nutrients/toxicants/bacteria, large wood, heat, forest succession, and upland disturbance regimes).
xi. how to protect in-stream habitat and natural channel morphological conditions through the control of storm-water inputs and bank-full flows;
xii. how to protect the stream-riparian ecosystem corridor, channel migration zone (CMZ), and floodplain.

8. Align the Pierce County Regional Trails Plan[25] goals with the growing network of trails plans from other jurisdictions to identify areas where communities can "adopt" a section to plant native species, assist with restoration, and set up designated photo monitoring sites to record changes over time.

Goal 2D.1. Create connections between key community destinations such as regional and county park sites and schools.
Goal 2D.2. Connect to neighboring counties and nearby jurisdictions throughout Pierce County.
Goal 2D.3. Provide linkages to the water trails and network where possible.
Goal 2D.4. Acquire trail segments that complete the regional trails system through a variety of methods.
Goal 2D.5. Work with other federal, state and local agencies to identify public property that could be used to further the regional trail system.

9. Maintain or restore to at least 65% native vegetation throughout the LWR BMA and White River Sub-basin. Per residence and boosted by keeping some large habitats in natural condition, this activity can help maintain both normal hydrological functions and connectivity for wildlife.
   a. Provide educational materials to homeowners in the Puyallup River Watershed (especially to property owners within the BMA and along the shorelines of the White River) on the importance of retaining native vegetation and forest cover.
   b. Survey homeowners with queries such as the White River and Lake Tapps Basin Plan Questionnaire to discover concerns about the use of private property to protect stream corridors, fish and other wildlife, or the water quality.

For example, out of 347 responses to that survey, 167 homeowners would not be willing to accept some limitations on the use of their property while 180 would. Of those 180, the following limits were acceptable (more than one could apply):

- Maintenance of vegetated buffer zones along streams or Lake Tapps (105)
- Limits on extent of paved or other impermeable surfaces (118)
- Limits on fertilizer or pesticide use (160)
- Retention of a proportion of the tree canopy (88)

[25] Pierce County Park and Recreation Open Space Plan, Chapter 7.1 http://www.co.pierce.wa.us/DocumentCenter/View/2895

c. Work with developers to identify best locations for native vegetation retention and open space set asides.
d. Work with property owners to plant, retain, and restore buffers around the White River, tributaries and wetlands.
    i. Organize work parties as an annual or biannual native vegetation planting event. Consider partnering with local Boy Scout or Girl Scout troops, schools, or other environmental or civic organizations for volunteers.
    ii. Target identified restoration areas for native vegetation planting events.
    iii. Pursue grant programs to help fund the purchase of native plant materials or work with local plant nurseries, Pierce and King Conservation Districts, developers or other potential sources to obtain native plant supplies.

10. Encourage targeting the purchase of land within the Lower White River for wildlife habitat.
    a. Work with property owners located within the BMA to identify parties who are interested in selling their property or a portion of their property for permanent open space, passive recreation, or conservation easement.
    b. Compile a list of willing sellers, property owners or other properties within the BMA that are a high priority for acquisition as permanent open space.
    c. Reduce the threat of habitat conversion and fragmentation (resulting from development and human activity) by purchasing PSE lands or other undeveloped open space areas along the river corridor (King County).
    d. Work with the cities of Buckley, Auburn, Pacific, and Sumner, and Forterra to promote purchase or transfer of development rights for high priority open space properties within the BMA.
    e. Submit applications to the Pierce County Conservation Futures Program for acquisition of high priority open space properties.

11. Consider using National Wildlife Federation's Community Habitat Program materials for public education. Registered Backyard Wildlife Habitats can combat habitat fragmentation.

<u>Source of Stress: Roads and Driveways</u>

1. Avoid new public and private roads that bisect and fragment the BMA considering the following criteria.
    a. Consider first the expansion of existing roads located outside or on the fringe of the BMA and install wildlife mitigation measures with the road expansion project.
    b. If a new road is the only feasible option, construct the roadway with wildlife mitigation measures.[26]
    c. Avoid new roads that bisect open space set-aside areas if at all possible.
    d. Utilize WDFW's landscape planning document to help plan where roads should go based on fish and wildlife information.
2. Work with the counties and cities to install signage along Lower White River BMA that indicates the motorist is traveling through a "sensitive wildlife area" and that this road is a "wildlife crossing area." Signage should include a caution statement to watch out for and avoid wildlife that may be crossing the road.
3. Seek to identify alternative driveway access points rather than introduce new stream crossings.

[26] Schuett-Hames, JP. J.M. Azerrad, M.J. Tirhi, B. Vadas Jr., C.L. Sato, C.W. May, J.L.Hayes, J.E. Jacobson, J.P. Carleton, and G.F. Wilhere. Draft 2008. Landscape Planning for Washington's Fish and Wildlife: Managing for Biodiversity in Develop Areas. Washington Department of Fish and Wildlife, Olympia, WA.

**Enhance Water Quality and Quantity**

Source of Stress: Application of Fertilizers, Pesticides, and Herbicides

*Conservation Strategies*

1. Evaluate the impacts of using fertilizers, pesticides and herbicides on properties within the BMA to the White River, its tributaries, and groundwater supplies.
   a. Collect water quality data over a five year time period.
   b. Work with the Tacoma Pierce County Health Department (TPCHD), Pierce County Public Works and Utilities (PWU), Pierce Conservation District (PCCD), King County Natural Resources Department, King Conservation District (KCCD) or a local water steward group to identify testing sites, gain access to monitoring equipment, etc.
   c. Develop a list of streams to apply for Pierce County's "Raise the Grade" program.
   d. Acquire commitment from the TPCHD, PWU or PCCD for sampling kits and lab costs to establish water quality information at different reaches along the White River.
   e. Educate property owners within the BMA on the importance of having their well water tested on a regular basis. Utilize this information to determine if any of the well water supplies are contaminated from the use of fertilizers, pesticides, herbicides, or other toxins.
   f. Partner with local Boy Scout or Girl Scout troops, schools, environmental or civic organizations to conduct monitoring and sampling of local streams and the White River.
   g. Encourage creation and distribution of a booklet, ideally produced by students, about the water quality monitoring in Lower White River and how the testing results impact the biodiversity in the BMA. Teachers and biologists could work with students to create such a booklet.

2. Replace the use of chemical fertilizers, pesticides, and herbicides with natural, organic, and permaculture methods.
   a. Provide increased education and outreach to property owners regarding negative impacts of using non-organic pesticides and fertilizers and demonstrate natural alternatives (such as the use of biological pest control).
   b. Provide this information as one of the community workshop topics or hold a Community Education Day to walk the neighborhood to distribute literature.
   c. Work with PCCD, WSU – Pierce County Cooperative Extension Office (WSU), KCCD or other sources to identify natural methods now available.

3. Eliminate/discontinue the spraying of herbicides within the public right-of-ways and public owned land within the BMA by working with the County Public Work Utilities Departments to assess spraying regimes.
   a. Property owners can install "no-spray" signs on their properties along public right-of-ways.
   b. Park and road maintenance crews can alter spraying practices within BMA area and should consider utilizing Integrated Pest Management systems as an alternative to the use of chemicals.
   c. Property owners can provide education and outreach to public agencies on why pesticide-free parks are beneficial.

4. Plant, retain, and restore buffers (also, request strengthened reforestation requirements from Washington Department of Natural Resources logging permits) to prevent runoff from reaching the streams and river.

Source of Stress: Domestic Animal Waste

*Conservation Strategies*

1. Acquire commitment with county/TPCHD for fecal coliform sampling kits and lab costs and collect fecal coliform water quality data for five years through local monitoring group.

2. Implement Pierce County pet waste education program.

3. Develop and implement community/school education programs to 1) prevent the introduction of nonnative species such as bullfrogs and fish, and 2) encourage wildlife friendly, responsible pet ownership.

4. Clean up after pets and livestock through community composting.
   a. Provide property owners with educational information/materials on why this is so important (i.e., impacts associated with waste).
   b. Work with local nurseries to institute a community compost program.

5. Use fencing to create a buffer between livestock pasture areas and riparian areas (i.e. the lake, creek and estuary), including wetlands and their associated buffer areas.
   a. Provide educational materials to property owners with livestock on negative impacts associated with unrestricted access to creeks and wetland areas.
   b. Partner with PCCD and KCCD staff to educate and work with property owners to help develop farm management plans.
   c. Provide educational materials to property owners with livestock on cost-share/grant programs for installing fencing between pasture areas and riparian and wetland areas.

<u>Source of Stress: Septic Tanks</u>

*Conservation Strategies*

1. Work with property owners to test all the septic tanks for possible contamination into the system.
   a. Explore available King and Pierce County or Tacoma-Pierce County Health Department programs to inspect septic tanks.
   b. Explore incentive programs to help homeowners pay for repairs as a result of inspections.

2. Collect fecal coliform water quality data within water bodies and watercourse for five years.

3. Develop and/or distribute informational packets about septic tanks that go out to all residents.

<u>Source of Stress: Runoff from Roads and Fields</u>

*Conservation Strategies*

1. Review all local jurisdictions' planning documents to determine if any storm water drains in the BMA area discharge directly into a water body, watercourse, or wetland. If this information is not available then work with the Counties or PCCD/KCCD to conduct an inventory to determine if any such stormwater drains exist. If there are any stormwater drains that discharge directly into a water body, watercourse, or wetland, then develop a community drain stenciling event to mark these drains to prohibit discharge into them.

2. Plant native vegetation along roads, driveways, roadside ditches, and channels of the tributaries to filter road runoff pollutants.

3. Work with local jurisdictions to apply new road maintenance standards to public right-of-way areas to reduce harmful impact from runoff from roads.

4. Identify culverts and ditches that deposit road runoff directly into a waterbody, watercourse, or wetland. If this information is not available, work with the county or PCCD/KCCD to conduct an inventory to determine where any such culverts or ditches exist. Work with the local jurisdiction to apply mitigation measures for pre-treatment of runoff prior to discharge into a waterbody, watercourse, or wetland. Consider applying low impact development techniques for mitigation measures.

5. Remove or move pipes in fields and industrial parks to channel untreated stormwater runoff into detention areas.

Source of Stress: Trash/Garbage

*Conservation Strategies*

1. Develop a trash pickup campaign along roadways. Work with local schools, neighborhood associations and local property owners to participate in an Adopt-a-road program to pick up trash and garbage.

2. Organize garbage cleanup days and/or educate property owners on need to keep garbage and pollutants out of habitat areas.

3. Create a watchdog team for development to report garbage dumping. When appropriate utilize the Pierce County Responds Program to report garbage dumping in the area.

**Eliminate Invasive and Introduced Species**

Source of Stress: Introduced Plant Species and Weeds

*Conservation Strategies*

1. Conduct a detailed inventory of the plants within the BMA to identify the density of invasive species and determine target areas for non-native/invasive plant removal and replanting of native vegetation.

2. Provide educational information to property owners and plant nurseries regarding the impact of local non-native and invasive plant species.
   a. Develop or obtain a booklet of invasive local weeds and mail to local property homeowners. A booklet should include the following information: list of undesirable non-native and/or invasive plant species, methods of removal, native plants that can be used to revegetate, and wildlife benefits of native plants.
   b. Contact local nurseries to discuss the impacts of non-native/invasive plant species on habitat areas, the potential to limit or eliminate the sales of non-native or invasive plant species, and how to increase the sales of native plant species.
      i. Explore the possibility for local nurseries to host monthly community education meetings.
      ii. Request local nurseries to distribute brochures on the benefits of utilizing native plant species.
      iii. Work with local nurseries to host native plant sales in conjunction with BMA events.
      iv. Request local nurseries to label invasive plant species.

3. Work with local property owners and municipal jurisdictions to remove non-native and invasive plant species within the BMA.

a. Organize a "Weed Walkabout" workshop for the community.

b. Organize weed cleanup activities utilizing PCCD, KCCD, schools, and Boy Scout troops or other local volunteers.

c. Contact Pierce County and the cities' Public Works and Parks Departments about removal of invasive species within the road right-of-way and public properties.

Source of Stress: Introduced Non-Native Wildlife Species

*Conservation Strategies*

1. Educate the homeowners and pet stores on the damage that is done when they turn loose non-native fish and wildlife species into wetlands, tributaries, and other habitat areas within the BMA.
   a. Include this information as part of lake information packet or fact sheet that should be developed for distribution to shoreline owners. Species that should be listed in the information packet include but are not limited to turtles, frogs, and aquarium fish.
   b. Contact local pet stores to discuss the impacts of non-native/invasive fish and wildlife species on habitat areas and the potential to limit or eliminate the sales of noxious/predatory fish and wildlife species.
   c. Contact WDFW enforcement if listed species are being sold.

2. Collect and destroy bullfrog egg masses. Establish a bullfrog eradication program that lasts a minimum of three years, which could be part of a whole wildlife monitoring plan and/or water monitoring program.

**Remove Fish and Wildlife Movement Blockages**

Source of Stress: Culverts

*Conservation Strategies*

1. Work with King and Pierce County, Cities of Buckley, Auburn, Pacific, and Sumner, PCCD and homeowners to replace existing culverts that are causing fish blockages.

Source of Stress: Roads and Driveways

*Conservation Strategies*

1. Monitor road kills and develop actions for better wildlife crossings where most of the kills take place.
   a. Amphibians may need crossings under roads.
   b. Mammals may need speed limit reduction, better signage, and connective corridors linking areas throughout the watershed.

2. Work with the County to establish signage along Lower White River roads that indicates this is a "sensitive wildlife area" and to drive with caution.

3. Provide education to landowners regarding the importance of maintaining vegetation corridors along roadways and driveways so that wildlife can have alternative movement corridors.

4. Work with the county, cities, and developers to design new roadways within BMA to be wildlife friendly. Roads should not create barriers and should utilize new technologies in ecological road design that incorporates the needs for stormwater treatment, safety and ecology functions (e.g., bioswales).

Source of Stress: Fencing

*Conservation Strategies*

1. Choose types of fencing or retention walls that do not impede wildlife movement.
   a. Avoid solid board on board fencing in wildlife movement corridors.
   b. Utilize smooth (as opposed to barbed) wire fencing for livestock that minimizes potential for injuring wildlife. An example is New Zealand smooth wire fencing.

**Control Erosion and Siltation**

Source of Stress: Channelization/Levees

*Conservation Strategies*

1. Improve riparian buffers along the King County-maintained levees and revetments that are limited in quality, width, and connectivity along the river corridor.
   a. Educate the public about King County's project to remove and set back levees.
   b. Engage the community in the riparian buffer restoration process.
   c. Engage the public, particularly schools, to "adopt" areas for wildlife monitoring.
2. Remove set back levees as planned in King County's updated 2013 Flood Hazard Management Plan
3. Monitor the changes (water flow, native vegetation, fish and wildlife) in the floodplain

Source of Stress: Development

*Conservation Strategies*

1. Monitor new construction activities to ensure that erosion control measures are properly installed and functioning from preventing erosion into ditch systems, watercourse, wetland, and estuary areas.
2. Local residents should call Pierce County Responds Code Enforcement with any potential violations of erosion control measures.

**Reduce Predation and Illegal Harvest of Native Species**

Source of Stress: Predation of wildlife by cats, dogs, and illegal hunting or fishing

*Conservation Strategies*

1. Provide educational materials to public on wildlife nesting and breeding seasons and encourage pet owners to keep domestic pets out of native habitat during these periods.
   a. Distribute handouts on keeping cats and dogs indoors (Seattle Audubon has good handouts on this).
   b. Address this issue as part of backyard habitat seminars.

2. Reduce the impact to wildlife from human poaching (illegal hunting) by educating the public about the effects of poaching to wildlife populations.

3. Encourage the public to report any suspected poaching to the Washington Department of Fish and Wildlife Poaching Hotline at 1-877-933-9847 or online at http://wdfw.wa.gov/enforcement/reporting_violations.html

4. Include legal hunting and fishing education in public educational forums.

**Manage Flooding**

Source of Stress: Water Fluctuation

*Conservation Strategies*

1. Work with the counties and cities to maintain buffers around wetlands to reduce major water fluctuation in the seeps, springs, wetlands, and creeks feeding into the Lower White River.

2. Maintain or restore ≥65% natural vegetation throughout the Lower White BMA (through working with the counties, cities, DNR, and property owners) to help maintain normal hydrological functions, including water level fluctuation in wetlands. This can be done per residence, and can be boosted by keeping some large patches in natural vegetation.
   a. Work with property owners within BMA to leave portions of the property in native vegetated condition, perhaps in conjunction with a Backyard Wildlife Habitat program.
   b. Organize native planting work parties with local property owners and interested non-profit agencies, schools, Boy Scout troops, Stream Team, etc.
   c. Work with property owners that have Forest Practices permits issued by DNR. Request applicants do not log in wetland buffers, increase their less restrictive buffers, and exceed restoration and reforestation requirements.

Source of Stress: Low Water Flow

*Conservation Strategies*

1. Maintaining the water level is a high priority in order for the Lower White River to function as a true river. Work with the Muckleshoot Tribe and other jurisdictions to maintain enough water in the river.

2. Conduct a review of adopted stormwater and watershed plans, or if necessary work with the county and cities to conduct a new analysis aimed at determining if any storm drains are directing water flow into the White River, tributaries and streams, or wetlands.

3. Work with the counties and cities to redirect any public storm water drains that discharge directly into a water body or water course into a pre-treatment facility that is designed to slowly infiltrate the water back into the aquifer (e.g. Low Impact Development facility).

4. Encourage property owners to leave BMA properties in an open space condition and, as an incentive, enroll their properties in the County's Current Use Assessment Program (Public Benefit Rating System) to reduce taxes.

5. Encourage property owners to conserve water by reusing, when possible, grey water and rainwater for watering plants; landscaping with native plant species that require less water; and avoiding watering at peak use times and not in the heat of the day when large amount of water is lost to evaporation.

6. Develop a viable plan for the responsible use of water allocation after severe events such as earthquake, volcanic activity, and forecasted climatic changes that can increase major flood events and long-term drought.

# Chapter V - Prioritization of Conservation Strategies for Unincorporated Pierce County

There are two distinct segments of the Lower White River Biodiversity Management Area that fall within unincorporated Pierce County. For a stretch of about nine miles upstream of the King County line, the White River has limited flood control structures and very few property owners. For the most part, parcels in this area are owned by Puget Sound Energy, the City of Buckley, and Pierce County Public Works.

Downstream of the King County line, a small part of the LWR BMA falls in a sliver of unincorporated Pierce County (about 32 acres) that is sandwiched between Sumner and the City of Pacific. This segment of the White River has levees on both banks and industrial land uses encroaching on the west. However, all of the land in this part of the BMA is owned by Pierce County Public Works or King County. The conservation strategies recommended for unincorporated Pierce County are quite different than those of other communities because of the limited ownership.

Pierce County Surface Water Management (SWM) completed a White River Basin Plan in 2013. Development of the Basin Plan included a rigorous characterization component and includes recommendations to address flooding, habitat, and water quality issues in the area. SWM incorporates actions identified in adopted Basin Plans into their capital facilities plan.

**Role of County Government in Biodiversity Conservation**

Biodiversity enhancement goals fall into two general areas: 1) protection of existing elements and 2) restoration and recovery of elements that have been damaged by human intervention. A community-driven biodiversity stewardship plan which incorporates the county's policy and regulatory tools is incomplete without the following to provide the best environment for success:

- Voluntary incentives
- Public education and outreach
- Multi-jurisdictional coordination

**Conservation Programs**

*Conversion and fragmentation reduction:* Due to the nature of the land ownership, the risk of conversion and fragmentation is relatively low. However, Pierce County has existing programs that will likely prevent conversion if any of the land owners divest their interest in these properties.

- Fish and Wildlife Critical Areas Ordinance
- Severe limits on construction in floodplains
- Wetlands Critical Areas Ordinance
- Very low density zoning designation (Rural 10)
- SWM has identified parcels for floodplain habitat acquisition in the White River Basin Plan.

*Enhance Water Quality:* The Washington State Department of Ecology completed a Total Maximum Daily Load (TMDL) plan for this portion of the White River. Pierce County has responsibilities for reducing nonpoint sources of pollution within that plan. In addition, Pierce County will continue to meet their NPDES permit conditions which are intended to protect waters of the state. The White River Basin Plan includes programmatic recommendations for addressing water quality concerns.

*Eliminate Invasive and Introduced Species:* Pierce County has a Noxious Weed Control Board that works to control detrimental introduced plant species. Also, Pierce County has been working with the Pierce Conservation District on their Japanese Knotweed control program. Pierce County Surface Water Management (SWM) has a maintenance division that is tasked with managing problem vegetation and animals on SWM property and flood control structures. SWM's Basin Plan includes a vegetation management recommendation.

*Remove Fish & Wildlife Barriers:* The White River Basin Plan didn't identify any fish passage barriers in the area upstream of the King County boundary. Nor are there any bridges or highways in that area. The area downstream of King County has passage issues related to the levees. King County is proposing to move the levee on the east side of the river back which will reconnect the river to 121 acres of floodplain habitat.

*Manage Flooding:* Pierce County has just established a Flood Control Zone District with an assessment to fund flooding concerns in Pierce County. However, the current property ownership and lack of development in the floodplain in unincorporated Pierce County has resulted in little or no need for projects in that area.

*Control Erosion:* Pierce County has some existing programs that address erosion. First, Pierce County has erosion control requirements for new construction in their Site Development Manual. Second, SWM has an Illicit Discharge Detection and Elimination program designed to respond to erosion problems from existing development. Finally, the Pierce Conservation District provides technical assistance to farms to prevent erosion from agricultural properties.

*Reduce Predation and Poaching:* Pierce County relies on the Washington State Department of Fish and Wildlife to enforce poaching laws in unincorporated Pierce County. Pierce County has animal control laws which allow them to capture free roaming dogs.

*Reduce Pollution*: Pierce County's implementation of their NPDES and TMDL program conditions are all designed to reduce pollution from stormwater in unincorporated Pierce County. This includes their enforcement obligations. Pierce County has Low Impact Development Guidance and technical assistance services available to reduce water quality impacts from stormwater.

The nature of the land use and ownership in the unincorporated portions of the LWR BMA means that the stressors on the BMA in those areas are relatively light. Such being the case, Pierce County will focus on preservation programs.

Two Pierce County programs that could have consequences for biodiversity conservation are the Conservation Futures program for land set-asides (to date 3,979 acres have been purchased with another 1,079 acres identified to be purchased by Dec 31, 2017) and the Open Space Taxation Program for landowners dedicating private land to Open Space (currently 10, 635 acres in unincorporated Pierce County; 1,164.4 acres in a BMA).

Additional regulations for BMA parcels and nearby corridors are available through the zoning category Rural Sensitive Resource. This designation is appropriate for BMA parcels, as it requires Low Impact Development practices, low density, and sets pervious cover restrictions. Such designation was applied to the Crescent Valley BMA and within biodiversity corridor connectors. Currently, RSR zoning includes 37,068.8 acres of unincorporated Pierce County.

**Suggested Voluntary Strategies for Pierce County agencies**

1. Place this current, 2016 *Plan*, in the place of the 2009 version, expressly to inform multi-jurisdictional efforts in biodiversity conservation strategies.
2. Adopt the Lower White River BMA Stewardship Plan as a Title 19D document.
3. Amend the Pierce County Comprehensive Plan Open Space Corridors Map and Biodiversity GIS layer to correct and incorporate the revised Lower White BMA boundary as evidence presents itself.
4. Align the PC Comprehensive Plan's Land Use and Environmental elements of the Pierce County Comprehensive Plan with Best Available Science practices for wildlife and native plant conservation; incorporate the term biodiversity as a value for land use regulation.
5. Support groups located in unincorporated Pierce County to act with inter-jurisdictional city and King county groups sharing parcels in the Biodiversity Network:
   a. To conduct surveys and collect 'best science' information about the Lower White River riparian system.
   b. To organize a bioblitz in the same areas "blitzed" in 2006.
   c. To work with school-related and other citizen projects in surveying the area.
   d. To collect latest information on how to keep private property and the riparian system healthy.
6. Cooperate with King County as they apply for Salmon Recovery Funding Board and other grant(s) to facilitate implementation of high priority restoration actions within the BMA.

**Suggested Community Conservation Strategies**

<u>Short Term Actions</u>

1. Encourage the goal of retaining a minimum 65% native vegetation and forest cover within the BMA.
2. Dispense educational materials concerning fish and wildlife habitat stewardship actions.
3. Maintain signage along Lower White River roads that indicates the motorist is traveling through a "sensitive wildlife area" and that this road is a "wildlife crossing area." Signage should include a caution statement to watch out for and avoid wildlife that may be crossing the road.
4. Advocate for conditions that eliminate or minimize threats to habitat fragmentation.
   a. Publicize "Habitats of Local Importance" in Title18E of the County Code.
   b. Coordinate with the cities of Buckley, Auburn, Pacific, and Sumner, and developers to help identify the best locations for designated open space areas during the development proposal review process. Look for "win-win" solutions (i.e. utilizing density bonus for open space and where best to locate open space areas in relation to the BMA).

<u>Mid Term Actions</u>

1. Foster partnerships with local Boy or Girl Scout troops, schools, or other environmental or civic organizations for volunteer restoration and monitoring events.
2. Conduct surveys and collect 'best science' information about the LWR riparian system.
   a. Coordinate with the Watershed Planning groups for current data.
   b. Coordinate with Surface Water Management and the Washington State Department of Ecology in collecting information on water quality and flow.
2. Inventory, record, and set goals for the level of native biodiversity in the BMA.
3. Engage businesses in efforts to enhance riparian vegetation and "sponsor" areas in the BMA.

<u>Long Term Actions</u>

1. Use community values and collected data to revise the PC Comprehensive Plan to better protect the persistence of native biodiversity.
2. Work with Puget Sound Energy or any succeeding owners on stewardship of LWR BMA properties.

# Chapter VI - Conclusions

**General Overview**

The availability of lowland deciduous, riparian, estuarine, and upland coniferous habitats along the Lower White River contributes to this BMA's ecological richness. Most of the at-risk, listed, and/or priority species–predicted or confirmed–within this BMA have a primary association with water for either all or part of their life cycles. Within the White River, its tributaries, streams, and wetlands, water quality should not be compromised as high water quality contributes foremost to the presence of the species predicted within.

Farmlands and pasturelands along Lower White River continue to collect water and some could be targeted for wetland restoration sites by willing sellers. In their present state, they may provide breeding locations for amphibians and reptiles, such as the Painted Turtle. Sections of Lower White River located on private property, where native vegetation has been removed to the river's edge, should be targeted for habitat restoration. Future land development should not allow removal of native vegetation along the river and associated creeks within a defined buffer. The updated Shoreline Master Program for each jurisdiction should address the need for the maintenance or restoration of native vegetation. Culverts along the creeks should be assessed for blockage to fish movement and the community should work with the local jurisdictions and Pierce County to correct these blockages and identify other target areas for restoration and protection. Landowners along these creeks, and within defined buffers of the Lower White River, should be educated on maintaining the integrity of the riparian corridors. Education should focus on vegetation retention and restoration, retaining in-stream flows to White River, and the biological importance of the Lower White River corridor. The Lower White River BMA would benefit by the application of WDFW PHS Riparian Habitat Guidelines on privately-owned riparian lands and by enforcing county regulations for development along riparian corridors. WDFW PHS recommendations for salmonids and county critical area ordinance standards should also be applied in consideration of salmonid presence.

The community should coordinate with the Forest Stewardship Council for working forest landowners (minimum of 20 acres) and continue to monitor wildlife species within and adjacent to the BMA. This can be accomplished through participation in the Tahoma Audubon birding events and WDFW's amphibian monitoring.

**Certification for Wildlife Habitat Programs (CWH)**

Puyallup Watershed Initiative (PWI) COIs, neighborhoods, and the Puyallup River Watershed Council should pursue certification in the NWF-CWH program. Puyallup River Watershed Council and city Parks Departments from Buckley, Auburn, Pacific, and Sumner should also continue to promote property owner participation in the WDFW-BWH program.

**Pursuing Conservation Strategies**

The conservation strategies outlined in Chapter IV provide a framework for abating threats to the Conservation Targets and conducting restoration of degraded habitat areas. Puyallup Watershed Initiative COIs should identify how these strategies fit within their own strategies and, with other community groups, pursue the conservation strategies outlined in this Stewardship Plan.

**Funding Options**

The National Wildlife Federation Community Habitat Program has grant monies available for schools to assist in native vegetation planting and monitoring. Partnerships within the Puyallup River Watershed

Initiative will develop funding opportunities, alongside monies from state and local agencies, the Pierce and King Conservation Districts, and environmental foundations.

**Stewardship Plans by Jurisdictions**

The Lower White River BMA runs through seven jurisdictions: Buckley, Pacific, Auburn, Sumner, King County, Pierce County, and the Muckleshoot Indian Tribe. Across these jurisdictions, the LWR BMA has the same biodiversity conservation targets. However, some unique stressors and subsequent conservation strategies will inform each jurisdiction's recommendations and their stewardship plans.

Because the configuration of the LWR BMA is long and narrow and because it includes multiple autonomous jurisdictions, the biodiversity corridor can be preserved only if goals and actions are mutual and coordinated. It is important that inter-jurisdictional meetings are held regularly to provide a forum that facilitates communication and to maximize resources.

The following chapters were developed with assistance from each city and King County. The Muckleshoot Indian Tribe chose not to engage in writing or editing their chapter (XI) of this stewardship plan.

# Chapter VII – City of Buckley

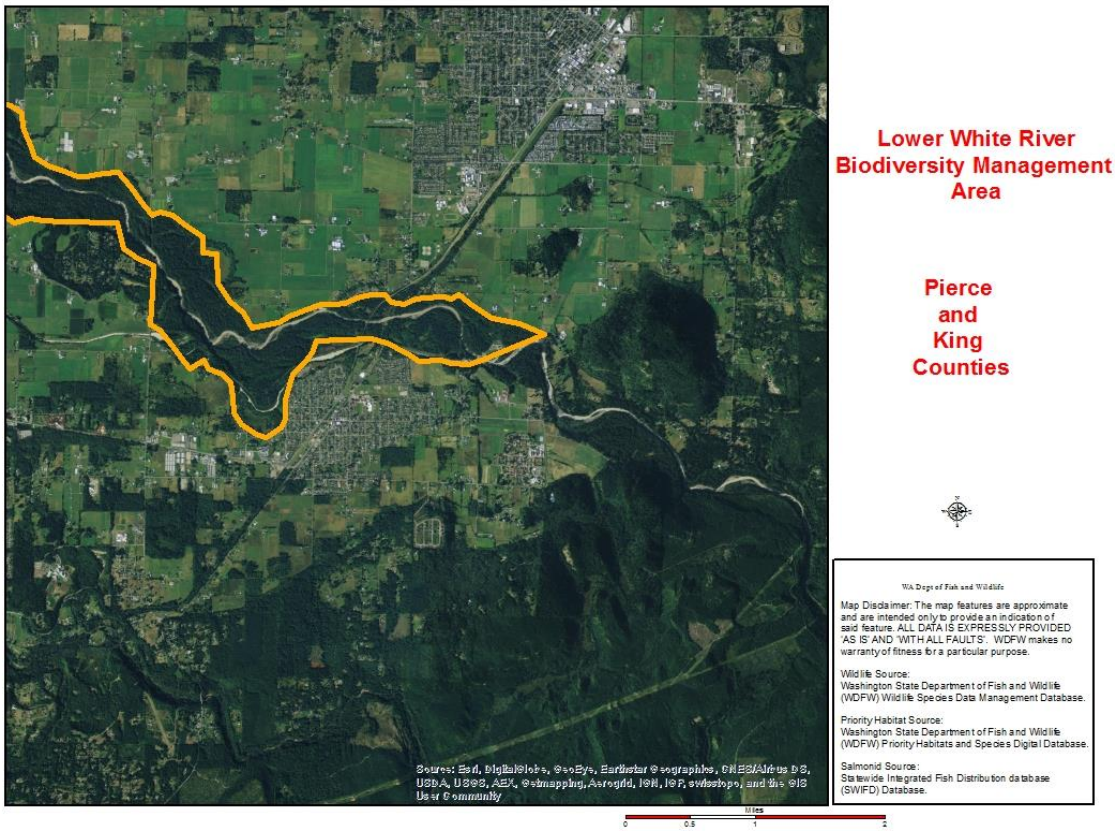



Figure VII-1. Section of the Lower White River BMA within the City of Buckley

**General Description**

The Lower White River Biodiversity Management Area (LWR BMA) is situated between the cities of Buckley and Enumclaw and portions of unincorporated Pierce and King County. The small City of Buckley is found at the junction of State Routes 410 and 165 and lies at the eastern end of the LWR BMA (Figure VII-1) and at the western end of the White River BMA. The landcover within the LWR BMA is non-irrigated agriculture, riparian dominated by hardwood trees and small shrubs, or hardwood and mixed hardwood/conifer forests.

Although this report is on the LWR BMA, it should be noted that the Greenwater BMA is subdivided into four geographic units, of which the Buckley Area (4B) butts up to the City of Buckley's south-eastern limits. Buckley's drinking water supply lies within the Greenwater BMA. The land cover within the Greenwater BMA is dominated by conifer forests with sections of hardwood trees.

**Demographics, Land Use, and Growth Potential**

<u>Unincorporated Pierce and King County</u>

The area surrounding the LWR BMA is characterized by low- and medium-density residential and commercial land uses, and forest resource lands owned and managed either by the state or by private

entities. The wildlife habitat is fragmented by the City of Buckley, but the lands generally present abundant opportunities for protection.

City of Buckley

The City of Buckley (3.95 square miles) lies along the White River across from Enumclaw in King County. The population was 4,354 in 2010 and 4,430 in 2014. The City's development assumptions and trends using 2006-2012 averages expect in these demographics in 2030:

- 10% of land used for roads
- 3% of land used for recreation or parks
- Critical Areas will be parcel specific wetlands and steep slopes
- 50% of land to be unavailable for development
- An increase of 1,339 housing units which is almost double of the 1,669 2010 housing units
- A population of 7,500*

  *To achieve the allocated number of 7500 in the year 2030, the city must grow at about 3 percent per year. The historic growth percentage is less than 2 percent. The city chooses to "relax" after achieving its 15-year-3-percent growth spurt and rest at about 1 percent growth for a few years. This will bring the population to 7,888 in 2035.

**Current Zoning and Comprehensive Plan**

Zoning

Current zoning specifically within the BMA is primarily Urban Lower Density. The corresponding zoning districts are

- R-6000 (7-9 DU/AC, a certain percentage of multi-family units allowed)
- R-8000 (5-7 DU/AC, a certain percentage of multi-family units allowed)
- R-20000 (2 DU/AC)

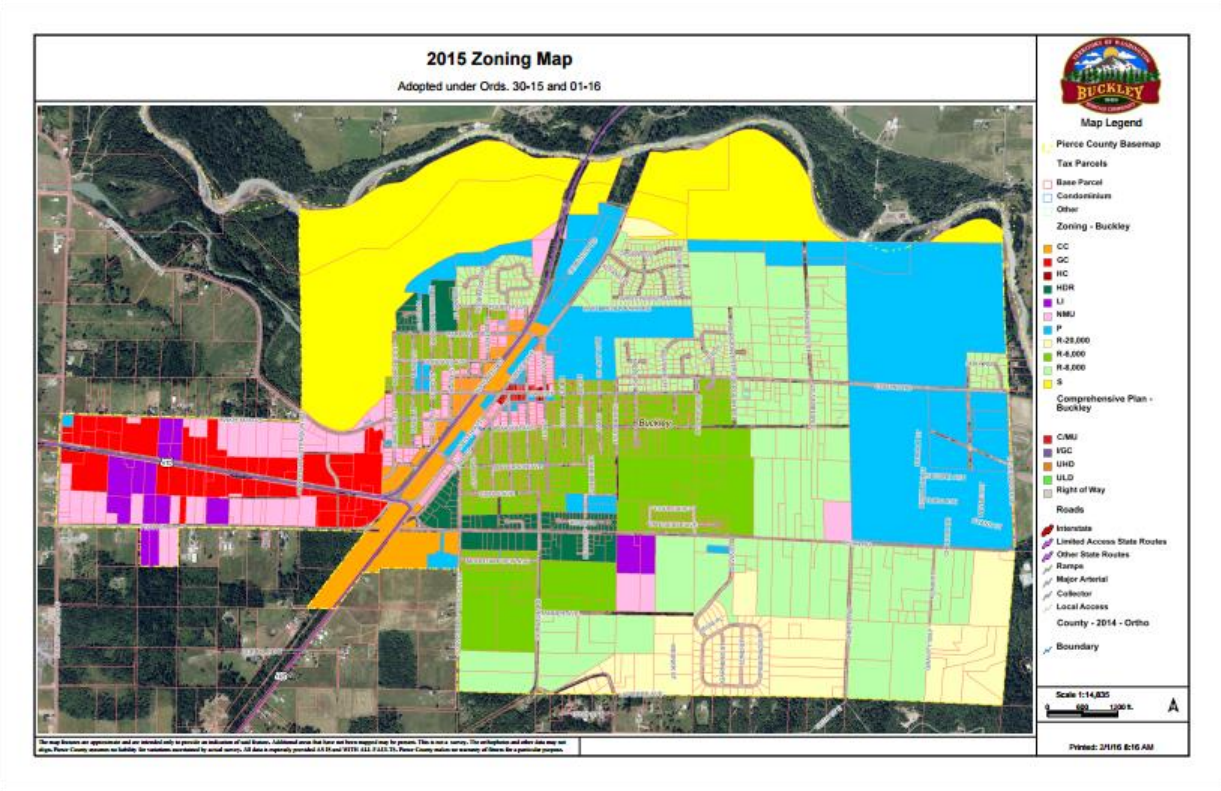



Figure VII-2. Existing Zoning Map

Figure VII-2 shows the Sensitive Area Zone (in yellow) that includes the portion of the LWR BMA located within the City limits. The Comp Plan Map (Figure VII-3) does not show zoning changes along the river. Within unincorporated Pierce County outside the City limits, the BMA is predominately zoned Rural 10 (R10) and Employment Centers.

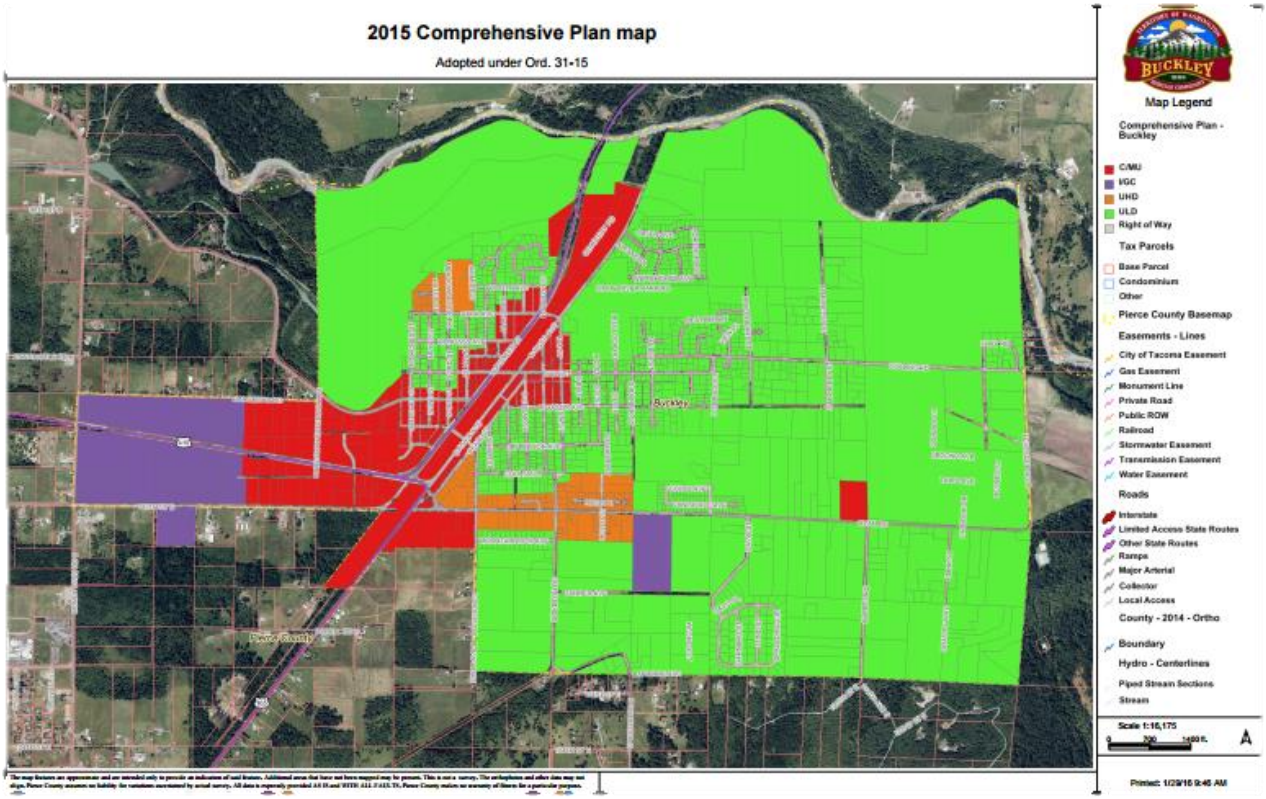



Figure VII-3. 2015 Comprehensive Plan Map

<u>Comprehensive Plan</u>

The Comprehensive Plan Land Use Element is the only element in the comprehensive plan that discusses critical areas, storm water, and pollution controls. Under Chapter 1: Resource protection it states

> "The area adjacent to the White River sustains healthy populations of fish, mammals, birds, insects, reptile, amphibians and plant life. This genetic and biological diversity, or biodiversity, should be protected. It is important to consider long-term ecosystem health and work to maintain adequate habitat and ensure the continued viability of a diversity of species to ensure the waterfront is available for our children."

This aligns well with previous chapters of this *Plan*.

**Critical Areas and Open Space Corridors**

The city does have policies protecting critical areas and endangered fish species. However, to maintain rich biodiversity in environmentally unique and sensitive areas, protections must extend to an integrated system of open space corridors functioning as buffers between natural areas and urban land uses. Identifying and conserving critical wildlife habitat including nesting sites, foraging areas, and migration corridors, as well as protecting native plant communities, are important. It does not appear that any specific corridors have been identified to accomplish these goals nor plans for conservation developed.

Critical Areas

The City of Buckley critical areas regulations are found in the Buckley Municipal Code Title 12. The City completed its last critical areas regulations update in 2005. The updated regulations are based on best available science and provide protection to critical areas in the City, including wetlands, frequently flooded areas, critical aquifer recharge areas, geologically hazardous areas, and fish and wildlife conservation areas (including lakes, ponds, and streams). There is a five-tiered watercourse typing system with standard buffers between 25 and 150 feet, and a four-tiered wetland rating system with standard buffers between 10 to 300 feet based on Ecology's rating system and the proposed land use adjacent to the wetlands.

Open Space Corridors

The Pierce County Park, Recreation and Open Space Plan was completed in 2008 and updated in 2009. (The 2014 PROS Plan is adopted but not yet under effect.) The City of Buckley has participated as a jurisdictional partner in the development of this parks and recreation program. One of the core values put forth in the plan is the conservation of natural and open spaces, wildlife habitat, shoreline environments, and ecological resources. The City has scope to emphasize and accomplish restoration projects using community volunteers and should look for opportunities to coordinate restoration efforts with Pierce County and the Pierce Conservation District for involvement in regional planning and implementation.

**Shoreline Environments**

Under the Washington State Shoreline Management Act the Lower White River is considered a "Shorelines of the State." All lands within 200 feet of the ordinary high water mark, and associated wetlands and floodplains, fall within the jurisdiction of Shorelines of the State, whose preferred uses according to the Act are (in order of priority) to:

> "recognize and protect the statewide interest over local interest; preserve the natural character of the shoreline; result in long-term over short-term benefit; protect the resources and ecology of the shoreline; increase public access to publicly owned shoreline areas; and increase recreational opportunities for the public in the shoreline area."

All shorelines, including those designated as Shorelines of the State, are classified into "environment designations" based on their physical, biological, and development characteristics. Historically, Plans have used primarily 4 basic environment designations:

- Natural
- Conservancy
- Rural
- Urban

New state guidelines recommend 6 designations:

- Natural
- Rural Conservancy
- Urban Conservancy
- High Intensity
- Shoreline Residential
- Aquatic

Local governments may modify state recommendations to better accommodate shoreline areas with unique characteristics. These environments are similar to zoning designations allowing different land uses,

densities and activities ranging from the most intensive uses (High Intensity) to very limited uses (Natural). The City of Buckley adopted their SMP in May, 2013, stating the following shoreline designations:

- Special Use – a special environment designated for the barrier dam and the portion of flume located within shoreline jurisdiction.
- Urban Conservancy – currently developed or are planned to accommodate future development, in support of some measure of human interaction, such as recreation.
- Natural – undeveloped and largely unaltered by human interaction. These areas provide the most ecological functions (such as wildlife habitat) for the shoreline.
- Aquatic Environment – includes the White River, waterward of the ordinary high water mark.

The City completed a comprehensive inventory and analysis of its shores (The Watershed Company, 2010) as an element of its Shoreline Master Program (SMP) Update. At that time, not including aquatic areas, the shoreline jurisdiction totaled approximately 362 acres (0.57 square miles) in area and encompassed about 9.2 miles of shoreline. The City owned six shoreline parcels totaling 220 acres, not including the city's informal shoreline park, Riverside Park where SR401 crosses the river. It is the only City-owned parcel with public access (Figure VII-5). In 2015 the City purchased former Puget Sound Energy property, adding15.5 shoreline acres at the city's north-eastern boundary.

Most of the shoreline down and upstream from Buckley is designated as Conservancy. The City's shoreline is designated as Natural with three sections designated as Urban Conservancy, and a small segment designated as Special Use (Figure VII-5). The White River barrier dam and its associated facilities define most of the Special Use reach. The City's only flood plains are next to the river. The steepest slopes are on the north side between the residential areas and the river. The SMP allows no residential or commercial development.

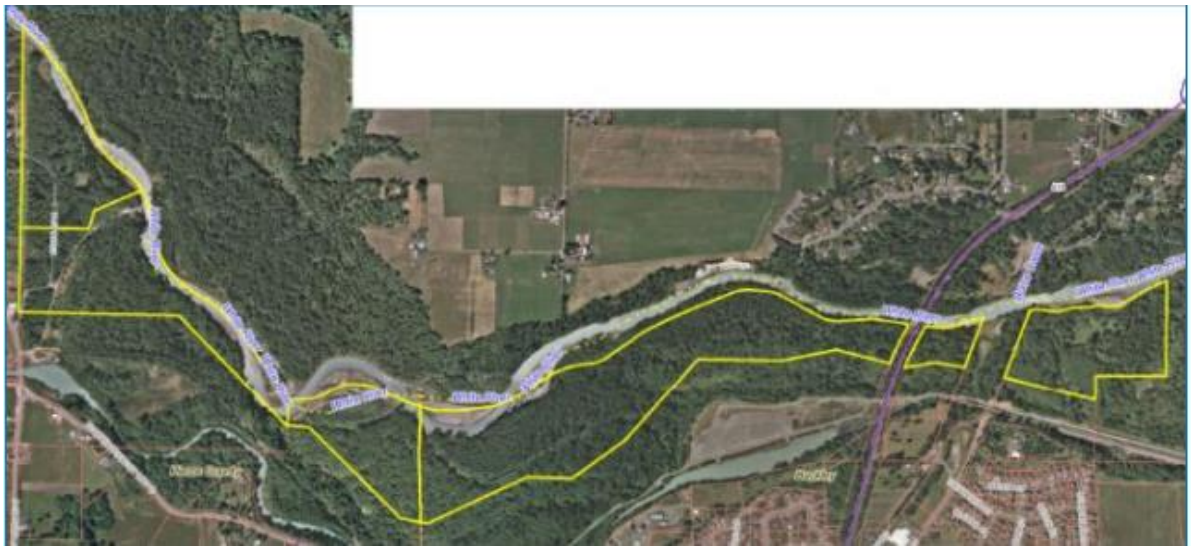


Figure VII-4. City Owned Shoreline Parcels (outlined in yellow have since been slightly altered, see Chapter II, page 37)

A restoration plan was developed in accordance with statewide provisions (WAC 173-26-201(2)(f)) to achieve overall improvements in shoreline ecological functions over time, when compared to the status upon adoption of the Shoreline Master Program. The City's Comprehensive Plan (2005) included the following goals and policies to promote restoration in the shoreline:

- Land Use Element Goals:
    - 1.4 - Have critical areas and environmentally sensitive areas receive consideration when designating areas for more intensive development.
    - 1.5 - Protect, preserve, and enhance endanger fish and wildlife habitat.
    - 1.6 - Have a well-maintained, interconnected system of multi-functional parks, recreational facilities, and open spaces that is attractive, save, and available to all segments of the City's population.
- The Pierce County updated SMP includes five goals in its restoration report component (ESA, Adolfson 2009). These goals are intended to fulfill the County-wide restoration vision.
    - Improve shoreline processes, functions, and values over time through regulatory and voluntary and incentive-based public and private programs.
    - Increase the availability, viability and sustainability of shoreline habitats for salmon, shellfish, forage fish, shorebirds, marine seabirds, and other species.
    - Improve habitat quality for sensitive and/or locally important species.
    - Support the biological recovery goals for federally protected species.

The City and County identified goals, section C6.0, "Strategies to Achieve Local Restoration Goals," including measures designed to foster shoreline restoration and achieve a net improvement in shoreline ecological processes, functions, and habitats. With projected budget and staff limitations, the City does not anticipate leading most restoration projects or programs in the short term. However, the SMP represents "an important vehicle for facilitating and encouraging restoration projects and programs that could be led by private and/or non-profit entities."

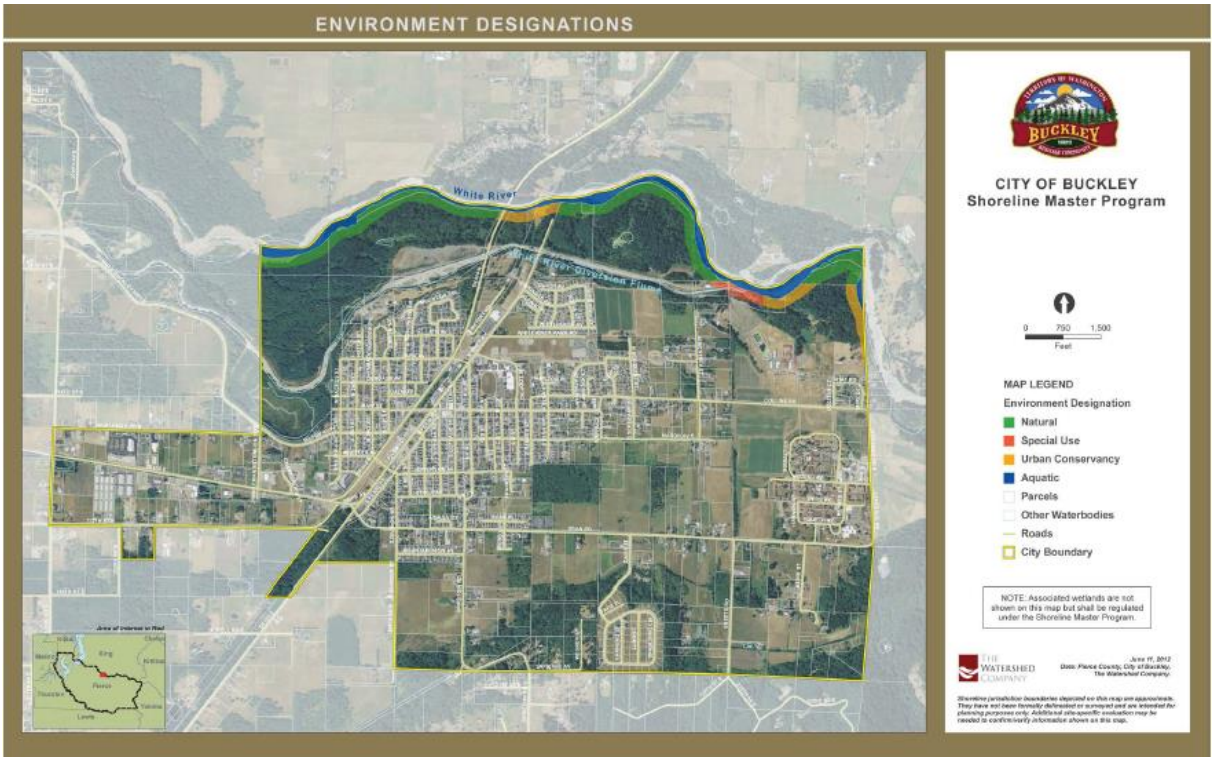



Figure VII-5. City of Buckley Shoreline Environment Designations

**Fish and Wildlife Resources**

Fish and Wildlife Habitat Area

The 2015 Comprehensive Plan Update expands on multiple topics including Resource Protection.

> "The area adjacent to the White River sustains healthy populations of fish, mammals, birds, insects, reptile, amphibians and plant life. This genetic and biological diversity, or biodiversity, should be protected. It is important to consider long-term ecosystem health and work to maintain adequate habitat and ensure the continued viability of a diversity of species to ensure the waterfront is available for our children."

Fish and wildlife have similar needs as humans. They need clean water, fresh food, and clean safe habitat area to raise their young. For fish, this means that there is an adequate supply of clean, cool water. This can be provided through the retention of shading vegetation on the banks of streams and rivers. Clean water can be retained through stormwater control structures that remove sediment and pollutants. Streamside vegetation can also provide safe habitat through shading and the provision of hiding places for adult and juvenile fish.

The White River supports three salmonid species that are listed as threatened under the Endangered Species Act: Puget Sound Chinook, Puget Sound steelhead, and Coastal-Puget Sound bull trout. The White River is particularly important to Chinook recovery because it is the only population of spring Chinook in south Puget Sound. The White River also supports pink, chum, coho, and sockeye[27] salmon, as well as cutthroat trout. The mouth of Boise Creek falls within the BMA. Boise Creek supports Chinook, coho, and pink salmon, steelhead, bull trout, and cutthroat trout.

The Washington Department of Fish and Wildlife's (WDFW) Priority Habitats and Species (PHS) map (Figure VII-6) shows locations of PHS species. PHS is the principal means by which WDFW provides important fish, wildlife, and habitat information to local governments, state and federal agencies, private landowners and consultants, and tribal biologists for land use planning purposes. PHS is the agency's primary means of transferring fish and wildlife information from their resource experts to those who can protect habitat. The entire area is light purple signifying that is a priority habitat for elk, and the river for salmon. The purple point shows the location of Bald Eagle breeding area.

[1]Gustafson, R.G., T.C. Wainwright, G.A. Winans, F.W. Waknitz, L.T. Parker, and R.S. Waples. 1997. Status review of sockeye salmon from Washington and Oregon. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-33, 282 pp.

