

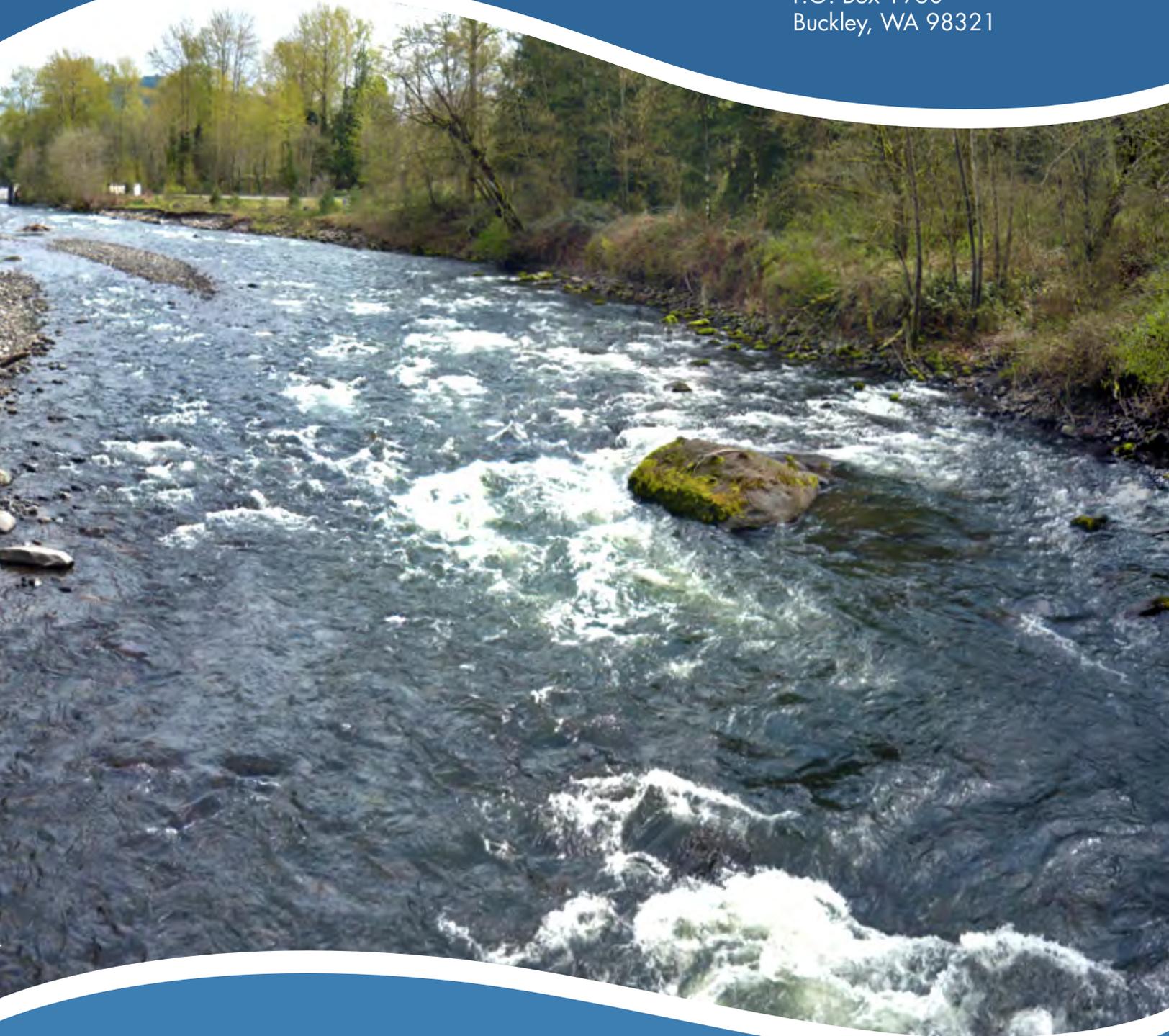
FINAL

Shoreline Analysis Report for City of Buckley's Shorelines: White River

GRANT NO. G1000038

Prepared January 2011 for:

City of Buckley
Building and Planning Division
P.O. Box 1960
Buckley, WA 98321



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for City of Buckley's Shorelines: White River

Task 2.3 Deliverable

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SHORELINE ANALYSIS REPORT

CITY OF BUCKLEY'S SHORELINES: WHITE RIVER

1 INTRODUCTION

1.1 Background and Purpose

The City of Buckley (City) obtained a grant from the Washington Department of Ecology (Ecology) in 2009 to complete a comprehensive Shoreline Master Program (SMP) update. One of the first steps of the update process is to inventory and characterize the City's shorelines as defined by the state's Shoreline Management Act (SMA) (RCW 90.58). This inventory and analysis was conducted in accordance with the Shoreline Master Program Guidelines (Guidelines, Chapter 173-26 WAC) and project Scope of Work promulgated by Ecology, and includes all shoreline areas within current City limits. Under these Guidelines, the City must identify and assemble the most current, accurate and complete scientific and technical information available that is applicable. This shoreline inventory and analysis will describe existing conditions and characterize ecological functions in the shoreline jurisdiction. This will serve as the baseline against which the impacts of future development actions in the shoreline will be measured. The Guidelines require that the City demonstrate that its updated SMP yields "no net loss" in shoreline ecological functions relative to the baseline due to its implementation.

A list of potential information sources was compiled (Appendix A) and an information request letter was distributed to potential interested parties and agencies that may have relevant information. Collected information was supplemented with other resources such as City documents, scientific literature, personal communications, aerial photographs, internet data, and a brief physical inventory of the City's shorelines.

1.2 Shoreline Jurisdiction

As defined by the Shoreline Management Act of 1971, shorelines include certain waters of the state plus their associated "shorelands." At a minimum, the waterbodies designated as shorelines of the state are streams whose mean annual flow is 20 cubic feet per second (cfs) or greater, lakes whose area is greater than 20 acres, and all marine waters. Shorelands are defined as:

"those lands extending landward for 200 feet in all directions as measured on a horizontal plane from the ordinary high water mark; floodways and contiguous floodplain areas landward 200 feet from such floodways; and all wetlands and river deltas associated with the streams, lakes, and tidal waters which are subject to the provisions of this chapter...Any county or city may

determine that portion of a one-hundred-year-floodplain to be included in its master program as long as such portion includes, as a minimum, the floodway and the adjacent land extending landward two hundred feet therefrom... Any city or county may also include in its master program land necessary for buffers for critical areas (RCW 90.58.030)''

The northern portion of the City of Buckley is located along the White River. The White River's mean annual flow in the study area exceeds 1,000 cfs, and it is therefore included in a classification of unique shorelines known as Shorelines of Statewide Significance. The river and floodplain have associated with them several wetlands, some of which are contiguous and others that are hydrologically connected to the river. The entire jurisdiction assessment and determination process can be reviewed in greater detail in Appendix B of this report.

1.3 Study Area

The City of Buckley is located in Pierce County, WA. The City encompasses approximately 3.86 square miles (2,470 acres) and is bordered to the south, east, and west, by unincorporated Pierce County jurisdiction. The White River delineates the northern boundary of the City; the north shore of the river is bordered by unincorporated King County. The nearest incorporated cities are the City of Enumclaw to the north and the small City of South Prairie to the southwest. Lake Tapps is located approximately 5 miles to the west-northwest. The White River has a mean annual flow greater than 1,000 cfs through the City of Buckley, and is thus considered a Shoreline of Statewide Significance. The minimum size limit for lakes to be designated as shoreline is 20 acres. No lakes or other water bodies within the City boundary exceed 20 acres.

A number of wetlands are contiguous with the White River, and several more are hydrologically associated with the river, and thus are included in shoreline jurisdiction (Appendix C, Figure 10). The White River floodplain within City limits is also included in the shoreline jurisdiction. A dam toward the east end of the study area diverts water to the White River Diversion Flume and westward into Lake Tapps. The flume is not a jurisdictional water body per the Washington State Department of Ecology (Ecology) and is thus not part of the shoreline jurisdiction, apart from the area that occurs with the White River floodplain (Ecology 2010). The total area within shoreline jurisdiction is 0.29 square miles (187.1 acres) and encompasses 16,071 linear feet of White River shoreline.

2 CURRENT REGULATORY FRAMEWORK SUMMARY

2.1 City of Buckley

The Shoreline Management Act of 1971 brought about many changes for local jurisdictions, including the City of Buckley. The legislative findings and policy intent of the SMA states:

“There is, therefore, a clear and urgent demand for a planned, rational, and concerted effort, jointly performed by federal, state, and local governments, to prevent the inherent harm in an uncoordinated and piecemeal development of the state's shorelines (RCW 90.58.020).”

While protecting shoreline resources by regulating development, the SMA is also intended to provide balance by encouraging water-dependent or water-oriented uses while also conserving or enhancing shoreline ecological functions and values. The SMP will be based on state guidelines, but tailored to the specific conditions and needs of individual communities. Because the White River with City limits is a Shoreline of Statewide Significance, the SMP will need to address specific management policies as listed in WAC 173-26-251 which gives preference to uses in the following order of preference which:

- (1) Recognize and protect the statewide interest over local interest;
- (2) Preserve the natural character of the shoreline;
- (3) Result in long term over short term benefit;
- (4) Protect the resources and ecology of the shoreline;
- (5) Increase public access to publicly owned areas of the shorelines;
- (6) Increase recreational opportunities for the public in the shoreline;
- (7) Provide for any other element as defined in RCW 90.58.100 deemed appropriate or necessary.”

The City presently addresses shoreline permitting through the Buckley Municipal Code (BMC), Chapter 19.42, Shoreline Management.

Regulations applicable to critical areas that are located within shoreline jurisdiction underwent a comprehensive update in 2005, consistent with Growth Management Act requirements for use of “best available science.”

Most of the uses, developments, and activities regulated under the Critical Areas Regulations are also subject to the City's Comprehensive Plan, the BMC, the International Building Code, and various other provisions of City, State and federal laws. Any applicant must comply with all applicable laws prior to commencing any use, development, or activity. Buckley will ensure consistency between the SMP and other City codes, plans and programs by reviewing each for consistency during periodic updates of the City's Comprehensive Plan as required by State statute.

2.2 State and Federal Regulations

State and federal regulations most pertinent to development in the City's shorelines include the federal Endangered Species Act, the federal Clean Water Act, the State Shoreline Management Act, and the State Hydraulic Code. Other relevant federal laws include the National Environmental Policy Act, Anadromous Fish Conservation Act, Clean Air Act, Coastal Zone Management Act, and the Migratory Bird Treaty Act. State laws which address shoreline issues include the Growth Management Act, State Environmental Policy Act, State Clean Water Act (RCW 90.48), tribal agreements and case law, Watershed Planning Act, Water Resources Act, Salmon Recovery Act, and the Water Quality Protection Act. A variety of agencies (e.g., U.S. Army Corps of Engineers, National Marine Fisheries Service, U.S. Fish and Wildlife Service, FEMA, Washington Department of Ecology, Washington Department of Fish and Wildlife) are involved in implementing these regulations, but review by these agencies of shoreline development in most cases would be triggered by in- or over-water work, discharges of fill or pollutants into the water, or substantial land clearing. Depending on the nature of the proposed development, State and Federal regulations can play an important role in the design and implementation of a shoreline project, ensuring that impacts to shoreline functions and values are avoided, minimized, and/or mitigated. With the comprehensive SMP update, the City will strive to ensure that Buckley's SMP regulations are consistent with other State and Federal requirements and explore ways to streamline the shoreline permitting process. A summary of some of the key regulations and agency responsibilities follows.

Section 404: Section 404 of the federal Clean Water Act provides the Corps, under the oversight of the U.S. Environmental Protection Agency, with authority to regulate "discharge of dredged or fill material into waters of the United States, including wetlands" (http://www.epa.gov/owow/wetlands/pdf/reg_authority_pr.pdf). The extent of the Corps' authority and the definition of fill have been the subject of considerable legal activity. As applicable to the City of Buckley's shoreline jurisdiction, however, it generally means that the Corps must review and approve most activities in streams, wetlands, and lakes. These activities may include lake or wetland fills, stream and wetland restoration, and culvert installation or replacement, among others. Similar to SEPA requirements, the Corps is interested in avoidance, minimization, restoration, and compensation of impacts.

Federal Endangered Species Act (ESA): Section 9 of the ESA prohibits “take” of listed species. Take has been defined in Section 3 as: “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.” The take prohibitions of the ESA apply to everyone, so any action of the City that results in a take of listed fish or wildlife would be a violation of the ESA and exposes the City to risk of lawsuit. Per Section 7 of the ESA, activities with potential to affect federally listed or proposed species and that either require federal approval, receive federal funding, or occur on federal land must be reviewed by the National Marine Fisheries Service (NOAA Fisheries) and/or U.S. Fish and Wildlife Service (USFWS) via a process called “consultation.” Federally listed species are known to use Fennel Creek below Victor Falls, thereby placing them within shoreline jurisdiction. These species include Puget Sound Chinook (federally threatened), Puget Sound coho (federal species of concern), and possibly migratory bull trout (federally threatened).

Section 401 Water Quality Certification: Section 401 of the federal Clean Water Act allows states to review, condition, and approve or deny certain federal permitted actions that result in discharges to state waters, including wetlands. In Washington, the Department of Ecology is the state agency responsible for conducting that review, with their primary review criteria of ensuring that state water quality standards are met. Actions within streams, lakes or wetlands within the shoreline zone that require a Section 404 permit (see above), will also need to be reviewed by Ecology.

Hydraulic Code: Chapter 77.55 RCW (the Hydraulic Code) gives the Washington Department of Fish and Wildlife (WDFW) the authority to review, condition, and approve or deny “any construction activity that will use, divert, obstruct, or change the bed or flow of state waters.” As applicable to the City of Buckley’s shoreline jurisdiction, however, it generally means that WDFW must review and approve most activities in any of the shoreline waterbodies. These activities may include pier and bulkhead repair or construction, stream alteration, and culvert installation or replacement, among others. WDFW can condition projects to avoid, minimize, restore, and compensate adverse impacts.

Instream Resources Protection Program-Puyallup River Basin, Water Resource Inventory Areas (WRIA) 10: WAC 173-510 applies minimum instream flow requirements to streams within the Puyallup River Basin (WRIA 10). This includes the White River. During periods of low stream flow in the White River, diversion to Lake Tapps may be decreased or stopped altogether in order to meet minimum instream flow requirements. The purpose of this rule is to “retain perennial rivers, streams, and lakes in the Puyallup River basin with instream flows and levels necessary to provide protection for wildlife, fish, scenic-aesthetic, environmental values, recreation, navigation, and to preserve high water quality standards” (Ecology 1998).

3 ELEMENTS OF THE SHORELINE INVENTORY & SPECIFIC CONDITIONS

3.1 Introduction

Development of a shoreline inventory is intended to record the existing or baseline conditions upon which the development of shoreline master program provisions will be examined to ensure the adopted regulations provide no net loss of shoreline ecological functions. At a minimum, local jurisdictions shall gather the inventory elements listed in the Guidelines, to the extent information is relevant and readily available. Table 1 lists those relevant inventory elements in which data is available for the City's shorelines. The table also describes the information collected for each of the required inventory elements. A list of inventory elements and the various data sources that were utilized for each element are provided in Appendix A. Figures depicting the various inventory pieces listed in Table 1 are provided in Appendix C (Figures 1-14).

Table 1. Shoreline Inventory Elements and Information Sources.

Inventory Element	Information Gathered	Data Sources	Appendix C Map
Shoreline Jurisdiction	Shorelines, wetlands, floodways and floodplains, City boundary	Greg and Osborn Inc., City	Figure 1
Zoning	Zoning designations	Greg and Osborn Inc., City	Figure 2
Sanitary Sewer	Sewer treatment, pipeline	Greg and Osborne Inc., City	Figure 3
Surface Water System	Drainage, Streams	Greg and Osborne Inc., City	Figure 4
Impervious Surfaces	Roads, parking lots, & buildings	USGS	Figure 5
Vegetation	Cover types	NOAA	Figure 6
Public Access Areas	Public access	Greg and Osborne Inc.	Figure 7
Soils	Soil types	USDA NRCS (SSURGO)	Figure 8

Inventory Element	Information Gathered	Data Sources	Appendix C Map
Floodplains & Floodway	Floodway, Floodplains; CMZ has not been officially mapped in City of Buckley shoreline	Greg and Osborne Inc., City	Figure 9
Critical Areas	Streams	WDFW, City	Figure 4
	Wetlands	NWI, WDFW, Greg and Osborn Inc., City	Figure 10
	Geologic Hazards	Greg and Osborne Inc., City	Figure 11
Areas of Special Interest	Priority Habitats and Species	WDFW, City	Figure 12
Water quality impairment	303(d)/305(b) waters and regulated sites	Ecology, City	Figure 13
Hazardous Substances	Confirmed and Suspected Contamination Sites	Ecology	N/A ¹
Shoreline Modifications	Overwater structures	DNR, City	Figure 14
Historical and Archeological Sites	Review of WISSARD	DAHP	N/A ²

¹The PSE Buckley Debris Pile Fill is a conformed contaminant site in the Voluntary Clean-up Program; no other sites are located within shoreline jurisdiction.

²Review of historical and archeological sites based on Washington Department of Archaeology & Historic Preservation. <https://fortress.wa.gov/dahp/wisaard/>

3.2 Assessment Unit Conditions

In order to break down the shoreline into manageable units and to help evaluate differences between discrete shoreline areas, the shorelines have been divided into assessment units based on ecological condition, land use, and projected future conditions as follows and as illustrated in Exhibit 1, below. Table 2 expands upon the relevant above required inventory elements, providing specific detail and relevant data for each of the assessment units.

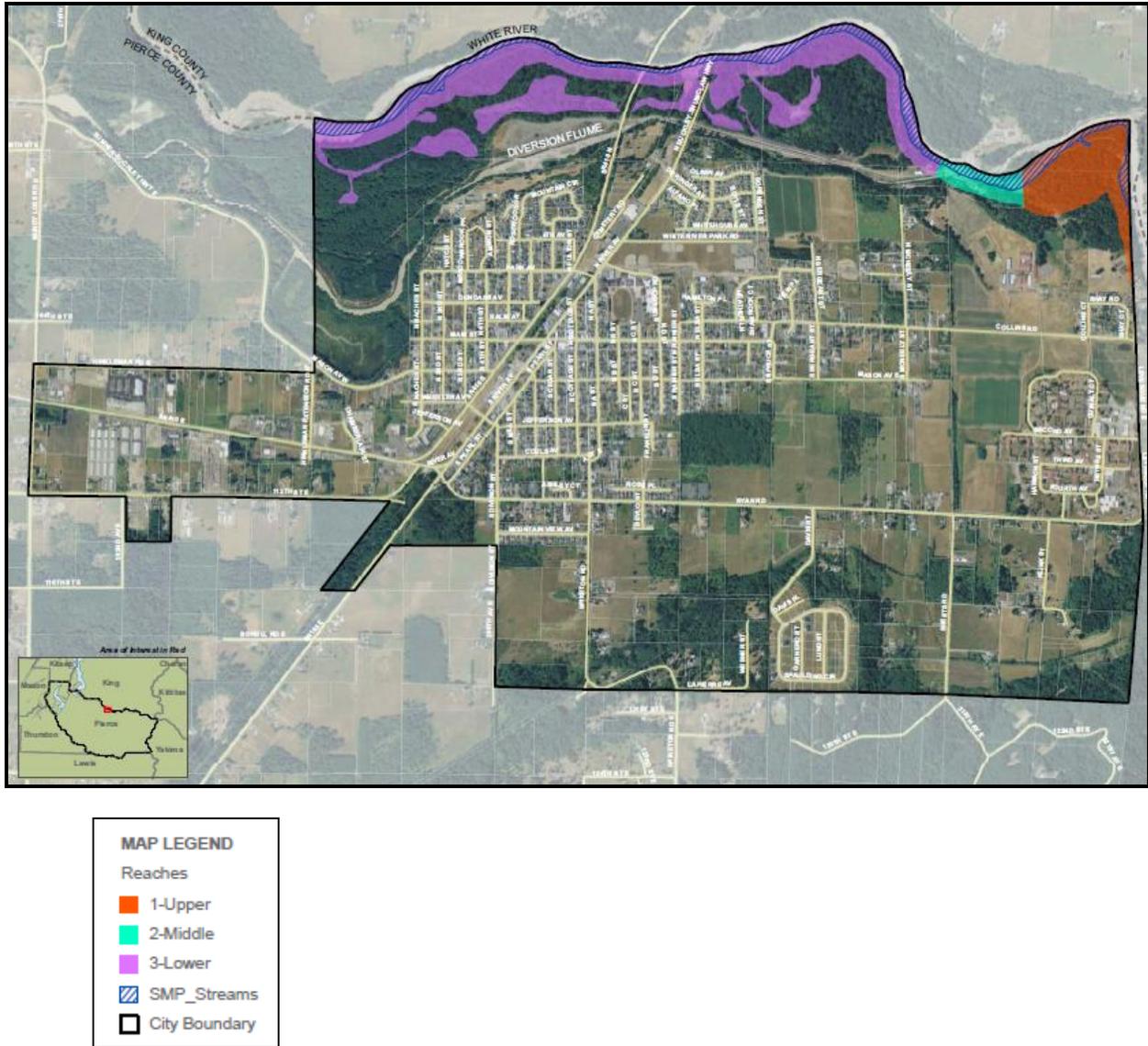


Exhibit 1. City of Buckley shoreline assessment units along the White River.

Table 2. Summary of Inventory by Assessment Unit.

