

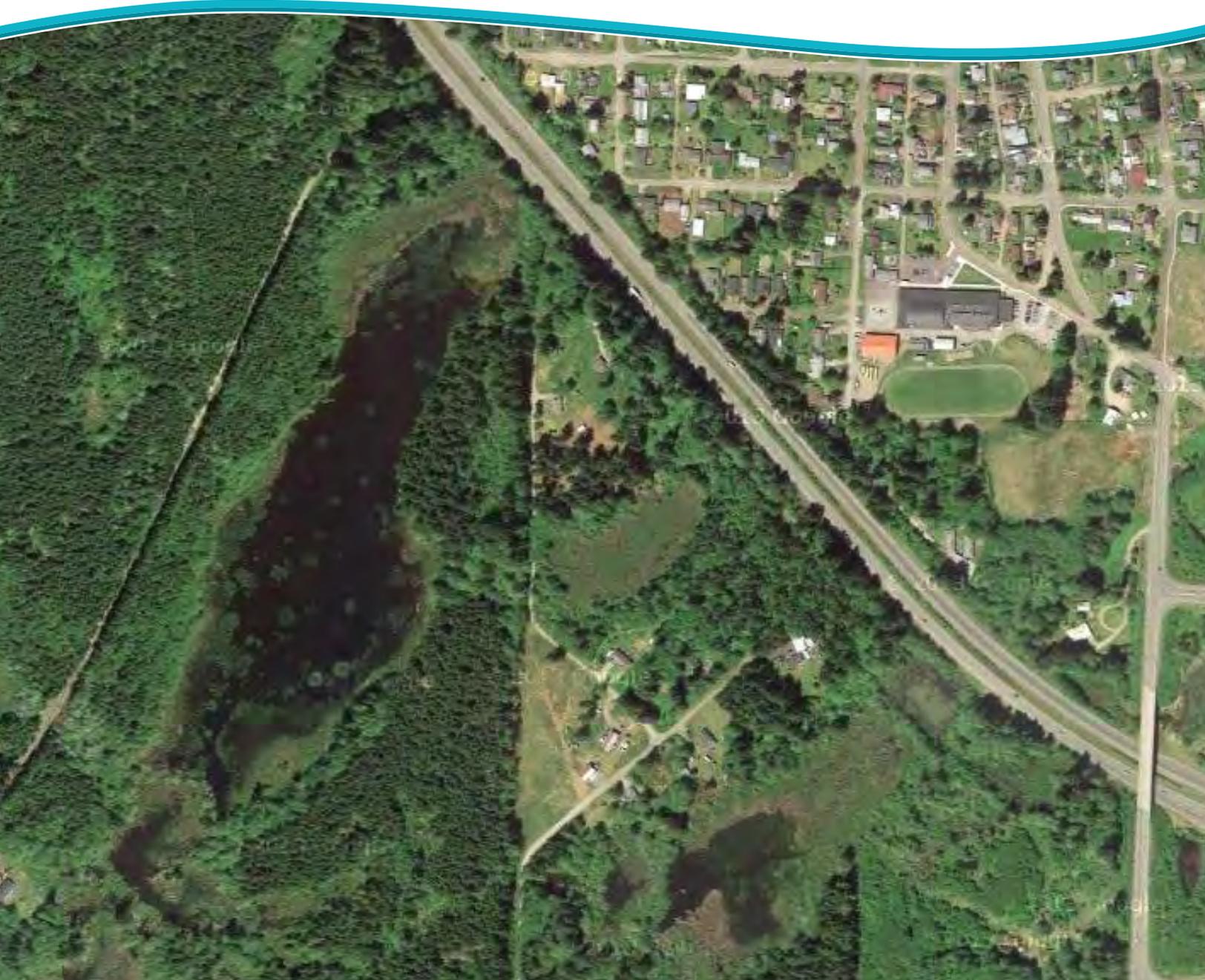


Shoreline Analysis Report

for Shorelines in the City of McCleary

Final

Prepared October 2014 by



FINAL

GRANT #G1400654

SHORELINE ANALYSIS REPORT

for Shorelines in the City of McCleary

Prepared for:

City of McCleary
100 S. 3rd Street
McCleary, WA 98557
(360) 495-3667
www.cityofmccleary.com



Prepared by:



750 Sixth Street South
Kirkland . WA 98033

p 425.822.5242

f 425.827.8136

watershedco.com

Prepared with funding from:



October 2014

The Watershed Company Reference Number:
140103

Cite this document as:

The Watershed Company. October 2014. Final Shoreline Analysis Report for Shorelines in the City of McCleary. Prepared for the City of McCleary, WA.

TABLE OF CONTENTS

	Page #
1 Introduction	1
1.1 Background and Purpose.....	1
1.2 Shoreline Jurisdiction.....	1
1.3 Study Area	2
2 Current Shoreline Regulatory Framework	3
2.1 City Regulatory Framework.....	3
2.2 State Regulatory Framework.....	3
2.2.1 Shoreline Management Act	4
2.2.2 Hydraulic Code	5
2.2.3 Clean Water Act – Section 401	5
2.3 Federal Regulatory Framework.....	5
2.3.1 Clean Water Act – Section 402 and Section 404	6
2.3.2 Endangered Species Act	6
3 Ecosystem Conditions.....	7
3.1 Climate	7
3.2 Geology	7
3.3 Geography, Topography, and Drainage Patterns.....	8
3.4 Key Species and Habitats.....	9
3.5 Major Land Use Changes and Current Shoreline Condition	10
4 Shoreline Inventory & Analysis	11
4.1 Shoreline Inventory & Analysis: Overview & Methodology	12
4.1.1 Inventory.....	12
4.1.2 Inventory Data Gaps.....	14
4.1.3 Inventory & Analysis Reach Delineation.....	14
4.1.4 Analysis of Ecological Functions	15
4.1.5 Analysis of Land Use	15
4.2 Shoreline Inventory and Analysis Results: Wildcat Pond.....	18
4.2.1 Inventory.....	18

4.2.2	Analysis of Ecological Functions	18
4.2.3	Analysis of Land Use	19
4.3	Shoreline Inventory and Analysis Results: Mox Chehalis Creek	20
4.3.1	Inventory.....	20
4.3.2	Analysis of Ecological Functions	21
4.3.3	Analysis of Land Use	22
5	Shoreline Management Recommendations	22
5.1	Environment Designations.....	23
5.1.1	Background.....	23
5.1.2	Recommendations	23
5.2	Policies and Regulations.....	24
5.2.1	General Provisions.....	24
5.2.2	Shoreline Modification Provisions.....	25
5.2.3	Shoreline Use Provisions	26
6	Acronyms and Abbreviations	28
7	References	29

APPENDIX A – Assessment of Shoreline Jurisdiction

APPENDIX B – Inventory Mapfolio

LIST OF FIGURES

	Page #
Figure 3-1. Physiographic provinces of Washington, including the Willapa Hills.....	7
Figure 3-2. Map of Chehalis Basin.	8
Figure 4-1. Shoreline reaches.	14

LIST OF TABLES

	Page #
Table 2-1. Standard wetland buffers specified by critical areas regulations.....	3
Table 3-1. Priority habitats and species within the shoreline areas of McCleary.....	10
Table 4-1. Shoreline inventory elements and information.	12
Table 4-2. Inventory data gaps.	14
Table 4-3. Framework for analysis of shoreline ecological functions.	15
Table 4-4. City of McCleary population by year.....	16
Table 4-5. Summary of shoreline inventory for Wildcat Pond.....	18
Table 4-6. Summary of ecological functions for Wildcat Pond.	19
Table 4-7. Summary of shoreline inventory for Mox Chehalis Creek.	20
Table 4-8. Summary of ecological functions for Mox Chehalis Creek.	21
Table 5-1. Potential environment designations.....	24

SHORELINE ANALYSIS REPORT

FOR SHORELINES IN THE CITY OF MCCLEARY

1 INTRODUCTION

1.1 Background and Purpose

The City of McCleary (City) is located in Grays Harbor County (County), Washington State (State). In 2013, the City obtained a grant from the Washington State Department of Ecology (Ecology) to complete a comprehensive update of its Shoreline Master Program (SMP), as required by the State Legislature. One of the first steps of the SMP update process is for the City to inventory and characterize its “Shorelines of the State,” as defined by Washington’s Shoreline Management Act (SMA) (Revised Code of Washington [RCW] 90.58).

This Shoreline Analysis Report presents the results of the inventory and characterization of McCleary’s Shorelines of the State. This report was prepared in accordance with the SMP Guidelines (Guidelines) (Washington Administrative Code [WAC] 173-26) and the SMP update scope of work promulgated by Ecology. Under the Guidelines, the City must identify and assemble the most current, applicable, accurate and complete scientific and technical information available.

1.2 Shoreline Jurisdiction

As defined by the SMA, Shorelines of the State include certain waters plus their associated “shorelands.” At a minimum, waters designated as Shorelines of the State are rivers and streams whose mean annual flow is 20 cubic feet per second (cfs) or greater; lakes whose area is greater than 20 acres; and 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 ordinary high water mark (OHWM) is:

That mark that will be found by examining the bed and banks and ascertaining where the presence and action of waters are so common and usual, and so long continued in all ordinary years, as to mark upon the soil a character distinct from that of the abutting upland, in respect to vegetation as that condition exists on June 1, 1971, as it may naturally change thereafter, or as it may change thereafter in accordance with permits issued by a local government or the department: PROVIDED, That in any area where the OHWM cannot be found, the OHWM adjoining salt water shall be the line of mean higher high tide and the OHWM adjoining fresh water shall be the line of mean high water (RCW 90.58.030(2)(b)).

In McCleary, a portion of Wildcat Pond (the other portion is located within the County) and Mox Chehalis Creek qualify as Shorelines of the State. Although Mox Chehalis Creek itself is located outside the City, areas of the City within 200 feet of the creek are included as Shorelines of the State. A detailed discussion of how shoreline jurisdiction was developed for the City is included in Appendix A (note that in Appendix A Wildcat Pond is referred to as an unnamed waterbody, as the name Wildcat Pond was only recently selected).

1.3 Study Area

The study area for this report includes all land within the City's proposed shoreline jurisdiction. The City's proposed shoreline jurisdiction covers 1,985 linear feet of shoreline. Further, the study area includes relevant discussion of the contributing watersheds.

2 CURRENT SHORELINE REGULATORY FRAMEWORK

This chapter reviews the current regulatory framework for development activities along the City’s shorelines. During the SMP update, the City will consider local, State, and federal regulations to ensure consistency as appropriate and feasible, with the goal of streamlining the shoreline permitting process.

2.1 City Regulatory Framework

Shoreline development activities are subject to the City’s zoning regulations and critical areas regulations, as well as other City regulations. The City does not currently have an SMP in effect.

Per Growth Management Act (GMA) requirements, the City is required to designate and protect critical areas. The City’s critical areas regulations are codified in McCleary Municipal Code (MMC) Chapter 18.08, Critical Areas and Resource Lands. The City is currently preparing an update to Chapter 18.08.

The City’s current critical areas regulations do not include any buffers specific to water features (such as creeks). However, per MMC 18.08.110(C.)(3.), where a fish and wildlife habitat conservation area is on or adjacent to a development site, a minimum separation of up to 50 feet may be required for regulated uses if a technical assessment indicates the need for such a buffer.

For wetlands, the City specifies standard wetland buffers in MMC 18.08.080(D.)(2.). These buffers are summarized below in Table 2-1.

Table 2-1. Standard wetland buffers specified by critical areas regulations.

Wetland Category	Buffer
I	200 feet
II	100 feet
III	50 feet
IV	25 feet

2.2 State Regulatory Framework

Key components of the State regulatory framework that may be pertinent to development in the City’s shorelines include the SMA, the Hydraulic Code, and Section

401 of the Clean Water Act, Water Quality Certification. Other components that may be relevant include the GMA, State Environmental Policy Act, Watershed Planning Act, Water Resources Act, Salmon Recovery Act, and case law.

Several State agencies (e.g. Ecology, Washington Department of Fish and Wildlife [WDFW], Washington Department of Natural Resources [DNR]) are involved in implementing these laws or own shoreline areas. Ecology reviews all shoreline projects that require a shoreline permit, but has specific regulatory authority over shoreline conditional use permits and shoreline variances. DNR is charged with protecting and managing the use of State-owned aquatic lands. Projects waterward of the OHWM require review by DNR to establish whether the project is on State-owned aquatic lands (DNR recommends that all proponents of a project waterward of the OHWM contact DNR to determine jurisdiction and requirements). Other agency reviews of shoreline developments are typically triggered by in- or over-water work, discharges of fill or pollutants into the water, or substantial land clearing. State laws 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.

Summaries of some of the key components of the State regulatory framework follow.

2.2.1 Shoreline Management Act

The SMA promotes planning along shorelines and coordination among governments. The legislative findings of the SMA state:

The legislature finds that the Shorelines of the State are among the most valuable and fragile of its natural resources and that there is great concern throughout the state relating to their utilization, protection, restoration, and preservation. In addition it finds that ever increasing pressures of additional uses are being placed on the shorelines necessitating increased coordination in the management and development of the Shorelines of the State. The legislature further finds that much of the Shorelines of the State and the uplands adjacent thereto are in private ownership; that unrestricted construction on the privately owned or publicly owned Shorelines of the State is not in the best public interest; and therefore, coordinated planning is necessary in order to protect the public interest associated with the Shorelines of the State while, at the same time, recognizing and protecting private property rights consistent with the public interest. 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 natural resources by regulating development, the SMA also aims to plan for and foster "all reasonable and appropriate uses" (RCW 90.58.020). Under the SMA, single-family residences are a preferred use of shorelines.

The SMA is implemented by locally adopted SMPs. While an SMP must comply with the Guidelines, the Guidelines offer considerable flexibility for a jurisdiction to tailor its SMP to address the specific conditions and needs of the local community.

2.2.2 Hydraulic Code

RCW 77.55, the Hydraulic Code, gives 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." These activities may include stream alteration, culvert installation or replacement, among others. Through a permit called a Hydraulic Project Approval, WDFW can condition projects to avoid, minimize, restore, and compensate for adverse impacts.

2.2.3 Clean Water Act – Section 401

Section 401 of the federal Clean Water Act allows states to review, condition, and approve or deny certain federally permitted actions that result in discharges to state waters, including wetlands. In Washington, Ecology is the State agency responsible for administering Section 401. Ecology's primary aim is to ensure that State water quality standards and other aquatic resource protections standards are met. Actions within watercourses or wetlands within the shoreline zone that require a Section 404 permit (see Subsection 2.3.1 below) also need Section 401 Water Quality Certification.

2.3 Federal Regulatory Framework

Key components of the federal regulatory framework that may be pertinent to development in the City's shorelines include Sections 402 and 404 of the Clean Water Act, and the Endangered Species Act (ESA). Other components that may be relevant include the National Environmental Policy Act, Anadromous Fish Conservation Act, Clean Air Act, Coastal Zone Management Act, National Historic Preservation Act, and the Migratory Bird Treaty Act.

A variety of agencies (e.g. U.S. Army Corps of Engineers [Corps], National Marine Fisheries Service [NMFS], U.S. Fish and Wildlife Service [USFWS]) are involved in implementing these laws. Review by these agencies of shoreline development in most cases is triggered by in- or over-water work, or discharges of fill or pollutants into the water. 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.

Summaries of some of the key components of the federal regulatory framework follow.

2.3.1 Clean Water Act – Section 402 and Section 404

Major components of the Clean Water Act include Section 402 and Section 404.

Section 402 of the Clean Water Act required the establishment of the National Pollutant Discharge Elimination System (NPDES). The NPDES is similar to Section 401 (discussed above in Subsection 2.2.3), and applies to ongoing point-source discharge. Examples of discharges requiring NPDES permits include municipal stormwater discharge, construction-related stormwater discharge, wastewater treatment effluent, and discharges related to industrial activities. Permits include limits on what can be discharged, monitoring and reporting requirements, and other provisions designed to protect water quality.