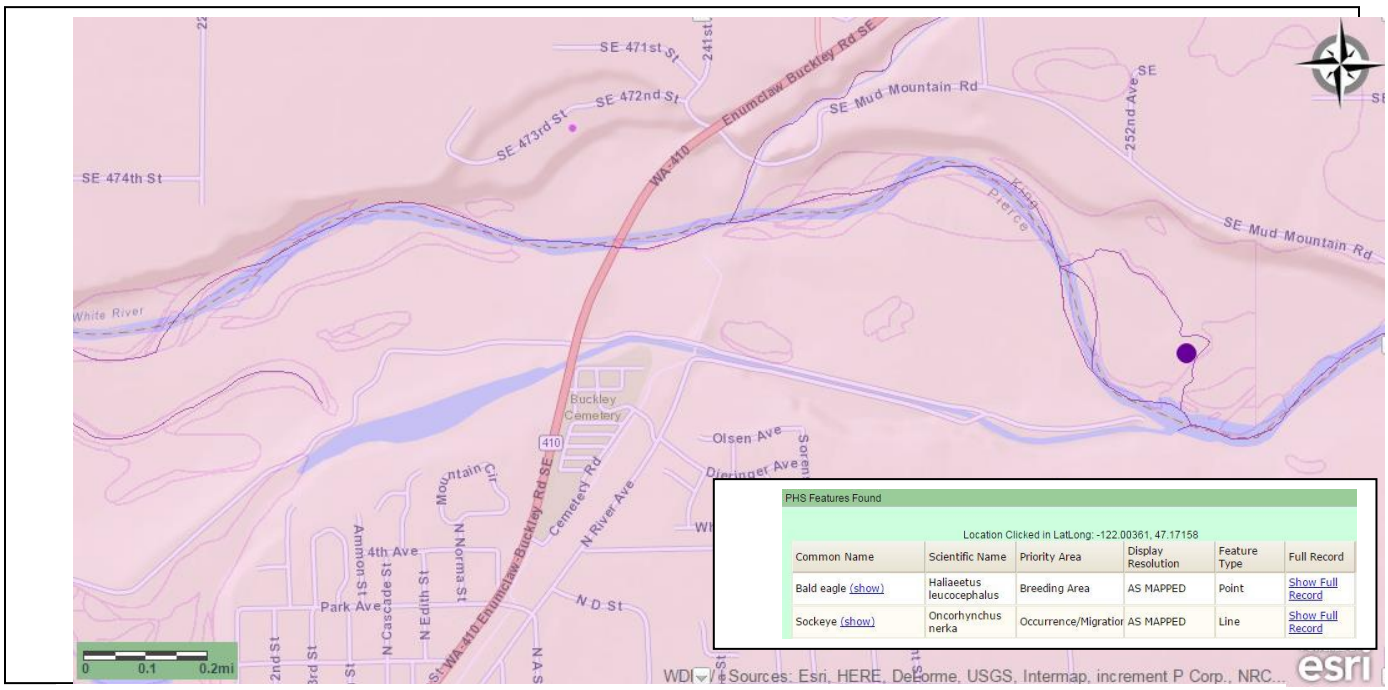



Figure VII-6. WDFW PHS Map

A 24-hour bioblitz (discussed in Chapter I) was conducted on June 2-3, 2006, in three large areas (Buckley and vicinity, Auburn, and Pacific) within and surrounding the LWR BMA extending into the riparian forests to confirm the species predicted to inhabit the LWR BMA. Data points collected on lands around the City of Buckley and the Marion Grange (2006 bioblitz's Science Central location) are shown on Figure VII-7 and data are listed in Table 13.

During the bioblitz, a total of 54 bird, 11 mammal, 2 reptile, 6 amphibian, and 4 fish species, and 42 terrestrial and 14 aquatic invertebrates were confirmed in the Buckley city limits or in close proximity. Fourteen species were "species of interest" as being either a WDFW PHS species of concern or a state or federal listed species. Two of those species (Pileated Woodpecker and Silver-haired bat) are considered GAP at-risk species[28]. The other 12 species were: Bald Eagle, Great Blue Heron, Vaux's Swift, Olive-sided Flycatcher, Turkey Vulture, Willow Flycatcher, Band-tailed Pigeon, Spotted Sandpiper, Red-legged frog, Big brown bat, California myotis, and Little brown myotis. Invertebrates were mainly collected between Buckley and Auburn during the 2006 bioblitz. Native and non-native plant data were collected in the same areas (Tables 3 and 4).

Another bioblitz is recommended in the Buckley area on both sides of the river during the winter to provide additional information as to what species are using the BMA throughout all seasons.

In the face of climate change, it is unknown what changes in the habitat and landscape will occur in the short term and/or long term. It is possible that some species' ranges will expand while others will contract or shift out of the area entirely, and it is unknown what species that were previously not present might move into the area. Range shifts may occur both horizontally (north-south or east-west) and vertically (up and down slope). Additionally, it is unknown what the impacts of species shifts will have on other species that are currently resident.

[28] Pierce County GAP Application Pilot Project: A Biodiversity Plan for Pierce County, Washington, January 2000.

Species of Concern and Noxious Weeds

The City's SMP lists all the noxious weeds and endangered, threatened, and sensitive species for Washington State in its Table 7, Class A-C Washington State Noxious Weeds, and Table 8,Threatened, Endangered, and Candidate Species. In this chapter, **Table 13** lists species that are predicted to occur in the LWR BMA and were found. Each species is notated with its status in Washington State. Table 3 (pages 28-29) and Table 4 (pages 30-32) in this *Stewardship Plan* list all plants found during the bioblitz, including noxious weeds. This information provides more precise information for the City of Buckley that can be used as a baseline for future bioblitzes, surveys, restoration, and land-use projects.

**Buckley and Vicinity, 2006**

Bioblitz data were reported at the locations marked below:

Mammals – yellow

Birds – white

Plants – green

Amphibians - purple

Invertebrates - red

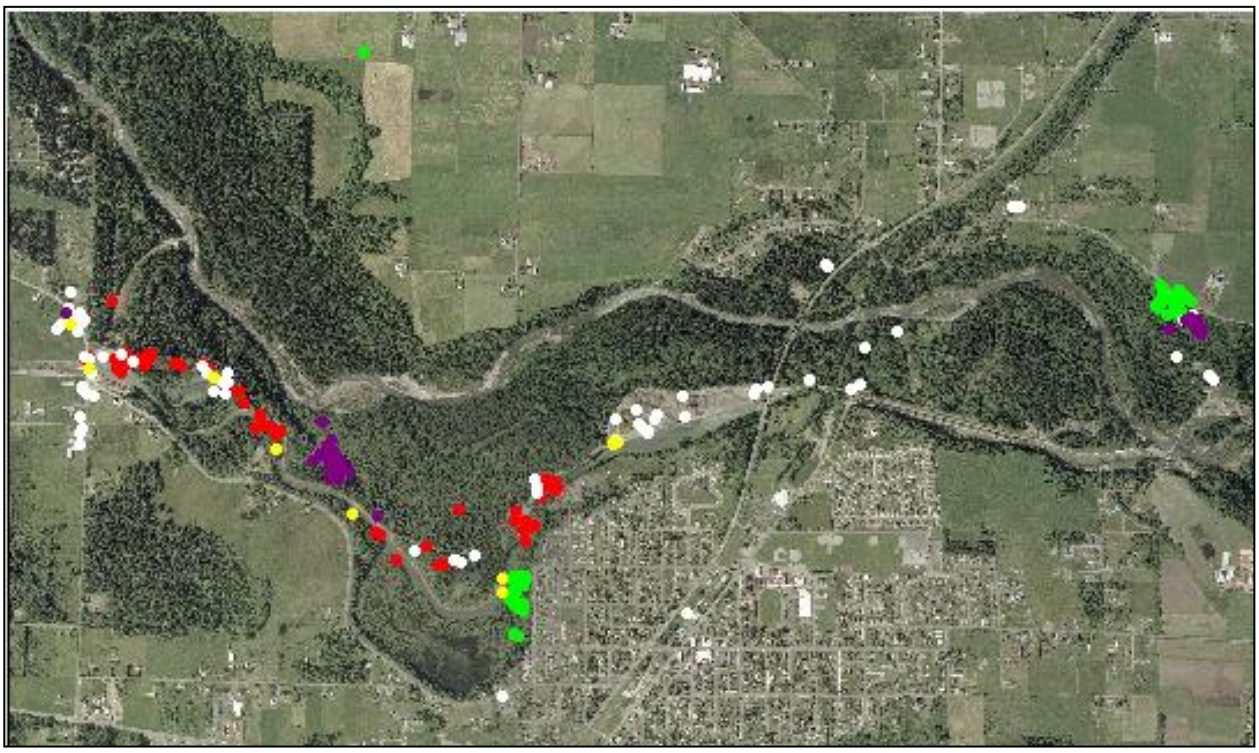


Figure VII-7. Bioblitz Data Locations 2006

## Table 13 PREDICTED AND CONFIRMED WILDLIFE AND FISH SPECIES FOR THE LOWER WHITE RIVER BMA

**Note: Predicted species lists were not developed for fish**

| AMPHIBIANS | Buckley | |
|---|---|---|
| *Bullfrog* | X | |
| Ensatina | | |
| Long-toed salamander | X | |
| Northwestern salamander | X | |
| Pacific treefrog (Chorus frog) | X | |
| Red-legged frog [3] | X | |
| Roughskin newt | X | |
| Western toad [3] | | |
| | | |
| **REPTILES** | | |
| Common garter snake | X | |
| Northern alligator lizard | | |
| Northwestern garter snake | | |
| Painted turtle [1] | | |
| Rubber boa | | |
| Western terrestrial garter snake | X | |
| | | |
| **FISH** | | |
| Prickly sculpin | X | |
| Sculpin spp. | X | |
| Speckled dace | X | |
| Western brook lamprey | X | |
| | | |
| **INVERTEBRATES** | | |
| 42 terrestrial species, 7 non-native | X | |
| 14 aquatic species, 3 non-native | | |

| BIRDS | Buckley | |
|---|---|---|
| American bittern [2] | | |
| American coot | | |
| American crow | X | |
| American dipper | | |
| American goldfinch | X | |
| American kestrel | | |
| American robin | X | |
| Bald eagle [3,4] | X | |
| Band-tailed pigeon [4] | X | |
| Bank swallow | X | |
| Barred owl | X | |
| Barn swallow | X | |
| Belted kingfisher | X | |
| Bewick's wren | X | |
| Black-capped chickadee | X | |
| Black-headed grosbeak | | |
| Black-throated gray warbler | X | |
| Blue-winged teal | | |
| Brewer's blackbird | X | |
| Brown creeper | X | |
| Brown-headed cowbird | X | |
| Bushtit | | |
| California quail | | |
| Canada goose | X | |
| Cedar waxwing | | |
| Chestnut-backed chickadee | | |
| Cinnamon teal | | |
| Cliff swallow | | |
| Common barn-owl | X | |
| Common merganser | X | |
| Common nighthawk | X | |
| Common raven | X | |
| Common snipe | | |
| Common yellowthroat | X | |
| Cooper's hawk [2] | | |
| Dark-eyed junco | | |
| Downy woodpecker | | |
| *European starling* | X | |
| Evening grosbeak | X | |
| Gadwall | | |
| Glaucous-winged gull | | |
| Golden-crowned kinglet | | |
| Great blue heron [3,4] | X | |
| Great horned owl | | |
| Green heron (Green-backed) [3] | | |
| Green-winged teal | | |
| Hairy woodpecker | | |
| Hooded merganser [4] | | |
| House finch | X | |
| *House sparrow* | X | |
| House wren | | |
| Hutton's vireo | X | |
| Killdeer | X | |

Table 13

## PREDICTED AND CONFIRMED WILDLIFE AND FISH SPECIES FOR THE LOWER WHITE RIVER BMA

**Note: Predicted species lists were not developed for fish**

| BIRDS (Cont'd) | Buckley | | BIRDS (Cont'd) | Buckley | |
|---|---|---|---|---|---|
| Lazuli bunting | X | | Wilson's warbler | X | |
| Macgillivray's warbler | | | Winter wren | X | |
| Mallard | X | | Wood duck [4] | | |
| Marsh wren | | | Yellow warbler [2] | | |
| Mourning dove | | | Yellow-rumped warbler | X | |
| Northern flicker | X | | | | |
| Northern harrier | | | **MAMMALS** | | |
| Northern oriole | | | Beaver | | |
| Northern rough-winged swallow | X | | Big brown bat [4] | X | |
| Northern shoveler | | | Black bear | | |
| Olive-sided flycatcher [3] | X | | Black rat | | |
| Orange-crowned warbler | | | Black-tailed deer [4] | | |
| Osprey [3] | | | Bobcat | | |
| Pacific slope flycatcher (Western) | | | California myotis [4] | X | |
| Pied-billed grebe [4] | | | Coast mole | | |
| Pileated woodpecker[2,3] | X | | Coyote | | |
| Pine siskin | X | | Creeping vole | | |
| Purple finch | X | | Deer mouse | X | |
| Red-breasted nuthatch | | | Douglas squirrel | | |
| Red-breasted sapsucker | X | | Dusky (Montane) shrew | | |
| Red-eyed vireo | | | *Eastern cottontail* | X | |
| Red-tailed hawk | X | | *Eastern gray squirrel* | | |
| Red-winged blackbird | X | | Elk | X | |
| Rock dove | | | Ermine | | |
| Ruddy duck | | | Fisher [2,3,4] | | |
| Ruffed grouse | | | Hoary bat | X | |
| Rufous hummingbird | X | | Little brown myotis [4] | X | |
| Savannah sparrow | | | Long-eared myotis [3,4] | | |
| Song sparrow | X | | Long-legged myotis [3,4] | | |
| Sora | | | Long-tailed (Forest) deer mouse | X | |
| Spotted sandpiper [4] | X | | Long-tailed vole | | |
| Spotted towhee (Rufous-sided) | | | Long-tailed weasel | | |
| Steller's jay | | | Mink [4] | | |
| Swainson's thrush | X | | Mole spp. | | |
| Townsend's warbler | | | Mountain beaver | | |
| Tree swallow | | | Mountain lion | | |
| Turkey vulture [3] | X | | Muskrat | | |
| Vaux's swift [3,4] | X | | Northern flying squirrel | | |
| Violet-green swallow | X | | *Norway rat* | | |
| Virginia rail | | | *Nutria* | X | |
| Warbling vireo | X | | Pacific jumping mouse | | |
| Western meadowlark | | | Pacific water shrew [3] | | |
| Western screech-owl | | | Porcupine | | |
| Western tanager | X | | Raccoon | | |
| Western wood-pewee | X | | Red fox | | |
| White-crowned sparrow | X | | River otter | X | |
| Willow flycatcher [3] | X | | Shrew-mole | | |

Table 13

## PREDICTED AND CONFIRMED WILDLIFE AND FISH SPECIES FOR THE LOWER WHITE RIVER BMA

**Note: Predicted species lists were not developed for fish**

| MAMMALS (Cont'd) | Buckley | |
|---|---|---|
| Shrew spp. | | |
| Silver-haired bat [2] | X | |
| Southern red-backed vole | | |
| Spotted skunk | | |
| Striped skunk | | |
| Townsend's big-eared bat [2,3,4] | | |
| Townsend's chipmunk | | |
| Townsend's mole | | |
| Townsend's vole | | |
| Vagrant shrew | | |
| Virginia opossum | | |
| Vole spp | | |
| Yuma myotis [3,4] | | |

***Footnote:***

(1) - Trigger Species - Species that needed additional mapped land cover units to ensure representation within the network

(2) - At-Risk - Washington Gap Analysis Project (WAGAP) selected species considered to be most as risk of continued or future population declines due to human activities

(3) - Listed (State or Federal) - Species listed as State endangered, threatened, sensitive, candidate or monitor, as well as species listed or proposed for listing by the U.S. Fish and Wildlife Service

(4) - PHS - a species defined as priority under the WDFW Priority Habitats and Species (PHS) Program

(5) - Included based on species significance under the WDFW PHS/Heritage database, although not predicted to occur

Non-native species are italicized

**Conservation Targets**

At a landscape level, "conservation targets" (systems) may include ecological systems, ecological communities, species, and other important natural resources. Ecological systems share common ecological processes (e.g., hydrology), environmental features (e.g., soil types), or environmental conditions (e.g., precipitation). Ecological communities have common or co-occurring features such as species or natural vegetation types.

In the Lower White River BMA several conservation targets were selected to represent the key habitat types occurring throughout the area. These conservation targets include:

- Lower White River
- Tributaries, wetlands, and oxbows
- Conifer/deciduous mixed forest areas

Combined, conservation targets create the rich variety of habitats necessary to foster a high level of biodiversity in the BMA. A detailed description of each conservation target can be found in Chapter III.

**Threats to Conservation Targets**

The main threats that are or may potentially be occurring to conservation targets include:

- Habitat conversion and fragmentation due to development, removal of native vegetation and roads;
- Poor water quality caused by residential and use of fertilizers, domestic animal feces, septic tank leakage, herbicides from road maintenance, farming and commercial sites, and road runoff;
- Loss of pools and large woody debris (LWD) due to development and channelization of the river;
- Introduction of invasive, non-native plant and animal species such as bullfrogs and Japanese knotweed;
- Fish passage blockage from culverts;
- Wildlife movement blockages from roads, driveways, and fencing;
- Erosion and damage to riparian habitat from dikes/levees along Cities of Buckley, Pacific, and Sumner;
- Predation of native species by domestic cats, dogs, and unregulated hunting and fishing;
- Stormwater and illegal discharge dumped directly into the river–
    - Water fluctuation surges due to storm drains from development redirecting water flow into the river and not into wetlands, dikes, and stormwater ponds; and
- Pollution caused by dumping of trash and debris into or near the river.

**Overview of Conservation Strategies**

Conservation strategies have been identified to ascertain the level or severity of a potential threat, directly abate known threats, or identify restoration opportunities where degradation has occurred. Some threats apply to multiple conservation targets and as such the conservation strategies have been grouped under the following categories:

- Reduce Habitat Conversion and Fragmentation (due to development and human activity)
- Eliminate Invasive and Introduced Species
- Remove Fish and Wildlife Movement Blockages
- Enhance Water Quality and Quantity
- Manage Flooding
- Control Erosion and Siltation
- Reduce Predation by domestic cats and dogs and Poaching of Native Species
- Reduce or Eliminate Pollution within the LWR BMA

**Role of City Government in Biodiversity Conservation**

Biodiversity enhancement goals fall into two general areas: 1) protection of existing elements and 2) restoration and recovery of elements that have been damaged by human intervention. A community-driven biodiversity stewardship plan which incorporates the city's policy and regulatory tools is incomplete without the following to provide the best environment for success:

- Voluntary incentives
- Public education and outreach
- Multi-jurisdictional coordination

Update existing regulatory tools

Future updates to Buckley's Comprehensive Plan should specifically identify the Lower White River Biodiversity Management Area (LWR BMA) as a valuable community asset. Biodiversity conservation goals, policies, and regulations are a way to preserve it. The Comprehensive Plan is the primary policy document for City governance and sets the foundation for land use and development regulations. This *Plan* encourages jurisdictions to add conservation language to comprehensive plans for land management in the BMA and adjacent areas. These may include examining zoning codes within the BMA and adjacent areas that establish acceptable land uses and complementary development ordinances (critical areas, stormwater management, etc.). This *LWR BMA Stewardship Plan* can be used to inform this process.

Provide Voluntary Incentives

There are a variety of tax incentive programs used by various city and county governments to reward landowners for native wildlife conservation on private property. These can include programs administered by cities, state or federal entities. As an example, landowners who certify their property as Open Space under Pierce County Public Benefits Rating System can qualify for property tax reduction. Those currently available in Washington are listed in Appendix II. The City of Buckley should consider implementing its own tax incentive program and/or promote those listed in Appendix II to landowners within the LWR BMA

Additional mechanisms the City can use for biodiversity protection involves purchasing property within and adjacent to the BMA thru fee simple land acquisition or purchasing development rights to properties. The City might consider creating its own Transfer of Development Rights/Purchase Development Rights (TDR/PDR) program similar to that created by the City of Tacoma in 2012 to encourage the retention of biodiversity areas and transfer urban development to more appropriate locations within the city boundaries.

Offer Public Education and Outreach Programs

The City of Buckley is at the *Registered* level in National Wildlife Federation's Community Wildlife Habitats Program. The City can use this forum to disseminate general information on the benefits of biodiversity. The City can take the lead in inter-jurisdictional actions, challenging other cities along the LWR to do the same.

The term "biodiversity" has been given many definitions making it confusing to the public. As stated in the Introduction of this *Plan*, biodiversity has been defined as the existence of a wide variety of plant and animal species in their natural environments. Maintaining biodiversity is economically valuable because it provides breathable air, drinkable water, food, pollution and pest control, and resilience after natural catastrophes, such as floods and drought.

Stormwater and biodiversity issues do overlap. Existing programs can emphasize the overlaps. Climate change and biodiversity also are deeply intertwined. Landowner education can help the community take steps such as preserving and planting native vegetation to meet extreme events of drought or flood.

Participate in Multi-jurisdictional Groups

An important element for success will be the coordination of efforts among all jurisdictions within the Lower White River BMA: Pierce County, King County, the Cities of Auburn, Sumner, Pacific, Enumclaw, and Buckley. Along with an engaged citizen group, jurisdictions can gain support from various government and non-governmental organizations such as Pierce Conservation District, King Conservation District, Forterra, and the Puyallup River Watershed Council. Such coordination allows periodic reviews of biodiversity action plans.

Remove Fish and Wildlife Barriers

One avenue the City of Buckley might consider for removing barriers to fish is to apply for project funds thru the Pierce County Community Salmon Fund. The National Fish and Wildlife Foundation (NFWF) and Pierce County formed the Pierce County Community Salmon Fund in 2002 as a funding program for restoration projects that involved landowners and raised local support for salmon recovery. The goals of the Fund are:

- To fund salmon protection and restoration projects that have a substantial benefit to the watershed and that are consistent with Pierce County's Ecosystem and Diagnosis Treatment (EDT).
- To enlist landowners and community groups in project implementation and monitoring.

Lead entities are local, watershed-based organizations created by RCW 77.85 to solicit, develop, prioritize and submit habitat protection and restoration projects for funding by the state's Salmon Recovery Funding Board. The Pierce County Lead Entity committee, staffed by Surface Water Management, is comprised of County, Tribal, Conservation District, citizens and state agency staff. It has been extremely successful in getting funds to build projects that improve salmon habitat in the Puyallup, Carbon and White rivers, as well as South Prairie, Chambers and Clover creeks and important tributaries in both watersheds. Many of these projects have also reduced flood hazards by removing flood prone houses and structures and building setback levees that create habitat and protect upland properties.

The Pierce County Lead Entity committee also strives to share their passion and spread the word about the importance of salmon and the link between healthy salmon runs and the great quality of life afforded by the natural resources in the county. The committee also runs the King County Cooperative Watershed Management Grant rounds for the King County portion of WRIA 10. The grant rounds generally begin in early spring when they can add official members to their citizens committee. Public participation is always welcome at their meetings.

Transportation and Trails

Other barriers to wildlife movement include roads and fencing. Along with minimizing development within the LWR BMA, the City of Buckley might also consider limiting new road development and decommissioning unmaintained roads within the BMA. This suggestion aligns with the Transportation Element of the Comprehensive Plan.

> Goal 5.6 Transportation improvements should be constructed with reduced environmental impacts. Policy 5.6.1 All transportation improvements should minimize impervious footprints and use current stormwater techniques as required in Title 14 of the Buckley Municipal Code - Policy and water runoff.

Policy 5.6.3 New roads and trails should be designed in such a way that they will not affect wetlands, natural preserves, parks and recreation areas, significant historical and cultural resources, and areas identified as critical wildlife habitat.

The City of Buckley is part of Pierce County's Regional Trails Plan which is popular among Pierce County residents. The intent of the regional trail system is to provide recreational opportunities, promote healthier lifestyles, create connections between major developed areas and destinations, and enhance non-motorized transportation options throughout the county. Figure 20 illustrates Pierce County trail connection opportunities for continued regional trail expansion. However, with the Foothills Trail, Buckley's largest open space area, running through the middle of the city (Figure VII-8), other trails may proliferate (such as the proposed shoreline trails–light blue dots in Figure VII-9), threatening the persistence of native wildlife in the BMA.

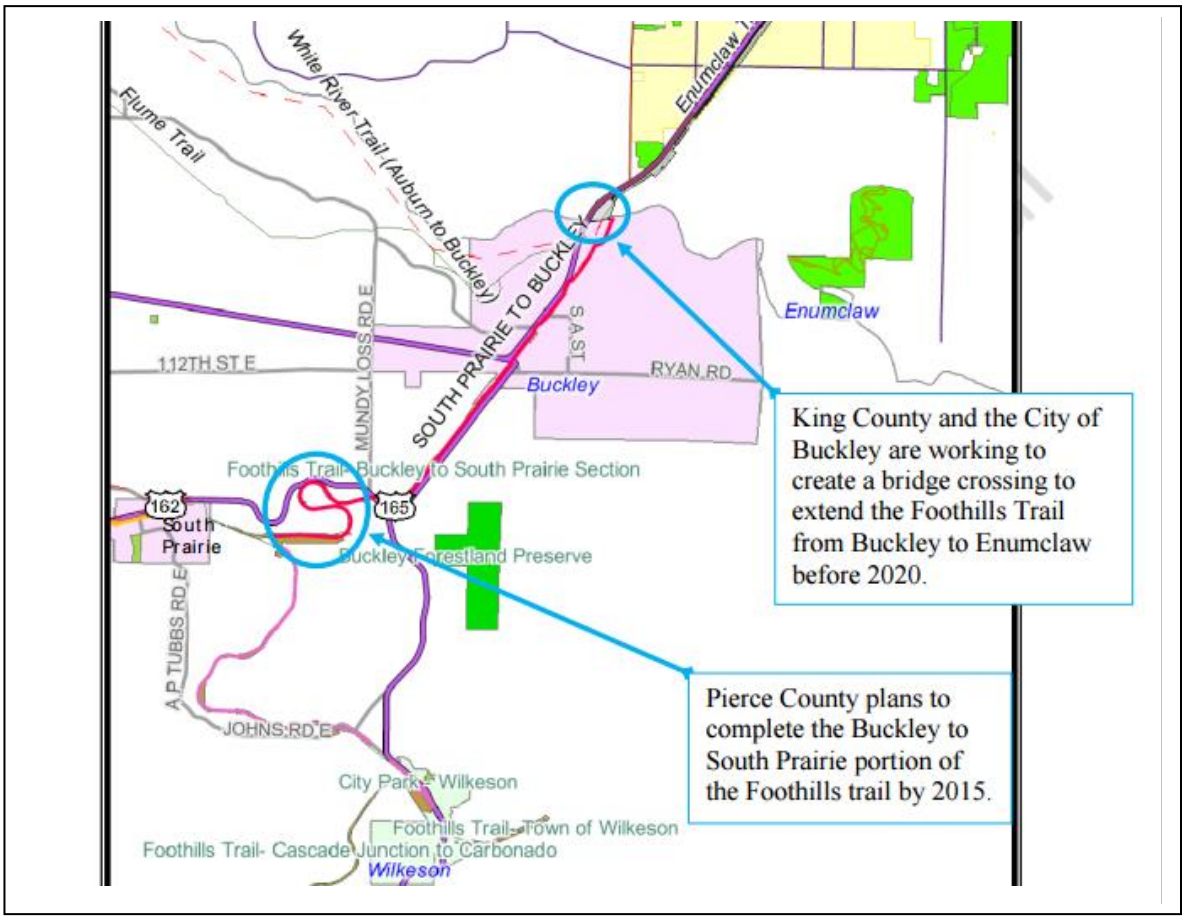



Figure VII-8. Foothill Trail Expansion

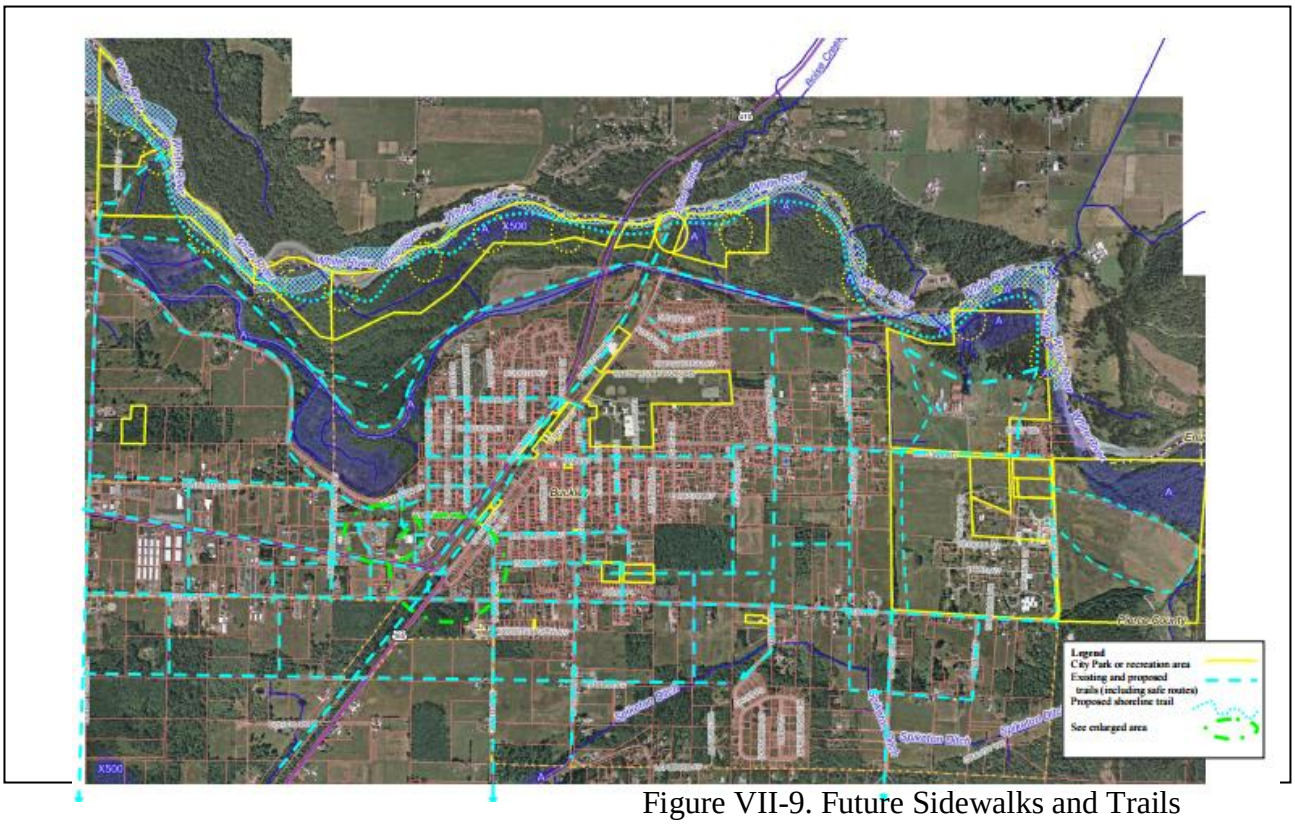


Figure VII-9. Future Sidewalks and Trails

**Suggested Voluntary City Government Strategies**

Short Term Actions

1. Participate in and contribute to LWR BMA inter-jurisdictional organized activities.
2. Identify and advocate for conditions that eliminate or minimize threats to habitat fragmentation.
3. Continue to apply for Salmon Recovery Funding Board and other grants to facilitate implementation of high priority restoration projects within the BMA.
4. Publicize County Open Space and Conservation incentives to landowners.
5. Publicize the Community Salmon Fund to landowners.
6. Participate in and contribute to LWR BMA inter-jurisdictional organized activities.
7. Help dispense educational materials concerning fish and wildlife habitat stewardship actions, including, when appropriate, materials on the effects of poaching and how to report any suspected poaching to the Washington Department of Fish and Wildlife Poaching Hotline at **1-877-933-9847** or online at http://wdfw.wa.gov/enforcement/reporting_violations.html.
8. Identify interested local residents or community organizations that may form a 'Friends of Group' to can provide citizen input to prioritize conservation strategies and action plans that will be incorporated into this LWR Stewardship Plan.
9. Apply for grants to publicize the City as a Registered National Wildlife Federation – Community Habitat.
    a. Advertise participation goals to bring in more landowners.
    b. Conduct public education and outreach efforts to property owners to participate in this program and certify their property as backyard wildlife sanctuaries.
10. Work together with King County residents to address the Boise Creek TMDL (A TMDL is a process that creates a plan under the Clean Water Act to clean up impairments in the water by reporting how much pollution needs to be reduced or eliminated to achieve clean water.) Boise Creek runs into the Lower White River near Buckley.

Mid-Term Actions

1. Identify parcels within and adjacent to BMA that may become available for purchase or conservation:
    a. Work with PSE and applicable jurisdictions to determine the best conservation strategy for PSE properties within the BMA. Encourage County and city purchase of ecologically rich properties currently owned by PSE with a target for wildlife and open space conservation and passive recreation–
        i. look at Wickersham Basin to LWR whose riparian corridor has high amphibian, reptile and fish value. Consider Oregon spotted frog, western toad and western pond turtle surveys and management.
        ii. use as a connection to a trail system for birding and elk viewing and possible hunting and fishing especially for wheelchair access.
        iii. continue to implement elk winter range habitat protection standards through WDFW.
    b. Work with Forterra and others to discuss purchase opportunities and options.
    c. Emphasize passive recreation in biodiverse areas. Any large undeveloped properties considered for park purchase by jurisdictions should be for passive, non-manicured recreational use. Manicured parks (e.g., sports fields, pavement, etc.) provide limited fish and wildlife value. Park designs that maintain the native, natural features of the lands with limited high-intensity use provide the most benefits to wildlife and ecological services.
    d. Investigate purchase options of WSU public land adjacent to BMA for City Park. Design the park with native vegetation buffering the LWR and high density usage furthest from the river.
2. Improve the quality of stormwater runoff going into the White River and impacting the LWR habitat.
    a. Plant more trees throughout the City.
    b. Create and promote the creation of rain gardens and bioswales. Require rain gardens and bioswales for all city owned stormwater projects where feasible.
3. Create a PDR/TDR mechanism to help the City purchase land along the LWR.
4. Apply Low Impact Development (LID) standards along ½ mile of the BMA. (Long term to extend LID to within Buckley).
5. Help the community to embrace and cherish the LWR habitat by providing educational opportunities to understand what exists in the ecosystem and how it works.
    a. Create a wildlife center in Buckley to explore the LWR and other wildlife corridors near/within the city limits.
    b. Create a display (seasonal or permanent) in the Buckley library on the LWR habitat
    c. Discuss with other cities the possibility of creating a LWR Salmon or Biodiversity Festival.
    d. Publicize shoreline designations and Buckley's water supply with maps and initiate poster contests for K-12.

Long-term Actions

1. Purchase and manage for wildlife land along the LWR. Create a plan for care of the land along the LWR owned by the City.
    a. City park maintenance reduces fertilizers pesticide runoff.
    b. Educate public maintenance staff on the use and care of plants that benefit wildlife.
    c. Develop a network of backyard habitats, city parks, and rain gardens that can become the wildlife corridor within the City out to the river.
2. Monitor city-owned wildlife areas through 'adoptions' by schools or businesses.

3. Locate open space set-aside areas in contiguous tracts or within contiguous conservation easements in such a manner as to promote connectivity and proximity to the conservation targets along the tributaries and adjoining wetlands.
4. Identify and provide sewer access in vulnerable areas along the river.
5. Create a plan to monitor and remove noxious weeds.
    a. Partner with King and Pierce County Extension to expand to invasive insects.
    b. Involve K-12 schools for a weed-pulling contest and other restoration events.

**Suggested Community Conservation Strategies**

A community-led group, when formed, will choose/modify strategies from those listed in Chapter IV of the *Plan*. The following lists of actions are suggestions for a group to select from or re-arrange from short, to medium, to long–term:

Short Term Actions

1. Promote native vegetation retention and re-planting in residential areas.
2. Promote organic fertilizers and Integrated Pest Management (IPM).
3. Register a targeted number of new Backyard Habitats.
4. Develop signage along the major roads to highlight the BMA.
5. Support native vegetation retention and critical area buffer regulations to environmentally sensitive areas within BMA and report any violations to these regulations.
6. Develop and implement citizen science wildlife monitoring projects.
7. Provide increased education and outreach to property owners, developers and real estate agents regarding impacts of vegetation removal and earth moving.
8. Create and dispense educational materials concerning fish and wildlife habitat stewardship actions.
9. Participate in local land use decisions regarding proposed developments that affect the BMA.
10. Identify the best areas for kayak pull-out areas to minimize disturbance to the habitat and wildlife. Create a map for kayakers of these areas with education material about the BMA.
11. Organize volunteer work parties.
12. Partner with local Boy and Girl Scout troops, schools, and other environmental and civic organizations for volunteers.
    a. Sponsor annual or biannual native vegetation planting event.
    b. Sponsor invasive species eradication events.
    c. Sponsor volunteer “bioblitz” activities led by experts.

Mid-Term Actions

1. Work with the City to qualify for Certification with the National Wildlife Federation Community Habitat Program.
2. Consider a project with Buckley Parks and Recreation to create a demonstration project within a new or existing park, cooperating with Pierce County Conservation District, Master Gardeners, schools, Boy and Girls Scout troops, and other local volunteers.
    a. Use the site to promote shoreline-dependent species through nest box placement (e.g., wood ducks) and monitor to see if this strategy is effective.
    b. Use the site for bat boxes and monitor to see if bats use them.
    c. Create a “chimney” and see if Vaux’s Swifts use it.
    d. Locate new areas for native vegetation and food gardens.
    e. Establish demonstration raingardens.
    f. Begin or better promote a Farmer’s Market.
    g. Contact Future Farmers of America (FFA) to have a stand at the Farmer’s Market and develop materials for the general public.

3. Work with communities along the Lower White River to develop a LWR Salmon or Biodiversity Festival committee and host the festival.
4. Identify sections of the regional "walking trail" along the river with different groups adopting sections of the river to restore and maintain.

Long-term Actions

1. Work with citizens in King County on projects for restoration, re-vegetation, and monitoring on both sides of the LWR.
2. Conduct water quality monitoring along creeks and ditches feeding into the LWR.
3. Develop a "report card" assessment tool to track the progress of selected actions. For a target area, measure:
   a. gains and losses to forest canopy.
   b. total acreage of habitat restoration efforts.
   c. areas identified as needing invasive eradication and number of areas receiving treatment.
   d. number of large mammals such as deer and bear that are seen or intercepted in the BMA.

   Or for a group working on projects within the BMA, assess number of people who have
   e. created backyard habitats for certification,
   f. conducted water quality monitoring,
   g. planted native vegetation in their yards,
   h. made rain gardens.

   Or for a community, count:
   i. the total number of educational events including where and how a group makes outreach to landowners.
   j. how many members have volunteered for city/county sponsored programs.
   k. how often committee leaders communicate with membership via meetings, social media, and essential governmental bodies, such as attending planning or recreation meetings.

# Chapter VIII – City of Pacific

**General Description**

The LWR BMA runs along the White River through the southern portion of the City of Auburn and through the City of Pacific. In Figure VIII-1, portions of BMA above the red line are in King County and below in Pierce County. The white box outlines the portion of the City the river runs through. The City of Sumner lies to the south.

The landcover *within* the BMA is riparian dominated by hardwood trees and small shrubs, hardwood and mixed hardwood/conifer forests on the east side of the river, and the City of Pacific Park and development along the west side.

The area *surrounding* the LWR BMA is characterized by low-and medium-density residential and commercial land uses, and forest resource lands owned and managed either by state agencies, King or Pierce County.

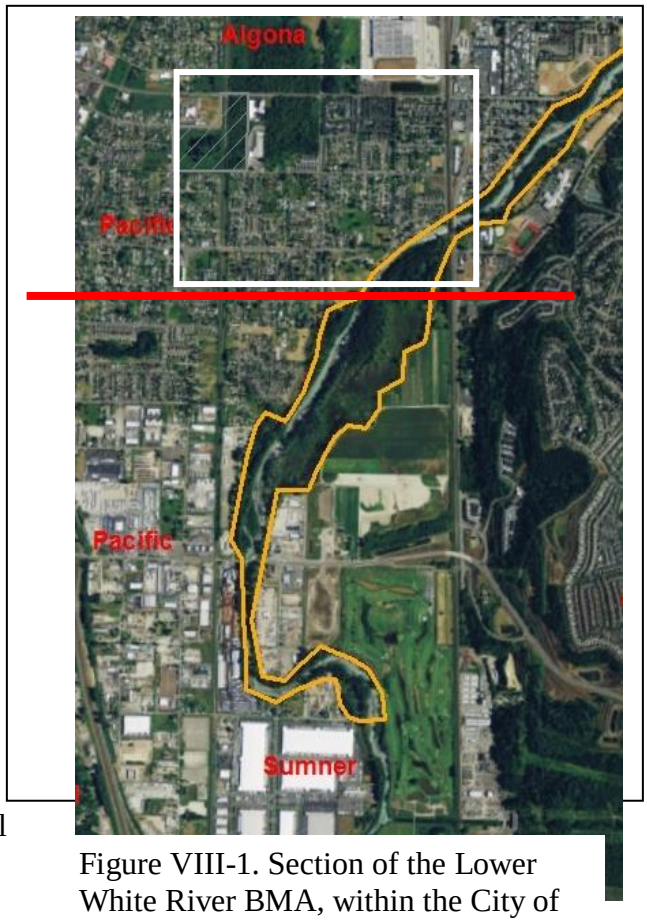



Figure VIII-1. Section of the Lower White River BMA, within the City of Pacific

**Demographics, Land Use and Growth Potential**

The City of Pacific encompasses 2.4 square miles and is located in both south central King County and north central Pierce County. It is surrounded by the City of Sumner to the south, City of Auburn to the east/northeast, Edgewood to the west, and Algona/Auburn to the north. The City of Pacific Pacific's 2014 population estimate was 6,830. The City of Pacific's population is currently anticipated to increase at an average annual rate of 2% per year.

There are eighteen properties located within or partially within the entire BMA that are publicly owned by local and state governments. The City of Pacific has one listed. It leases 26 acres from King County for their City Park. Table 7 provides a breakdown of publicly owned lands within the Lower White River BMA. Another 25.20 acre parcel currently owned by the Pierce County Water Programs may become part of the Countyline Levee Setback discussed later in this chapter.

Current Zoning and Comprehensive Plan

*Zoning*

In the Pierce County, very small portions of the Lower White River BMA are located within the City of Pacific (14 acres). The remaining area is located in unincorporated Pierce County. Within the City of Pacific, the BMA is currently zoned RO-Residential Open Space. Within unincorporated Pierce County, the BMA is predominately zoned Rural 10 (R10) and Employment Centers.

The City of Pacific has Urban Growth Areas (UGA) in both counties. Jovita Heights in unincorporated King County is an area of approximately 218 acres abutting the City of Pacific's western neighborhoods on the West Hill. A land sliver of about 6.6 acres between West Valley Highway and SR 167 is the City's western Pierce County UGA. Another isolated portion of unincorporated Pierce County, consisting of less than 30 acres, abuts Pacific on the east from the King County Line to just above Stewart Road. It meets the northwestern boundary of Sumner in the middle on the left bank of the White/Stuck River channel.

Comprehensive Plan

The Comprehensive Plan update is scheduled for completion in 2016. The Natural Environment element in the City's Comprehensive Plan is intended to meet the objectives of the State Growth Management Act (GMA); Endangered Species Act (ESA); State Environmental Policy Act (SEPA); Countywide Planning Policies of King and Pierce counties; and other federal, state, and county policies. It also affirms the City's role in regulating land use; implementing federal and state statutes; obtaining funding from federal, state and local jurisdictions; and consistently managing impacts to the Natural Environment. Besides managing impacts to the Natural Environment, the City is trying to meet the GMA goal of open space and recreation. The City's goal is to:

- encourage the retention of open space and development of compatible recreational opportunities,
- conserve fish and wildlife habitats,
- increase access to natural resource lands and water (including wetlands).

Critical Areas

The GMA also requires adoption of development regulations that protect critical areas (RCW 36.70A.060), and use of the "Best Available Science" in developing policies and development regulations to protect the functions and values of critical areas (RCW 36.70A.172). The City's critical areas are divided into:

- Geologically Hazardous Areas
- Erosion Hazard Areas identified by the Soil Conservation Service
- Volcanic Hazard Areas
    - The City of Pacific has one of the highest percentages of population and assets in the Mt. Rainier lahar (mud flow) zone.
- Steep Slopes
- Aquifer Recharge Areas
- Flood Hazard Areas
    - These are based on the 1980 report by the Federal Insurance Administration and periodically updated due the rising riverbed of the White River.
- Wetlands ("Wetlands may include those artificial wetlands intentionally created from non-wetland areas created to mitigate conversion of wetlands, if permitted by the county or city.")

The Critical Areas map (Figure VIII-2) includes the full length of the streams feeding into Pacific including the Government Canal (25' buffer) that crosses Butte Avenue and runs north along the railroad tracks into the City of Auburn. The PHS map discussed below shows only streams segments that would support fish.

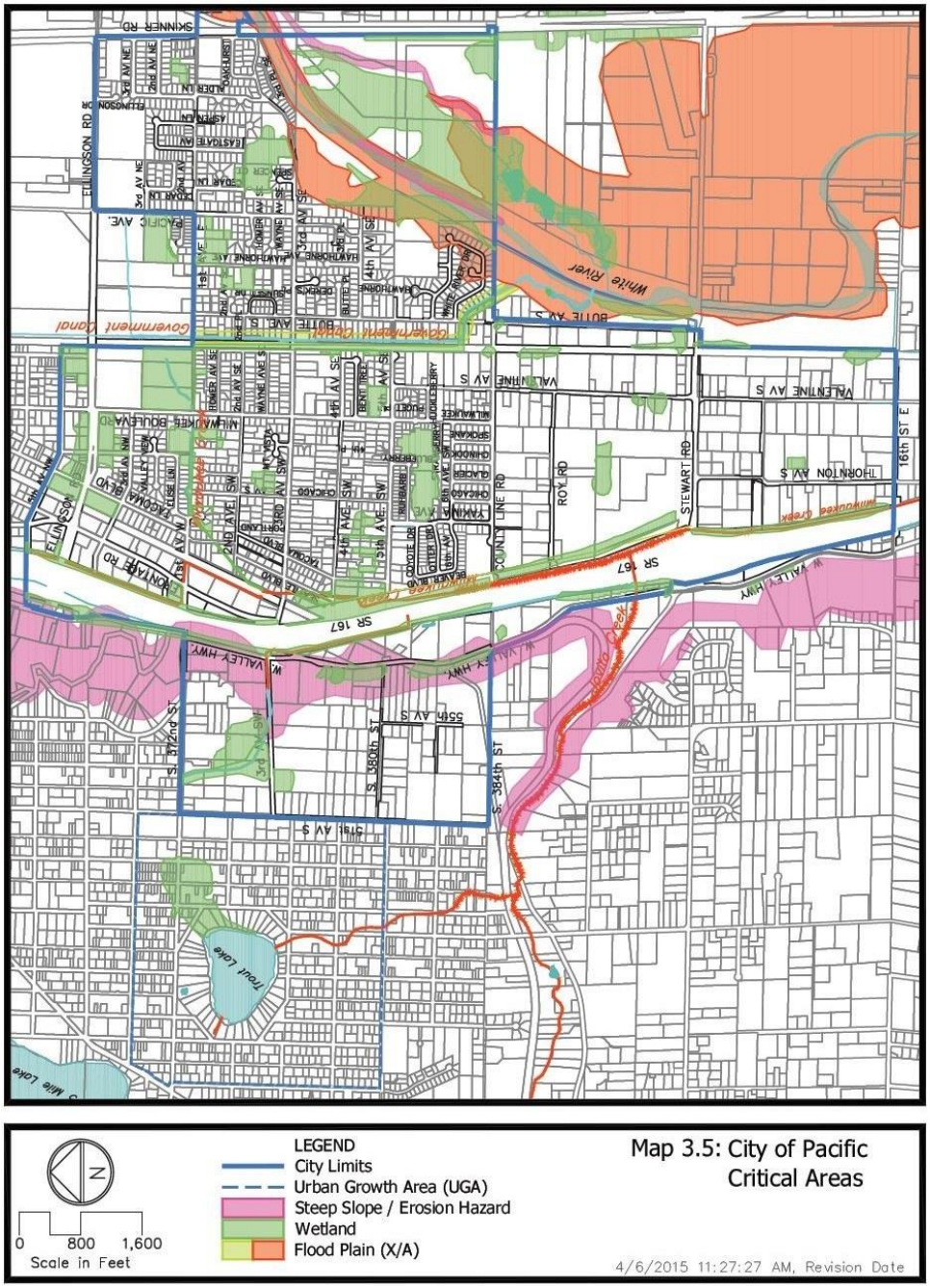



Figure VIII-2. City of Pacific Critical Areas

**Shoreline Environments**

Under the Washington State Shoreline Management Act the Lower White River is considered a "Shorelines of the State." All lands within 200 feet of the ordinary high water mark, and associated wetlands and floodplains, fall within the jurisdiction of Shorelines of the State, whose preferred uses according to the Act are (in order of priority) to:

> "recognize and protect the statewide interest over local interest; preserve the natural character of the shoreline; result in long-term over short-term benefit; protect the resources and ecology of the shoreline; increase public access to publicly owned shoreline areas; and increase recreational opportunities for the public in the shoreline area."

All shorelines, including those designated as Shorelines of the State, are classified into "environment designations" based on their physical, biological, and development characteristics. Historically, Plans have used primarily four basic environment designations:

- Natural
- Conservancy
- Rural
- Urban

New state guidelines recommend 6 designations:

- Natural
- Rural Conservancy
- Urban Conservancy
- High Intensity
- Shoreline Residential
- Aquatic

- Local governments may modify state recommendations to better accommodate shoreline areas with unique characteristics. These environments are similar to zoning designations allowing different land uses, densities and activities ranging from the most intensive uses (High Intensity) to very limited uses (Natural). The City of Pacific chose the following shoreline designations:

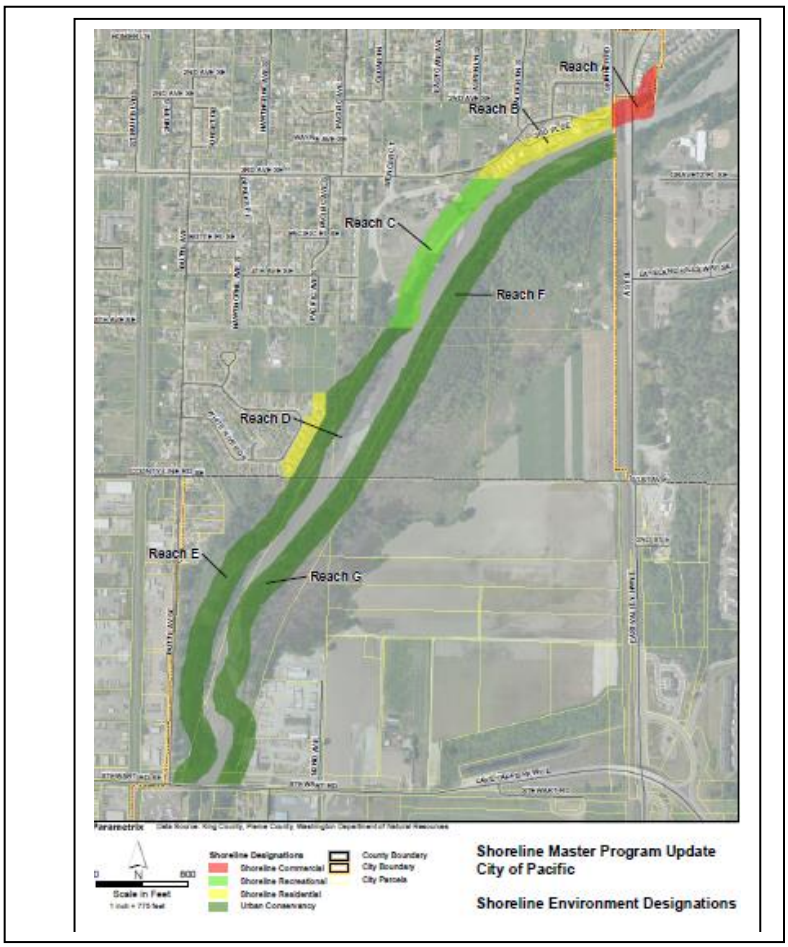



Figure VIII-3. Shoreline Master Program Designations

- Urban Conservancy – appropriate for those areas planned for development that are compatible with maintaining or restoring of the ecological functions of the area and that are not generally suitable for intensive water dependent uses.
- Shoreline Commercial - provide for high-intensity, water-oriented commercial, transportation, and industrial uses while protecting existing ecological functions and restoring ecological functions in areas that have been previously degraded.
- Shoreline Residential – appropriate for those areas of the City's shorelines that are characterized predominantly by residential development or are planned and platted for residential development.
- Shoreline Recreation - provide recreational and public access opportunities along the City's shorelines. An additional purpose is to maintain and restore ecological functions to the area and preserve open space within the City.
- Aquatic Shoreline Overlay District – purpose is to protect, restore, and manage the unique characteristics and resources of the areas waterward of the ordinary high-water mark.

Most of the shoreline is designated as Urban Conservancy along the east side (left bank) of and southwest side (right bank) of the river (Figure VIII-3). There is a small section, Shoreline Commercial, on the northeast side. Shoreline Residential is located on both sides of Shoreline Recreational.

**Fish and Wildlife Resources**

Fish and Wildlife Habitat Area

These areas are identified as being of critical importance to the maintenance of fish, wildlife, and plant species. The principal Fish and Wildlife Habitat areas within the City of Pacific planning area are the White/Stuck River floodplain and its associated stream reaches and riverine wetlands, Trout Lake and its associated wetlands, and the steep wooded slopes that form the west wall of the valley floor.

The White River supports three salmonid species that are listed as threatened under the Endangered Species Act: Puget Sound Chinook, Puget Sound steelhead, and Coastal-Puget Sound bull trout. The White River is particularly important to Chinook recovery because it is the only population of spring Chinook in south Puget Sound. The White River also supports pink, chum, coho, and sockeye[29] salmon, as well as cutthroat trout.

Washington Department of Fish and Wildlife's (WDFW) Priority Habitats and Species (PHS) map shows locations of PHS species. PHS is the principal means by which WDFW provides important fish, wildlife, and habitat information to local governments, state and federal agencies, private landowners and consultants, and tribal biologists for land use planning purposes.

PHS is the agency's primary means of transferring fish and wildlife information from their resource experts to those who can protect habitat. Figure VIII-4 highlights priority habitats (light purple areas), including tributaries to the White River:

- Jovita Creek & Milwaukee Creek south of 5th Ave. SW are Type F (fish-bearing),
- Milwaukee Creek, middle portion, and Government Canal are Type Np (non-fish, perennial),
- Milwaukee Creek east of Tacoma Blvd. Type Ns (non-fish, seasonal).

Typing is based on the Washington Department of Natural Resources (DNR) stream typing criteria. The DNR stream typing is based upon the "Forest Practices Application Review System" (FPARS). As stated in the 2015 Comprehensive Plan,

> "Within urban areas, the DNR stream typing may not have been field verified. As development occurs adjacent to streams and creeks in the City, additional studies should be required by development to verify the stream/creek classification. To ensure the most complete "Best Available Science" to determine a stream type, the City should explore partnering with the City of Sumner and the Muckleshoot Tribe to apply for grant funds to conduct a comprehensive stream assessment of the City's streams & creeks. This includes Milwaukee Creek to its confluence with the White River in Sumner, the Government Canal (Boeing Creek), and other unnamed creeks."

Predicted and Confirmed Wildlife Species

The PHS point locations and maps were one of the layers of information used to generate the LWR Biodiversity Management Area. A list of all predicted species to occur within the LWR BMA was made as part of the development of the Biodiversity Network. To locate and validate whether those species were present, a 24-hour bioblitz (explained in Chapter 1) was conducted in 2006 in three large areas of the LWR BMA (Buckley and vicinity, unincorporated Pierce County between Buckley and City of Auburn's Game Farm and Game Farm Wilderness Parks, the City of Pacific's Pacific City Park, and the Sumner Golf Course (birds only) (Figure VIII-5). The species observed in the City of Pacific and parts of Sumner are listed in Table 14. Most of the bioblitz efforts were in Pacific. However, the species observed would

[1]Gustafson, R.G., T.C. Wainwright, G.A. Winans, F.W. Waknitz, L.T. Parker, and R.S. Waples. 1997. Status review of sockeye salmon from Washington and Oregon. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-33, 282 pp. http://www.nwfsc.noaa.gov/publications/techmemos/tm33/tm33.html#toc

be expected to occur in both cities due to similar habitats and their close proximity. The second bioblitz held in 2007 over a 12-hour period focused on the area between Auburn and Sumner (Figure VIII-6). Invertebrates were mainly collected between Buckley and Auburn during the 2006 bioblitz and at the Wilderness Park in 2007. Due to the cold weather in 2007, the invertebrate count was low (Table 2). Plant data were collected in the same areas as vertebrates in 2006, but only down to Stewart Road in 2007 (Tables 3 and 4).