Inventory Element	Shoreline Assessment Unit		
	Reach 1	Reach 2	Reach 3
Assessment Unit Dimensions	<ul style="list-style-type: none"> • 3481.4 linear feet of shoreline frontage • 10.8 acres¹ 	<ul style="list-style-type: none"> • 1332.0 linear feet of shoreline frontage • 6.3 acres¹ 	<ul style="list-style-type: none"> • 11,257.7 linear feet of shoreline frontage • 106.9 acres¹
Zoning	<ul style="list-style-type: none"> • Public/Institutional - 69% • Sensitive - 31% 	<ul style="list-style-type: none"> • Public/Institutional – 100% 	<ul style="list-style-type: none"> • Public/Institutional – <1% • Sensitive – 99%
Comprehensive Plan	<ul style="list-style-type: none"> • Urban lower density – 100% 	<ul style="list-style-type: none"> • Urban lower density – 100% 	<ul style="list-style-type: none"> • Urban lower density – 100%
Waterfront Parcels	2	2	5
Vacant Land²	None	None	None
Impervious Surface	1.2%	14.0%	1.6%
Vegetation	<ul style="list-style-type: none"> • Bare land - 0% • Forest – 91% • Grassland - 0% • Wetland – 0% • Pasture/Hay – 4% • Scrub-shrub - <1% • Unconsolidated shore – 0% • Water - 2% 	<ul style="list-style-type: none"> • Bare land - <1% • Forest – 46% • Grassland - 0% • Wetland – 0% • Pasture/Hay – <1% • Scrub-shrub - <4% • Unconsolidated shore – 0% • Water - 13% 	<ul style="list-style-type: none"> • Bare land - <1% • Forest – 81% • Grassland - 2% • Wetland – 10% • Pasture/Hay – 0% • Scrub-shrub - 3% • Unconsolidated shore – <1% • Water - <1%
Overwater Cover	No piers, docks, or other structures	<ul style="list-style-type: none"> • SR 410 bridge 	No piers, docks, or other structures
Shoreline Armoring⁴	<ul style="list-style-type: none"> • No armoring 	<ul style="list-style-type: none"> • Some armoring adjacent to diversion structure 	<ul style="list-style-type: none"> • No armoring
Public Access	<1 acre	No formal public access; access via CWA facilities	There are no formal public access opportunities.

Inventory Element	Shoreline Assessment Unit		
	Reach 1	Reach 2	Reach 3
Critical Areas	<ul style="list-style-type: none"> Wetlands – 8 ac³ Floodplain – 31 ac Geologically Hazardous Areas - 100% (seismic 100%; volcanic 79%; landslide <1%) 	<ul style="list-style-type: none"> Wetlands – <1 ac³ Floodplain – 1.5 ac Geologically Hazardous Areas - 100% (seismic 100%; volcanic 61%; landslide <1%) 	<ul style="list-style-type: none"> Wetlands – 44 ac³ Floodplain – 41 ac Geologically Hazardous Areas - 100% (seismic 100%; volcanic 99%; landslide <1%; erosion <1%)
Listed Species	<ul style="list-style-type: none"> Chinook salmon Bull trout Steelhead 	<ul style="list-style-type: none"> Chinook salmon Bull trout Steelhead 	<ul style="list-style-type: none"> Chinook salmon Bull trout Steelhead
Priority Habitat and Species	<ul style="list-style-type: none"> Elk damage areas Priority riparian zones 	<ul style="list-style-type: none"> Elk damage zones Priority riparian zones 	<ul style="list-style-type: none"> Elk damage zones Priority riparian zones Priority wetlands
Impaired Waters (303d/305b)	<ul style="list-style-type: none"> pH 	<ul style="list-style-type: none"> Instream flow 	<ul style="list-style-type: none"> Instream flow pH Fecal coliform
Historical and Archeological Sites	None listed	Historic properties associated with diversion dam	White River Bridge ⁵

- ¹ Assessment unit area is the landward portion of the shoreline management area.
- ² Vacant land pertains only to presently vacant but developable parcels
- ³ Wetland coverage based on NWI data; wetland areas shown in the “vegetation” row are from NOAA C-CAP land cover database and are likely lower due to low precision in the methodology for this cover type.
- ⁴ Shoreline armoring data are not available; armoring was observed using 2008 aerial photographs.
- ⁵ Determined eligible, NPS

3.3 Data Gaps

GIS information was not located or incomplete for the following parameters:

- Shoreline armoring
- Stormwater outfalls. Approximate locations are known, but are not mapped in GIS.
- Channel migration zone – while a CMZ appears to exist in Buckley shoreline jurisdiction, it has not been mapped.

Although information about each of the above items might help develop a fuller picture of shoreline conditions and processes, it is not expected that the absence of these items would have significant impacts on the selection of environment designations or the development of the SMP. Qualitative assessments of most components can be derived from aerial photo interpretation.

3.4 Restoration Opportunities

3.4.1 Restoration

Ecology's *Shoreline Master Program Guidelines* (173-26 WAC) includes the following definition:

“Restore,” “Restoration” or “ecological restoration” means the reestablishment or upgrading of impaired ecological shoreline processes or functions. This may be accomplished through measures including but not limited to re-vegetation, removal of intrusive shoreline structures and removal or treatment of toxic materials. Restoration does not imply a requirement for returning the shoreline area to aboriginal or pre-European settlement conditions.

Consistent with Ecology's definition, use of the word “restore,” or any variations, in this document is not intended to encompass actions that re-establish historic conditions. Instead, it encompasses a suite of strategies that can be approximately delineated into four categories: creation (of a new resource), restoration (of a converted or substantially degraded resource), enhancement (of an existing degraded resource), and protection (of an existing high-quality resource).

There is a critical distinction between restoration and mitigation. Mitigation will require applicants whose shoreline proposals will have adverse impacts to complete actions to mitigate those impacts or provide compensation in other ways for losses of ecological function. The City can encourage applicants to implement restoration actions that will improve ecological functions relative to the applicant's pre-project condition. As stated in WAC 173-26-201(2)(c):

It is intended that local government, through the master program, along with other regulatory and nonregulatory programs, contribute to restoration by planning for and fostering restoration and that such restoration occur through a combination of public and private programs and actions. Local government should identify restoration opportunities through the shoreline inventory process and authorize, coordinate and facilitate appropriate publicly and privately initiated restoration projects within their master programs. The goal of this effort is master programs which include planning elements that, when implemented, serve to improve the overall condition of habitat and resources within the shoreline area of each city and county."

The opportunity areas discussions below present options for "restoration" that would improve ecological functions. For example, installation of large woody debris to riparian areas, water quality and quantity protection measures, and improvements to fish habitat would each increase one or more ecological parameters of the City's shoreline. The City or City residents could implement these options voluntarily or, depending on specific project details, they could be required measures to mitigate adverse impacts of new shoreline projects.

3.4.2 Opportunity Areas

Reach 2 provides the greatest opportunities for restoration in the City of Buckley shoreline jurisdiction. Potential for increasing some functional values is limited by the presence and use of the diversion dam. Transport of water, sediment and organic material is a low-potential restoration target because it would require changes to dam structure and use that are unlikely to occur. Functions related to vegetation and habitat have far greater potential for improvement. Although facilities associated with the diversion dam require impervious surface and some cleared areas, improvement to and expansion of vegetated buffers in this reach could improve LWD and other organic material input to the river, improving habitat, slowing erosion, and attenuating flow energy. Denser floodplain vegetation would also improve sediment removal, water quality, and non-aquatic habitat. Specifically, opportunities for improvement in Reach 2 include:

- Restoration of floodplain habitat in the form of native plantings, especially trees for future LWD recruitment.
- Conversion of lawn and other non-vital cleared areas to native habitat.
- Shoreline planting.

Reach 1 and 3 are higher functioning than Reach 2, leaving fewer opportunities for improvement. However, both reaches are lacking somewhat in LWD (both size and quantity), which in turn limits riffle-pool sequence development. Encouragement of large native tree growth would improve future recruitment of LWD, which would improve aquatic habitat as well as diversifying upland habitat.

Additional opportunities may be available for the following restoration actions in or adjacent to the City of Buckley. These potential actions will be evaluated as part of the City's Shoreline Restoration Plan.

- Improve water quality within the White River. Currently, the White River is listed on the 303d list for pH, minimum flow, and fecal coliform in or near the City of Buckley.
- Enhancement and/or creation of wetlands to increase flood storage capacity.
- Provide additional options for the treatment of stormwater runoff prior to entry into the White River.

4 ANALYSIS OF ECOLOGICAL FUNCTIONS

4.1 Geographic and Ecosystem Context (WRIA 10)

The City of Buckley is located at the northern extent of Pierce County in the Puget Sound Region. Within City limits are freshwater shorelines associated with Washington State's Water Resources Inventory Area (WRIA) 10, Puyallup-White River (Exhibit 2). The City's jurisdictional shorelines are in the Lower White River Sub-basin and Mud Mountain Sub-basin within WRIA 10; the sub-basins are described in detail in the White River Basin Plan Characterization Report (Pierce County 2007), and the physical characteristics, biological processes, and development/land use history of the White River are further described in the Draft Pierce County Inventory and Characterization Report (ESA 2007).

Per the White River Basin Plan Characterization Report (Pierce County 2007), the White River Basin can be described by the following general summary of ecological functions:

- Riparian cover is generally good with the upper watershed, east of Lake Tapps, consisting of a mix of hardwood and conifer trees and a well-established understory of native and non-native shrubs.
- In-stream habitat supports anadromous runs of steelhead and coastal cutthroat trout as well as chinook, coho, chum, pink and sockeye salmon. Bull trout may also be present.
- Impervious surfaces in the Lower White River sub-basin are projected to increase from 14 percent to 20 percent (mostly west of Lake Tapps). However, impervious surfaces in the Mud Mountain and upper portions of the White River Basin are not projected to increase substantially. The Mud Mountain sub-basin currently contains approximately 4 percent impervious cover.

- The geology within and east of Buckley was affected by the Osceola mudflow, about 5,700 years ago. This mudflow is composed of an unsorted and unstratified mixture of subangular stones in a sand-clay matrix. This mudflow has very low permeability, forming an aquitard that tends to impede surface water infiltration.
- Since the last period of glaciation, the White River and its tributaries have deposited large quantities of sediments within the floodplains. In the upper reaches of the basin, glacial action, high stream gradients, and erosion combine to produce large volumes of sediment.
- Mud Mountain Dam captures approximately 8,000 to 10,000 cords of wood (booms, firewood, habitat logs, etc) annually behind the dam. River bedload or sediment deposited while the pool is high is eroded and passed through the outlets by river flow when the pool is evacuated. However, a general loss of wood transport results from presence of the dam. The diminished availability of wood downstream within the City of Buckley affects the natural creation of aquatic habitat that results from wood debris accumulations.

Within Buckley city limits, there are 3.04 miles of shoreline on the White River. Shoreline jurisdiction totals 0.29 square miles, of which approximately 0.23 square miles is the landward portion of the shoreline management area, comprising uplands, wetland and floodplain. There are no jurisdictional shorelines outside of the White River and associated wetlands and floodplain in Buckley. A diversion structure directs water from the river to the White River flume in Reach 2, at approximately RM 24.3. The diversion was constructed in 1912 with the White River Hydroelectric Project (ESA Adolfson 2009). Presently, the rights to the flume belong to Cascade Water Alliance (CWA), which may use the flume and Lake Tapps to provide a drinking water supply. Discharge from Lake Tapps enters back into the White River near the City of Sumner. Puget Sound Energy (PSE) has recently ceased hydroelectric production in Lake Tapps and has sold the lake and the associated water right to CWA. Much like operations conducted during PSE's ownership, CWA plans to maintain higher water levels in the spring, summer and fall for recreational purposes. In late fall through winter, the lake levels are lowered.

According to the Washington Department of Ecology, the entire length of the White River within the City and its UGA has been identified as an area where channel migration may occur (Ecology 2010a). However, the channel migration zone (CMZ) of the White River has not yet been mapped.

A 1990 Total Maximum Daily Load (TMDL) study for Ecology revealed pH levels exceeding water quality standards in the lower White River (Pelletier 1993). Subsequent monitoring continued to show pH levels exceeding standards (Ecology 2009). As a

result, the White River was placed on Washington State's 303(d) list of impaired water bodies as a Category 1 water as of 2003, carried over from 2004 (Ecology 2010b).

Updates to the 1993 Puyallup River Basin TLMD report recommend the preservation of minimum flows of 110 cfs in the White River at RM 15.7 (Pelletier 1994).

Wickersham Basin was created as a settling pool for turbulent water flowing through the White River flume to Lake Tapps. Although the basin held open water historically, it appears to be at present a fully vegetated wetland. Neither the White River flume nor Wickersham Basin constitutes a jurisdictional shoreline (Lukas 2010).

4.2 Major Land Use Changes and General Shoreline Conditions

Buckley, named in 1887 for J.M. Buckley, Northern Pacific Railway district superintendent, incorporated as a City in 1889. In 2008, the City population was estimated at 4,560. Steady growth of the town is expected to continue as the rural lifestyle and natural landscape attract people and development. City departments, commissions, plans and regulations reflect the desire to maintain the City's natural beauty and resources in face of ongoing development.

The great majority of City development is on the plateaus above the floodplain and outside of shoreline jurisdiction. City development is primarily single-family residential, with public/institutional land, light industrial, and central, general, and historic commercial. The commercial areas predominate along the SR 410 corridor. The bulk of the remainder of the City maintains an historic small-town character, and the Comprehensive Plan focuses on preserving this character in the face of projected significant population growth (City of Buckley 2005). Within the White River shoreline area, land use is primarily natural open space, with the exception of the diversion dam and related access and facilities. One public access to Riverside Park, a small area with picnic tables near the river, includes the Foothills Trails on the only City-owned property in shoreline jurisdiction.

Regulations within the shoreline jurisdiction are unlikely to impact the developed areas of the City. Development likely to occur within the shoreline is limited to public access and other public uses, as well as maintenance of the diversion dam facilities. Regulations under the City's SMP are not likely to impact or regulate water diversion strategies by CWA. The existing SMP and the City of Buckley Comprehensive Plan cite goals that focus on preserving the natural shoreline element and enhancing recreational opportunities, limiting development to water-oriented, and specifically, water-dependant uses. Overlapping critical areas regulations related to streams and wetlands further protect the majority of shoreline jurisdiction.

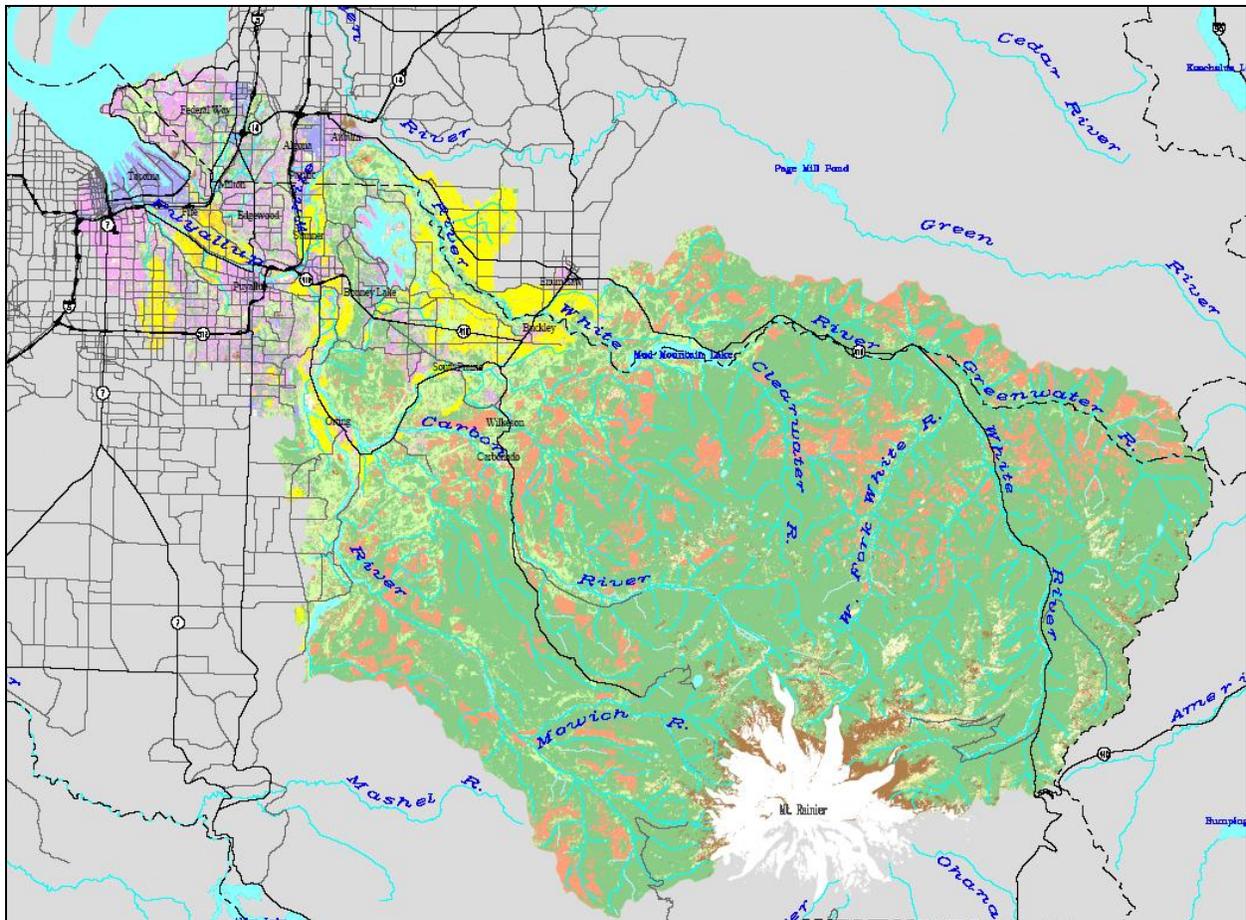


Exhibit 2. Puyallup-White River, Water Resource Inventory Area (WRIA) 10 (Department of Ecology).

4.3 Analysis of Ecological Functions

Ecological processes and functions of the White River within the City of Buckley are summarized in Tables 3 through 6. These tables are organized around the Department of Ecology’s list of processes and functions for freshwater lakes and streams (Washington Department of Ecology 2010). The list includes the evaluation of four major processes: 1) hydrologic; 2) vegetation; 3); hyporheic and 4) habitat. These are further broken down into the following functions which are in turn used to evaluate assessment unit performance:

- | Stream Functions |
|---|
| <p>1. Hydrologic Functions</p> <ul style="list-style-type: none"> • Storing water and sediment • Transport of water and sediment • Attenuating flow energy • Developing pools, riffles, and gravel bars • Removing excess nutrients and toxic |

Stream Functions

compounds

- Recruitment of LWD and other organic material

2. Vegetative Functions

- Temperature regulation
- Water quality improvement
- Slowing riverbank erosion; bank stabilization
- Attenuating of flow energy
- Sediment removal
- Provision of LWD and organic matter

3. Hyporheic Functions

- Removing excess nutrients and toxic compounds
- Water storage and maintenance of base flows
- Support of vegetation
- Sediment storage

4. Habitat Functions

- Physical space and conditions for life history
 - Food production and delivery
-

Assessment of each function is based upon both quantitative data results derived from the GIS inventory information described in Chapter 3; a qualitative assessment based on aerial photography and field inventory (where possible); and existing assessment information prepared by such entities as the Pierce County's Surface Water Management Division. As described in Chapter 3, the shoreline has been divided into broad assessment units based on waterbody, general land use, and ecological condition. In the ensuing tables, each assessment unit has been given an overall "rating" for ecological functions based on the available and relevant GIS information and the corresponding quantitative and qualitative evaluation. Rating was completed using a "low" to "high" function scale. The level categories are:

- Low (i.e. lowest quality functions)
- Low/Moderate
- Moderate
- Moderate/High
- High (i.e. highest quality functions)

4.3.1 Reach 1

The Reach 1 assessment unit extends along the south bank of the White River within shoreline jurisdiction from the eastern City boundary to approximately 800 feet upstream of the diversion dam (see Exhibit 1). The unit includes 3,481 linear feet of

White River shoreline and 33.3 acres of total landward jurisdiction. It includes “sensitive” and “public/institutional” and is almost entirely forested upland and wetland, with some emergent wetland and a small area of pastureland and rural development (Exhibit 3). There is no public access to the river in this reach. Ownership of the parcels within the reach is by PSE and the Washington State Department of Social and Health Services (Pierce County 2010).

Reach 1 of Buckley’s shoreline jurisdiction on the White River, while not greatly impacted by the diversion dam, is below the Mud Mountain Dam. Flow modifications caused by these two man-made features are considered the most significant habitat factors causing poor Chinook population parameters in the river (Pierce County 2008). Riparian and upland habitat conditions are generally good, with dense vegetation and high potential for LWD recruitment. The assessment of shoreline ecological functions for Reach 1 is provided in Table 3. This assessment includes all aquatic, upland, and associated wetland areas in shoreline jurisdiction



Exhibit 3. Forested floodplain and LWD viewed from the south in Reach 1 (copyright Microsoft 2010).

Table 3. Function Summary of the White River, Reach 1 (3,481 linear feet), within City of Buckley shoreline jurisdiction.

Reach 1	
Shoreline Processes and Functions Occurring within Assessment Unit	Alterations and Assessment of Functions
Hydrologic	
Storage of water and sediment	MODERATE/HIGH: Mud Mountain Dam is operated solely as a flood-control dam, and as such has no permanent reservoir. Sediment trapped upstream of the dam during peak flow events is transported past the dam as the water evacuates, allowing it to continue being transported downstream. The presence of the diversion structure just downstream of Reach 1 functions to encourage sedimentation in the reach, resulting in gravel bars and a split channel. A broad floodplain, generally lacking in human-created structures, allows water to spread over a broad front and be stored, at least for a short time during high-flow events.
Transport of water and sediment	LOW/MODERATE: The diversion structure immediately downstream of Reach 1 limits the potential for water and sediment transport. Sediment stored in the reach also slows transport of sediment and water through the reach.
Attenuating flow energy	MODERATE/HIGH: A broad, generally well-vegetated floodplain allows for significant flow energy attenuation at higher flow events. Gravel bars in the reach are indicators that energy is being removed from the system in this reach.
Developing pools, riffles, and gravel bars	MODERATE: Gravel bars in the reach have helped to establish a riffle-pool sequence. However, LWD in the reach is lacking in quantity and in size compared to probable historic conditions. LWD is an important component in developing and maintaining riffle/pool sequences in Pacific Northwest streams.
Removing excess nutrients and toxic compounds	MODERATE/HIGH: Floodplains are well vegetated and readily accessible to higher flows, allowing vegetation to remove nutrients and toxic compounds. The forested floodplain also helps prevent such contaminants from reaching the river water in the first place.
Recruitment and transport of LWD and other organic material	MODERATE: The floodplain area is generally well-vegetated with conifer-dominated forest. No notable bank protection exists on the left (City) bank, allowing the potential for tree recruitment. However, the trees are generally too small to be fully effective as LWD in a river the size of the White River, and this limits the effectiveness of the reach. Upstream sources of LWD to the reach are limited by the operation of the Mud Mountain Dam, which annually removes wood trapped by the dam and uses it for booms, habitat logs, or firewood. Eight thousand to 10,000 cords of wood are salvaged annually, by one estimate (Pierce County Public Works & Utilities 2007).