Section 404 of the Clean Water Act provides the Corps, under the oversight of the U.S. Environmental Protection Agency (EPA), with the authority to regulate discharge of dredged or fill material into waters of the United States, including wetlands. The extent of the Corps' authority and the definition of fill have been the subject of considerable legal activity. As applicable to the City's shoreline jurisdiction, however, it generally means that the Corps must review and approve most activities in water and wetlands. These activities may include wetland fills, in-water and wetland restoration, and culvert installation or replacement, among others. The Corps requires projects to avoid, minimize, and compensate for impacts.

2.3.2 Endangered Species Act

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 that results in a take of listed fish or wildlife would be a violation of the ESA and is strictly prohibited. Per Section 7 of the ESA, activities with

potential to affect federally listed or proposed species and that require federal approval, receive federal funding, or occur on federal land must be reviewed by the NMFS and/or USFWS via a process called “consultation.” For example, activities requiring a Section 404 permit (see Subsection 2.3.1 above) require such consultation if these activities occur in waters with listed species.

3 ECOSYSTEM CONDITIONS

3.1 Climate

McCleary has a predominantly marine climate with mild, wet winters. Annual rainfall in Grays Harbor County ranges by location from 65 to 150 inches. In McCleary, average annual precipitation is approximately 68 inches, with the highest amounts falling in the winter months.

3.2 Geology

McCleary is located in the Willapa Hills physiographic region (Figure 3-1), which is part of the Coast Range, bounded by the Columbia River to the south and the Olympic Mountains to the north. The region includes the Black Hills, Doty Hills, and the broad valleys that lead to the Pacific Ocean. The following description of the geologic setting is derived from Lasmanis’ *Geology of Washington* (1991).

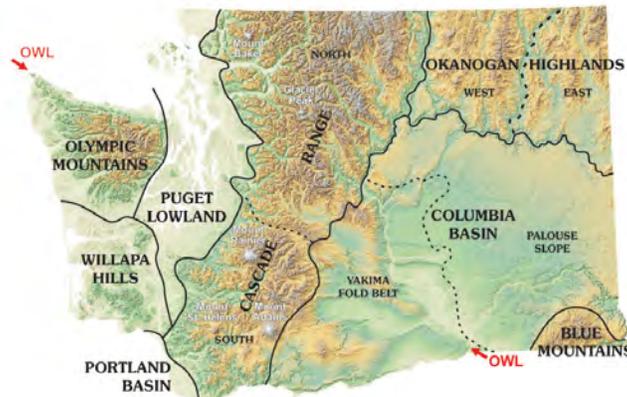


Figure 3-1. Physiographic provinces of Washington, including the Willapa Hills.

Sequences of exposed Tertiary igneous and sedimentary rocks of Eocene through Miocene age are present in the Willapa Hills. Geological features and fossils demonstrate the presence of a marine shoreline along the eastern side of the Willapa Hills during the Tertiary period. During the middle and late Miocene, Columbia River

basalt flowed down the Columbia River to the Pacific Ocean, Willapa Bay, and Grays Harbor. Unlike the Olympic Mountains, the Willapa Hills were not subject to subduction tectonism or metamorphism. The Willapa Hills have rounded topography and deep weathering profiles. During the Pleistocene, melt waters from the western foothills of the Cascades formed a major river in the Chehalis Valley. As sea levels rose after the last glacial period, the lower end of the Chehalis River was flooded, forming Grays Harbor.

3.3 Geography, Topography, and Drainage Patterns

McCleary is located in the Chehalis Basin (Figure 3-2). The Chehalis Basin is one of the larger river basins in Washington, consisting of approximately 2,766 square miles and spanning eight counties. The Chehalis Basin is comprised of Water Resource Inventory Areas (WRIAs) 22 and 23. The basin drains the western side of the Willapa Hills, the Black Hills, an area of low mountains on the west side of the Cascade Range, and the lower south slopes of the Olympic Range.



Figure 3-2. Map of Chehalis Basin.
(Source: Chehalis Basin Partnership)

The largest tributaries to the Chehalis River, the Satsop and Wynoochee Rivers, originate in the southern Olympic Mountains. The Humptulips, the Hoquiam and the Wishkah Rivers also originate in the southern Olympic Mountains and flow into Grays Harbor.

The Chehalis River is a low-gradient, slow-moving river. The unconfined channel flows through a two- to three-mile-wide valley formed by a glacial river. Watershed Geodynamics (2012) noted areas where the Chehalis River migrated laterally up to 1,500 feet between 1945 and 2009 in the eastern portion of the County (in Grays Harbor County the study addressed the stretch of the Chehalis River located to the east of Porter). Instances of large channel avulsions were also noted between 1876 and 1945 (Watershed Geodynamics 2012).

A number of tributaries to the Chehalis River are within McCleary's vicinity. Mox Chehalis Creek, the shorelands of which are part of the City's shoreline jurisdiction (see Section 1.2, Shoreline Jurisdiction, for details), is a low-gradient stream that flows just south of the City and enters the Chehalis River at river mile 25 (Smith and Wenger 2001). Sand Creek is the primary tributary to Mox Chehalis Creek. Sand Creek originates in Wildcat Pond, which is part of the City's shoreline jurisdiction (see Section 1.2, Shoreline Jurisdiction, for details). East Fork Wildcat Creek, a small stream originating several miles northeast of McCleary, flows southwest through the center of the City, eventually connecting to Cloquallum Creek.

Within Grays Harbor County, the topography includes steep, forested slopes of the southern Olympic Mountains; expansive alluvial floodplains associated with the Chehalis River valley; steep, forested slopes along the Coast Range foothills; and poorly drained estuarine wetlands associated with Grays Harbor. Within McCleary, the topography is generally flat.

3.4 Key Species and Habitats

The low gradients of most rivers and streams in the Chehalis Basin allow for access by spawning and migrating salmonids (Smith and Wenger 2001). Cutthroat occurrence is documented in Sand Creek and Wildcat Pond, as well as in Mox Chehalis Creek. Mox Chehalis Creek also supports migrating and spawning coho salmon.

Wetlands, along with riparian habitats and floodplains, provide a broad range of critical functions for water quality and habitat. Water quality functions include filtration of nutrients, bacteria, sediment, and other contaminants (Naiman and Decamps 1997, Mayer et al. 2007). Functions important to fish and wildlife habitats include microclimate regulation, invertebrate and detrital food sources for juvenile fish, shaded

cover, and woody debris recruitment (Naiman and Decamps 1997). Floodplain habitats act as an extension of riparian areas. Floodplains often include off-channel rearing habitats and wetlands, and they provide pulses of organic detritus and insect prey following flood events.

Protection of salmonid habitat must include consideration of the condition and extent of water-related resources as well as upland processes that influence aquatic habitat (Knight 2009). Land cover has a significant effect on water flow through the watershed. A loss of forested vegetation cover associated with development is correlated with increased high flows, increased variability in daily streamflow, reduced groundwater recharge, and reduced summer low flow conditions (Burgess et al. 1998, Jones 2000, Cuo et al. 2009). Changes in hydrology related to development are generally associated with soil compaction, draining, and ditching across the landscape, increased impervious surface cover, and decreased forest cover (Moore and Wondzell 2005).

Table 3-1 lists priority habitat and species (PHS) associated with the City’s shoreline area. Map 10 in Appendix B shows the location of these species and habitats.

Table 3-1. Priority habitats and species within the shoreline areas of McCleary.
 (Source: WDFW)

Category	Species/Habitats	State Status	Federal Status
Fish	Coastal Res./ Searun Cutthroat	--	Species of Concern
	Coho Salmon	--	--
Wetlands	Palustrine	--	--

Non-native, invasive vegetation often forms dense monocultures that preclude native vegetation and alter the ecosystem. Potential effects of invasive plant species in riparian and instream habitats include increased instream water temperatures, lowered dissolved oxygen, changes in pH, reduced bank stability, altered flow conditions, and increased localized flooding (Grays Harbor County Lead Entity 2011). Throughout the Chehalis Basin, there are problems with Scot’s broom, knotweed, blackberry, and other noxious weeds within riparian areas.

3.5 Major Land Use Changes and Current Shoreline Condition

Logging in the Chehalis Basin has had a significant effect on the freshwater shorelines in the watershed. As a result of past forest practices, the watershed has experienced reduced large woody debris (LWD) densities, reduced riparian tree cover, and excess

sediment inputs (Smith and Wenger 2001). Fish passage barriers, incised channels, and high summer water temperatures are also conditions associated with past timber harvest that limit natural processes in the basin (Smith and Wenger 2001). Today, forest management is regulated by the State Forest Practices Act.

Riparian conditions are degraded throughout most of the lower Chehalis Basin as a result of past forest and agricultural practices. Riparian buffer protection increased in the mid-1980s, and more recently with the 1999 Salmon Recovery Act and subsequent amendment of Forest Practices Rules. Although these protections do little to improve LWD recruitment potential in the short-term, they improve the long-term LWD recruitment potential for the WRIA (Smith and Wenger 2001).

Today, the majority of the total basin area (87%) is forestland; however, most urban, agricultural and industrial development is concentrated along the river valleys (Grays Harbor County 2004). In fact, the Chehalis Watershed Management Plan reports that 42 percent of land within one mile of the major rivers in the basin is in agricultural, urban or industrial uses. Land use in the Mox Chehalis Creek floodplain primarily consists of scattered rural residential and livestock grazing lands, while the low hills are in commercial timber production (Smith and Wenger 2001). The historic lower mile of the Mox Chehalis stream path has been re-routed and filled for croplands (Smith and Wenger 2001).

Water quality conditions in several waterbodies within the Chehalis basin are listed as impaired (303(d) listing by Ecology) or have established Total Maximum Daily Loads to address known water quality impairments. Data is not available on water quality for Mox Chehalis Creek; however, the generally degraded riparian vegetation of streams in this region suggests water quality problems (Smith and Wenger 2001).

4 SHORELINE INVENTORY & ANALYSIS

This chapter discusses the inventory and analysis of McCleary's shorelines, and consists of three sections. Section 4.1, Shoreline Inventory and Analysis: Overview and Methodology, reviews why and how the inventory and analysis was conducted. Section 4.2, Shoreline Inventory and Analysis Results: Wildcat Pond, and Section 4.3, Shoreline Inventory and Analysis Results: Mox Chehalis Creek, present the actual results of the inventory and analysis.

4.1 Shoreline Inventory & Analysis: Overview & Methodology

4.1.1 Inventory

The shoreline inventory is intended to document the existing conditions in the City’s shorelines. At a minimum, local jurisdictions must gather the inventory elements listed in the Guidelines (at WAC 173-26-201(3)(c)), to the extent that information is relevant and readily available.

Information collected for McCleary’s shoreline inventory principally included watershed and other basin documents, regional studies, scientific literature, aerial photographs, and geographic information systems (GIS) data from a variety of providers.

Table 4-1 lists relevant inventory elements for which spatial data was available. The table also describes the spatial information gathered for each of the required inventory elements, and identifies data limitations and assumptions. Map figures provided in the Inventory Mapfolio (Appendix B) depict the various inventory elements listed in the table.

Table 4-1. Shoreline inventory elements and information.

Inventory Element	Information Gathered, Inventory Map	Data Source	Limitations /Assumptions
Critical areas	100-year floodplain, Map 1	Federal Emergency Management Agency (FEMA), 2013 (provided by Grays Harbor County)	<ul style="list-style-type: none"> • Data is preliminary Digital Flood Insurance Rate Map (DFIRM), and has not formally been adopted by the City • Floodplain based on federal models, and may contain some inaccuracies
	Wetland type, Map 7	National Wetland Inventory (NWI), 2010	<ul style="list-style-type: none"> • Useful for broad-scale assessment of potential wetlands • NWI mapping based on interpretation of multi-spectral imagery • Many wetlands are not identified by NWI mapping; mapped wetlands may not meet wetland criteria • Not to be used in place of site-specific studies
Surface water	Other stream, all maps	U.S. Geological Survey (USGS)	<ul style="list-style-type: none"> • Small, intermittent or ephemeral streams may not be identified
	SMP stream, all maps	Ecology, 2010	<ul style="list-style-type: none"> • Only identifies waters that may be subject to the SMA

Inventory Element	Information Gathered, Inventory Map	Data Source	Limitations/Assumptions
Geology	Seismic design site class, Map 9	DNR, 2010	<ul style="list-style-type: none"> Requires site-specific review to verify presence/absence of geologic hazards
	Shallow-rapid slope stability, Map 9	DNR, 2000	<ul style="list-style-type: none"> Requires site-specific review to verify presence/absence of geologic hazards
	Surficial geology, Map 8	DNR, 2010	<ul style="list-style-type: none"> Based on broad-scale geologic classifications Useful for broad-scale assessment of geologic conditions Not to be used in place of site-specific studies
Habitats and species	Fish barrier, Map 11	WDFW, 2013	<ul style="list-style-type: none"> WDFW fish barriers identify the location, type, and status of road-based stream crossing structures No fish barriers are located within City limits
	Salmon Stock Inventory, Map 11		<ul style="list-style-type: none"> WDFW maps do not capture every priority species location or habitat, particularly for rare species or species that use shoreline habitats seasonally or intermittently Absence of mapping information does not indicate absence of a particular species The number of documented species may reflect the relative amount of past survey efforts New data will need to be obtained at the time of project application
Land cover	Percent impervious, Map 5	National Land Cover Database, 2006	<ul style="list-style-type: none"> Based on interpretation of multispectral imagery at 30 by 30 meter cell resolution Useful for broad-scale assessment, not useful for accurate characterization of fine-scale data (e.g. parcel level, species composition) May overestimate or underestimate coverage when type of coverage within cells is mixed 2006 data may not accurately reflect current conditions
	Land cover classification, Map 6		
Land use patterns	Current land use, Map 2	Grays Harbor County, 2013	<ul style="list-style-type: none"> Gross-scale characterization (e.g. residential, trade and services) Useful in assessing existing intensity and type of development at broad-scale planning level Land use data may not be updated as frequently as other property information
	Ownership type, Map 4	Grays Harbor County, 2013	<ul style="list-style-type: none"> For parcels within proposed shoreline jurisdiction only
	Zoning, Map 3	Grays Harbor Council of Governments, 2009	
Water resources	Principal northwest basin-fill aquifers, Map 11	USGS Water Resources Program	<ul style="list-style-type: none"> Shows aquifers that supply groundwater

4.1.2 Inventory Data Gaps

Table 4-2 identifies notable data gaps in the shoreline inventory. While the data identified in the table would be beneficial, a substantial quantity of information about McCleary’s shorelines was available to aid in the development of this report.

Table 4-2. Inventory data gaps.

Data Gap	Comment
Channel migration zone (CMZ)	CMZ data was not available. The 100-year floodplain may be used as a proxy for the CMZ except where areas are separated from the channel by a legally existing artificial structure.
Shoreline stabilization	Citywide data were not available for shoreline stabilization, such as riprap. To address this data gap, a visual assessment of shoreline stabilization using aerial photography was incorporated into the analysis of ecological functions. However, visual assessment may underestimate the extent of armoring.

4.1.3 Inventory & Analysis Reach Delineation

For purposes of the shoreline inventory and analysis, the City’s shorelines were broken down into two segments or “reaches.” One reach covers the shoreline of Wildcat Pond; the other reach covers the shoreline of Mox Chehalis Creek (see Figure 4-1).



Figure 4-1. Shoreline reaches.

4.1.4 Analysis of Ecological Functions

Building upon the more quantitative inventory information, the more qualitative analysis of ecological functions was structured according to the four major function categories identified in the Guidelines: hydrologic, hyporheic, shoreline vegetation, and habitat. These four primary functional categories were further broken down into relevant functions identified in WAC 173-26-201(3)(d)(i). Table 4-3 outlines the ecological functions that apply to the City’s proposed shoreline jurisdiction, including both Wildcat Pond and Mox Chehalis Creek.