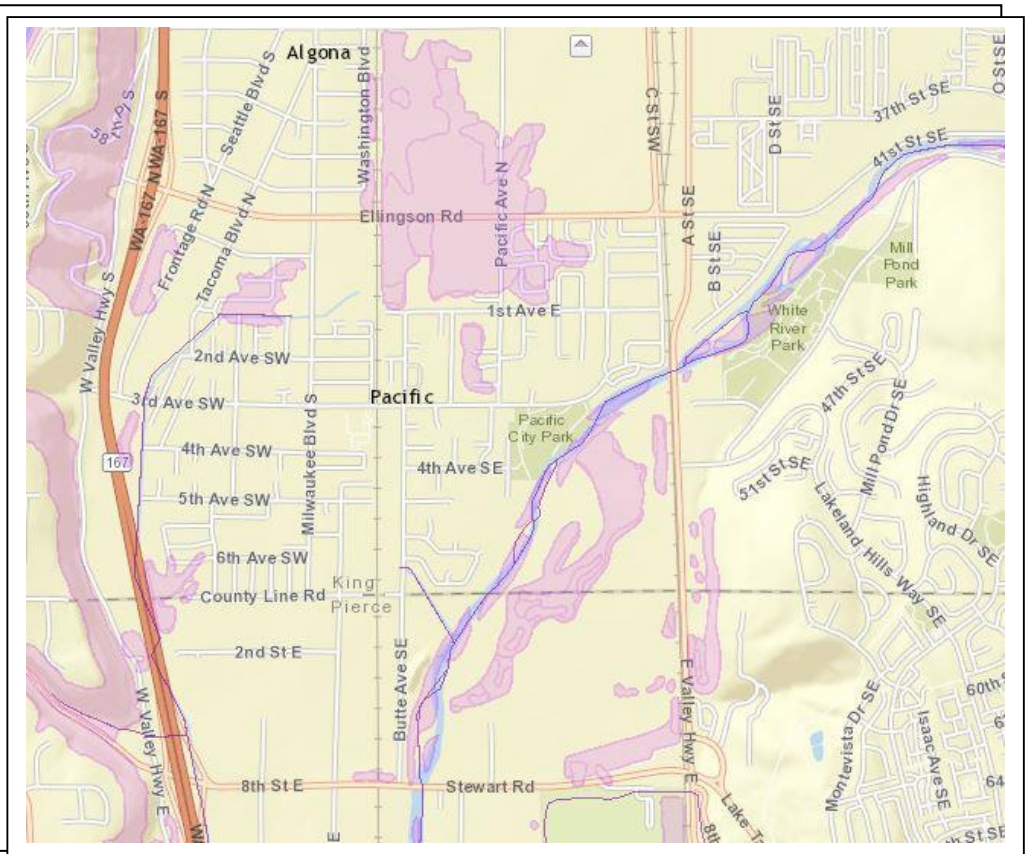



Figure VIII-4. PHS Polygons for the City of Pacific

URS Consulting surveyed the reach between the Auburn Game Farm and the Stewart Road Bridge in 2004 for the White River Basin Plan[30]. The channel was largely confined, with very little channel migration. Numerous levees and much residential development were along this reach. Riparian canopy was present through much of the reach's length but was rather narrow in most areas. The channel had a moderate amount of poll and riffle habitat, and spawning gravel was present. Spawning by Chum, Pink, and summer/fall Chinook salmon likely occurred, and yearling steelhead trout were likely to use this habitat. However, due to the severity of the 2007 and 2009 floods, this area should be re-sampled.

[30] White River Basin Plan, Pierce County Public Works and Utilities, November 26, 2013,

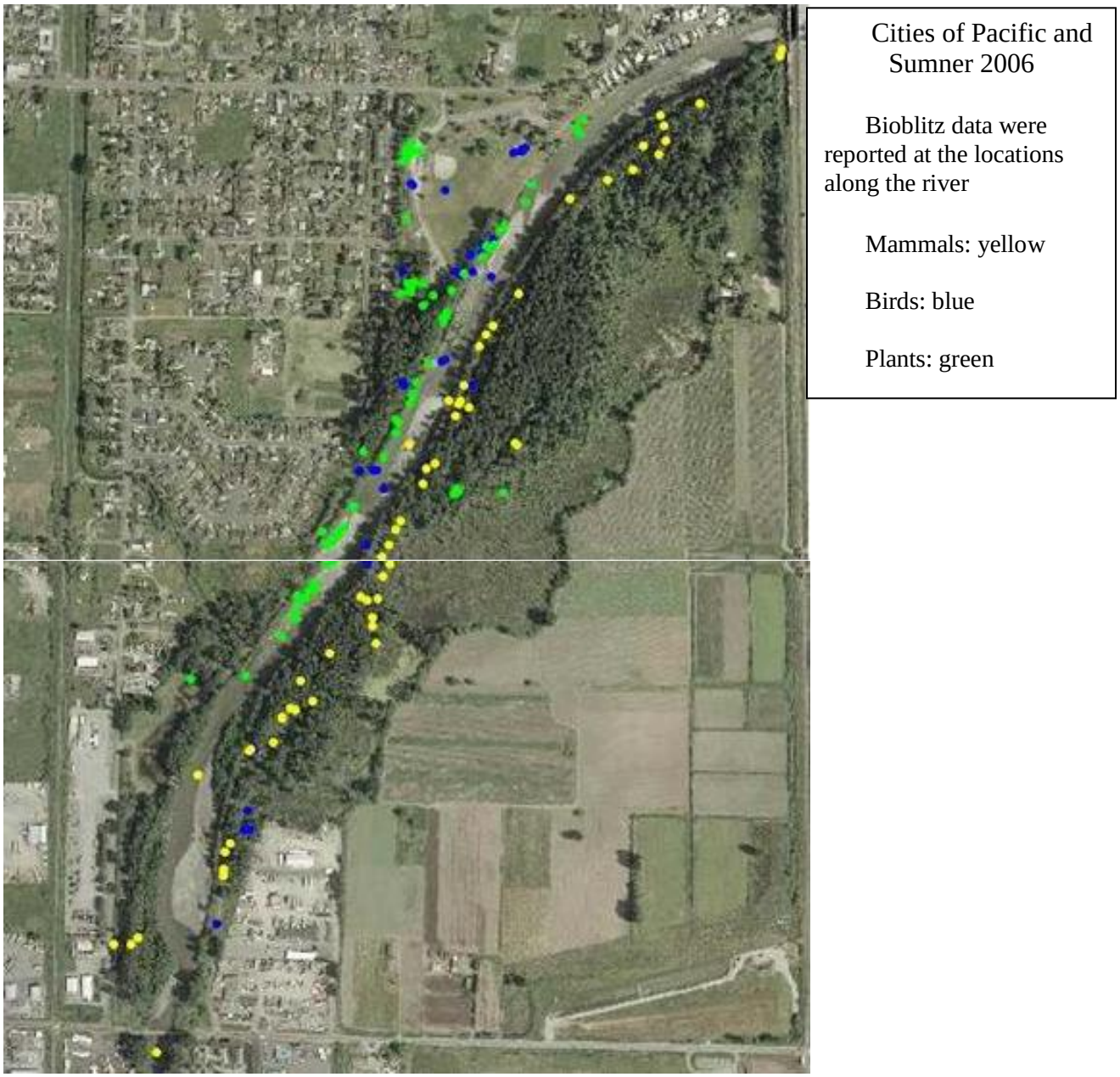



Figure VIII-5. Bioblitz Data Locations 2006

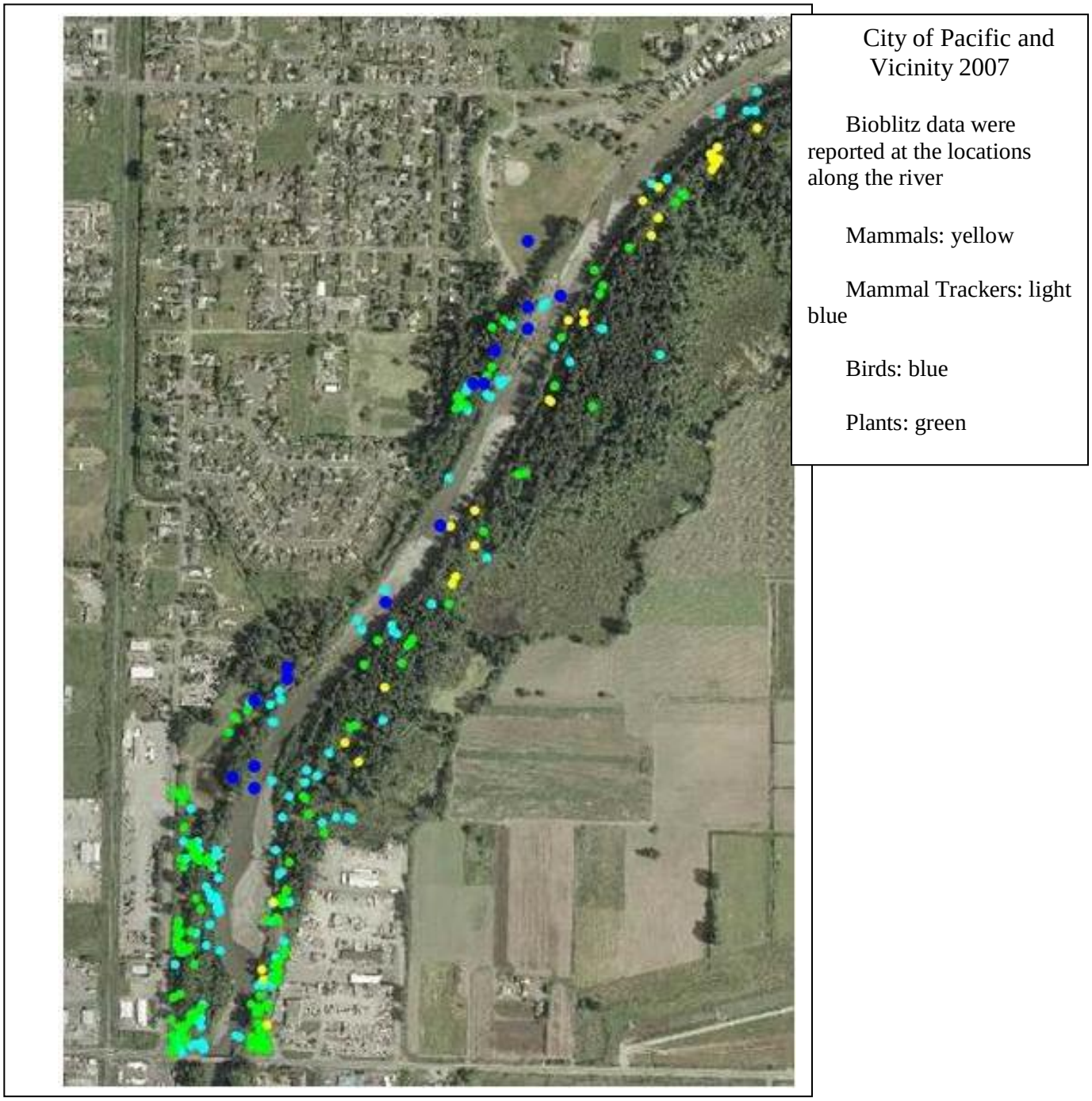



Figure VIII-6. Bioblitz Data Locations 2007

Table 14

## PREDICTED AND CONFIRMED WILDLIFE AND FISH SPECIES FOR THE LOWER WHITE RIVER BMA

**PREDICTED SPECIES Note: Species observed but not predicted are italicized**

| AMPHIBIANS | Pacific | | BIRDS | Pacific | |
|---|---|---|---|---|---|
| *Bullfrog* | | | American bittern [2] | | |
| *Ensatina* | | | American coot | | |
| Long-toed salamander | | | American crow | X | |
| Northwestern salamander | | | American dipper | | |
| Pacific treefrog (Chorus frog) | | | American goldfinch | X | |
| Red-legged frog [3] | | | *American kestrel* | X | |
| Roughskin newt | | | American robin | X | |
| Western toad [3] | | | Bald eagle [3,4] | X | |
| | | | Band-tailed pigeon [4] | | |
| **Reptiles** | | | *Bank swallow* | | |
| Common garter snake | X | | *Barred owl* | | |
| Northern alligator lizard | X | | Barn swallow | X | |
| *Northwestern garter snake* | | | Belted kingfisher | X | |
| Painted turtle [1] | | | Bewick's wren | | |
| Rubber boa | | | Black-capped chickadee | X | |
| Western terrestrial garter snake | | | Black-headed grosbeak | X | |
| | | | Black-throated gray warbler | | |
| **Fish** | | | Blue-winged teal | | |
| *Prickly sculpin* | | | Brewer's blackbird | | |
| *Sculpin spp.* | | | *Brown creeper* | X | |
| *Speckled dace* | | | Brown-headed cowbird | | |
| *Western brook lamprey* | | | Bushtit | X | |
| | | | California quail | | |
| **Invertebrates** | | | Canada goose | X | |
| 42 species, 7 non-native | | | Cedar waxwing | X | |
| 14 species, 3 non-native | | | *Chestnut-backed chickadee* | X | |
| | | | Cinnamon teal | | |
| | | | Cliff swallow | | |
| | | | Common barn-owl | | |
| | | | Common merganser | X | |
| | | | Common nighthawk | | |
| | | | Common raven | | |
| | | | Common snipe | | |
| | | | Common yellowthroat | X | |
| | | | Cooper's hawk [2] | X | |
| | | | *Dark-eyed junco* | | |
| | | | Downy woodpecker | X | |
| | | | European starling | X | |
| | | | *Evening grosbeak* | | |
| | | | Gadwall | | |
| | | | *Glaucous-winged gull* | X | |
| | | | *Golden-crowned kinglet* | | |
| | | | Great blue heron [3,4] | X | |
| | | | Great horned owl | | |
| | | | Green heron (Green-backed) [3] | X | |
| | | | Green-winged teal | | |
| | | | *Hairy woodpecker* | X | |
| | | | Hooded merganser [4] | | |
| | | | House finch | X | |
| | | | *House sparrow* | | |
| | | | House wren | | |

*Footnote:*

(1) - Trigger Species - Species that needed additional mapped land cover units to ensure representation within the network

(2) - At-Risk - Washington Gap Analysis Project (WAGAP) selected species considered to be most as risk of continued or future population declines due to human activities

(3) - Listed (State or Federal) - Species listed as State endangered, threatened, sensitive, candidate or monitor, as well as species listed or proposed for listing by the U.S. Fish and Wildlife Service

(4) - PHS - a species defined as priority under the WDFW Priority Habitats and Species (PHS) Program

(5) - Included based on species significance under the WDFW PHS/Heritage database, although not predicted to occur

**Italicized species:**
**Observed but not predicted**

red

## Table 14 - PREDICTED AND CONFIRMED WILDLIFE AND FISH SPECIES FOR THE LOWER WHITE RIVER BMA

**PREDICTED SPECIES Note: Species observed but not predicted are italicized**

| BIRDS (Cont'd) | Pacific | | MAMMALS | Pacific | |
|---|---|---|---|---|---|
| Hutton's vireo | | | Beaver | X | |
| Killdeer | X | | Big brown bat [4] | | |
| Lazuli bunting | | | Black bear | | |
| Macgillivray's warbler | | | Black rat | | |
| Mallard | X | | Black-tailed deer [4] | X | |
| Marsh wren | | | Bobcat | | |
| *Mourning dove* | X | | California myotis [4] | | |
| Northern flicker | X | | Coast mole | X | |
| Northern harrier | | | Coyote | X | |
| Northern oriole | | | Creeping vole | | |
| Northern rough-winged swallow | | | Deer mouse | X | |
| Northern shoveler | | | *Douglas squirrel* | X | |
| Olive-sided flycatcher [3] | | | Dusky (Montane) shrew | | |
| Orange-crowned warbler | | | Eastern cottontail | X | |
| Osprey [3] | X | | *Eastern gray squirrel* | X | |
| Pacific slope flycatcher (Western) | | | *Elk* | | |
| Pied-billed grebe [4] | | | Ermine | | |
| *Pileated woodpecker* | X | | Fisher [2,3,4] | | |
| *Pine siskin* | | | Hoary bat | | |
| Purple finch | | | Little brown myotis [4] | | |
| *Red-breasted nuthatch* | | | Long-eared myotis [3,4] | | |
| Red-breasted sapsucker | X | | Long-legged myotis [3,4] | | |
| Red-eyed vireo | | | Long-tailed (Forest) deer mouse | | |
| Red-tailed hawk | X | | Long-tailed vole | | |
| Red-winged blackbird | X | | Long-tailed weasel | | |
| Rock dove | X | | Mink [4] | X | |
| Ruddy duck | | | Mole spp. | | |
| Ruffed grouse | | | Mountain beaver | | |
| Rufous hummingbird | X | | Mountain lion | | |
| Savannah sparrow | X | | Muskrat | X | |
| Song sparrow | X | | Northern flying squirrel | | |
| Sora | | | Norway rat | X | |
| Spotted sandpiper [4] | X | | Nutria | | |
| Spotted towhee (Rufous-sided) | X | | Pacific jumping mouse | | |
| Steller's jay | X | | Pacific water shrew [3] | | |
| Swainson's thrush | X | | Porcupine | | |
| *Townsend's warbler* | X | | Raccoon | X | |
| Tree swallow | | | Red fox | | |
| Turkey vulture [3] | | | River otter | X | |
| Vaux's swift [3,4] | | | Shrew-mole | | |
| Violet-green swallow | X | | Shrew spp. | X | |
| Virginia rail | | | Silver-haired bat [2] | | |
| Warbling vireo | X | | Southern red-backed vole | | |
| *Western meadowlark* | | | Spotted skunk | | |
| Western screech-owl | | | Striped skunk | | |
| *Western tanager* | X | | Townsend's big-eared bat [2,3,4] | | |
| Western wood-pewee | X | | *Townsend's chipmunk* | | |
| White-crowned sparrow | X | | Townsend's mole | X | |
| Willow flycatcher [3] | X | | Townsend's vole | | |
| Wilson's warbler | | | Vagrant shrew | | |
| *Winter wren* | | | Virginia opossum | X | |
| Wood duck [4] | | | Vole spp | | |
| Yellow warbler [2] | X | | Yuma myotis [3,4] | | |
| *Yellow-rumped warbler* | | | | | |

**Conservation Targets**

In the Lower White River BMA several conservation targets were selected to represent the key ecological functions occurring throughout the area. These conservation targets include:

- Lower White River
- Tributaries, wetlands, and oxbows
- Conifer/deciduous mixed forest areas

Each of these conservation targets provides the systems that collectively create the rich variety of habitats necessary to foster a high level of biodiversity in the BMA. A detailed description of each conservation target can be found in Chapter III, page 51.

**Threats to Conservation Targets**

The main threats that are or may potentially be occurring to conservation targets include:

- Habitat conversion and fragmentation due to development, removal of native vegetation and roads;
- Poor water quality caused by residential and use of fertilizers, domestic animal feces, septic tank leakage, herbicides from road maintenance, farming and commercial sites, and road runoff;
- Loss of pools and large woody debris (LWD) due to development and channelization of the river;
- Introduction of invasive, non-native plant and animal species such as bullfrogs and Japanese knotweed;
- Fish passage blockage from culverts;
- Wildlife movement blockages from roads, driveways and fencing;
- Erosion and damage to riparian habitat from dikes/levees along Cities of Buckley, Pacific, and Sumner;
- Predation of native species by domestic cats, dogs, and unregulated hunting and fishing;
- Stormwater and illegal discharge dumped directly into the river–
    - Water fluctuation surges due to storm drains from development redirecting water flow into the river and not into wetlands, dikes, and stormwater ponds; and
- Pollution caused by dumping of trash and debris into or near the river.

**Overview of Conservation Strategies**

Conservation strategies have been identified to ascertain the level or severity of a potential threat, directly abate known threats, or identify restoration opportunities where degradation has occurred. Some threats applied to multiple conservation targets and as such the conservation strategies have been grouped under the following categories, which have been stated as a positive outcome:

- Reduce Habitat Conversion and Fragmentation (due to development and human activity)
- Eliminate Invasive and Introduced Species
- Remove Fish and Wildlife Movement Blockages
- Enhance Water Quality and Quantity
- Manage Flooding
- Control Erosion and Siltation
- Reduce Predation by domestic cats and dogs and Poaching of Native Species
- Reduce or Eliminate Pollution Within the LWR BMA

**Role of City Government in Biodiversity Conservation**

Biodiversity enhancement goals fall into two general areas: 1) protection of existing elements and 2) restoration and recovery of elements that have been damaged by human intervention. A community-driven biodiversity stewardship plan which incorporates the city's policy and regulatory tools is incomplete without the following to provide the best environment for success:

- Voluntary incentives
- Public education and outreach
- Multi-jurisdictional coordination

Update existing regulatory tools so that they can be used to protect native wildlife biodiversity.

As a first step, Pacific's Comprehensive Plan update in 2015 included Goal NE-10 to protect biodiversity along the White River in Pacific. Policy NE-10.1 inserts, as an appendix, the Lower White River Biodiversity Management Area Stewardship Plan as a non-regulatory plan that can be used to guide the City to protect its wildlife habitat in coordination with new development.

The Comprehensive Plan is the primary policy document for City governance and sets the foundation for land use and development regulations. Once the Comprehensive Plan is updated, biodiversity management can be incorporated into existing and future regulations and programs. These may include examining zoning codes within the BMA and adjacent areas that establish acceptable land uses and complementary development ordinances (critical areas, stormwater management, etc.). Pierce County included the Biodiversity Network into its Open Space Map as their fish and wildlife element. The City of Pacific's Open Space Map could include the BMA in its update. Policy NE-2.5: Encourages private open space preservation in the City that could be achieved though density credits and criteria that connect open space corridors with adjoining properties within the City. Such corridors could help facilitate the migration of wildlife from one area of the City to another.

As currently written, the City provides open space to its citizens by their Open Space Plan Categories including:

- Community Parks
- Neighborhood Parks
- Pocket Parks
- Trails – discussed later in the chapter
- Open Space/Passive Natural Parks
    - As defined, open space may be unlimited in size and may or may not have public access.
    - Two sites with a combined area of 5.5 acres are within the west side greenbelt, along with steep slopes that are preserved as critical open space and permanent regional greenbelts.
- Undeveloped Park Parcels.

Provide Voluntary Incentives

There are a variety of tax incentive program used by various city and county governments to reward landowners for environmental conservation on private property. These can include programs administered by cities, state or federal entities. As an example, landowners who certify their property as Open Space under Pierce County Public Benefits Rating System can qualify for property tax reduction. Those currently available in Washington are listed in Appendix II. The City of Pacific should consider implementing its own tax incentive program and/or promote those listed in Appendix II to landowners within the LWR BMA.

Additional mechanisms the City can use for biodiversity protection involves purchasing property within the BMA through fee simple land acquisition or purchasing development rights to properties. The City might consider creating its own Transfer of Development Rights/Purchase Development Rights (TDR/PDR) program similar to that created by the City of Tacoma in 2012 to encourage the retention of highly biodiverse areas and transfer urban development to more appropriate locations within the city

boundaries. Another potential funding source is King County Park Levy Regional Open Space Acquisition Funds (CFT) to supplement the purchase of environmentally sensitive areas.

Offer Public Education and Outreach Programs

Efforts could include disseminating general information on the benefits of biodiversity; enrolling in formal, coordinated programs such as Community Wildlife Habitats by the National Wildlife Federation; and sponsoring habitat restoration projects.

The term "biodiversity" has been given many definitions making it confusing to the public. As stated in the Introduction of this *Plan*, biodiversity has been defined as the existence of a wide variety of plant and animal species in their natural environments. Maintaining biodiversity is economically valuable because it provides breathable air, drinkable water, food, pollution and pest control, and resilience after natural catastrophes, such as floods and drought.

Stormwater and biodiversity issues do overlap. Existing programs can emphasize the overlaps. Climate change and biodiversity also are deeply intertwined. Landowner education can help the community take steps such as preserving and planting native vegetation to meet extreme events of drought or flood.

Participate in Multi-jurisdictional Groups

An important element for success will be the coordination of efforts among all jurisdictions within the Lower White River BMA: Pierce County, King County, the Cities of Auburn, Sumner, Buckley, Enumclaw, and Pacific. Along with an engaged citizen group, jurisdictions can gain support from various government and non-governmental organizations such as Pierce Conservation District, King Conservation District, Forterra, and the Puyallup River Watershed Council. Such coordination allows periodic reviews of biodiversity action plans.

Remove Fish and Wildlife Barriers

One avenue the City of Pacific might consider for removing barriers to fish is to apply for project funds thru the Pierce County Community Salmon Fund. The National Fish and Wildlife Foundation (NFWF) and Pierce County formed the Pierce County Community Salmon Fund in 2002 as a funding program for restoration projects that involved landowners and raised local support for salmon recovery. The goals of the Fund are:

- To fund salmon protection and restoration projects that have a substantial benefit to the watershed and that are consistent with Pierce County's Ecosystem and Diagnosis Treatment (EDT).
- To enlist landowners and community groups in project implementation and monitoring.

Lead entities are local, watershed-based organizations created by RCW 77.85 to solicit, develop, prioritize and submit habitat protection and restoration projects for funding by the state's Salmon Recovery Funding Board. The Pierce County Lead Entity committee, staffed by Surface Water Management, is comprised of county, tribal, conservation district, citizens and state agency staff. It has been extremely successful in getting funds to build projects that improve salmon habitat in the Puyallup, Carbon and White rivers, as well as South Prairie, Chambers and Clover creeks and important tributaries in both watersheds. Many of these projects have also reduced flood hazards by removing flood prone houses and structures and building setback levees that create habitat and protect upland properties.

The Pierce County Lead Entity committee also strives to share their passion and spread the word about the importance of salmon and the link between healthy salmon runs and the great quality of life afforded by the natural resources in the county. The committee also runs the King County Cooperative Watershed Management Grant rounds for the King County portion of WRIA 10. The grant rounds generally begin in

early spring when they can add official members to their citizens committee. Public participation is always welcome at their meetings.

Monitor Effects of Transportation and Trails programs

Other barriers to wildlife movement include roads and fencing. Along with minimizing development within the LWR BMA, the City of Pacific's Transportation Element states that" most transportation funding is provided by either State or Federal agencies. A critical element of all projects is an environmental evaluation." The City shall "consider the impact of road construction on the environment and natural resources (particularly on sensitive areas, wildlife habitats and water quality) as part of its environmental review process. Environmental impacts will be reduced to the extent feasible and where it is not feasible, the impacts will be mitigated elsewhere."

The creeks and ditches that feed into the River are the most at risk road construction (Figure VIII-7).

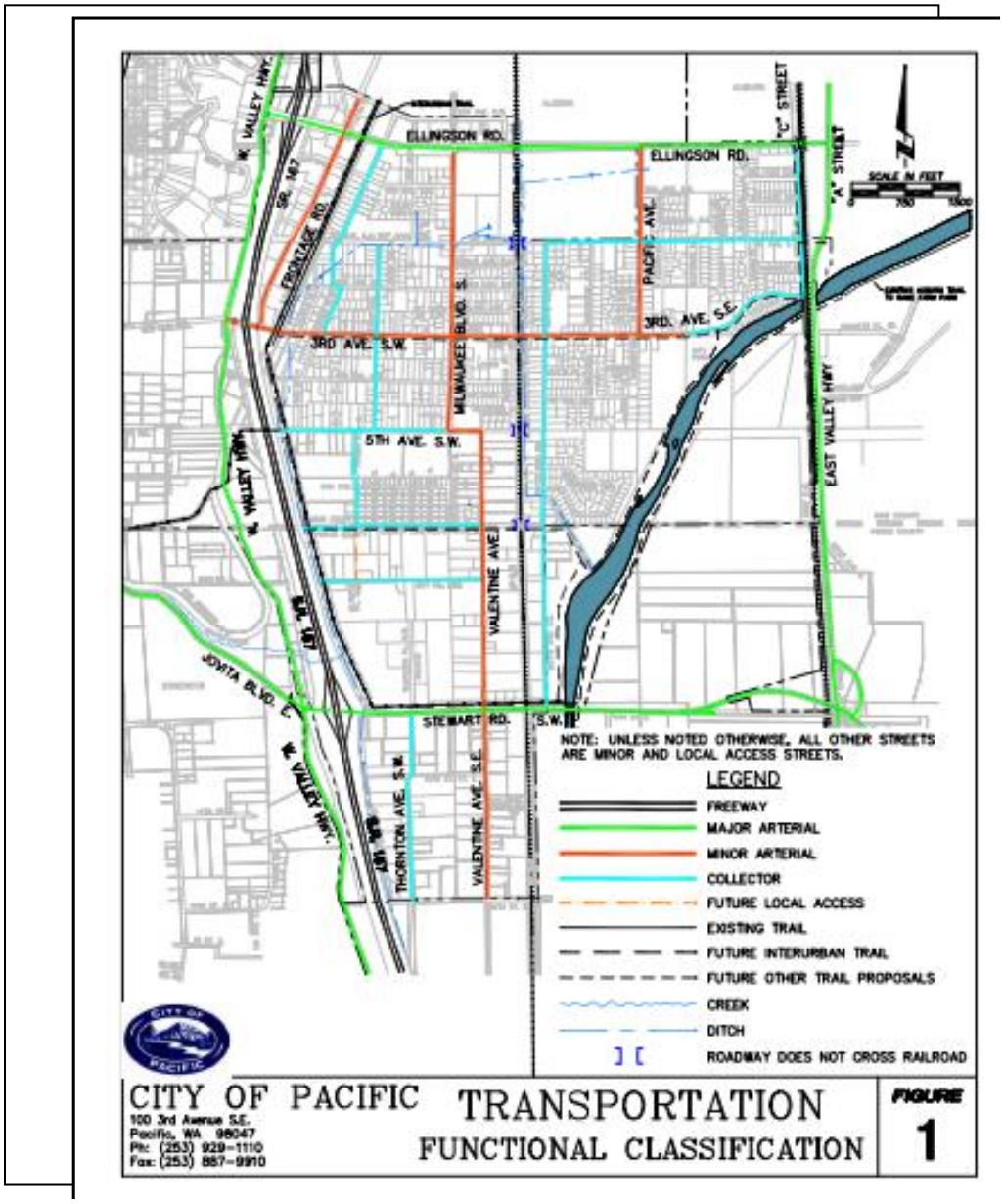



Figure VIII-7. Transportation Map

The City of Pacific is part of Pierce County's Regional Trails Plan. The City of Pacific Parks, Open Space, Recreation, and Trails Comprehensive Plan element updated the Sumner/Pacific Trail Plan in 2004. The City of Sumner updated their Trail Plan in 2008. The City of Pacific continues to update the Pacific Trail Plan, and cooperates with adjoining jurisdictions to facilitate connections with other systems. The intent of the regional trail system is to provide recreational opportunities, promote healthier lifestyles, create connections to major developed areas and destinations, and enhance non-motorized transportation options throughout the County. Figure 20 illustrates Pierce County trail connection opportunities for continued regional trail expansion.

In addition to the planned future Interurban Trail along the River in Figure VIII-7, Figure VIII-8 below highlights the trail connections to existing trails with the City of Sumner.

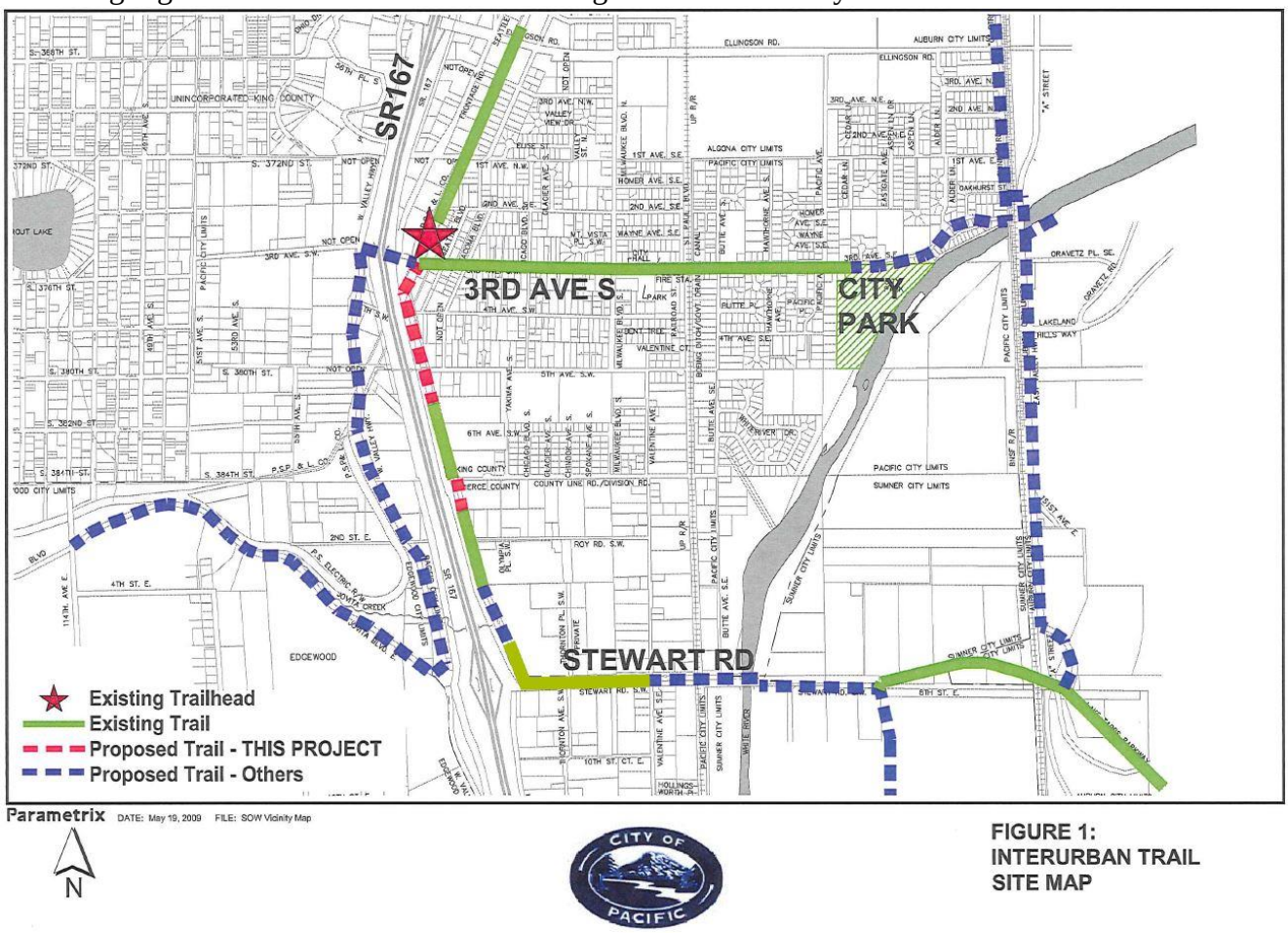



Figure VIII-8. Interurban Trail Site Map

<u>Enhance Water Quality and Quantity, Manage Flooding, Control Erosion and Siltation</u>

Environmental goals, objectives, and policies contained in the City's 2015 Draft Comprehensive Plan, Chapter 3 – Natural Environment, addresses substantive issues, such as potential development on wetlands, floodplains, and steep slopes. These policies outline steps the City should take towards establishing policy direction and regulatory authority on environmental issues, and identify procedures that help to guide the property owner and citizen. One example of this is to encourage the combining of storm water storage areas to create more viable natural areas, instead of creating a patchwork of small detention ponds.

A TMDL is a process that results in a plan under the Clean Water Act to clean up impairments in the water by telling us how much pollution needs to be reduced or eliminated to achieve learn water. Within

the White River Watershed, the Upper White's TMDLs for sediment and temperature were completed in 2004 and the implementation report was completed in 2006. Most of the recommendations in the implementation plan were assigned to the US Forest Service to decommission roads and plant riparian areas as funds allow.

The Lower White has high pH values that exceed state water quality standards. A TMDL is currently being developed with a Memorandum of Agreement between the Muckleshoot Tribe, the Washington Department of Ecology, and EPA. Ecology conducted monitoring in 2012 and is currently modeling the river. A draft technical report will be available in 2015. Once complete, this TMDL should help direct the City of Pacific's efforts outlined in Policy NE 6.1:

"The City can protect surface and groundwater resources through some of the following methods

- Control development in areas of high water table
- Encourage the retention of vegetation along waterways
- Reduce or control surface water runoff from paved and other impervious surfaces
- Encourage the use of properly designed ditches and swales
- Encourage innovate ditch maintenance activities, such as the rotation of segments for ditch cleanings in adjacent areas
- Require the use and maintenance of sedimentation traps and filters to prevent the movement of silt and other materials into the surface water system. This could be done using catch basin inserts that help filter out sediments and pollutants from street and parking lots
- Emphasize public education on how to maintain water quality
- Consider water quality issues in planning for parks and open space"

Additional city map showing creeks and streams:

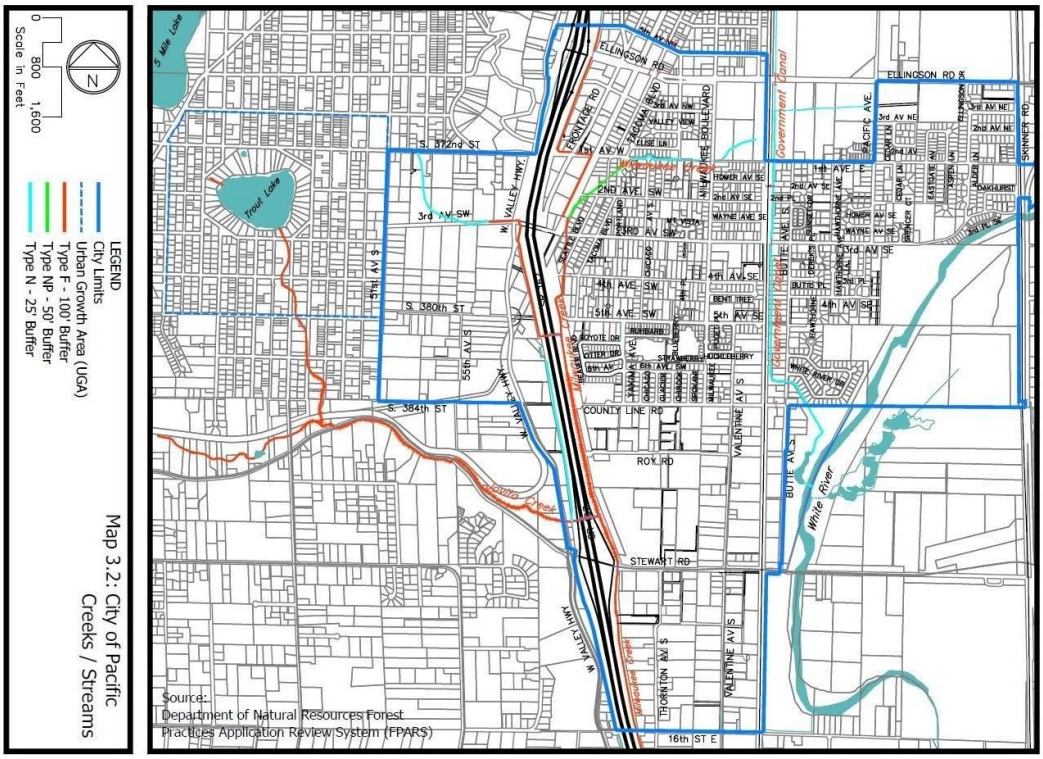



Figure VIII-9. City of Pacific Creeks/Streams

Figure VIII-10 identifies the condition of aquatic habitat and riparian corridor based on the stream surveys of Jovita Creek for the White River Basin Plan. Milwaukee Creek was not surveyed.

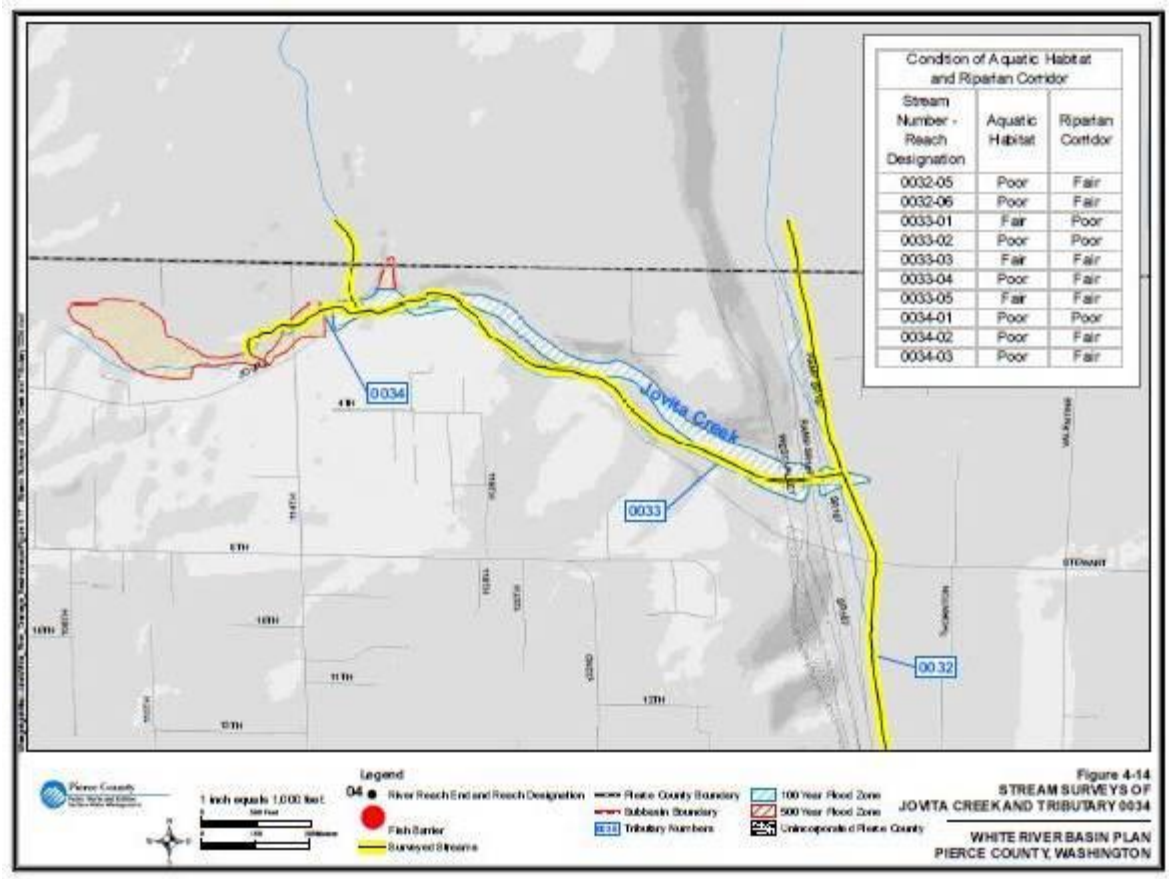
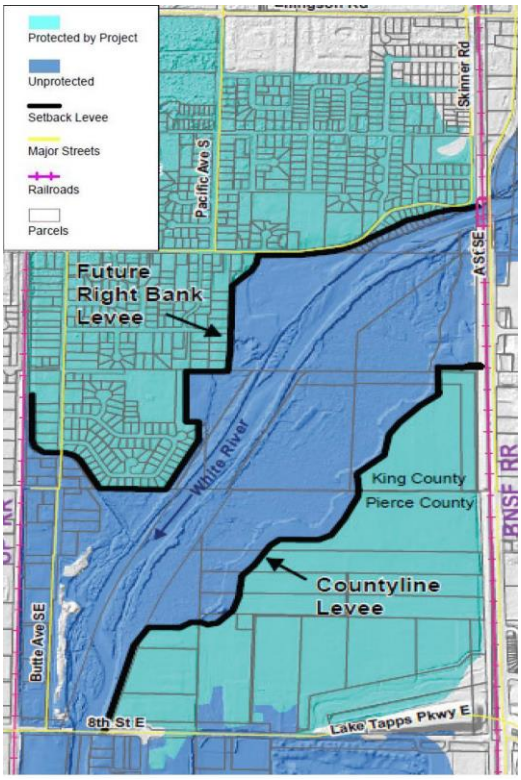



Figure VIII-10. Jovita Creek Condition of Aquatic Habitat

Figure VIII-11, to the right, is a hydraulic model showing potential impacts of LWR flood events in and around the City of Pacific and the risk reduction provided by the flood protection projects. The specific flood protection alignment along the Right bank has yet to be determined.




As part of the Countyline Levee Setback project, King County is now is the process of setting back the 1920's levees on the left bank of the White River in Pacific to create additional flood storage capacity. Existing levees will be removed and relocated further east of their present location. The purpose of the relocation is to allow the river channel to migrate more naturally, create flood storage capacity, and help alleviate potential flooding of structures on the right bank of the White River. In the near future, the counties will also relocate the levees on the right bank of the White River to increase flood storage capacity.

Pierce County priorities include 1) the continuance of the floodplain property acquisition program to reduce potential flood damage, and 2) identification of further opportunities to combine flood protection with habitat and stream rehabilitation through the levee setback program.

King County's Countyline project will include 6,000 LF setback levee, 5,000 LF biorevetment, 4 bank deflector engineered log jams (ELJ), and 4 apex ELJ's as shown in Figure VIII-12. Re-vegetation will also occur along the banks.

While the focus is on endangered species in land planning, all species of fish and wildlife are addressed under biodiversity. Fish and wildlife have similar needs as humans. They need clean water, fresh food and clean safe habitat area to raise their young. For fish, this means that there is an adequate supply of clean cool water. This can be provided through the retention of shading vegetation on the banks of streams and rivers, especially important during times of drought. Clean water can be retained through stormwater control structures that remove sediment and pollutants. Streamside vegetation can also provide safe habitat through the provision of ELJ's hiding places for adult and juvenile fish.

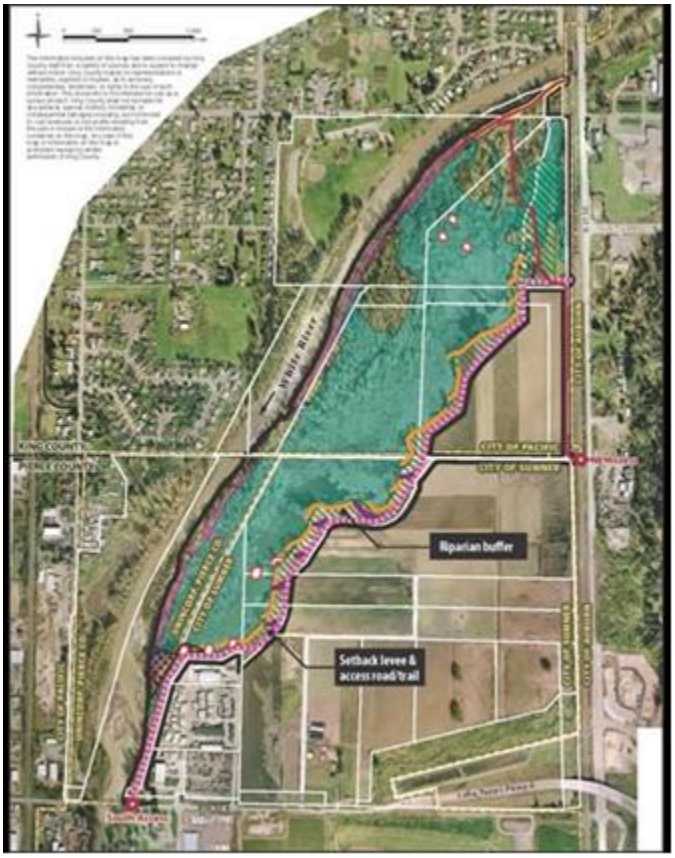



Figure VIII-12. Countyline Project

**Suggested Voluntary City Government Strategies**

Short Term Actions

1. The Pierce County Biodiversity Alliance will work with City of Pacific staff to develop the final draft of the City's chapter in the Lower White River Biodiversity Stewardship Plan.
2. The PCBA will re-introduce the updated Lower White River Stewardship Plan with the City of Pacific's chapter to the Planning Commission and City Council, and
    a. Advocate for community member participation in land use decisions regarding proposed developments that affect the BMA,
    b. Identify and advocate for conditions that eliminate or minimize threats to habitat fragmentation,
    c. Incorporate information from the LWR Stewardship Plan into maintaining or down-zoning parcels along the river within the BMA.
3. Work with extension offices to reduce fertilizer and other toxic runoff into LWR and the adjoining wetlands.
4. Identify interested local residents or community organizations that can provide citizen input to prioritize conservation strategies and action plans that will be incorporated into this LWR BMA Stewardship Plan.

5. Help local groups apply for National Wildlife Federation Community Habitat Program for the City. *(Registered)*
    a. See if Parks Department or other community group might play a role in this.
    b. Conduct public education and outreach efforts to property owners to participate in this program.
    c. Educate and involve landowners in the stewardship of streams.
6. Coordinate the City's Utilities Department and residents in efforts to address the Lower White River pH TMDL.

Mid-Term Actions

1. Identify parcels within and adjacent to BMA that may become available for purchase or conservation.
    a. Connect a regional trail system for birding and fishing especially for wheelchair access.
    b. Design parks and trails with native vegetation buffering the LWR and keeping high density usage furthest from the river.
    c. Publicize landowner incentives for participation in County Open Space and Conservation designations.
2. Publicize the Community Salmon Fund to landowners.
3. Improve the quality of stormwater runoff going into the White River with restoration projects.
    a. Plant more trees throughout the City.
    b. Create and promote the creation of rain gardens and bioswales.
    c. Install rain gardens and bioswales for all city owned stormwater projects where feasible.
4. Revise the municipal code to ensure that development and other activities in the City's jurisdiction mitigate impacts to the LWR habitat.
    a. Create a PDR/TDR mechanism to help the City purchase land along the LWR.
5. Minimize development within the BMA, and where it is permitted require Low Impact Development (LID).
6. Help the community to embrace and cherish the LWR habitat by providing educational opportunities to understand what exists in the ecosystem and how it works.
    a. Create a display (seasonal or permanent) in the Algona/Pacific library on the LWR BMA.
    b. Discuss with other cities the possibility of creating a LWR Salmon or Biodiversity Festival.
7. Publicize shoreline designations and Pacific's water supply with maps and initiate poster contests for K-12.

Long-term Actions

1. Create a fish and wildlife monitoring plan that aligns with the levee relocation and restoration work conducted by King County.
2. Encourage schools to adopt sections of the areas and monitor persistence of native biodiversity.
3. Create a plan for maintenance and restoration of habitat for land owned by the City within the BMA.
    a. Minimize or eliminate the city use of fertilizers within the BMA, and instead adopt Integrated Pest Management practices.
    b. Encourage the planting of native vegetation that benefits wildlife on city property within the BMA.
    c. Develop a network of backyard habitats, city parks, and rain gardens that can become the wildlife corridor within the City and that extends out to the Green and White rivers.
4. Create a plan to monitor and remove noxious weeds.
    a. Partner with King and Pierce County Extension to expand to invasive insects.
    b. Involve K-12 schools for a weed-pulling contest and other restoration events.

5. Identify priority lands for future open space allocation that are contiguous tracts. Promote connectivity by using conservation easements or simple fee title acquisition.
    a. Develop a trail enhancement program where the public can adopt a section to improve, monitor, and set up photo-monitoring stations.
    b. Develop a "listening post" network where pedestrian trail users can use an app to hear about the history of the site.

**Suggested Community Conservation Strategies**

A community-led group, when formed, will choose/modify strategies from those listed in Chapter IV of the *Plan*. The following lists of actions are suggestions for a group to select from or re-arrange from short, to medium, to long–term:

Short Term Actions

1. Apply for National Wildlife Federation – Community Wildlife Habitat Program for local neighborhoods or in partnership with the Edgewood who is at the Registered Level.

    National Wildlife Federation's program is for homeowners, students, community leaders and businesses. A dedicated group pledges to preserve, restore and create sustainable landscapes that support a multitude of wildlife and native plants in their backyards, workplaces, places of learning and other community spaces. NWF supports these efforts through training, print and online resources and recognition through a formal certification process. (Chapter 1 in the Stewardship Plan has the full description of the program.)
2. Promote native vegetation retention and re-planting in residential areas.
3. Promote organic fertilizers and Integrated Pest Management (IPM).
4. Develop signage with the City to highlight the BMA.
5. Work with the City to establish or enhance a City Gateway. (Per 2011 Comp Plan "A gateway should be dramatic and obvious, and include a combination of buildings, structures, landscaping, signs, light, and public art.")
6. Support native vegetation retention and critical area buffer regulations to environmentally sensitive areas within the BMA and report any violations to these regulations.
7. Develop and implement citizen science wildlife monitoring projects.
8. Provide increased education and outreach to property owners, developers and real estate agents regarding impacts of vegetation removal and earth moving.
9. Create and dispense educational materials concerning fish and wildlife habitat stewardship actions.
10. Work with local Audubon Society to develop the "Bird of the Month" reporting program.
11. Participate in local land use decisions regarding proposed developments that affect the BMA.
12. Identify high use areas for people and wildlife along trails to minimize disturbance to the habitat and wildlife.
13. Organize volunteer work parties and partner with local Boy or Girl Scout troops, schools, or other environmental or civic organizations for volunteers.
    a. Sponsor annual or biannual native vegetation planting event.
    b. Sponsor invasive species eradication events.
    c. Sponsor volunteer "bioblitz" activities led by experts.
14. Promote wildlife nesting through a nest box program (e.g., bats, songbirds, wood ducks and monitor for success.

Mid-Term Actions

1. Consider a project with Pacific's Parks and Recreation to create a demonstration project within a new park, cooperating with Pierce/King County Conservation District, Master Gardeners, schools, Girls and Boy Scout troops, and other local volunteers.

a. Use the site to promote shoreline-dependent species through nest box placement (e.g., wood ducks) and monitor to see if this strategy is effective.
b. Use the site for bat boxes and monitor to see if bats use them.
c. Create a "chimney" and see if Vaux's Swifts use it.
d. Locate new areas for native vegetation and food gardens.
e. Establish demonstration raingardens.
f. Begin or better promote a Farmer's Market.

2. Work with communities along the Lower White River to develop a LWR Salmon or Biodiversity Festival committee and host the festival.
3. Identify sections of the regional "walking trail" along the river with different groups adopting sections of the river to restore and maintain.

Long-term Actions

1. Work with citizens in Pierce and King Counties on projects for restoration, re-vegetation, and monitoring on both sides of the LWR.
2. Conduct water quality monitoring along creeks and ditches feeding into the LWR.
3. Develop a "report card" assessment tool to track the progress of selected actions. For a target area, measure:
   a. gains and losses to forest canopy.
   b. total acreage of habitat restoration efforts.
   c. areas identified as needing invasive eradication and number of areas receiving treatment.
   d. number of large mammals such as deer and bear that are seen or intercepted in the BMA.

   Or for a group working on projects within the BMA, assess number of people who have
   e. created backyard habitats for certification,
   f. conducted water quality monitoring,
   g. planted native vegetation in their yards,
   h. made rain gardens.

   Or for a community, count:
   i. the total number of educational events including where and how a group makes outreach to landowners.
   j. how many members have volunteered for city/county sponsored programs.
   k. how often committee leaders communicate with membership via meetings, social media, and essential governmental bodies, such as attending planning or recreation meetings.