Reach 1	
Shoreline Processes and Functions Occurring within Assessment Unit	Alterations and Assessment of Functions
Vegetation	
Temperature regulation	MODERATE/HIGH: Forested floodplain areas on the south and west bank provide shade from the most critical directions, the south and the west, during peak heating hours. As the trees continue to mature, this function should improve.
Water quality improvement	MODERATE/HIGH: Floodplains are well-vegetated and readily accessible to higher flows, allowing vegetation to remove nutrients and toxic compounds. The forested floodplain also helps prevent such contaminants from reaching the river water in the first place.
Slowing riverbank erosion; bank stabilization	MODERATE/HIGH: Forested banks provide a dense root system and potential LWD to help slow riverbank erosion. As the trees continue to mature, this function should improve..
Attenuation of flow energy	MODERATE/HIGH: A broad, generally well-vegetated floodplain that is accessible to higher-flow events allows for significant flow energy attenuation. Gravel bars in the reach are indicators that energy is being removed from the system in this reach.
Sediment removal	MODERATE/HIGH: The presence of a well-vegetated floodplain area accessible to higher flow events encourages sediment removal from the higher-flow events that mobilize the most sediment. As flow energy is dissipated by spreading over the floodplain and moving through the vegetated areas, the sediment-carrying capacity is reduced, causing sediment to deposit.
Provision of LWD and organic matter	MODERATE/HIGH: Shoreline vegetation along this reach is dense, consisting largely of conifer-dominated forest. There is great opportunity for LWD and organic matter to be introduced into the aquatic environment.
Hyporheic	
Removing excess nutrients and toxic compounds	HIGH: The soils in this portion of the stream are primarily Pilchuck fine sands, a soil derived from alluvium (river deposits) and described as “excessively well drained.” The reach is generally well-vegetated with mostly native trees. The combination of soils and vegetation should produce nearly ideal conditions for removing excess nutrients and toxic compounds.
Water storage and maintenance of base flows	MODERATE/HIGH: Soils are conducive to water infiltration, and the lack of barriers to floodplain flow allows water to infiltrate over a broad area during higher flow events.
Support of vegetation	HIGH: Soils are conducive to both hyporheic flow and support of vegetation. The floodplain area is well-vegetated.
Sediment Storage	HIGH: Soils in this reach are derived from stream deposits, indicating that significant sediment is stored in the reach and contributing to hyporheic function.

Reach 1	
Shoreline Processes and Functions Occurring within Assessment Unit	Alterations and Assessment of Functions
Habitat	
Physical space and conditions for life history	MODERATE/HIGH: Habitat in the reach consists primarily of conifer-dominated forests. Although the vegetative community in the upland provides extensive habitat for terrestrial species (accumulated downed wood and snags, resulting in places for various wildlife species to find cover or suitable nesting and rearing sites), the aquatic environment provides much less complexity. Within the channel itself, less wood overall similarly results in less available protective cover, and diminishes the creation of pool/riffle sequences as well.
Food production and delivery	MODERATE/HIGH: Food production from upland areas is fairly good, with abundant native seed- and fruit-bearing vegetation. Not only does such vegetation provide food directly for terrestrial wildlife, but it is a source of insects and other organic matter that drop into the water and provide food, either directly or indirectly, for fish and other aquatic life.
Summary	Taking into consideration the existing hydrologic, vegetative, hyporheic and habitat conditions within Reach 1, the overall shoreline ecological function is MODERATE/HIGH.

4.3.2 Reach 2

Reach 2 is the location of the greatest degree of development within the City and UGA shoreline jurisdiction. It is defined by the diversion dam and associated facilities (Exhibit 4). No substantial portion of undeveloped parcels exists. The reach contains the lowest proportion of the shoreline, with 6.3 acres of landward area and 1,332 linear feet of shoreline. There is private access to the river via CWA property, which owns all but a small portion of the land in the reach (Pierce County 2010). Shoreline hardening and an in-water structure are present in the dam vicinity.

Total vegetative cover in the reach is approximately 32 percent, with the remainder primarily consisting of impervious surface. Habitat throughout Reach 2 is the lowest functioning of the three reaches, as it supports the least amount of high quality vegetation and contains the highest proportion of impervious surface (Table 2). The assessment of shoreline ecological functions is provided in Table 4. This assessment includes all aquatic, upland, and associated wetland areas in shoreline jurisdiction.



Exhibit 4. View of the diversion dam and associated structures from the north facilities in Reach 2 (copyright Microsoft 2010).

Table 4. Function Summary of the White River, Reach 2 (1,332 linear feet), within City of Buckley shoreline jurisdiction.

Reach 2	
Shoreline Processes and Functions Occurring within Assessment Unit	Alterations and Assessment of Functions
Hydrologic	
Storage of water and sediment	HIGH: The diversion dam encourages water and sediment storage in this reach.
Transport of water and sediment	LOW/MODERATE: The diversion dam interrupts both water and sediment transport processes, diverting a portion of the flow into the flume and to Lake Tapps. The change in gradient caused by the diversion dam slows water velocities, which reduces stream energy and causes sediment to be deposited. The flow is then split, further reducing stream energy and limiting the sediment transport capacity in this reach and in downstream reaches.
Attenuating flow energy	MODERATE/HIGH: The diversion dam slows water velocity, and the diversion reduces flow volume, both of which attenuate stream energy. Infrastructure related to the diversion serves to limit the area that can be inundated in a flood event and reduces the vegetation cover in the reach, which in turn limits the amount of flow energy attenuation that can be achieved.
Developing pools, riffles, and gravel bars	MODERATE: Gravel bars in the reach have helped to establish a riffle-pool sequence. However, LWD in the reach is lacking in quantity and in size compared to probable historic conditions. LWD is an important component in developing and maintaining riffle/pool sequences in Pacific Northwest streams.
Removing excess nutrients and toxic compounds	LOW: Due to its relatively short length, infrastructure related to the diversion, and comparative lack of vegetation, this reach offers little ability to remove nutrients and toxic compounds.
Recruitment and transport of LWD and other organic material	LOW: Trees, especially those of a size necessary to function well in the White River, are generally lacking in this reach. Logs from upstream sources transported to and/or through this reach are limited by the Mud Mountain Dam
Vegetation	
Temperature regulation	LOW/MODERATE: Banks and buffers in this Reach 2 are lacking in size and quantity needed to provide significant benefit to temperature regulation function.
Water quality improvement	LOW: due to its minimal length, infrastructure related to the diversion, and comparative lack of vegetation, this reach offers little ability to remove nutrients and toxic compounds. Crop land and residential properties adjacent to this reach, with little vegetated buffer between them and the river, may serve as a source of water quality problems.
Slowing riverbank erosion; bank stabilization	MODERATE/HIGH: Flow and diversion dam function are managed as part of the diversion operation, resulting in shoreline protections and this limited bank erosion.

Reach 2	
Shoreline Processes and Functions Occurring within Assessment Unit	Alterations and Assessment of Functions
Attenuation of flow energy	LOW/MODERATE: This reach is small and comparatively poorly vegetated. Due to the infrastructure associated with the diversion, flows are less able to reach vegetated areas where energy attenuation can be accomplished. While this reach generally functions well at attenuating flow energy, vegetation plays little role in that attenuation.
Sediment removal	LOW/MODERATE: As stated above, there is little floodplain vegetation and flood flows are less able to reach what vegetation does exist. This limits the potential and opportunity for vegetation to remove sediment.
Provision of LWD and organic matter	LOW/MODERATE: Shoreline vegetation along this reach is sparse, much of it converted to fields and lawns.
Hyporheic	
Removing excess nutrients and toxic compounds	HIGH: The soils in this portion of the stream are primarily Pilchuck fine sands, a soil derived from alluvium (river deposits) and described as “excessively well drained”. The reach is generally well-vegetated with mostly native trees. The combination of soils and vegetation should produce nearly ideal conditions for removing excess nutrients and toxic compounds..
Water storage and maintenance of base flows	MODERATE/HIGH: Soils are conducive to water infiltration, and the lack of barriers to floodplain flow allows water to infiltrate over a broad area during higher flow events.
Support of vegetation	MODERATE/HIGH: Soils are conducive to both hyporheic flow and support of vegetation. The floodplain area is poorly vegetated.
Sediment Storage	HIGH: Soils in this reach are derived from stream deposits, indicating that significant sediment is stored in the reach and contributing to hyporheic function.
Habitat	
Physical space and conditions for life history	LOW/MODERATE: Habitat in this reach is limited by alterations in vegetation. Modifications to much of the shoreline for the diversion structure, and the conversion of much of the area to laws or fields has limited the habitat structure of the reach
Food production and delivery	LOW/MODERATE: Food production from upland areas is limited in some areas of the shoreline by a lack of vegetative quantity, quality, and diversity.
Summary	Considering the existing hydrologic, vegetative, hyporheic and habitat conditions within Reach 2, the overall shoreline ecological function is MODERATE.

4.3.3 Reach 3

Reach 3, the downstream reach of the City's shoreline area below the diversion dam, consists of 106.9 acres and has 11,257 linear feet of shoreline. The reach includes one area not contiguous with the floodplain: a wetland hydrologically connected to the river, although not by surface waters. A second wetland is narrowly connected to the river and therefore also within shoreline jurisdiction.

This is the largest and least developed reach, zoned almost entirely "sensitive" with one small "public/institutional"-zoned area. PSE owns the majority of waterfront land, and CWA is listed as owner of the majority of land just inland of the most waterward parcels, as well as a single waterfront parcel in Reach 1. The City of Buckley owns an area of public waterfront access just east of SR 410 containing Foothills Trail and Riverside Park (Pierce County 2010).

Despite lacking a well-defined riffle pool and LWD, habitat function throughout Reach 3 is high, and riparian and forest vegetation is dense and includes wetlands (Exhibits 5 and 6). The assessment of shoreline ecological functions is provided in Table 5. This assessment includes all aquatic, upland, and associated wetland areas in shoreline jurisdiction.



Exhibit 5. Upland and shoreline habitat viewed from the north in Reach 3 (copyright Microsoft 2010).



Exhibit 6. Shoreline in Reach 3.

Table 5. Function Summary of the White River, Reach 3 (11,257 linear feet), within City of Buckley shoreline jurisdiction.

Reach 3	
Shoreline Processes and Functions Occurring within Assessment Unit	Alterations and Assessment of Functions
Hydrologic	
Storage of water and sediment	HIGH: This reach has a broad, well-vegetated floodplain, with high-flow channels and scars indicative of an active floodplain. During flood events, water flows leaves the banks and is stored in the floodplain. Gravel bars are present, though not as prolifically as in Reach 1.
Transport of water and sediment	MODERATE/HIGH: The active channel is primarily a single-thread channel. Gravel bars are present, but not the dominant feature of the reach.
Attenuating flow energy	MODERATE/HIGH: High flow events reach the heavily-vegetated floodplain, enabling the flow to disperse over a larger area and increasing flow resistance, which decreases stream energy. More LWD in the channel would help improve this function.
Developing pools, riffles, and gravel bars	MODERATE: Gravel bars and riffles are present, but a well-defined riffle-pool sequence is absent in Reach 3. LWD is generally lacking in this reach, limiting pool formation and preventing establishment of a sequence of riffles and pools.
Removing excess nutrients and toxic compounds	HIGH: Abundant vegetation on the floodplain through most of Reach 3 can help remove excess nutrients and toxic compounds during high flow events and in water entering the channel along this reach. Vegetated buffers on this reach range from approximately 150 feet to 1,800 feet wide. The exception is one section where the right (north) bank has eroded, near SE 472 nd Street, where the buffer is largely gone. The area of impaired buffer is quite small given the overall size of the reach.
Recruitment and transport of LWD and other organic material	MODERATE/HIGH: This reach is well-forested on both banks, and the only bank armoring is near the Highway 410 bridge. The potential for LWD recruitment is high, although the size of the LWD available may be small compared to historic standards, especially on a river the size of the White. LWD transport is limited by the low volume and quality of LWD reaching the site.
Vegetation	
Temperature regulation	MODERATE/HIGH: Well-vegetated banks and buffers provide shaded conditions, which in turn benefit both temperature and dissolved oxygen conditions.
Water quality improvement	HIGH: Abundant vegetation on the floodplain through most of this reach can help remove excess nutrients and toxic compounds during high flow events and in water entering the channel within the reach. Vegetated buffers range from 150 feet to 1,800 feet wide.
Slowing riverbank erosion; bank	MODERATE/HIGH: Roots from established forest vegetation provide resistance to bank erosion, and where

Reach 3	
Shoreline Processes and Functions Occurring within Assessment Unit	Alterations and Assessment of Functions
stabilization	erosion does occur, LWD is often recruited to help stabilize the banks. One exception is a portion of the right (north) bank near 427nd Street where a high bank has been eroded. Vegetation at the top of the bank is a combination of pasture and low-growing shrubs lacking the deep, dense root structure that might help stabilize the bank.
Attenuation of flow energy	HIGH: High flow events reach the heavily-vegetated floodplain, enabling the flow to disperse over a larger area and increasing flow resistance, which decreases stream energy.
Sediment removal	HIGH: High flows readily reach the well-vegetated floodplain where velocities are slowed by friction with the vegetation. As velocities slow, sediment carried by the flow is deposited on the floodplain.
Provision of LWD and organic matter	MODERATE/HIGH: Vegetation in the floodplain is abundant and dominated by conifer species, which provide generally the most stable LWD, but lacking in size to be fully functional on a river the size of the White. Organic matter input should reflect the abundant vegetation.
Hyporheic	
Removing excess nutrients and toxic compounds	HIGH: The soils in this portion of the stream are primarily derived from alluvium (river deposits) and well-drained. The reach is generally well-vegetated with mostly native trees. The combination of soils and vegetation should produce nearly ideal conditions for removing excess nutrients and toxic compounds..
Water storage and maintenance of base flows	MODERATE/HIGH: Soils are conducive to water infiltration, and the lack of barriers to floodplain flow allows water to infiltrate over a broad area during higher flow events.
Support of vegetation	HIGH: Soils are conducive to both hyporheic flow and support of vegetation. The floodplain area is well vegetated.
Sediment Storage	HIGH: Soils in this reach are derived from stream deposits, indicating that significant sediment is stored in the reach and contributing to hyporheic function.
Habitat	
Physical space and conditions for life history	MODERATE/HIGH: Habitat in the reach consists primarily of conifer-dominated forest. Although the vegetative community in the upland areas provides extensive habitat for terrestrial species (accumulated downed wood and snags, resulting in places for various wildlife species to find cover or suitable nesting and rearing sites), the aquatic environment provides much less complexity. Within the channel itself, less wood overall similarly results in less available protective cover, and diminishes the creation of pool/riffle sequences as well.
Food production and delivery	MODERATE/HIGH: Food production from upland areas is fairly good with native seed- and fruit-bearing

Reach 3	
Shoreline Processes and Functions Occurring within Assessment Unit	Alterations and Assessment of Functions
	vegetation. Not only does such vegetation provide food directly for terrestrial wildlife, but it is a source of insects and other organic matter that drop into the water and provide food, either directly or indirectly, for fish and other aquatic life.
Summary	Considering the existing hydrologic, vegetative, hyporheic, and habitat conditions within Reach 3, the overall shoreline ecological function is MODERATE/HIGH.

5 LAND USE ANALYSIS AND IMPLICATIONS

5.1 Introduction

Land use patterns are an important consideration in SMP analysis because such analysis can identify opportunities for “preferred uses”, especially water-dependent, water-related and water-enjoyment uses. Land uses adjacent to the water are also a determinant in assigning environment designations to specific sections of the shoreline. Additionally, an analysis of land use conditions is necessary to determine potential land use changes and their effect on shorelines with respect to SMA objectives. Finally, the existing land uses and proposed environment designation boundaries and provisions must be mutually consistent with the City’s comprehensive plan.

As part of SMP development, the shoreline is to be classified into specific shoreline environment designations based upon existing land use patterns, baseline inventory results, goals stipulated in the City’s Comprehensive Plan, and Ecology criteria. Allowed uses, conditional uses, and prohibited uses will be defined for each designation. Ecology Guidelines include six recommendations for shoreline environment designations (listed below). However, each jurisdiction may use alternate or parallel environment designations, as appropriate, as long as they provide equal or better protection than the standard.

Ecology Recommendations

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

This section of the Analysis Report examines conditions of Buckley shorelines with respect to potential environment designation criteria and potential use provisions to meet SMP objectives.

5.2 Assessment Unit Conditions

This section examines the data gathered in the inventory and describes for each assessment unit the (1) likely future land uses and activities, and (2) implications for shoreline management (Table 6). Likely or appropriate environment designations are listed for each assessment unit.

Table 6. Likely changes in land use and implications for shoreline management.

Reaches	Likely Changes in Land Use	Implications for Shoreline Management
<p>Reach 1</p>	<p>The great majority of Reach 1 is forested, both upland and wetland. All is designated Urban Lower Density in the Buckley Comprehensive Plan, and zoning is approximately 2/3 Public-Institutional and 1/3 Sensitive. A small area is cleared as part of a rural development, most of which is outside of shoreline jurisdiction. Reach 1 ownership is PSE, CWA, and Washington State Department of Social and Health Services (DSHS). Land ownership may change as PSE transfer land to CWA. The presence of a wetland and the turn in the river along this reach would limit most development, with the possible exception of passive recreation or public access, regardless of shoreline jurisdiction.</p>	<p>Urban Conservancy appears to be the most appropriate environment designation for Reach 1.</p>
<p>Reach 2</p>	<p>Reach 2 is designated entirely as Urban Lower Density and zoned Public-Institutional. Ownership is formerly PSE, but the greater part of the reach is now owned by CWA. The reach is unlikely to develop for uses besides its present use of the diversion dam facility.</p>	<p>Urban Conservancy appears to be the most appropriate existing environment designation for Reach 2. However, a new designation may be created to reflect the reach's unique use.</p>
<p>Reach 3</p>	<p>Reach 3 is designated entirely as Urban Lower Density and zoned nearly entirely Sensitive, with about 1% Public/Institutional. Public access has been recently improved with a trail and picnic area. The reach includes the SR 410 overpass and Riverside Park, which contains the above-referenced picnic area accessed by Foothills Trail. Further development of the park or other accesses is possible, but land outside of the City-owned park and trail is owned by PSE (waterfront parcels) and CWA (adjacent landward parcels) CWA. Ownership may change as PSE transfers ownership to CWA. The remainder of the reach is undeveloped riparian, upland and wetland forest. River and wetland buffers encompass most of the reach that is not critical area. Thus, future</p>	<p>Urban Conservancy appears to be the most appropriate environment designation for Reach 3.</p>

Reaches	Likely Changes in Land Use	Implications for Shoreline Management
	development would be limited by critical area regulations.	

6 PUBLIC ACCESS ANALYSIS AND IMPLICATIONS

6.1 Introduction

Public access includes the ability of the general public to reach, touch, and enjoy the water’s edge, to travel on the waters of the state, and to view the water and the shoreline from adjacent locations.

WAC 173-26-221(4)(c) states that:

“Local governments should plan for an integrated shoreline area public access system that identifies specific public needs and opportunities to provide public access... This planning should be integrated with other relevant comprehensive plan elements, especially transportation and recreation.”

To support this planning, WAC 173-26-201(3)(c) calls for local governments to inventory existing and potential shoreline public access sites, including public rights-of-way and utility corridors. Because shoreline access includes visual access, important views of the water from shoreline areas were also identified.

Information about public access sites in the City was drawn from site visits, aerial photographs, the City’s Comprehensive Plan Parks and Recreation Element, the City’s website, and the City’s and County’s land use maps.

6.2 Shoreline Access

6.2.1 White River Access

The main recreational access to the White River within Buckley is Foothills Trail. The trail presently extends from Buckley to Meeker Junction, and the Pierce County Parks and Recreation Department is working to secure grant money for additional trail improvements, including trail connections and extensions. Within the City of Buckley is a 2-mile paved trail segment. This is an improved paved section beginning in downtown Buckley at the Buckley National Guard Armory and extending along an abandoned railroad grade adjacent to the White River flume to the River Avenue right-of-way, where it enters shoreline jurisdiction and continues to the river. Near the river shoreline, the trail enters

Riverside Parks, which was developed by Tacoma Water as part of an agreement for the use of the property by the utility for a water main replacement process. The park consists of a gravel parking lot and grassy picnic area with river access; the parcel on which the park is located is visible as a public access area in Appendix C, Figure 7. A number of side trails and informal paths lead eastward from the park area through the wooded floodplain to the diversion dam area. Plans to extend the trail to King County via a bridge over the White River are a collaborative effort between the City and Enumclaw, Pierce County and King County (City of Buckley 2005).

The river can also be accessed beneath the SR 410 bridge, although there are no public parking or trail facilities.

6.2.2 Other Shoreline Areas

Private access via PSE and CWA parcels leads to the diversion dam area and does not generally provide recreational opportunities to the public. The access road along the White River flume borders shoreline jurisdiction, and access to the shoreline area is possible, although no formal parking areas exist. No developed recreational facilities are present in the shoreline area accessible from this road, although the area could potentially be used for bird-watching and other passive recreational activities.

6.3 Public Access Implications

The City provides essentially one recreational public access, Riverside Park, reached via Foothills Trail, to the White River. Opportunity exists for the City to add new public access and provide recreational sites along the river. No such opportunities are directly identified in the Parks and Recreation Element of the City's Comprehensive Plan (City of Buckley 2005), except for connecting Foothills Trail to King County by bridging the river. As well, the Level of Service standards used for the plan do not include a numerical standard for conservation and greenway systems. However, the mission of the Plan is *"to ensure the retention of open space and the continued development of active and passive recreational opportunities to benefit the citizens of the growing community of Buckley and its surroundings"* and several goals listed in the plan promote passive recreational facilities, environmental protection, and acquisition and expansion of open space in the City:

"Goal (1) The City should promote a diversified system of parks, recreational facilities and open space areas that furnish quality active and passive recreational experiences for all community residents and preserve, protect and enhance significant open space." Objectives of Goal (1) include maintenance of landscaping, equipment and other features; promotion of private and volunteer efforts in maintenance and operating community activities; and compliance with the American Disabilities Act.

“Goal (2) The City should continue development and expansion of the Community Activities Program (CAP).” Objectives of this goal are to pursue a property for a multi-use sports facility, to continue cost sharing with and explore possible expansion option for the White River School District, and to develop and implement a youth activities program.

“Goal (3) The City should pursue and enhance identified undeveloped and underdeveloped spaces for parks, recreational facilities and open space.” Objectives are to obtain land for open space and recreation within residential developments, or to collect applicant fees for development or expansion of open space and recreational lands.

“Goal (4) The City will maximize funding and construction opportunities for park and recreation facilities, including joint projects with private or public partners.” Objectives include establishing recreational facilities on suitable abandoned railroad right-of-way, updating the current cost-sharing program using mitigation fees for residential developments, and encouraging private donations for acquisition and development of recreational facilities.