Table 4-3. Framework for analysis of shoreline ecological functions.

Hydrologic Functions	Transport and/or storage of water and sediment
	Energy attenuation ¹
	Development of pools, riffles, and gravel bars
	Recruitment and transport of LWD and organic material
	Removal through wetland filtration of excess nutrients and toxic compounds
Vegetative Functions	Temperature regulation
	Provision of LWD and other organic matter ²
	Filtering excess nutrients, fine sediment, and toxic substances
	Bank stabilization
Habitat Functions	Physical space and conditions for life history
	Food production and delivery
Hyporheic Functions	Water and sediment storage
	Support of vegetation
	Maintenance of base flows ³

¹ Vegetated uplands help to desynchronize flooding impacts downstream. Broad, vegetated floodplain wetlands help slow and disperse flood flows. Vegetative root structure stabilizes shoreline soils and limits excessive erosion.

² Riparian forested vegetation provides a source of LWD recruitment, and provides organic matter in the form of leaves, branches, and terrestrial insects.

³ Groundwater/surface water interactions are important to maintain base flows.

4.1.5 Analysis of Land Use

Context

Timber harvesting and the manufacturing of wood products have long been mainstays of McCleary’s economy. The City was named for Henry McCleary, who built a sawmill in 1897 and went on to establish a company town with two large factories that manufactured plywood and doors. In 1941, he sold the entire town, including the manufacturing plants, to the Simpson Logging Company (now Simpson Lumber Company). The City was incorporated soon thereafter on January 9, 1943.

Over the next four decades, Simpson eventually exhausted its supply of virgin timber and shut down most of its old-growth logging and milling operations. By 1985, environmental regulations and economics forced the company to close all the plants in McCleary, except for door manufacturing. Today, the Simpson Door Company is McCleary's main industry and largest employer with approximately 200 workers (McCleary 2006, "City of McCleary" 2014).

According to the Washington State Office of Financial Management's most recent population estimate, in 2013 McCleary had a population of 1,655. Decennial census population figures for McCleary since its incorporation in 1943 are shown in Table 4-4. In the most recent two decades, the City on average added approximately nine persons per year.

Table 4-4. City of McCleary population by year.

Year	Population
2010	1,653
2000	1,454
1990	1,473
1980	1,419
1970	1,265
1960	1,115
1950	1,175

Overview & Methodology

A requirement of the Guidelines is an analysis of shoreline use (WAC 173-26-201(3)(d)(ii)). A major reason for this is to ensure uses consistent with WAC 173-26-201(2)(d), which states that local governments, when determining allowable uses and resolving use conflicts within shoreline jurisdiction, must apply, in order, the following preferences and priorities:

1. Reserve appropriate areas for protecting and restoring ecological functions to control pollution and prevent damage to the natural environment and public health. In reserving areas, local governments should consider areas that are ecologically intact from the uplands through the aquatic zone of the area, aquatic areas that adjoin permanently protected uplands, and tidelands in public ownership. Local governments should ensure that these areas are reserved consistent with constitutional limits.

2. Reserve shoreline areas for water-dependent and associated water-related uses. Harbor areas, established pursuant to Article XV of the state constitution, and other areas that have reasonable commercial navigational accessibility and necessary support facilities, such as transportation and utilities, should be reserved for water-dependent and water-related uses that are associated with commercial navigation unless the local governments can demonstrate that adequate shoreline is reserved for future water-dependent and water-related uses and unless protection of the existing natural resource values of such areas preclude such uses. Local governments may prepare master program provisions to allow mixed-use developments that include and support water-dependent uses and address specific conditions that affect water-dependent uses.
3. Reserve shoreline areas for other water-related and water-enjoyment uses that are compatible with ecological protection and restoration objectives.
4. Locate single-family residential uses where they are appropriate and can be developed without significant impact to ecological functions or displacement of water-dependent uses.
5. Limit nonwater-oriented uses to those locations where the above described uses are inappropriate or where nonwater-oriented uses demonstrably contribute to the objectives of the SMA.

Building upon the inventory information, Subsections 4.2.3 and 4.3.3 provide more specific information on land use within the City's shoreline jurisdiction associated with Wildcat Pond and Mox Chehalis Creek, respectively. In preparing the analysis of land use, the following factors were considered:

- Existing land use
- Future land use
- Land ownership
- Water-oriented uses
- Public access locations
- Historical or archaeological sites
- Use conflicts

4.2 Shoreline Inventory and Analysis Results: Wildcat Pond

4.2.1 Inventory

For Wildcat Pond, Table 4-5 provides an at-a-glance summary of select inventory information described in Table 4-1.

Table 4-5. Summary of shoreline inventory for Wildcat Pond.

Reach Characteristic	Summary
Area, length	10.429 AC 1,958 LF
Land Use Patterns	<p><i>Current land use</i></p> <ul style="list-style-type: none"> • Resource, Production and Extraction: 7.437 AC / 71.3% • Residential: 0.776 AC / 7.4% • Not Classified: 2.216 AC / 21.3% <p><i>Zoning</i></p> <ul style="list-style-type: none"> • Forest Open Space District: 8.263 AC / 79.2%
Land Cover	<p><i>Impervious Surfaces</i></p> <ul style="list-style-type: none"> • Medium-Intensity Developed: 0.812 AC / 8.0% • Low-Intensity Developed: 0.440 AC / 4.3% • Developed Open Space: 3.015 AC / 29.7% • Not Developed: 5.886 AC / 58.0% <p><i>Vegetation</i></p> <ul style="list-style-type: none"> • Evergreen Forest: 2.603 AC / 25.6% • Scrub/Shrub: 1.654 AC / 16.3% • Deciduous Forest: 0.859 AC / 8.5% • Woody Wetlands: 0.771 AC / 7.6%
Shoreline Modifications	<p><i>Roads</i></p> <ul style="list-style-type: none"> • 1,317 LF
Species	<p><i>Fish</i></p> <ul style="list-style-type: none"> • Resident Cutthroat
Critical Areas	<ul style="list-style-type: none"> • Floodplain: 2.346 AC / 22.5% • Wetlands: 2.249 AC / 21.6%

AC = acre, LF = linear feet

4.2.2 Analysis of Ecological Functions

Building upon the inventory information, Table 4-6 presents the results of analysis of ecological functions for Wildcat Pond. In brief, this reach covers well-vegetated forestry lands. Shoreline functions are presumed to be relatively high despite the presence of roads.

Table 4-6. Summary of ecological functions for Wildcat Pond.

Process	Function	Notes
Hydrologic	Store water and sediment	Riparian habitats are well vegetated, though intersected by a number of roads including State Route 8, which runs adjacent to the north end of the lake. These structures restrict full floodplain and upland habitat connectivity.
	Attenuate flow energy	
	Remove excessive nutrients and toxic compounds	
Vegetation	Regulate temperature	Riparian and wetland vegetation is extensive in the reach.
	LWD and organic matter recruitment	
	Filtration of upland inputs	
	Bank stabilization	
Habitat	Space and conditions supporting fish and wildlife, including PHS species	The lake maintains substantial freshwater emergent and forested/shrub wetlands. The largely intact riparian habitat is dominated by evergreen forest and scrub-shrub. The lake and surrounding vegetation provide habitat for resident cutthroat, and likely support other fish, amphibians, birds, and mammals. The lake does not have any overwater structures.
Hyporheic		Hyporheic functions are generally dependent on directional flow, and therefore were not evaluated for this lake system.

4.2.3 Analysis of Land Use

Shoreline jurisdiction associated with Wildcat Pond affects three parcels, as well as areas of right-of-way.

The parcel (number 618051413002) that encompasses most of shoreline jurisdiction, as well as the most of the shoreline itself, is owned by Green Diamond Resource Company. According to data from the Grays Harbor County Assessor's Office (Assessor), current land use for this approximately 35-acre parcel is Designated Forest Land RCW 84.33. No structures appear to be situated on this parcel. This parcel is zoned F/OS - Forest Open Space District. Given this zoning designation, this parcel is expected to continue to be in forestry use for the foreseeable future.

Two parcels (numbers 618051414013 and 618051414015) located immediately to the east of the Green Diamond Resource Company parcel described in the above paragraph feature a limited amount of shoreline jurisdiction. According to Assessor's data, current land use for these two parcels is Household, Single Family Units. This is consistent with

City permit records, which indicate that manufactured homes were installed on these two parcels in 1997 (these are the only development activities documented by City permit records for parcels in shoreline jurisdiction). These structures appear to be located outside of shoreline jurisdiction. These two parcels are zoned F/OS - Forest Open Space District. Property improvements (e.g. structure expansions) associated with the homes could occur in the future.

Shoreline jurisdiction also includes right-of-way for State Route 8, Old Sand Creek Road, and Heslep Road. These roads will presumably be maintained or expanded in the future.

No existing or planned water-oriented uses, shoreline public access locations, or historical or archaeological sites were identified in this reach. Additionally, no potential for use conflicts was identified.

4.3 Shoreline Inventory and Analysis Results: Mox Chehalis Creek

4.3.1 Inventory

For Mox Chehalis Creek, Table 4-7 provides an at-a-glance summary of select inventory information described in Table 4-1.

Table 4-7. Summary of shoreline inventory for Mox Chehalis Creek.

Reach Characteristic	Summary
Area, length	0.694 AC 285 LF
Land Use Patterns	<i>Current land use</i> <ul style="list-style-type: none"> Residential: 0.694 AC / 100% <i>Zoning</i> <ul style="list-style-type: none"> Single Family Residential: 0.694 AC / 100%
Land Cover	<i>Impervious Surfaces</i> <ul style="list-style-type: none"> Developed Open Space: 0.389 AC / 56.1% Not Developed: 0.305 AC / 43.9% <i>Vegetation</i> <ul style="list-style-type: none"> Scrub/Shrub: 0.305 AC / 43.9%
Shoreline Modifications	<i>Roads</i> <ul style="list-style-type: none"> 425 LF

Reach Characteristic	Summary
Species	<i>Fish</i> <ul style="list-style-type: none"> • Coho Salmon • Resident Cutthroat
Critical Areas	<i>Critical Areas</i> <ul style="list-style-type: none"> • Floodplain: 0 AC • Wetlands: 0 AC

AC = acre, LF = linear feet

4.3.2 Analysis of Ecological Functions

Building upon the inventory information, Table 4-8 presents the results of analysis of ecological functions for Mox Chehalis Creek. In brief, this reach covers a small vegetated area that is separated from Mox Chehalis Creek by Mox Chehalis Road East.

Table 4-8. Summary of ecological functions for Mox Chehalis Creek.

Process	Function	Notes
Hydrologic	Moderate water and sediment transport	Hydrologic function is limited in the reach because Mox Chehalis Road East separates it from the creek.
	Attenuate flow energy	
	Development and maintenance of complex habitat features	
Vegetation	Regulate temperature	The reach is well vegetated, but functional contribution to the creek is restricted due to Mox Chehalis Road East.
	LWD and organic matter recruitment	
	Filtration of upland inputs	
	Bank stabilization	
Habitat	Space and conditions supporting fish and wildlife, including PHS species	The reach does not include any wetland or floodplain habitat. Mox Chehalis Road East limits the potential for habitat connectivity between the shoreland area in the reach and Mox Chehalis Creek.
Hyporheic	Water storage, cool water refugia, and filtration	This reach likely does not contribute hyporheic function to Mox Chehalis Creek because it is isolated from the active channel bed by Mox Chehalis Road East.
	Support of vegetation	
	Maintenance of base flows	

4.3.3 Analysis of Land Use

As previously mentioned, the City's limited amount (285 linear feet) of Mox Chehalis Creek shoreline jurisdiction includes only shorelands associated with Mox Chehalis Creek, but not the creek itself (the creek in this area is within Grays Harbor County). Shoreline jurisdiction associated with Mox Chehalis Creek affects one parcel, as well as areas of right-of-way.

This parcel (number 618051334000) is owned by the Green Diamond Resource Company. According to Assessor's data, current land use for this approximately 39-acre parcel is All Other Residential Not Elsewhere Coded (Bare Land Platted & Outside Plats and Sheds in City Limits). This parcel appears to include one non-residential structure in the northwest corner of the property (outside of shoreline jurisdiction). This parcel features two zoning designations. The northern portion, which is outside of shoreline jurisdiction, is zoned C3 - Highway Commercial. The southern portion, which includes the area of shoreline jurisdiction, is zoned R1- Single Family Residential. According to MMC 17.24.030, up to six dwelling units per acre may be located in this zone. The minimum lot area is 7,200 square feet. This parcel could be developed to highway commercial or residential uses in the coming years as influenced by market forces.

Shoreline jurisdiction also includes right-of-way for Mox Chehalis Road East, which separates Mox Chehalis Creek from the shorelands described in the above paragraph. This road will presumably be subject to maintenance activities in the future.

No existing or planned water-oriented uses, shoreline public access locations, or historical or archaeological sites were identified in this reach. Additionally, no potential for use conflicts was identified.

5 SHORELINE MANAGEMENT RECOMMENDATIONS

This chapter sets forth recommendations for translating the inventory and analysis information presented in the previous chapters of this report into SMP environment designations, policies, and regulations. In addition to these recommendations, the updated SMP should meet all applicable requirements of the SMA and the Guidelines.

The inventory and analysis information presented in this report will also inform the forthcoming Shoreline Restoration Plan, a required component of the SMP update

process. As directed by WAC 173-26-201(2)(f), the Shoreline Restoration Plan will include “goals, policies and actions for restoration of impaired shoreline ecological functions.”

5.1 Environment Designations

5.1.1 Background

As outlined in the Guidelines (WAC 173-26-191(1)(d)) “shoreline management must address a wide range of physical conditions and development settings along shoreline areas. Effective shoreline management requires that the shoreline master program prescribe different sets of environmental protection measures, allowable use provisions, and development standards for each of these shoreline segments.”

Under the SMA, different shoreline segments are regulated through the assignment of various “environment designations.” Environment designations can be thought of as system of shoreline zoning (though the standard underlying zoning still applies as well). The Guidelines recommend a classification system with six basic environment designations. These six environment designations are: Natural, Rural Conservancy, Aquatic, High-intensity, Urban Conservancy, and Shoreline Residential. Jurisdictions may use these environment designations as applicable, or develop their own unique environment designations (provided they meet certain requirements).

There is substantial flexibility in the development and assignment of environment designations to a shoreline area; however, the Guidelines (WAC 173-26-211(2)(a)) direct that the development and assignment of environment designations be based on “existing use pattern, the biological and physical character of the shoreline, and the goals and aspirations of the community as expressed through comprehensive plans...” While current and future land use provide basic context for a given segment of land, environment designations should not be expected to always correlate strongly with these parameters, particularly in shoreline areas that are currently undeveloped, feature existing development located away from shoreline jurisdiction (especially on larger parcels), or have extensive critical areas (e.g. wetlands).

5.1.2 Recommendations

The following recommendations are provided for the development and assignment of environment designations for McCleary’s shorelines:

- Use the classification system recommended in the Guidelines when assigning environment designations.
- Based on the findings of this report, the potential environment designations identified in Table 5-1 may be appropriate:

Table 5-1. Potential environment designations.

Area	Potential Environment Designation
Below the OHWM of Wildcat Pond	Aquatic
Uplands associated with Wildcat Pond	Urban Conservancy
Shorelands associated with Mox Chehalis Creek	Urban Conservancy or Shoreline Residential

5.2 Policies and Regulations

Policies and regulations form the core of the SMP. The Guidelines address policies and regulations for three distinct topic areas: General Master Program Provisions (WAC 173-26-221), Shoreline Modifications (WAC 173-26-231), and Shoreline Uses (WAC 173-26-241). The following subsections discuss policy and regulation recommendations for each of these topic areas in turn.