# Chapter IX – City of Auburn

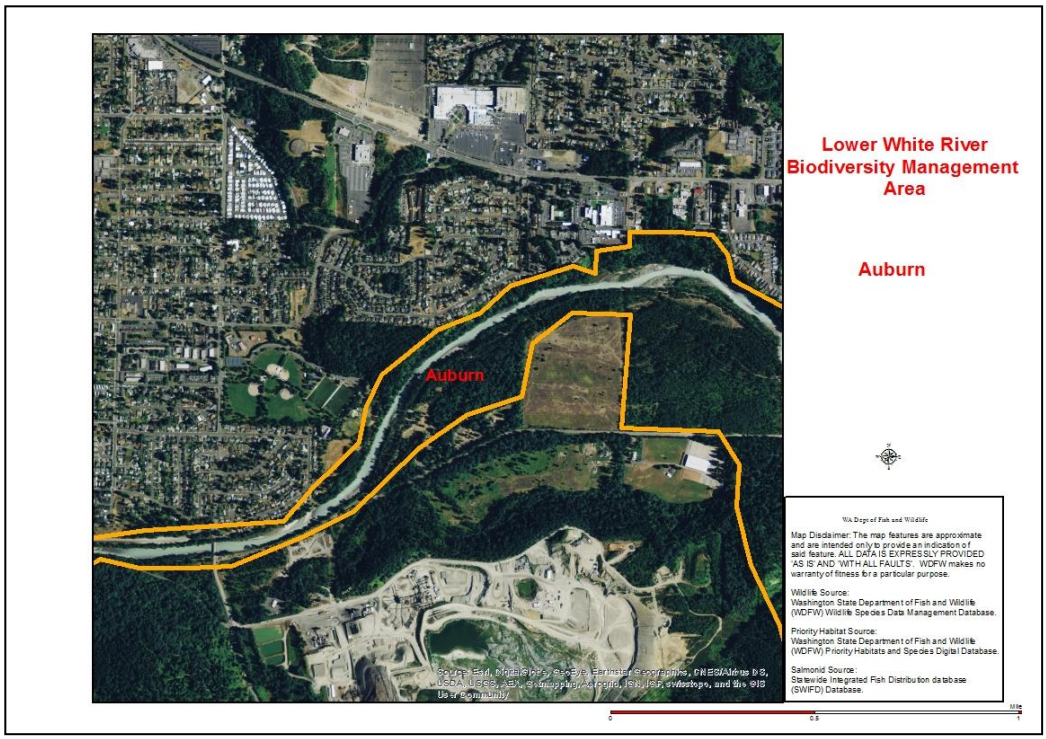



Figure IX-1. Section of the Lower White River BMA within the City of Auburn

**General Description**

The LWR Biodiversity Management Area runs along the White River through the southern portion of the City of Auburn and portions of unincorporated Pierce and King Counties (Figure IX-1). The land cover within the BMA is riparian dominated by hardwood trees and small shrubs, hardwood and mixed hardwood/conifer forests, and developed parcels as it nears the City of Pacific. The portion of the LWR BMA within the City of Auburn starts at boundary between King and Pierce County on the east and west boundaries.

**Demographics, Land Use, and Growth Potential**

Unincorporated Pierce and King County

The area surrounding the LWR BMA as it passes through Auburn is characterized by low- and medium-density residential housing, parks, and forest resource lands owned and managed either by King or Pierce County.

City of Auburn

The City of Auburn lies in both south central King County and north central Pierce County. It ranks as the 14th most populated city within the State of Washington (2014). Auburn's 2013 population estimate was 74,860. The City is recognized as a Regional Growth Center: a "designated area of high-intensity residential and employment development and serves as primary framework for regional transportation and economic development planning." However, under the Puget Sound Regional Council's Vision 2040, growth will be conducted in a manner that supports a healthy environment, addresses global climate change, and uses resources wisely and efficiently to protect the environment.

To capture a comprehensive community vision and involve the public in the planning, Auburn initiated a visioning process in 2014 titled "Imagine Auburn." City staff developed seven value statements to shape the contents of the 2015 Comprehensive Plan.

The City's values of

- wellness,
- environment,
- sustainability provides a framework for natural resource protection and enhancement,
- appropriate access to natural resources and open spaces,
- maintenance and strategic expansion of public infrastructure,
- natural resource protection that results in a thriving and long-lasting community, and
- appropriate updating of the adopted Shoreline Master Program (SMP)

were aligned with four of the 14 Growth Management Act (GMA) planning goals which must be considered as local jurisdictions develop their plans. They were

#8, Natural Resource Industries,
#9, Open Space and Recreation,
#10, Environment, and
#14, Shoreline Management.

These aligned goals are significant for the long-term viability of the LWR Biodiversity Management Areas.

Existing Land Use

Table 8 provides a breakdown of publicly owned lands by acreage within the Lower White River BMA. The publicly owned gravel pit is not included in Table 8 and lies just outside the boundary of the BMA. Regardless, a critical environmental concern is the proper management of gravel extraction. This is an industry which has been active in Auburn for many years and which remains a viable industry. Many historic mining operations caused significant environmental damage and will do so again if not strictly regulated. Within geographic King County, the City of Auburn owns 210.1 acres within the BMA.* The acreage was calculated on the original LWR BMA boundaries and has not been re-calculated for the revised boundaries.

Table 8. Lower White River BMA Public Lands within geographic King County.

| **Public Agency** | **Acres within BMA** |
|---|---|
| King County | 251.3 |
| City of Auburn | 210.1 |
| City of Pacific | 2.2 |
| United States-BIA | 36.9 |
| Grand Total | 500.6 |

Late in 2015, Auburn purchased an additional approximately 42 acres along the bed and banks of the White River from Puget Sound Energy to ensure that this land would be managed as floodplain open space. The acquisition area is shown in red in Figure IX-2.

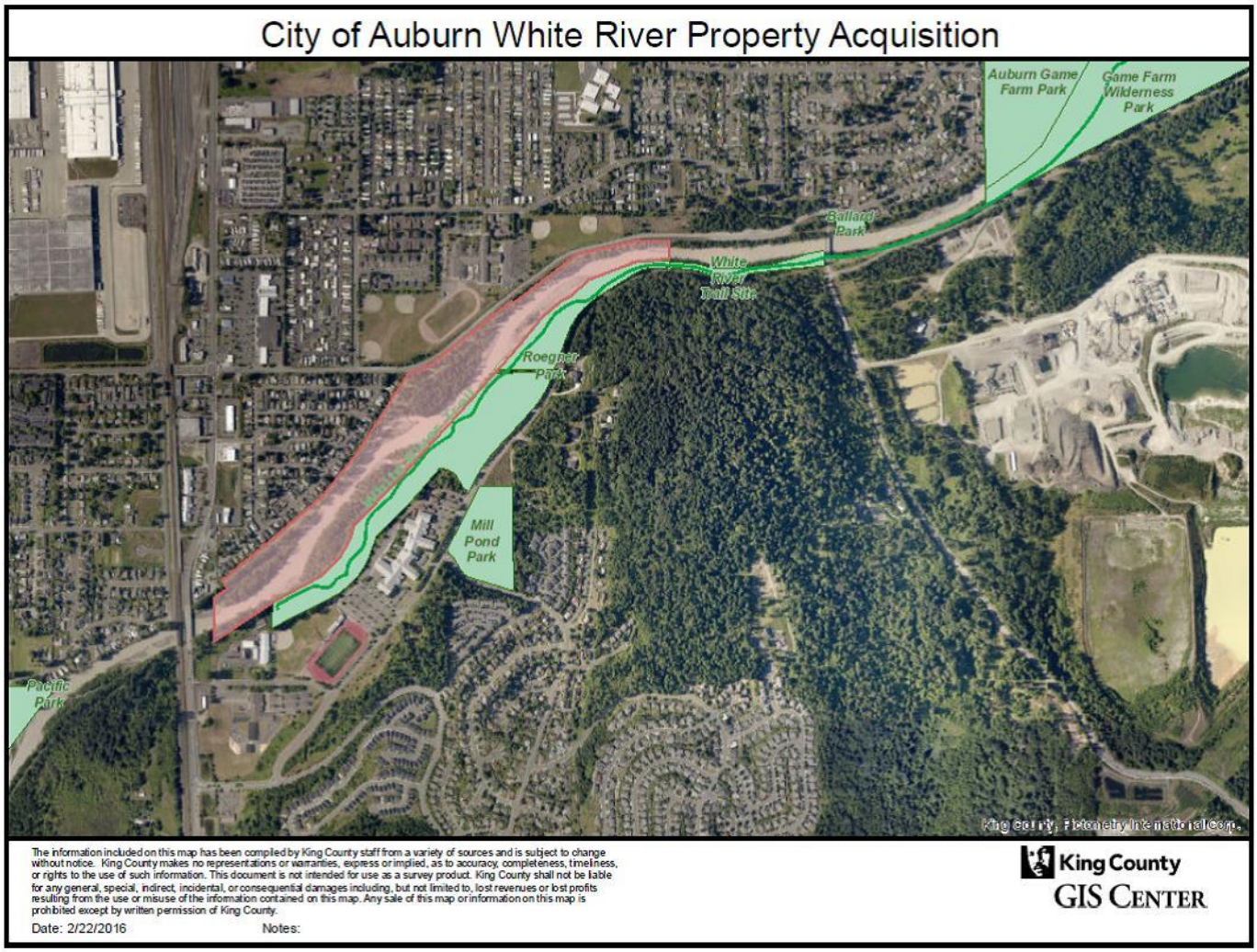



Figure IX-2 City of Auburn White River Property Acquisition (acquisition area shown in red)

**Current Zoning and Shoreline Environments**

Zoning

The City of Auburn is currently zoned as depicted in Figure IX-3. Within the City of Auburn, the BMA is zoned primarily Residential Conservancy and Public Use (parks). The remaining zones are:

- R5 Residential (5 DU/acre),
- R7 Residential (7 DU/acre),
- R10 (10 DU/acre),
- RHMC (Manufactured/Mobile Homes),
- UNC (Unclassified Use), and
- a small area of C3-Heavy Commercial.

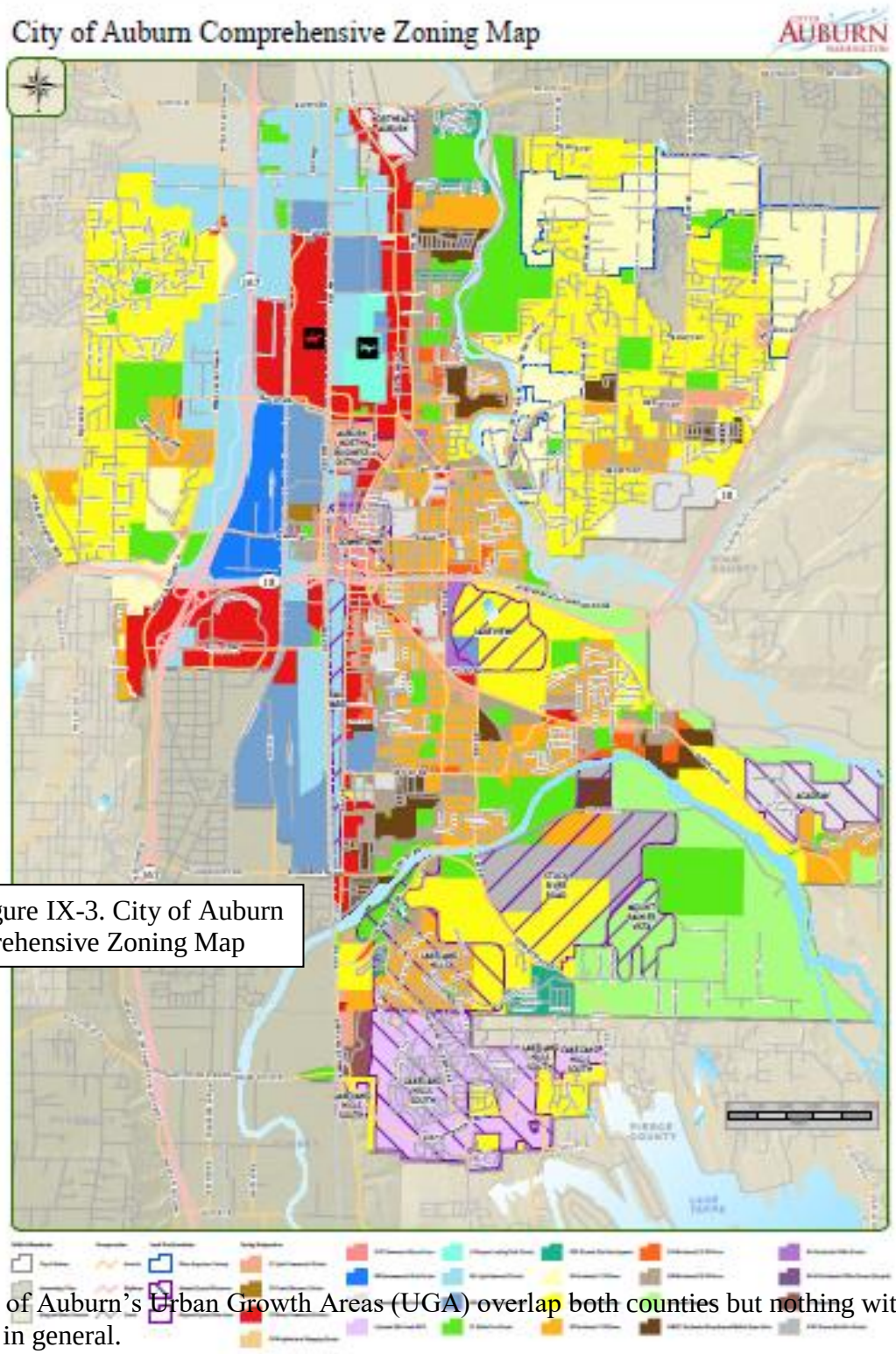



Figure IX-3. City of Auburn Comprehensive Zoning Map

The City of Auburn's Urban Growth Areas (UGA) overlap both counties but nothing with the BMA or White River in general.

Shoreline Environments

Under the Washington State Shoreline Management Act the Lower White River is considered a "Shorelines of the State." All lands within 200 feet of the ordinary high water mark, and associated wetlands and floodplains, fall within the jurisdiction of Shorelines of the State, whose preferred uses according to the Act are (in order of priority) to:

"recognize and protect the statewide interest over local interest; preserve the natural character of the shoreline; result in long-term over short-term benefit; protect the resources and ecology of the shoreline; increase public access to publicly owned shoreline areas; and increase recreational opportunities for the public in the shoreline area."

All shorelines, including those designated as Shorelines of the State, are classified into "environment designations" based on their physical, biological, and development characteristics. Historically, Plans have used primarily four basic environment designations:

- Natural
- Conservancy
- Rural
- Urban

New state guidelines recommend six designations:

- Natural
- Rural Conservancy
- Urban Conservancy
- High Intensity
- Shoreline Residential
- Aquatic

Local governments may modify state recommendations to better accommodate shoreline areas with unique characteristics. These environments are similar to zoning designations allowing different land uses, densities and activities ranging from the most intensive uses (High Intensity) to very limited uses (Natural). The City of Auburn chose the following shoreline designations:

- Shoreline Residential – Accommodates residential development and appurtenant structures and to provide appropriate public access and recreational uses. Standards for density or minimum frontage width, setbacks, lot coverage limitations, buffers, shoreline stabilization, vegetation conservation, critical area protection, and water quality shall be set to maintain no net loss of shoreline ecological functions.
- Urban Conservancy - Areas zoned Urban Conservancy (light green in Figure IX-3) represents areas that have environmental constraints or which promote protection of City water sources. They should be no greater than 1 DU/4 acres until such time public facilities are available. This zoning allows farm animals, appropriate-scale commercial activity in support of agricultural uses where it does not substantially adversely impact the surrounding residential community and demonstrates compliance to development standards specified in the zoning code. This is the largest zoned area along the LWR and could see future growth if and when public facilities are available.
- Natural – Protect those shoreline areas that are relatively free of human influence or that include intact or minimally degraded shoreline functions that would become irreversibly impaired as a result of human development and activity.

Most of the Auburn's shoreline is designated as Natural and Urban Conservancy (Figure IX-4). Shoreline Residential designation occurs on the north side of the river in two separate areas, south of Game Farm Park and between 41st St and the City of Pacific. Unfortunately, the Shoreline Residential area is located within the 100 and 500-year flood hazard (Figure IX-5) and within identified erosion and landslide areas (Figure IX-6). According to URS Consulting's 2004 survey, most of the floodplain corridor is forested with the exception of the Auburn Game Farm Park and a small amount of residential land downstream from the diversion levee. A few side channels were present, and there was a smaller

amount of large woody debris than in upstream reaches. Directing future growth to flood hazard zones is likely to create conflicts for both homeowners and the City of Auburn. Instead, the natural condition of the White River should be maintained in this area to conserve biodiversity and to alleviate flooding, erosion, and landslide hazards over time. In particular, there should be minimal development in this area or the streams feeding into it and what is permitted should be strictly controlled and require low impact development standards.

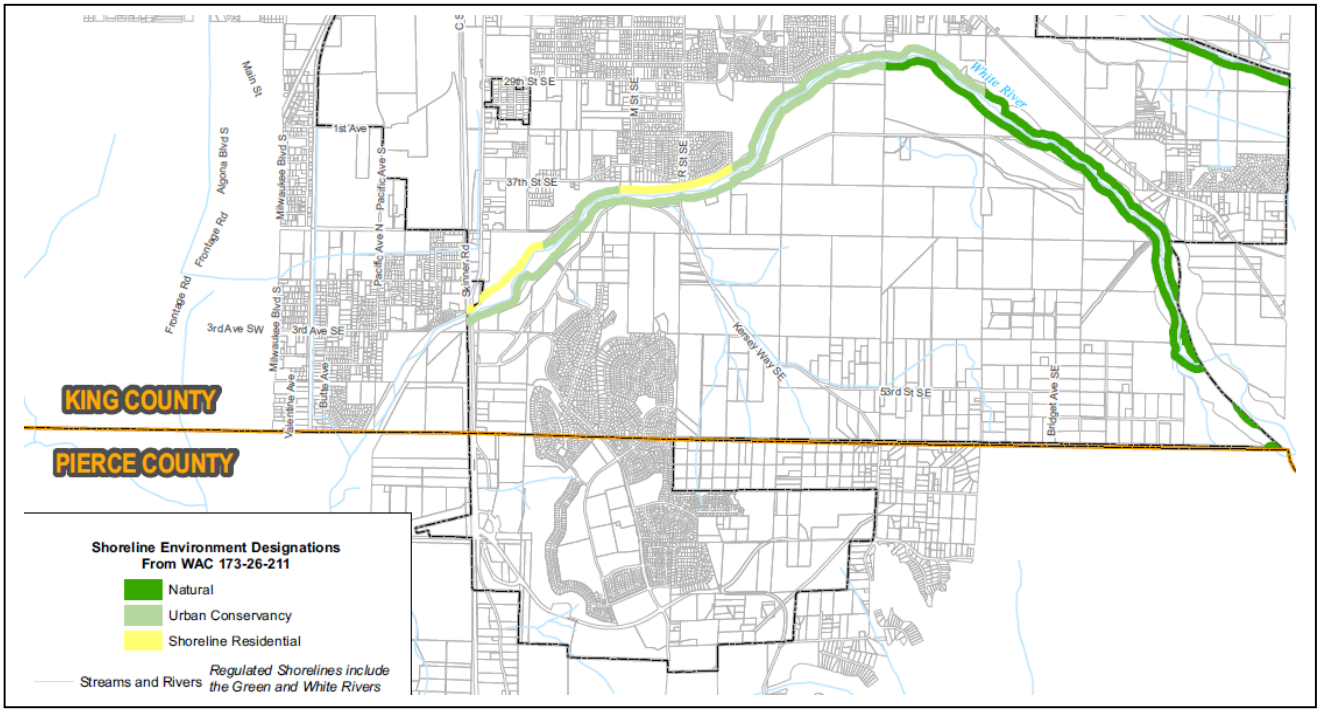



Figure IX-4. Shoreline Environmental Designations (May, 2009)

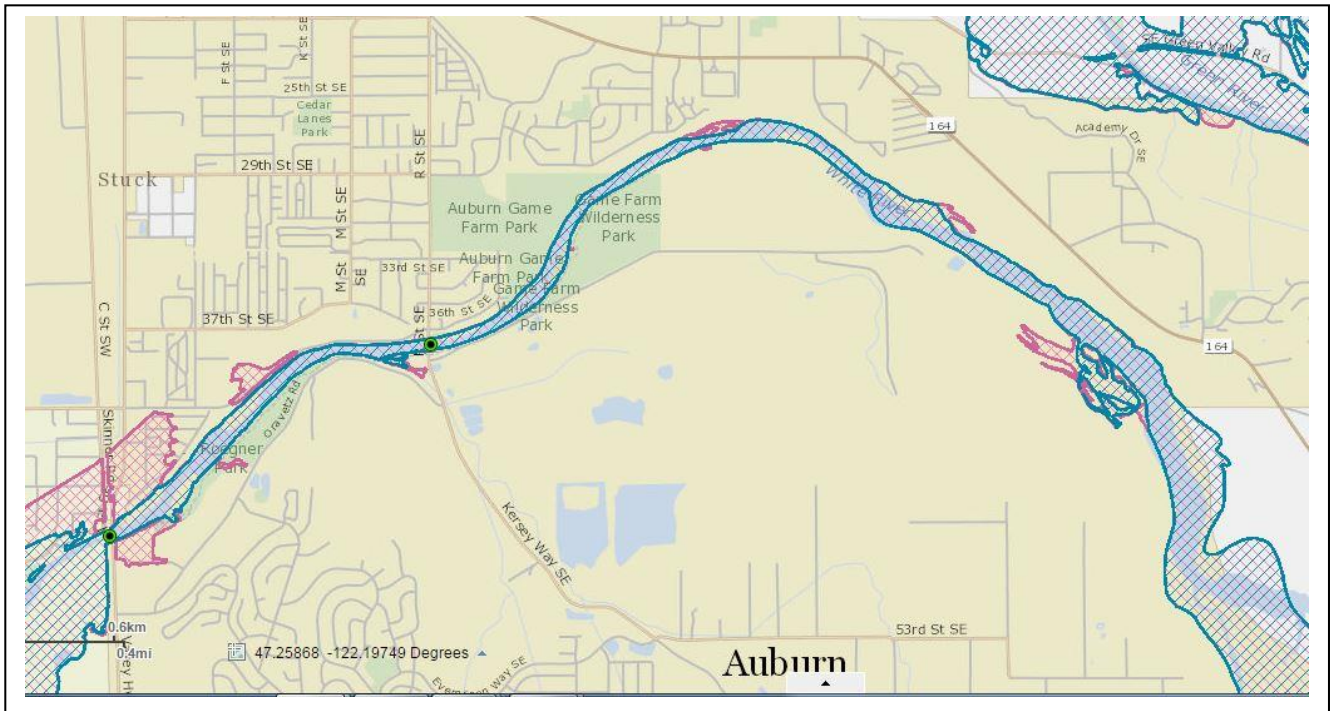



Figure IX-5. 100 Year (blue) and 500 Year (red) Flood Map

City of Auburn has adopted a regulatory floodplain map that is based on and includes the FEMA flood risk maps, but also includes additional regulatory features (e.g. Riparian Habitat Zone) to protect federally-listed species and habitat.

Figure IX-6. Erosion Areas

2015 Comprehensive Plan

The Natural Environment element in the City's Comprehensive Plan is intended to meet the objectives of the State Growth Management Act (GMA); Endangered Species Act (ESA); State Environmental Policy Act (SEPA); Countywide Planning Policies of King and Pierce counties; and other federal, state, and county policies. It also affirms the City's role in regulating land use; implementing federal and state statutes; obtaining funding from federal, state and local jurisdictions; and consistently managing impacts to the Natural Environment.

The following GMA goals relate directly to the Natural Environment:

- Open space and recreation - Retain open space, enhance recreational opportunities, conserve fish and wildlife habitat, increase access to natural resource lands and water, and develop parks and recreation facilities.
- Protect the environment and enhance the state's high quality of life, including air and water quality, and the availability of water.

The GMA also requires adoption of development regulations that protect critical areas (RCW 36.70A.060), and use of the "best available science" in developing policies and development regulations to protect the functions and values of Critical Areas (RCW 36.70A.172).

*City of Auburn Open Space Plan and Critical Areas*

The City of Auburn defines open space as "land largely undeveloped, which has been left in a natural, near natural or natural appearing condition. Open space includes both public and privately owned lands and is accessible to allow people to connect with the natural environment."

The Parks and Recreation Open Space Plan is currently being updated in the 2015 Comprehensive Plan. It was last updated in 2006. Since then the demand for recreational space increased with the population.

In addition, the parks are no longer just a weekend destination and are being used from dawn to dusk, seven days a week.

The City of Auburn's Critical Areas are:

- Flood hazards
- Geological hazards
- Ground water protection areas
- Significant trees
- Streams
- Wetlands
- Wildlife habitat

Proposed development and other activities in or near environmental Critical Areas are subject to the City's Critical Area review requirements found in Chapter 16.10 of the Auburn City Code to prevent adverse impacts to these areas and to protect public health, safety, and welfare. Where such proposals occur within the 200-foot shoreline jurisdiction of the White River, reviews are conducted as required under the City's Shoreline Master Program and Chapter 16.08 ACC. Where development proposals are located within the City's regulatory shoreline, they are also subject to the species, habitat, and water quality review requirements of the City's Flood Hazard Area regulations in Chapter 15.68 ACC.

Auburn has grown rapidly during the past decade, and housing and employment are expected to continue to increase significantly by 2030, with the population reaching over 90,000, as shown in Figure

IX-7 (Auburn Comp Transportation Plan, 2012). Potential residential and commercial development on wetlands, floodplains, and steep slopes are some of the issues that are being addressed through the goals and policies in the updated Comprehensive Plan.

The orange diagonal stripes in Figure IX-8 are proposed Special Plan Areas. This designation applies to specific areas identified as being appropriate for mixed, urban level development on a planned basis. Portions of these areas enter into the LWR BMA and should have special requirements that work well with biodiversity preservation.

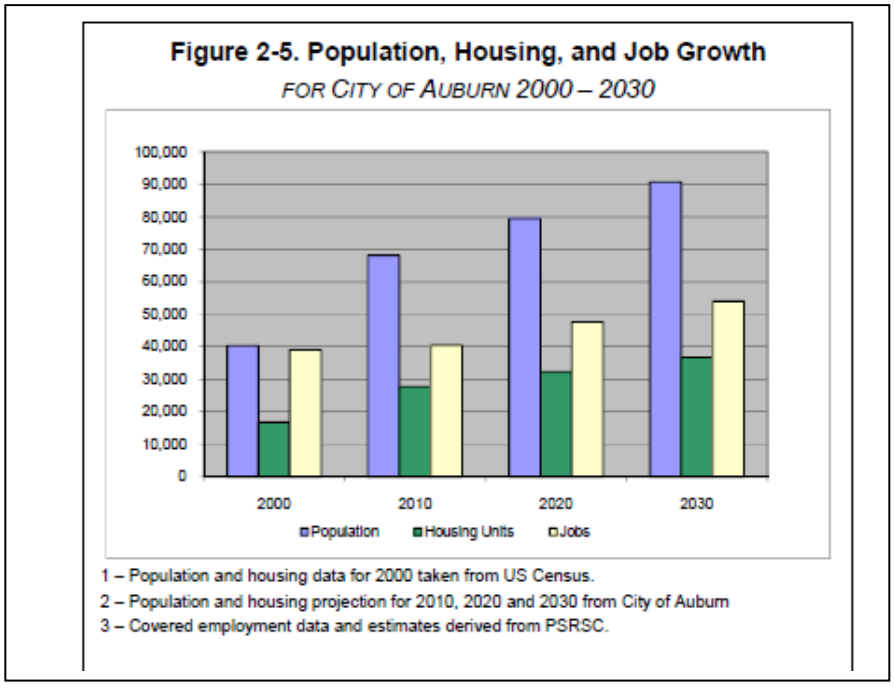



Figure IX-7. Population, Housing, and Job Growth 2000-2030

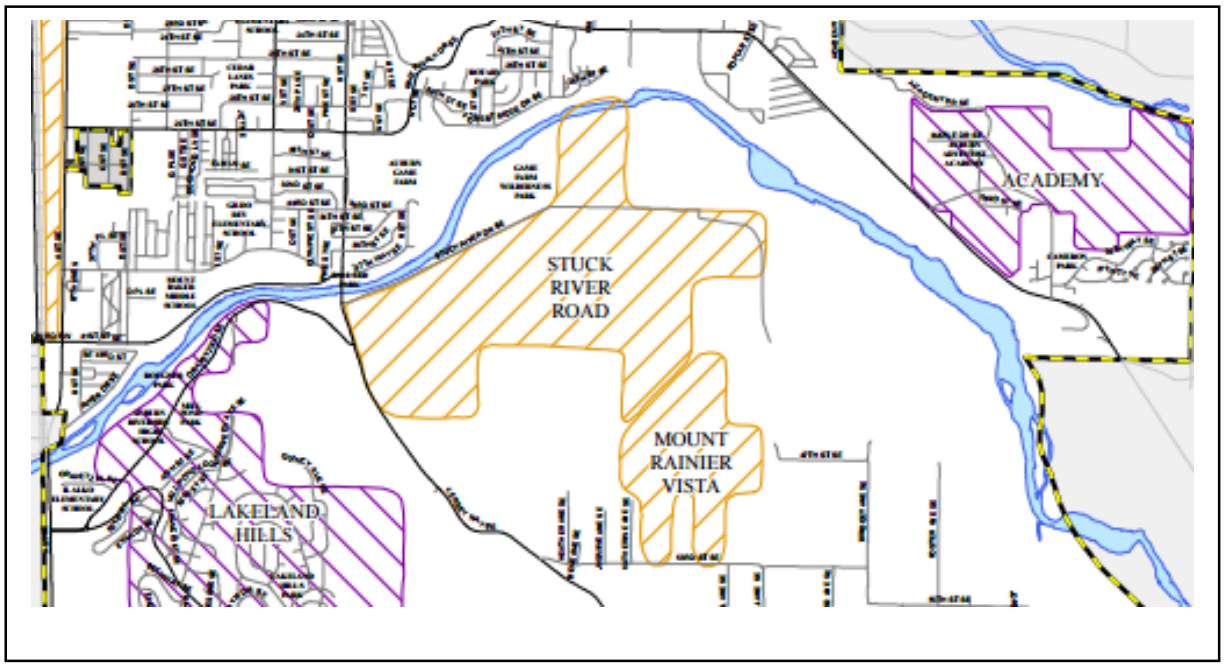



Figure IX-8. Special Plan Areas

**Fish and Wildlife Resources**

*Fish and Wildlife Habitat Area*

These areas are defined in Auburn's 2011 Comprehensive Plan as being of critical importance to the maintenance of fish, wildlife, and plant species. The principal Fish and Wildlife Habitat areas within the City of Auburn are the White River forested riparian area, the floodplain and its associated stream reaches and riverine wetlands. Fish and wildlife have similar needs as humans. They need clean water, fresh food and clean safe habitat area to raise their young. For fish, this means that there is an adequate supply of clean cool water. This can be provided through the retention of shading vegetation on the banks of streams and rivers. Clean water can be retained through stormwater control structures that remove sediment and pollutants. Streamside vegetation can also provide safe habitat through the provision of hiding places for adult and juvenile fish. The White River supports three salmonid species that are listed as threatened under the Endangered Species Act: Puget Sound Chinook, Puget Sound steelhead, and Coastal-Puget Sound bull trout. The White River is particularly important to Chinook recovery because it is the only population of spring Chinook in south Puget Sound. The White River also supports pink, chum, coho, and sockeye[31] salmon, as well as cutthroat trout.

The Washington Department of Fish and Wildlife's (WDFW) Priority Habitats and Species (PHS) map shows locations of PHS species. PHS is the principal means by which WDFW provides important fish, wildlife, and habitat information to local governments, state and federal agencies, private landowners, consultants, and tribal biologists for land use planning purposes. Figure IX-9 highlights priority habitats (light purple areas). Purple points are either: Bald Eagle, Great Blue Heron, or Osprey nest sites.

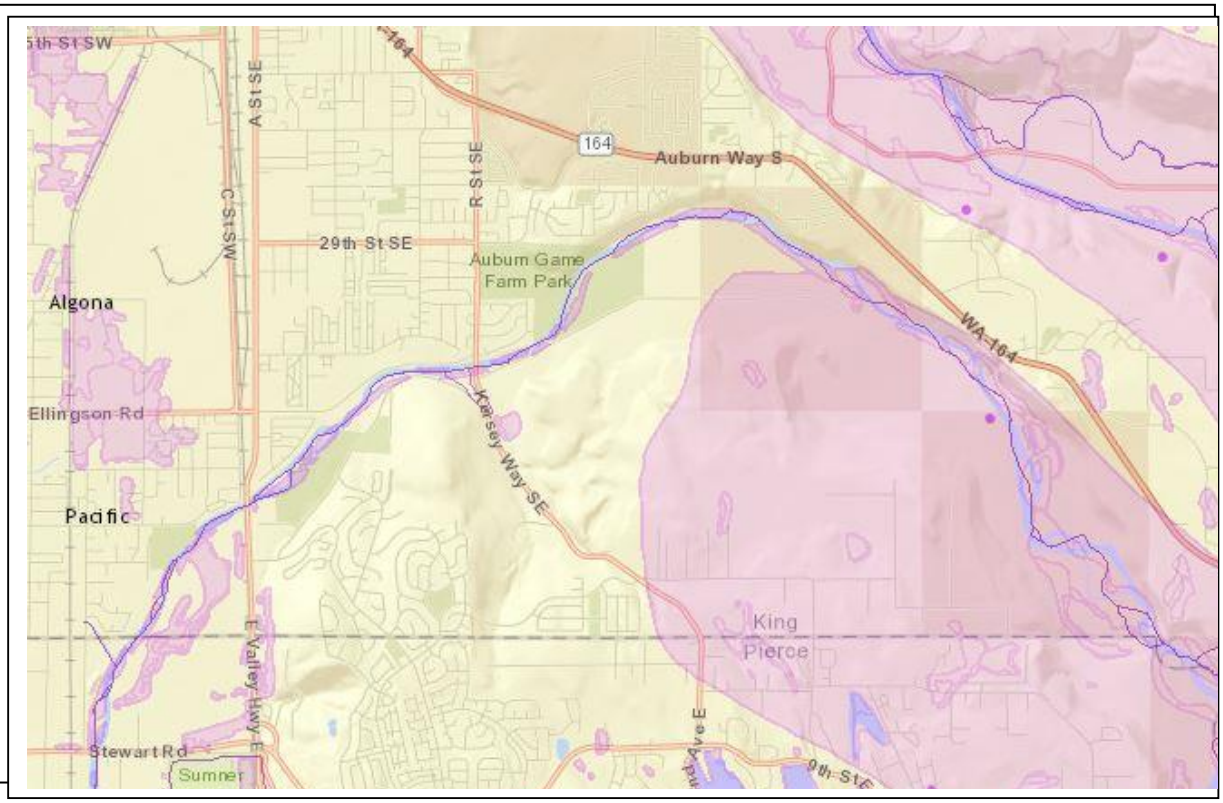



Figure IX-9. PHS Map within the BMA

[1]Gustafson, R.G., T.C. Wainwright, G.A. Winans, F.W. Waknitz, L.T. Parker, and R.S. Waples. 1997. Status review of sockeye salmon from Washington and Oregon. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-33, 282 pp. http://www.nwfsc.noaa.gov/publications/techmemos/tm33/tm33.html#toc

Predicted and Confirmed Wildlife Species

The PHS point locations and maps were one of the layers of information used to generate the LWR BMA. Table 15 lists all predicted species to be within the LWR BMA. To locate and validate whether those species were present, a 24-hour bioblitz (explained in Chapter 1) was conducted in 2006 in three large areas of the LWR BMA (Buckley and vicinity, unincorporated Pierce County between Buckley and City of Auburn's Game Farm and Game Farm Wilderness Parks, the City of Pacific's Pacific City Park, and the Sumner Golf Course (birds only) (Figure IX-10). The second bioblitz held in 2007 over a 12-hour period focused on the area between Auburn and Sumner. Data points collected over both bioblitzes within the City of Auburn are shown in Figure IX-11. Invertebrates were mainly collected between Buckley and Auburn during the 2006 bioblitz and at the Wilderness Park in 2007. Due to the cold weather in 2007, the invertebrate count was low (Table 2). Plant data were collected in the same three areas as vertebrates in 2006, but only down to Stewart Road in 2007 (Tables 3 and 4).

URS Consulting surveyed the reach between the Auburn Game Farm and a major pipeline crossing on the Muckleshoot reservation in 2004 for the White River Basin Plan[32]. The reach has fair spawning habitat for steelhead trout, Chum, Pink, and summer/fall Chinook salmon and rearing habitat for all of the above species, plus Cutthroat trout.

[32] White River Basin Plan, Pierce County Public Works and Utilities, November 26, 2013,

# Auburn Game Farm and Vicinity, 2006

Bioblitz data were reported at the locations marked below:
Mammals – yellow
Birds – blue
Plants – green

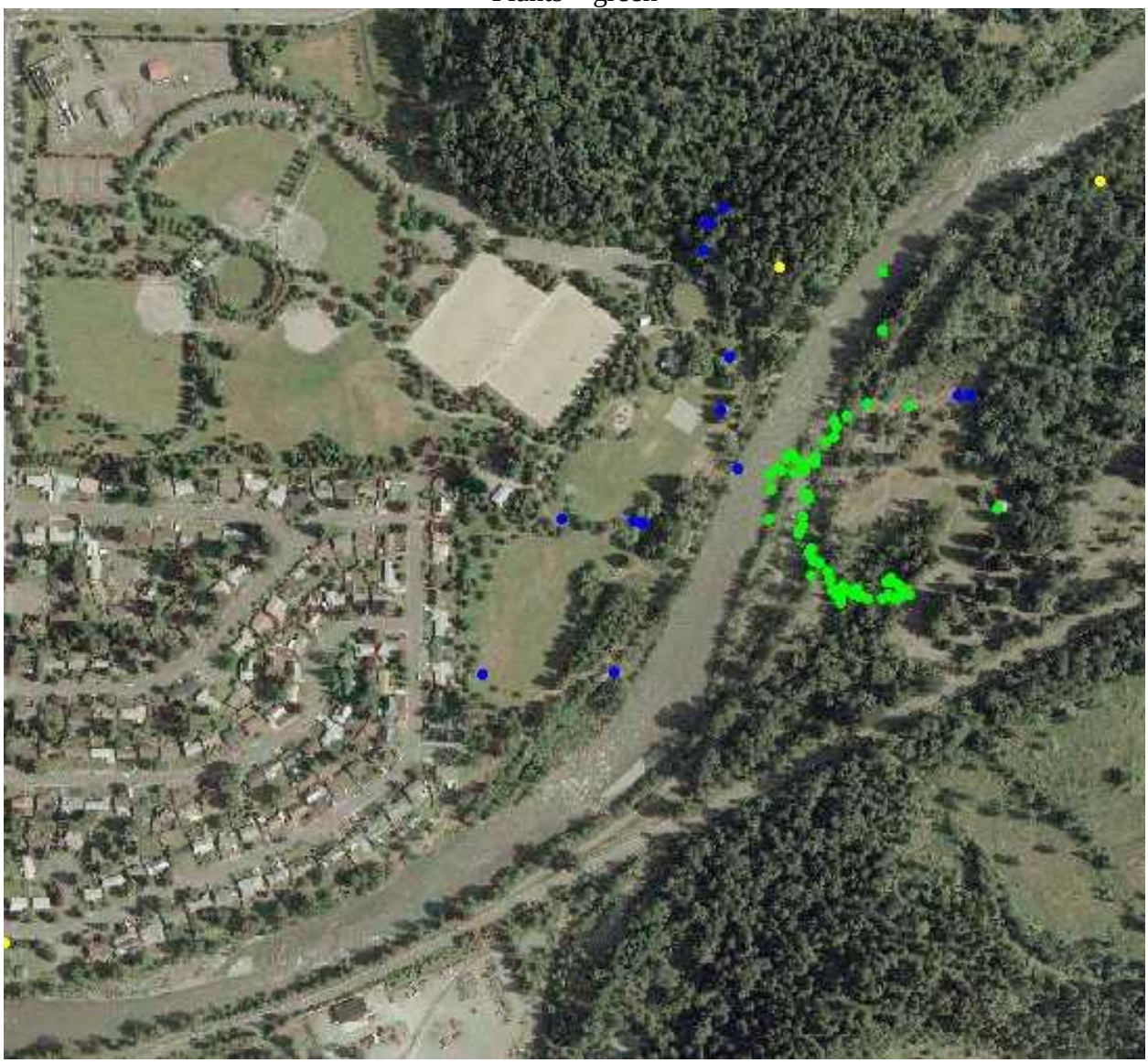


Figure IX-10. City of Auburn Bioblitz Data Locations, 2006

# Auburn Wilderness Park and Vicinity, 2007

Bioblitz data were reported at the locations marked below:
Mammals – yellow…Mammal Trackers – light blue
Birds – blue
Plants – green
Invertebrates - red

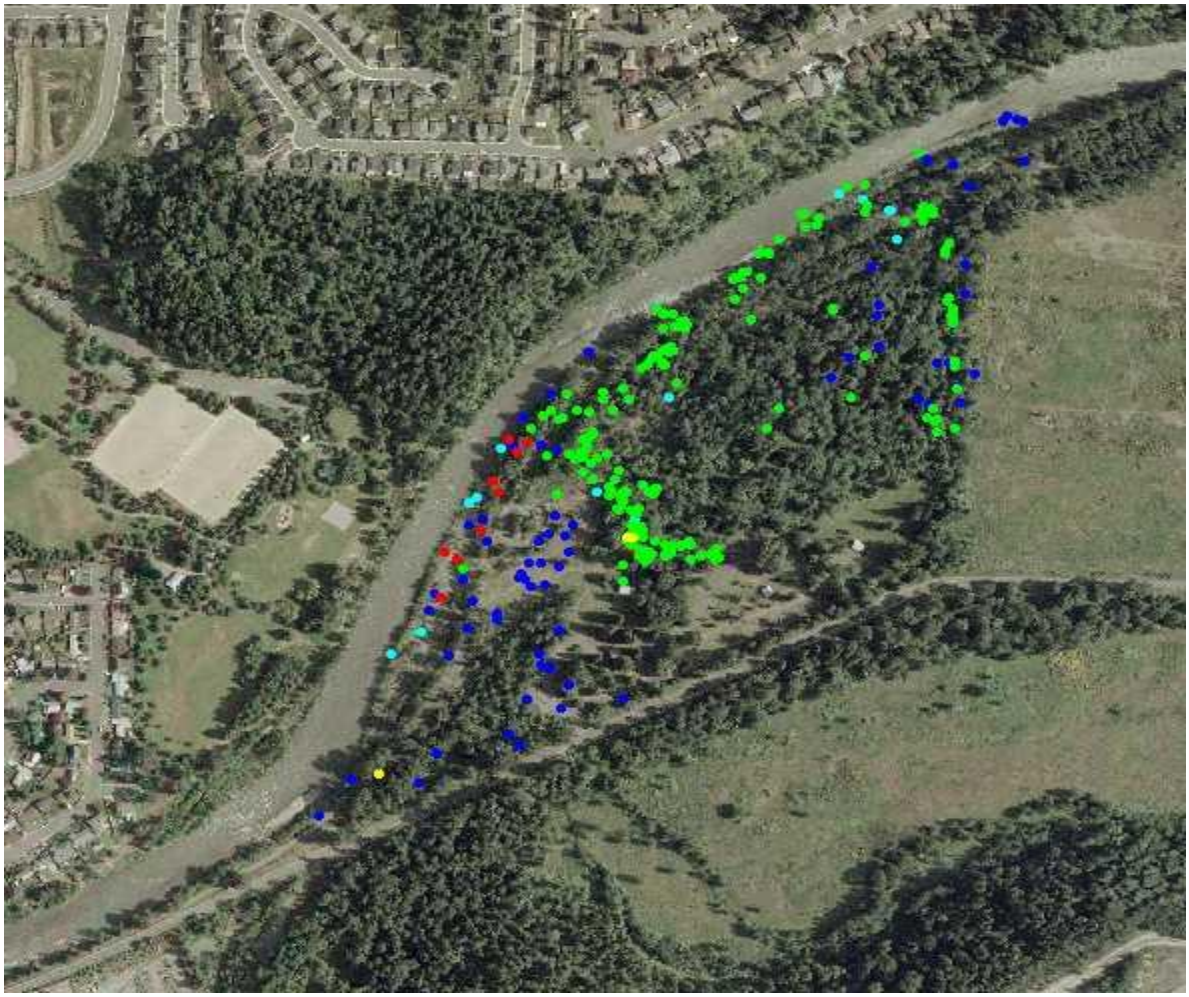


Figure IX-11. City of Auburn Bioblitz Data Locations, 2007

Table 15

## PREDICTED AND CONFIRMED WILDLIFE AND FISH SPECIES FOR THE LOWER WHITE RIVER BMA

**PREDICTED SPECIES Note: Species observed but not predicted are italicized**

| AMPHIBIANS | Auburn | | BIRDS | Auburn |
|---|---|---|---|---|
| *Bullfrog* | | | American bittern [2] | |
| *Ensatina* | | | American coot | |
| Long-toed salamander | | | American crow | X |
| Northwestern salamander | | | American dipper | |
| Pacific treefrog (Chorus frog) | | | American goldfinch | X |
| Red-legged frog [3] | X | | *American kestrel* | |
| Roughskin newt | | | American robin | X |
| Western toad [3] | | | Bald eagle [3,4] | |
| | | | Band-tailed pigeon [4] | |
| **Reptiles** | | | *Bank swallow* | |
| Common garter snake | X | | *Barred owl* | |
| Northern alligator lizard | | | Barn swallow | |
| *Northwestern garter snake* | | | Belted kingfisher | X |
| Painted turtle [1] | | | Bewick's wren | X |
| Rubber boa | | | Black-capped chickadee | X |
| Western terrestrial garter snake | | | Black-headed grosbeak | X |
| | | | Black-throated gray warbler | |
| **Fish** | | | Blue-winged teal | |
| *Prickly sculpin* | | | Brewer's blackbird | |
| *Sculpin spp.* | | | *Brown creeper* | X |
| *Speckled dace* | | | Brown-headed cowbird | |
| *Western brook lamprey* | | | Bushtit | X |
| | | | California quail | |
| **Invertebrates** | | | Canada goose | |
| 42 species, 7 non-native | | | Cedar waxwing | X |
| 14 species, 3 non-native | | | *Chestnut-backed chickadee* | X |
| | | | Cinnamon teal | |
| | | | Cliff swallow | |
| | | | Common barn-owl | |
| | | | Common merganser | |
| | | | Common nighthawk | |
| | | | Common raven | |
| | | | Common snipe | |
| | | | Common yellowthroat | |
| | | | Cooper's hawk [2] | |
| | | | *Dark-eyed junco* | X |
| | | | Downy woodpecker | X |
| | | | European starling | |
| | | | *Evening grosbeak* | |
| | | | Gadwall | |
| | | | *Glaucous-winged gull* | |
| | | | *Golden-crowned kinglet* | |
| | | | Great blue heron [3,4] | |
| | | | Great horned owl | |
| | | | Green heron (Green-backed) [3] | |
| | | | Green-winged teal | |
| | | | *Hairy woodpecker* | |
| | | | Hooded merganser [4] | |
| | | | House finch | |
| | | | *House sparrow* | |
| | | | House wren | |
| | | | Hutton's vireo | |

Table 15 PREDICTED AND CONFIRMED WILDLIFE AND FISH SPECIES FOR THE LOWER WHITE RIVER BMA

**PREDICTED SPECIES Note: Species observed but not predicted are italicized**

| BIRDS (Cont'd) | Auburn | | BIRDS (Cont'd) | Auburn |
|---|---|---|---|---|
| Killdeer | | | Western wood-pewee | |
| Lazuli bunting | | | White-crowned sparrow | X |
| Macgillivray's warbler | | | Willow flycatcher (3) | X |
| Mallard | | | Wilson's warbler | |
| Marsh wren | | | *Winter wren* | X |
| *Mourning dove* | | | Wood duck (4) | |
| Northern flicker | X | | Yellow warbler (2) | X |
| Northern harrier | | | *Yellow-rumped warbler* | X |
| Northern oriole | | | | |
| Northern rough-winged swallow | | | **MAMMALS** | |
| Northern shoveler | | | Beaver | X |
| Olive-sided flycatcher (3) | | | Big brown bat (4) | |
| Orange-crowned warbler | X | | Black bear | |
| Osprey (3) | | | Black rat | |
| Pacific slope flycatcher (Western) | | | Black-tailed deer (4) | |
| Pied-billed grebe (4) | | | Bobcat | |
| *Pileated woodpecker* | X | | California myotis (4) | |
| *Pine siskin* | | | Coast mole | X |
| Purple finch | X | | Coyote | X |
| *Red-breasted nuthatch* | X | | Creeping vole | |
| Red-breasted sapsucker | X | | Deer mouse | |
| Red-eyed vireo | | | *Douglas squirrel* | |
| Red-tailed hawk | X | | Dusky (Montane) shrew | |
| Red-winged blackbird | | | Eastern cottontail | X |
| Rock dove | | | *Eastern gray squirrel* | |
| Ruddy duck | | | *Elk* | |
| Ruffed grouse | | | Ermine | |
| Rufous hummingbird | X | | Fisher (2,3,4) | |
| Savannah sparrow | | | Hoary bat | |
| Song sparrow | X | | Little brown myotis (4) | X |
| Sora | | | Long-eared myotis (3,4) | |
| Spotted sandpiper (4) | X | | Long-legged myotis (3,4) | |
| Spotted towhee (Rufous-sided) | X | | Long-tailed (Forest) deer mouse | |
| Steller's jay | X | | Long-tailed vole | |
| Swainson's thrush | | | Long-tailed weasel | |
| *Townsend's warbler* | | | Mink (4) | |
| Tree swallow | X | | Mole spp. | |
| Turkey vulture (3) | X | | Mountain beaver | |
| Vaux's swift (3,4) | | | Mountain lion | |
| Violet-green swallow | X | | Muskrat | |
| Virginia rail | | | Northern flying squirrel | |
| Warbling vireo | | | Norway rat | |
| *Western meadowlark* | | | Nutria | |
| Western screech-owl | X | | Pacific jumping mouse | |
| *Western tanager* | | | Pacific water shrew (3) | |

Table 15

## PREDICTED AND CONFIRMED WILDLIFE AND FISH SPECIES FOR THE LOWER WHITE RIVER BMA

**PREDICTED SPECIES Note: Species observed but not predicted are italicized**

| MAMMALS (Cont'd) | Auburn | |
|---|---|---|
| Porcupine | | |
| Raccoon | | |
| Red fox | | |
| River otter | | |
| Shrew-mole | | |
| Shrew spp. | | |
| Silver-haired bat [2] | | |
| Southern red-backed vole | | |
| Spotted skunk | | |
| Striped skunk | | |
| Townsend's big-eared bat [2,3,4] | | |
| *Townsend's chipmunk* | | |
| Townsend's mole | X | |
| Townsend's vole | | |
| Vagrant shrew | | |
| Virginia opossum | | |
| Vole spp | | |
| Yuma myotis [3,4] | X | |

***Footnote:***

(1) - Trigger Species - Species that needed additional mapped land cover units to ensure representation within the network

(2) - At-Risk - Washington Gap Analysis Project (WAGAP) selected species considered to be most as risk of continued or future population declines due to human activities

(3) - Listed (State or Federal) - Species listed as State endangered, threatened, sensitive, candidate or monitor, as well as species listed or proposed for listing by the U.S. Fish and Wildlife Service

(4) - PHS - a species defined as priority under the WDFW Priority Habitats and Species (PHS) Program

(5) - Included based on species significance under the WDFW PHS/Heritage database, although not predicted to occur

**Italicized species:**
**Observed but not predicted**

**Conservation Targets**

In the Lower White River BMA several conservation targets were selected to represent the key habitat types occurring throughout the area. These conservation targets include:

- Lower White River
- Tributaries, wetlands, and oxbows
- Conifer/deciduous mixed forest areas

Combined, conservation targets create the rich variety of habitats necessary to foster a high level of biodiversity in the BMA. A detailed description of each conservation target can be found in Chapter III.

**Threats to Conservation Targets**

The main threats that are or may potentially be occurring to conservation targets include:

- Habitat conversion and fragmentation due to development, removal of native vegetation and roads;
- Poor water quality caused by residential and use of fertilizers, domestic animal feces, septic tank leakage, herbicides from road maintenance, farming and commercial sites, and road runoff;
- Loss of pools and large woody debris (LWD) due to development and channelization of the river;
- Introduction of invasive, non-native plant and animal species such as bullfrogs and Japanese knotweed;
- Fish passage blockage from culverts;
- Wildlife movement blockages from roads, driveways, and fencing;
- Erosion and damage to riparian habitat from dikes/levees along cities of Buckley, Pacific, and Sumner;
- Predation and disturbance of native species by domestic cats, dogs, and unregulated hunting/fishing;
- Stormwater and illegal discharge dumped directly into the river–
    - Water fluctuation surges due to storm drains from development redirecting water flow into the river and not into wetlands, dikes, and stormwater ponds;
- Pollution caused by dumping of trash and debris into or near the river.

**Overview of Conservation Strategies**

Conservation strategies have been identified to ascertain the level or severity of a potential threat, directly abate known threats, or identify restoration opportunities where degradation has occurred. Some threats apply to multiple conservation targets and as such the conservation strategies have been grouped under the following categories:

- Reduce Habitat Conversion and Fragmentation (due to development and human activity)
- Eliminate Invasive and Introduced Species
- Remove Fish and Wildlife Movement Blockages
- Enhance Water Quality and Quantity
- Manage Flooding
- Control Erosion and Siltation
- Reduce Predation by Domestic Animals
- Reduce or Eliminate Pollution Within the LWR BMA

**Role of City Government in Biodiversity Conservation**

Biodiversity enhancement goals fall into two general areas: 1) protection of existing elements and 2) restoration and recovery of elements that have been damaged by human intervention. A community-driven biodiversity stewardship plan which incorporates the city's policy and regulatory tools is incomplete without the following to provide the best environment for success:

- Voluntary incentives
- Public education and outreach
- Multi-jurisdictional coordination

Update existing regulatory tools so that they can be used to protect biodiversity.