“Goal (5) The City will provide an open and continuing opportunity for the public to participate, comment, and offer direction to the development of recreational facilities, space and activities.” The objective of Goal (5) is to use public outreach to encourage public involvement.

“Goal (6) The City shall strive to increase citizen awareness of the types, extent and location of recreational facilities throughout the community.” Goal (5) objectives are to install signage at facilities as funding allows, and to develop materials such as brochures and mailings identifying types and locations of recreational facilities.

“Goal (7) The City should preserve quality park and open space resources and develop a diversified park system which preserves significant environmental opportunity areas and features.” The City aims to complete the Buckley section of Foothills Trail and the trail crossing linking the trail to King County over the White River.

“Goal (9) The City will promote a system of parks, recreational facilities and open space that are resource-effective and distributed community-wide in a manner to provide multiple benefits to the community.”

“Goal (10) The City will promote a connected and coordinated open space system of linkage to major recreation areas via trails, paths, and other travel corridors that separate vehicular and non-vehicular transportation where feasible.” The City’s objective for this goal is to adopt Level of Service standards to ensure that linking recreational areas is prioritized.

“Goal (11) The City will promote a park system that provides a sense of security and well-being.” Objectives are to ensure security needs are reviewed and adopted into the Buckley Police Department patrol program, and to continue to add lighting to parks and other recreational facilities.

“Goal (12) The City will continue to explore and identify environmentally sound projects that balance the need for expanded operations or services and protection of the environment.” The City aims to continue efforts at negotiating with DSHS and the State to construct a bio-solids compost facility and wastewater re-use system with recreational facilities.

“Goal (13) The City will continue to work with neighboring communities to identify and implement measures designed to enhance tourism, recreational and economic development through exploring and sharing historical knowledge and information about our common heritage.” The objectives are to establish monuments, signs and/or open spaces at each entrance to the City, and to create tourism promotional materials identifying recreational opportunities, natural features, and historic heritage of the City and neighboring communities.

“Goal (14) The City should actively explore the idea of participating in the formation of a Park District with neighboring communities and unincorporated areas of the White River School District.”

A number of the above goals and objectives may be applied within shoreline jurisdiction.

7 SHORELINE MANAGEMENT RECOMMENDATIONS

The following are recommended actions for translating inventory and characterization findings into the draft SMP policies, regulations, environment designations, and restoration strategies for areas within shoreline jurisdiction.

7.1 Shoreline Master Program

7.1.1 Shoreline Environment Designation Provisions

- Recommendations for specific shoreline segments are discussed in section 5.0.

7.1.2 General Policies and Regulations

Shorelines of Statewide Significance

- Considering that the White River is a Shoreline of Statewide Significance, the SMP will need to address specific management policies as listed in WAC 173-26-251 which gives preference to uses in the following order of preference which:
 - (1) Recognize and protect the statewide interest over local interest;
 - (2) Preserve the natural character of the shoreline;
 - (3) Result in long term over short term benefit;
 - (4) Protect the resources and ecology of the shoreline;
 - (5) Increase public access to publicly owned areas of the shorelines;
 - (6) Increase recreational opportunities for the public in the shoreline;
 - (7) Provide for any other element as defined in RCW 90.58.100 deemed appropriate or necessary.”

Critical Areas

- Consider whether the City's critical areas regulations should be incorporated into the SMP by reference or through direct inclusion (WAC 173-26-191).
- Maintain a 200-foot buffer on the White River to the extent consistent with existing conditions and the objectives of the Shoreline Management Act.
- Address the fact that there are a number of wetlands which are hydrologically connected to the White River and thus may extend shoreline jurisdiction beyond the standard 200-foot jurisdictional area.
- Due to areas of steep topography in and adjacent to the shoreline, ensure the SMP includes provisions regarding geologically hazardous areas, since these encumber much of the landward edge of shoreline jurisdiction.

Volcanic Hazard Reductions

- Consider incorporating Pierce County Department of Emergency Management's Region 5 Hazard Mitigation Plan (Pierce County 2009).

Flood Hazard Reduction

- Consider incorporating Pierce County Department of Emergency Management's Region 5 Hazard Mitigation Plan (Pierce County 2009).
- Consider how to incorporate the various options developed by FEMA and others during development of the strategy for responding to National Marine Fisheries Service Biological Opinion evaluating FEMA's National Flood Insurance Program.

Public Access

- Work with the Public Works Department to identify potential locations for new public access sites and to identify improvements to increase the quality of existing public access to the White River and other parts of shoreline jurisdiction.
- Policies should be developed to encourage identification of development opportunities for additional shoreline public access sites. Sites that are both long-term and short-term priorities should be identified. City plans and improvement programs should be amended to reflect updated information.
- Policies and regulations that address the development of new or redevelopment of existing access and recreation facilities should ensure

that the development of such facilities result in no net loss of ecological function. Regulations should address upland uses and developments within shoreline jurisdiction, such as the location and design and construction of parking facilities, trails and structures.

- Ensure policies and regulations that are developed for the SMP are consistent with those identified in the Land Use, Parks and Recreation, Urban Design, and Utilities Elements of the City's Comprehensive Plan.

Vegetation Conservation

- Retain large woody debris in rivers, and maintain and enhance the long-term recruitment of woody debris from adjacent riparian zones.
- Prohibit the removal, relocation, or modification of large woody debris in aquatic habitats and adjacent banks except when the large woody debris poses an immediate threat to public safety or critical facilities. Assessment of the threat posed by large woody debris should be determined in consultation with a qualified geomorphologist.
- Mitigate the movement or removal of large woody debris complexes clearly posing a threat to infrastructure and critical facilities. Mitigation may include placing the wood back into the system at a location where it will not pose an immediate hazard and where the lack of large woody debris has been identified as a problem. If wood is not returned to the system, it should be reserved for use in habitat restoration projects. Mitigation also includes replanting native trees at the site of removal.
- Build on the existing protections provided in the City's critical areas regulations.

Water Quality, Stormwater, and Nonpoint Pollution

- Include policies and regulations that appropriately incorporate recommendations of the City's and County's water quality-related studies, particularly as related to impaired parameters listed by Ecology or outcomes of the NPDES Municipal Stormwater Permit requirements.
- Ensure that regulations allow for placement of any water quality-related structures or facilities in shoreline jurisdiction, including in the Aquatic environment.
- Consider whether special stormwater management provisions may be necessary beyond the standard City requirements contained in the adopted Ecology Stormwater Management Manual for Western Washington.

7.1.3 Shoreline Modification Provisions

Shoreline Stabilization

- Ensure “replacement” and “repair” definitions and standards are consistent with WAC 173-26-231(3)(a). Repair activities should be defined to include a replacement threshold so that applicants and staff will know when “replacement” requirements need to be met.

Piers and Docks

- No need for piers and docks is anticipated. Consider prohibiting this use and removing it from this section.

Fill

- Restoration fills, including improvements to shoreline habitats, material to anchor LWD placements, and as needed to implement shoreline restoration, should be encouraged. Consider allowing other fills related to the maintenance and repair of existing infrastructure (i.e. bridge footings).

Breakwaters, Jetties, Groins and Weirs

- Except for purposes of shoreline restoration (or possibly as part of flood hazard reduction), consider prohibiting these modifications.

Shoreline Habitat and Natural Systems Enhancement Projects

- The SMP should include incentives to encourage restoration projects, particularly in areas identified as having lower function. Emphasize that certain fills can be an important component of some restoration projects.

7.1.4 Shoreline Uses

Agriculture

- Consider prohibiting this use and removing it from this section.

Aquaculture

- Consider prohibiting this use and removing it from this section.

Boating Facilities

- Consider limiting boating facilities to boat ramps for public access. Piers, docks, and other similar overwater structures should be prohibited.

Commercial Development

- Consider prohibiting this use and removing it from this section. Current commercial development should be exempt.

Forest Practices

- Provide general policies and regulations for forest practices according to the WAC Guidelines.

Industry

- Consider prohibiting this use and removing it from this section.

Mining

- Consider prohibiting this use and removing it from this section.

Recreational Development

- Work with the Parks and Recreation Department and other entities to identify issues related to park development. Park lands provide many opportunities for shoreline restoration and can serve as demonstration projects to the greater public. Policies and regulations related to parks management should provide clear preferences for shoreline restoration consistent with public access needs and uses. Riverside Park should be protected and enhanced.

Residential Development

- No residential zoning exists within shoreline jurisdiction and no residential development is expected. Consider prohibiting residential uses.

Transportation/Parking and Utilities

- There are no major public roads apart from SR 410 in the City's shoreline, and no major need for public transportation within the shorelines, as the City's amenities are located outside of shoreline jurisdiction. The sole public park in the shoreline is accessed via Foothills Trail. The diversion dam and associated development is likely to remain the only utility-related use of the shoreline. Policies and regulations pertaining to activities that may take place on and adjacent to SR 410 and the existing dam facility should require careful consideration of short-term and long-term impacts on shoreline functions and processes, particularly in their management of stormwater runoff, shoreline hardening, potential for generating a later need for shoreline hardening and placement of in-water structures which can affect flows and substrates.

7.2 Restoration Plan

A Restoration Plan document will be prepared as a later phase of the Shoreline Master Program update process, consistent with WAC 173-26-201(2)(f). The Shoreline Restoration Plan must address the following six subjects (WAC 173-26-201(2)(f)(i-vi)) and incorporated findings from this analysis report:

- (i) *Identify degraded areas, impaired ecological functions, and sites with potential for ecological restoration;*
- (ii) *Establish overall goals and priorities for restoration of degraded areas and impaired ecological functions;*
- (iii) *Identify existing and ongoing projects and programs that are currently being implemented, or are reasonably assured of being implemented (based on an evaluation of funding likely in the foreseeable future), which are designed to contribute to local restoration goals;*
- (iv) *Identify additional projects and programs needed to achieve local restoration goals, and implementation strategies including identifying prospective funding sources for those projects and programs;*
- (v) *Identify timelines and benchmarks for implementing restoration projects and programs and achieving local restoration goals; and*
- (vi) *Provide for mechanisms or strategies to ensure that restoration projects and programs will be implemented according to plans and to appropriately review the effectiveness of the projects and programs in meeting the overall restoration goals.*

The Restoration Plan will “include goals, policies and actions for restoration of impaired shoreline ecological functions. These master program provisions should be designed to achieve overall improvements in shoreline ecological functions over time, when compared to the status upon adoption of the master program.” The Restoration Plan will mesh potential projects (opportunity areas) identified in this report with additional projects, regional or City-wide efforts, and programs of the City, watershed groups, and environmental organizations (e.g. WDFW or Puget Sound Partnership) that contribute or could potentially contribute to improved ecological functions of the shoreline.

8 REFERENCES

City of Buckley GIS, 2010.

City of Buckley. 2005. City of Buckley Lake Comprehensive Plan.

ESA Adolfson. 2009. Pierce County Shoreline Master Program Project: Final Shoreline Inventory and Characterization Report. October 2007. Prepared for Pierce County Planning and Land Services Department. Pierce County, WA.

Pierce County Public Works & Utilities, Water Programs Division. 2007. White River Basin Plan Characterization Report. September 2007.
<http://www.co.pierce.wa.us/pc/services/home/environ/water/ps/watershed/whiterivermain.htm>.

Pierce County. 2008. Salmon Habitat Protection and Restoration Strategy, WRIA 10: Puyallup Watershed, WRIA 12: Chambers/Clover Creek Watershed. Pierce County (Lead Entity) guidance document, March 2008. 52pp.

Pierce County Department of Emergency Management. 2009. Region 5 Hazard Mitigation Plan: September 2008-2013 Edition.

Pierce County. 2010. Parcel information from online GIS database. Accessed September 2010.

Lukas, S.M. 2010. Letter to D. Schmidt, City of Buckley Planning Department, from the Washington Department of Ecology. Dated May 13, 2010.

Pelletier, G.J. 1994 . Addendum to the Puyallup River total maximum daily load for biochemical oxygen demand, ammonia, and residual chlorine. Washington State Department of Ecology, Publication #94-e36, Olympia, WA.

Washington Department of Archaeology & Historic Preservation.
<http://www.dahp.wa.gov/pages/wisaardIntro.htm>

Washington Department of Ecology. 2008. Washington Water Quality Assessment 303(d).

Washington Department of Ecology. 2009. Quality Assurance Project Plan: Lower White River pH and Nutrients Study. Washington Department of Ecology Publication No. 09-03-131. 22pp.

Washington Department of Ecology. 1998. Chapter 173-510, Instream Resources Protection Program – Puyallup River Basin, Water Resource Inventory Area (WRIA) 10. June. <http://www.ecy.wa.gov/biblio/wac173510.html>.

Washington Department of Ecology. 2010. Shoreline Master Program Handbook: Chapter 7, Shoreline Inventory and Characterization. March 23, 2010. 17pp.

Washington Department of Ecology. 2010a. Memo Concerning White River Flume and Wickersham Basin. Letter to City of Buckley. 13 May 2010.

Washington State Department of Ecology. 2010b. Water Quality Assessment for Washington. Ecology database query results for the White River. Available at <http://apps.ecy.wa.gov/wats08/QueryResults.aspx>.

Washington Department of Fish and Wildlife. 2010. Priority Habitats and Species database search results prepared for The Watershed Company, September 30, 2009.

9 LIST OF ACRONYMS AND ABBREVIATIONS

CAO	Critical Areas Ordinance
Corps.....	U.S. Army Corps of Engineers
CWA.....	Cascade Water Alliance
Ecology	Washington Department of Ecology
GMA.....	Growth Management Act
LWD	Large Woody Debris
NRCS.....	Natural Resources Conservation Service
PHS.....	Priority Habitats and Species
PSE.....	Puget Sound Energy
SMA.....	Shoreline Management Act
SMP	Shoreline Master Program
USFWS.....	U.S. Fish and Wildlife Service
USGS	U.S. Geological Service
WDFW	Washington Department of Fish and Wildlife

APPENDIX A

List of Data Sources

Preliminary List of Information Sources by Topic April 30, 2010

Map Folio Data Sources

Ecology GIS <http://www.ecy.wa.gov/services/gis/data/data.htm>:

- Lakes
- Existing/suggested shoreline streams/rivers/lakes
- 2008 Washington Water Quality Assessment 303(d)

City of Buckley GIS:

- Aerial photograph (July 2009)
- Lakes, streams, wetlands
- City boundary
- Parcels
- Comprehensive Plan designations
- Zoning
- Streets
- Stormwater
- Sanitary Sewer
- Parks and other public access

Pierce County GIS:

- Aerial photograph
- Floodway and floodplain

WDFW GIS:

- Priority habitats and species (September 30, 2009)
- SalmonScape

USGS

- ReGAP (impervious surfaces, 1999-2003)

NOAA

- C-CAP zone 1 2006-Era Land Cover [computer file]. (2008). Charleston, SC: NOAA's Ocean Service, Coastal Services Center (CSC). Available at <http://www.csc.noaa.gov/crs/lca> (March 2010).

Natural Resources Conservation Service

- Soils (<http://soildatamart.nrcs.usda.gov/Survey.aspx?County=WA053>)

Additional Characterization Data Sources

Multi-Topic General Reference Materials

City of Buckley. 2005. City of Buckley Comprehensive Plan.

City of Buckley. 2003. Fact Sheet for NPDES Permit WA 0023361 City of Buckley Wastewater Treatment Plant. Buckley, WA.

ESA Adolfson. 2008. Pierce County Shoreline Master Program Update Project: Shoreline Restoration Plan. Prepared for Pierce County Planning and Land Services Department. Pierce County, WA.

ESA Adolfson. 2009. Pierce County Shoreline Master Program Project, Final Shoreline Inventory and Characterization Report. June. Prepared for Pierce County Planning and Land Services Department. Pierce County, WA.

Washington Department of Ecology. 1998. Chapter 173-510, Instream Resources Protection Program – Puyallup River Basin, Water Resource Inventory Area (WRIA) 10. June. <http://www.ecy.wa.gov/biblio/wac173510.html>.

Critical Areas

Pierce County Public Works and Utilities. 1997. White River Basin Plan Characterization Report. September 2007.
<http://www.co.pierce.wa.us/pc/services/home/environ/water/ps/watershed/whiterivermain.htm>

Washington Department of Fisheries, Washington Department of Wildlife, and Western Washington Treaty Indian Tribes. 1993. 1992 Washington State salmon and steelhead stock inventory. March 1993. Olympia, WA. 212 p.

Williams, R.W., R.M. Laramie, and J.J. Ames. 1975. A Catalog of Washington Streams and Salmon Utilization, Vol. 1, Puget Sound Region. Washington Department of Fisheries.

Floodplains and Channel Migration Zones

Pierce County. 2007. County Floodplains and County Floodways. GIS database of preliminary Digital Flood Insurance Rate Map (DFIRM). Pierce County Water Programs, Pierce County, WA. April 17, 2007.

Pierce County. 2008. Pierce County Flood Risk Assessment. Pierce County Public Works and Utilities Water Programs Division, University Place, WA. March 2008.

Historical or Archaeological Sites

Washington Department of Archaeology & Historic Preservation.

<https://fortress.wa.gov/dahp/wisaard/>

DAHPP records search by Consultant.

Parks/Existing and Potential Public Access Sites

City of Buckley. 2004. Park and Recreation Plan. Buckley, WA. May, 2004.

APPENDIX B

Assessment of Shoreline Jurisdiction

19 February 2010

Dave Schmidt, City Administrator
City of Buckley
P.O. Box 1960
Buckley, WA 98321

Re: City of Buckley Shoreline Jurisdiction Options

Dear Dave:

The Watershed Company has developed the attached proposed maps of shoreline jurisdiction, illustrating the minimum jurisdiction option and the additional wetland buffers options. Under the City's current Shoreline Master Program (SMP), the White River is regulated as a shoreline. Existing shoreline jurisdiction includes the shorelands extending 200 feet from the ordinary high water mark, the contiguous floodplain, and identified associated wetlands. As part of the update to the City's Shoreline Master Program, the City plans to review and evaluate these boundaries for consistency with Washington Department of Ecology (Ecology) guidelines.

MINIMUM JURISDICTION

The first step in updating the map of shoreline jurisdiction was to review the precise shoreline, floodway, and associated wetlands definitions found in the WAC and in Ecology rules and guidance documents. Portions of these definitions that apply to the City of Buckley revolve around the flow thresholds for waterbodies meeting shoreline criteria, the two State floodway definitions, and when to consider critical areas (wetlands) as "associated" with the shoreline. The final illustration of the minimum shoreline jurisdiction is provided on the *Minimum Shoreline Jurisdiction* exhibit.

Lakes

The minimum size limit for lakes to be designated as shoreline is 20 acres. No waterbodies within the City boundary exceed 20 acres.

Streams and Rivers

Ecology's Digital Atlas was consulted to verify the upstream limits of stream and river shoreline jurisdiction based on USGS's recent study of the 20 cubic feet per second (cfs) cut-off. Based on this information, only the White River has a mean annual flow greater

than 20 cfs. The White River, through the City of Buckley, has a mean annual flow greater than 1,000 cfs and is thus considered a Shoreline of Statewide Significance.

No other waterbodies were indicated as having flows sufficient to meet shoreline criteria.

Shorelands

Floodplains/Floodways

The mapping of floodplains and floodways uses the latest information developed by Pierce County and is in the final stages of review by FEMA. Along the northern City limits, the White River has a floodway and floodplain that extends south, through portions of the City (see Step 1 of the *Shoreline Jurisdiction Assembly* exhibit). As required by the Shoreline Management Act, the minimum jurisdiction includes the floodways (see Step 2 of the *Shoreline Jurisdiction Assembly* exhibit) and portions of the floodplain that extend up to 200 feet inland from the floodway edge. The City currently regulates the entire floodplain of the White River as shoreline and plans to continue to do so in the future (see Step 3 of the *Shoreline Jurisdiction Assembly* exhibit). We will continue to monitor progress of the floodplain/floodway mapping until final adoption by FEMA, and will update jurisdiction maps as needed during the SMP update process.

Associated Wetlands

Existing wetland inventory information, essentially what has been identified by Pierce County's Supplemental Inventory and Washington Department of Fish and Wildlife's Priority Habitats and Species maps, was reviewed to identify associated wetlands (see Steps 4 and 5 of the *Shoreline Jurisdiction Assembly* exhibit). Ecology guidance states that the entire wetland is associated if any part of it lies within the area 200 feet from the OHWM (or floodway in riverine environments) of a state shoreline. Further guidance states that wetlands that are hydraulically connected to a Shoreline also would be considered associated, as well as wetlands within the 100-year floodplain. Wetlands that are separated by an obvious topographic break from the shoreline are not associated, provided they are outside the shoreland zone and provided that the break is not an artificial feature such as a berm or road.

Associated wetlands are identified in several areas to the south of the White River, just south of the northern City limit (see Step 5 of the *Shoreline Jurisdiction Assembly* exhibit).

OTHER JURISDICTION OPTIONS

The information above describes assembly of the minimum shoreline jurisdiction. The City may further elect to expand jurisdiction to include buffers of associated wetlands that would otherwise encompass areas outside of shoreline jurisdiction.

Schmidt, D.
19 February 2010
Page 3 of 3

The wetland buffers option was assembled by combining the *Minimum Shoreline Jurisdiction* exhibit with buffers assigned to wetlands illustrated on Steps 4 and 5 of the *Shoreline Jurisdiction Assembly* exhibit. Known wetlands within the City have not been rated using Ecology's latest wetland rating system as required by the City's critical areas regulations. According to the critical area regulations, possible buffers range from 50 to 150 feet. For illustration purposes only, these wetlands were assigned a 100-foot buffer (see *Shoreline Jurisdiction Option 1* exhibit).

Given the anticipated inclusion of the City's existing critical areas regulations wetland buffers into the SMP, it does not appear that expansion of shoreline jurisdiction to include these buffers would provide meaningful additional protection to the wetland and may unnecessarily increase the permit burden on the property owner.

Please call if you have any questions.