5.2.1 General Provisions

Archaeological and Historic Resources

- Based on the contents of this report and local conditions, no recommendations are set forth beyond the guidance or requirements specified by the Guidelines.

Critical Areas

- The City’s critical areas ordinance is currently being updated. Incorporate the updated critical areas ordinance into the SMP. Consider whether the updated critical areas ordinance should be incorporated into the SMP by direct inclusion, as an appendix, or by reference. Either of the first two methods is recommended. Adopting critical areas protections by reference would require that future changes to the City-wide critical areas ordinance be formally approved by Ecology as an SMP amendment.

Flood Hazard Reduction

- Based on the contents of this report and local conditions, no recommendations are set forth beyond the guidance or requirements specified by the Guidelines.

Public Access

- Use the shoreline visioning process to foster community dialogue about shoreline public access opportunities in and around the City. Opportunities for physical public access are limited in McCleary given the private ownership of Wildcat Pond, the lack of direct access to Mox Chehalis Creek within City limits, and the limited potential for any new developments that would require public access (e.g. subdivisions of more than four lots, non-water-dependent commercial uses).

Shoreline Vegetation Conservation

- Based on the contents of this report and local conditions, no recommendations are set forth beyond the guidance or requirements specified by the Guidelines.

Water Quality, Stormwater, and Nonpoint Pollution

- Based on the contents of this report and local conditions, no recommendations are set forth beyond the guidance or requirements specified by the Guidelines.

5.2.2 Shoreline Modification Provisions

Shoreline Stabilization

- Consider requiring a Shoreline Conditional Use Permit for any new hard shoreline stabilization.

Piers and Docks

- Based on the contents of this report and local conditions (lack of overwater structures), consider prohibiting piers and docks.

Fill

- Based on the contents of this report and local conditions, no recommendations are set forth beyond the guidance or requirements specified by the Guidelines.

Breakwaters, Jetties, Groins and Weirs

- Based on the contents of this report and local conditions, consider prohibiting breakwaters, groins, jetties, and weirs. These structures are not present or necessary in Wildcat Pond, and Mox Chehalis Creek itself is not in the City's shoreline jurisdiction.

Dredging and Dredge Material Disposal

- Except for purposes of shoreline restoration or flood hazard reduction, consider prohibiting dredging activities.

Shoreline Habitat and Natural Systems Enhancement Projects

- Based on the contents of this report and local conditions, no recommendations are set forth beyond the guidance or requirements specified by the Guidelines.

5.2.3 Shoreline Use Provisions

Agriculture

- Based on the apparent lack of agricultural activities along the City's shorelines, consider prohibiting agriculture.

Aquaculture

- Based on the contents of this report and local conditions, consider prohibiting aquaculture unless associated with shoreline restoration.

Boating Facilities

- Based on the contents of this report and local conditions, consider prohibiting boating facilities in shoreline jurisdiction.

Commercial Development

- Commercial development is not currently planned or anticipated in McCleary's shoreline jurisdiction; consider prohibiting it or requiring a Shoreline Conditional Use Permit.

Forest Practices

- Per the Guidelines, the City's SMP should rely on the Forest Practices Act and its implementing rules, as well as the *Forest and Fish Report* for adequate management of commercial forest uses within shoreline jurisdiction. However, the City's SMP will apply to Class IV-General forest practices where shorelines are being converted or are expected to be converted to non-forest uses.

Industry

- Industrial development is not currently present, planned or anticipated in McCleary's shoreline jurisdiction. Based on the contents of this report and local conditions, consider prohibiting industrial development in shoreline jurisdiction.

In-stream Structural Uses

- Mox Chehalis Creek is not in the City's shoreline jurisdiction, so this section is not relevant.

Mining

- Mining is not currently present, planned or anticipated in McCleary's shoreline jurisdiction. Based on the contents of this report and local conditions, consider prohibiting mining in shoreline jurisdiction.

Recreational Development

- Based on the contents of this report and local conditions, no recommendations are set forth beyond the guidance or requirements specified by the Guidelines.

Residential Development

- Incorporate clear dimensional criteria for residential development, such as setbacks/buffers.

Transportation and Parking

- Allow for maintenance and improvements to existing roads, parking areas, or other transportation facilities.

Utilities

- Allow for maintenance and improvements to existing utility facilities.

6 ACRONYMS AND ABBREVIATIONS

AC	Acres
Assessor	Grays Harbor County Assessor's Office
Cfs	Cubic feet per second
City	City of McCleary
CMZ	Channel migration zone
Corps	U.S. Army Corps of Engineers
County	Grays Harbor County
DFIRM	Draft Flood Insurance Rate Map
DNR	Washington Department of Natural Resources
Ecology	Washington State Department of Ecology
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
GIS	Geographic information systems
GMA	Growth Management Act
Guidelines	Shoreline Master Program Guidelines
LF	Linear feet
LWD	Large woody debris
OHWM	Ordinary high water mark
MMC	McCleary Municipal Code
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NWI	National Wetlands Inventory
PHS	Priority habitats and species
RCW	Revised Code of Washington
SMA	Shoreline Management Act
SMP	Shoreline Master Program
State	Washington State
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WRIA	Water Resource Inventory Area

7 REFERENCES

- Burges, S., M. Wigmosta, and J. Meena. 1998. Hydrological effects of land use change in a zero-order catchment. *Journal of Hydrologic Engineering* 3: 86–97.
- City of McCleary. 2014. <http://www.cityofmccleary.com/>.
- Cuo, L., D. P. Lettenmaier, M. Alberti, and J. E. Richey. 2009. Effects of a century of land cover and climate change on the hydrology of the Puget Sound basin. *Hydrological Processes* 933: 907–933.
- Grays Harbor County. 2004. Chehalis Basin Watershed Management Plan.
- Grays Harbor County Lead Entity. 2011. The Chehalis Basin Salmon Habitat Restoration and Preservation Strategy for WRIA 22 and 23.
- Jones, J. A. 2000. Hydrologic processes and peak discharge response to forest removal, regrowth, and roads in 10 small experimental basins, western Cascades, Oregon. *Water Resources Research* 36(9): 2621–2642.
- Knight, K. 2009. Land use planning for salmon, steelhead and trout: A land use planner’s guide to salmonid habitat protection and recovery. Pp. 132. *Aquatic Habitat Guidelines Program/Washington Department of Fish and Wildlife*.
- Lasmanis, R. 1991. The geology of Washington. *Rocks and Minerals* 66(4): 262–277.
- Mayer, P. M., S. K. Reynolds, M. D. McCutchen, and T. J. Canfield. 2007. Meta-analysis of nitrogen removal in riparian buffers. *Journal of Environmental Quality* 36(4): 1172–80.
- McClary, D. C. 2006. McCleary -- Thumbnail History. http://www.historylink.org/index.cfm?DisplayPage=output.cfm&file_id=8046.
- Moore, R., and S. Wondzell. 2005. Physical hydrology and the effects of forest harvesting in the Pacific Northwest: A review. *Journal of the American Water Resources Association* 41(4): 763–784.
- Naiman, R. J., and H. Decamps. 1997. The Ecology of Interfaces: Riparian Zones. *Annual Review of Ecology and Systematics* 28: 621–658.
- Smith, C., and M. Wenger. 2001. Salmon and Steelhead Limiting Factors Chehalis Basin and Nearby Drainages Water Resource Areas 22 and 23. Washington State Conservation Commission.

Watershed Geodynamics. 2012. Appendix B. Geomorphology/Sediment Transport/Large
Woody Debris Report. Chehalis River Fish Study. Pp. 50.

APPENDIX A

Assessment of Shoreline Jurisdiction

June 17, 2014

Todd Baun
Public Works Director
City of McCleary
100 South 3rd Street
McCleary, WA 98557
Via email: Toddb@cityofmcclary.com

Re: City of McCleary Shoreline Master Program Update — Preliminary Shoreline Jurisdiction

Dear Todd:

The Watershed Company has developed the accompanying Preliminary Shoreline Jurisdiction map as part of the City of McCleary (City) Shoreline Master Program (SMP) update. This letter describes the development of this map in detail.

OVERVIEW

The Preliminary Shoreline Jurisdiction map shows the City's minimum shoreline jurisdiction based upon the Shoreline Management Act (SMA), the Washington Administrative Code (WAC) and Washington Department of Ecology (Ecology) guidance documents.

Under the SMA, the following features in Washington are regulated as Shorelines of the State:

- Rivers and streams with over 20 cubic feet per second (cfs) mean annual flow;
- Floodway and contiguous floodplain areas extending 200 feet from the floodway;
- Marine waters;
- Lakes 20 acres or greater in size;
- Shorelands 200 feet landward from the ordinary high water mark (OHWM) of marine waters and jurisdictional rivers, streams, and lakes; and
- Associated wetlands that are hydrologically connected to any of the shorelines described above, located within 200 feet of a jurisdictional waterbody or floodway, or are entirely/partly located within a jurisdictional waterbody's 100-year floodplain.

SUPPORTING GIS DATA

A first step in developing the Preliminary Shoreline Jurisdiction map was to collect and compare existing GIS datasets. GIS datasets from several agencies were reviewed to determine

the most accurate data for the City. GIS datasets used for mapping shoreline jurisdiction are listed below.

Lake data

- Suggested Shoreline Polygons (Ecology 2010)

Stream data

- Suggested Shoreline Arcs (Ecology, 2010)

Wetland data

- National Wetlands Inventory (US Fish and Wildlife Service, 2010)

Flood data

- Preliminary Digital Flood Insurance Rate Map (Federal Emergency Management Agency [FEMA], 2013)

Please note that while the preliminary shoreline jurisdiction shown in the map is built on the best available data, the level of accuracy is limited and may require ground-truthing at the time of development action review. Each map depicting shoreline jurisdiction will therefore include the following disclaimer, derived from Ecology's recommendation:

All features 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

Lakes

The City features a portion (the other portion is located within Grays Harbor County) of an **unnamed waterbody** that appears to exceed the 20-acre size criterion needed for a Shoreline of the State. This waterbody is located to the south of State Route 8. This waterbody was mapped using Ecology's Suggested Shoreline Polygons dataset.

Streams

Ecology GIS data were consulted to verify the upstream limits of stream shoreline jurisdiction based on the US Geological Survey's study (2003)¹ of the 20 cfs cut-off.

Based on this information, the City has shoreline jurisdiction associated with **Mox Chehalis Creek**. The centerline of the creek was mapped using Ecology's Suggested Shoreline Arcs dataset. Although the creek itself is located outside the City, areas of the City within 200 feet of the creek are included as preliminary shoreline jurisdiction. Based on FEMA Preliminary

¹ http://www.ecy.wa.gov/programs/sea/pubs/USGS_reports/WRIR%2096-4208.pdf

Digital Flood Insurance Rate Map (DFIRM) data, near the City Mox Chehalis Creek has associated floodplain, but does not have associated floodway.

Wildcat Creek is not jurisdictional within the City. According to the aforementioned US Geological Survey study of the 20 cfs cut-off, the upstream limits of shoreline jurisdiction for Wildcat Creek are located to the west of the City (.17 mile west of the City for Wildcat Creek, East Fork; .38 mile west of the City for an unnamed tributary to Wildcat Creek, East Fork; and 1.23 miles west of the City for Wildcat Creek, West Fork). The upstream limits of shoreline jurisdiction for Wildcat Creek are shown below in Figure 1.

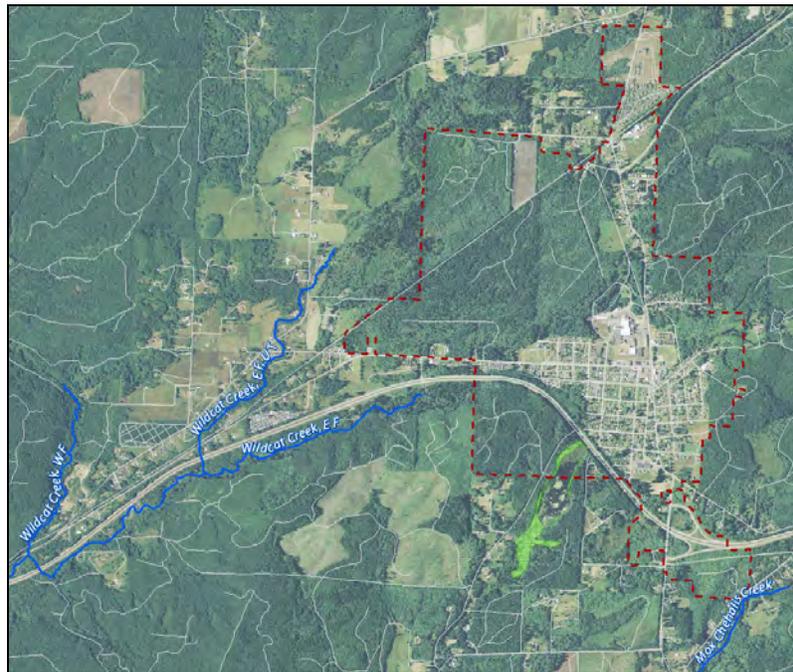


Figure 1: Proximity of upstream limits of shoreline jurisdiction for Wildcat Creek to the City of McCleary. Jurisdictional portions of creeks are shown in blue.

Associated wetlands

Existing wetland data in the National Wetlands Inventory were reviewed to identify any potentially associated wetlands. Ecology guidance states that an entire wetland is associated if any part of it lies within the area 200 feet from the OHWM or floodway of a Shoreline of the State. Further guidance states that wetlands that are hydraulically connected to a Shoreline of the State would also 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. NWI wetlands surrounding the unnamed waterbody that appear to meet the above criteria were mapped as potentially associated wetland. These wetlands do not extend shoreline jurisdiction beyond the standard 200 feet.

OPTIONAL SHORELINE JURISDICTION BOUNDARIES

Under the SMA, the City has the option of expanding shoreline jurisdiction to include lands necessary for the entire 100-year floodplain and/or critical area buffers. The legislative intent for sole regulation under an updated SMP includes the caveat that if a local government's SMP does not include "land necessary for buffers for critical areas," then its critical areas ordinance (CAO) will continue to regulate critical areas and floodplain that are partly within the normal SMA jurisdiction and their buffers. The SMP also will apply within shoreline jurisdiction, resulting in dual coverage by both the CAO and SMP.

The City can voluntarily extend shoreline jurisdiction to include critical area buffers and/or floodplain that are beyond the minimum SMA jurisdiction (note that the current preliminary DFIRM data shows the 100-year floodplain as entirely within the minimum shoreline jurisdiction). Extending SMA jurisdiction can reduce regulatory duplication in the future. This is an issue that should be considered by the City. The attached maps currently do not include expanded shoreline jurisdiction to include critical area buffers or floodplain.

Please call if you have any questions.