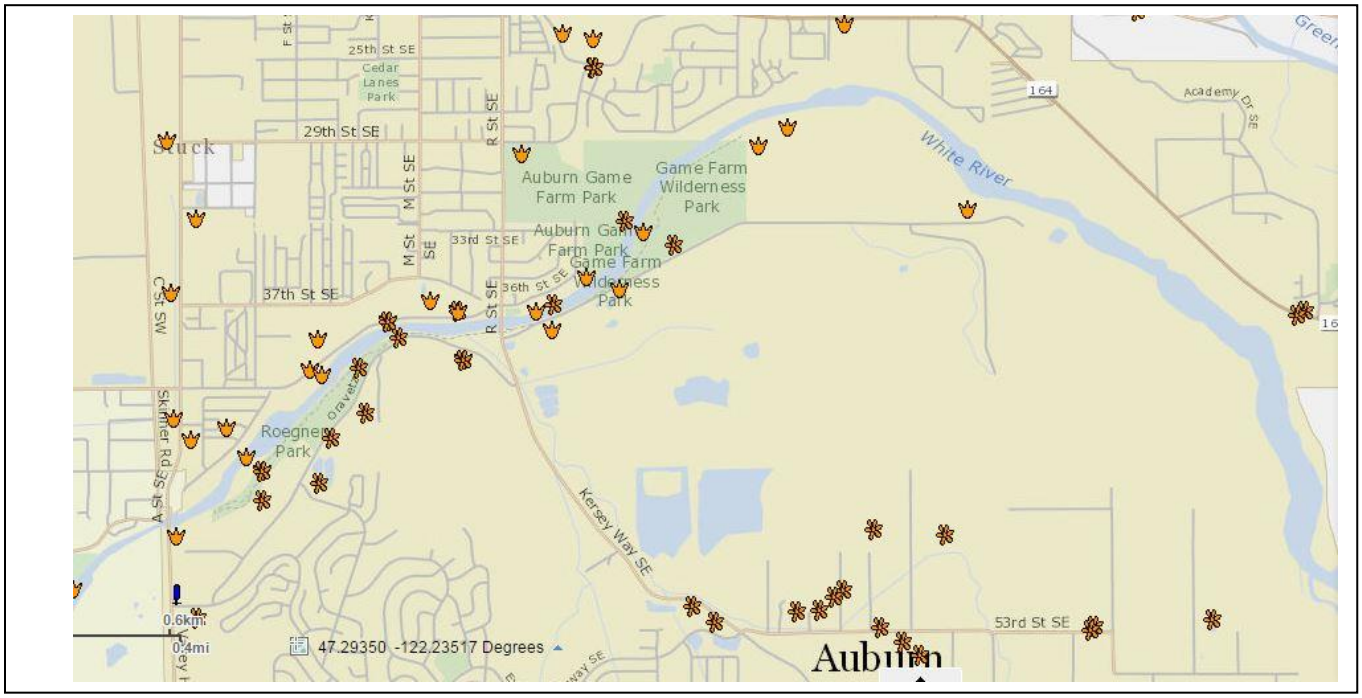
As a first step, insert into Auburn's Comprehensive Plan update in 2015 the Lower White River Biodiversity Management Area Stewardship Plan as an appendix. The LWR Stewardship Plan is a non-regulatory plan that can be used to guide the City to protect its biodiversity in coordination with new development.

The Comprehensive Plan is the primary policy document for City governance and sets the foundation for land use and development regulations. Once the Comprehensive Plan is updated, biodiversity management can be incorporated into existing and future regulations and programs. These may include examining zoning codes within the BMA and adjacent areas that establish acceptable land uses and complementary development ordinances (critical areas, stormwater management, etc.). Pierce County included the Biodiversity Network into its Open Space Map as their fish and wildlife element. The City of Auburn's Open Space Map could include the BMA in its update. As currently written, the City provides open space to its citizens by their Open Space Plan goals including:

- Continuing the application of regulatory tools as an important part of environmental protection – in order to ensure that new development, redevelopment, land management, and property use do not degrade the environment;
- Identifying particularly sensitive properties for protection through purchase easement acquisition, or other means;
- Seeking out opportunities on public and private property for restoration or enhancement of existing sensitive areas;
- Placing significant emphasis for city leaders and staff on policies and financial investments that protect natural resources.

Eliminate Invasive and Introduced Species

The World Conservation Union states that the impacts of alien invasive species are immense, insidious, and usually irreversible. They may be as damaging to native species and ecosystems on a global scale as the loss and degradation of habitats. Hundreds of extinctions have been caused by invasive alien species and the ecological cost is the irretrievable loss of native species and ecosystems. An excellent source of information for the City of Auburn to begin to address invasive species is the noxious weed map (Figure IX-12).



Purple loosestrife Giant hogweed Spotted knapweed Tansy ragwort

Figure IX-12. Most Widespread Noxious Weeds (2014)

Provide Voluntary Incentives

There are a variety of tax incentive program used by various city and county governments to reward landowners for environmental conservation on private property. These can include programs administered by cities, state or federal entities. As an example, landowners who certify their property as Open Space under Pierce County Public Benefits Rating System can qualify for property tax reduction. Those currently available in Washington are listed in Appendix II. The City of Auburn should consider implementing its own tax incentive program and/or promote those listed in Appendix II to landowners within the LWR BMA.

Additional mechanisms the City can use for native biodiversity protection involves purchasing property within the BMA through fee simple land acquisition or purchasing development rights to properties. The City might consider implementing Transfer of Development Rights/Purchase Development Rights (TDR/PDR) to encourage the retention of biodiversity areas and transfer urban development to more appropriate locations within the city boundaries.

Offer Public Education and Outreach Programs

Efforts could include disseminating general information on the benefits of biodiversity, enrolling in formal coordinated programs such as Community Wildlife Habitats certified by the National Wildlife Federation, and sponsoring habitat restoration projects.

The term "biodiversity" has been given many definitions making it confusing to the public. As stated in the Introduction of this *Plan*, biodiversity has been defined as the existence of a wide variety of plant and animal species in their natural environments. Maintaining biodiversity is economically valuable because it provides breathable air, drinkable water, food, pollution and pest control, and resilience after natural catastrophes, such as floods and drought.

Stormwater and biodiversity issues do overlap. Existing programs can emphasize the overlaps. Climate change and biodiversity also are deeply intertwined. Landowner education can help the community take steps such as preserving and planting native vegetation to meet extreme events of drought or flood.

Participate in Multi-jurisdictional Coordination

An important element for success will be the coordination of efforts among all jurisdictions within the Lower White River BMA: Pierce County, King County, the Cities of Auburn, Sumner, Pacific, Buckley, and Enumclaw. Along with an engaged citizen group, jurisdictions can gain support from various government and non-governmental organizations such as Pierce Conservation District, King Conservation District, Forterra, and the Puyallup River Watershed Council. Such coordination allows periodic reviews of biodiversity action plans.

One example of coordinating efforts is the Pierce and King County's Regional Trails Plan, of which the City of Auburn is a part. The intent of the regional trail system is to provide recreational opportunities, promote healthier lifestyles, create connections to major developed areas and destinations, and enhance non-motorized transportation options throughout the counties. Keeping in mind that building new trails into the BMA can be problematic for biodiversity conservation, existing trails can provide an opportunity for public education in biodiversity issues.

Figure 20 illustrates Pierce County trail connection opportunities for continued regional trail expansion. To date, Auburn has 23.37 miles of trails. Land for trail development has been acquired, dedicated, or improved in two locations in the City–

1. in association with the Lakeland Hills development, and
2. in south Auburn, along the Green River.

A master site plan is currently being developed for the Future Green River Trail. The trail is a project partly financed by the King County Open Space Bond funding. Future plans include connecting other trails, such as the Lakeland Trail to the White River Trail.

Remove Fish and Wildlife Barriers

One avenue the City of Auburn might consider for removing barriers to fish is to apply for project funds thru the Pierce County Community Salmon Fund. The National Fish and Wildlife Foundation (NFWF) and Pierce County formed the Pierce County Community Salmon Fund in 2002 as a funding program for restoration projects that involved landowners and raised local support for salmon recovery. The goals of the Fund are

- To fund salmon protection and restoration projects that have a substantial benefit to the watershed and that are consistent with Pierce County's Ecosystem and Diagnosis Treatment (EDT).
- To enlist landowners and community groups in project implementation and monitoring.

Lead entities are local, watershed-based organizations created by RCW 77.85 to solicit, develop, prioritize and submit habitat protection and restoration projects for funding by the state's Salmon Recovery Funding Board. The Pierce County Lead Entity committee, staffed by Surface Water Management, is comprised of county, tribal, conservation district, citizens and state agency staff. It has been extremely successful in getting funds to build projects that improve salmon habitat in the Puyallup,

Carbon and White rivers, as well as South Prairie, Chambers and Clover creeks and important tributaries in both watersheds. Many of these projects have also reduced flood hazards by removing flood-prone houses and structures and building setback levees that create habitat and protect upland properties.

The Pierce County Lead Entity committee also strives to share their passion and spread the word about the importance of salmon and the link between healthy salmon runs and the great quality of life afforded by the natural resources in the county. The committee also runs the King County Cooperative Watershed Management Grant rounds for the King County portion of WRIA 10. The grant rounds generally begin in early spring when they can add official members to their citizens committee. Public participation is always welcome at their meetings.

Transportation and Trails

Other barriers to wildlife movement include roads and fencing. Along with minimizing development within the LWR BMA, the City of Auburn might also consider limiting new road development and decommissioning unmaintained roads within the BMA. According to Auburn Comprehensive Transportation Plan (2012) and the Transportation Improvement Program (2015-2020 adopted June, 2014), no priority transportation projects or roadway improvement alternatives are planned within the LWR BMA through 2020 (Figures IX-13 and IX-14). Auburn is encouraged to prevent new transportation projects within its LWR BMA in future adoptions of transportation planning.

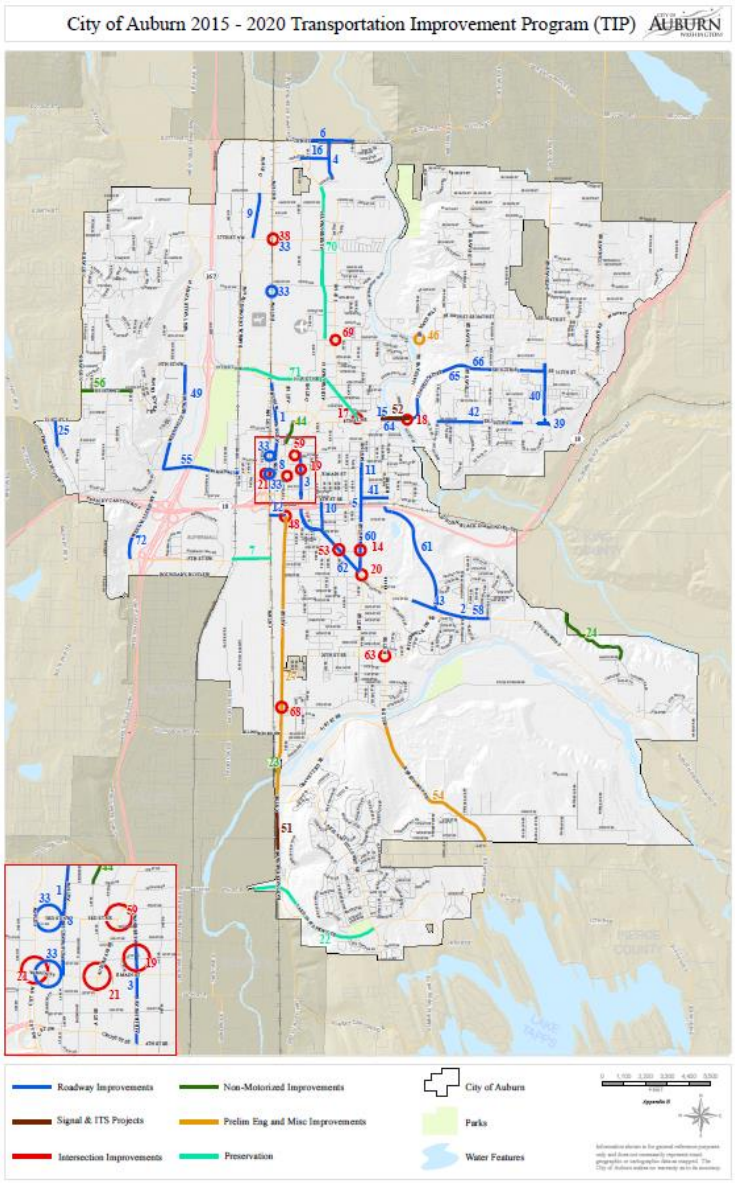



Figure IX-13. 2015-2020 Transportation Improvement Program

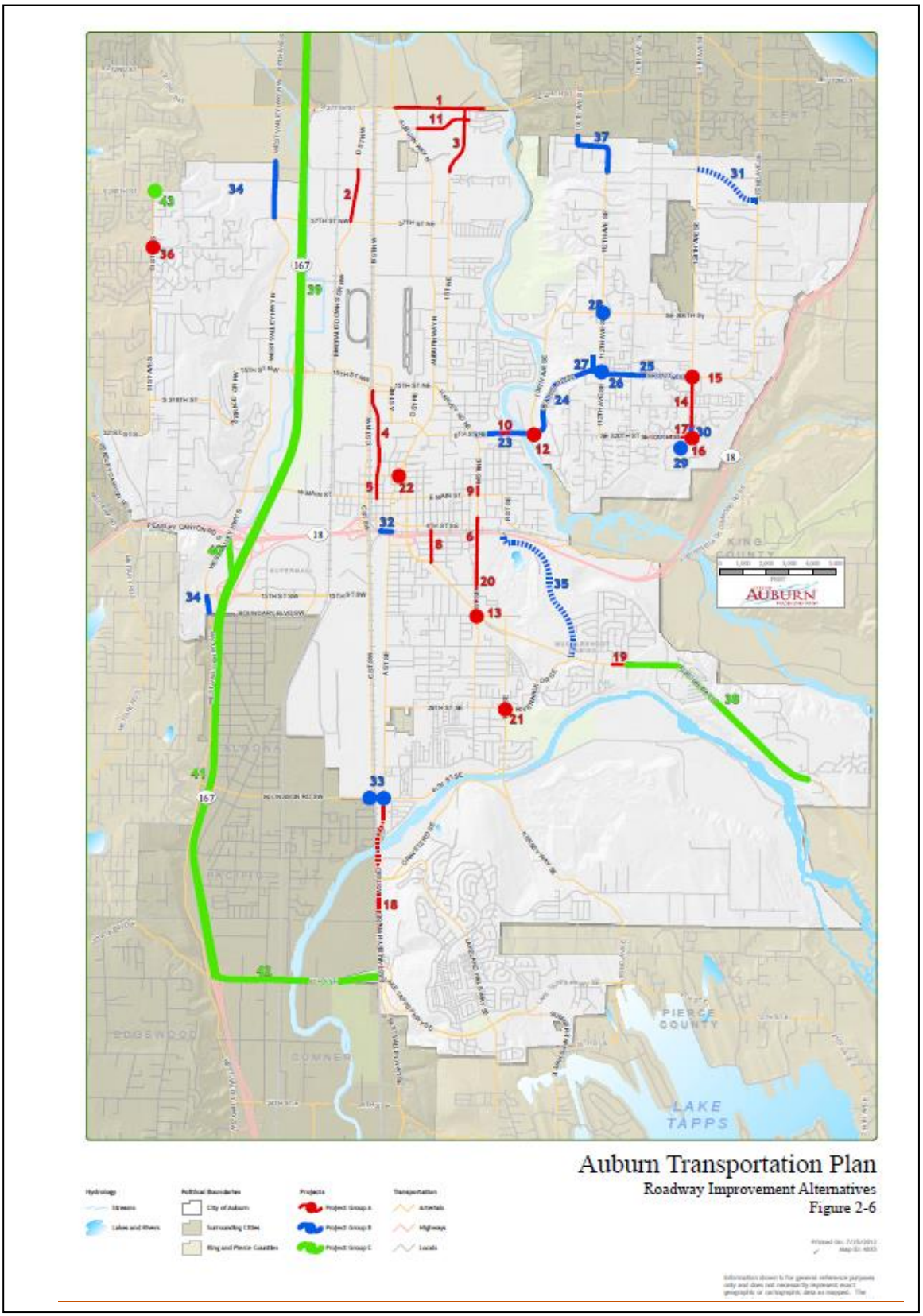



Figure IX-14. City of Auburn Transportation Plan

Enhance Water Quality and Quantity, Manage Flooding, and Control Erosion and Siltation

Auburn's Comprehensive Plan, Objective 18.1 states: "To continue to enhance and maintain the quality of surface water, ground water, and shoreline resources in the City and Region." Policy EN-4 states: "The City will regulate any new storm water discharges to creeks, streams, rivers, ponds, lakes and other water bodies with the goal of no degradation of the water quality or habitat of the receiving waters, and where feasible seek opportunities to enhance the water quality and habitat of receiving waters." These guiding principles align well with the concept of biodiversity preservation.

A TMDL is a process that results in a plan under the Clean Water Act to clean up impairments in the water by telling us how much pollution needs to be reduced or eliminated to achieve learn water. Within the White River Watershed, the Upper White's TMDLs for sediment and temperature were completed in 2004 and the implementation report was completed in 2006. Most of the recommendations in the implementation plan were assigned to the US Forest Service to decommission roads and plant riparian areas as funds allow.

The Lower White has high pH values that exceed state water quality standards. A TMDL is currently being developed with a Memorandum of Agreement between the Muckleshoot Tribe, the Washington Department of Ecology, and EPA. Ecology conducted monitoring in 2012 and is currently modeling the river. A draft technical report will be available in 2015. Once complete, this TMDL should achieve Auburn's Policy EN-11: "The City will seek to ensure that the quality of water leaving the City is of equivalent quality to the water entering and will provide good monitoring for pH levels."

Flood hazard reduction for the White River Basin is focused on the floodplain property acquisition program. A capital improvement project to acquire property in the 100-year floodplain of the bypass reach of the lower White River is recommended. Acquiring and maintaining undeveloped properties preserves flood storage, preserves natural hydrology, and reduces the potential for future flood damages. Figure 18 provides potential properties for acquisition in Pierce County.

**Suggested Voluntary City Government Strategies**

Short Term Actions

1. The Pierce County Biodiversity Alliance will work with City of Auburn staff to develop the final draft of the City's chapter in the Lower White River Biodiversity Management Area Stewardship Plan.
2. The PCBA will re-introduce the updated LWR BMA Stewardship Plan with the City of Auburn's chapter to the Planning Commission and City Council.
    a. Advocate for community member participation in land use decisions regarding proposed developments that affect the BMA.
    b. Identify and advocate for conditions that eliminate or minimize threats to wildlife habitat fragmentation.
    c. Incorporate information from the LWR Stewardship Plan into maintaining or down-zoning parcels along the river within the BMA.
3. Work with extension offices to reduce fertilizer and other toxic runoff into LWR and the adjoining wetlands.
4. Identify interested local residents or community organizations that can provide citizen input to prioritize conservation strategies and action plans that will be incorporated into this LWR Stewardship Plan.
5. Encourage Parks Board or other community groups to register city areas in the National Wildlife Federation Community Wildlife Habitat program.
6. Educate and involve landowners in the stewardship of streams.

7. Identify ways to work with the public to address the Lower White River pH TMDL.

Mid-Term Actions

1. Identify parcels within and adjacent to BMA that may become available for purchase or conservation.
    a. Use parcels as a connection to the regional trail system for birding and elk viewing and especially for wheelchair access.
    b. Design parks and trails with native vegetation buffering the LWR, siting high density traffic furthest from the river.
    c. Publicize County Open Space and Conservation incentives to landowners.
2. Publicize the Community Salmon Fund to landowners.
3. Improve the quality of stormwater runoff going into the White River and impacting the LWR habitat.
    a. Encourage tree planting under Policy EN-38: "The City shall develop a tree planting and maintenance program. Promote the tree planting program to the public. Develop tree planting projects."
    b. Create and promote the creation of rain gardens and bioswales. Establish rain gardens and bioswales for city-owned stormwater projects where feasible.
4. Revise the municipal code to ensure that development and other activities in the City's jurisdiction mitigate impacts to the LWR wildlife habitat.
    a. Policy 3.2.5: Conservation easements along river and stream corridors throughout the City are being sought. The program seeks continuous easements across property boundaries along these corridors.
    b. Create a PDR/TDR mechanism to help the City purchase land along the LWR.
5. Minimize development within the BMA, and where it is permitted use Low Impact Development (LID) strategies.
6. Help the community to embrace and cherish the LWR habitat by providing educational opportunities to understand what exists in the ecosystem and how it works.
    a. Create a display (seasonal or permanent) in the Auburn library on the LWR BMA.
    b. Discuss with other cities the possibility of creating a LWR Salmon or Biodiversity Festival.
7. Publicize shoreline designations and Auburn's water supply with maps and initiate poster contests for K-12.

Long-term Actions

1. Create a fish and wildlife monitoring plan that aligns with the levee relocation and restoration work conducted by King County. Schools may adopt sections of the lands to monitor.
2. Create a plan for maintenance and restoration of habitat for land owned by the City within the BMA.
    a. Minimize or eliminate city use of fertilizers within the BMA and instead adopt Integrated Pest Management practices.
    b. Encourage the planting of native vegetation that benefits wildlife on city property within the BMA.
    c. Develop a network of backyard habitats, city parks, and rain gardens that can become the wildlife corridor within the City and that extends out to the Green and White rivers.
3. Create a plan to continue monitoring and removing noxious weeds.
    a. Partner with King and Pierce County Extension to expand to invasive insects.
    b. Involve K-12 schools for a weed-pulling contest and other restoration events.
4. Identify priority lands for future open space allocation that are contiguous tracts and that promote connectivity and use conservation easements or simple fee title acquisition.

**Suggested Community Conservation Strategies**

A community-led group when formed will choose/modify strategies from those listed in Chapter IV. The following lists of actions are suggestions for a group to select from or re-arrange from short, to medium, to long-term:

Short Term Actions

1. Apply for National Wildlife Federation – Community Wildlife Habitat Program for local neighborhoods.

   National Wildlife Federation's program is for homeowners, students, community leaders, and businesses. A dedicated group pledges to preserve, restore, and create sustainable landscapes that support a multitude of wildlife and native plants in their backyards, workplaces, places of learning and other community spaces. NWF supports these efforts through training, print and online resources and recognition through a formal certification process. (Chapter 1 in the Stewardship Plan has the full description of the program.)
2. Promote native vegetation retention and re-planting in residential areas.
3. Promote organic fertilizers and Integrated Pest Management (IPM).
4. Develop signage with the City to highlight the BMA.
5. Support native vegetation retention and critical area buffer regulations to environmentally sensitive areas within the BMA and report any violations to these regulations.
6. Develop and implement citizen science wildlife monitoring projects.
7. Provide increased education and outreach to property owners, developers and real estate agents regarding impacts of vegetation removal and earth moving.
8. Create and dispense educational materials concerning fish and wildlife habitat stewardship actions, such as Audubon Society's "Bird of the Month" reporting program.
9. Participate in local land use decisions regarding proposed developments that affect the BMA.
10. Identify high use areas for people and wildlife along trails to minimize disturbance to the habitat and wildlife.
11. Organize volunteer work parties. Partner with local Boy or Girl Scout troops, schools, or other environmental or civic organizations for volunteers.
    a. Sponsor annual or biannual native vegetation planting event.
    b. Sponsor invasive species eradication events.
    c. Sponsor volunteer "bioblitz" activities led by experts.
12. Promote wildlife nesting thru a nest box program (e.g., bats, songbirds, wood ducks) and monitor for success.
13. Develop materials that discuss how to deal with nuisance wildlife situations.

Mid-Term Actions

1. Consider a project with Auburn's Parks and Recreation to create a demonstration project within a new park, cooperating with Pierce/King County Conservation District, Master Gardeners, schools, Girls and Boy Scout troops, and other local volunteers.
    a. Use the site to promote shoreline-dependent species through nest box placement (e.g., wood ducks) and monitor to see if this strategy is effective.
    b. Use the site for bat boxes and monitor to see if bats use them.
    c. Create a "chimney" and see if Vaux's Swifts use it.
    d. Demonstrate use of native plants in landscaping and organic, pesticide-free food gardens.
    e. Demonstrate installing and maintaining rain gardens.

2. Enlist farmers, especially those in the Farmland Preservation Program to provide their ideas for preventing runoff into the river.
    a. Highlight to the community the farmers that use Integrated Pest Management.
    b. Begin or better promote a Farmer's Market at the demonstration Park.
    c. Contact Future Farmers of America (FFA) to have a stand at the Farmer's Market and develop materials for the general public.
3. Work with communities along the Lower White River to develop a LWR Salmon or Biodiversity Festival committee and host the festival.
4. Identify sections of the regional "walking trail" along the river with different groups adopting sections of the river to restore and maintain native vegetation and processes.

<u>Long-term Actions</u>

1. Work with citizens in Pierce and King Counties on projects for restoration, re-vegetation, and monitoring on both sides of the LWR.
2. Continue to conduct water quality monitoring along creeks and ditches feeding into the LWR.
3. Develop a "report card" assessment tool to track the progress of selected actions. For a target area, measure:
    a. gains and losses to forest canopy.
    b. total acreage of habitat restoration efforts.
    c. areas identified as needing invasive eradication and number of areas receiving treatment.
    d. number of large mammals such as deer and bear that are seen or intercepted in the BMA.

    Or for a group working on projects within the BMA, assess number of people who have
    e. created backyard habitats for certification,
    f. conducted water quality monitoring,
    g. planted native vegetation in their yards,
    h. made rain gardens.

    Or for a community, count:
    i. the total number of educational events including where and how a group makes outreach to landowners.
    j. how many members have volunteered for city/county sponsored programs.
    k. how often committee leaders communicate with membership via meetings, social media, and essential governmental bodies, such as attending planning or recreation meetings.

# Chapter X – City of Sumner

**General Description**

Although the Lower White River Biodiversity Management Area (BMA) boundary ends just above the Dieringer Canal, the Biodiversity Network's connecting corridor continues through the City of Sumner meeting with the Puyallup River and out to Commencement Bay (Figure X-1). The land cover within the BMA and corridor is hardwood trees and small shrubs, and mixed hardwood/conifer trees. The area surrounding the LWR BMA is characterized by low- and medium-density residential and commercial land uses, mostly light industrial.

Figure X-1 Section of the Lower White River BMA in Sumner

**Demographics, Land Use and Growth Potential**

City of Sumner

The City of Sumner encompasses 7.2 square miles. Current land use is a combination of residential, civic, vacant, limited industrial and commercial in and around the BMA. Nearby cities include Edgewood to the west, Puyallup to the south, Pacific to the north, and Bonney Lake to the east. Population was 9,451 at the 2010 census with a 2.4% growth rate.

There are eighteen properties located within or partially within the BMA that are publicly owned by local and state governments. The City of Sumner owns six parcels for a total of 136.59 acres of which, 9.21 acres that lie within the BMA. (Table 7 – City of Sumner only. Complete table is in the Stewardship Plan, p. 37). The City of Sumner went through segregation and/or merging with 4 of the 6 parcels in 2009 and again in 2013. Cascade Water Alliance now owns one of the "children" properties after the 2009 segregation. The City continues to own the rest of the parcels.

Adjacent to the BMA is the City's former Sumner Meadows Golf Course (approximately 156 acres) which has been sold to a private developer for industrial development consistent with the zoning in the area. A 200-foot setback remains along the White River in this area to further the opportunities for biodiversity.

**Current Zoning and Urban Village**

*Zoning*

On the Pierce County side, very small portions of the Lower White River BMA are located within Pacific (14 acres), Sumner (78 acres), and Buckley (69 acres) and the remaining area is located in

unincorporated Pierce County. Within the City of Sumner, the BMA and the LWR corridor are zoned commercial. Within unincorporated Pierce County, the BMA is predominately zoned Rural 10 (R10) and Employment Centers Table 6 provides a breakdown of the zones that apply within the BMA.

The City of Sumner zoning within the BMA contains mainly light manufacturing and resource protection (agriculture) (Table 16).

| **TABLE 7 – LOWER WHITE RIVER BMA PUBLIC LANDS (PIERCE & KING COUNTY) – City of Sumner only** | | | | |
|---|---|---|---|---|
| **Parcel Number** | **Total Area** | | **Area Within BMA Only** | |
| | **# Parcels** | **Acres** | **# Parcels** | **Acres** |
| ***City of Sumner*** | | | | |
| 0420121012 | 1 | 1.01 | 1 | 0.61 |
| 0420014059 | 1 | 10.89 | 1 | 7.24 |
| 0420014058 * | 1 | 104.86 | 1 | 0.05 |
| 0420121003 * | 1 | 5.25 | 1 | 0.29 |
| 0420121011 * | 1 | 4.74 | 1 | 0.96 |
| 0420121010 * | 1 | 9.84 | 1 | 0.06 |
| **Total City of Sumner** | **6** | **136.59** | **6** | **9.21** |

*** - Parcels were segregated/merged**

Table 16: City of Sumner's 2015 Comp Plan Designated Density

| Category | Density |
|---|---|
| Residential Protection | 1 du/20-40 acres |
| Residential Protection | 1 du/20 acres |
| Low density residential (LDR – 1) | 2.9-5.0 du/acre |
| Low density residential (LDR – 2) | 5.1-6.5 du/acre |
| Low density residential (LDR – 3) | 6.6-8 du/acre |
| Medium density multifamily residential | 8.1-15 du/acre |
| High density multifamily residential | 12.1-25 du/acre |
| General commercial | 12.1-20 du/acre |
| Neighborhood commercial | 12.1-20 du/acre |
| Interchange commercial | - |
| Central business | 12.1-30 du/acre |
| Mixed use development | 15-40 du/acre |
| Urban village | 12.1-40 du/acre |
| Light manufacturing | - |
| Heavy manufacturing | - |
| Public & private facilities& utilities | - |

Urban Village – East Sumner Neighborhood Plan

Although this development area is outside the BMA, it contains extensive wetlands and has flooding and stormwater issues, and thus impacts the ecological functions of the BMA. The East Sumner Neighborhood Plan (ESNP) is the main focus for new development within the city. The City of Sumner first adopted the ESNP for East Sumner in 2001. This plan envisioned a mixed use "urban village" that complemented and supported the Downtown. Since that time, little development occurred, because of three obstacles:

- The roadway system, with poorly functioning intersections along Sumner-Tapps Highway, impeded access to potential regional commercial businesses.
- Extensive wetlands and other environmental constraints prevented construction of new connector roads and feasible development of central sites.
- A high water table, periodic flooding, and stormwater management concerns made the development of single family subdivisions infeasible.

The ESNP was adopted as part of the overall 2015 update, amends the 2001 Plan, and addresses major changes to the area including:

  - Off-site wetland mitigation bank needed in order to construct essential new roadways and develop central portions of the subarea. (An economic analysis of ESNP concluded the value of land gained by filling wetlands, paying for the mitigation bank credits, and offering the land for development would provide property owners with a substantial net economic benefit.
- Allowance of a broad range of uses including multi-family, mixed-use and pedestrian-oriented, smaller scale commercial with low impact development (LID) techniques implemented into the design as much as possible.
- Provide an improved stormwater treatment and flow control for the region.

Supplemental Environmental Impact Statement (SEIS)

The purpose of SEIS was to assist the public and City decision makers in considering future growth and land use patterns with an emphasis on the East Sumner Neighborhood through the plan.

The recommendations that focused on Salmon Creek (Strawberry Creek) were:

- Improve habitat for spawning salmon and result in an increase in salmon returns and therefore fry production.
- Restore select locations along Salmon Creek.
  - East of Parker Rd E, near the utility access road and northeast of the intersection at 45th St. Ct. E and 154th Ave Ct. E.
- Remove invasive species (reed canarygrass), planting of native riparian vegetation.
- Install habitat features (i.e. large woody debris and large boulders).

Open Space Corridors

Although the City does not have an “Open Space” land use designation for the Comprehensive Plan, there are several things the City is already doing regarding biodiversity. For instance, LID and rain gardens are already a requirement of City code. Only sites that cannot do this are allowed to do something alternative. The City is applying native buffers along rivers and wetlands.

The City of Sumner’s Open Space map (Figure X-2) shows potential linkage of parks, trails, and steep slopes. The City includes these entities to meet the 35% open space goal for the City. A new policy was adopted called Open Space for employees recognizing there is a need for open space and other outdoor amenities within the industrial and commercial areas for employees.

Future Growth Potential

Potential residential and commercial development on wetlands, floodplains, and steep slopes are part of the substantive issues that are being addressed through the goals and policies in the updated Comprehensive Plan.

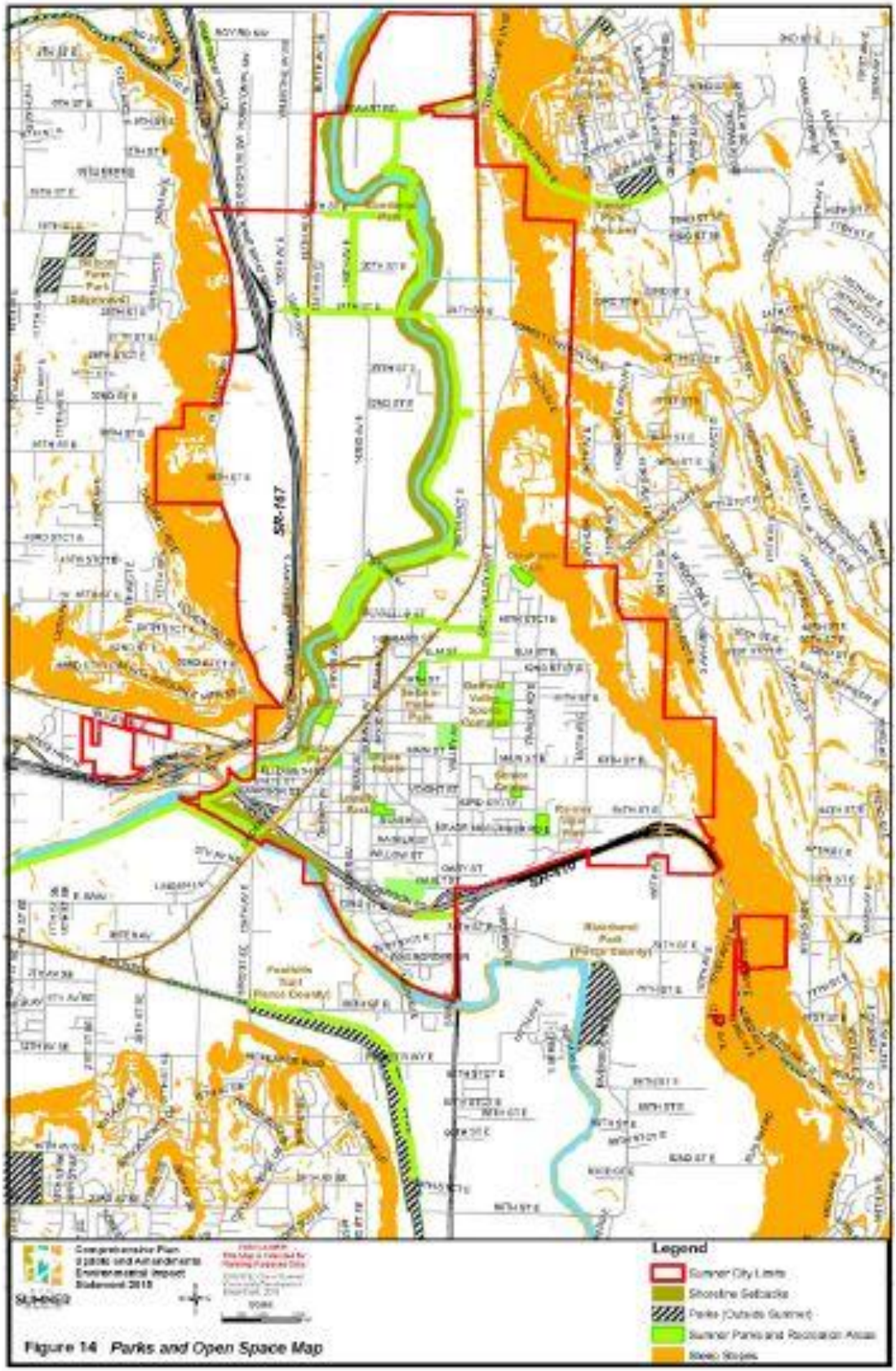



Figure X-2. City of Sumner Open Space Map

The stream reach surveys in Lower White River and Lake Tapps Sub-basins conducted for the White River Basin Plan[33] included percentage future impervious areas. Much of Sumner is projected to have areas from 30% to as much as 85% impervious along the Lower White River (Figure X-3). All new development within the effective base flood elevations would increase current flood elevations through the placement of fill and reduction of flood storage. This could increase the area affected by floods and/or the time it takes for flood waters to recede. Therefore, it is critical that existing commercial properties become involved with restoration of native plants and buffers along the river, streams, and wetlands on their properties.

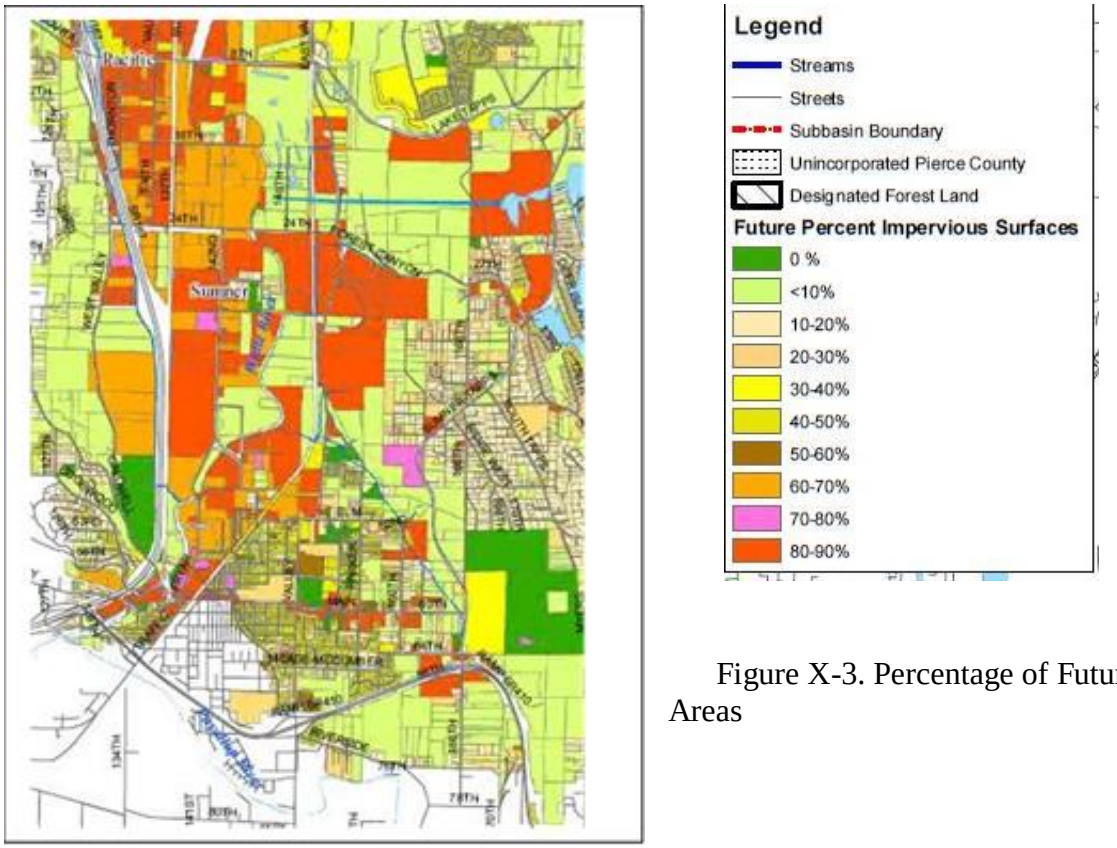



Figure X-3. Percentage of Future Impervious Areas

The City has recently adopted a "Zero Rise" restriction for future floodplain development rather than a "One Foot Rise" allowance. Furthermore, the City is now under the FEMA/NFIP BiOp and "Door 3" option which requires compensatory storage for all floodwaters displaced by development.

The proposed Urban Growth Area (UGA) outlined in green in Figure X-4 extends east to Lake Tapps and south to 47th St**.** The amount of future development will be dependent upon the type of zoning planned for the area. This area runs along the ridge where salmonid streams feed into the Stuck and Lower White River.

For new development, stream buffer widths are influenced by the 2003 Biological Opinion prepared by US Department of Fish and Wildlife (USFW) and the National Marine Fisheries Service (NMFS) for the permitting of the 24th Street/SR167 Interchange.

[33] White River Basin Plan, Pierce County Public Works and Utilities, November 26, 2013,

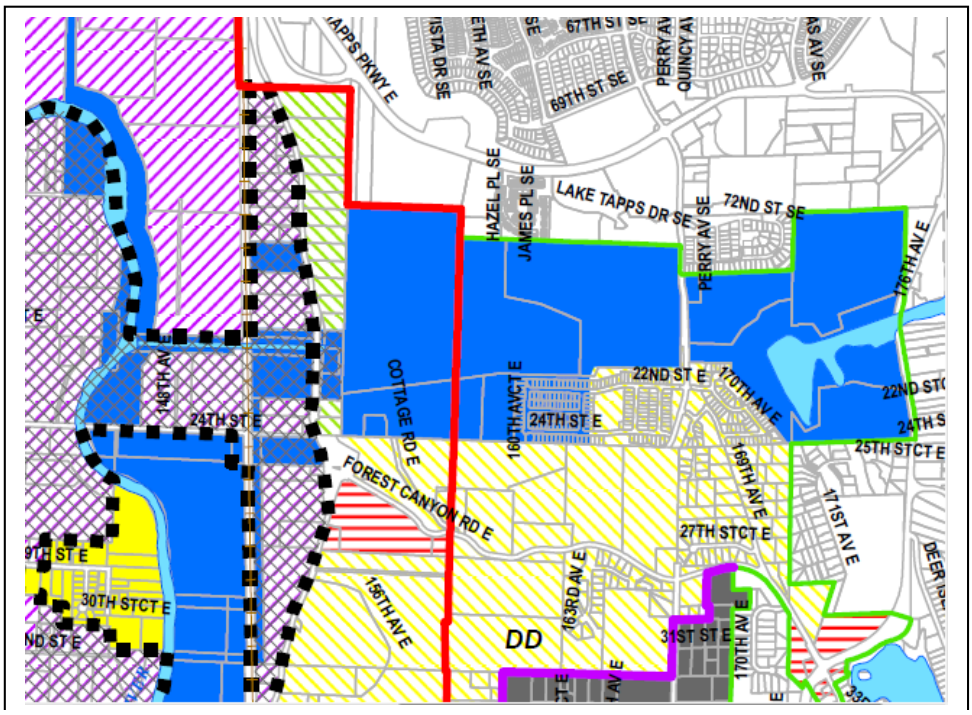


Figure X-4. Proposed UGA from Lake Tapps along Dieringer Canal

**Shoreline Environments**

Under the Washington State Shoreline Management Act the Lower White River is considered a "Shorelines of the State." All lands within 200 feet of the ordinary high water mark, and associated wetlands and floodplains, fall within the jurisdiction of Shorelines of the State, whose preferred uses according to the Act are (in order of priority) to:

> "recognize and protect the statewide interest over local interest; preserve the natural character of the shoreline; result in long-term over short-term benefit; protect the resources and ecology of the shoreline; increase public access to publicly owned shoreline areas; and increase recreational opportunities for the public in the shoreline area."

All shorelines, including those designated as Shorelines of the State, are classified into "environment designations" based on their physical, biological, and development characteristics. Historically, plans have used primarily 4 basic environment designations:

- Natural
- Conservancy
- Rural
- Urban

New state guidelines recommend 6 designations:

- Natural
- Rural Conservancy
- Urban Conservancy
- High Intensity
- Shoreline Residential
- Aquatic

Local governments may modify state recommendations to better accommodate shoreline areas with unique characteristics. These environments are similar to zoning designations allowing different land uses, densities and activities ranging from the most intensive uses (High Intensity) to very limited uses (Natural). The City of Sumner's SMP was completed in 2014, and the City chose the following shoreline designations for the White and Puyallup rivers:

- Urban – Areas of high intensity land use including residential, commercial, and industrial development.
- Shoreline Residential – An area of low to moderate development intensity with existing and proposed residential land uses that still maintain significant natural features.
- Urban Conservancy – An area of mixed land use that includes residential, commercial, and industrial developments generally located in a floodplain with potential for ecological restoration. There are two sub-designations for Urban Conservancy, one with a 100 foot setback and one with a 200 foot setback.
- Natural – An area of vacant land uses with relatively unaltered ecological conditions; this area includes a high value, large forested wetland complex with potential for ecological restoration and protection.
- Aquatic – Areas waterward of the ordinary high water mark.

Small sections (circled in Figure X-5 next page) on the west tip of the BMA in Sumner are Urban with a 50-foot setback. These areas are presently subjected to urban uses that are consistent with the goals and objectives of the SMP. Most of the shoreline along the White and Puyallup Rivers is designated as Urban Conservancy with 100-200 foot setbacks from the county line south to the Union Pacific Railroad spur bridge (left bank) and the Bridge Street Bridge (right bank). This part of the White river is included in the BMA. The rest of the river down to the confluence of the Puyallup River is Urban with a 50 foot setback. The shoreline of the Puyallup River between SR 162 bridge and 70$^{th}$ Street East is classified as Shoreline Residential with a100 foot setback. These areas, while not designated BMAs, provide essential connections or corridors between the BMAs.

URS Consulting surveyed the reach between the outlet of the Dieringer Canal and the Stewart Road Bridge in 2004 for the White River Basin Plan. The river in this area is confined, with very little channel migration. The channel has similar riparian habitat and land use. A few riffles and pools are present as are limited spawning gravels for summer/fall Chinook, Chum, and Pink salmon, but it is unknown if they are utilized.

The White River Basin Plan scored the Aquatic Habitat and Riparian Corridor as poor and poor respectively at the Dieringer Canal, and fair and fair at the stream entering the river below Stewart Road (Figure X-6). The stream feeding into Salmon Creek near the gaging station received the only good and good scores.

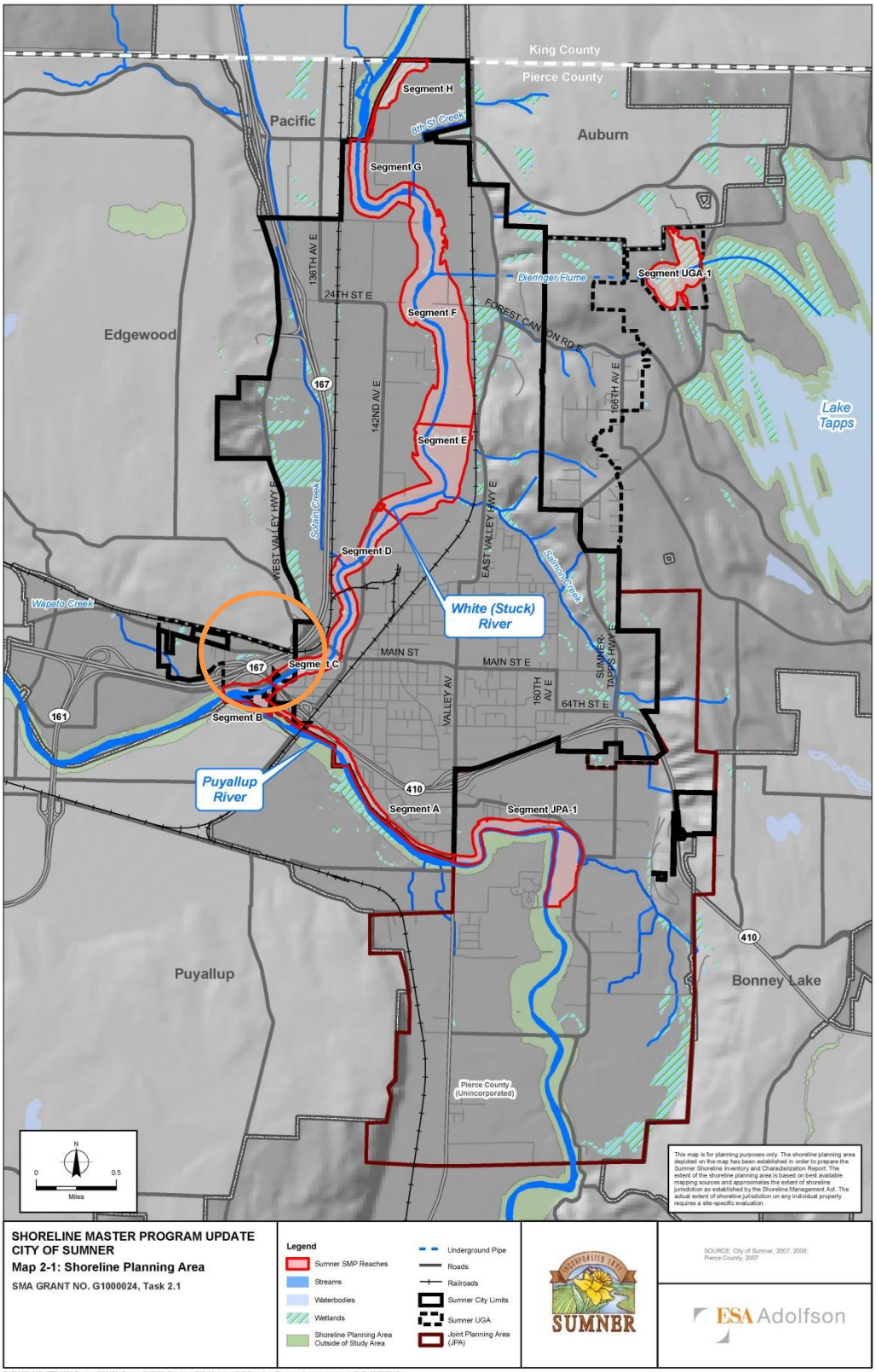



Figure X-5 Shoreline Map

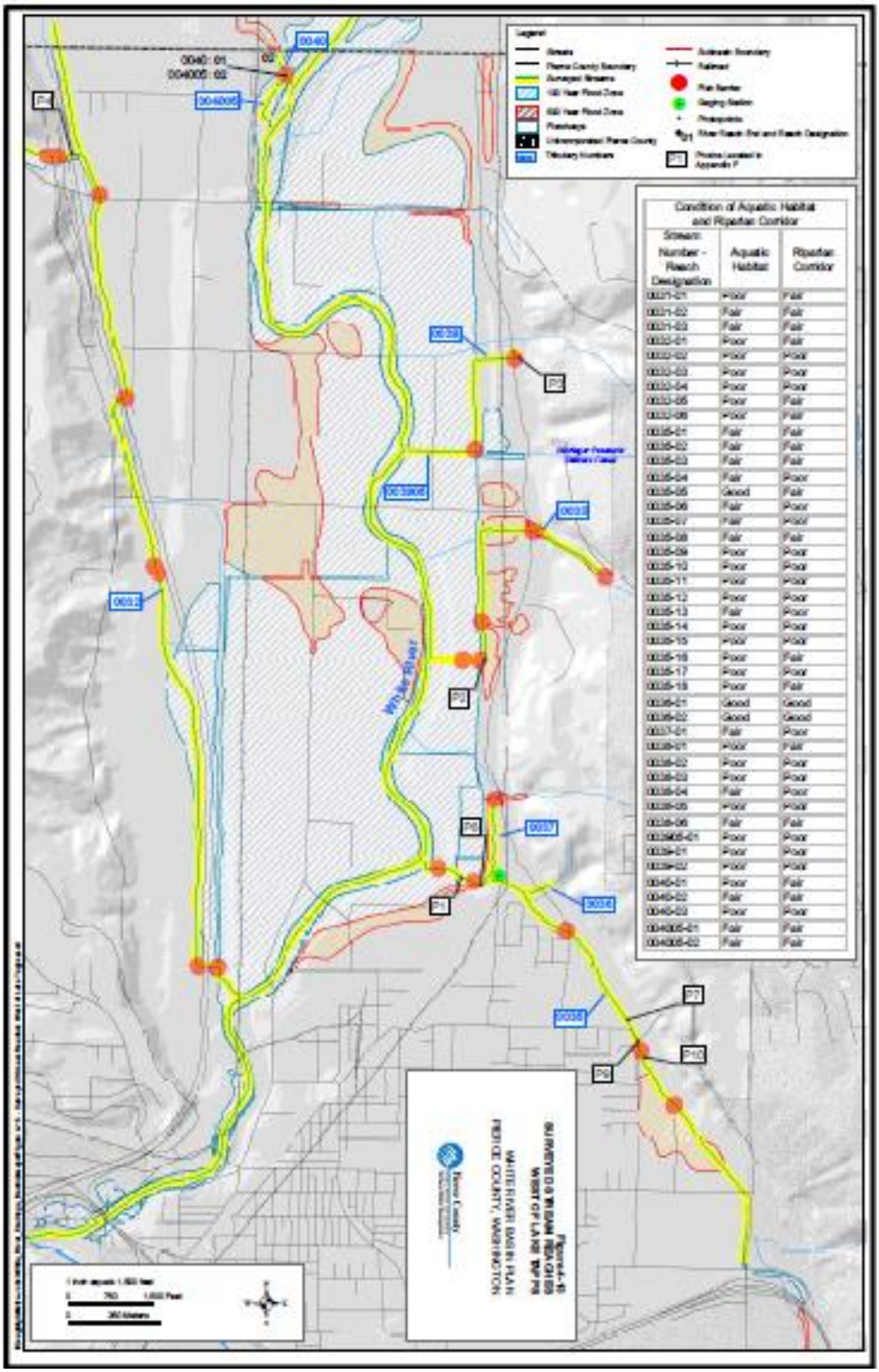



Figure X-6. Surveyed Stream Reaches West of Lake Tapps

**Fish and Wildlife Resources**

Fish and Wildlife Habitat Area

These areas are identified as being of critical importance to the maintenance of fish, wildlife, and plant species. The principal Fish and Wildlife Habitat areas within the City of Sumner planning area are 1) the White/Stuck River floodplain and its associated stream reaches and riverine wetlands, and 2) the steep wooded slopes that form the east and west wall of the valley floor. Fish and wildlife have similar needs as humans. They need clean water, fresh food and clean safe habitat area to raise their young. For fish, this means that there is an adequate supply of clean cool water. This can be provided through the retention of shading vegetation on the banks of streams and rivers. Clean water can be retained through stormwater control structures that remove sediment and pollutants. Streamside vegetation can also provide safe habitat through the provision of hiding places for adult and juvenile fish.

The White River supports three salmonid species that are listed as threatened under the Endangered Species Act: Puget Sound Chinook, Puget Sound steelhead, and Coastal-Puget Sound bull trout. The White River is particularly important to Chinook recovery because it is the only population of spring Chinook in south Puget Sound. The White River also supports pink, chum, coho, and sockeye[34] salmon, as well as cutthroat trout.

The Washington Department of Fish and Wildlife's (WDFW) Priority Habitats and Species (PHS) map shows locations of PHS species. PHS is the principal means by which WDFW provides important fish, wildlife, and habitat information to local governments, state and federal agencies, private land owners, consultants, and tribal biologists for land use planning purposes.