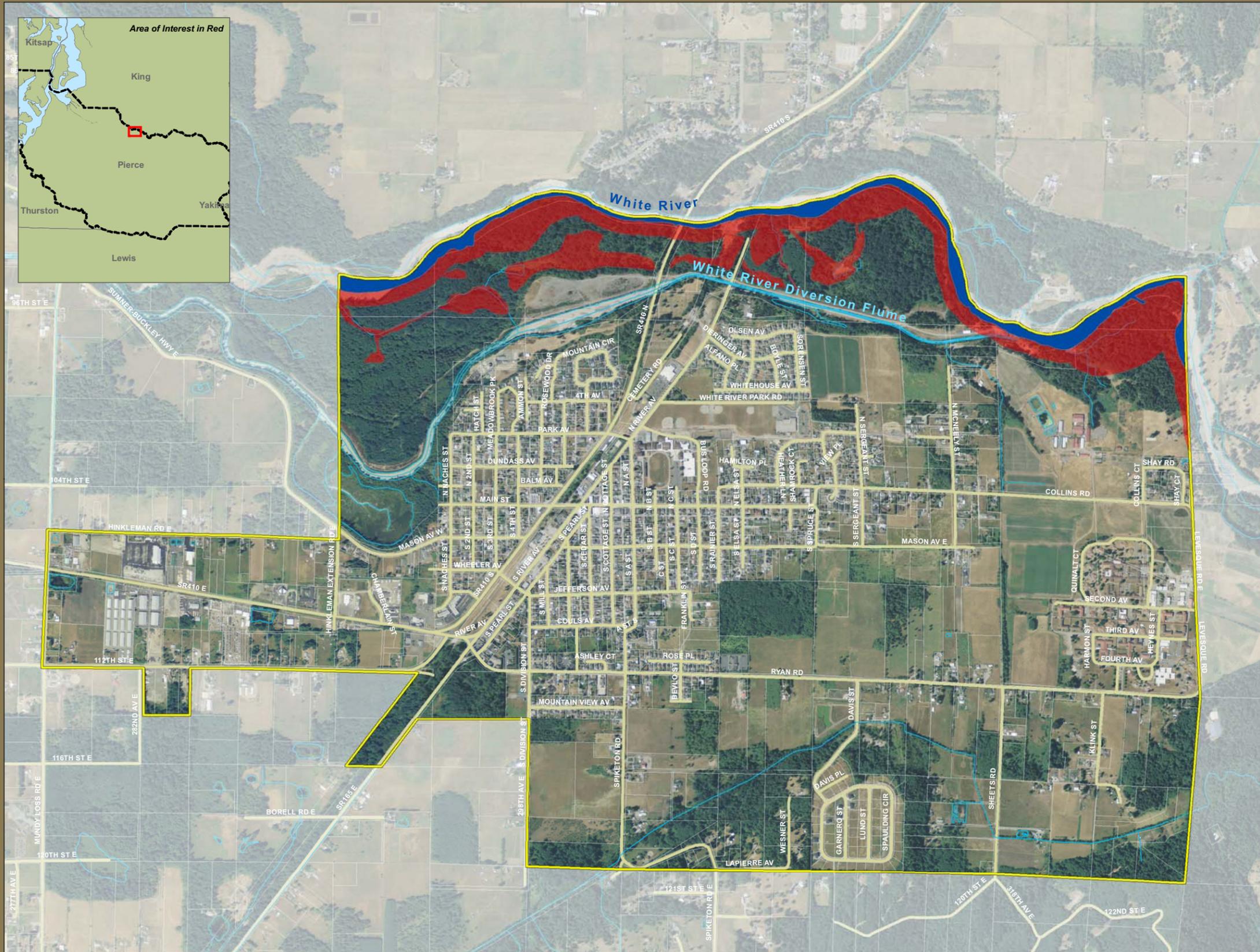
Sincerely,

A handwritten signature in blue ink, appearing to read "Dan Nickel", with a long, sweeping underline that extends to the left and then curves back under the name.

Dan Nickel
Environmental Engineer

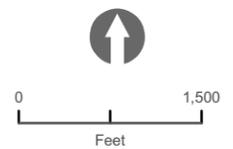
Enclosures

Minimum Shoreline Jurisdiction



CITY OF BUCKLEY Shoreline Master Program

Minimum Shoreline Jurisdiction



MAP LEGEND

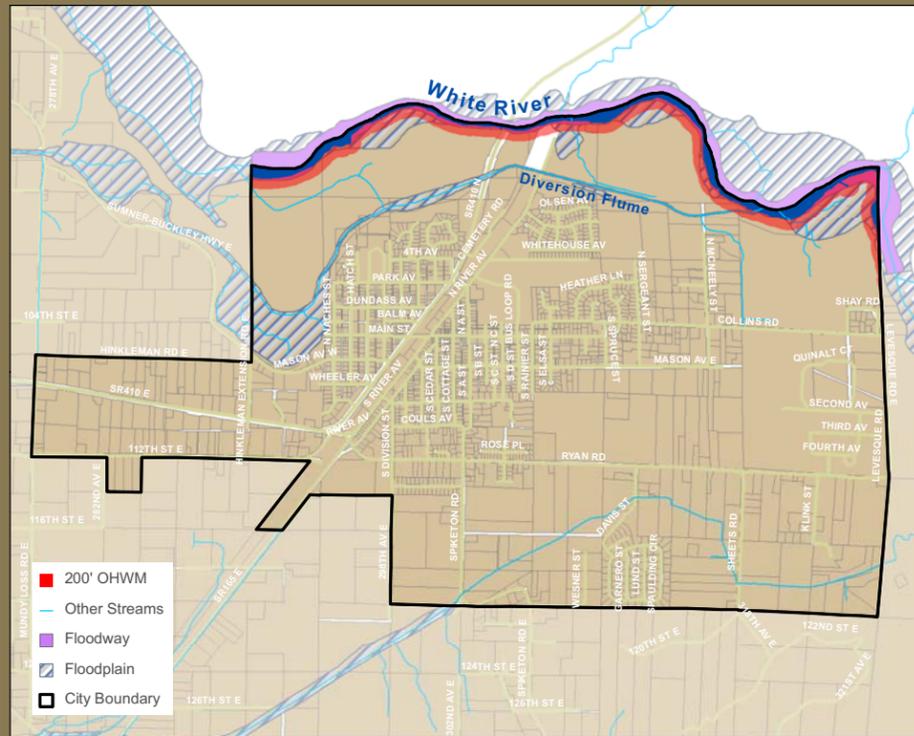
- Shoreline Jurisdiction
- SMP Waterbodies
- Other Waterbodies
- Roads
- Parcels
- City Boundary



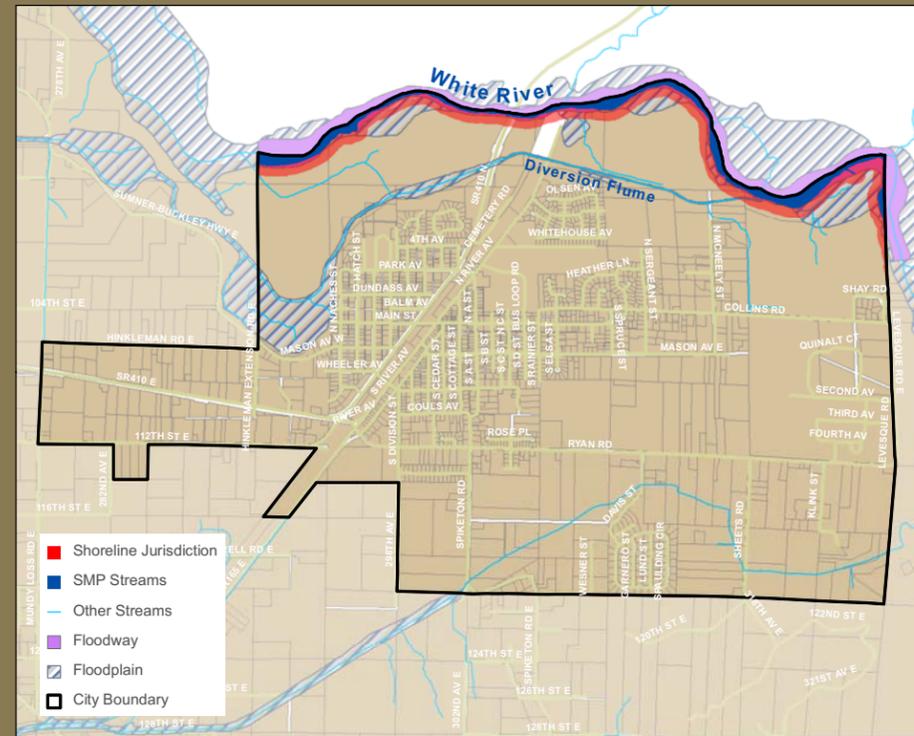
February, 2010
Data: Pierce County,
City of Buckley.

Shoreline jurisdiction boundaries depicted on this map are approximate. They have not been formally delineated or surveyed and are intended for planning purposes only. Additional site-specific evaluation may be needed to confirm/verify information shown on this map.

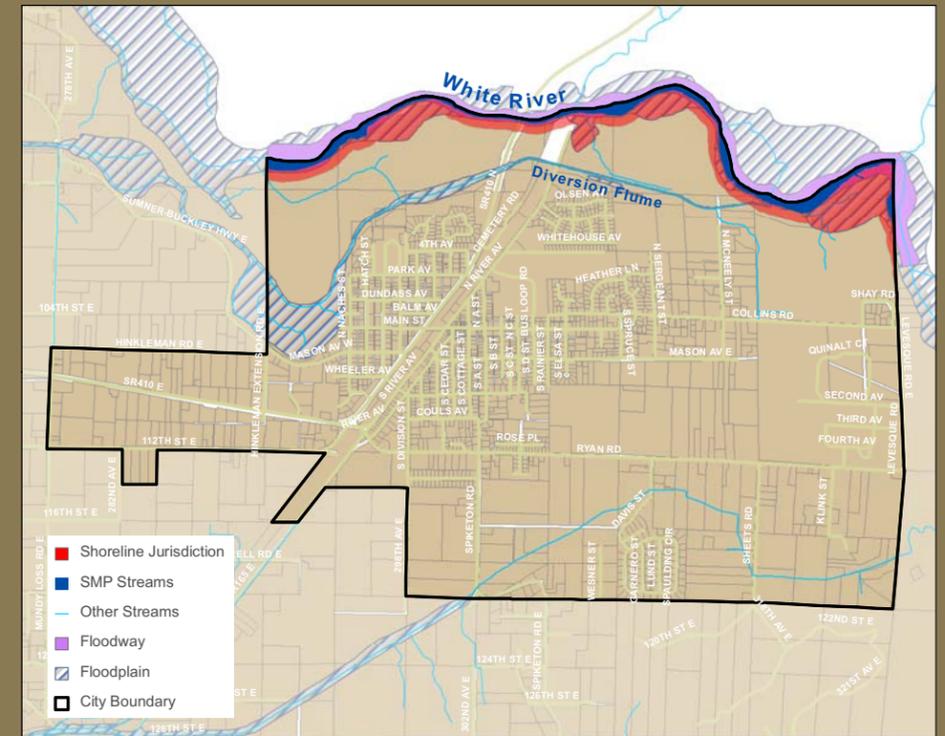
1. River Channels, 200' OHWM, Floodway, Floodplain



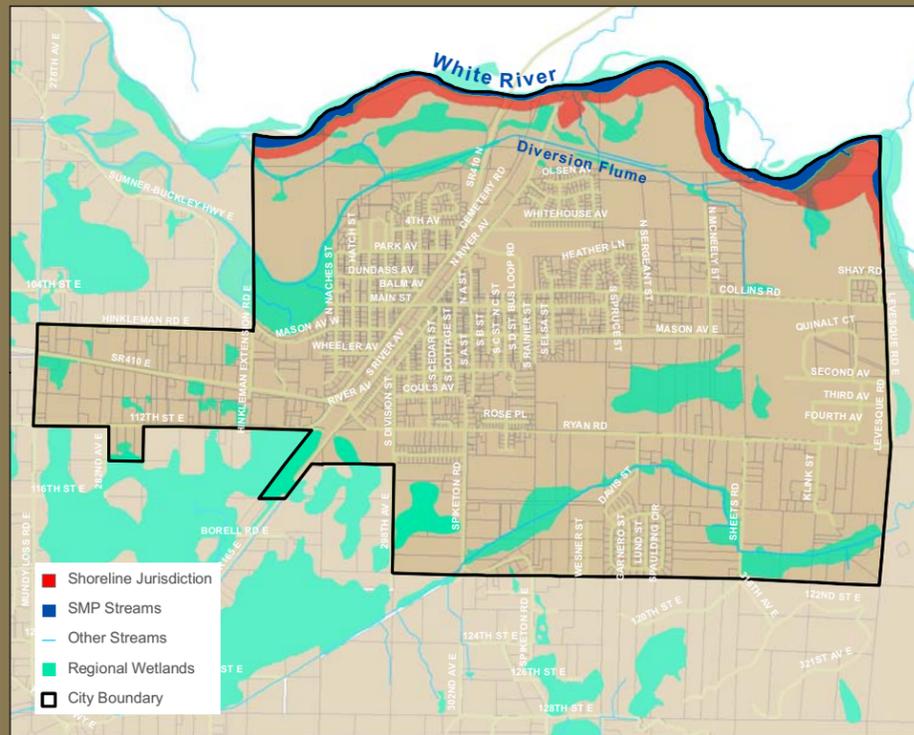
2. SMP Jurisdiction, including Floodway



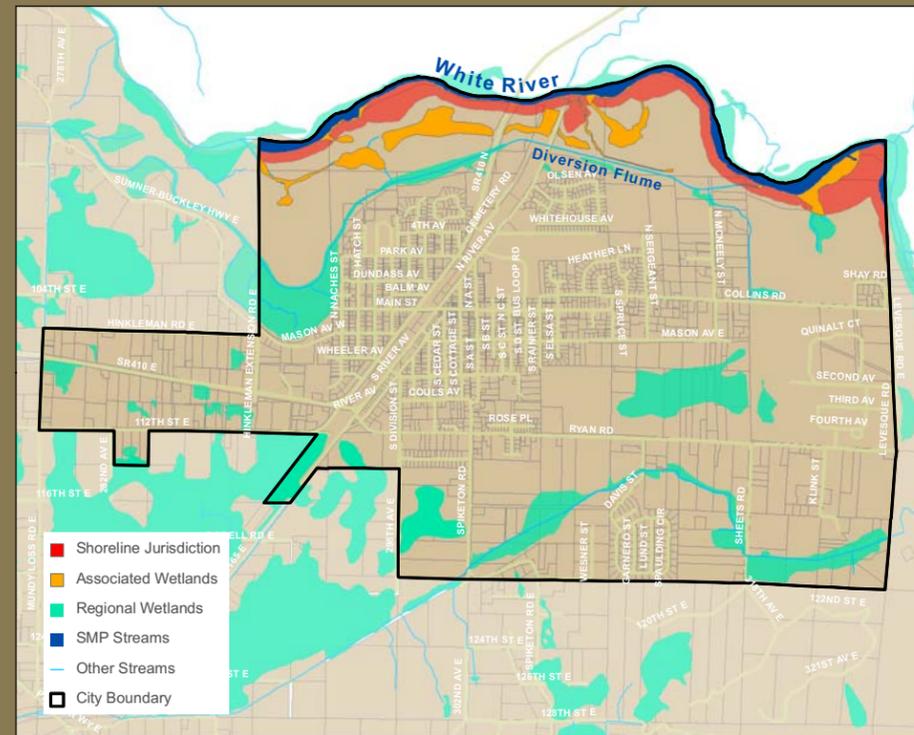
3. SMP Jurisdiction, including Floodplain



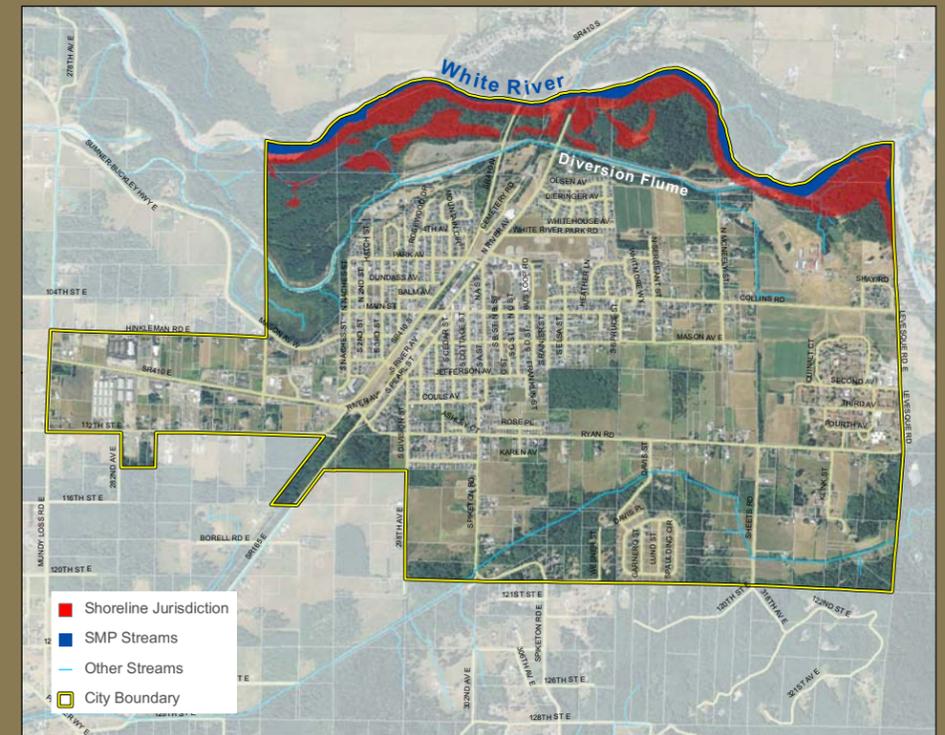
4. Regional Wetlands



5. Associated Wetlands



6. Shoreline Jurisdiction



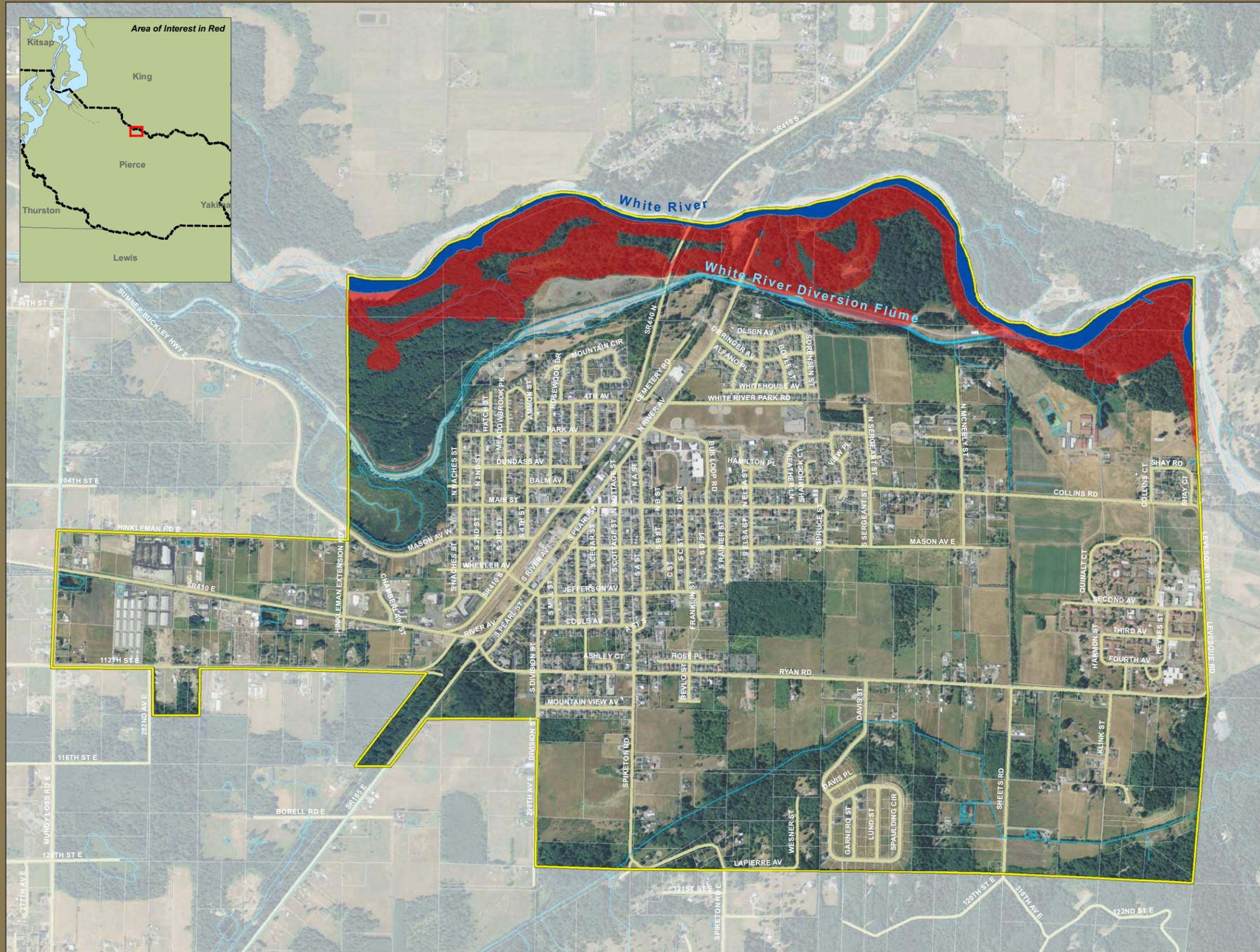
Data: Pierce County, City of Buckley, February, 2010.



Shoreline jurisdiction boundaries depicted on this map are approximate. They have not been formally delineated or surveyed and are intended for planning purposes only. Additional site-specific evaluation may be needed to confirm/verify information shown on this map.

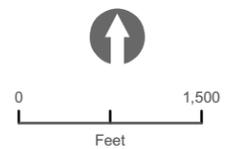


Shoreline Jurisdiction - Option 1 (Wetland Buffers)



CITY OF BUCKLEY Shoreline Master Program

Shoreline Jurisdiction Option 1



MAP LEGEND

- Shoreline Jurisdiction
- SMP Waterbodies
- Other Waterbodies
- Parcels
- Roads
- City Boundary



February, 2010
Data: Pierce County,
City of Buckley.

Shoreline jurisdiction boundaries depicted on this map are approximate. They have not been formally delineated or surveyed and are intended for planning purposes only. Additional site-specific evaluation may be needed to confirm/verify information shown on this map.



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

PO Box 47775 • Olympia, Washington 98504-7775 • (360) 407-6300

May 13, 2010

Mr. David Schmidt
City of Buckley
Planning Department
Po Box 1960
Buckley, WA 98321

RE: Memo Concerning the White River Flume and Wickersham Basin

Dear Mr. Schmidt:

As you are aware, upon the request of the Town of Buckley, the Department of Ecology completed a site visit on April 1, 2010, to determine the current conditions of the White River Flume and Wickersham Basin. The attached memo and image appendix catalogue our findings from the site visit. Please add this memo to your Shoreline Master Program Comprehensive Update file for future use.