Sincerely,



Mark Daniel, AICP
Associate Planner

Enclosure:
Preliminary Shoreline Jurisdiction map

Preliminary Shoreline Jurisdiction

-  SMP Stream ¹ECY
-  SMP Waterbody ²ECY
-  Preliminary Shoreline Jurisdiction ³TWC
-  Potentially Associated Wetland ⁴NWI
-  100-year Floodplain ⁵FEMA
-  Other Stream ^{NHD}
-  City Limit ^{GHC}

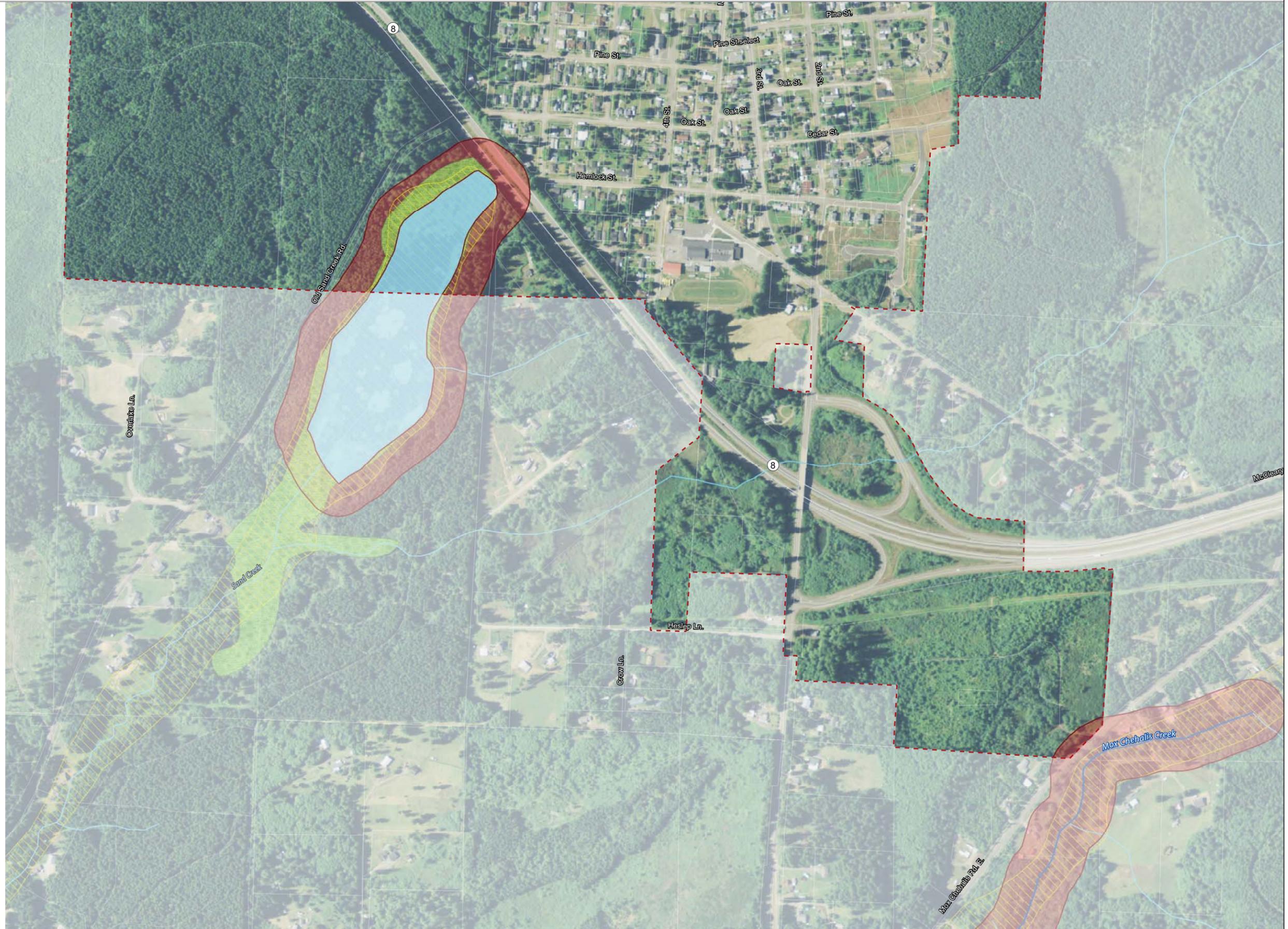
Notes:
¹ Stream centerline from Suggested Shoreline Arcs (ECY) 2010.
² Boundary of lake from Suggested Shoreline Polygons (ECY) 2010.
³ Boundaries of shoreline jurisdiction are derived from the SMP Stream and Waterbody depicted on this map.
⁴ All wetlands are from NWI data of 2010 and have not been field verified.
⁵ FEMA preliminary DFIRM flood data of 2013 provided by Grays Harbor County.

Data Sources:
 ECY - Washington Department of Ecology
 FEMA - Federal Emergency Management Agency
 GHC - Grays Harbor County
 NHD - USGS National Hydrologic Dataset
 NWI - USFWS National Wetland Inventory
 TWC - The Watershed Company

Print Date: 6/17/2014



All features 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 information shown on this map.



APPENDIX B

Inventory Mapfolio

City of McCleary

Inventory Mapfolio - Cover

-  SMP Stream ^{ECY}
-  SMP Waterbody ^{ECY}
-  Proposed Shoreline Jurisdiction ^{TWC}
-  Potentially Associated Wetland ^{NWI}
-  Other Stream ^{USGS}
-  Road ^{GHC}
-  Parcel ^{GHC}
-  City Limit ^{GHC}

Table of Contents:

1. Proposed Shoreline Jurisdiction
2. Current Land Use
3. Zoning
4. Shoreline Land Ownership
5. Impervious Surface Coverage
6. Land Cover
7. Wetlands
8. Surficial Geology
9. Geological Hazards
10. Priority Habitats and Species
11. Aquifers

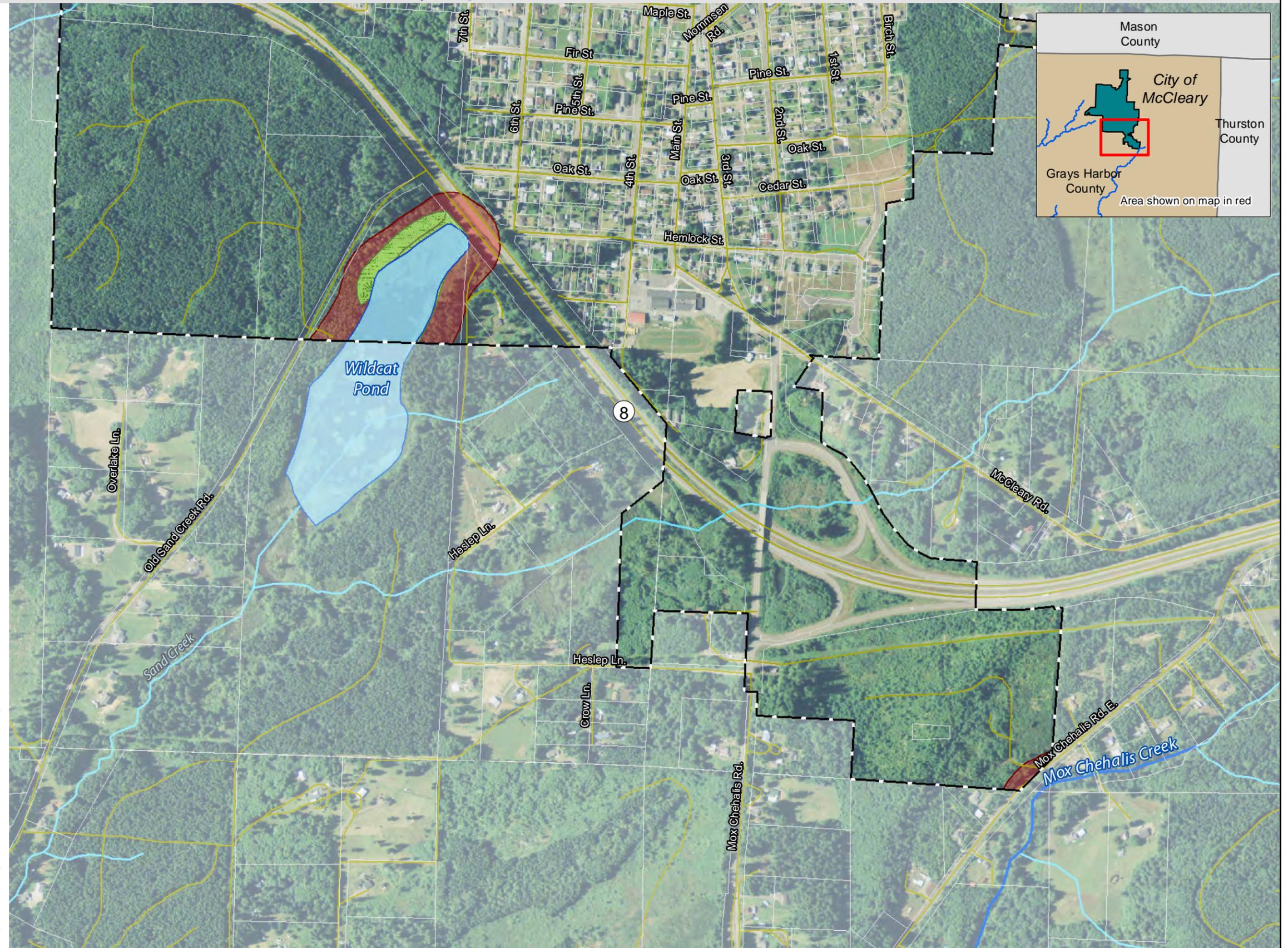
Data Sources:

- DNR - Washington Department of Natural Resources
- ECY - Washington Department of Ecology
- FEMA - Federal Emergency Management Agency
- GHC - Grays Harbor County
- GHCOG - Grays Harbor Council of Governments
- NWI - USFWS National Wetlands Inventory
- TWC - The Watershed Company
- USGS - U.S. Geological Survey
- WDFW - Washington Department of Fish and Wildlife

Print Date: 10/28/2014



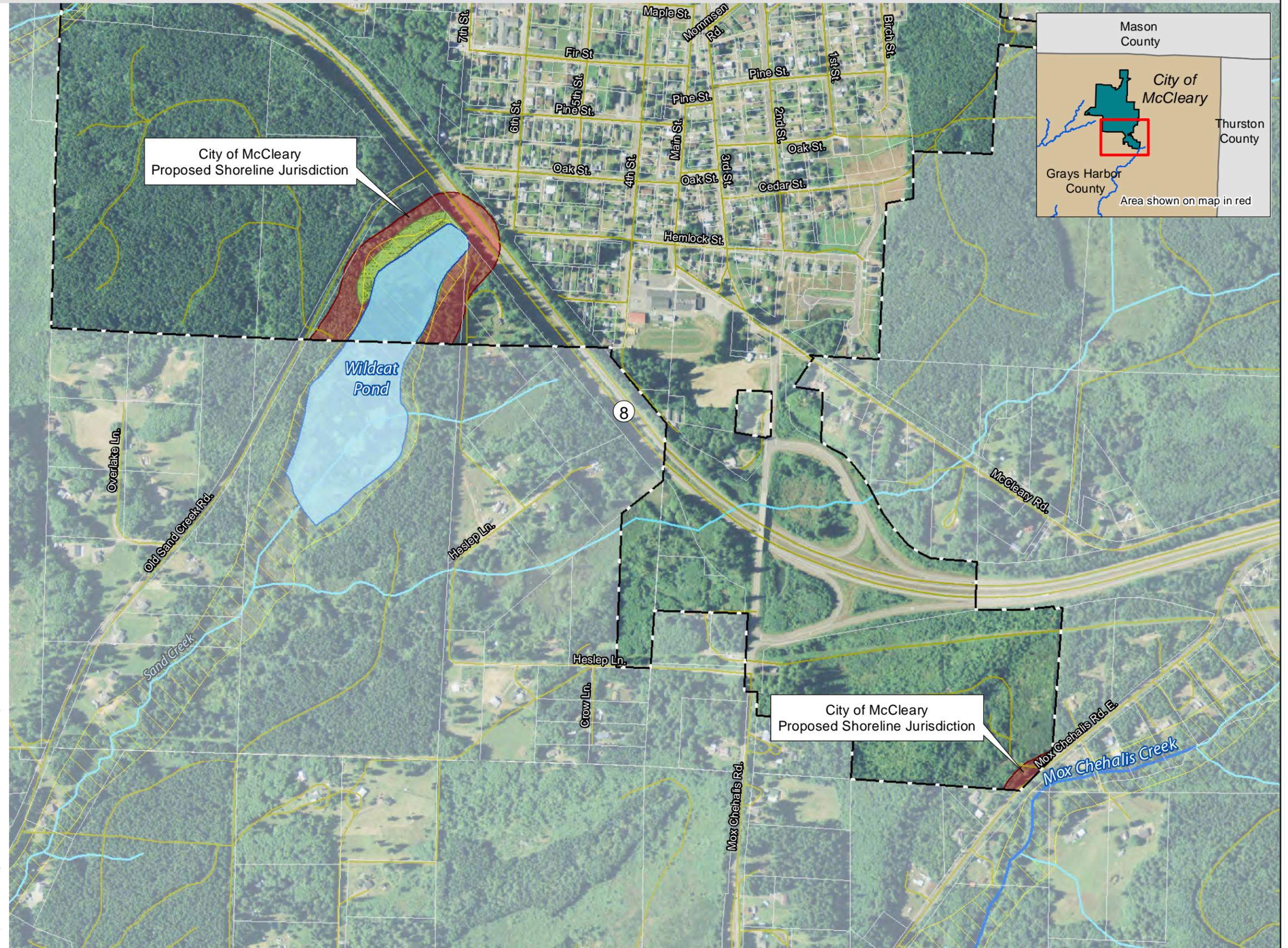
All features depicted on this map are approximate. They have not been formally delineated or surveyed and are intended for planning purposes only. Additional site-specific evaluation may be needed to confirm information shown on this map.



City of McCleary

1. Proposed Shoreline Jurisdiction

- Proposed Shoreline Jurisdiction ¹TWC
- Potentially Associated Wetland ²NWI
- SMP Stream ³ECY
- SMP Waterbody ⁴ECY
- 100-year Floodplain ⁵FEMA
- Other Stream ^{USGS}
- Road ^{GHC}
- Parcel ^{GHC}
- City Limit ^{GHC}



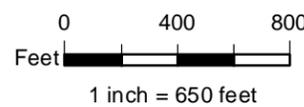
City of McCleary
Proposed Shoreline Jurisdiction

City of McCleary
Proposed Shoreline Jurisdiction

Notes:
¹ Boundaries of shoreline jurisdiction are derived from the SMP Stream and Waterbody depicted on this map.
² All wetlands are from NWI data of 2010 and have not been field verified.
³ Stream centerline from Suggested Shoreline Arcs (ECY) 2010.
⁴ Boundary of lake from Suggested Shoreline Polygons (ECY) 2010.
⁵ FEMA preliminary DFIRM flood data of 2013 provided by Grays Harbor County.

Data Sources:
 Refer to mapfolio coversheet for source abbreviations.

Print Date: 10/28/2014



THE
WATERSHED
COMPANY

All features 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 information shown on this map.

City of McCleary

2. Current Land Use

Current Land Use ¹ GHC

- Cultural, Entertainment and Recreational
- Residential
- Resource, Production and Extraction
- Services
- Trade
- Transportation, Communication and Utilities
- Undeveloped Land and Water Areas
- Unknown
- Proposed Shoreline Jurisdiction ^{TWC}
- Potentially Associated Wetland ^{NWI}
- SMP Stream ^{ECY}
- SMP Waterbody ^{ECY}
- Other Stream ^{USGS}
- Road ^{GHC}
- Parcel ^{GHC}
- City Limit ^{GHC}

Notes:

¹ Land use classification derived from 2013 GHC parcel data and assessor land use codes and descriptions.