PHS is the agency's primary means of transferring fish and wildlife information from their resource experts to those who can protect habitat. Figure X-7 highlights priority habitats (light purple areas), including tributaries to the White River identified in the City of Sumner's Fish and Wildlife Habitat Area Map specifically

- Salmon/Strawberry Creek (Type III) – small to moderate-sized streams important for fish
- 8th Street Creek (Type III)
- Sotain (Type III)
- Type IV (perennial, non-fish bearing streams important for amphibians and downstream water quality)

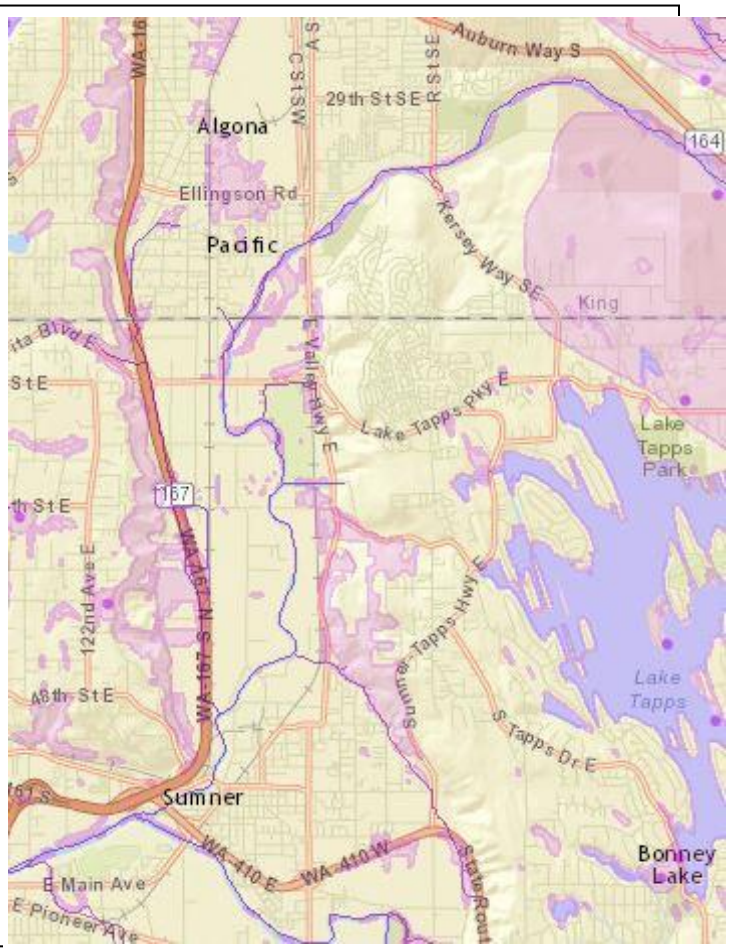



Figure X-7. WDFW PHS polygons

[1]Gustafson, R.G., T.C. Wainwright, G.A. Winans, F.W. Waknitz, L.T. Parker, and R.S. Waples. 1997. Status review of sockeye salmon from Washington and Oregon. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-33, 282 pp. http://www.nwfsc.noaa.gov/publications/techmemos/tm33/tm33.html#toc

and

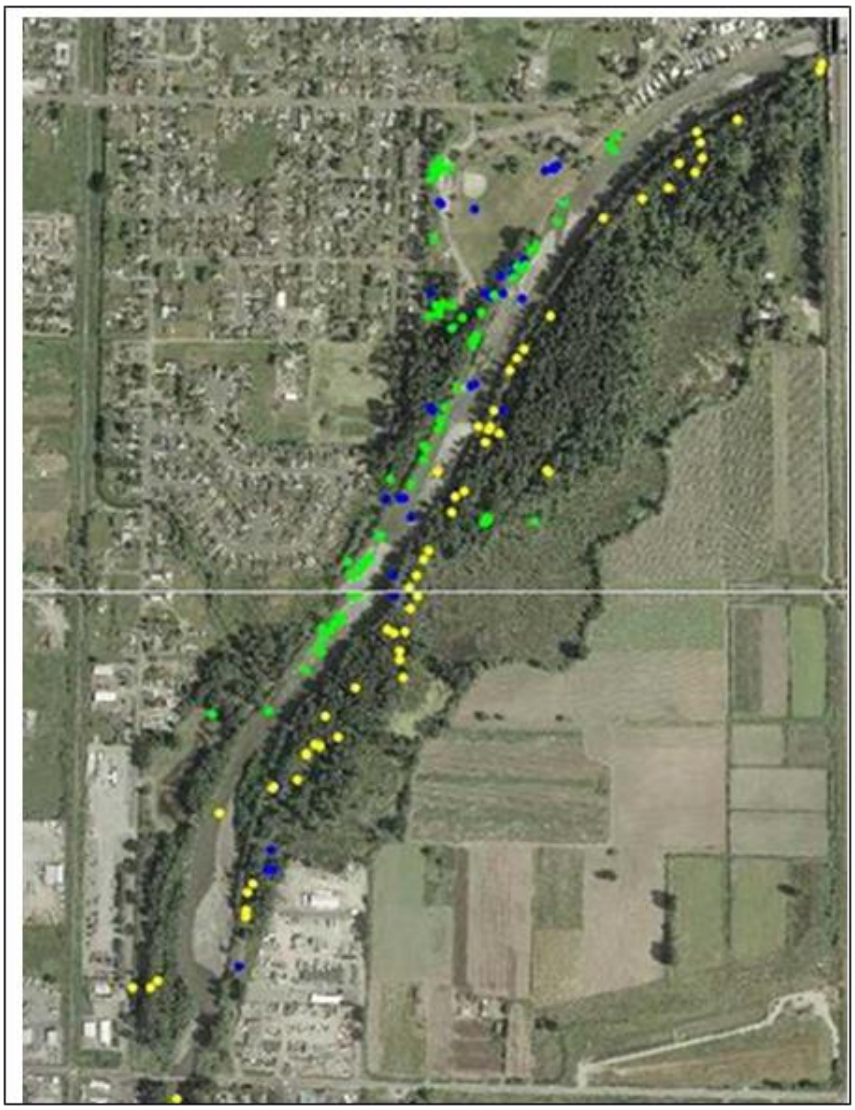
- Type V (seasonal, non-fish bearing) streams that must connect to typed water) running down the slopes that feed into Salmon Creek.

Typing is based on the Washington Department of Ecology's Water Typing System.

Predicted and Confirmed Wildlife Species

The PHS point locations and maps were one of the layers of information used to generate the LWR BMA. A list of all predicted species to occur within the LWR BMA was made as part of the development of the Biodiversity Network. To locate and validate whether those species were present, a 24-hour bioblitz (explained in Chapter 1) was conducted in 2006 in three large areas of the LWR BMA (Buckley and vicinity, unincorporated Pierce County between Buckley and City of Auburn's Game Farm and Game Farm Wilderness Parks, the City of Pacific's Pacific City Park and the Sumner Golf Course (birds only) (Figure X-8).

The species observed in the City of Pacific and parts of Sumner are listed in Table 14. Most of the bioblitz efforts were in Pacific. However, the species observed would be expected to occur in both cities



Cities of Pacific and Sumner 2006

Bioblitz data were reported at the locations along the river

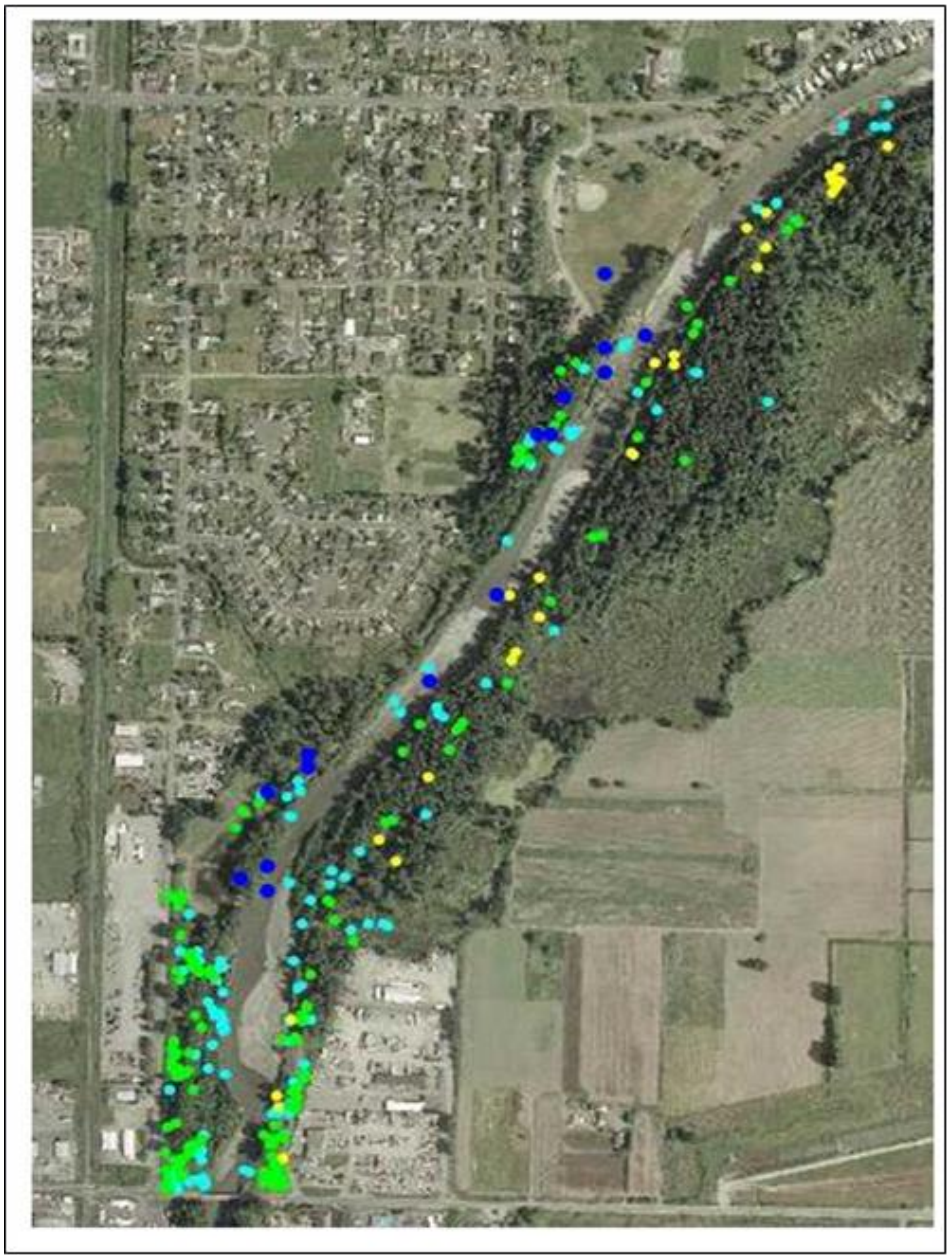
Mammals: yellow

Birds: blue

Plants: green

Figure X-8. Bioblitz Data Locations 2006

due to similar habitats and their close proximity. Table 17 lists the species observed at the Golf Course, but no map was made. The second bioblitz held in 2007 over a 12-hour period focused on the area between Auburn and Sumner (Figure X-9). Invertebrates were mainly collected between Buckley and Auburn during the 2006 bioblitz and at the Wilderness Park in 2007. Due to the cold weather in 2007, the invertebrate count was low (Table 2). Plant data were collected in the same areas as vertebrates in 2006, but only down to Stewart Road in 2007 (Tables 3 and 4).



Started at City of Auburn's Game Farm Park and moved south to Stewart Rd.

Bioblitz data were reported at the locations along the river

Mammals: yellow

Mammal Trackers: light blue

Birds: blue

Figure X-9. Bioblitz Data Locations 2007

## Table 14 PREDICTED AND CONFIRMED WILDLIFE AND FISH SPECIES FOR THE LOWER WHITE RIVER BMA

**PREDICTED SPECIES Note: Species observed but not predicted are italicized**

| AMPHIBIANS | Pacific/ Sumner | |
|---|---|---|
| *Bullfrog* | | |
| *Ensatina* | | |
| Long-toed salamander | | |
| Northwestern salamander | | |
| Pacific treefrog (Chorus frog) | | |
| Red-legged frog (3) | | |
| Roughskin newt | | |
| Western toad (3) | | |
| | | |
| **Reptiles** | | |
| Common garter snake | X | |
| Northern alligator lizard | X | |
| *Northwestern garter snake* | | |
| Painted turtle (1) | | |
| Rubber boa | | |
| Western terrestrial garter snake | | |
| | | |
| **Fish** | | |
| *Prickly sculpin* | | |
| *Sculpin spp.* | | |
| *Speckled dace* | | |
| *Western brook lamprey* | | |
| | | |
| **Invertebrates** | | |
| 42 species, 7 non-native | | |
| 14 species, 3 non-native | | |

| BIRDS | Pacific/ Sumner | |
|---|---|---|
| American bittern (2) | | |
| American coot | | |
| American crow | X | |
| American dipper | | |
| American goldfinch | X | |
| *American kestrel* | X | |
| American robin | X | |
| Bald eagle (3,4) | X | |
| Band-tailed pigeon (4) | | |
| *Bank swallow* | | |
| *Barred owl* | | |
| Barn swallow | X | |
| Belted kingfisher | X | |
| Bewick's wren | | |
| Black-capped chickadee | X | |
| Black-headed grosbeak | X | |
| Black-throated gray warbler | | |
| Blue-winged teal | | |
| Brewer's blackbird | | |
| *Brown creeper* | X | |
| Brown-headed cowbird | | |
| Bushtit | X | |
| California quail | | |
| Canada goose | X | |
| Cedar waxwing | X | |
| *Chestnut-backed chickadee* | X | |
| Cinnamon teal | | |
| Cliff swallow | | |
| Common barn-owl | | |
| Common merganser | X | |
| Common nighthawk | | |
| Common raven | | |
| Common snipe | | |
| Common yellowthroat | X | |
| Cooper's hawk (2) | X | |
| *Dark-eyed junco* | | |
| Downy woodpecker | X | |
| European starling | X | |
| *Evening grosbeak* | | |
| Gadwall | | |
| *Glaucous-winged gull* | X | |
| *Golden-crowned kinglet* | | |
| Great blue heron (3,4) | X | |
| Great horned owl | | |
| Green heron (Green-backed) (3) | X | |
| Green-winged teal | | |
| *Hairy woodpecker* | X | |
| Hooded merganser (4) | | |
| House finch | X | |
| *House sparrow* | | |
| House wren | | |

*Footnote:*

(1) - Trigger Species - Species that needed additional mapped land cover units to ensure representation within the network

(2) - At-Risk - Washington Gap Analysis Project (WAGAP) selected species considered to be most as risk of continued or future population declines due to human activities

(3) - Listed (State or Federal) - Species listed as State endangered, threatened, sensitive, s species listed or proposed for listing by the U.S. Fish and Wildlife Service

(4) - PHS - a species defined as priority under the WDFW Priority Habitats and Species (PHS) Program

(5) - Included based on species significance under the WDFW PHS/Heritage database, although not predicted to occur

**Italicized species:**
**Observed but not predicted**

Non-native species in red

## Table 14 - PREDICTED AND CONFIRMED WILDLIFE AND FISH SPECIES FOR THE LOWER WHITE RIVER BMA

**PREDICTED SPECIES Note: Species observed but not predicted are italicized**

| BIRDS (Cont'd) | Pacific/ Sumner | | MAMMALS | Pacific/ Sumner | |
|---|---|---|---|---|---|
| Hutton's vireo | | | Beaver | X | |
| Killdeer | X | | Big brown bat [4] | | |
| Lazuli bunting | | | Black bear | | |
| Macgillivray's warbler | | | Black rat | | |
| Mallard | X | | Black-tailed deer [4] | X | |
| Marsh wren | | | Bobcat | | |
| *Mourning dove* | X | | California myotis [4] | | |
| Northern flicker | X | | Coast mole | X | |
| Northern harrier | | | Coyote | X | |
| Northern oriole | | | Creeping vole | | |
| Northern rough-winged swallow | | | Deer mouse | X | |
| Northern shoveler | | | *Douglas squirrel* | X | |
| Olive-sided flycatcher [3] | | | Dusky (Montane) shrew | | |
| Orange-crowned warbler | | | Eastern cottontail | X | |
| Osprey [3] | X | | *Eastern gray squirrel* | X | |
| Pacific slope flycatcher (Western) | | | *Elk* | | |
| Pied-billed grebe [4] | | | Ermine | | |
| *Pileated woodpecker* | X | | Fisher [2,3,4] | | |
| *Pine siskin* | | | Hoary bat | | |
| Purple finch | | | Little brown myotis [4] | | |
| *Red-breasted nuthatch* | | | Long-eared myotis [3,4] | | |
| Red-breasted sapsucker | X | | Long-legged myotis [3,4] | | |
| Red-eyed vireo | | | Long-tailed (Forest) deer mouse | | |
| Red-tailed hawk | X | | Long-tailed vole | | |
| Red-winged blackbird | X | | Long-tailed weasel | | |
| Rock dove | X | | Mink [4] | X | |
| Ruddy duck | | | Mole spp. | | |
| Ruffed grouse | | | Mountain beaver | | |
| Rufous hummingbird | X | | Mountain lion | | |
| Savannah sparrow | X | | Muskrat | X | |
| Song sparrow | X | | Northern flying squirrel | | |
| Sora | | | Norway rat | X | |
| Spotted sandpiper [4] | X | | Nutria | | |
| Spotted towhee (Rufous-sided) | X | | Pacific jumping mouse | | |
| Steller's jay | X | | Pacific water shrew [3] | | |
| Swainson's thrush | X | | Porcupine | | |
| *Townsend's warbler* | X | | Raccoon | X | |
| Tree swallow | | | Red fox | | |
| Turkey vulture [3] | | | River otter | X | |
| Vaux's swift [3,4] | | | Shrew-mole | | |
| Violet-green swallow | X | | Shrew spp. | X | |
| Virginia rail | | | Silver-haired bat [2] | | |
| Warbling vireo | X | | Southern red-backed vole | | |
| *Western meadowlark* | | | Spotted skunk | | |
| Western screech-owl | | | Striped skunk | | |
| *Western tanager* | X | | Townsend's big-eared bat [2,3,4] | | |
| Western wood-pewee | X | | *Townsend's chipmunk* | | |
| White-crowned sparrow | X | | Townsend's mole | X | |
| Willow flycatcher [3] | X | | Townsend's vole | | |
| Wilson's warbler | | | Vagrant shrew | | |
| *Winter wren* | | | Virginia opossum | X | |
| Wood duck [4] | | | Vole spp | | |
| Yellow warbler [2] | X | | Yuma myotis [3,4] | | |
| *Yellow-rumped warbler* | | | | | |

## Table 17 - PREDICTED AND CONFIRMED WILDLIFE AND FISH SPECIES FOR THE LOWER WHITE RIVER BMA

**PREDICTED SPECIES Note: Species observed but not predicted are italicized**

| BIRDS | Sumner Golf Course | | BIRDS (Cont'd) | Sumner Golf Course |
|---|---|---|---|---|
| American bittern [2] | | | House finch | |
| American coot | | | *House sparrow* | |
| American crow | | | House wren | |
| American dipper | | | Hutton's vireo | |
| American goldfinch | | | Killdeer | X |
| *American kestrel* | | | Lazuli bunting | |
| American robin | X | | Macgillivray's warbler | |
| Bald eagle [3,4] | | | Mallard | |
| Band-tailed pigeon [4] | | | Marsh wren | X |
| *Bank swallow* | X | | *Mourning dove* | |
| Barn swallow | | | Northern flicker | |
| *Barred owl* | | | Northern harrier | |
| Belted kingfisher | | | Northern oriole | |
| Bewick's wren | | | Northern rough-winged swallow | |
| Black-capped chickadee | | | Northern shoveler | |
| Black-headed grosbeak | | | Olive-sided flycatcher [3] | |
| Black-throated gray warbler | | | Orange-crowned warbler | |
| Blue-winged teal | | | Osprey [3] | |
| Brewer's blackbird | | | Pacific slope flycatcher (Western) | |
| *Brown creeper* | | | Pied-billed grebe [4] | |
| Brown-headed cowbird | | | *Pileated woodpecker* | |
| Bushtit | | | *Pine siskin* | |
| California quail | | | Purple finch | |
| Canada goose | X | | *Red-breasted nuthatch* | |
| Cedar waxwing | | | Red-breasted sapsucker | |
| *Chestnut-backed chickadee* | | | Red-eyed vireo | |
| Cinnamon teal | | | Red-tailed hawk | X |
| Cliff swallow | X | | Red-winged blackbird | X |
| Common barn-owl | | | Rock dove | |
| Common merganser | | | Ruddy duck | |
| Common nighthawk | | | Ruffed grouse | |
| Common raven | | | Rufous hummingbird | |
| Common snipe | | | Savannah sparrow | |
| Common yellowthroat | X | | Song sparrow | X |
| Cooper's hawk [2] | | | Sora | |
| *Dark-eyed junco* | | | Spotted sandpiper [4] | |
| Downy woodpecker | | | Spotted towhee (Rufous-sided) | |
| European starling | X | | Steller's jay | |
| *Evening grosbeak* | | | Swainson's thrush | |
| Gadwall | | | *Townsend's warbler* | |
| *Glaucous-winged gull* | | | Tree swallow | |
| *Golden-crowned kinglet* | | | Turkey vulture [3] | X |
| Great blue heron [3,4] | | | Vaux's swift [3,4] | |
| Great horned owl | | | Violet-green swallow | |
| Green heron (Green-backed) [3] | | | Virginia rail | |
| Green-winged teal | | | Warbling vireo | |
| *Hairy woodpecker* | | | *Western meadowlark* | |
| Hooded merganser [4] | | | Western screech-owl | |
| | | | *Western tanager* | |

| TABLE 17 - PREDICTED AND CONFIRMED WILDLIFE AND FISH SPECIES FOR THE LOWER WHITE RIVER BMA | | | | |
|---|---|---|---|---|
| **PREDICTED SPECIES Note: Species observed but not predicted are italicized** | | | | |
| **BIRDS (Cont'd)** | **Sumner Golf Course** | | | |
| Western wood-pewee | | | | |
| White-crowned sparrow | | | | |
| Willow flycatcher (3) | | | | |
| Wilson's warbler | | | | |
| *Winter wren* | | | | |
| Wood duck (4) | | | | |
| Yellow warbler (2) | | | | |
| *Yellow-rumped warbler* | | | | |
| | | | | |
| | | | | |
| | | | | |
| *Footnote:* | | | | |
| (1) - Trigger Species - Species that needed | | | | |
| additional mapped land cover units to ensure | | | | |
| representation within the network | | | | |
| (2) - At-Risk - Washington Gap Analysis | | | | |
| Project (WAGAP) selected species | | | | |
| considered to be most as risk of continued | | | | |
| or future population declines due to human | | | | |
| activities | | | | |
| (3) - Listed (State or Federal) - Species listed | | | | |
| as State endangered, threatened, sensitive, | | | | |
| candidate or monitor, as well as species listed | | | | |
| or proposed for listing by the U.S. Fish and | | | | |
| Wildlife Service | | | | |
| (4) - PHS - a species defined as priority under | | | | |
| the WDFW Priority Habitats and Species | | | | |
| (PHS) Program | | | | |
| (5) - Included based on species significance | | | | |
| under the WDFW PHS/Heritage database, | | | | |
| although not predicted to occur | | | | |
| | | | | |
| **Italicized species:** | | | | |
| **Observed but not predicted** | | | | |
| | | | | |
| ed | | | | |
| | | | | |

## Conservation Targets

In the Lower White River BMA several conservation targets were selected to represent the key ecological functions occurring throughout the area. These conservation targets include:

- Lower White River
- Tributaries, wetlands, and oxbows
- Conifer/deciduous mixed forest areas

Each of these conservation targets provides the systems that collectively create the rich variety of habitats necessary to foster a high level of biodiversity in the BMA. The LWR BMA is one of 16 BMA's that are part of the Pierce County Biodiversity Network. Each BMA provides unique features that together can maintain the biodiversity in this region. A detailed description of each conservation target can be found in Chapter III.

**Threats to Conservation Targets**

The main threats that are or may potentially be occurring to conservation targets include:

- Flooding issues include the Sumner golf course, residences near the intersection of 8th Street and 138th Avenue East, and the Sumner sewage treatment plant;
- Poor water quality caused by residential and use of fertilizers, domestic animal feces, septic tank leakage, herbicides from road maintenance, farming and commercial sites, and road runoff;
- Loss of pools and large woody debris (LWD) due to development and channelization of the river;
- Introduction of invasive, non-native plant and animal species such as bullfrogs and Japanese knotweed;
- Fish passage blockage from culverts;
- Wildlife movement blockages from roads, driveways and fencing;
- Erosion and damage to riparian habitat from dikes/levees along Cities of Buckley, Pacific, and Sumner;
- Predation of native species by domestic cats, dogs, and unregulated hunting and fishing;
- Stormwater and illegal discharge dumped directly into the river–
    - Water fluctuation surges due to storm drains from development redirecting water flow into the river and not into wetlands, dikes, and stormwater ponds;
- Pollution caused by dumping of trash and debris into or near the river.

**Overview of Conservation Strategies**

Conservation strategies have been identified to ascertain the level or severity of a potential threat, directly abate known threats, or identify restoration opportunities where degradation has occurred. Some threats applied to multiple conservation targets and as such the conservation strategies have been grouped under the following categories, which have been stated as a positive outcome:

- Reduce Habitat Conversion and Fragmentation (due to development and human activity)
- Eliminate Invasive and Introduced Species
- Remove Fish and Wildlife Movement Blockages
- Enhance Water Quality and Quantity
- Manage Flooding
- Control Erosion and Siltation
- Reduce Predation by domestic cats and dogs and Poaching of Native Species
- Reduce or Eliminate Pollution Within the LWR BMA

**Role of City Government**

Biodiversity enhancement goals fall into two general areas: 1) protection of existing elements and 2) restoration and recovery of elements that have been damaged by human intervention. A community-driven biodiversity stewardship plan which incorporates the city's policy and regulatory tools is incomplete without the following to provide the best environment for success:

- Voluntary incentives
- Public education and outreach
- Multi-jurisdictional coordination

Pursue existing regulatory tools so that they can be used to protect biodiversity.
The Comprehensive Plan is the primary policy document for City governance and sets the foundation for land use and development regulations. In response to comments from the Pierce County Biodiversity Alliance (PCBA), City staff recommended that a new policy 3.12 be added showing the City's intent to work with the PCBA and other stakeholders in completing the Sumner Chapter of the *Lower White River BMA*. "3.12 The City will collaborate with partners and volunteers citizen groups that make up the Pierce County Biodiversity Alliance to assist in completing the Sumner Chapter of the *Lower White River BMA Stewardship Plan*."

Once these policies are established, biodiversity management goals can be incorporated into existing and future regulations and programs. These *may* include examining zoning codes and complementary development ordinances (e.g., critical areas, stormwater management, etc.) that support the persistence of native wildlife in the BMA and adjacent areas.

Urban Forestry Strategy.
Recommended to the City Council by the City's Forestry Commission, this Strategy is intended to guide the community's investment in trees on public and private property for the subsequent five years. The Strategy inventories the state of the City's urban forest and proposes numerous projects to implement the policies of the Comprehensive Plan. The Strategy was adopted in February 1996 by Resolution No. 912. Continued efforts, such as breaking the "tree planting record" through the City's tree-planting initiative can restore fragmented areas and improve the pedestrian and non-motorized trails.

Offer Voluntary Incentives
There are a variety of tax incentive programs used by various city and county governments to reward landowners for environmental conservation on private property. These can include programs administered by cities, state or federal entities. As an example, landowners who certify their property as Open Space under Pierce County Public Benefits Rating System can qualify for property tax reduction. Those currently available in Washington are listed in Appendix II. The City of Sumner can consider participation in Pierce County Open Space tax incentive programs and/or promote those listed in Appendix II to landowners within the LWR BMA. For example, the City may purchase land outright, use onsite clustering of development rights, or implement its own TDR/PDR (Transfer of Development Rights/Purchase Development Rights) program to encourage the retention of biodiversity areas and transfer urban development to more appropriate locations within the city boundaries.

Provide Public Education and Outreach Programs
The term "biodiversity" has been given many definitions making it confusing to the public. As stated in the Introduction of this *Plan*, biodiversity has been defined as the existence of a wide variety of plant and animal species in their natural environments. Maintaining biodiversity is economically valuable because it provides breathable air, drinkable water, food, pollution and pest control, and resilience after natural catastrophes, such as floods and drought.

- Efforts could include disseminating general information on the benefits of biodiversity, including publicizing whenever possible the City of Sumner's Values Statement:
  *"The people of Sumner respect the environment in which we live and strive to reduce the impacts our activities have on the environment. We strive to protect the environment and replenish what we must take from it. We recognize the biologically rich and diverse area adjacent to the White River as a unique and special place and strive to protect and restore these areas to maintain and increase biodiversity. We recognize the benefits and importance of a healthy and functioning natural environment to the continued prosperity and quality of life in the city and region. We*

*examine our daily activities to determine how we can do things differently to reduce our use of the earth's resources. We look at the long-term effects of our activities, and we strive to mitigate those effects. We are proactive about taking steps to improve the environment. We use our resources whenever possible to educate our children and our adults about the environment."*

- Enrolling in formal coordinated programs such as Community Wildlife Habitats certified by the National Wildlife Federation, and sponsoring habitat restoration projects serves the goal of public education and outreach.

- Also, weather and biodiversity issues overlap. Existing city programs for stormwater management can emphasize the overlaps. Climate change and biodiversity are deeply intertwined. Steps should be taken now to educate landowners that extreme climate events and biodiversity loss or change are significant to their community's livability.

Participate in Multi-jurisdictional Groups

An important element for success will be the coordination of efforts among all jurisdictions within the Lower White River BMA: Pierce County, King County, the Cities of Auburn, Pacific, Buckley, Enumclaw, and Sumner. Along with an engaged citizen group, jurisdictions can gain support from various government and non-governmental organizations such as Pierce Conservation District, King Conservation District, Forterra, and the Puyallup River Watershed Council. Such coordination allows periodic reviews of biodiversity action plans.

Remove Fish and Wildlife Barriers

The City has been and will continue to pursue funding for removal of fish barriers. One avenue the City of Sumner might consider for removing barriers to fish is to apply for project funds through the Pierce County Community Salmon Fund. The National Fish and Wildlife Foundation (NFWF) and Pierce County formed the Pierce County Community Salmon Fund in 2002 as a funding program for restoration projects that involved landowners and raised local support for salmon recovery. The goals of the Fund are:

- To fund salmon protection and restoration projects that have a substantial benefit to the watershed and that are consistent with Pierce County's Ecosystem and Diagnosis Treatment (EDT).
- To enlist landowners and community groups in project implementation and monitoring.

Lead entities are local, watershed-based organizations created by RCW 77.85 to solicit, develop, prioritize and submit habitat protection and restoration projects for funding by the state's Salmon Recovery Funding Board. The Pierce County Lead Entity committee, staffed by Surface Water Management, is comprised of county, tribal, conservation district, citizens and state agency staff. It has been extremely successful in getting funds to build projects that improve salmon habitat in the Puyallup, Carbon and White rivers, as well as South Prairie, Chambers and Clover creeks and important tributaries in both watersheds. Many of these projects have also reduced flood hazards by removing flood prone houses and structures and building setback levees that create habitat and protect upland properties.

The Pierce County Lead Entity committee also strives to share their passion and spread the word about the importance of salmon and the link between healthy salmon runs and the great quality of life afforded by the natural resources in the county. The committee also runs the King County Cooperative Watershed Management Grant rounds for the King County portion of WRIA 10. The grant rounds generally begin in early spring when they can add official members to their citizens committee. Public participation is always welcome at their meetings.

Transportation and Trails

Other barriers to wildlife movement include roads and fencing. Creeks and ditches that feed into the River are the most at risk during road construction and maintenance. The City of Sumner discourages the use of private streets and will not agree to maintain them. The City also plans to design transportation facilities within the Sumner UGA minimizing adverse environmental impacts resulting from both their construction and operation.

The City of Sumner is part of Pierce County's Regional Trails Plan. The City of Pacific Parks, Open Space, Recreation, and Trails Comprehensive Plan element updated the Sumner/Pacific Trail Plan in 2004. The City of Sumner updated their Trail Plan in 2008. The intent of the regional trail system is to provide recreational opportunities, promote healthier lifestyles, create connections to major developed areas and destinations, and enhance non-motorized transportation options throughout the County. Figure 20 illustrates Pierce County trail connection opportunities for continued regional trail expansion. Figures X-9 and X-10 show the City's existing and proposed trail systems.

The City of Sumner's 2035 vision of their park system is a unification of a major sports complex, community parks, and neighborhood parks situated in the various sectors of the City. Sumner's recreational facilities will be linked by a network of sidewalks and linear trails systems along the Puyallup and White Rivers and other areas of town. Linear trails separate development from riparian buffers and assist in the preservation of their natural resources. The City has reserved lands in a natural state along rivers and wetlands for passive enjoyment and to benefit fish and wildlife and biodiversity.

Figure X-10. Major Pedestrian System

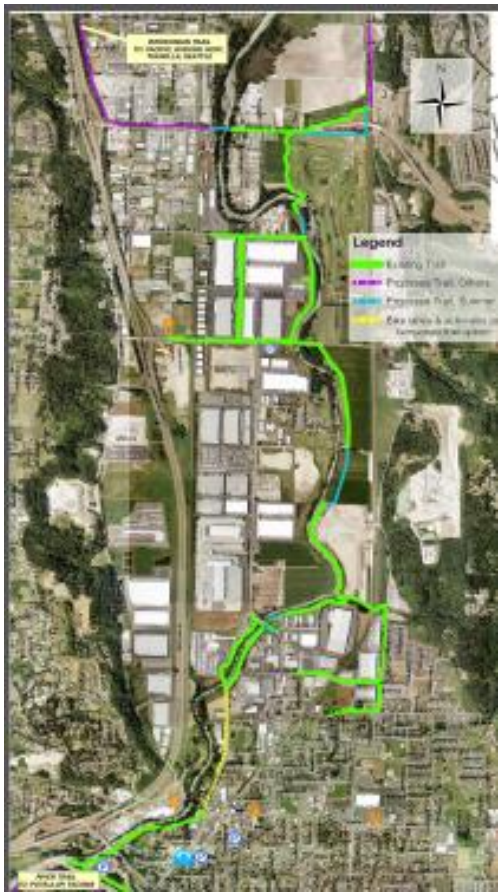



Figure X-11. Existing and Proposed Trails

Enhance Water Quality & Quantity, Manage Flooding, and Control Erosion and Siltation

A TMDL is a process that results in a plan under the Clean Water Act to clean up impairments in the water by telling us how much pollution needs to be reduced or eliminated to achieve clean water. Within the White River Watershed, the Upper White's TMDLs for sediment and temperature were completed in 2004 and the implementation report was completed in 2006. Most of the recommendations in the implementation plan were assigned to the US Forest Service to decommission roads and plant riparian areas as funds allow.

The Lower White has high pH values that exceed state water quality standards. A TMDL is currently being developed with a Memorandum of Agreement between the Muckleshoot Tribe, the Washington Department of Ecology, and EPA. Ecology conducted monitoring in 2012 and is currently modeling the river. A draft technical report will be available in 2015.

The City of Sumner's Environmental Elements 1.4.2 and 1.4.3 are to monitor surface water quality discharges to provide a sufficient data base for determining if water quality is being degraded and to work with other agencies to educate the general public and developers on the potential surface water quality issues degradation resulting from development and human activity and how to reduce impacts. One example is to encourage the combining of storm water storage areas to create more viable natural areas, instead of creating a patchwork of small detention ponds. Another is to encourage landowners to enhance wetlands with vegetation to act as a buffer as an essential part of water quality protection.

The City of Sumner is researching the feasibility of a wetland mitigation bank to offset wetlands being removed for the East Sumner Neighborhood Plan. Although the City is doing habitat improvements along the corridor along Salmon Creek, it is unsure of the impact regarding flooding.

Both the Puyallup River and the White River have overtopped the existing dike system within the City of Sumner's limits, resulting in flooding. Major flood events recorded by the United States Geological Survey (USGS) in the Puyallup River at the Puyallup gage include events in December 1917, December 1933, January 1965, December 1977, November 1986, January 1990, November 1990, February 1996, and January 2009. The 1996 flood is the current peak flood of record for the Sumner region. The City's Flood Hazard Area Map (Figure X-12) shows the 100-year flood range in red and 500-year flood impact in gold.

Figure X-13 is a computer model showing the results of a 1% annual chance flood event, based on a series of floods that has occurred on the Lower White River in and around the City of Pacific. King County is now in the process to relocate the levees on the left bank of the White River in Pacific to create additional flood storage capacity. Existing levees will be removed and relocated further east of their present location. The purpose of the relocation is to allow the river channel to migrate more naturally, create flood storage capacity and to help alleviate potential flooding of structures on the right bank of the White River. In the near future, the King County will be relocating the levees on both banks of the White River which will also increase flood storage capacity.

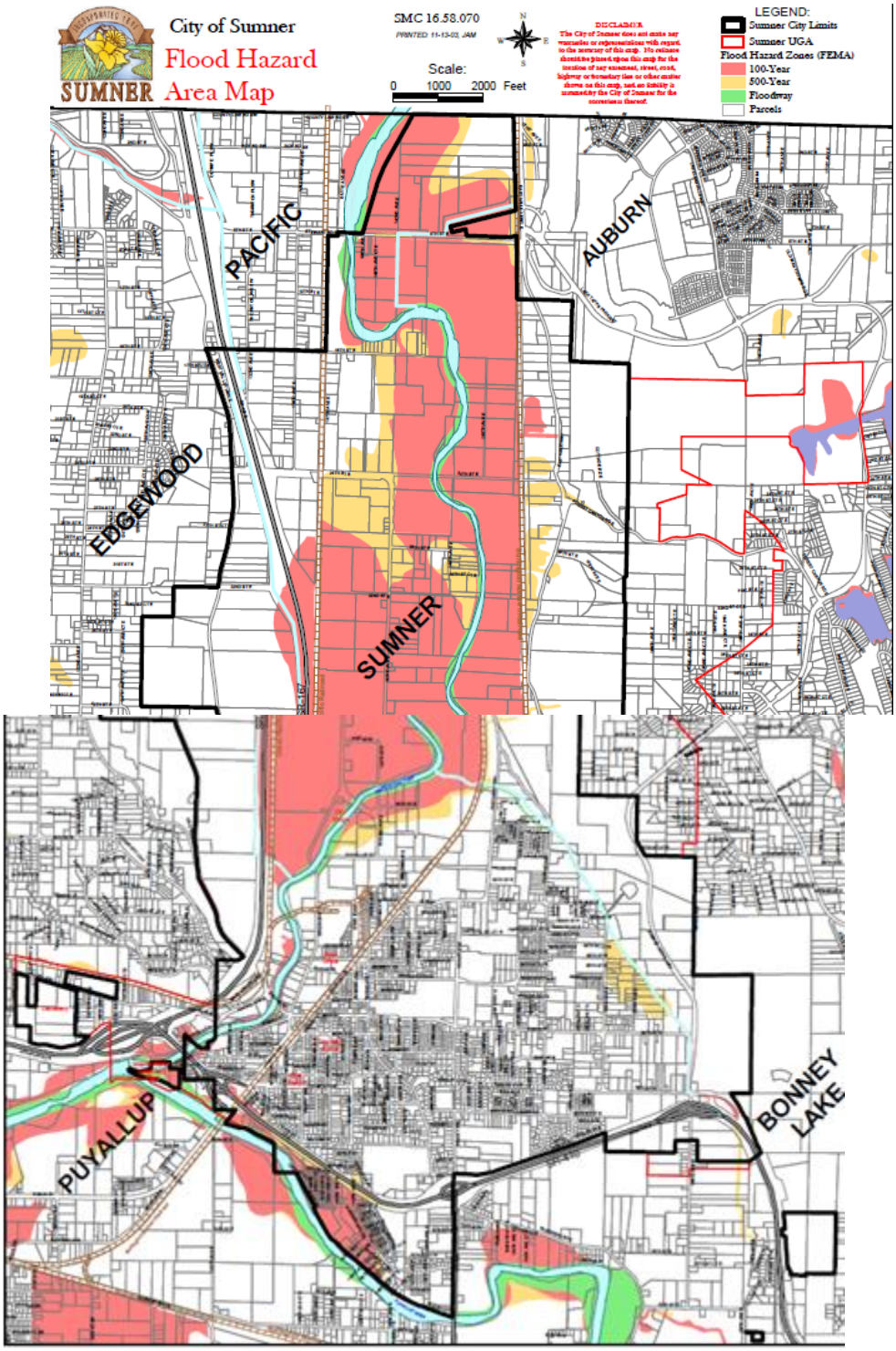



Figure X-12. Flood Hazard Area Map

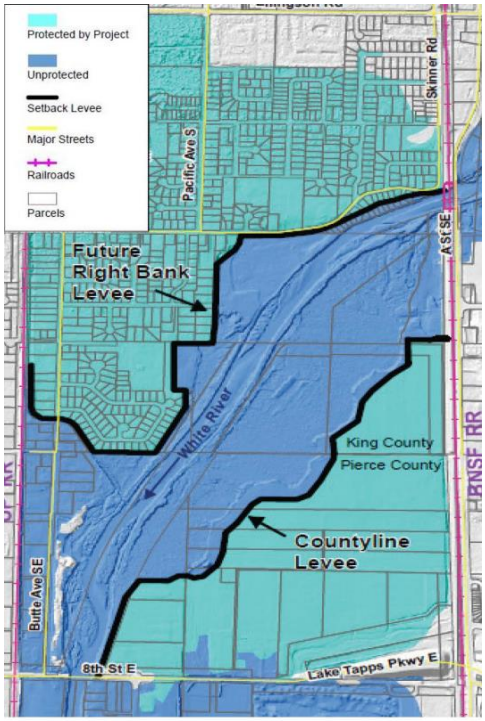



Figure X-13. Hydraulic Model showing flood reduction benefits from the Countyline Levee Setback and future Right Bank flood protection projects. (Alignment of the Right Bank protection is not final.)

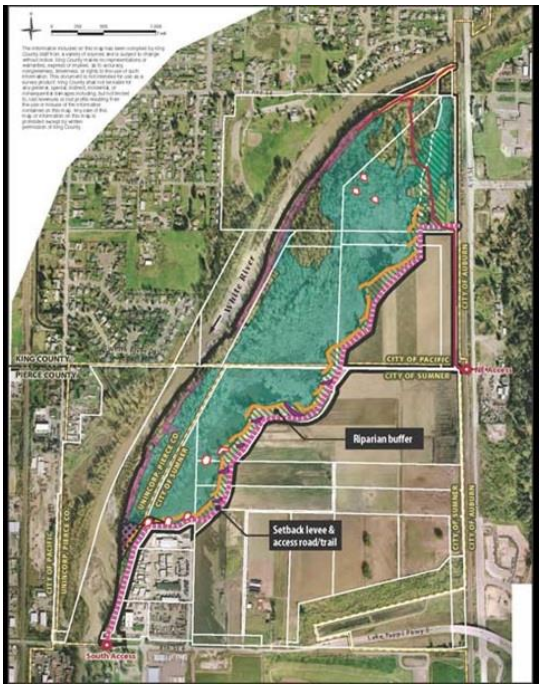



Figure X-14. Countyline Project

The King County Countyline Project will include 6,000 LF setback levee, 5,000 LF biorevetment, four bank deflector engineered log jams (ELJ), and four apex ELJ's as shown in Figure X-14. Re-vegetation will also occur along the banks.

**Voluntary City Government Efforts**

1. The City obtained necessary permits from federal and state agencies to move Salmon/Strawberry Creek to enhance the resource, and work was completed Summer, 2015.
2. The PCBA has worked with City of Sumner staff to develop the final draft of the City's chapter in the Lower White River Biodiversity Stewardship Plan.
3. The PCBA will re-introduce the updated Lower White River Stewardship Plan with the City of Sumner's chapter to the Planning Commission and City Council, and
    a. Advocate community members' participation in land use decisions regarding proposed developments that affect the BMA
    b. Identify and advocate for conditions that eliminate or minimize threats to habitat fragmentation.
    c. Provide opportunities for local residents or organizations to advocate conservation strategies and pursue those actions that are appropriate for the city. Initiate the "Open Space for Employees" volunteer group.

**Voluntary City Government Conservation Strategies**

<u>Short Term Actions</u>

1. Participate in and contribute to LWR BMA inter-jurisdictional organized activities.
2. Encourage Parks Board or other community groups to apply for the National Wildlife Federation – Community Habitat Program for the City. *(Registered)*

3. Integrate the Comp Plan's Environmental Element 1.1.7 with the Community Habitat Program by requiring trees and other vegetated barriers between busy roadways and schools, residential areas and other places with a high concentration of vulnerable children and adults.
4. Through such organizations, educate and involve landowners in the stewardship of streams.
5. Identify ways to work with the public to address the Lower White River pH TMDL.
6. Apply stewardship principles in area of Dieringer Canal as an important wildlife passage between BMA-designated polygons.

<u>Mid-Term Actions</u>

1. Identify parcels within and adjacent to BMA that may become available for purchase or conservation:
    a. Use as a connection to the regional trail system for birding and possible fishing especially for wheelchair access.
    b. Design the proposed trails and new parks with native vegetation buffering the LWR and high density usage furthest from the river.
    c. Publicize County Open Space and Conservation incentives to landowners.
2. Publicize the Community Salmon Fund to landowners.
3. Improve the quality of stormwater runoff going into the White River and impacting the LWR habitat.
    a. Plant more trees and native plants throughout the City strategically to absorb runoff.
    b. Continue to create and promote the creation of rain gardens.
    c. Require bioswales for all city owned stormwater projects where feasible.
4. Update the municipal code to ensure that development and other activities in the City's jurisdiction will mitigate impacts to the LWR habitat as Best Available Science is updated.
5. Continue to apply Low Impact Development (LID) standards along streams, creeks, and wetlands feeding into the LWR).
6. Help the community to embrace and cherish the LWR habitat by providing educational opportunities to understand what exists in the ecosystem and how it works.
    a. Create a display (seasonal or permanent) in the Sumner library on the LWR habitat
    b. Discuss with other cities the possibility of creating a LWR Salmon Festival.
    c. Might consider educational signs/kiosks on the White River Trail.

<u>Long-term Actions</u>

1. Prioritize the restoration opportunities along the 10 inventory segments listed within the Shoreline Master Program and identify ways the public can get involved in the restoration.
2. Create a fish and wildlife monitoring plan that aligns with the levee relocation and restoration work conducted by King County.
    a. Schools and community adopt sections Salmon Creek to monitor.
3. Create a plan for care of the land along the LWR owned by the City.
    a. Reduces fertilizers/pesticide runoff through improved City park maintenance.
    b. Educate public maintenance staff on the use and care of plants that benefit wildlife.
    c. Encourage a network of backyard habitats, city parks, and rain gardens that can become the wildlife corridor within the City out to the river.
4. Locate open space set-aside areas in contiguous tracts or within contiguous conservation easements in such a manner as to promote connectivity and proximity to the conservation targets along the tributaries and adjoining wetlands.
    a. Develop a trail enhancement program where the public can adopt a section to improve, monitor, and set up photo-monitoring stations.
    b. Develop a "listening post" network where pedestrian trail users can use an app to hear about the history of the site.

**Suggested Community Conservation Strategies**

A community-led group, when formed, may choose or modify strategies from those listed in Chapter IV of this Plan. The following lists are suggestions on how short, to medium, to long–term actions may be set:

Short Term Actions

1. Apply for National Wildlife Federation – Community Wildlife Habitat Program for local neighborhoods or in partnership with the Edgewood who is at the Registered Level.

   National Wildlife Federation's program is for homeowners, students, community leaders and businesses. A dedicated group pledges to preserve, restore and create sustainable landscapes that support a multitude of wildlife and native plants in their backyards, workplaces, places of learning and other community spaces. NWF supports these efforts through training, print and online resources and recognition through a formal certification process. (Chapter 1 in the Stewardship Plan has the full description of the program.)
2. Continue to promote native vegetation retention and re-planting in residential areas.
3. Promote organic fertilizers and Integrated Pest Management (IPM).
4. Develop signage with the City to highlight the BMA.
5. Continue to support native vegetation retention and critical area buffer regulations to environmentally sensitive areas within the BMA and report any violations to these regulations.
6. Develop and implement citizen science wildlife monitoring projects.
7. Provide increased education and outreach to property owners, developers and real estate agents regarding impacts of vegetation removal and earth moving.
8. Create and dispense educational materials concerning fish and wildlife habitat stewardship actions.
   a. Work with Audubon Society to develop the "Bird of the Month" reporting program.
   b. Work with the Department of Fish and Wildlife regarding managing wildlife such as nuisance wildlife that may be damage property or be a threat to personal safety.
9. Participate in local land use decisions regarding proposed developments that affect the BMA.
10. Identify high use areas for people and wildlife along trails to minimize disturbance to the habitat and wildlife.
11. Continue to organize volunteer work parties.
12. Continue to partner with local Boy or Girl Scout troops, schools, or other environmental or civic organizations for volunteers.
    a. Sponsor annual or biannual native vegetation planting event.
    b. Sponsor invasive species eradication events.
    c. Sponsor volunteer "bioblitz" activities led by experts.
13. Promote wildlife nesting through a nest box program (e.g., bats, songbirds, wood ducks and monitor for success.
14. Promote materials that discuss how to deal with nuisance wildlife situations.

Mid-Term Actions

1. Consider a project with Sumner's Parks to create a demonstration project within a new park, cooperating with Pierce County Conservation District, Master Gardeners, schools, Girls and Boy Scout troops, and other local volunteers.
   a. Use the site to promote shoreline-dependent species through nest box placement (e.g., wood ducks) and monitor to see if this strategy is effective.
   b. Use the site for bat boxes and monitor to see if bats use them.
   c. Create a "chimney" and see if Vaux's Swifts use it.
   d. Native vegetation and food garden
   e. Rain demonstration garden

2. Work with communities along the Lower White River to develop a LWR Salmon or Biodiversity Festival committee and host the festival.
3. Identify sections of the regional "walking trail" along the river with different groups adopting sections of the river to restore and maintain.

Long-term Actions

1. Work with citizens in Pierce and King Counties on projects for restoration, re-vegetation, and monitoring on both sides of the LWR.
2. Conduct water quality monitoring along creeks and ditches feeding into the LWR.
3. Develop a "report card" assessment tool to track the progress of selected actions. For a target area, measure:
   a. gains and losses to forest canopy.
   b. total acreage of habitat restoration efforts.
   c. areas identified as needing invasive eradication and number of areas receiving treatment.
   d. number of large mammals such as deer and bear that are seen or intercepted in the BMA.

   Or for a group working on projects within the BMA, assess number of people who have
   e. created backyard habitats for certification,
   f. conducted water quality monitoring,
   g. planted native vegetation in their yards,
   h. made rain gardens.

   Or for a community, count:
   i. the total number of educational events including where and how a group makes outreach to landowners.
   j. how many members have volunteered for city/county sponsored programs.
   k. how often committee leaders communicate with membership via meetings, social media, and essential governmental bodies, such as attending planning or recreation meetings.

# Chapter XI – Muckleshoot Indian Tribe

**General Description**

The Lower White Rriver Biodiversity Management Area (BMA) runs along the White River through the Muckleshoot Indian Tribal lands. In Figure XI-1, portions of BMA above the red line are in King County and below in Pierce County.

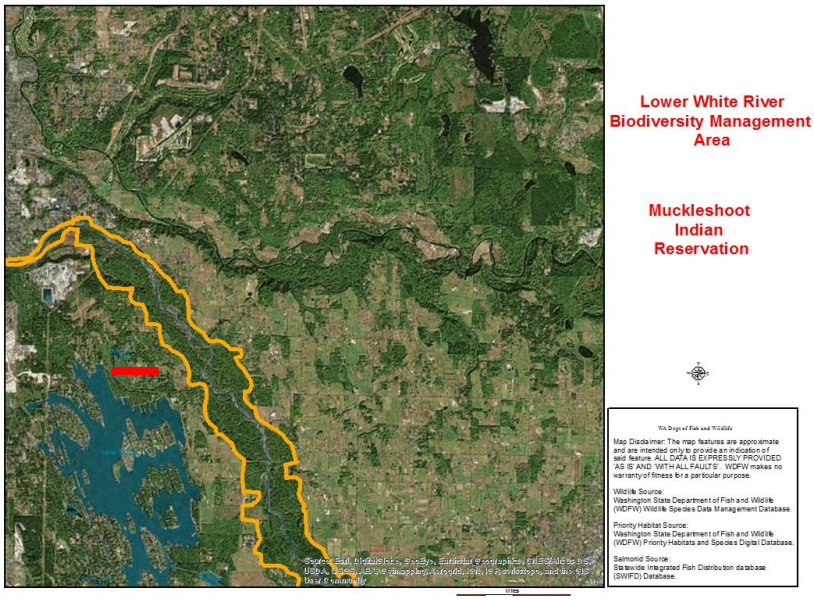



Figure XI-1. Section of the Lower White River BMA within the Muckleshoot Tribal Lands

The landcover within the BMA is riparian dominated by hardwood trees and small shrubs, hardwood and mixed hardwood/conifer forests on both sides of the river.

The LWR BMA was initially drawn at a coarse level (e.g., county-wide) trying to include riparian vegetation. The boundary lines were re-drawn at a finer scale to follow the river, riparian habitat, and the borders of the left and right bank King County levee projects west of tribal lands allowing it to include some of the historic floodplain.

**Demographics, Land Use and Growth Potential**

The Muckleshoot Indian Tribe

The area surrounding the LWR BMA as it passes through the Muckleshoot Indian Reservation are forest resource lands owned and managed by the Tribe. Lands to the east and west are primarily unincorporated King and Pierce County. The Muckleshoot Indian Reservation consists of 3,860 acres (Figure XI-2). With over 200 Tribal Government employees and a gaming employment work force of over 2,200, the Tribe is South King County's number two employer and a growing economic force in the region.

Existing Land Use and Population

There are eighteen properties located within or partially within the BMA that are publicly owned by local and state governments. The Muckleshoot Indian Tribe owns five properties containing 66 acres. Table 7, page 37 in the Plan, provides a breakdown of publicly owned lands within the Lower White River BMA. Table 7 (below) only lists the Tribal lands. The acreage may be higher with the re-drawn BMA boundary lines. Potential growth along the LWR BMA has been extremely limited because of the river, wetlands, the Tribe's wildlife management practices, and Puget Sound Energy (PSE) ownership to the east.

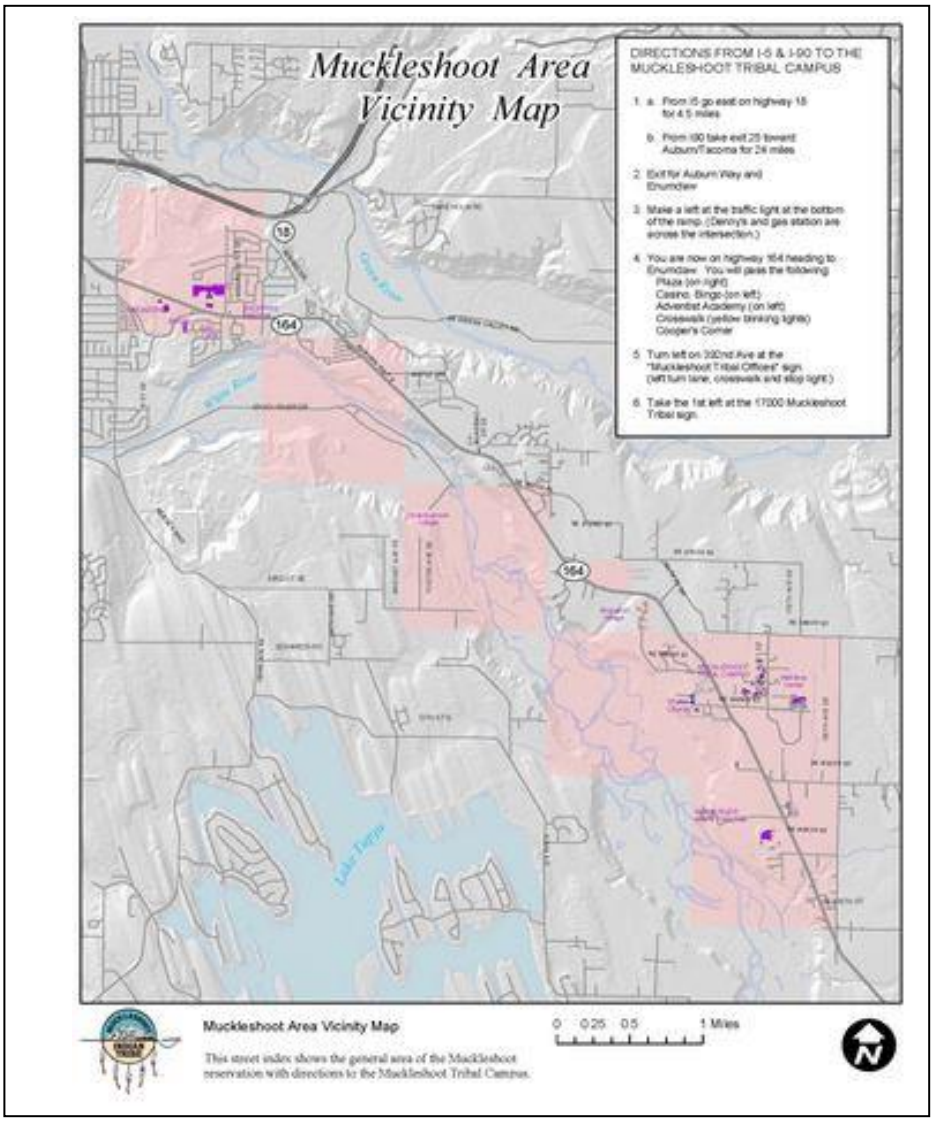



Figure XI-2. Muckleshoot Area Vicinity Map

| TABLE 7 – LOWER WHITE RIVER BMA PUBLIC LANDS (PIERCE & KING COUNTY) | | | | |
|---|---|---|---|---|
| **Parcel Number** | **Total Area** | | **Area Within BMA Only** | |
| | **# Parcels** | **Acres** | **# Parcels** | **Acres** |
| ***Muckleshoot Tribe*** | | | | |
| 0520023008 | 1 | 39.32 | 1 | 36.94 |
| 0520023012 | 1 | 3.20 | 1 | 0.13 |
| 0520023010 | 1 | 10.37 | 1 | 10.01 |
| 0520023002 | 1 | 16.16 | 1 | 6.80 |
| 0520024000 | 1 | 19.17 | 1 | 12.41 |
| **Total Muckleshoot Tribe** | **5** | **88.22** | **5** | **66.29** |

Open Space Corridors and Future Growth Potential

It is unknown if the tribe has a plan for open space and future growth. The PCBA recommends including the LWR BMA conservation targets into their development plans. This would include purchasing lands along the LWR to protect fish and wildlife habitat. Figure XI-3 shows potential properties to acquire within the LWR floodplain.