If you have any questions or concerns regarding this memo please contact me to discuss this further. I can be reached at (360) 407-7459, or by email at sarah.lukas@ecy.wa.gov.

Sincerely,

A handwritten signature in cursive script that reads "Sarah M. Lukas".

Sarah M. Lukas
Shorelands Planner

cc: Dan Nickel, The Watershed Company
Kathy James, City of Buckley

Summary

On April 1, 2010, Ecology staff from the Shorelands and Environmental Assistance Program conducted a site visit to help determine if the White River flume and Wickersham Basin are shorelines of the state. From the evidence observed in the field and other information compiled concerning these two waterbodies, we determined that neither exhibit the characteristics of a shoreline (RCW 90.58.030) and should not be regulated as shorelines of the state under the Pierce County or Town of Buckley updated Shoreline Master Programs.

The White River Flume is a constructed water conveyance originally built in 1911 by the company currently doing business as Puget Sound Energy (PSE) to produce hydroelectricity. In 2004, PSE terminated the power generation operation, and in 2009 the Cascade Water Alliance (Cascade) bought the entire diversion system from PSE. Cascade intends to retrofit the diversion system and utilize it as a source of municipal drinking water.

Water is conveyed through several structures on its eight-mile journey which starts at the initial diversion dam at White River Mile 24.3 within the Town of Buckley's corporate limits, to its termination at Lake Tapps (see image 1). The diverted water initially flows through an above grade wooden and cement flume (see image 2); the water then flows through a constructed, earthen canal at approximately the crossing point of highway 410; The open channel then transitions into a series of underground pipes until it daylights in Printz Basin just upstream of Lake Tapps. From the discharge point at the northwest end of Lake Tapps, the water flows through the Deiringer Tailrace back into the White River at River Mile 3.6.

To maintain the flume, regular dredging and vegetation removal is necessary. Regular maintenance for the flume has lapsed for the past six years, however due to the change in use of the flume; the Cascade Water Alliance expects to reestablish a maintenance schedule upon the establishment of Lake Tapps as a source for drinking water.

We do not consider the flume a shoreline of the state. It is not a stream, it is a constructed facility designed and managed to carry water for a specific purpose. Also, we consider Printz Basin to be part of the flume and, likewise, not a shoreline of the state.

Wickersham Basin is listed in WAC 173-20-560(31) as a 60 acre lake and has been considered a shoreline since the establishment of the SMA in 1971; however, no shoreline permits have been issued for the Wickersham Basin by Pierce County or the Town of Buckley since the establishment of the Act.

The Basin was created as the first of two settling pools for turbid water flowing through the White River Flume to Lake Tapps. From 1936 aerial photographs of the basin (see image 3), it appears that at one time there was open water; however, from our observations in the field that is no longer the condition of the Basin.

During our site visit we observed Wickersham Basin from several different perspectives. From the access road north of the Basin we observed the Basin looking south across the flume. From this viewpoint we were able to see two channels flowing from the Basin one at the west perimeter of the Basin, and as we walked further east along the access road we observed a second channel flowing from the Basin. Located between the two channels along the flume we observed a low bank with established vegetation of a shrub understory and a hardwood canopy (see image 4).

Looking down from Naches Road on the Eastside of the Basin's upper rim, we observed a small pond of open water surrounded by extensive emergent vegetation (see image 5).

On the Westside of the Basin we observed several well established small channels flowing north towards the flume (see image 6). There are also several small areas of ponded water interspersed with emergent grasses and shrubs and a hardwood canopy layer. Wickersham Basin does not appear to be a lake, but a well established emergent and scrub/shrub wetland.

We do not consider Wickersham Basin to be a shoreline of the state; it is not a lake. And because we also do not consider the flume to be a shoreline, Wickersham Basin would, likewise, not be an associated wetland under SMA jurisdiction.

Image 1: Vicinity Map of the White River Flume

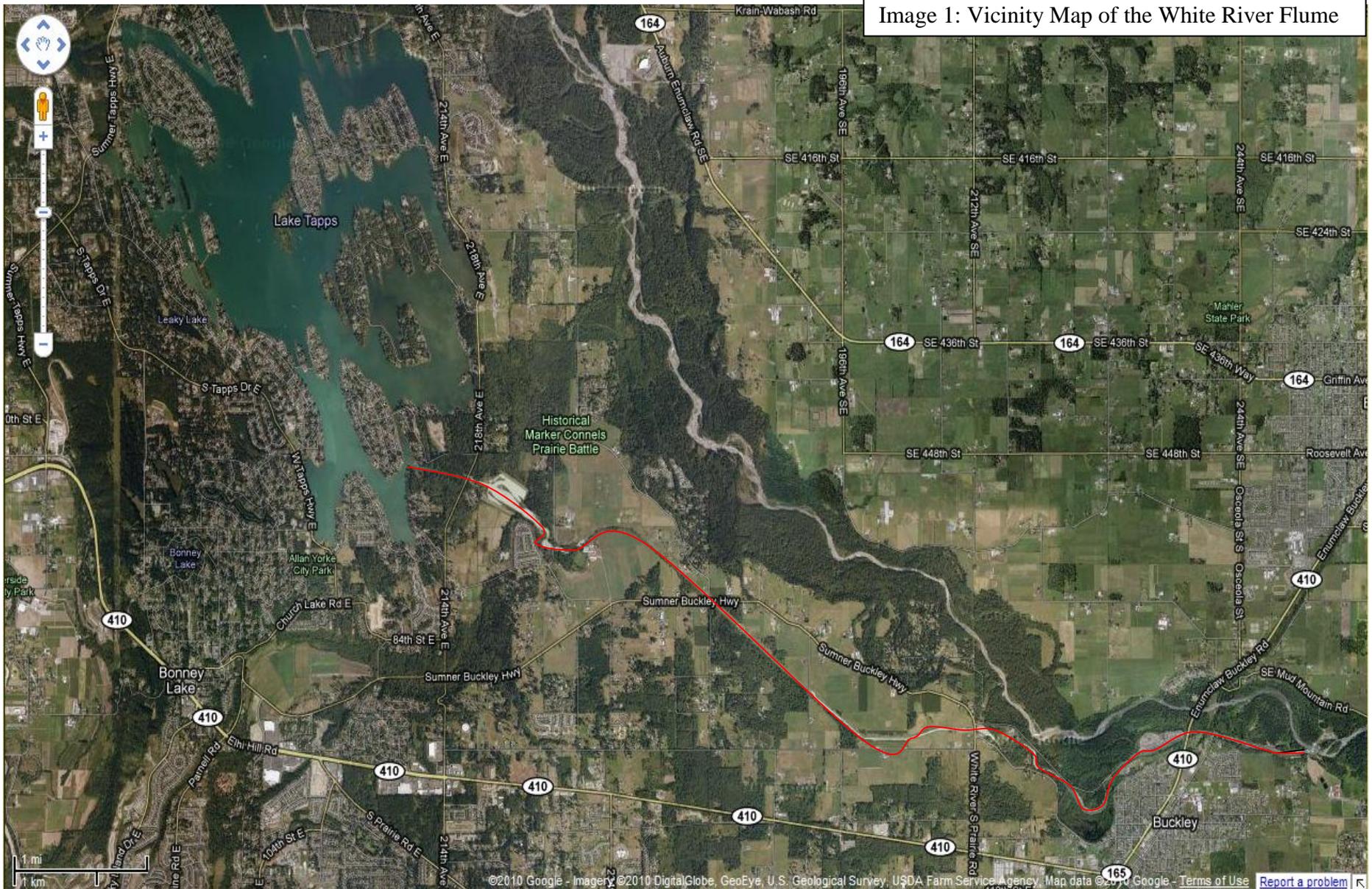
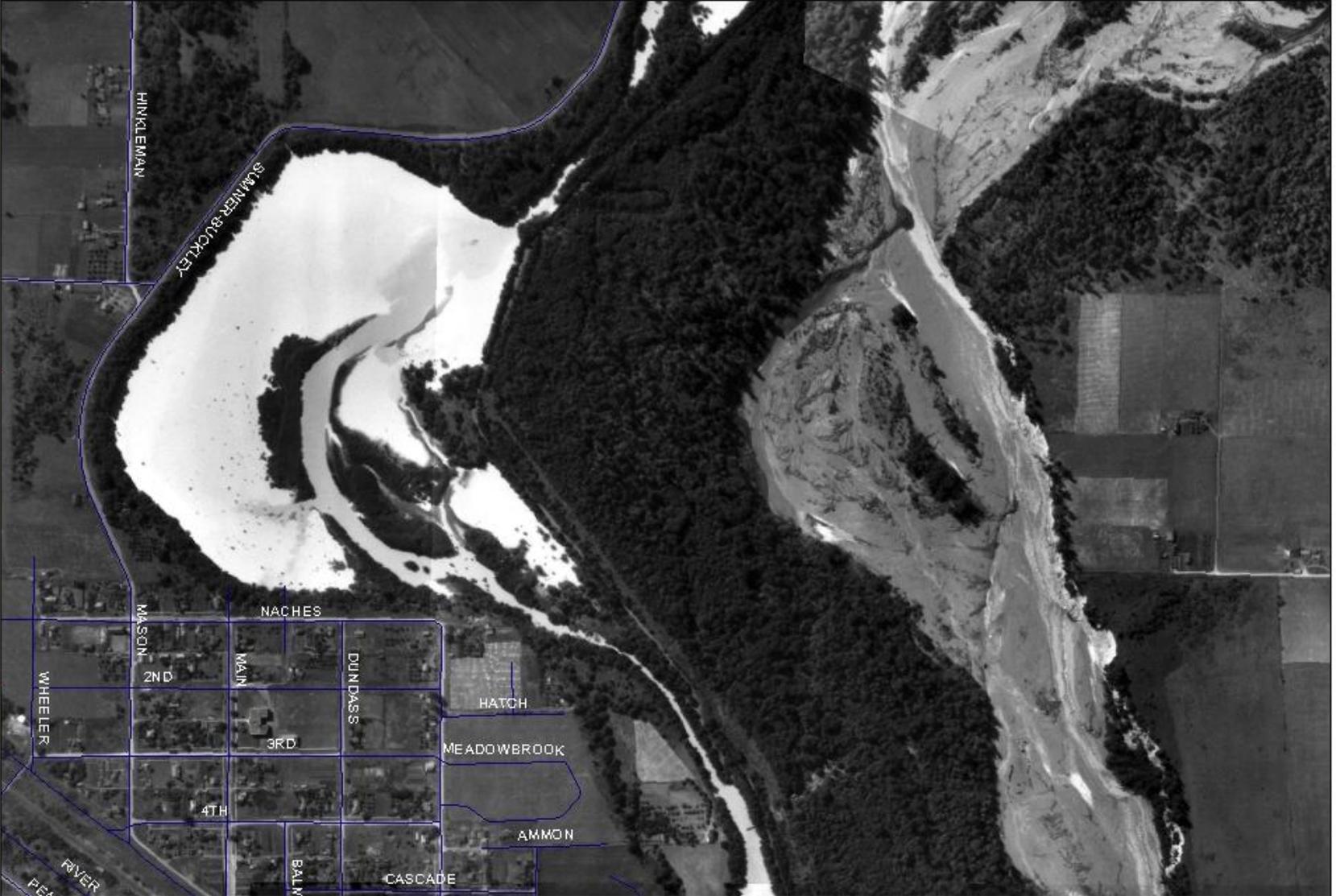




Image 2: The White River Flume immediately downstream from the diversion dam.
Next Page: Image 3, of Wickersham Basin in 1936.

aiweghlksjfh



Source: Puget Sound River History Project
<http://riv.erhistory.ess.washington.edu/>

Wickersham Basin
Circa 1936 Aerial Photography
with Current Roads Layer

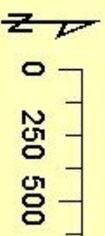


Image 4: The Northern Banks of the Wickersham Basin viewed looking South across the White River Flume.



Image 5: Open water found in Wickersham Basin looking down from Naches Road in Buckley



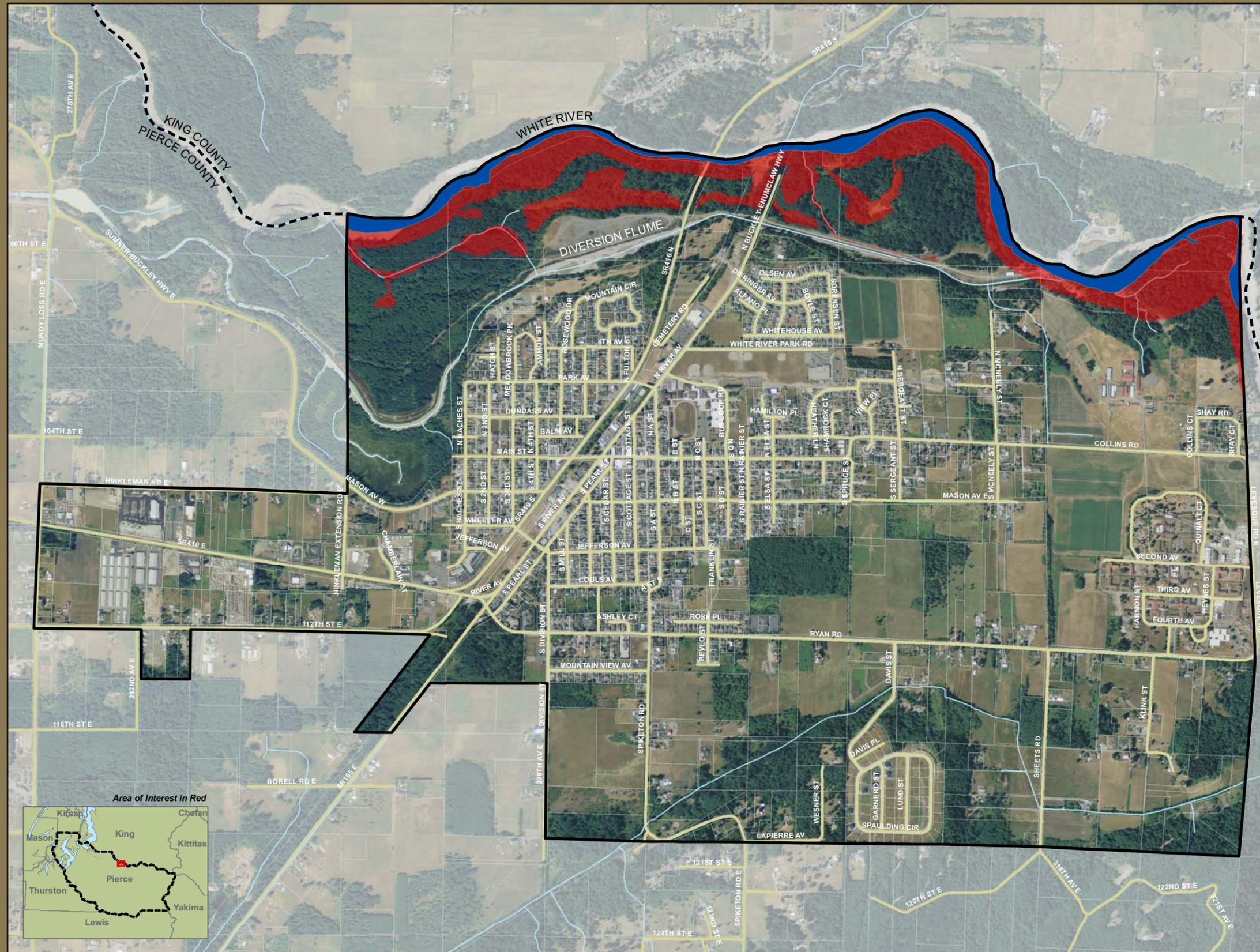
Image 6: established channel found inside Wickersham Basin



APPENDIX C

Inventory and Analysis Map Folio

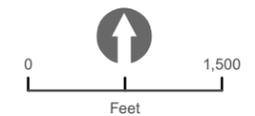
FIGURE 1. SHORELINE JURISDICTION



CITY OF BUCKLEY
Shoreline Master Program

MAP LEGEND

- Shoreline Jurisdiction
- SMP Streams
- Other Streams
- Roads
- Parcels
- City Boundary

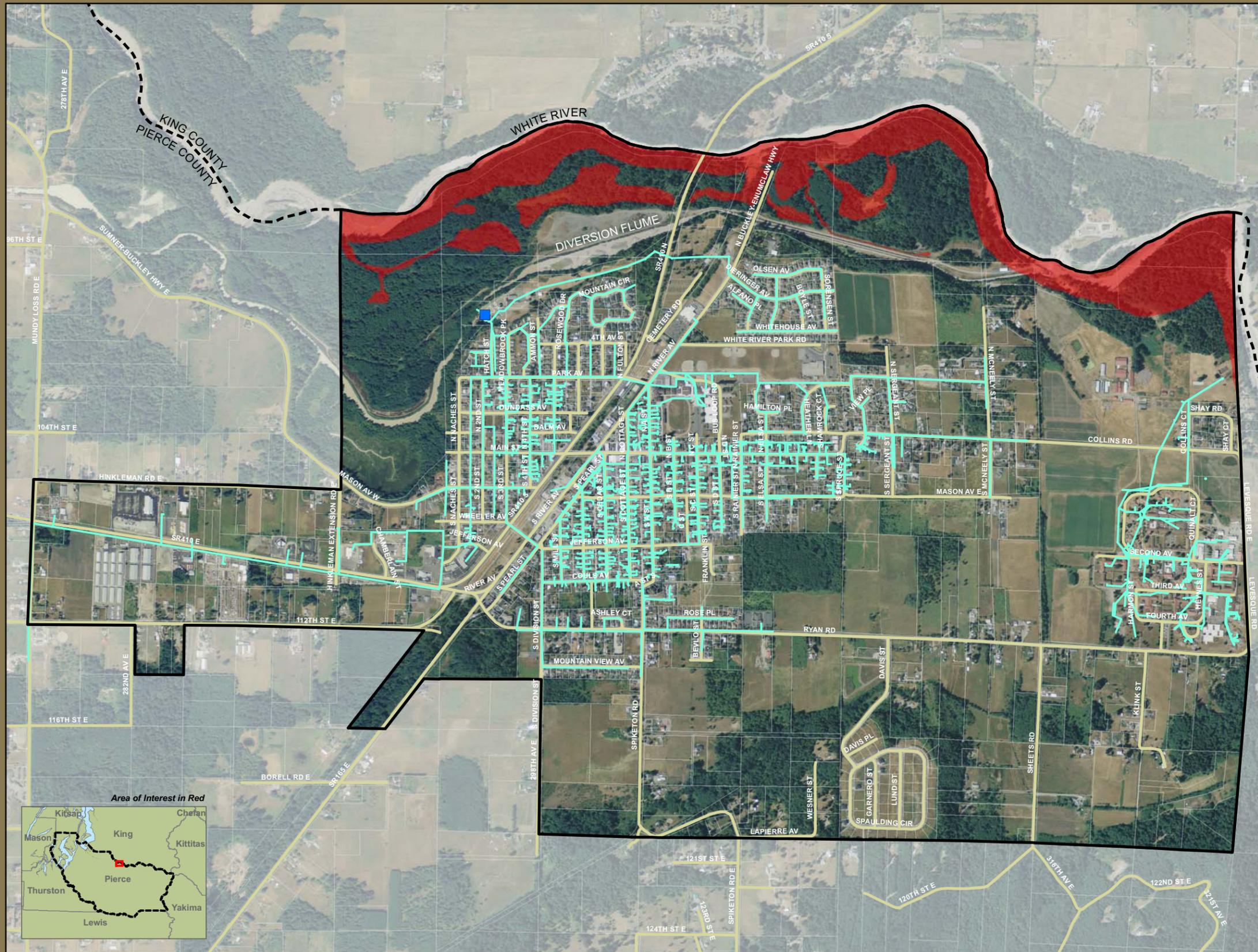


April, 2010.
Data: Greg & Osbrone, Inc.,
TWC, City of Buckley.

Shoreline jurisdiction boundaries depicted on this map are approximate. They have not been formally delineated or surveyed and are intended for planning purposes only. Additional site-specific evaluation may be needed to confirm/verify information shown on this map.



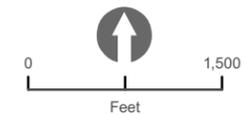
FIGURE 3. SANITARY SEWER



CITY OF BUCKLEY
Shoreline Master Program

MAP LEGEND

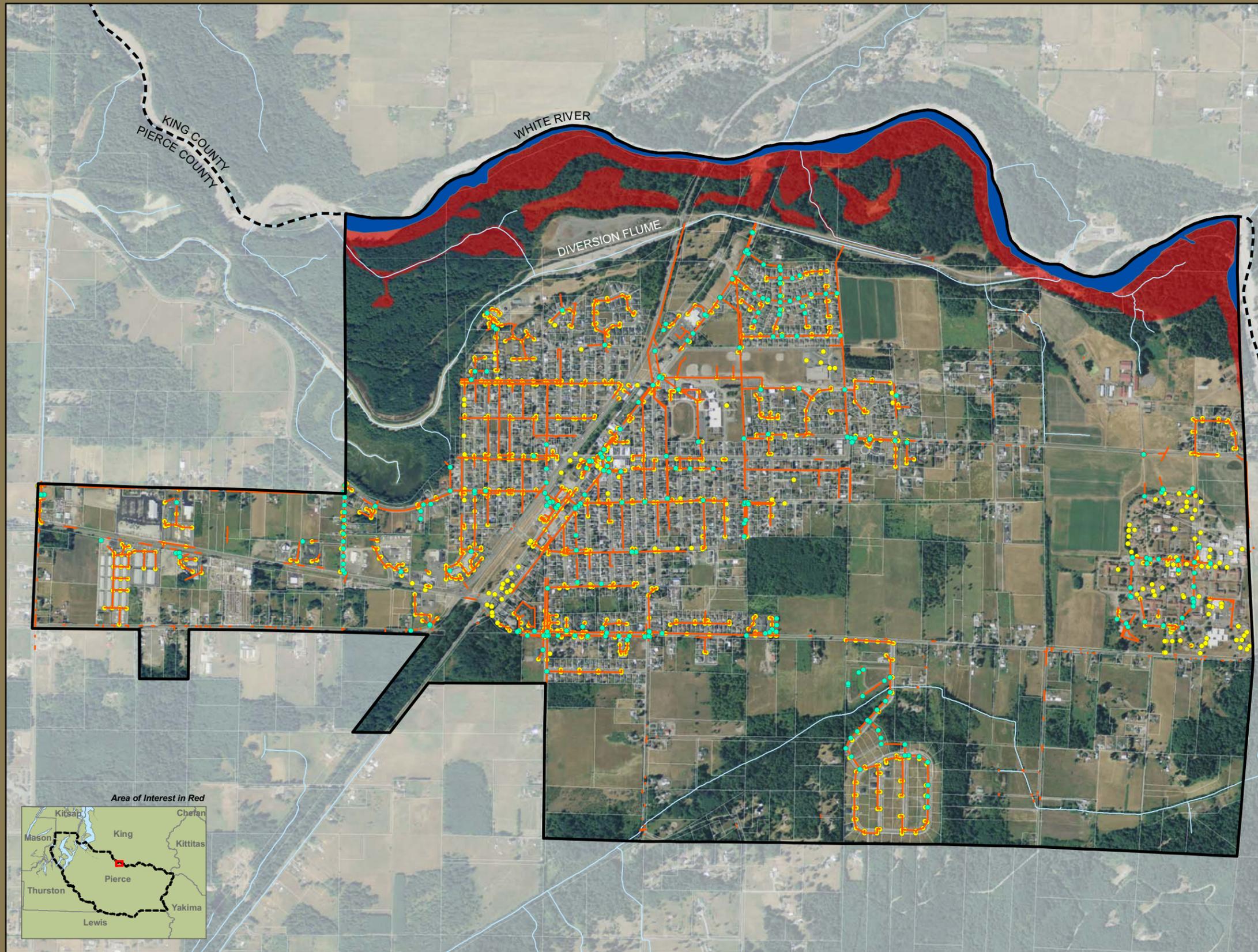
- Sewer Treatment Plant
- Sanitary Sewer pipeline
- Shoreline Jurisdiction
- City Boundary



April, 2010.
 Data: Greg & Osborne, Inc.,
 TWC, City of Buckley.