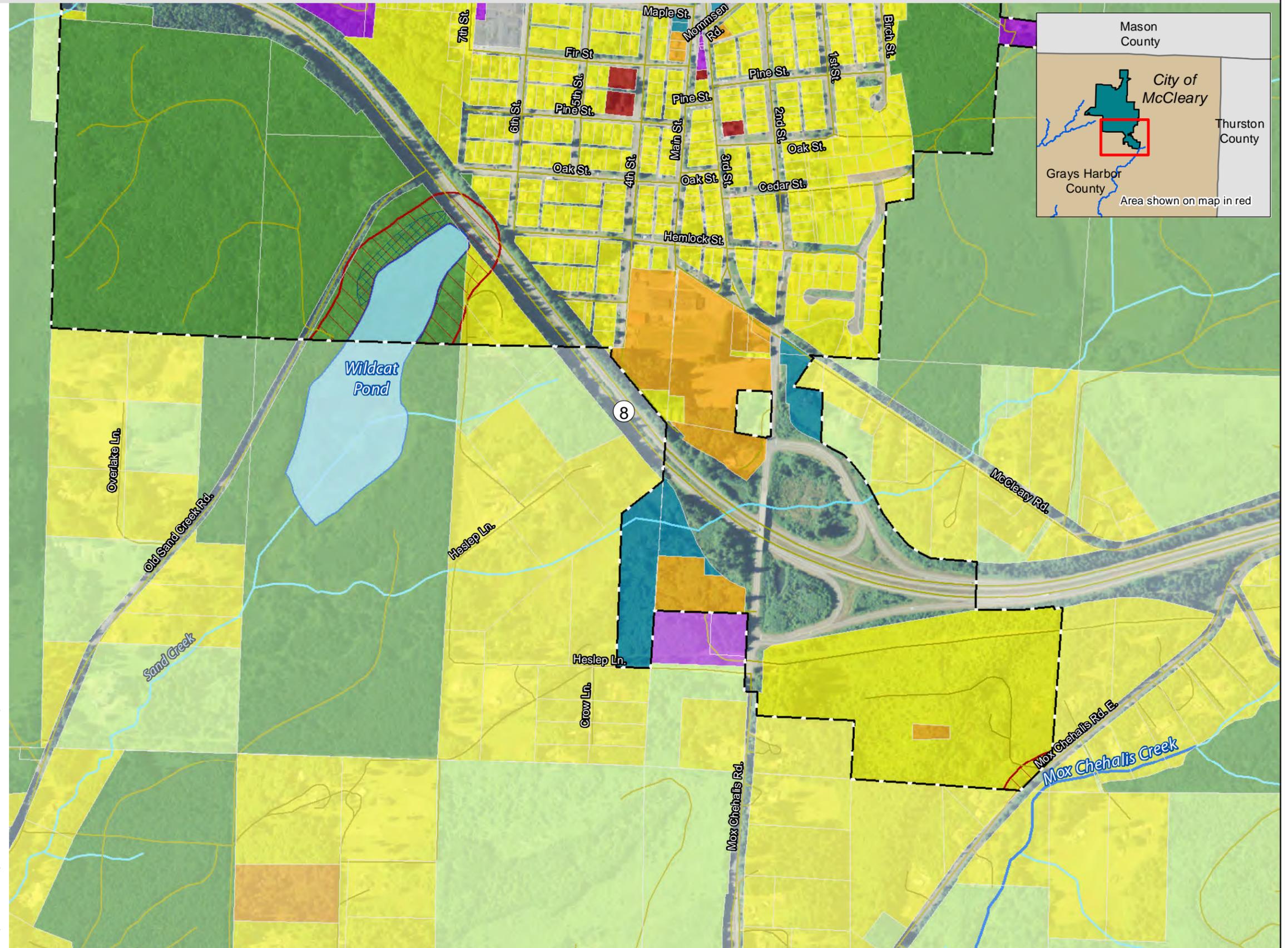
Data Sources:

Refer to mapfolio coversheet for source abbreviations.

Print Date: 10/28/2014



All features 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 information shown on this map.



City of McCleary

3. Zoning

Zoning ¹GHCOG

- C1 - Downtown District
- C2 - General Commercial District
- C3 - Highway Commercial
- F/OS - Forest Open Space District
- R1 - Single Family Residential
- R2 - Multiple Family Residential
- Proposed Shoreline Jurisdiction ^{TWC}
- Potentially Associated Wetland ^{NWI}
- SMP Stream ^{ECY}
- SMP Waterbody ^{ECY}
- Other Stream ^{USGS}
- Road ^{GHC}
- Parcel ^{GHC}
- City Limit ^{GHC}

Notes:

¹ Zoning districts of the City of McCleary, 2009.

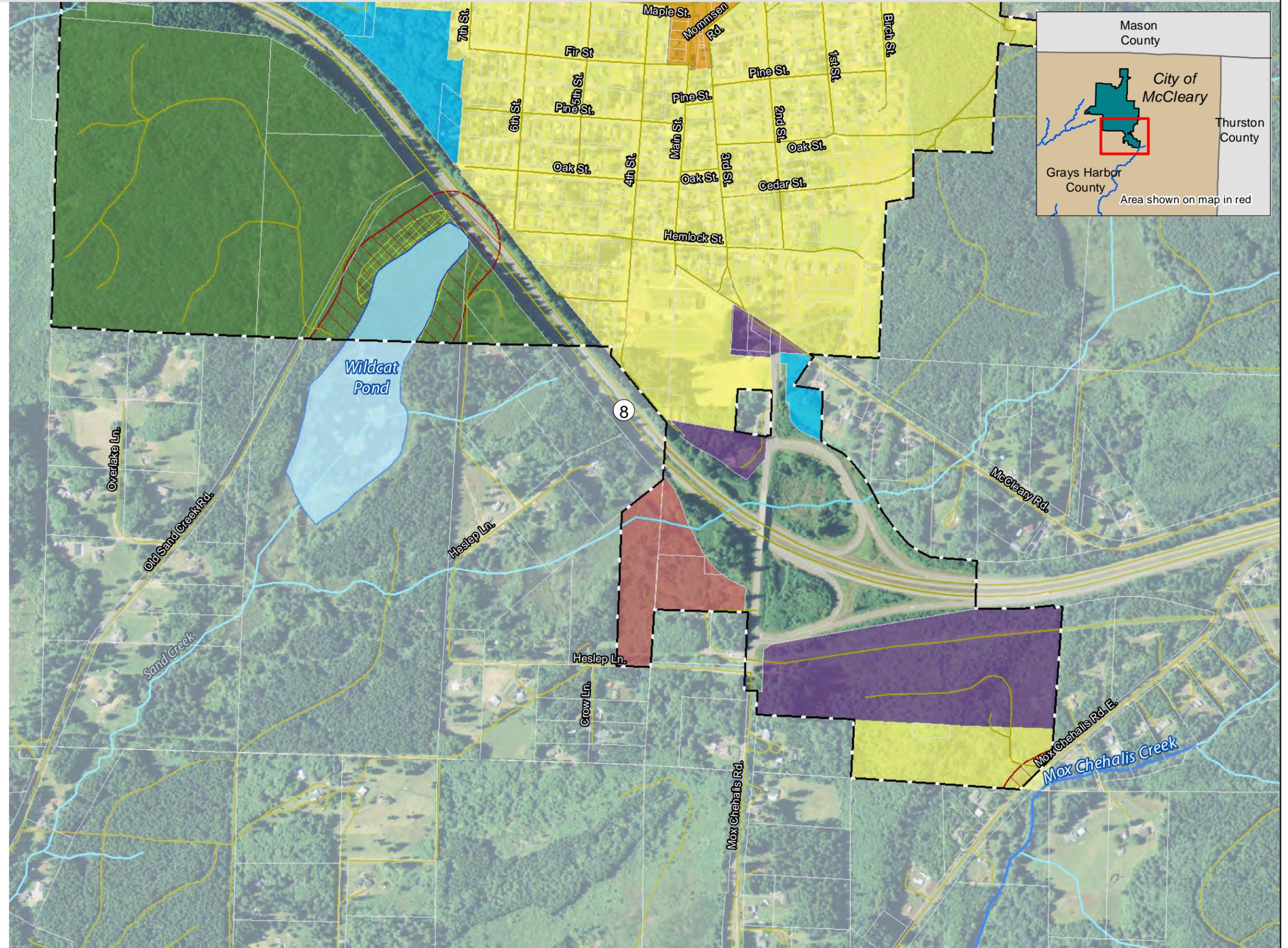
Data Sources:

Refer to mapfolio coversheet for source abbreviations.

Print Date: 10/28/2014



All features 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 information shown on this map.



City of McCleary

4. Shoreline Land Ownership

Ownership Type ¹GHC, TWC

- Private
- Proposed Shoreline Jurisdiction ^{TWC}
- Potentially Associated Wetland ^{NWI}
- SMP Stream ^{ECY}
- SMP Waterbody ^{ECY}
- Other Stream ^{USGS}
- Road ^{GHC}
- Parcel ^{GHC}
- City Limit ^{GHC}

Notes:

¹ Ownership type (for parcels that intersect proposed shoreline jurisdiction only) are derived from 2013 GHC parcel data and assessor land use codes and descriptions.

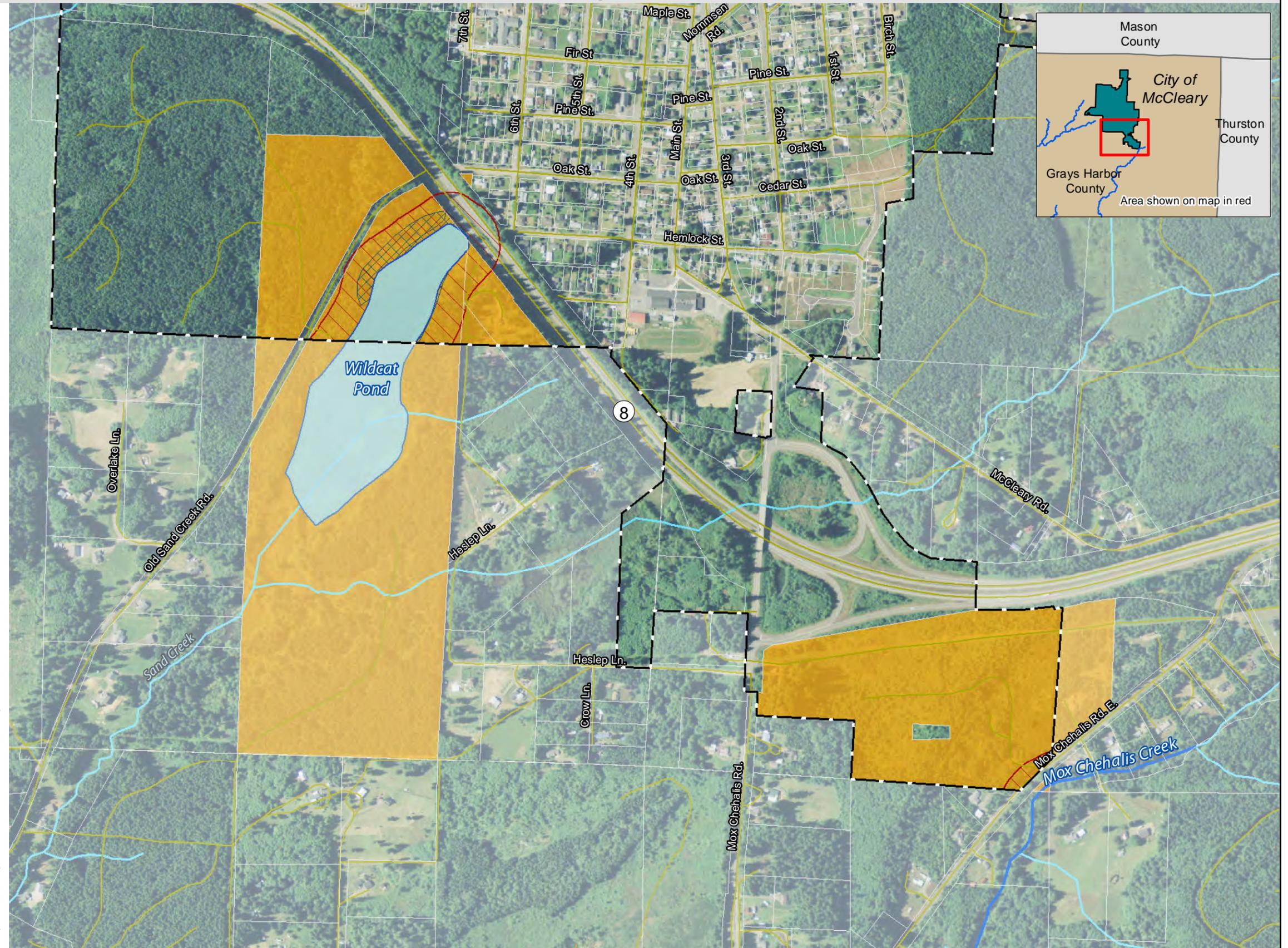
Data Sources:

Refer to mapfolio coversheet for source abbreviations.

Print Date: 10/28/2014

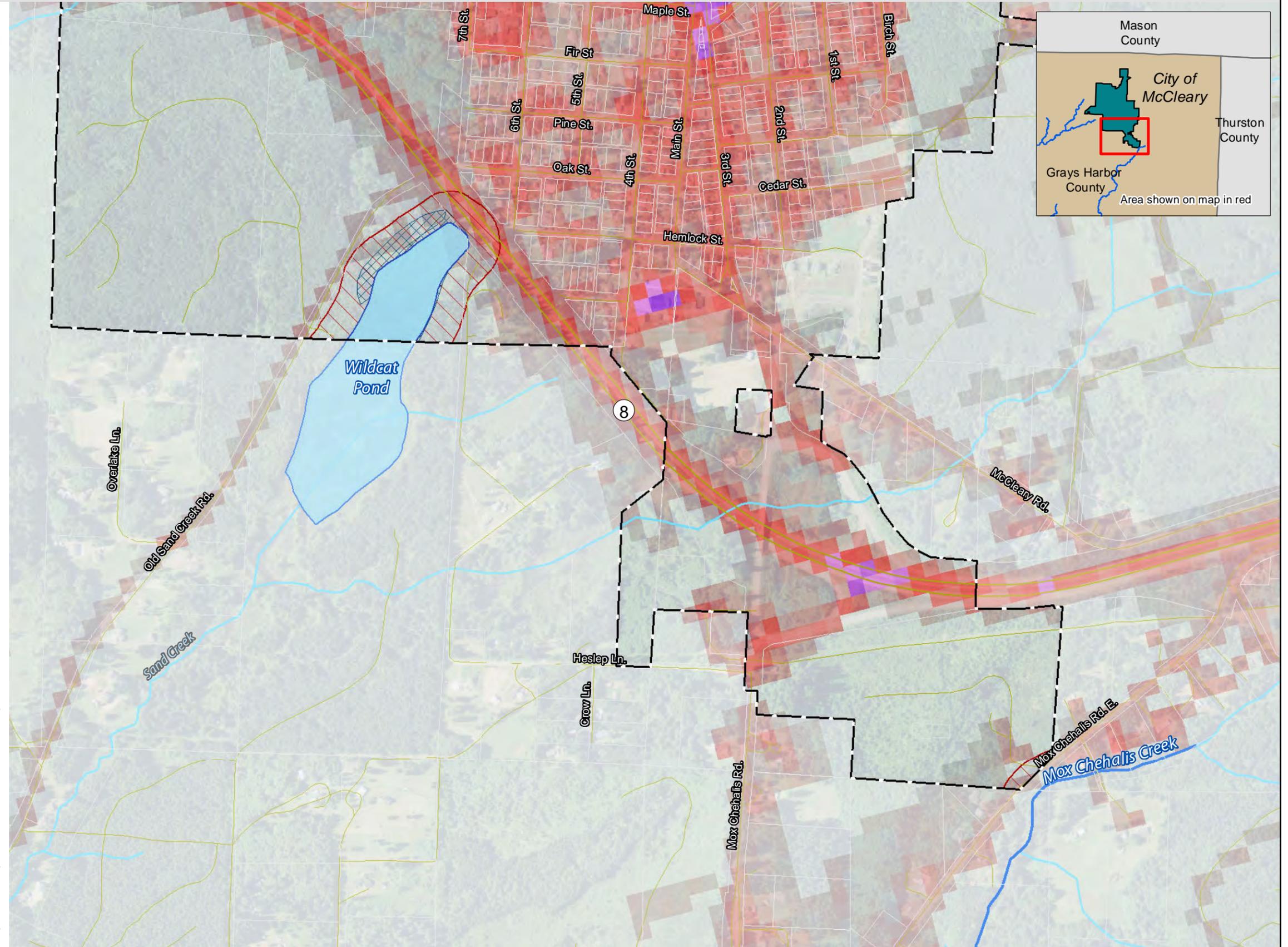
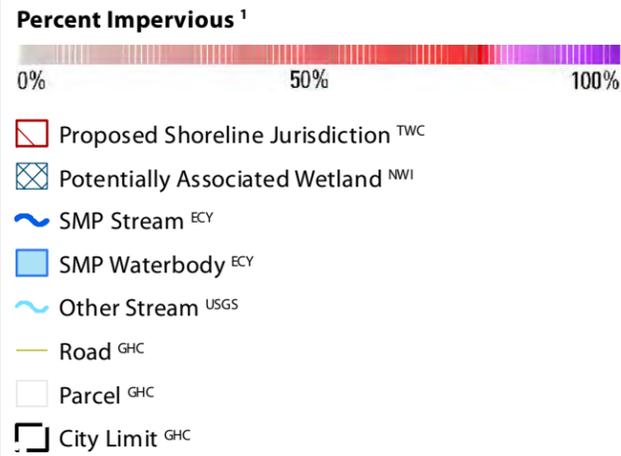


All features depicted on this map are approximate. They have not been formally delineated or surveyed and are intended for planning purposes only. Additional site-specific evaluation may be needed to confirm information shown on this map.