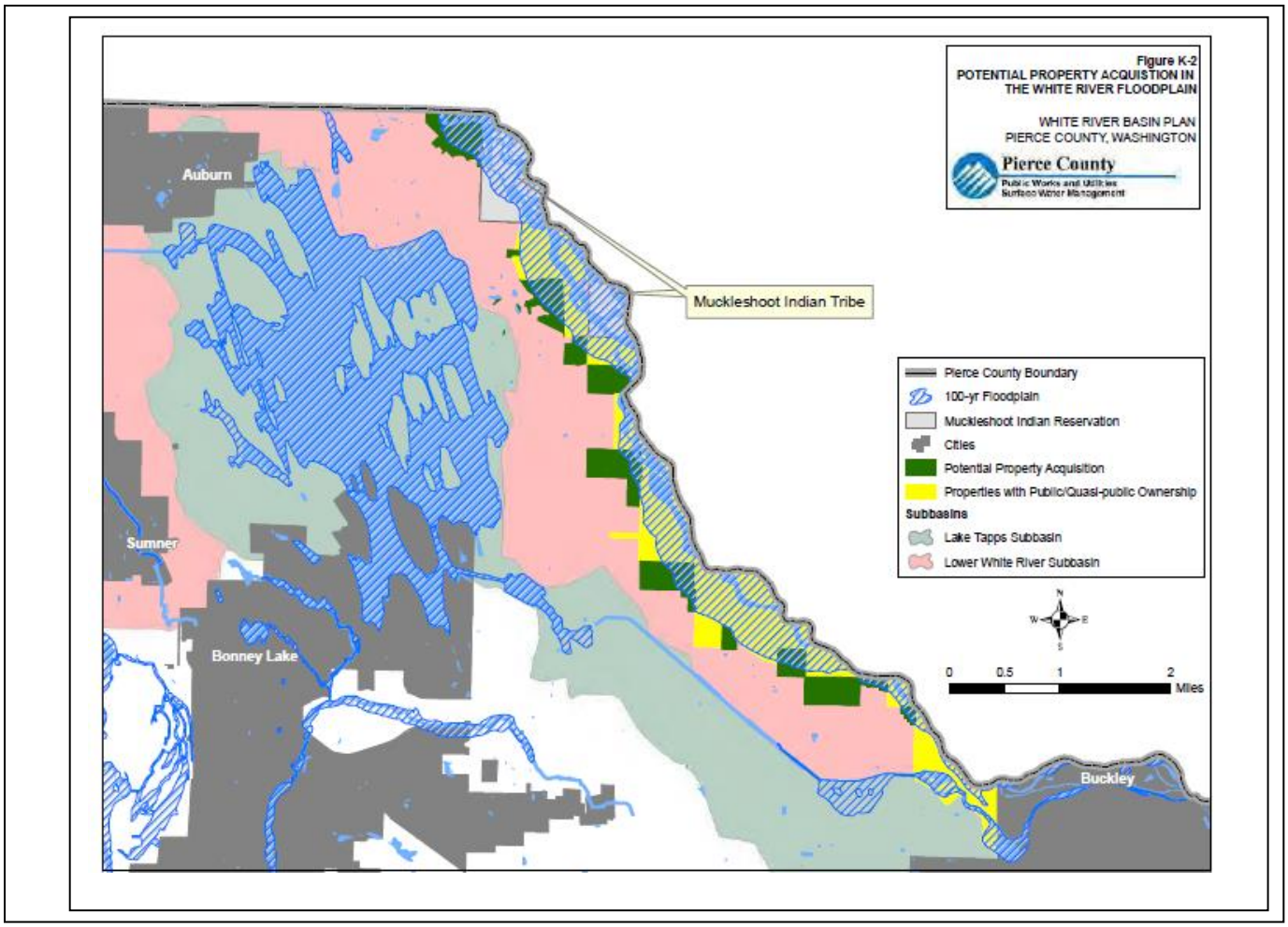



Figure XI-3. Potential Property Acquisition in the White River Floodplain

**Shoreline Environments**

Under the Washington State Shoreline Management Act the Lower White River is considered a "Shorelines of the State." All lands within 200 feet of the ordinary high water mark, and associated wetlands and flood-plains, fall within the jurisdiction of Shorelines of the State, whose preferred uses according to the Act are (in order of priority)to:

> "recognize and protect the statewide interest over local interest; preserve the natural character of the shoreline; result in long-term over short-term benefit; protect the resources and ecology of the shoreline; increase public access to publicly owned shoreline areas; and increase recreational opportunities for the public in the shoreline area."

All shorelines, including those designated as Shorelines of the State, are classified into "environment designations" based on their physical, biological, and development characteristics. Historically, Plans have used primarily four basic environment designations:

- Natural
- Conservancy
- Rural
- Urban

New state guidelines recommend six designations:

- Natural
- Rural Conservancy
- Urban Conservancy
- High Intensity
- Shoreline Residential
- Aquatic

Local governments may modify state recommendations to better accommodate shoreline areas with unique characteristics. These environments are similar to zoning designations allowing different land uses, densities and activities ranging from the most intensive uses (High Intensity) to very limited uses (Natural). Although the Muckleshoot Indian Tribe does not have to file a Shoreline Management Program, the river's land use has not changed since the 2008 aerial photograph and the 2015 aerial comparison (Figures XI-4 and XI-5).

Most of the river from the tribal land towards Buckley is classified as Conservancy, which allows for low density residential, outdoor recreation and low intensity agricultural and forestry uses. As the river flows to the Puget Sound, Natural designation is replaced by Residential Rural and Urban.

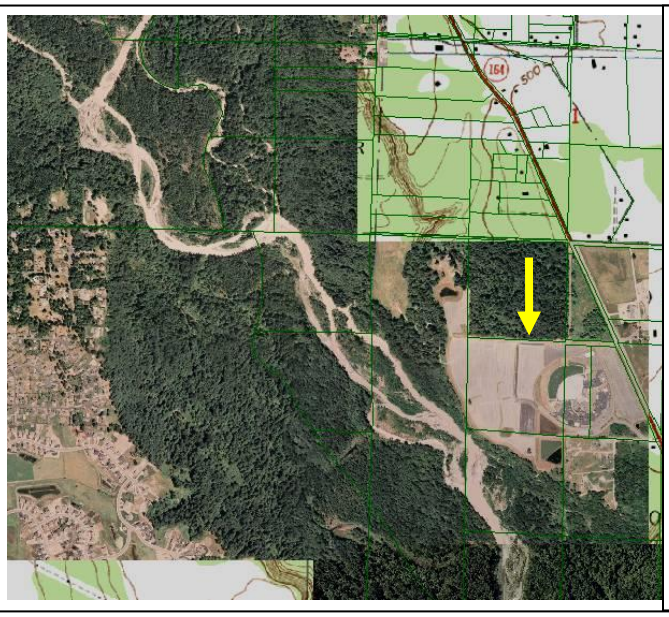


Figure XI-4. 2008 Aerial of LWR and Amphitheater

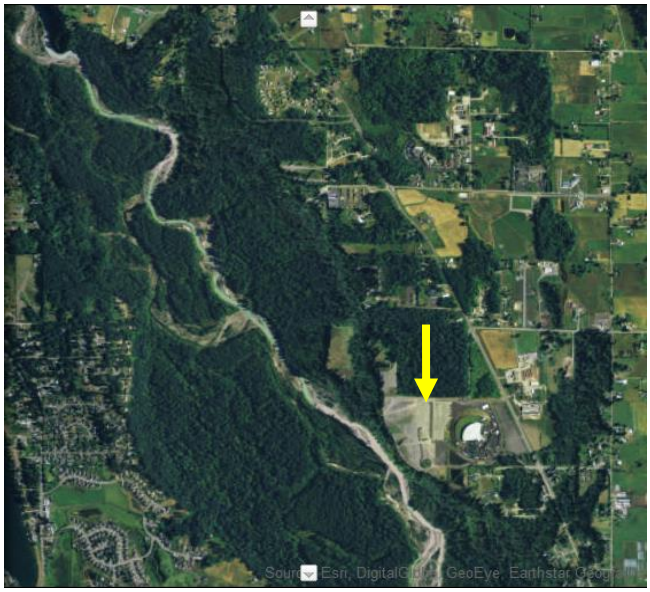


Figure XI-5. 2015 Aerial of LWR and Amphitheater

URS Consulting surveyed the reach between a major pipeline crossing on the Muckleshoot Reservation and the Muckleshoot tribal land in 2004 for the White River Basin Plan. This reach had the best spawning and rearing habitat for salmonids available in the White River below the Buckley diversion dam. There were numerous side channels and the river had a relatively normal braided channel typical of

a glacial river. Most of the floodplain and the surrounding valley walls were forested with second growth forest, and there was more LWD present than elsewhere below the Buckley diversion dam. Numerous pools occurred at the junctures of channels and at bends in the river, as well as near a moderate number of logjams that were present at bends in the river. There were also several areas where ponds and small connecting side channels were present in forested side terraces between the valley walls and the river. Some riffles in this reach of the river may have been too shallow for adult salmon (Chinook) spawner passage during periods of low water.

The White River Basin Plan scored the Aquatic Habitat and Riparian Corridor as good and fair respectively from 8 of the 11 sampling sites from three stream reaches feeding into the White River east of Lake Tapps (Figure XI-6). Two sites were fair and fair and one was poor and poor. The one site on the White River north of the three streams was scored fair and fair (Figure XI-7).

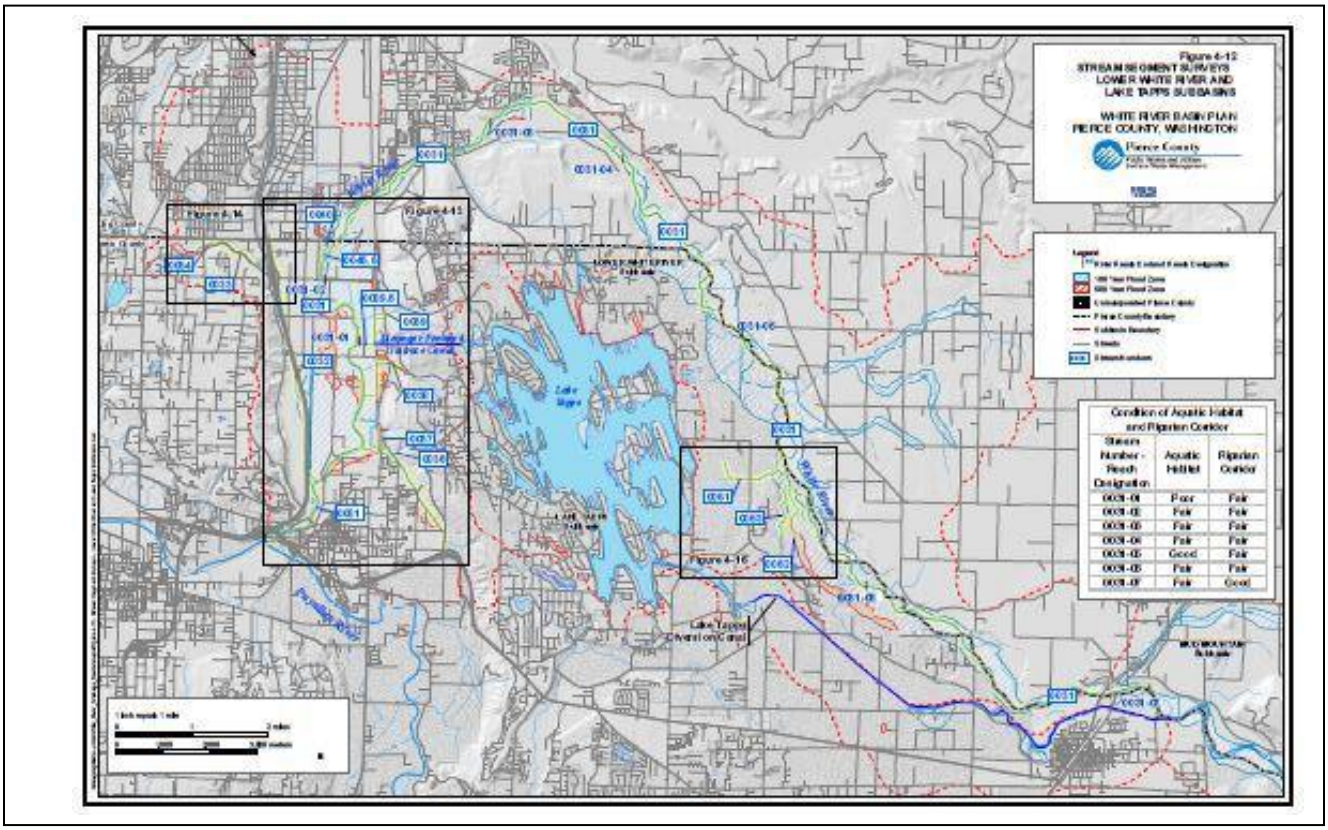



Figure XI- 6. Stream segments surveyed in Lower White River and Lake Tapps Sub-basins.

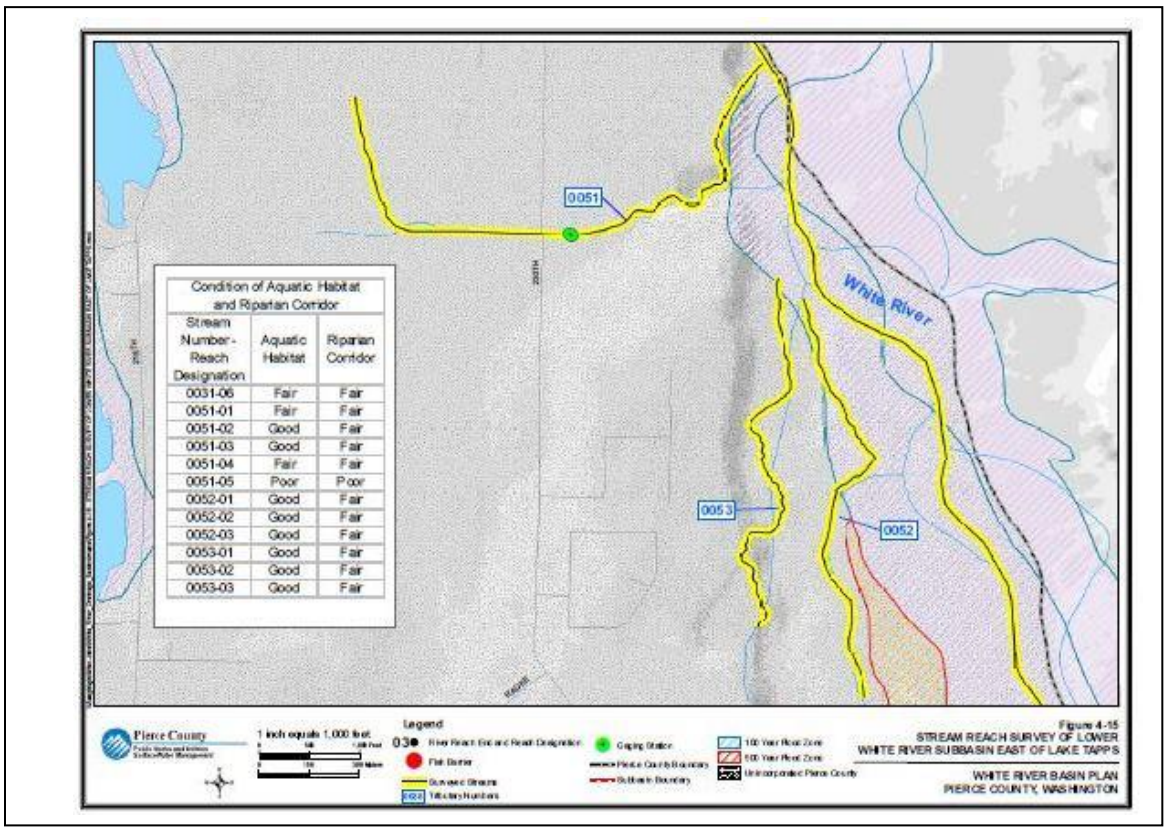



Figure XI- 7. Stream Reach Survey East of Lake Tapps.

**Fish and Wildlife Resources**

Fish and Wildlife Habitat Area

The White River supports three salmonid species that are listed as threatened under the Endangered Species Act: Puget Sound Chinook, Puget Sound steelhead, and Coastal-Puget Sound bull trout. The White River is particularly important to Chinook recovery because it is the only population of spring Chinook in south Puget Sound. The White River also supports pink, chum, coho, and sockeye[35] salmon, as well as cutthroat trout. The mouth of Boise Creek falls within the BMA. Boise Creek supports Chinook, coho, and pink salmon, steelhead, bull trout, and cutthroat trout.

The Washington Department of Fish and Wildlife's (WDFW) Priority Habitats and Species (PHS) map (Figure XI-8) shows locations of PHS species. PHS is the principal means by which WDFW provides important fish, wildlife, and habitat information to local governments, state and federal agencies, private landowners and consultants, and tribal biologists for land use planning purposes. PHS is the agency's primary means of transferring fish and wildlife information from their resource experts to those who can protect habitat. The entire area is light purple signifying that is a priority habitat for elk, and the river for salmon. Purple points are either Bald Eagle, Great Blue Heron, or Osprey nest sites.

[1]Gustafson, R.G., T.C. Wainwright, G.A. Winans, F.W. Waknitz, L.T. Parker, and R.S. Waples. 1997. Status review of sockeye salmon from Washington and Oregon. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-33, 282 pp. http://www.nwfsc.noaa.gov/publications/techmemos/tm33/tm33.html#toc

Figure XI-8. WDFW PHS Map

Predicted and Confirmed Wildlife Species

The PHS point locations and maps were one of the layers of information used to generate the LWR BMA. Table 15 lists all predicted species to be within the LWR BMA. To locate and validate whether those species were present, a 24-hour bioblitz (explained in Chapter I) was conducted in 2006 in three large areas of the LWR BMA (Buckley and vicinity, unincorporated Pierce County between Buckley and City of Auburn's Game Farm and Game Farm Wilderness Parks, the City of Pacific's Pacific City Park, and the Sumner Golf Course (birds only). The second bioblitz held in 2007 over a 12-hour period focused on the area between Auburn and Sumner. Invertebrates were mainly collected between Buckley and Auburn during the 2006 bioblitz and at the Wilderness Park in 2007. Due to the cold weather in 2007, the invertebrate count was low (Table 2, Chapter II). Plant data were collected in the same three areas as vertebrates in 2006, but only down to Stewart Road in 2007 (Tables 3 and 4, Chapter II). The Muckleshoot Tribe declined to be involved in the bioblitzes of 2006 and 2007. Because data were collected along the White River below and above tribal lands on the left banks of the river, the species predicted and confirmed would be expected to occur on tribal lands (Table 1, Chapter II). Although the cougar sighting by Dave Vales along the Lower White River was added to the list of species confirmed, it is not included on the bioblitz list.

**Conservation Targets**

In the Lower White River BMA several conservation targets were selected to represent the key habitat types occurring throughout the area. These conservation targets include:

- Lower White River
- Tributaries, wetlands, and oxbows
- Conifer/deciduous mixed forest areas

Combined, conservation targets create the rich variety of habitats necessary to foster a high level of biodiversity in the BMA. A detailed description of each conservation target can be found in Chapter III.

**Threats to Conservation Targets**

The main threats that are or may potentially be occurring to conservation targets include:

- Habitat conversion and fragmentation due to development, removal of native vegetation, and roads;
- Poor water quality caused by residential and use of fertilizers, domestic animal feces, septic tank leakage, herbicides from road maintenance, farming and commercial sites, and road runoff;
- Loss of pools and large woody debris (LWD) due to development and channelization of the river;
- Introduction of invasive, non-native plant and animal species such as bullfrogs and Japanese knotweed;
- Fish passage blockage from culverts;
- Wildlife movement blockages from roads, driveways, and fencing;
- Erosion and damage to riparian habitat from dikes/levees along cities of Buckley, Pacific, and Sumner;
- Predation of native species by domestic cats, dogs, and unregulated hunting and fishing;
- Stormwater and illegal discharge dumped directly into the river
    - Water fluctuation surges due to storm drains from development redirecting water flow into the river and not into wetlands, dikes, and stormwater ponds;
- Pollution caused by dumping of trash and debris into or near the river.

**Overview of Conservation Strategies**

Conservation strategies have been identified to ascertain the level or severity of a potential threat, directly abate known threats, or identify restoration opportunities where degradation has occurred. Some threats apply to multiple conservation targets and as such the conservation strategies have been grouped under the following categories:

- Reduce Habitat Conversion and Fragmentation (due to development and human activity)
- Eliminate Invasive and Introduced Species
- Remove Fish and Wildlife Movement Blockages
- Enhance Water Quality and Quantity
- Manage Flooding
- Control Erosion and Siltation
- Reduce Predation by domestic cats and dogs and Poaching of Native Species
- Reduce or Eliminate Pollution Within the LWR BMA

**Biodiversity Conservation**

Biodiversity enhancement goals fall into two general areas: 1) protection of existing elements and 2) restoration and recovery of elements that have been damaged by human intervention. A community-driven biodiversity stewardship plan which incorporates the city's policy and regulatory tools is incomplete without the following to provide the best environment for success:

- Voluntary incentives
- Public education and outreach
- Multi-jurisdictional coordination

Update existing regulatory tools so that they can be used to protect native biodiversity.

As a first step, the PCBA has requested that the cities of Buckley, Auburn, Pacific, and Sumner insert into their Comprehensive Plan 2015 update the Lower White River Biodiversity Management Area Stewardship Plan as an appendix. The Muckleshoot Tribe can find partners in efforts of this kind. The LWR BMA Stewardship Plan is a non-regulatory plan that can be used to guide communities experiencing growth and new development.

Offer Public Education and Outreach Programs

*Eliminate Invasive and Introduced Species*

The World Conservation Union states that the impacts of alien invasive species are immense, insidious, and usually irreversible. They may be as damaging to native species and ecosystems on a global scale as the loss and degradation of habitats. Hundreds of extinctions have been caused by invasive alien species and the ecological cost is the irretrievable loss of native species and ecosystems. An excellent source of information is the noxious weed map and monitoring program conducted by King County (Figure XI-9).

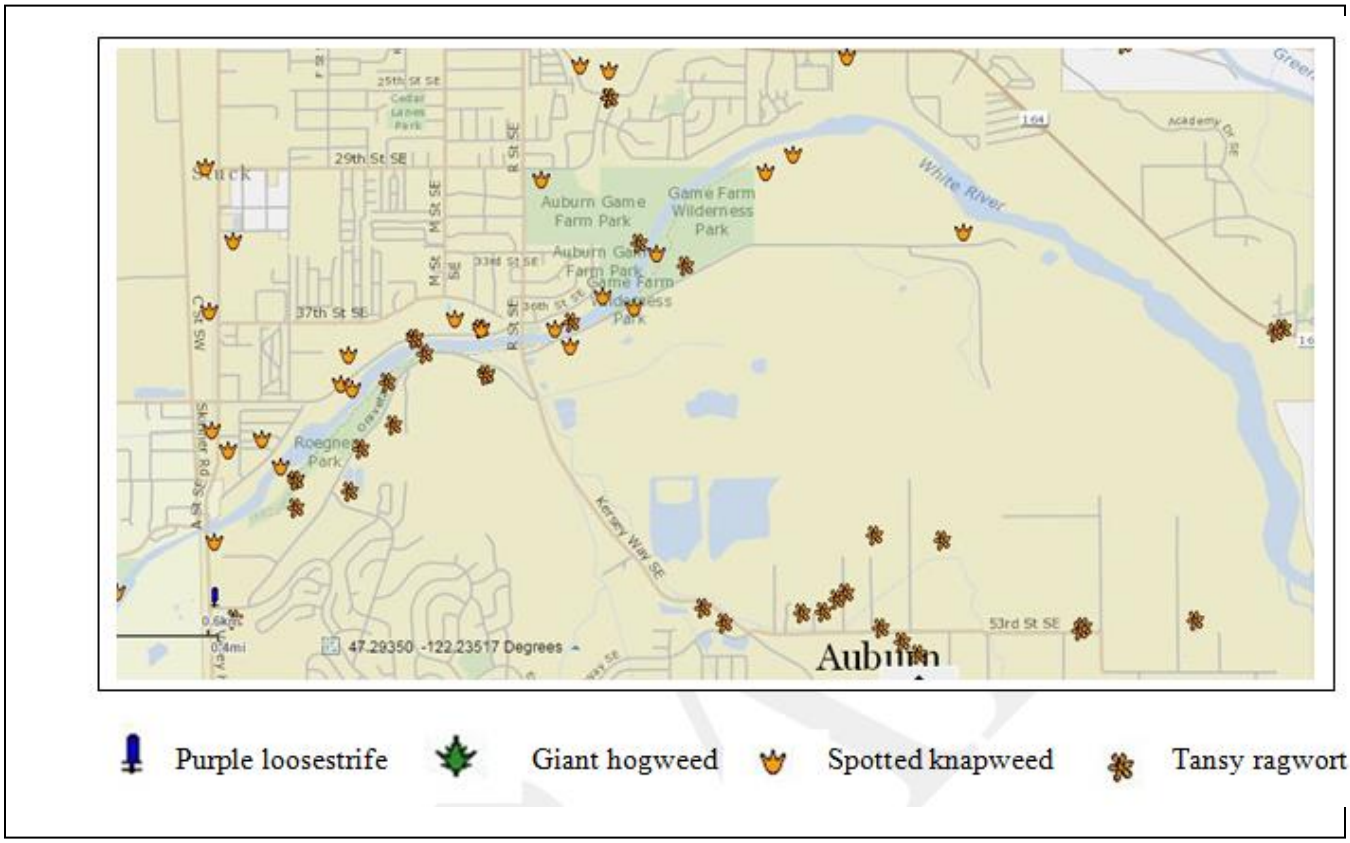



Figure XI-9. Most Widespread Noxious Weeds (2014)

The term "biodiversity" has been given many definitions making it confusing to the public. As stated in the Introduction of this Plan, biodiversity has been defined as the existence of a wide variety of plant and animal species in their natural environments. Maintaining biodiversity is economically valuable because it provides breathable air, drinkable water, food, pollution and pest control, and resilience after natural catastrophes, such as floods and drought.

Public education efforts could include disseminating general information on the benefits of restoring and sustaining native biodiversity. Climate change and biodiversity are deeply intertwined and steps

should be taken now to educate landowners what climate change and biodiversity loss or change means to them.

Participate in Multi-jurisdictional Groups

An important element for success will be the coordination of efforts among all jurisdictions within the Lower White River BMA: Pierce County, King County, the Cities of Auburn, Sumner, Pacific, Enumclaw, and Buckley. Along with an engaged citizen group, jurisdictions can gain support from various government and non-governmental organizations such as Pierce Conservation District, King Conservation District, Forterra, and the Puyallup River Watershed Council. Such coordination allows periodic reviews of biodiversity action plans.

Remove Fish and Wildlife Barriers

The National Fish and Wildlife Foundation (NFWF) and Pierce County formed the Pierce County Community Salmon Fund in 2002 as a funding program for restoration projects that involved landowners and raised local support for salmon recovery. The goals of the Fund are:

- To fund salmon protection and restoration projects that have a substantial benefit to the watershed and that are consistent with Pierce County's Ecosystem and Diagnosis Treatment (EDT).
- To enlist landowners and community groups in project implementation and monitoring.

Lead entities are local, watershed-based organizations created by RCW 77.85 to solicit, develop, prioritize and submit habitat protection and restoration projects for funding by the state's Salmon Recovery Funding Board. The Pierce County Lead Entity committee, staffed by Surface Water Management, is comprised of County, Tribal, Conservation District, citizens and state agency staff. It has been extremely successful in getting funds to build projects that improve salmon habitat in the Puyallup, Carbon and White rivers, as well as South Prairie, Chambers and Clover creeks and important tributaries in both watersheds. Many of these projects have also reduced flood hazards by removing flood prone houses and structures and building setback levees that create habitat and protect upland properties.

The Pierce County Lead Entity committee also strives to share their passion and spread the word about the importance of salmon and the link between healthy salmon runs and the great quality of life afforded by the natural resources in the county. The committee also runs the King County Cooperative Watershed Management Grant rounds for the King County portion of WRIA 10. The grant rounds generally begin in early spring when they can add official members to their citizens committee. Public participation is always welcome at their meetings.

Enhance Water Quality and Quantity, Manage Flooding, and Control Erosion and Siltation

A TMDL is a process that results in a plan under the Clean Water Act to clean up impairments in the water by telling us how much pollution needs to be reduced or eliminated to achieve learn water. Within the White River Watershed, the Upper White's TMDLs for sediment and temperature were completed in 2004 and the implementation report was completed in 2006. Most of the recommendations in the implementation plan were assigned to the US Forest Service to decommission roads and plant riparian areas as funds allow.

The Lower White has high pH values that exceed state water quality standards. A TMDL is currently being developed with a Memorandum of Agreement between the Muckleshoot Tribe, the Washington Department of Ecology, and EPA. Ecology conducted monitoring in 2012 and is currently modeling the river. A draft technical report will be available in 2015.

King County is now is the process of setting back the 1920s levees on the left bank of the White River in Pacific with Pierce County to create additional flood storage capacity (Figure XI-10). Existing levees will be removed and relocated further east of their present location. The purpose of the relocation is to allow the river channel to migrate more naturally, create flood storage capacity, and help alleviate potential flooding of structures on the right bank of the White River. In the near future, the counties will also relocate the levees on the right bank of the White River to increase flood storage capacity.

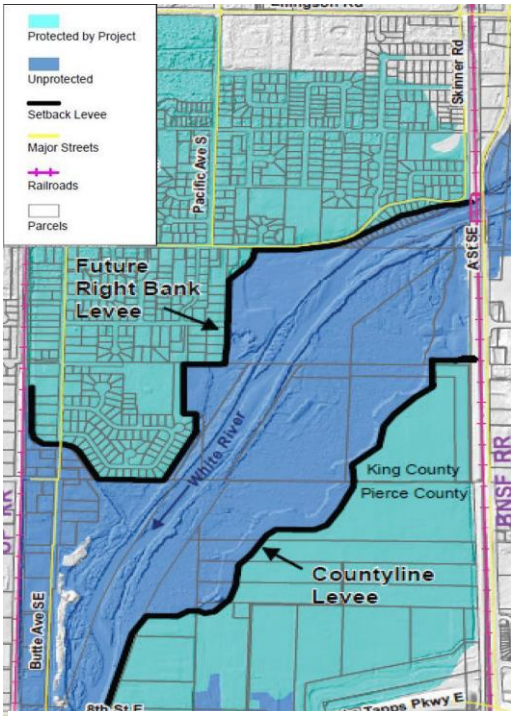



Figure XI-10. Hydraulic Model showing flood reduction benefits from the Countyline Levee Setback and future Right Bank flood protection projects. (Alignment of the Right Bank protection is not final.)

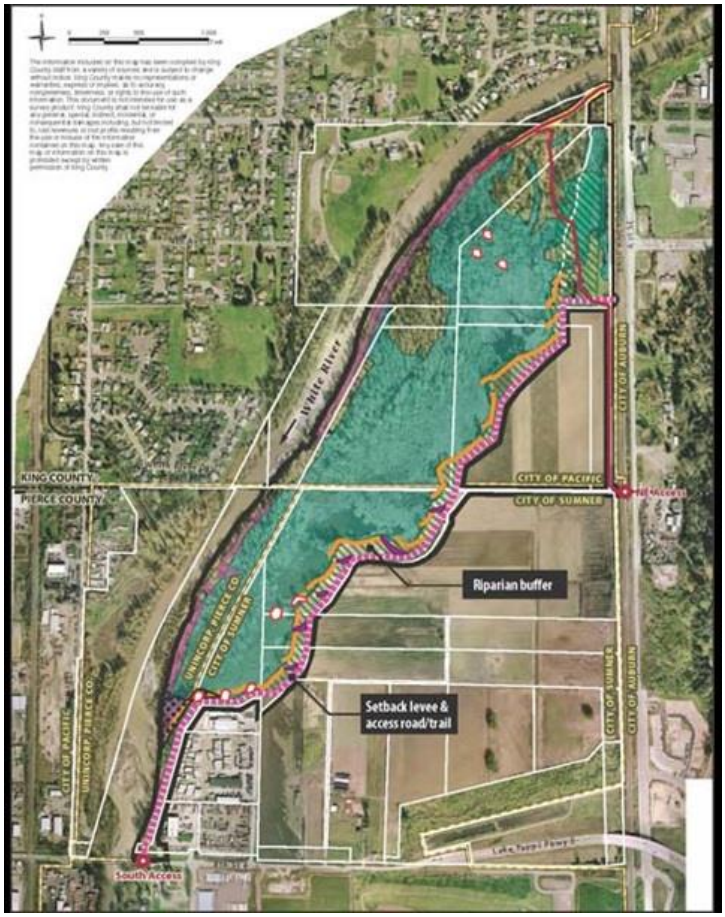



Figure XI-11. Countyline Project

Pierce County priorities include

1. The continuance of the floodplain property acquisition program to reduce potential flood damage.
2. Identification of further opportunities to combine flood protection with habitat and stream rehabilitation through the levee setback program.

The Countyline Project will include 6,000 LF setback levee, 5,000 LF biorevetment, four bank deflector engineered log jams (ELJ), and four apex ELJ's as shown in Figure XI-11. Re-vegetation will also occur along the banks. Although these projects are southwest of Muckleshoot lands, the long term effects should be positive for fish and wildlife east of these levees.

While the focus is on endangered species in land use planning, all species of fish and wildlife are addressed under management for biodiversity. Fish and wildlife need clean water, fresh food and clean

safe habitat area to raise their young. For fish, this means that there is an adequate supply of clean cool water. This can be provided through the retention of shading vegetation on the banks of streams and rivers, especially important during times of drought. Clean water can be retained through stormwater control structures that remove sediment and pollutants. Streamside vegetation can also provide safe habitat through the provision of hiding places for adult and juvenile fish.

These efforts are rewarded by providing the area greater resilience in the face of catastrophic events such as fire, flood, earthquake, and disease.

**Suggested Voluntary Action Strategies**

1. Designate open space set-aside areas in contiguous tracts or within contiguous conservation easements in such a manner as to promote connectivity and proximity to the conservation targets (i.e., tributaries, wetlands, and oxbows of the LWR, and conifer/deciduous mixed forest areas).
2. Encourage schools to adopt sections of the lands and monitor native wildlife.
3. Promote Low Impact Development strategies and lower density housing on the river side of the highway.
4. Promote backyard habitats (as those promoted by the National Wildlife Federation "Backyard Wildlife Habitat" program) among residents.
5. Encourage landscaping with native plants.
6. Dispense educational materials concerning fish and wildlife habitat stewardship actions, including, when appropriate, materials on the effects of poaching and how to report any suspected poaching to the Washington Department of Fish and Wildlife Poaching Hotline at **1-877-933-9847 or online at** http://wdfw.wa.gov/enforcement/reporting_violations.html
7. Educate landowners near to the river about the damage domestic animal waste can cause.
8. Plant natives along slopes to reduce run-off.
9. Create a plan to monitor and remove noxious weeds. Partner with King and Pierce County Extension to expand to invasive insect identification and elimination
10. Consider creating demonstration projects, cooperating with schools and local volunteers.
    a. Use the site to promote shoreline-dependent species through nest box placement (e.g., wood ducks) and monitor to see if this strategy is effective.
    b. Use the site for bat boxes and monitor to see if bats use them.
    c. Create a "chimney" and see if Vaux's Swifts use it.
    d. Locate new areas for native vegetation and food gardens.
    e. Establish demonstration raingardens above areas prone to erosion.

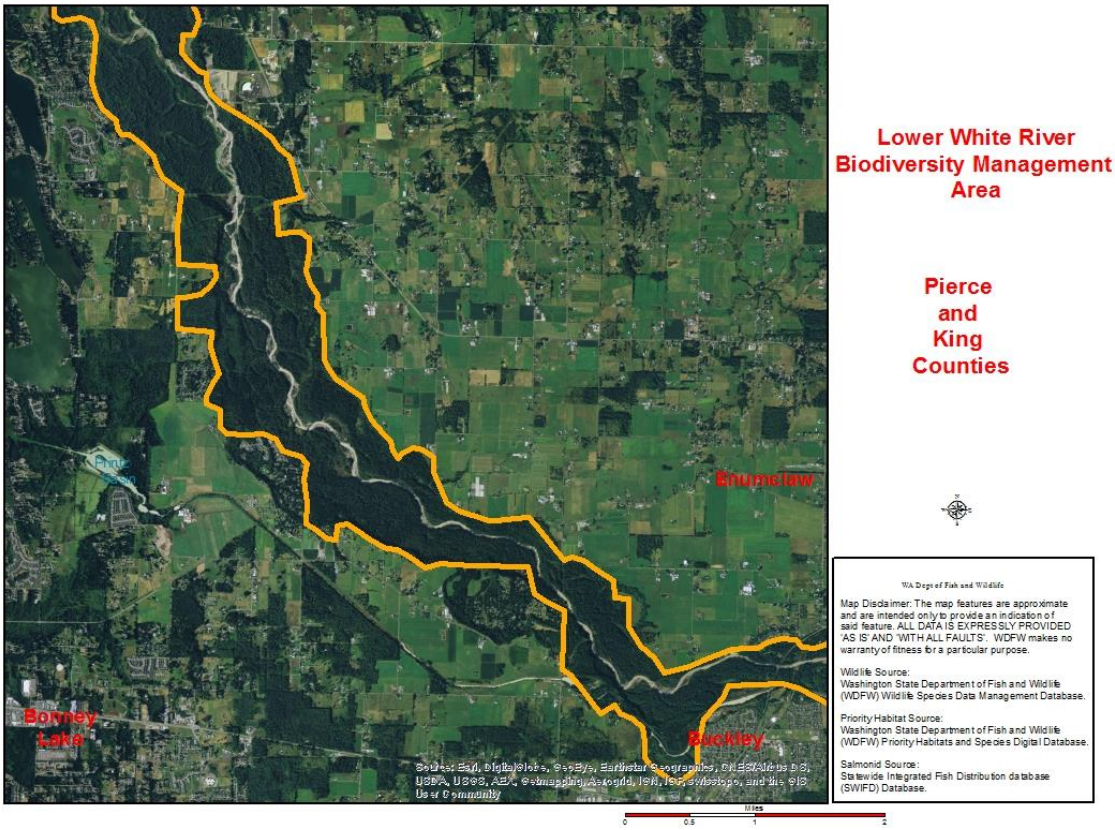



Figure XII-1. LWR BMA aerial view

**General Description**

The Pierce County Biodiversity Network was developed using watershed boundaries rather than political county lines. The White River demarcates King County's southern geo-political boundary (Figure XII-1a). The focus of this report is the Lower White River BMA that extends into King County. However, the Greenwater BMA also stretches into King County (Figure XII-2). Multiple jurisdictions are present in the BMA: Pierce and King counties, the cities of Auburn, Pacific, Buckley, and the Muckleshoot Indian Tribe. King County owns some lands within those other jurisdictions. Additionally, the portion of the BMA that stretches from the Muckleshoot Indian Tribe Reservation east to the terminus of the Lower White River BMA is unincorporated King County. The actual area covered by the BMA that lies within the jurisdiction of unincorporated King County is very limited.

The Lower White River BMA is narrow and, in fact, does not fully occupy the extent of the historic floodplain in which it lies because of development from Auburn through Sumner. The original BMA and analysis was drawn at a county-level scale and has since been updated to include the riparian forest and much of the extant floodplain.

Figure XII-2 shows a section of the Pierce County Biodiversity Network with the dark green BMAs and light green corridors. The Network use watershed boundaries with King/Pierce County boundary outlined in black. King County maintains levees and revetments along the lower White River within the cities of Pacific, Auburn and Buckley (Figures XII-3 and XII-4). The river through these reaches is channelized and disconnected from its historic floodplain.

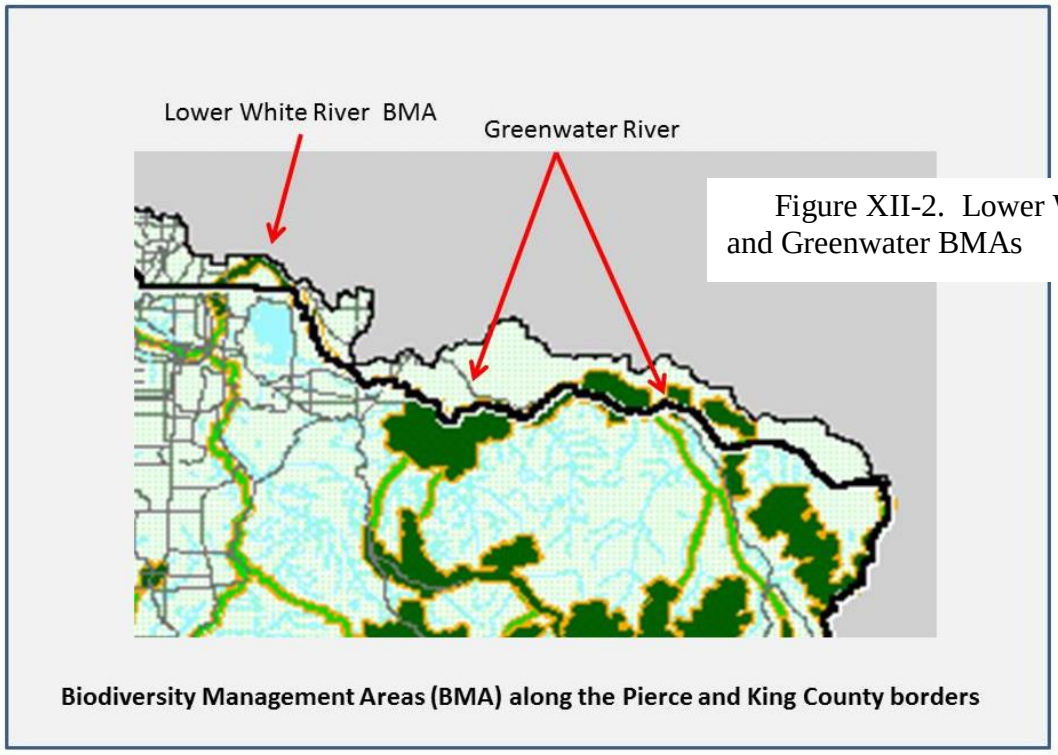



Figure XII-2. Lower White and Greenwater BMAs

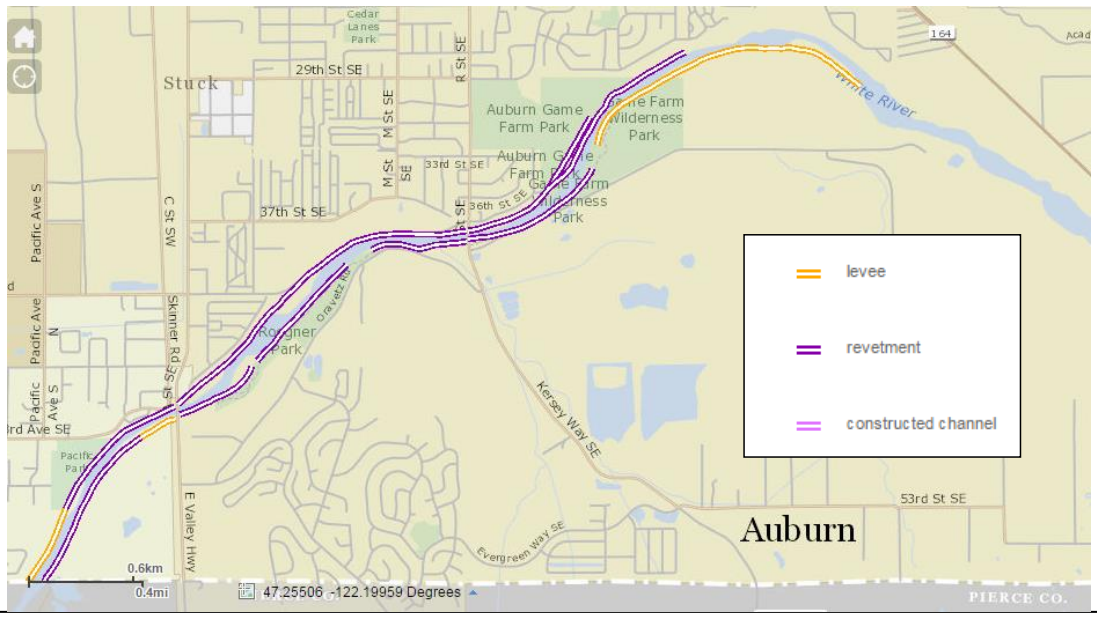



Figure XII-3. Levees and Revetments along the Lower White River

Figure XII-4. Levees near Buckley

**Current Zoning, Ownership, and Shoreline Environments**

Lands in the BMA, as it is currently drawn, in unincorporated King County (and outside the Muckleshoot Indian Tribe Reservation) are within either the Agriculture Production District (APD) (Figure XII-6), whose southern boundaries are along the Lower White River, or are in RA-10 zoning (Table 10, page 180). The zoning in the APD is A-35 (Agricultural, one dwelling unit per 35 acres). The Comprehensive Plan designates Agricultural Production Districts where the principal land use should be agriculture. Lands within Agricultural Production Districts should remain in parcels large enough for commercial agriculture.

King County has designated about 41,000 acres as APD. About 27,000 acres of the APDs are farmable, the rest being forested, farm buildings or pavement, water bodies or other non-farmable areas. About 25,000 acres of the APDs are in production.

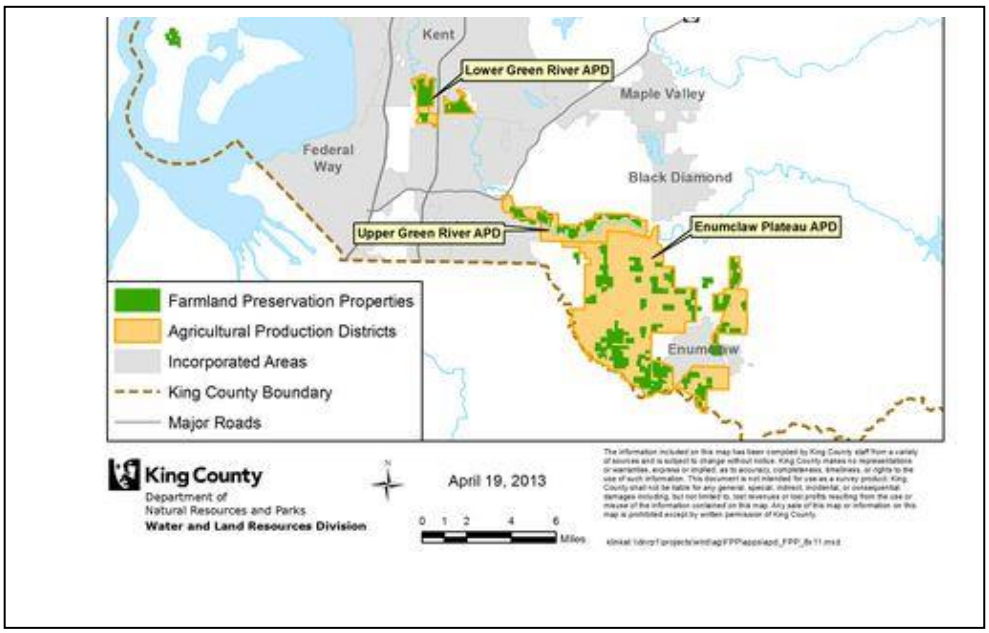



Figure XII-5. Protected Farmlands in southern King County

The Farmland Preservation Program (King County) helps preserve agriculture by purchasing the development rights from farmland. This helps reduce the cost of farmland by discouraging other non-farm uses. The development rights on about 14,200 acres have been purchase through the Farmland Preservation Program and the Transfer of Development Rights Program. As noted later in this chapter, these lands in and near the LWR BMA can play an important role in preserving biodiversity.

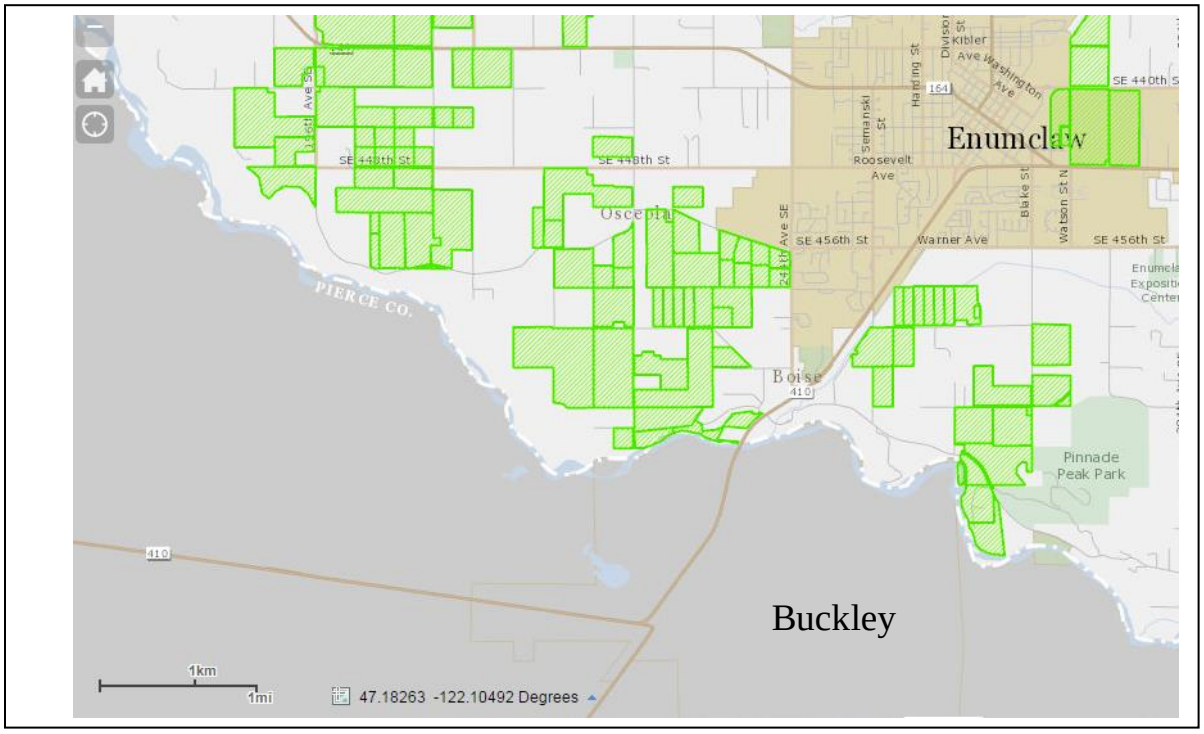



Figure XII-6. Farmland Preservation Properties in King County (in green)

The zoning in RA-10 has a 10-acre minimum parcel size, except for smaller parcels that were already established when zoning was established.

**Table 10. Zoning Classifications within the Lower White River BMA in Geographic King County.**

| Zoning Classification | Acres in BMA |
|---|---|
| A-35 (Agricultural Production District) | 109.57 |
| RA-10 (Rural, 10-acre minimum parcel size) | 83.17 |
| MIT (Muckleshoot Reservation; their zoning applies) | 175.02 |
| Grand Total | 367.76 |

The properties along the White River in unincorporated King County in and adjacent to the BMA are nearly all owned by Puget Sound Energy and all in riparian/floodplain forest (Table 5).

**Table 5. Land ownership of acreage within BMA within King County's jurisdiction.**

| Land Owner | Acres within BMA |
|---|---|
| King County | 5.4 |
| State of Washington-DNR | 2.1 |
| Puget Sound Energy | 60.1 |
| Other Private Ownership | 15.3 |
| Total | 82.9 |

**Critical Areas**

Riparian buffers, protected as critical area, along the King County-maintained levees and revetments are limited in quality, width, and connectivity along the river corridor within the BMA. Removing and setting back levees, restoring riparian buffer, and connecting the river to its historical floodplain habitat were all recommended in King County's adopted 2006 Flood Hazard Management Plan and its 2013 Update and Progress Report, where some of these recommendations have been implemented as outlined in "Projects and Proposals."

Future land development potential in unincorporated King County is somewhat limited by regulatory protections offered to critical areas present within the BMA. The LWR BMA in unincorporated King County is within a Critical Aquifer Recharge Area (CARA) and a seismic hazard area, and much of it is within an erosion hazard area, as it follows the Lower White River. Portions of the BMA that are along the valley wall are within the landslide hazard area. The BMA also lies within the 100-year floodplain of the White River.

Shoreline Environments

Under the Washington State Shoreline Management Act, the Lower White River is considered a "Shorelines of the State." All lands within 200 feet of the ordinary high water mark, and associated wetlands and floodplains, fall within the jurisdiction of Shorelines of the State, whose preferred uses according to the Act are (in order of priority) to:

> "recognize and protect the statewide interest over local interest; preserve the natural character of the shoreline; result in long-term over short-term benefit; protect the resources and ecology of the shoreline; increase public access to publicly owned shoreline areas; and increase recreational opportunities for the public in the shoreline area."

All shorelines, including those designated as Shorelines of the State, are classified into "environment designations" based on their physical, biological, and development characteristics. Historically, Plans have used primarily four basic environment designations:

- Natural
- Conservancy
- Rural
- Urban

New state guidelines recommend six designations:

- Natural
- Rural Conservancy
- Urban Conservancy
- High Intensity
- Shoreline Residential
- Aquatic

Local governments may modify state recommendations to better accommodate shoreline areas with unique characteristics. These environments are similar to zoning designations allowing different land uses, densities and activities ranging from the most intensive uses (High Intensity) to very limited uses (Natural).

The shoreline in the LWR BMA was designated as either Natural or Rural shoreline in the 2004 Shoreline Management Master Program when the Biodiversity Network was created. In the 2008

Shoreline Master Program, King County shorelines along the White River were designated Resource Shoreline because they were within the Agricultural Production District. A small area outside the APD were designated Conservancy Shoreline. King County completed its Shoreline Master Program (SMP) update January 28, 2013, and established eight shoreline environment designations:

- High Intensity – areas that provide high-intensity water-oriented commercial, transportation, and industrial uses.
- Residential – accommodate residential uses at urban densities, while allowing for non-residential uses that are consistent with the protection of the shoreline jurisdiction.
- Rural – accommodate rural residential shoreline development, while allowing for rural non-residential uses that are consistent with the protection of the shoreline.
- Conservancy – protect and conserve the shoreline for ecological, public safety, and recreation purposes. Residential areas can also be designated as conservancy shorelines.
- Resource – allow mining and agriculture land uses, except for shorelines that are relatively intact or that have minimally degraded shoreline processes and functions.
- Forestry – applied in areas to allow for forest production and protect municipal water supplies.
- Natural – shorelines that are relatively intact or have minimally degraded shoreline processes and functions that are intolerant of human use.
- Aquatic – areas waterward of the ordinary high water mark.