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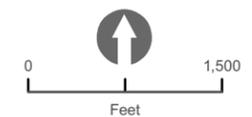
FIGURE 4. SURFACE WATER SYSTEM



CITY OF BUCKLEY
Shoreline Master Program

MAP LEGEND

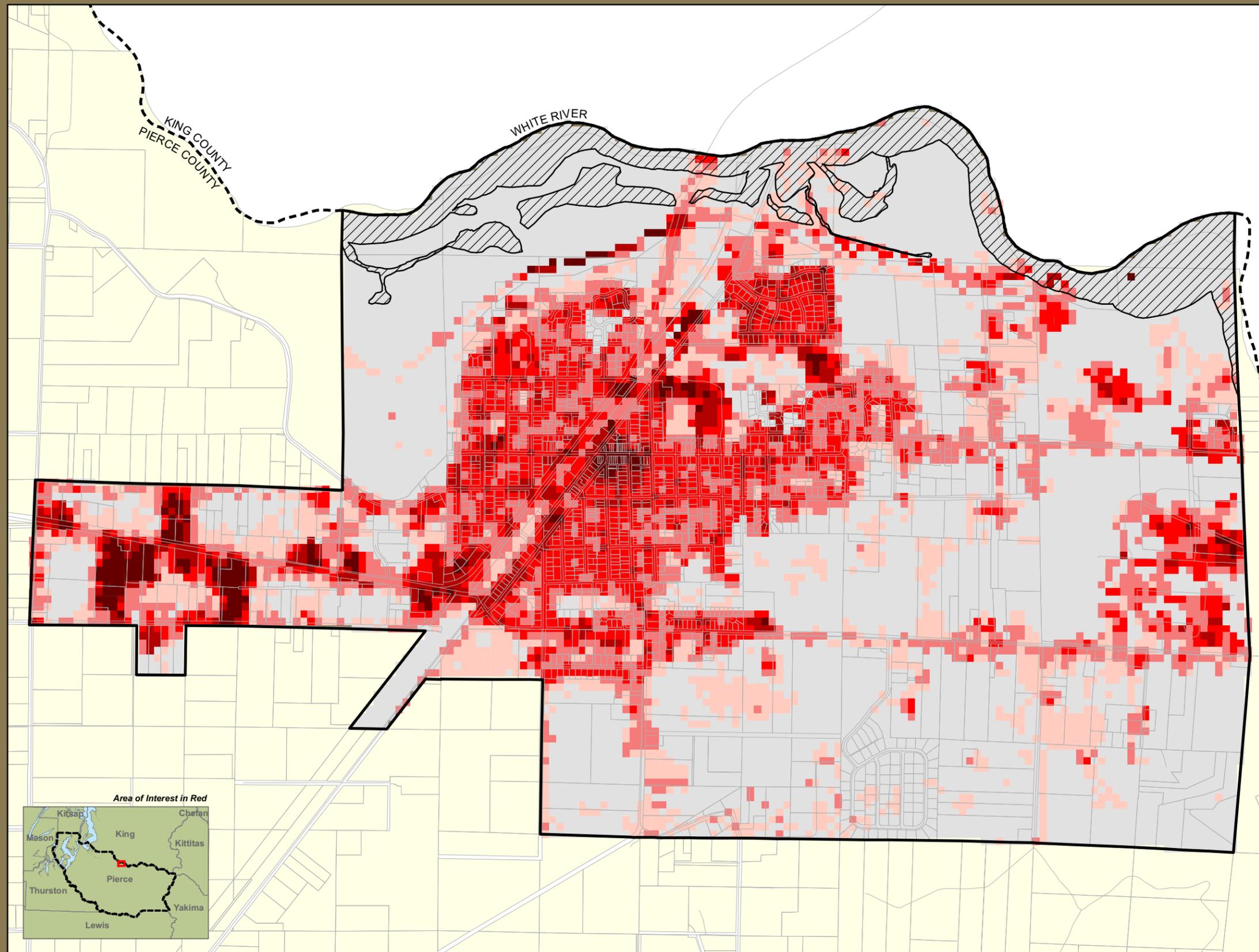
- Storm Drain Manholes
- Storm Drain Catch Basins
- Storm Drain Pipeline
- Other Streams
- SMP Streams
- Shoreline Jurisdiction
- City Boundary



April, 2010.
 Data: Greg & Osborne, Inc.,
 TWC, City of Buckley.

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FIGURE 5. IMPERVIOUS SURFACES



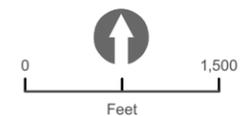
CITY OF BUCKLEY
Shoreline Master Program

MAP LEGEND

- City Boundary
- Shoreline Jurisdiction

Percent Impervious

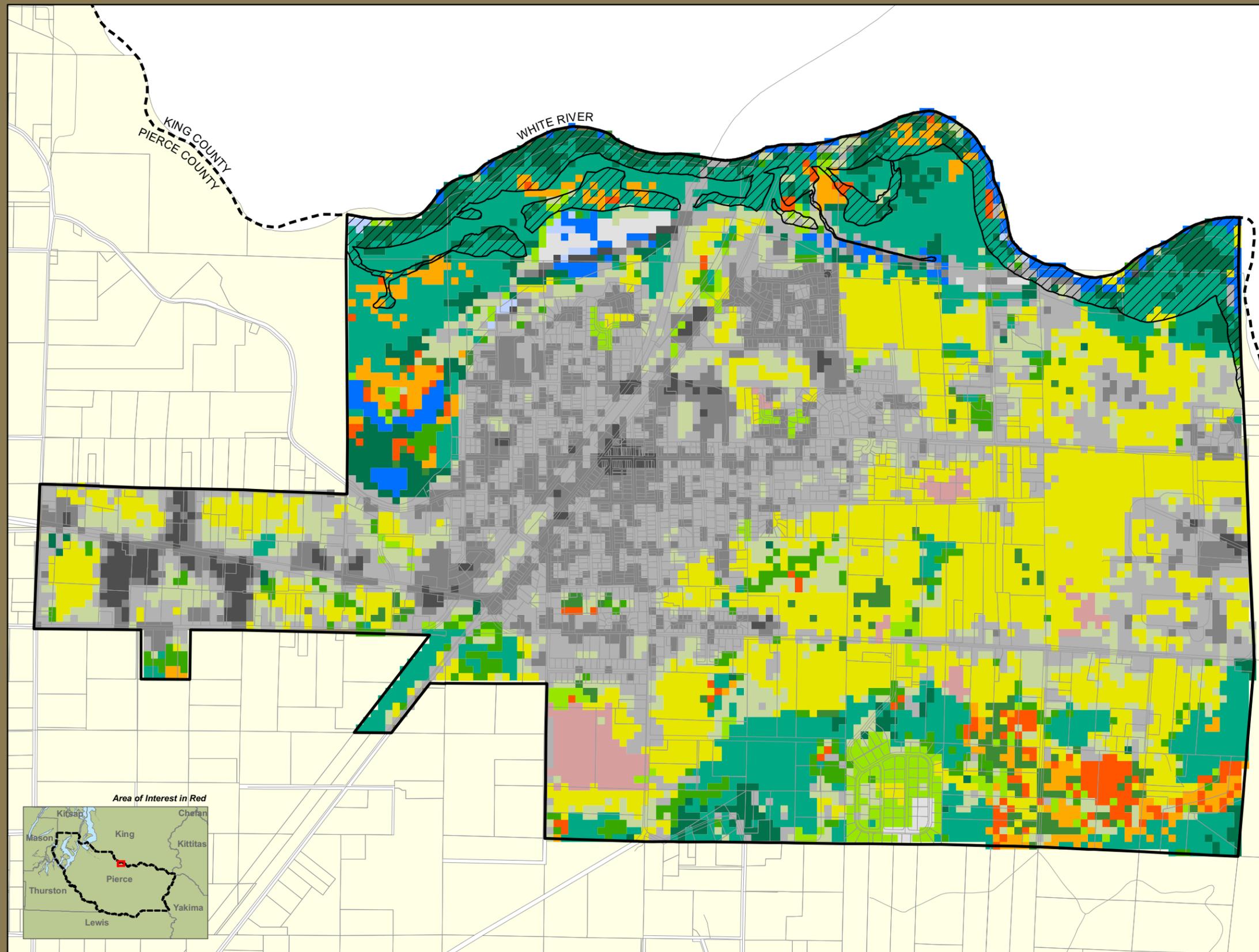
- 0
- 1 - 20
- 21 - 40
- 41 - 60
- 61 - 80
- 81 - 100



April, 2010
Data: USGS, TWC,
City of Buckley.

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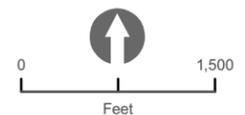
FIGURE 6. VEGETATION



CITY OF BUCKLEY
Shoreline Master Program

MAP LEGEND

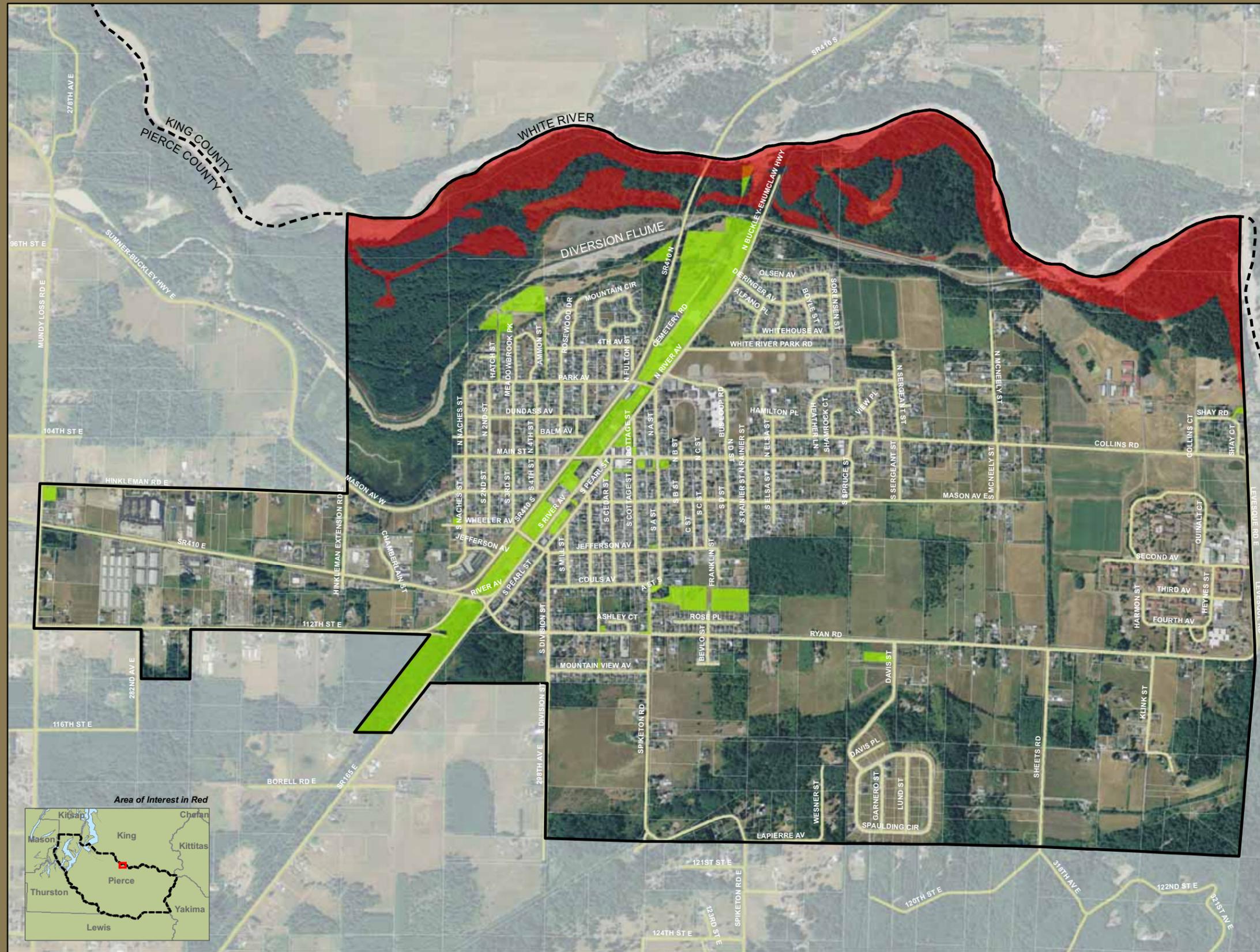
- City Boundary
- Shoreline Jurisdiction
- Bare Land
- Cultivated
- Deciduous Forest
- Developed Open Space
- Evergreen Forest
- Grassland
- High Intensity Developed
- Low Intensity Developed
- Medium Intensity Developed
- Mixed Forest
- Palustrine Emergent Wetland
- Palustrine Forested Wetland
- Palustrine Scrub/Shrub Wetland
- Pasture/Hay
- Scrub/Shrub
- Unconsolidated Shore
- Water



April, 2010.
Data: NOAA, TWC,
City of Buckley.

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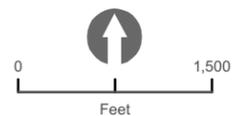
FIGURE 7. PUBLIC ACCESS AREAS



CITY OF BUCKLEY
Shoreline Master Program

MAP LEGEND

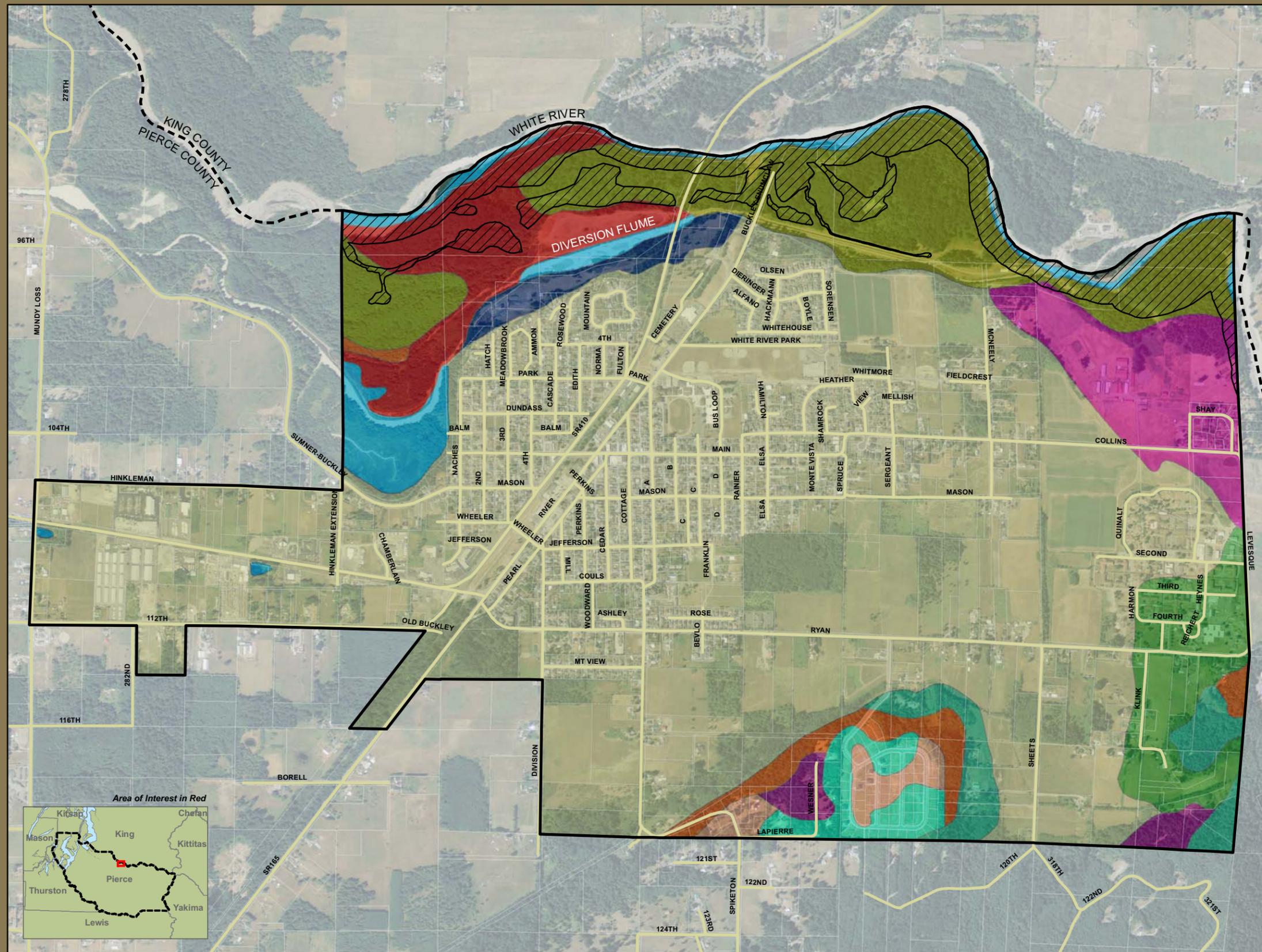
- Public Access Areas
- Shoreline Jurisdiction
- City Boundary



April, 2010.
 Data: Greg & Osborne, Inc.,
 TWC, City of Buckley.

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FIGURE 8. NATURAL RESOURCES CONSERVATION SERVICE SOIL SURVEY GEOGRAPHIC DATA



CITY OF BUCKLEY
Shoreline Master Program

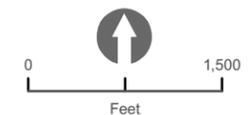
MAP LEGEND

Shoreline Jurisdiction

City Boundary

NRCS SSURGO SOILS

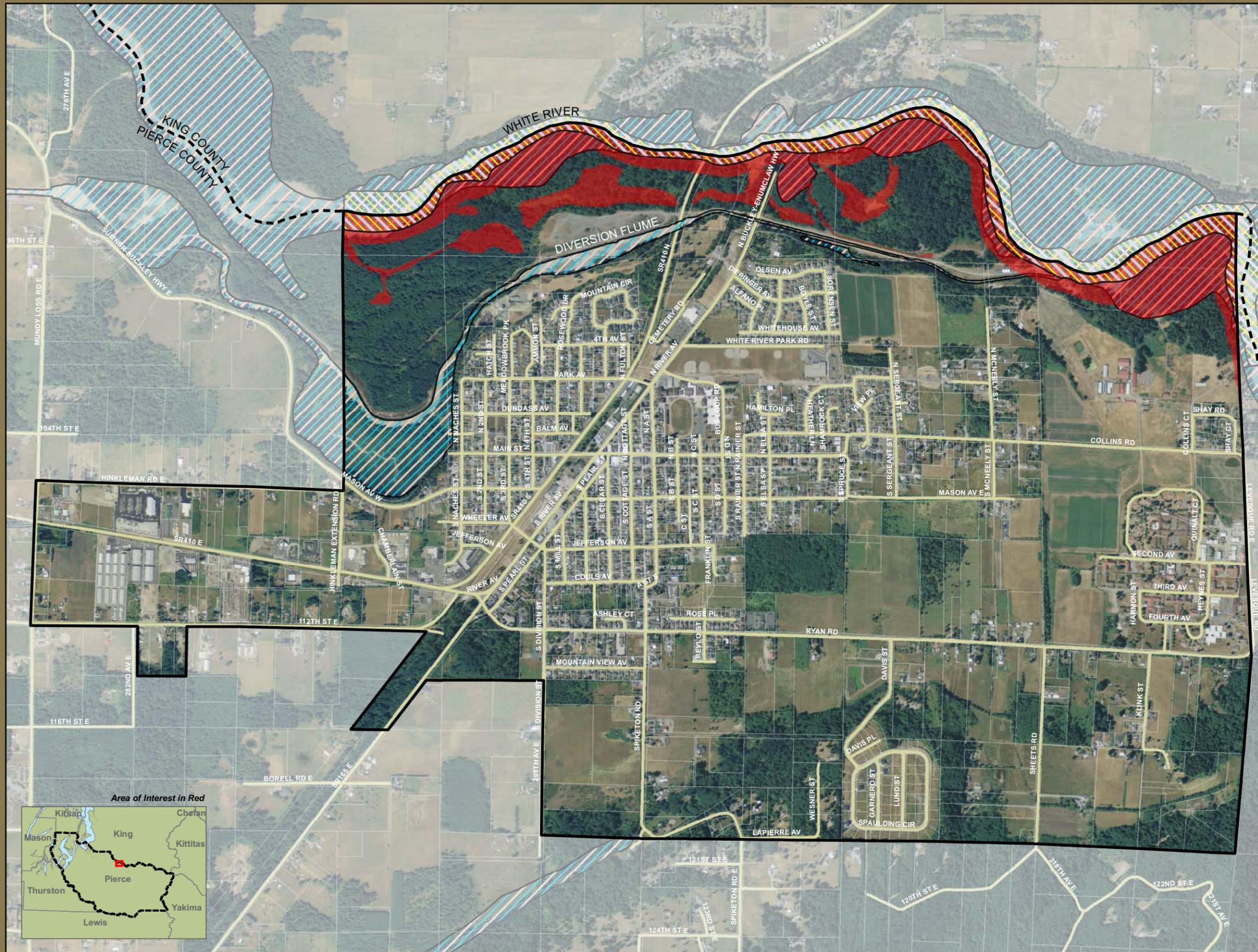
- Alderwood Gravelly Sandy Loam, 6-15% Slopes
- Aquic Xerofluvents, Level
- Buckley Loam - Hydric
- Greenwater Loamy Sand
- Kapowsin Gravelly Loam, 0-6% Slopes
- Kapowsin Gravelly Loam, 15-30% Slopes
- Kapowsin Gravelly Loam, 30-50% Slopes
- Kapowsin Gravelly Loam, 6-15% Slopes
- Pilchuck Fine Sand
- Puyallip Fina Sandy Loam
- Water
- Xerochrepts, 45-70% Slopes



April, 2010.
 Data: NRCS, TWC,
 City of Buckley.