City of McCleary

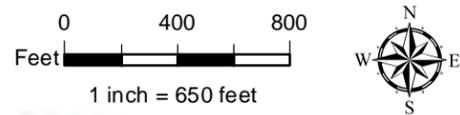
5. Impervious Surface Coverage



Notes:
¹ National Land Cover Database of 2006 by U.S. Department of Interior and USGS. Percent impervious as defined by source agencies.

Data Sources:
 Refer to mapfolio coversheet for source abbreviations.

Print Date: 10/28/2014



THE WATERSHED COMPANY

All features 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 information shown on this map.

City of McCleary

6. Land Cover

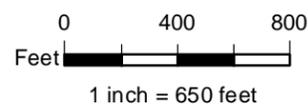
Land Cover Classification ¹

-  Open Water
-  Developed, Open Space
-  Developed, Low Intensity
-  Developed, Medium Intensity
-  Developed, High Intensity
-  Deciduous Forest
-  Evergreen Forest
-  Mixed Forest
-  Shrub/Scrub
-  Herbaceous
-  Hay/Pasture
-  Woody Wetlands
-  Emergent Herbaceous Wetlands
-  Proposed Shoreline Jurisdiction ^{TWC}
-  Potentially Associated Wetland ^{NWI}
-  SMP Stream ^{ECY}
-  SMP Waterbody ^{ECY}
-  Other Stream ^{USGS}
-  Road ^{GHC}
-  Parcel ^{GHC}
-  City Limit ^{GHC}

Notes:
¹ National Land Cover Database of 2006 by U.S. Department of Interior and USGS. NLCD is a 16-class land cover classification scheme that has been applied consistently across the conterminous United States at a spatial resolution of 30 meters.

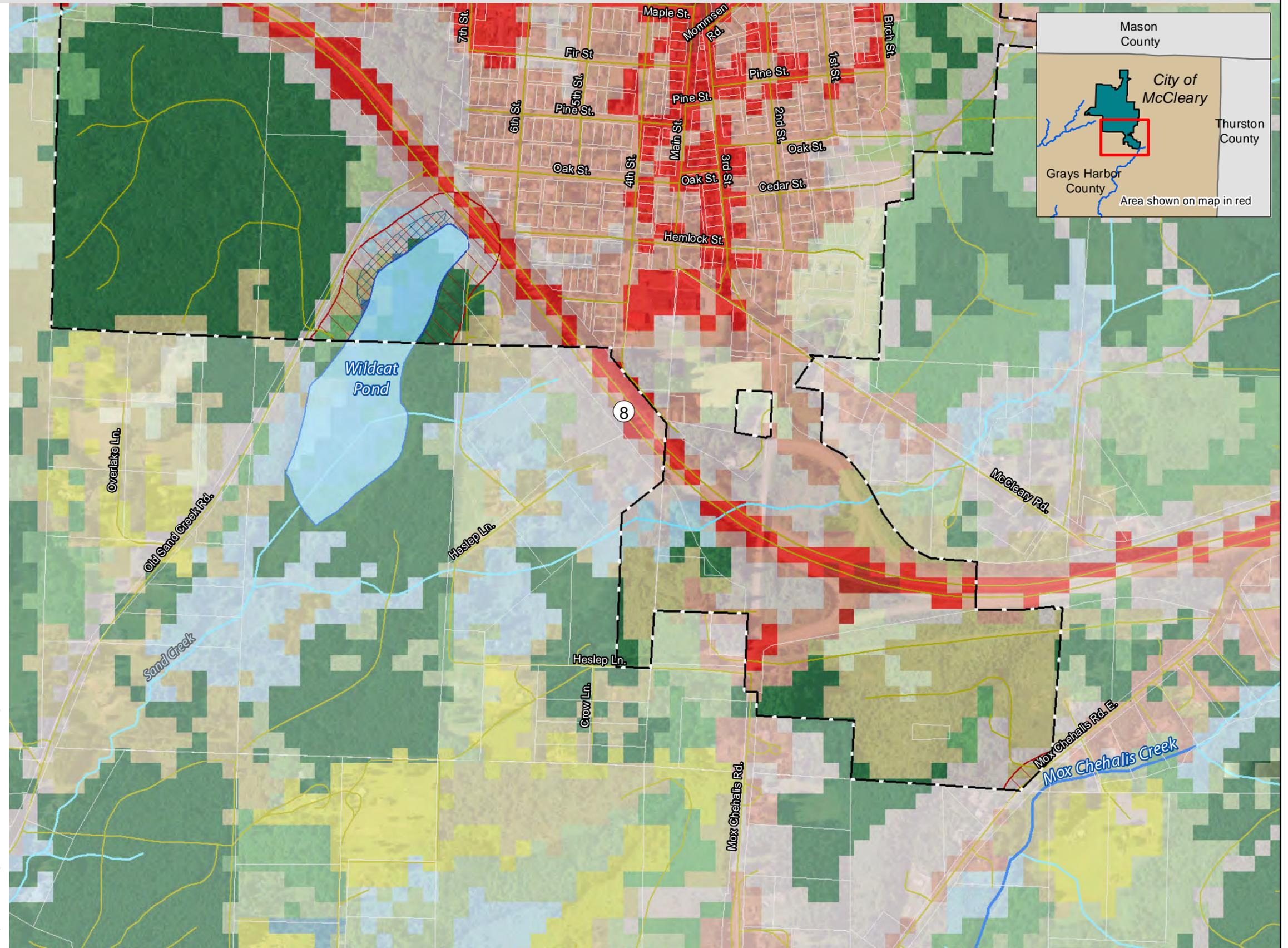
Data Sources:
 Refer to mapfolio coversheet for source abbreviations.

Print Date: 10/28/2014



THE WATERSHED COMPANY

All features 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 information shown on this map.

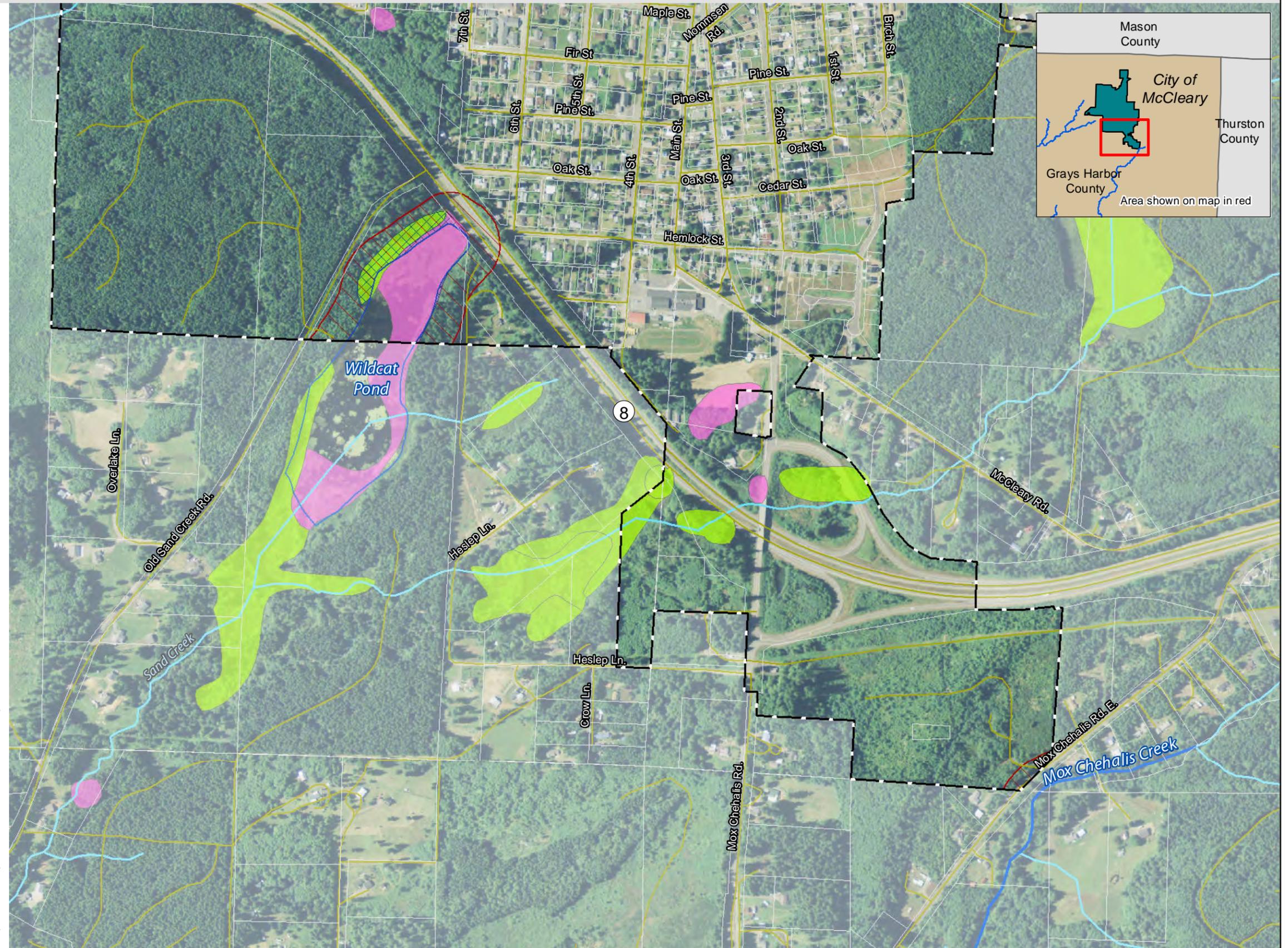


City of McCleary

7. Wetlands

Wetland Type ¹ NWI

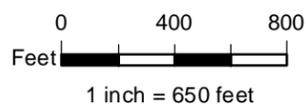
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Potentially Associated Wetland ¹ NWI
- Proposed Shoreline Jurisdiction ^{TWC}
- SMP Stream ^{ECY}
- SMP Waterbody ^{ECY}
- Other Stream ^{USGS}
- Road ^{GHC}
- Parcel ^{GHC}
- City Limit ^{GHC}



Notes:
¹ All wetlands are derived from USFWS National Wetlands Inventory of 2010 and have not been field verified.

Data Sources:
 Refer to mapfolio coversheet for source abbreviations.

Print Date: 10/28/2014



All features 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 information shown on this map.

City of McCleary

8. Surficial Geology

Surficial Geology ¹ DNR

Unconsolidated Sediments

-  Quaternary alluvium, dune sand, loess, and artificial fill
-  Pleistocene continental glacial, glaciolacustrine, and outburst flood deposits, Fraser-age
-  Pleistocene continental glacial deposits, pre-Fraser

Sedimentary Rocks and Deposits

-  Oligocene-Eocene marine sedimentary rocks

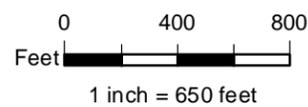
Volcanic Rocks and Deposits

-  Eocene volcanic rocks
-  Proposed Shoreline Jurisdiction ^{TWC}
-  Potentially Associated Wetland ^{NWI}
-  SMP Stream ^{ECY}
-  SMP Waterbody ^{ECY}
-  Other Stream ^{USGS}
-  Road ^{GHC}
-  Parcel ^{GHC}
-  City Limit ^{GHC}

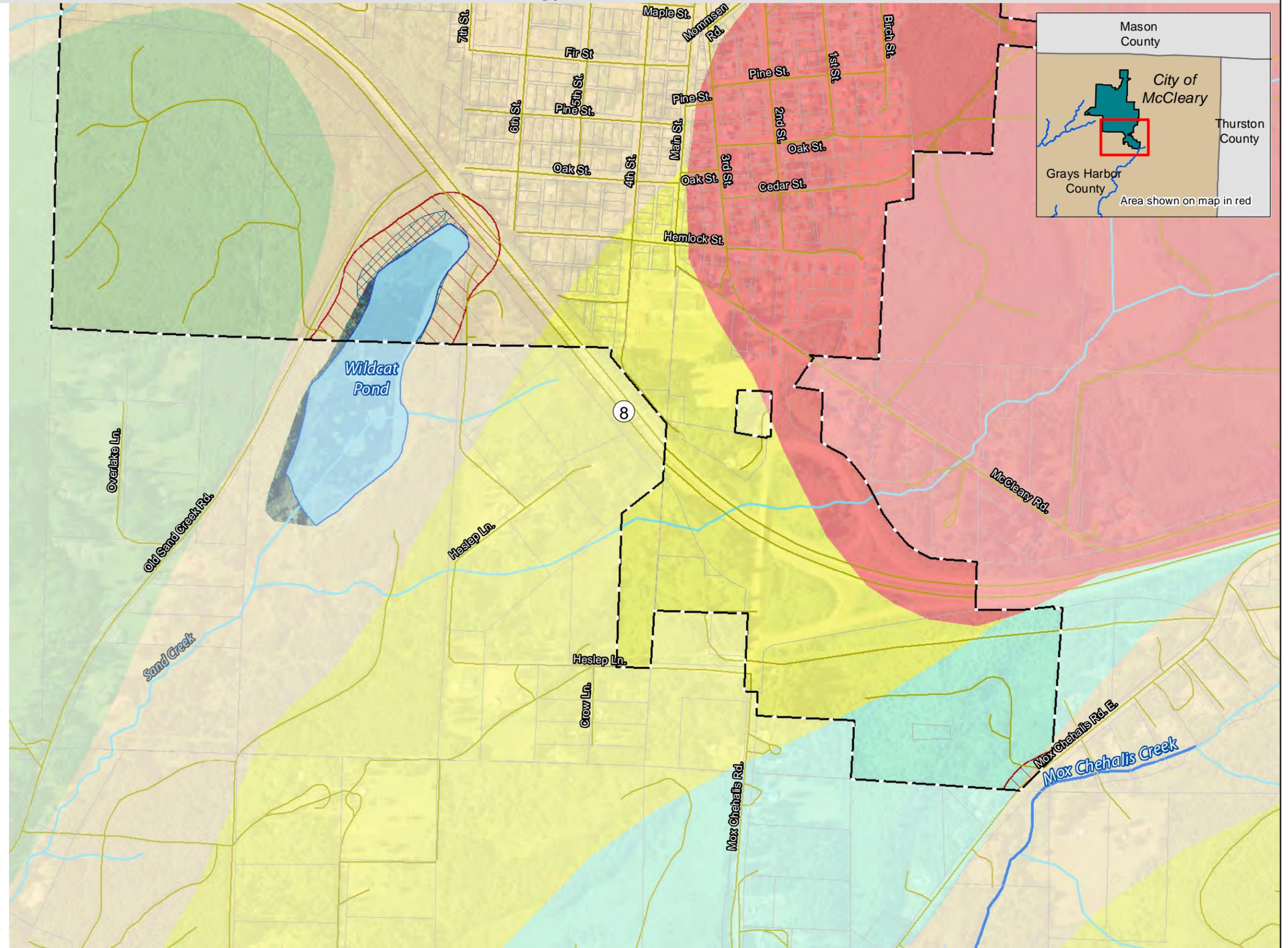
Notes:
¹ Geological unit portrays 1:100,000-scale geology coverage of Washington in 2000. Data was digitized and published by WA DNR Division of Geology and Earth Resources in 2010.