Eight program elements that had to be addressed included:

- Economic Development
- Public Access
- Recreational
- Circulation
- Land Use
- Conservation
- Historic-Cultural-Scientific-Educational
- Flood Hazards

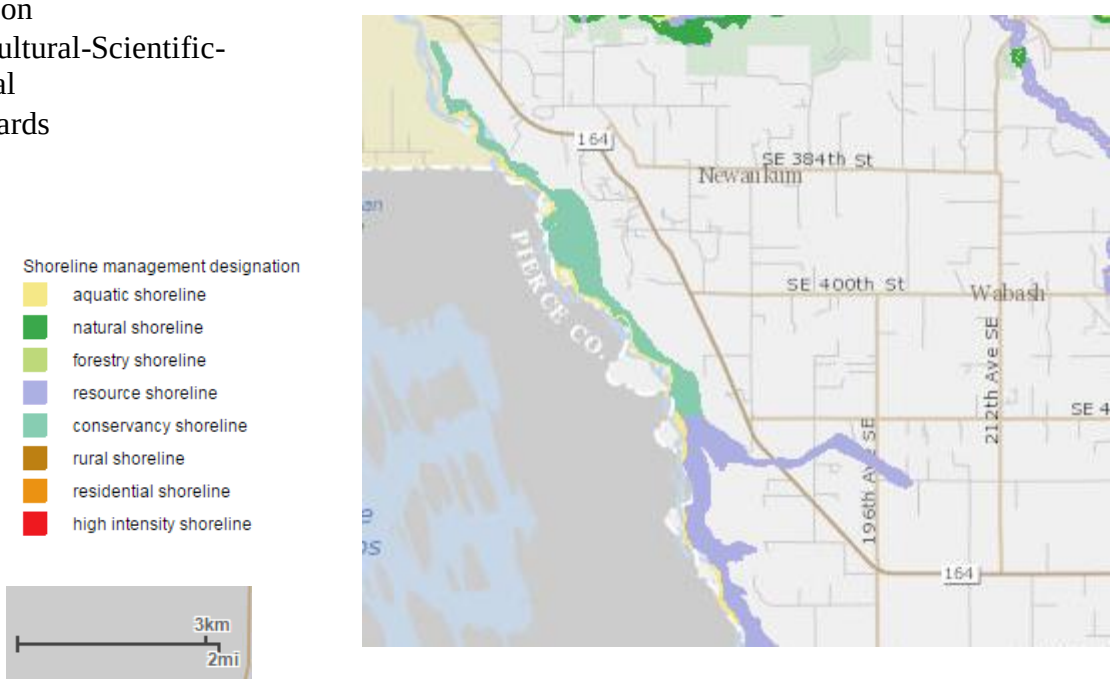



Figure XII-7. King County 2013 SMP Designations

Shorelines along the Lower White River on the King County side within the BMA are now classified as Aquatic, Resource, Conservancy, and Rural (see Figure XII-7).

**Fish and Wildlife Resources**

The White River supports three salmonid species that are listed as threatened under the Endangered Species Act: Puget Sound Chinook, Puget Sound steelhead, and Coastal-Puget Sound bull trout. The White River is particularly important to Chinook recovery because it is the only population of spring Chinook in south Puget Sound. The White River also supports pink, chum, coho, and sockeye[36] salmon, as well as cutthroat trout. The mouth of Boise Creek falls within the BMA. Boise Creek supports Chinook, coho, and pink salmon, steelhead, bull trout, and cutthroat trout.

The King County Wildlife Habitat Network, mapped in the County's Comprehensive Plan[37], runs through the BMA (Figure XII-8). The Wildlife Habitat Network is protected in the King County Critical Areas Ordinance (CAO) as a Wildlife Habitat Conservation Area (WHCA). Other WHCA's include the nest and designated buffer areas around the nest of certain species, including Bald Eagle, Osprey, and Great Blue Heron. Although the White River Hatchery Bald Eagle nest has not been surveyed since 2002, there have been unconfirmed reports of a new nest location in that area. It is likely Osprey and Red-tailed Hawks were nesting in the area. Red-tailed Hawks have been removed from the Comprehensive Plan and CAO but their nests are still protected by the Migratory Bird Treaty Act. Great Blue Herons would be expected to forage anywhere along the river where there is calm, shallow water and fish. There are few to no roads leading to this area and no development thus far, resulting in a lack of species sightings. As such, there have been no surveys to verify whether King County species of local importance are present. (Enumclaw-Buckley Rd. SE/State Route 410 crosses the river towards the eastern end of the BMA; otherwise no other public roads are within the BMA in this area).

[1]Gustafson, R.G., T.C. Wainwright, G.A. Winans, F.W. Waknitz, L.T. Parker, and R.S. Waples. 1997. Status review of sockeye salmon from Washington and Oregon. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-33, 282 pp.
http://www.nwfsc.noaa.gov/publications/techmemos/tm33/tm33.html#toc

[37] King County Comprehensive Plan
http://www.kingcounty.gov/~/media/property/permits/documents/GrowthManagement/CompPlan2012/Final_Wildlife_Hab.ashx?la=en

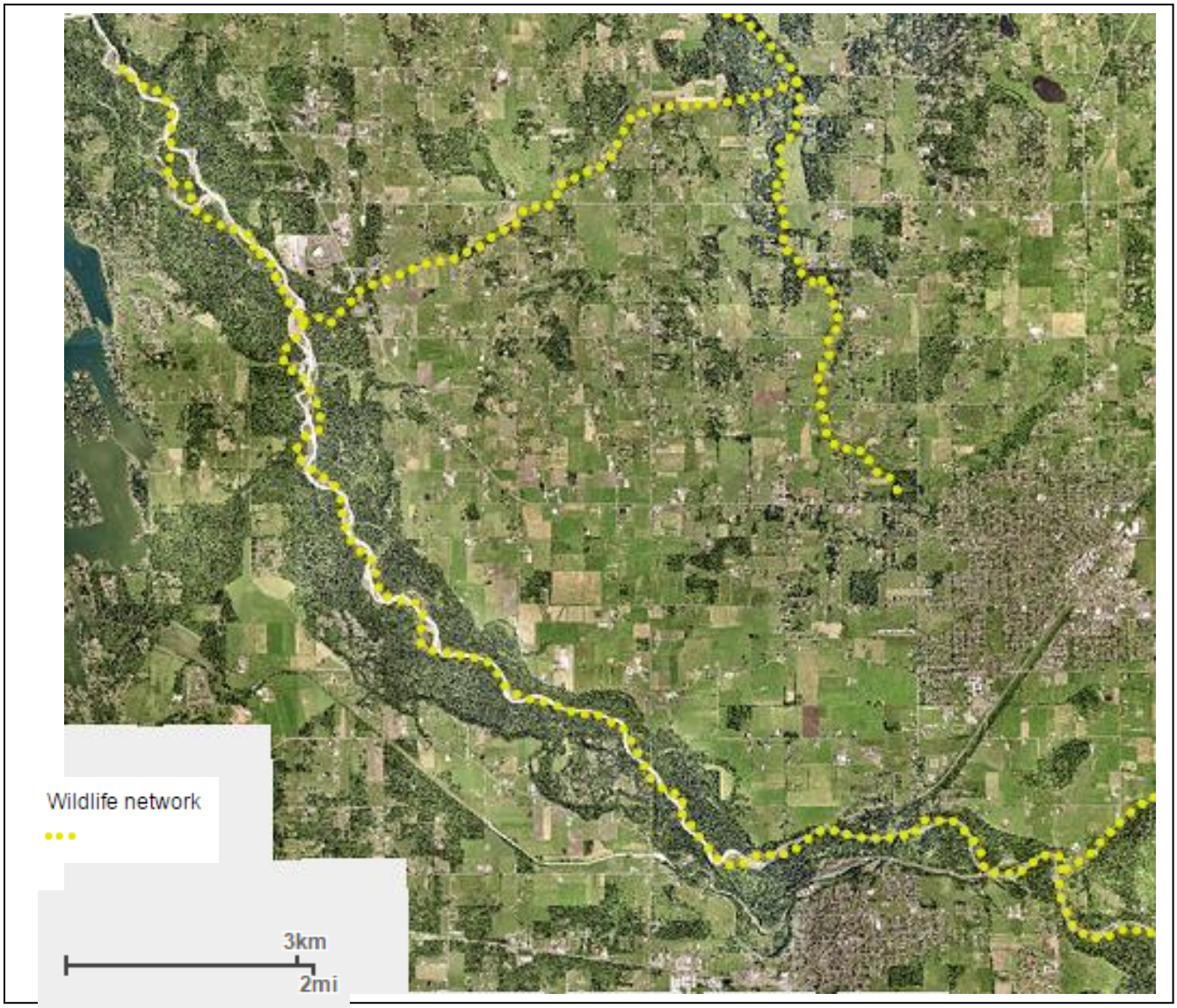



Figure XII-8. King County Wildlife Network

Washington Department of Fish and Wildlife's (WDFW) Priority Habitats and Species (PHS) maps show locations of PHS species (example Figure XII-9). PHS is the principal means by which WDFW provides important fish, wildlife, and habitat information to local governments, state and federal agencies, private landowners and consultants, and to tribal biologists for land use planning purposes. PHS is WDFW's primary means of transferring fish and wildlife information from their resource experts to those who can protect habitat. The example shown in Figure XII-9 highlights priority habitats (light purple areas) and large dots for location. The large purple dot's legend is displayed. The Bald Eagle observation was in March, 2015.

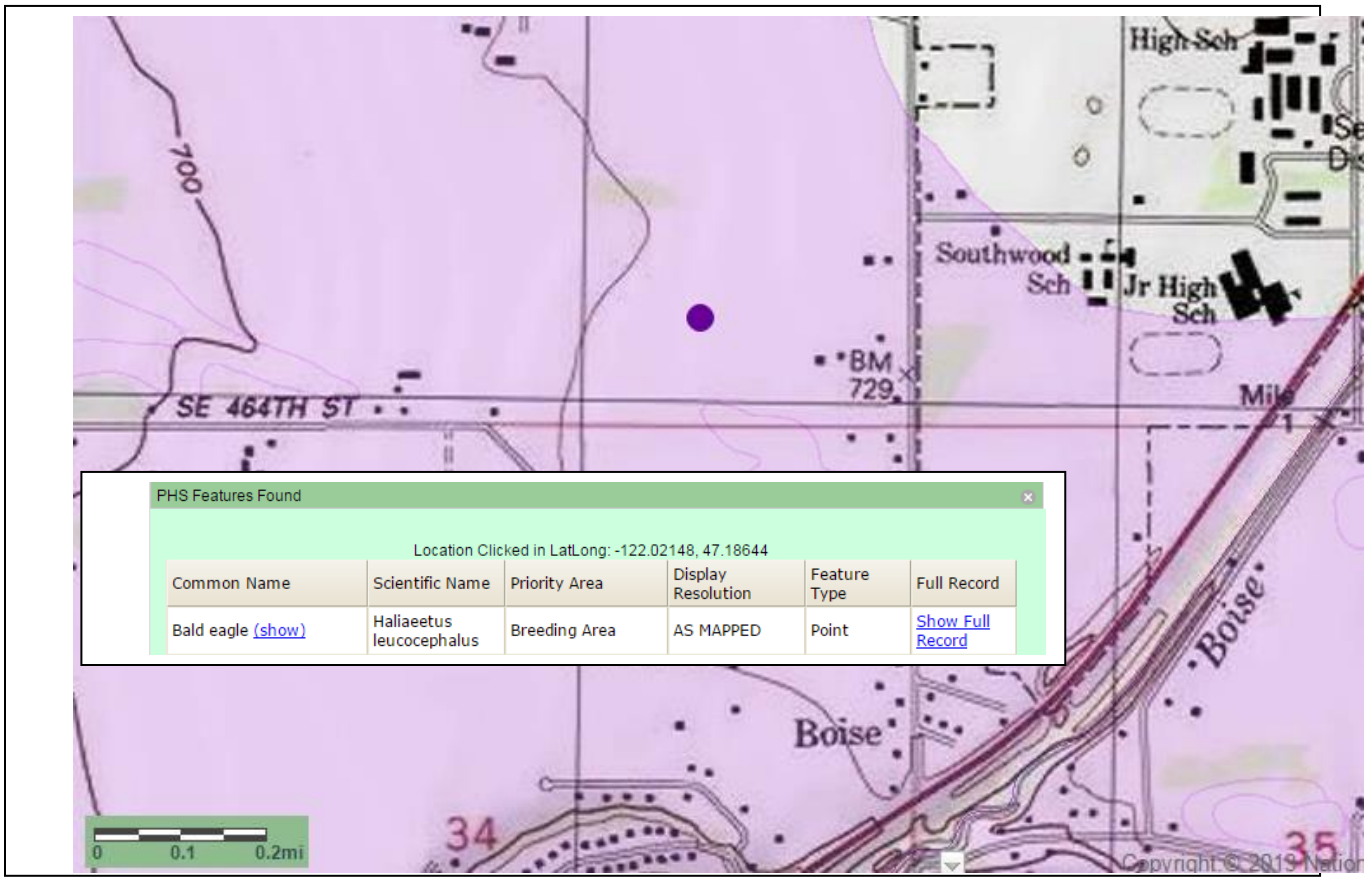


Figure XII-9. Washington Department of Fish and Wildlife PHS polygons and points.

A bioblitz (discussed in Chapter 1) was conducted on June 2-3, 2006, in three large areas (Buckley and vicinity, Auburn, and Pacific) within and surrounding the LWR BMA extending into the riparian forests to confirm the species predicted to inhabit the LWR BMA. A total of 54 bird, 11 mammal, 2 reptile, 6 amphibian, and 4 fish species, and 42 terrestrial and 14 aquatic invertebrates were confirmed in the Buckley city limits or in close proximity during the bioblitz. Fourteen species were "species of interest" as being either a WDFW PHS species of concern or a state or federal listed species. Two of those species (Pileated Woodpecker and Silver-haired bat) are considered GAP at-risk species[38]. The other 12 species were: Bald Eagle, Great Blue Heron, Vaux's Swift, Olive-sided Flycatcher, Turkey Vulture, Willow Flycatcher, Band-tailed Pigeon, Spotted Sandpiper, Red-legged frog, Big brown bat, California myotis, and Little brown myotis.

Because it is impossible to survey all properties in a 24-hr period, it was assumed that species confirmed within certain habitat communities were highly probable to occur in similar habitats in the remainder of the BMA. Chapter VII – City of Buckley provides a complete list of species found during the bioblitz.

The 24-hour bioblitz in 2006 was challenging because of inclement weather during most of it. Therefore a 12-hour biobilitz was conducted in 2007 at the western end of the LWR BMA at Auburn's Game Farm Park and south to Stewart Road in Sumner. Another bioblitz is recommended in the Buckley area on both sides of the river during the winter to provide additional information as to what species are using the BMA throughout all seasons.

[38] Pierce County GAP Application Pilot Project: A Biodiversity Plan for Pierce County, Washington, January 2000.

It is unknown what changes in the habitat and landscape will occur in the short term and long term in the face of climate change. It is possible that some species ranges will expand while others will contract or shift out of the area entirely, and it is unknown what species that were previously not present might move into the area. Range shifts may occur both horizontally (north-south or east-west) and vertically (up and down slope). Additionally, it is unknown what the impacts of species shifts will have on other species that are currently resident.

**Conservation Targets**

In the Lower White River BMA, several conservation targets were selected (see Introduction, page 1, of this *Plan* and Pierce County Biodiversity Network Assessment) to represent the key habitat types occurring throughout the area. These conservation targets include:

- Lower White River
- Tributaries, wetlands, and oxbows
- Conifer/deciduous mixed forest areas

Combined, conservation targets create the rich variety of habitats necessary to foster a high level of biodiversity in the BMA. A detailed description of each conservation target can be found in Chapter III.

**Threats to Conservation Targets**

The greatest immediate threats in King County are 1) urbanization and residential development and 2) invasive plant and animal species. Global climate change is also recognized as a major threat to biodiversity, and its effects have already been observed in the county. Although its full impacts are only beginning to be understood, they are expected to increase over time. The loss of genetic and species diversity contributes to the destruction of natural habitats, and the decrease in species' populations lowers resilience after major disturbances and alterations to the landscape.

Threats that are or may potentially be occurring to conservation targets include:

- Water fluctuations due to stormwater runoff where the extreme water flow will not allow infiltration into the groundwater table via wetlands and flow into the river;
- Habitat conversion, fragmentation, and the removal of native vegetation due to new development and new roads;
- Loss of complex aquatic habitat (pools and large woody debris), floodplain function, off-channel fish rearing and refuge habitat, and riparian buffers as a result of development along the river;
- Poor water quality caused by residential use of fertilizers, domestic animal feces, septic tank leakage, spraying of herbicides along public roads, and road runoff;
- Introduction/range expansion of invasive, exotic, non-native species including plant species, wildlife species (e.g. Japanese knotweed, bullfrogs);
- Wildlife movement barriers created by dams, roads, driveways, and fencing;
- Accelerated erosion and damage of riparian habitat from channel constricting levees and armored bank revetments;
- Predation of native species by increasing human populations and their associated pets;
- Pollution caused by dumping of trash and debris into or near the river; and
- Stormwater and illegal discharge dumped directly into the river.

**Overview of Conservation Strategies**

King County has two general goals for biodiversity: 1) Protection of existing elements of native biodiversity, and 2) Restoration and recovery of elements that have been unduly harmed by human interference. Accomplishing these goals depends on multiple approaches. The 2008 King County Biodiversity Report outlines these strategies in greater detail. Conservation strategies for the LWR BMA listed in Chapter III are compatible with that report. They include actions to ascertain the level or severity of a potential threat, directly abate known threats, or identify restoration opportunities where degradation has occurred. Some threats apply to multiple conservation targets and as such the conservation strategies were grouped under the following categories, which have been stated as a positive outcome:

- Reduce the threat of habitat conversion and fragmentation (resulting from development and human activity) by purchasing lands within the riparian corridor for protection or restoration.
- Enhance water quality by protecting and planting vegetated buffers, as well as addressing non-point source pollution (road runoff, agricultural practices, etc.).
- Foster natural floodplain processes by preserving and creating conveyance areas (levee removal and/or setback) to accommodate flood waters.
- Reduce or eliminate invasive and introduced species, where applicable and feasible.
- Remove or improve fish and wildlife movement blockages. (*For example*, Boise Creek at RM 4.4, PSE Diversion Dam, where few, if any, adult fish reach Red Creek—between the Diversion Dam and Mud Mountain Dam—but where there is likely good juvenile rearing habitat in this reach and Red Creek.)
- Control erosion and siltation.
- Reduce predation by domestic animals.

**Projects and Proposals -** Recommendations to remove and set back levees, restore riparian buffer, and connect the river to its historical floodplain habitat are part of King County's adopted 2006 Flood Hazard Management Plan and its 2013 Update and Progress Report. Projects such as these would enhance the potential for biodiversity conservation in the BMA. Current projects and project proposals include:

Lower Boise Creek Channel Restoration Project

This project was funded by the Salmon Recovery Funding Board and implemented by King County.

- Boise Creek (RM 1-3) Restoration. This project was added to WRIA 10/12's 3-Year Implementation List (approved by NOAA) in 2009. The project was a multi-year effort to purchase conservation easements to improve riparian habitat and restore natural stream function to this stretch of Boise Creek, which is currently lacking fluvial meander, instream wood, and riparian buffer.
- Site cleanup was completed by July 2010 and construction of the final floodplain and channel was completed in August 2010. Site planting was performed in February 2011.
    - Created two acres of spawning habitat for chinook, coho and pink salmon, and steelhead;
    - Doubled channel length from 500 to 1,100 feet;
    - Created approximately two acres of alluvial fan floodplain habitats;
- The Lower Boise Creek Channel Restoration Project achieved Platinum level LEED rating based on King County's Sustainable Infrastructure Scorecard. (LEED = Leadership in Energy & Environmental Design. It is a green building certification program that recognizes best-in-class building strategies and practices.)

Figure XII-10 shows the land use in the area surrounding Boise Creek before it meets the White River. The King County Water and Land Resources Division has proposed to enhance the channel of Boise Creek upstream of 268th St. and to enhance degraded wetland habitat nearby. This project is called Middle Boise – Evans Restoration Project.

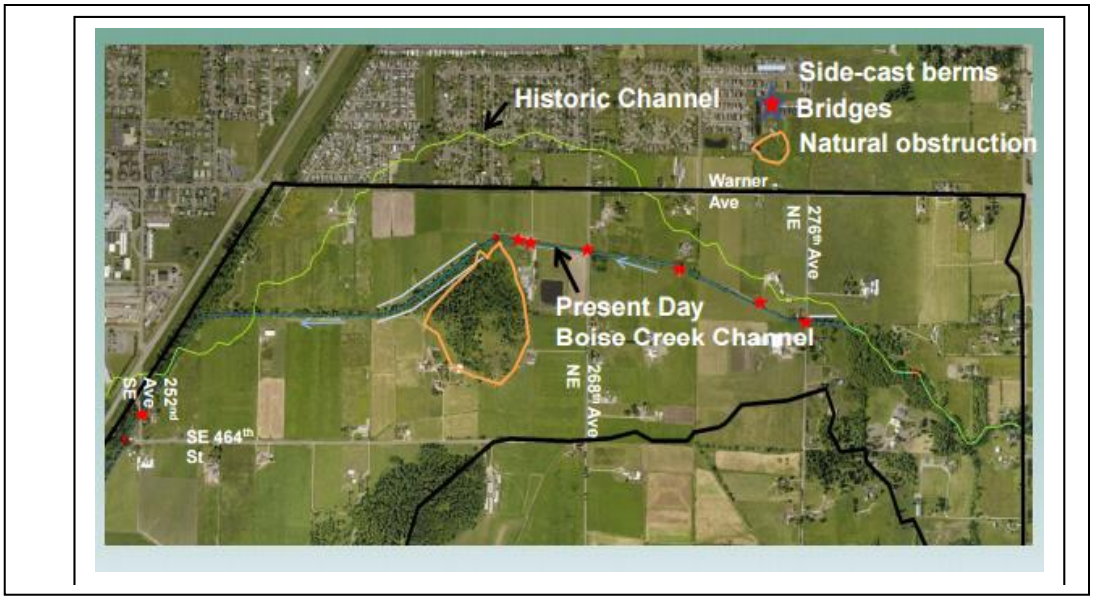



Figure XII-10. Boise Creek Project Location

The channel will be widened by re-contouring the south bank, placing large woody debris (LWD) in the channel and wetlands and planting willows and other native riparian plants across the project site to provide shade, improve water quality and improve habitat within the wetland.

<u>Countyline Levee Setback Project</u>

The goal of the Countyline Levee Setback project is to reduce flood risks along the Lower White River by removing the existing levee and reconnecting the river with 121 acres of off-channel aquatic habitat that has been isolated from the river for nearly a century. The Countyline Levee Setback project will provide significant flood risk reduction benefits for more than 200 residential properties. The proposed project is a combination of property acquisition, levee removal, setback levee construction, and flood- plain restoration within the Countyline reach of the Lower White River in the cities of Pacific and Sumner.

The Countyline reach of the Lower White River is bounded by the A Street and Burlington Northern-Santa Fe (BNSF) Railway bridges at the upstream end (River Mile 6.33) and the 8th Street Bridge at the downstream end (RM 5.00). The Countyline reach spans the King-Pierce County boundary.

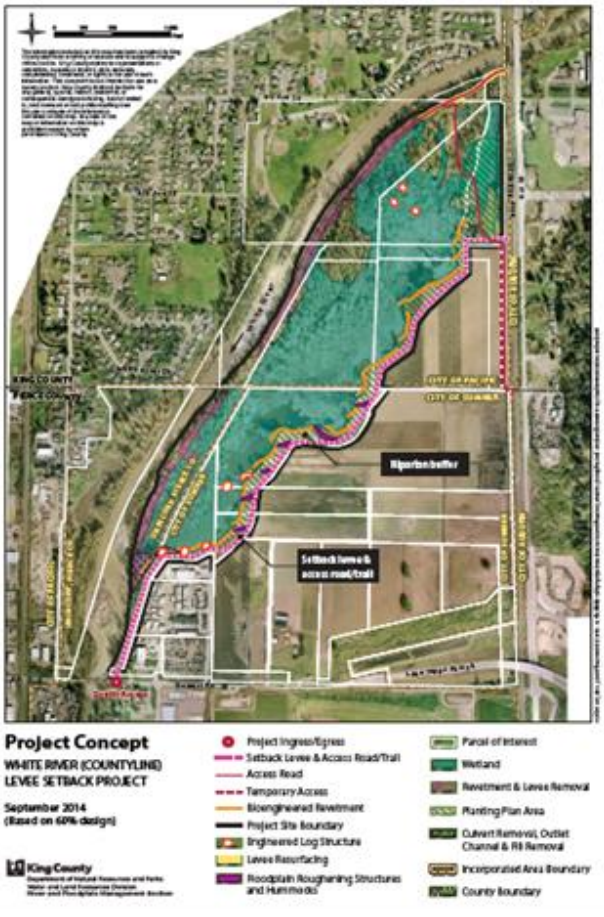



Figure XII-11. Countyline Levee Setback Project Concept

These projects will be completed in collaboration

with the Muckleshoot Indian Tribe, Puyallup Tribe of Indians and the local jurisdictions including Pierce County, and the cities of Pacific, Auburn, and Sumner.

Pacific Right Bank Levee Setback

Significant flooding along the right bank of the White River during January 2009 directly impacted the neighborhood communities of White River Estates and 4th Ave. SE apartments.

The goal of this project is to implement a flood protection along the right bank from the Burlington Northern-Santa Fe railway embankment and continuing southerly by the Pacific City Park and the adjacent residential areas in the White River Estates neighborhood. This project will provide significant flood protection for these neighborhoods, maintaining flood storage capacity and offer opportunities for additional side channel habitats in the reach.

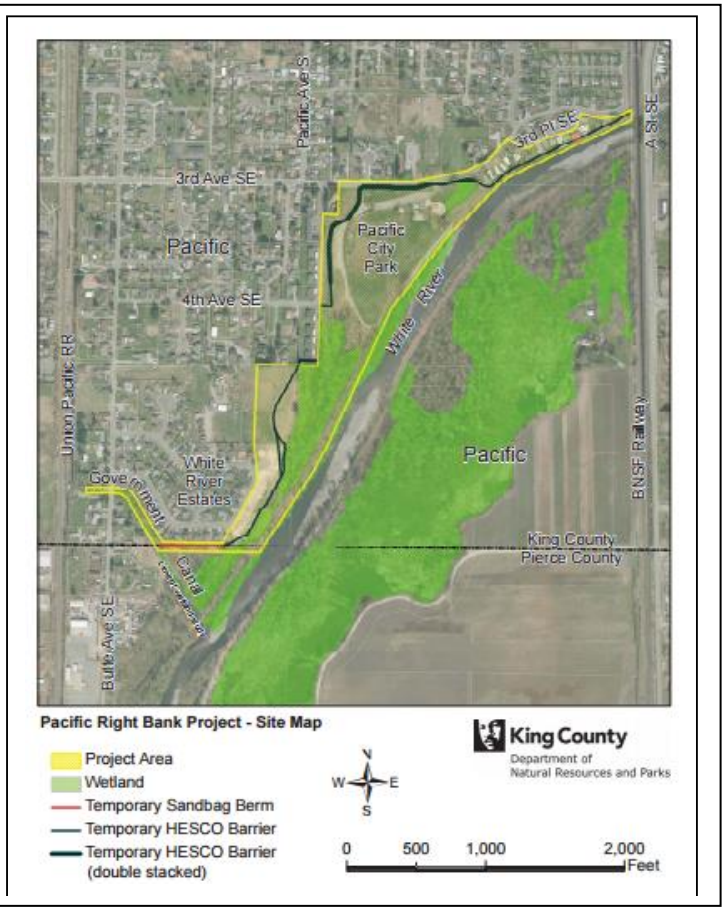



Figure XII-12.Pacific Right Bank Setback Levee Project Area

TransCanada Levee

The removal of the TransCanada Levee on the left bank of the White River in Auburn (RM 8.8) on the Muckleshoot Indian Reservation was recommended. The feasibility study was funded by the Salmon Recovery Funding Board and the project is at a conceptual design level (Figure XII-11).

This project is a high priority for salmon recovery as it would enhance White River Chinook habitat. The project's goals complement the WRIA 10/12 Salmon Habitat Protection and Restoration Strategy by seeking to restore riverine process through the removal of levee rock armor and the installation of engineered log jams. The project will reinforce the remaining downstream portion of the existing levee to ease flow transition and avoid impacts to private property and power lines downstream.

**Role of County Government in Biodiversity Conservation**

Biodiversity goals fall into two general areas: protection of existing elements and restoration and recovery of elements that have been damaged by human intervention. A community driven biodiversity stewardship plan which incorporates regulatory tools is incomplete without the following to provide the best environment for success:

- voluntary incentives
- public education and outreach
- multi-jurisdictional coordination

Provide Voluntary Incentives

The Public Benefit Rating System (PBRS) offers an incentive to preserve open space on private property in King County by providing a tax reduction. A participating property is assessed at a "current use" value, which is lower than the "highest and best use" assessment value that would otherwise apply to the property (see King County Code, Chapter 20.36). PBRS is based on a point system. Points are assigned to each qualifying resource category as described in King County's Public Benefit Rating System Resource Information document (www.kingcounty.gov/incentives). The total points awarded for a property's PBRS resources translate into a 50% to 90% reduction in land assessed value for the portion of the property participating.

Additional mechanisms the County uses for biodiversity protection involve ownership of lands or purchase of development rights. The County has a TDR/PDR (Transfer of Development Rights/Purchase Development Rights) program. The TDR program is a voluntary, incentive-based, and market-driven approach to preserve land and steer development growth away from rural and resource lands into King County's Urban Area. The Program is based on free-market principles and prices that would motivate landowner and developer participation. Rural landowners realize economic return through the sale of development rights to private developers who are able to build more compactly in designated unincorporated urban areas and partner cities. To date the Program has protected 141,500 acres of rural/resource land.

Offer Public Education and Outreach

Educational programs can help encourage landowners to incorporate biodiversity-friendly practices into their everyday lives. Efforts could include disseminating general information on the benefits of biodiversity, enrolling in formal coordinated programs such as Community Wildlife Habitats certified by the National Wildlife Federation, and sponsoring habitat restoration projects.

Some specific programs are discussed in more detail in the King County Biodiversity Report, Chapter 4, Public Participation:

**"4.2. Biodiversity awareness-raising/education projects"**

1. Rural Stewardship Planning Program
2. Salmon Watchers Program
3. Basin Stewardship Program
4. Naturescaping/Native Plant Salvage Program
5. Volunteer Program

The King County Comprehensive Plan and the King County Biodiversity Report both use this definition of biodiversity: "Biological diversity, or biodiversity, is the variety of living organisms, from genetic diversity through species, to higher taxonomic levels, which is the classification of plants and animals according to their presumed natural relationships, and includes the variety of habitats, ecosystems, and landscapes in which the species are found."

There are existing programs within King County (Programs for Educators) where components of biodiversity could be emphasized to familiarize the public with the term and its importance. Stormwater

education with funding via NPDS permit requirements could be an opportunity to overlap with biodiversity education. Climate change and biodiversity are deeply intertwined and steps should be taken now to educate landowners what climate change and biodiversity loss or change means to them.

King County Regional Trail System

Building new trails into the BMA can be problematic for biodiversity conservation, however existing trails can provide an opportunity for public education in biodiversity issues. Walkers can be encouraged to observe, learn, and report wildlife or invasive species. Two activities that have had success are Photo Points and Listening Posts.

- Photo Points are set locations that could be along the trails where the public can take a picture by putting their camera on a post with directions to aim the exact same way each time a photo is taken. They then upload their pictures to a server where everyone can see changes over time or season. This is a great monitoring technique for restoration projects.
- Listening Posts are locations with a sign showing the topic and a bar code. The public, for example, stops at Listening Post sign near a historic site or wetland, and using an app, click on the bar code and hear a little bit of history about that historic site or wetland. This can also be a way to ask the public to look for a certain animal and report it.

The King County Regional Trail System (RTS) has over 175 miles of trails for bicycling, hiking, walking, and horseback riding. The system provides extensive opportunities for recreation and non-motorized mobility and commuting throughout King County. King County is actively planning and developing a planned network of regional trails totaling more than 300 miles in length. Figure XII-13 identifies potential trail links to Pierce County Regional Trail System.

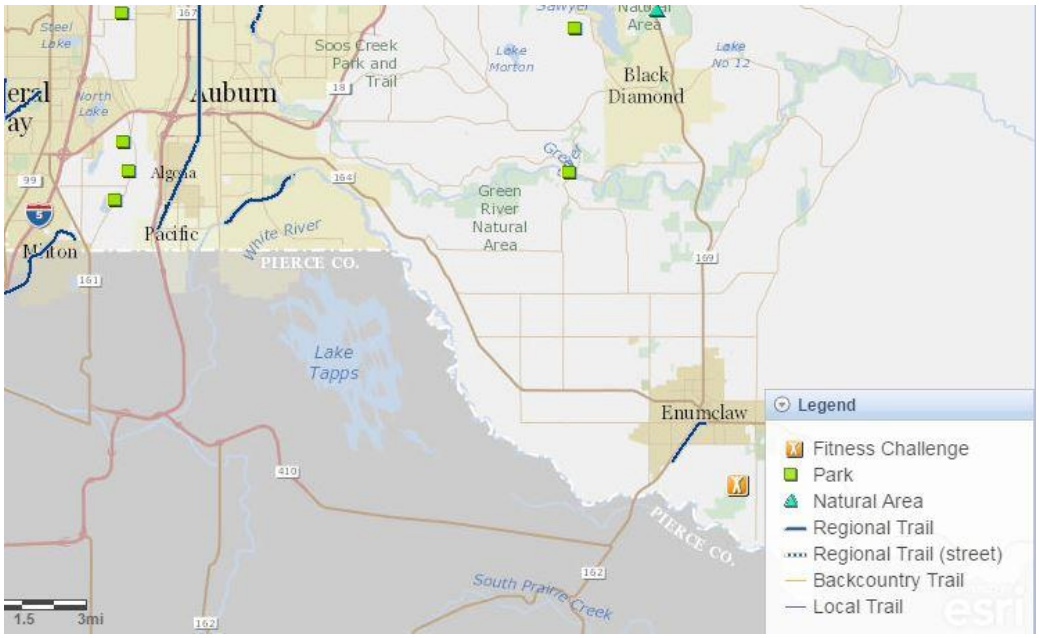



Figure XII-13. King County Regional Trail System near the Lower White River

Participate in Multi-jurisdictional Coordination

An important element for success will be the coordination of efforts among all jurisdictions within the Lower White River BMA: Pierce County, King County, the Cities of Auburn, Sumner, Pacific, Enumclaw, and Buckley. Along with an engaged citizen group, jurisdictions can gain support from various government and non-governmental organizations such as Pierce Conservation District, King Conservation District, Forterra, and the Puyallup River Watershed Council. Such coordination allows periodic reviews of biodiversity action plans.

- WRIA 10/12 Pierce County Salmon Recovery Lead Entity

The Puyallup and Chambers/Clover Watershed (WRIA 10/12) Lead Entity is a local, watershed-based organization created by RCW 77.85 to solicit, develop, prioritize and submit habitat protection and restoration projects for funding by the state's Salmon Recovery Funding Board (SRFB). The Pierce County Lead Entity Citizens' Advisory Committee and Technical Advisory Group are coordinated by Pierce County Surface Water Management staff. The committees are comprised of county, Tribal, Conservation District, city, non-governmental organization, citizens and state agency staff. Since its inception in 1999, the Lead Entity has been extremely successful in getting funds to build projects that improve salmon habitat in the Puyallup, Carbon, White, and Greenwater rivers, as well as Boise, South Prairie, Chambers and Clover creeks and other important tributaries in both watersheds. Many of these projects have also reduced flood hazards by removing flood prone houses and structures and building setback levees that create habitat and protect upland properties.

In addition to developing, reviewing and prioritizing projects for SRFB funding, the WRIA 10/12 Lead Entity now assists with three additional grant sources: the Puget Sound Acquisition and Restoration fund (PSAR), the King County Flood Control District Cooperative Watershed Management grant program (CWM), and Washington State's Floodplains by Design grant program. The SRFB, PSAR, and CWM grant rounds typically begin in late winter/early spring, and the Floodplains by Design process typically begins in the winter. SRFB, PSAR, and CWM applications are reviewed and ranked in accordance with the WRIA 10/12 Salmon Habitat Protection and Restoration Strategy, and then prioritized lists are provided to the granting agency. CWM projects must be physically located in the King County portion of the watershed. Floodplains by Design projects are screened according to different criteria, as those projects strive to address salmon recovery, flood risk reduction, agricultural productivity, water quality, and recreation.

The Pierce County Lead Entity committee also strives to share their passion and spread the word about the importance of salmon and the link between healthy salmon runs and the great quality of life afforded by the natural resources in the county. Public participation is always welcome at their meetings.

- The Puget Sound Partnership

The Puget Sound Partnership Action Agenda (2008) identified everyday activities of humans as the source of Puget Sound's decline. Sources of water pollution were identified as one of the three main problems contributing the degraded health of Puget Sound. The report noted that this is caused in part by "how we have covered up the land with houses, buildings and parking lots; how we live and prosper; how we treat our waste; and how we transport ourselves."

Many Puget Sound citizens and science groups have emphasized stormwater runoff as a major threat to ecosystem health. The Action Agenda includes large-scale regional approaches that call for: the creation of consistent protection and restoration standards for the region; reducing pollutant inputs at the source; prioritizing and retrofitting existing stormwater management facilities (particularly in areas that were urbanized long ago); and ramping up low impact develop techniques in urbanizing areas.

**Potential County Government/Community Organization Strategies**

Short-Term and On-going Actions

1. Implement the Countyline Levee Setback project.
2. Continue to apply for Salmon Recovery Funding Board and other grants to facilitate implementation of high priority restoration projects within the BMA.
3. Coordinate with WRIA 10/12 Pierce County Lead Entity Salmon Recovery.
4. Administer Community Watershed Management grant program annually.
5. Collaborate with other jurisdictions on biodiversity-related conservation or restoration efforts.
6. Continue work with farmers on best management practices.

Mid-Term Actions

1. Develop more projects for wetland restoration, levee removal and setback projects, and reconnection of off-channel habitat along the Lower White River.
2. Monitor project performance within levee removal and setback areas to determine fish and wildlife use of restored habitat for those projects whose goals included improved fish and wildlife habitat, such as the Countyline and Boise Creek projects.
3. Pursue more restoration actions (conservation easements, riparian buffer and stream restoration, etc.) through the Boise Creek (RM 1-3) corridor.
4. Examine current and possible future changes in the river ecosystems to facilitate planning for and adapting to climate change.
5. Support efforts to conduct one or more additional bioblitzes to complement information already gathered and begin to track changes in species composition over time.

Long-Term Actions

1. Explore additional opportunities to facilitate levee setback and floodplain reconnection projects in the Lower White River.

# Appendices

**Appendix 1. Meeting Agendas – Buckley**

September, 2009
October, 2009
November, 2009

**Appendix 2. WA Landowner Incentive Programs**

# Kickoff Meeting Agenda for September 21, 2009

**Buckley Library**

| **Time** | **Topic** | **Discussion Leader** |
|---|---|---|
| 6:00 | Introductions | Linda |
| 6:15 | Pierce County Biodiversity Network Overview & questions | Karen/Michelle |
| 7:00 | LWR Stewardship Plan and Buckley's chapter | Linda/Karen/Michelle |
| 7:30 | Next steps | Linda |
| 7:45 | **Community *NatureMapping* Workshop**<br>October 10-11 at Northwest Trek | Karen |

# Lower White River Biodiversity Management Area
# Buckley and Vicinity

## Community Workshop #2
**Monday, October 12, 2009**
**6:00 p.m. to 8:00 p.m.**
**Enumclaw Library**

| | |
|---|---|
| 6:00 – 6:10 p.m. | Welcoming comments and review of BMA network |
| | PCBA slide logo and partners |
| | Mission to implement and protect bd network |
| | Picture of network |
| 6:10 – 6:40 | Start at terminology - define |
| | Conservation target and definition |
| | Threats (stressor) – give bullfrog examples |
| | Sources of stress - release of exotics (Japanese knotweed) |
| | Conservation strategy - actions |
| | Change CVA examples to Buckley |
| 6:40 – 6:50 | Break time |
| 6:50 – 7:00 | Buckley and vicinity Stewardship Plan overview |
| | Start with conservation strategies in draft plan |
| 7:00-7:45 | Threats to conservation targets (make a slide) |
| | Read each individual bullet and discuss |
| 7:45 – 8:00 | Closing discussion |

**Next Meeting –November 16, 2009, 6:00 p.m. TBD**

# Lower White River Biodiversity Management Area
# Buckley and Vicinity

## Community Workshop #3
**Monday, November 16, 2009**
**6:00 p.m. to 8:00 p.m.**
**Enumclaw Library**

| | |
|---|---|
| 6:00 – 6:05 p.m. | Welcome |
| 6:05 – 7:00 | National Wildlife Federation Backyard Habitat |
| 7:00 – 7:45 | Segue into biodiversity<br>Review last meeting terminology – questions?<br>Conservation target and definition<br>Threats (stressor) – give bullfrog examples<br>Sources of stress - release of exotics (Japanese knotweed)<br>Conservation strategy - actions<br>Begin Matrix |
| 7:45 – 8:00 | Closing discussion |

**Next Meeting –January 11, 2010, 6:00 p.m. TBD**

## Appendix 2. WA Landowner Incentive Programs *(2016)*

**Private individuals, non-profit groups and/or other non-governmental organizations**

**Aquatic Lands Enhancement Account (ALEA) Volunteer Cooperative Projects Grant Program**

Washington Department of Fish & Wildlife provides monetary support, on a cost reimbursement basis, for qualifying individuals, Non-profit Organizations, Tribes and Municipal Subdivisions (Cities, Towns, Counties, Park and Recreation, Public Utility Districts and School Districts) who undertake projects that benefit Washington state's fish and wildlife resources. ALEA grant program funds 1) Habitat Projects, 2) Research Projects, 3) Education Projects, 4) Facility Development Projects, and 5) Artificial Production Projects. Open competitive. For more information see: http://wdfw.wa.gov/grants/alea/index.html

**Private individuals, Non-profit groups and/or other non-governmental organizations, State, Local, Tribal Governments.**

**Cooperative Endangered Species Conservation Fund (Section 6 Grants)**

U.S. Fish & Wildlife Service (USFWS) recognizes that success in conserving species will ultimately depend on working cooperatively with landowners, communities, and Tribes to foster voluntary stewardship efforts on private lands, because more than half of all species currently listed as endangered or threatened spend at least part of their life cycle on privately owned lands. States play a key role in catalyzing these efforts. The Cooperative Endangered Species Conservation Fund provides grants to states for species and habitat conservation actions on non-federal lands. A state must have a cooperative agreement with the USFWS under Section 6 of the Endangered Species Act to be eligible to receive funds under the CESCF. States and Territories must contribute a minimum non-Federal cost share of 25% for the estimated program costs of approved projects, or 10% when two or more States or Territories implement a joint project. A State or Territory must currently have, or enter into a cooperative agreement with the Secretary of the Interior to receive grant funds. Four grant programs are available through the CESCF. They include the **"Traditional"** Conservation Grants and the **"Non-traditional"** Habitat Conservation Plan Land Acquisition, Habitat Conservation Planning Assistance, and Recovery Land Acquisition Grants. In Washington State, the non-traditional Section 6 grants are administered by the USFWS in conjunction with the state Departments of Fish and Wildlife (WDFW) and Natural Resources (DNR). For more information: http://wdfw.wa.gov/grants/section6/index.html

**Private individuals, Non-profit groups and/or other non-governmental organizations, State, Local, Tribal Governments.**

**Estuary and Salmon Restoration Program (ESRP)**

The Estuary and Salmon Restoration Program provides grants to protect and restore the Puget Sound nearshore. The program was created by Washington Department of Fish and Wildlife to support the emerging priorities of the Puget Sound Nearshore Ecosystem Restoration Program. Healthy functioning ecosystems provide local communities with a range of valuable ecosystem goods, such as abundant fish and shellfish, clean water, public access and swimming beaches; and ecosystem services, such as flood storage, erosion control, water filtration, and carbon sequestration. As Puget Sound's nearshore has been altered, its ability to provide the same level of ecosystem goods and services has decreased. However, by strategically focusing on restoring key ecosystem processes, we can restore the nearshore. ESRP provides funding for nearshore restoration, land protection, and supports all phases in project continuum land

acquisition through feasibility and design to construction and monitoring and adaptive management. Projects include 1) Infrastructure Improvement, 2) Drainage and Flood Storage, 3) Recreation and Public Access, 4) Resiliency to Climate Change, and 5) Restoring Natural Processes by addressing the root causes of environmental degradation. Open competitive. Eligible applicants include government agencies, tribes, NGOs, private institutions and universities. **Private landowners are not eligible directly as applicants but are able to partner with eligible applicants to advance projects on privately owned lands. Private individuals, Non-profit groups and/or other non-governmental organizations, State, Local, Tribal Governments.**

### Forest Riparian Easement Program (FREP)

The Forest Practice Division of the Washington State Department of Natural Resources has established the Forestry Riparian Easement Program (FREP). FREP is a voluntary program that reimburses landowners for the value of the trees they are required to leave to protect fish habitat. The program provides compensation for a minimum of 50 percent of the timber value and applies to trees adjacent to streams, wetlands, seeps, or unstable slopes. Landowners receive compensation in exchange for a 50 year easement on qualifying timber. To qualify, landowners must have at least twenty contiguous acres or more than 80 forested acres, and have completed a harvest and left a buffer of trees next to a stream, river, wetland, lake, pond, or adjacent unstable slopes. and agree not to cut or remove the qualifying timber during the easement period. Participants receive 50% of the stumpage value of the qualifying timber plus reimbursement of easement compliance costs. If a landowner regulatory impact exceeds 19% for western Washington or 12% for eastern Washington, additional compensation is allowed. For more information: http://www.dnr.wa.gov/programs-and-services/forest-practices/small-forest-landowners/forestry-riparian-easement-program **Private individuals, partnership, corporation, or other nongovernmental for-profit legal entity.**

### Partnerships for Pheasants

Washington Department of Fish & Wildlife provides annual cash rental payments to landowners who plant and maintain high quality habitat for pheasants and allow public hunting. Property must be within the Pheasant Management Focus Area in southeast Washington (portions of Whitman, Walla Walla, Columbia, and Garfield counties). Minimum agreement is 5 years, preferably 10 years or more. This program may extend the Conservation Reserve Enhancement Program widths (CREP is a joint federal and state funded program that restores riparian (streamside) habitat for salmon and protects that habitat for 10-15 years) or riparian forest buffer widths and provide habitat incentive payments for lands enrolled in U.S. Department of Agriculture conservation programs. General property location will be displayed on WDFW's GoHunt map with state, federal, and other WDFW access program lands. Projects must be able to support desired habitat without irrigation. For more information: http://wdfw.wa.gov/grants/pheasants/index.html .

**Private individuals, non-profit groups and/or other non-governmental organizations.**

### Puget Sound Marine and Nearshore Protection & Restoration Grant Program (EPA)

The Puget Sound Marine and Nearshore Grant Program (PSMNGP) functions as the Marine and Nearshore Lead Organization . They are a partnership program, staffed by both the Washington Departments of Fish and Wildlife and Natural Resources. They administer funds awarded to us by the federal Environmental Protection Agency to implement priorities of the **Action Agenda for Puget Sound** to protect and restore habitat and ecosystem functions. The PSMNGP provides financial support, on a cost reimbursement basis, to qualifying Local, State and Tribal government agencies, and Non-profit organizations, for projects that protect and restore marine and nearshore habitat and further Puget Sound

2020 recovery goals. Open competitive. **Are you interested in proposing an activity to be included in the Puget Sound Action Agenda? Proposals are due 10 a.m., December 31, 2015. Find out more. Private individuals, Non-profit groups and/or other non-governmental organizations, State, Local, Tribal Governments.**

**Rivers and Habitat Open Space Program (RHOSP)**

The Rivers and Habitat Open Space Program (RHOSP) was recently amended from a program that was originally called the Riparian Open Space Program. The earlier Riparian Open Space Program allowed the State to acquire a conservation easement only on forest land within unconfined channel migration zones (CMZ). As a result of this amendment, the state can now acquire a conservation easement on both unconfined CMZs, which are areas where shifts in stream or river location may occur, resulting in a complex floodplain environment, and also on forest lands containing critical habitat for threatened or endangered species as designated by the Forest Practices Board. RHOSP is funded by the Washington State legislature to purchase or accept donations for permanent conservation easements from private forest landowners. This voluntary program is administered by the Forest Practices Division of the Department of Natural Resources. Refer to Chapter 222-23 WAC and Forest Practices Board Manual18 for additional language describing the purpose and process of the Rivers and Habitat Open Space Program. Funding is based on 1) the ecological value of the property to salmon and other species, 2) the potential benefits to water quality, 3) the biological characteristics of the property, 4) the historic, biological, or cultural significance, and the viability of management action applied to the property. To qualify for a conservation easement under the Rivers and Habitat Open Space Program, your property must: 1) be located on forestland containing critical habitat for state threatened or endangered species that has been designated a particular concern by the Forest Practices Board, 2) be identified as either "designated forest land" or "current use forestland" (WAC 222-23) on county assessor records, 3) be free of unacceptable liabilities such as hazardous substances or other site conditions that may jeopardize the preservation of fisheries enhancement or ecological protection of the project area, and 4) be open to allow DNR adequate legal access to the property to process the application and administer the easement terms and conditions. For more information: http://www.dnr.wa.gov/programs-and-services/forest-practices/small-forest-landowners/rivers-and-habitat-open-space .

**Private landowners.**

***Regional Fisheries Enhancement Group Program (RFEG)***

Consists of 14 non-profit community-based organizations that work toward enhancing and recovering Washington's salmon and steelhead and their habitats.

***Small Forest Landowner Stewardship Program***

The Department of Natural Resources (DNR) Forest Stewardship Program helps family forest owners manage and care for their lands. This program is about helping you steward your land in a way that meets your objectives. The Forest Stewardship Program provides landowner assistance foresters who will offer on-site forest management consultation. Through this non-regulatory program landowners can receive assistance on many aspects of forest management, resource protection, wildlife management, animal damage control, and guidance to develop a Forest Stewardship Plan. A Forest Stewardship Plan will help you meet your objectives to improve forest health, identify timber and other forest products, and reduce wildfire threats. Learn if you qualify for programs to reduce taxes, access financial assistance, and get recognition for your stewardship. As part of DNR assistance to forest landowners, the department explains the cost share and incentive programs that may apply to your forest. These include Forestry Riparian Easement Program (FREP), Family Forest Fish Passage Program (FFFPP), Rivers and Habitat Open Space Program (RHOSP) and the Environment Quality Incentives Program (EQIP). While assisting you

with your forest management, DNR can offer some limited help with Forest Practices Applications, Long-term Forest Practices Applications, and Alternate Plans.

**Forest landowners owning ten or more acres are eligible for an advisory on-site visit by a forester or our wildlife biologist**. Owners of smaller acreages can receive consultation from DNR by telephone or email. Another valuable resource is the *Backyard Forest Stewardship* publication that can be found online at: www.dnr.wa.gov/sflo under the Forest Stewardship Program. For more information: http://www.dnr.wa.gov/programs-and-services/forest-practices/small-forest-landowners/forest-stewardship-program .

**Private landowners.**
*Education/Technical Assistance*

***Washington Department of Fish and Wildlife Grants & Incentives***

The Washington Department of Fish and Wildlife (WDFW) administers several pass-through grant programs that provide funding opportunities for projects within Washington state conducted by outside organizations or members of the public. Funding is available for projects that benefit the conservation and management of fish and wildlife and their habitat. The federal government is often the funding source for pass-through grants, which are given to an individual state for distribution to the applicant. In some cases, other sources provide grant funds, which are then administered by WDFW. Many of those grant opportunities may be found here: http://wdfw.wa.gov/grants/

***Technical Assistance for Habitat Protection***

The Department of Fish and Wildlife offers technical assistance on habitat protection.
*Education/Technical Assistance*

***The Cooperative Habitat Enhancement Agreements Program***

Owners of lands that contain Marbled murrelet or Northern spotted owl habitat may enter into safe harbor agreements, no take agreements and receive education under the program with the Department of Fish and Wildlife under WAC 222-16-105. The program is intended to remove disincentives for landowners who create, enhance, or maintain habitat for the Northern spotted owl and Marbled murrelet by providing landowners with protection against future rules regarding those species. Landowners identify the baseline level of habitat in their management plan, along with the overall benefits to the Marbled murrelet or northern spotted owl which includes proposed measures to create, enhance, or maintain habitat, and the terms of agreement. The plan must also minimize and mitigate significant adverse impacts caused by the plan on the species. For Northern spotted owls, the plan must avoid harvest and road construction of pesticide use between March 1 and August 31 on seventy acres of the highest quality suitable Northern spotted owl habitat surrounding the nest. This program has been in existence since August 1997. The program currently has two plans in the final stages, covering 630 acres. For more information: http://app.leg.wa.gov/wac/default.aspx?cite=222-16-105
*Education/Technical Assistance, Legal/Statutory Mechanisms*

***The Habitat Incentives Program***

The Department of Fish and Wildlife offers an exemption from new regulations if a long term habitat management plan is adopted. WASH. REV. CODE § 77.55.300. Under the program, a landowner may enter into an agreement to enhance habitat for food fish, game fish or other wildlife species and in exchange receive state regulatory certainty with regard to future applications for hydraulic project approval or a forests practices permit on the property covered by the agreement. This incentive has been available since 1998.
*Legal/Statutory Mechanisms*

***"Less Than Fee Simple Purchase Agreements"***

A development right, easement, covenant, restriction, or other right, or any interest less than the fee simple, to protect, preserve, maintain, improve, restore, limit the future use of, or conserve for open space purposes, any land or improvement on the land, whether the right or interest be appurtenant or in gross, may be held or acquired by any state agency, federal agency, county, city, town, federally recognized Indian tribe, or metropolitan municipal corporation, nonprofit historic preservation corporation, or nonprofit nature conservancy corporation. Any such right or interest constitutes and is classified as real property. All instruments for the conveyance thereof must be substantially in the form required by law for the conveyance of any land or other real property. WASH. REV. CODE § 64.04.130.

*Property Rights Tools*

***Tax Benefits for Conservation***

Landowners receive an exemption from ad valorem taxation if the property is used for specific conservation activities. WASH. REV. CODE § 84.36.260.

*Tax Relief*

***Tax Benefits for Fish and Wildlife Habitat Enhancement***

Washington exempts improvements to fish and wildlife habitat from taxation under RCW 84.36.255 provided landowners adhere to a standardized list of best management practices (RCW 89.08.440). This law is designed to encourage private property owners to make voluntary improvement to their property without the penalty of paying higher property taxes. All improvements to real and personal property that benefit fish and wildlife habitat, water quality, or water quantity are exempt from taxation if the improvements are included under a written conservation plan approved by a conservation district. This incentive is administered by local conservation districts and the Department of Revenue.

*Tax Relief*

***Property Tax Benefits for Open Space Land***

Washington offers a current use assessment, which results in a property tax reduction, to owners of open space lands. WASH. REV. CODE § 84.34.010. The incentive is administered by local jurisdictional taxing authorities (assessors).

*Tax Relief*

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