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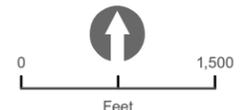
FIGURE 9. FLOODPLAIN & FLOODWAY



CITY OF BUCKLEY
Shoreline Master Program

MAP LEGEND

-  County Floodway
-  County Floodplain
-  Shoreline Jurisdiction
-  City Boundary

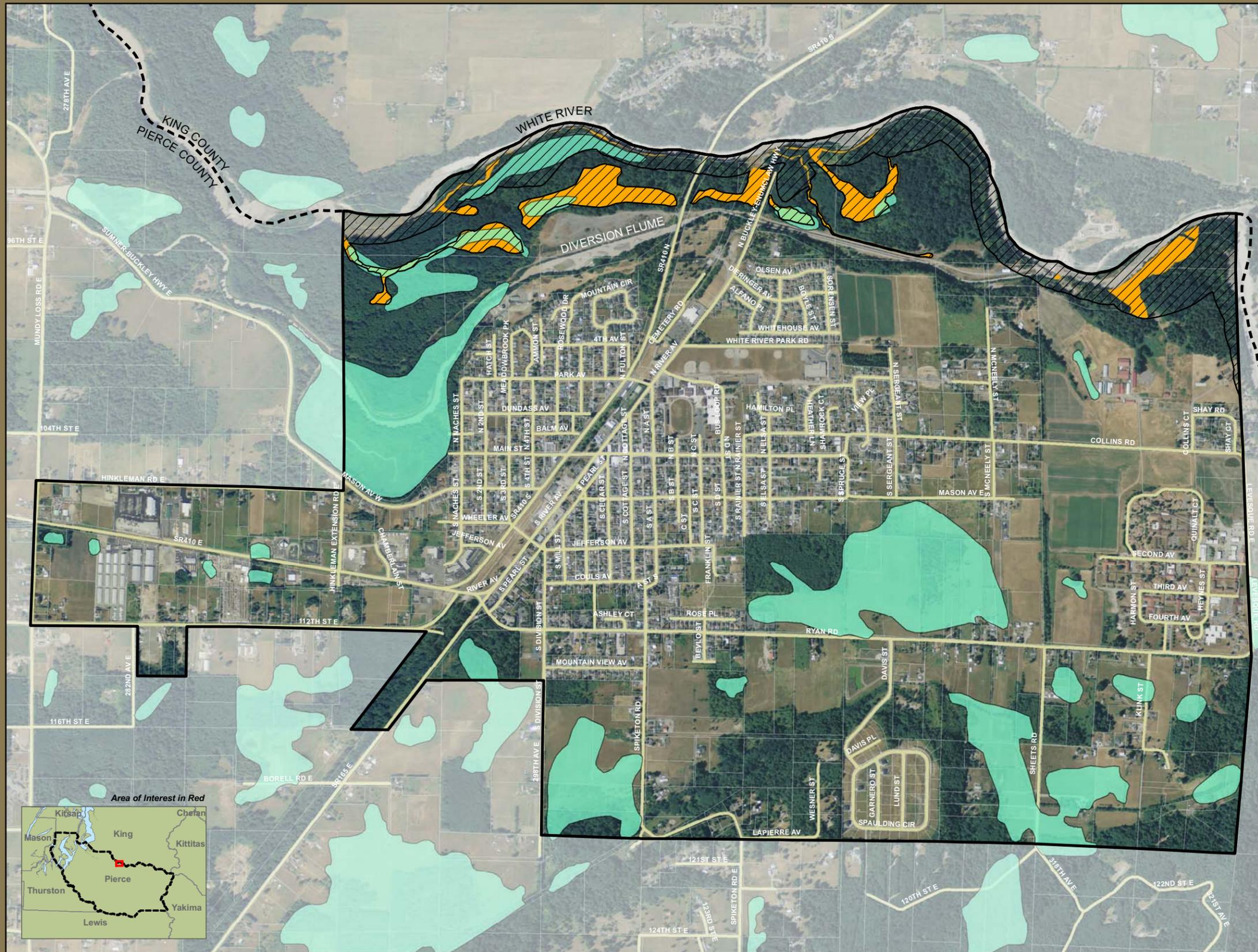


April, 2010.
 Data: Grey & Osborne Inc.,
 City of Buckley.

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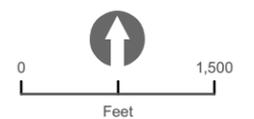
FIGURE 10. WETLANDS



CITY OF BUCKLEY
Shoreline Master Program

MAP LEGEND

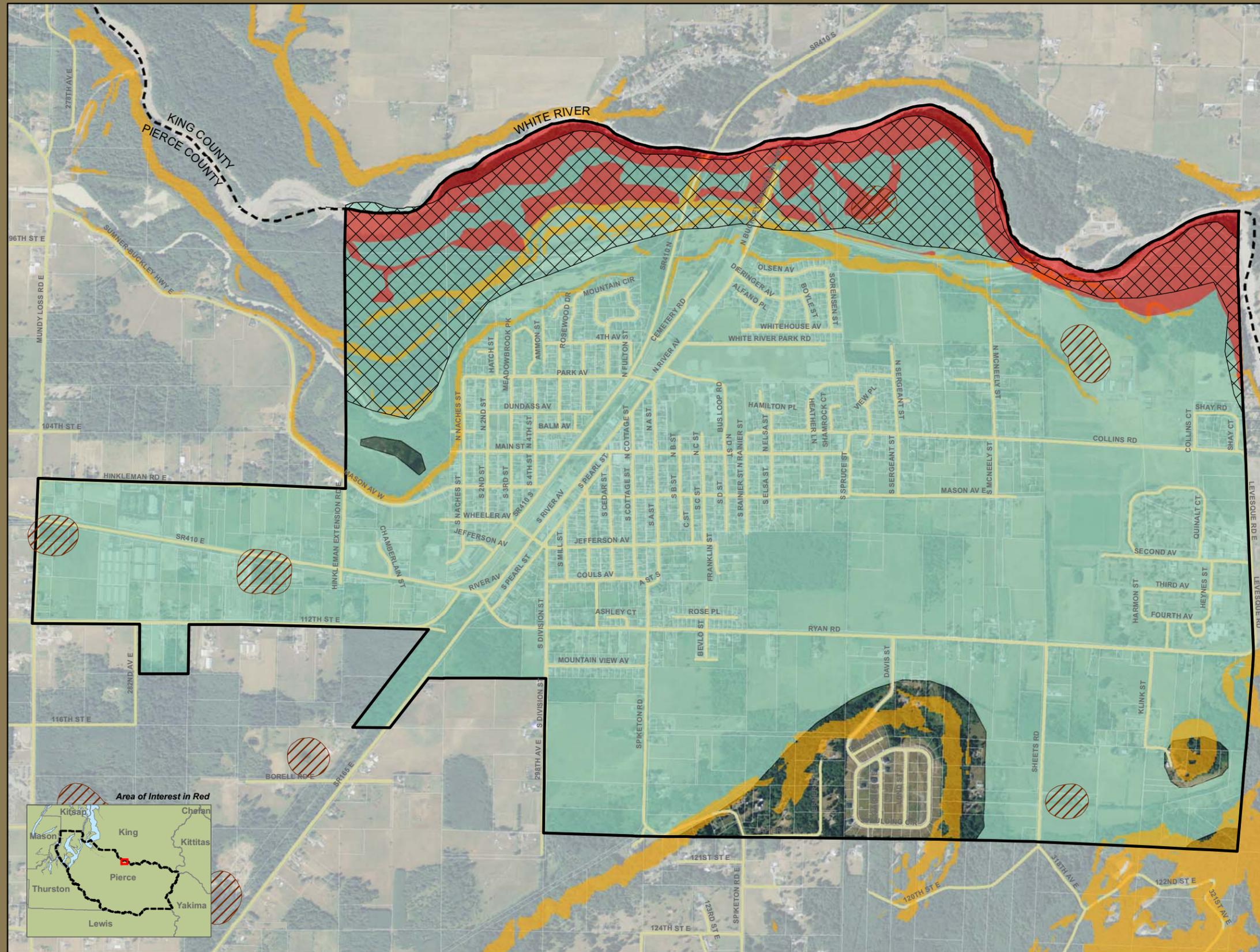
- NWI Wetlands
- Associated Wetlands
- Shoreline Jurisdiction
- City Boundary



April, 2010.
 Data: Grey & Osborne Inc.,
 WDFW, TWC, City of Buckley.

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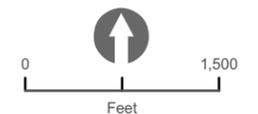
FIGURE 11. GEOLOGICALLY HAZARDOUS AREAS



CITY OF BUCKLEY
Shoreline Master Program

MAP LEGEND

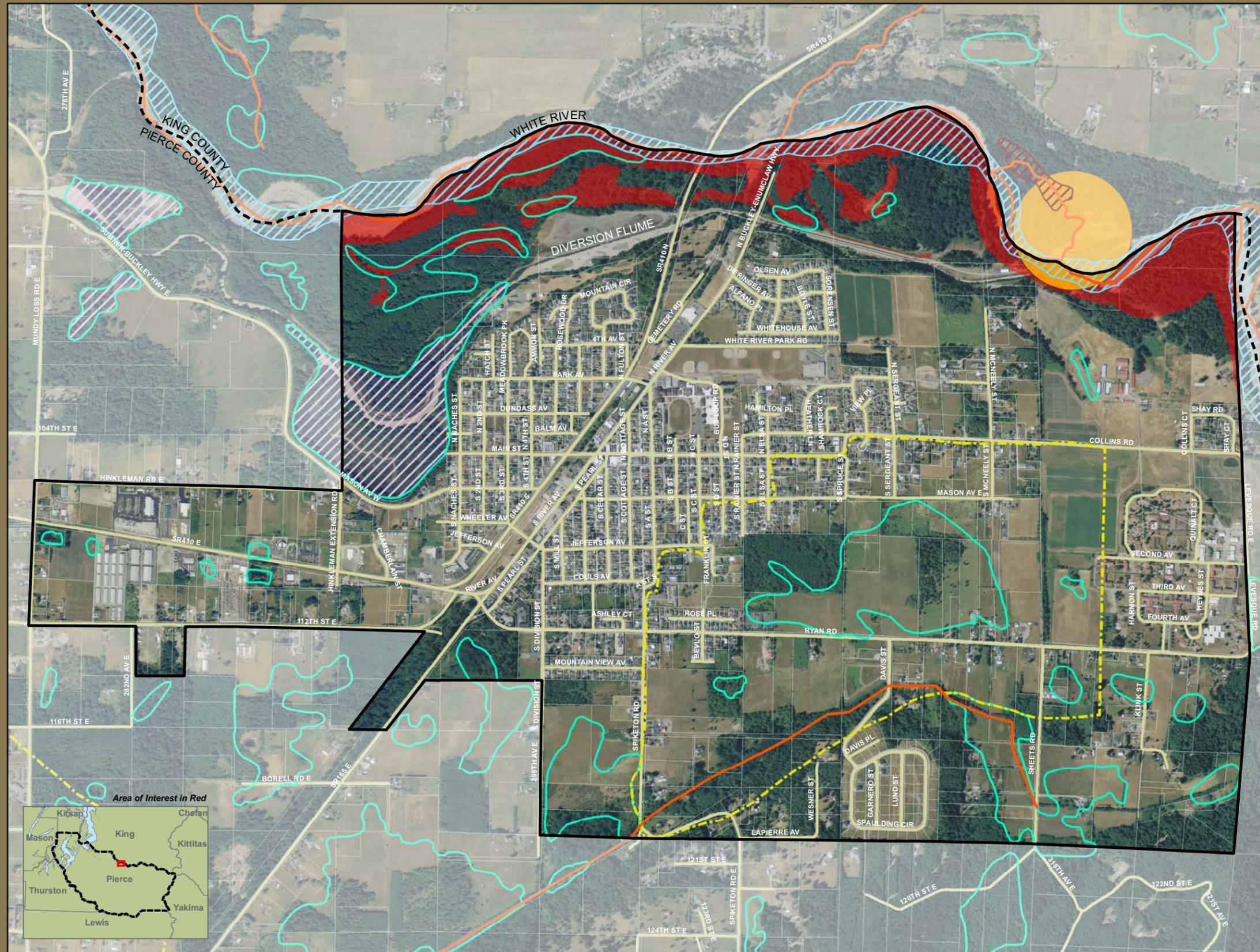
- Erosion Hazard
- Landslide Hazard
- Seismic Hazard
- Volcanic Hazard
- Shoreline Jurisdiction
- City Boundary



April, 2010.
 Data: Grey & Osborne, Inc.,
 TWC, City of Buckley.

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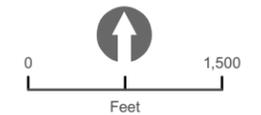
FIGURE 12. WDFW PRIORITY HABITATS



CITY OF BUCKLEY
Shoreline Master Program

MAP LEGEND

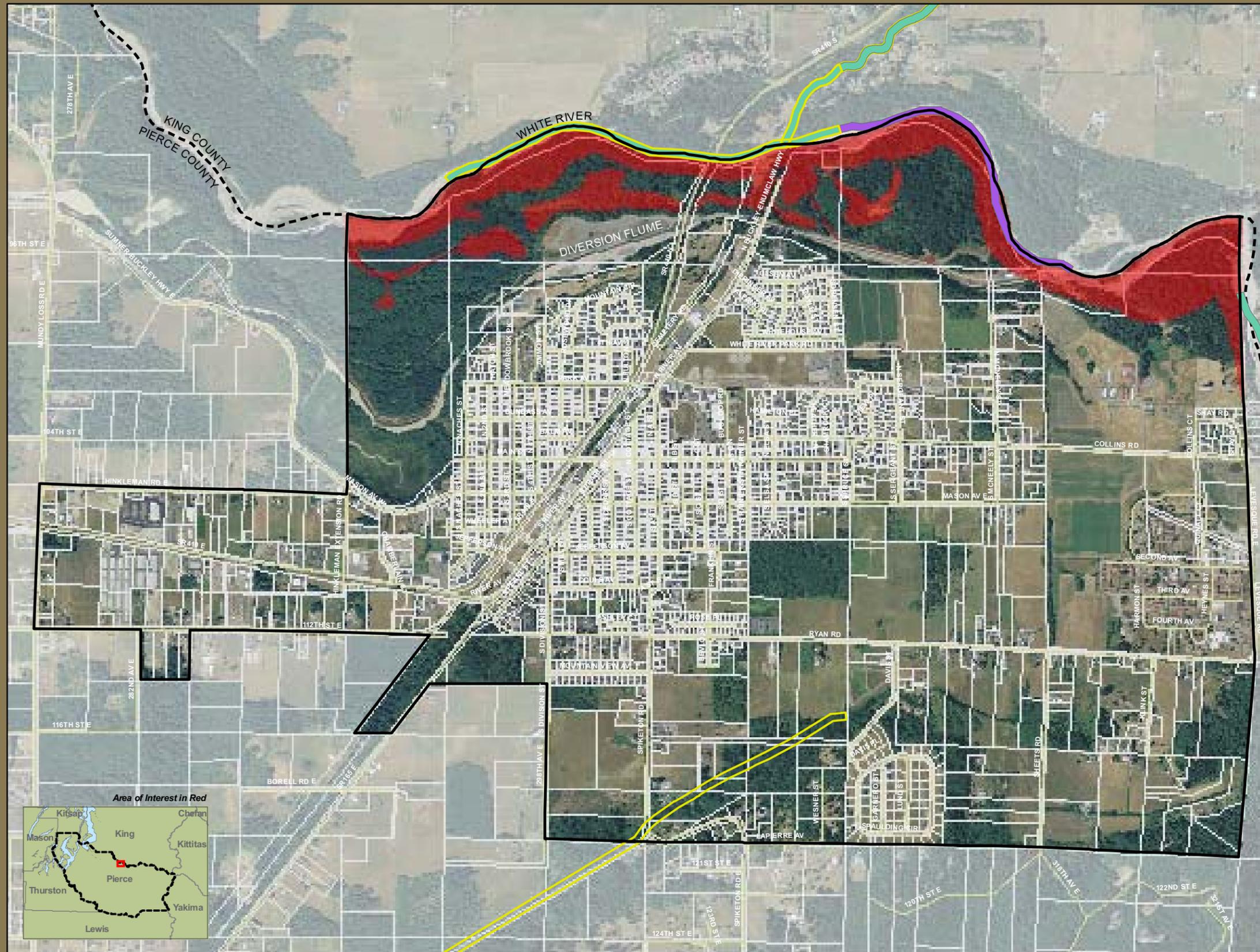
- Fish Distribution
- Bald Eagle Nest Buffer
- Elk Damage Area
- Riparian Zones
- Urban Natural Open Space
- Waterfowl Concentrations
- Priority Wetlands
- Wood Duck
- Shoreline Jurisdiction
- City Boundary



April, 2010.
 Data: WDFW, TWC,
 City of Buckley.

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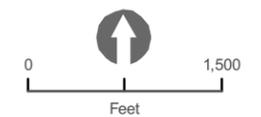
FIGURE 13. 303d LISTED WATERS



CITY OF BUCKLEY
Shoreline Master Program

MAP LEGEND

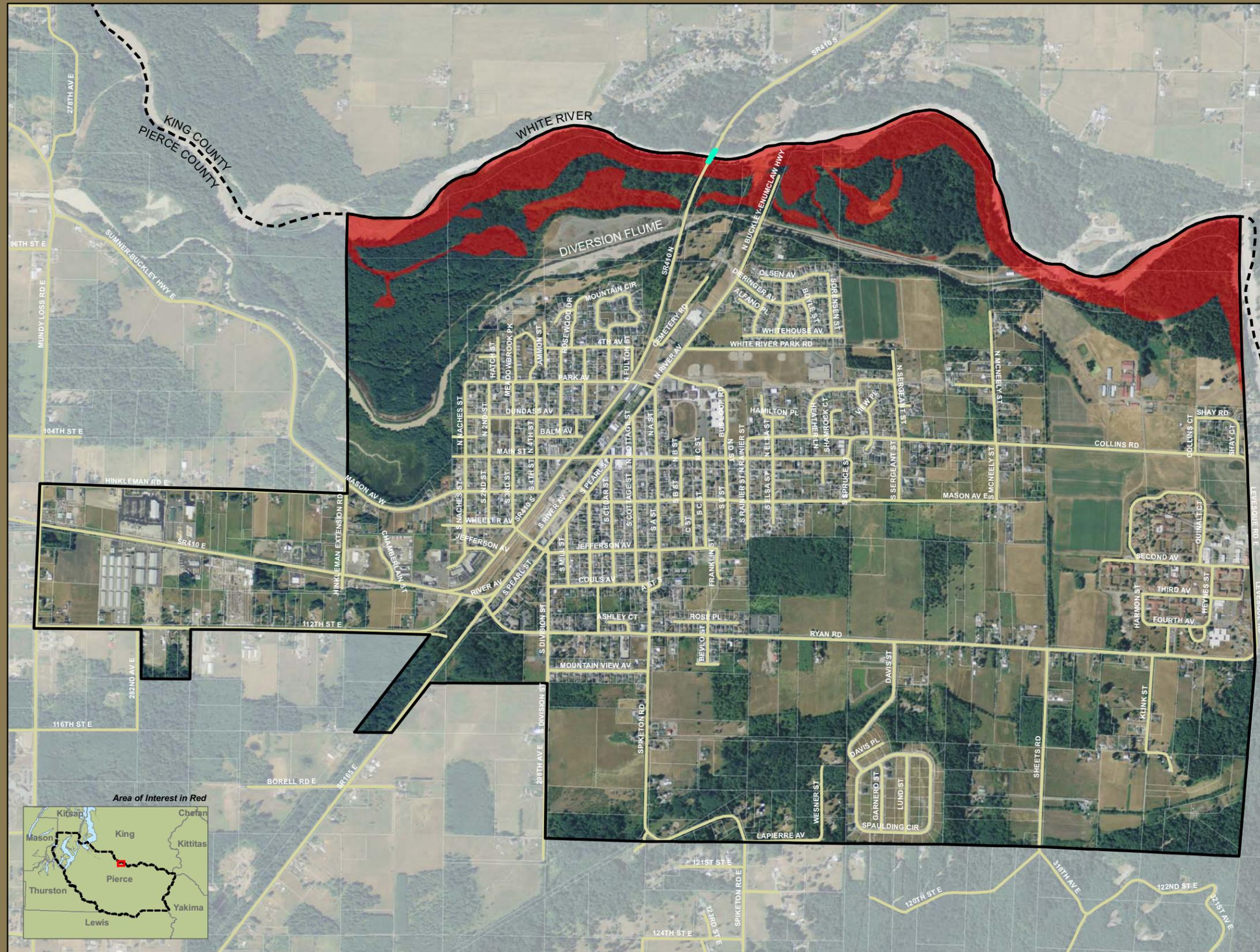
- Fecal Coliform
- Instream Flow
- pH
- Shoreline Jurisdiction
- City Boundary



April, 2010.
 Data: DOE, TWC,
 City of Buckley.

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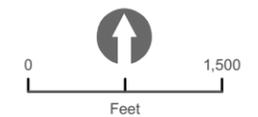
FIGURE 14. SHORELINE MODIFICATIONS



CITY OF BUCKLEY
Shoreline Master Program

MAP LEGEND

- Overwater Structures
- Shoreline Jurisdiction
- City Boundary



April, 2010.
 Data: DNR, TWC,
 City of Buckley.

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