Data Sources:
 Refer to mapfolio coversheet for source abbreviations.

Print Date: 10/28/2014



All features 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 information shown on this map.



City of McCleary

9. Geological Hazards

Seismic Design Site Class ¹DNR

Seismic Design Category D1²

Shallow-Rapid Slope Stability ³DNR

- High Probability of Instability
- Proposed Shoreline Jurisdiction ^{TWC}
- Potentially Associated Wetland ^{NWI}
- ~ SMP Stream ^{ECY}
- SMP Waterbody ^{ECY}
- ~ Other Stream ^{USGS}
- Road ^{GHC}
- Parcel ^{GHC}
- City Limit ^{GHC}

Notes:

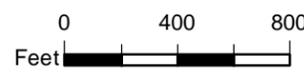
¹ 1:100,000-scale surface, hazards and environmental geology data is published by WA DNR Division of Geology and Earth Resources. A Seismic Design Category (SDC) is a classification assigned to a structure according to the seismic risk they pose.

² Seismic Design Category D1 are structures of ordinary occupancy that could experience very strong shaking.

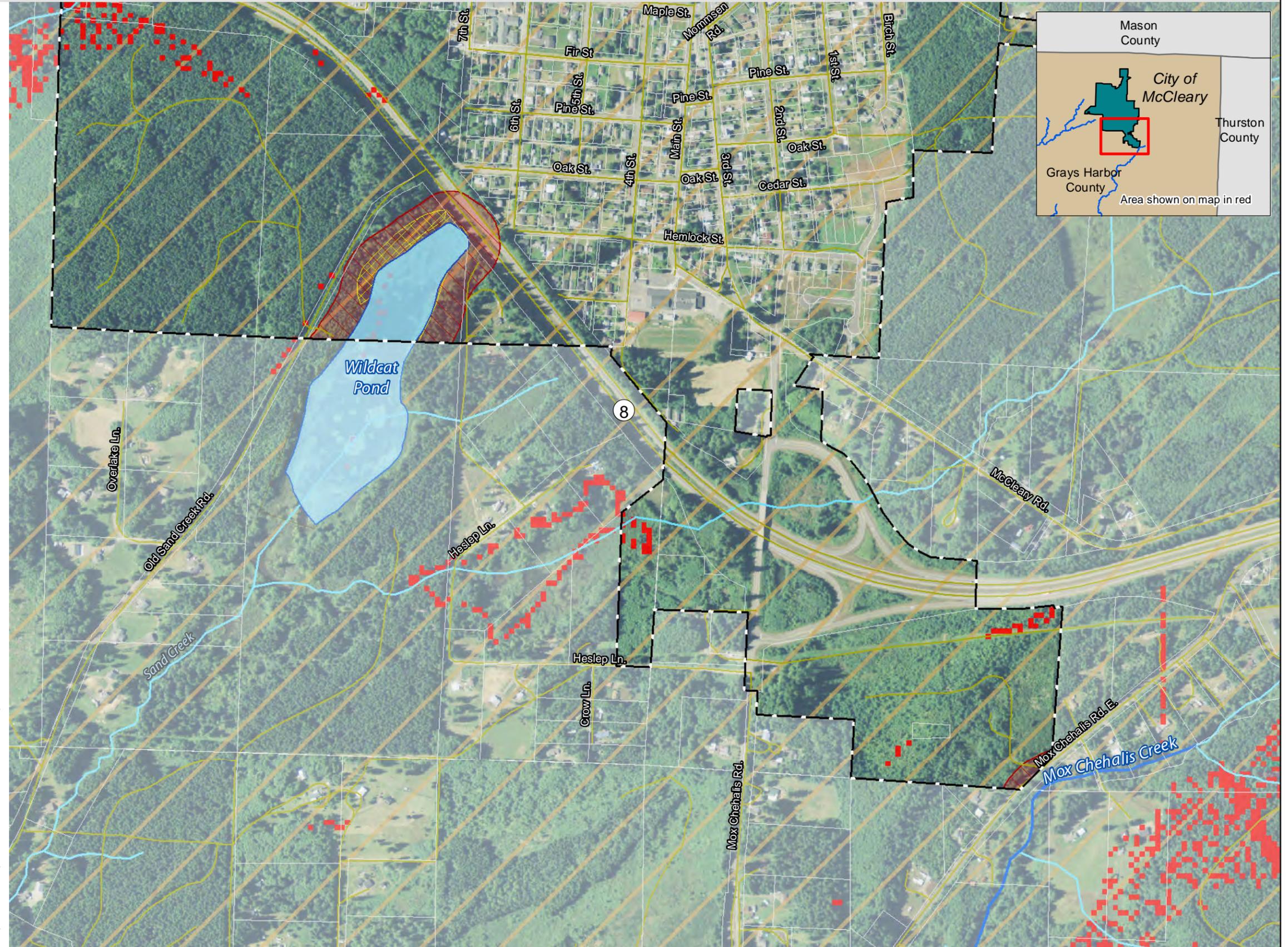
³ This coverage is a predictive data layer of shallow-rapid slope stability using one or more calibrated GIS-based models. The purpose of this dataset is to be a screen for determining shallow-rapid landslide potential. Modeled tests (Shaw and Vagueois, 1999) show that 93% of shallow-rapid type landslides occur in areas modeled with a high probability of instability. No model accurately predicts where deep seated landslides are going to occur (DNR 2000).

Data Sources:
Refer to mapfolio coversheet for source abbreviations.

Print Date: 10/28/2014



All features 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 information shown on this map.



City of McCleary

10. Priority Habitats and Species

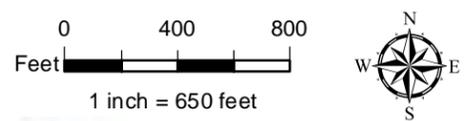
Salmon Stock Inventory ¹WDFW

-  Resident Cutthroat
-  Coho Salmon
-  Fish Barrier
-  Proposed Shoreline Jurisdiction ^{TWC}
-  Potentially Associated Wetland ^{NWI}
-  SMP Stream ^{ECY}
-  SMP Waterbody ^{ECY}
-  Other Stream ^{USGS}
-  Road ^{GHC}
-  Parcel ^{GHC}
-  City Limit ^{GHC}

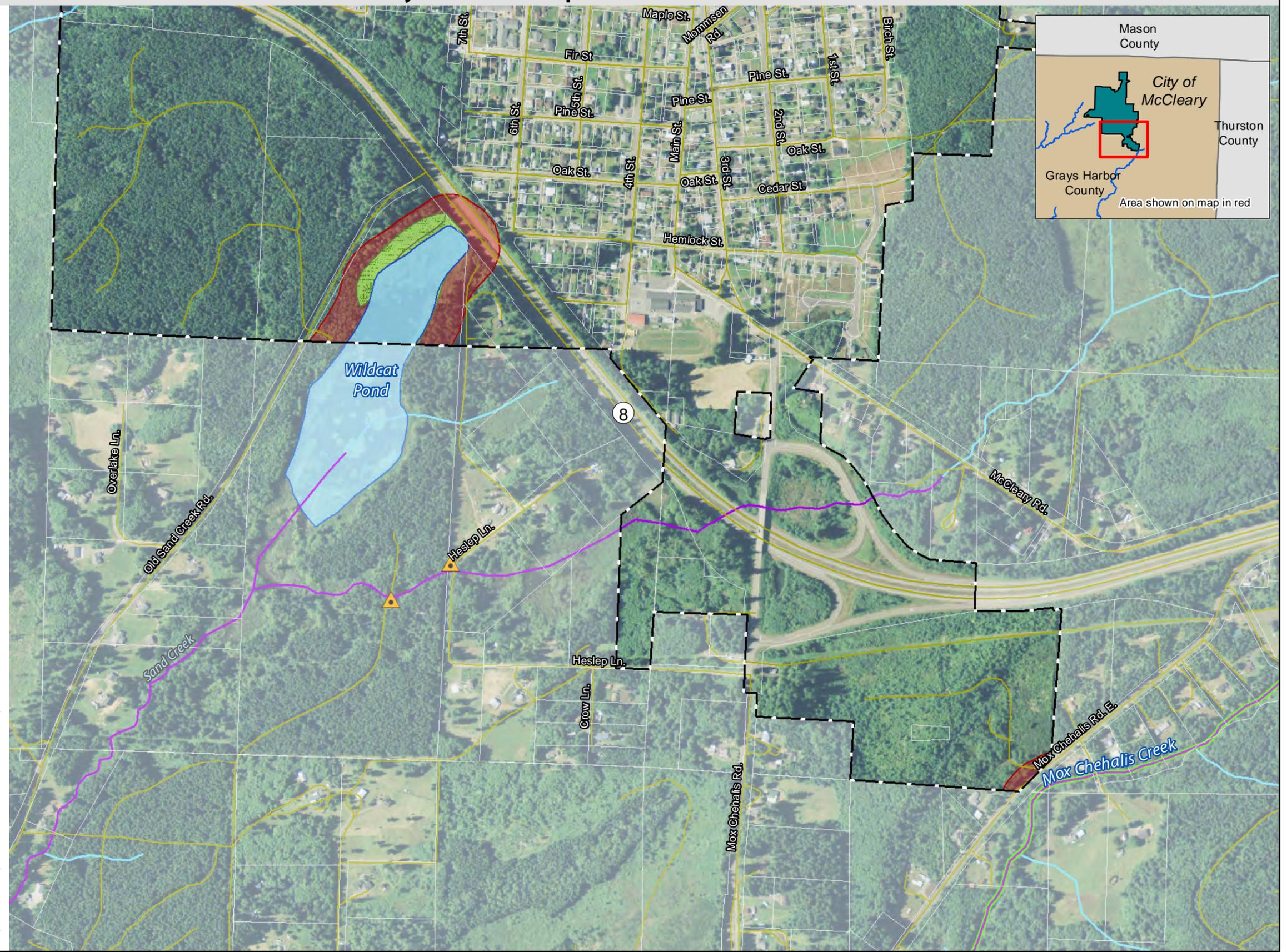
Notes:
¹ Data provided by WA Department of Fish and Wildlife in December 2013.

Data Sources:
 Refer to mapfolio coversheet for source abbreviations.

Print Date: 10/28/2014



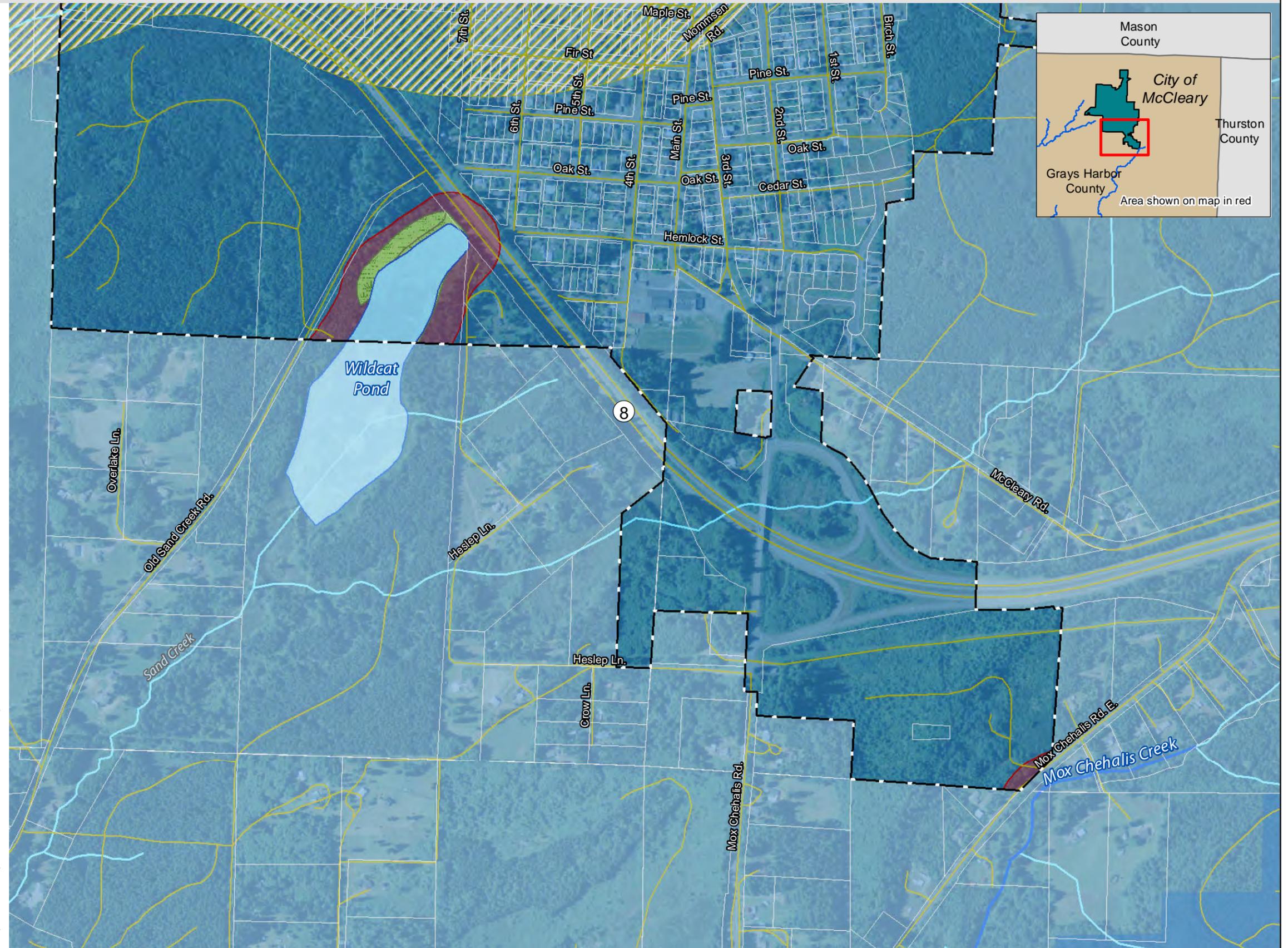
All features depicted on this map are approximate. They have not been formally delineated or surveyed and are intended for planning purposes only. Additional site-specific evaluation may be needed to confirm information shown on this map.



City of McCleary

11. Aquifers

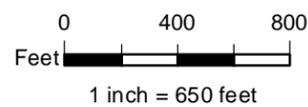
-  Pacific Northwest Basin-fill Aquifers ¹ USGS
-  Aquifer Recharge Area ^{GHC}
-  Proposed Shoreline Jurisdiction ^{TWC}
-  Potentially Associated Wetland ^{NWI}
-  SMP Stream ^{ECY}
-  SMP Waterbody ^{ECY}
-  Other Stream ^{USGS}
-  Road ^{GHC}
-  Parcel ^{GHC}
-  City Limit ^{GHC}



Notes:
¹ Principal aquifers data published by the U.S. Geological Survey Water Resources Program.

Data Sources:
Refer to mapfolio coversheet for source abbreviations.

Print Date: 10/28/2014



THE
WATERSHED
COMPANY

All features 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 information shown on this map.