

Stormwater Management Action Plan (SMAP) Receiving Water Assessment

Prepared for



March 2022

Prepared by
Parametrix

Stormwater Management Action Plan (SMAP) Receiving Water Assessment

Prepared for

City of Renton

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CITATION

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TABLE OF CONTENTS

1. INTRODUCTION	1
1.1 Purpose.....	1
1.2 Process Summary	1
2. BASIN DELINEATION (STEP 1).....	1
2.1 Methodology	1
2.2 Receiving Water Drainage Basins	2
2.3 Individual Basin Descriptions.....	2
2.3.1 Black River	4
2.3.2 Duwamish River.....	4
2.3.3 East Lake Washington.....	4
2.3.4 South Lake Washington.....	4
2.3.5 West Lake Washington	4
2.3.6 Lower Cedar River.....	5
2.3.7 May Creek.....	5
2.3.8 Soos Creek	5
3. CONDITION ASSESSMENT (STEP 2).....	6
3.1 Methodology	6
3.2 Water Quality	7
3.2.1 Designated Uses	7
3.2.2 Water Quality Index.....	7
3.2.3 State Water Quality Assessment	7
3.2.4 Biological Condition.....	11
3.3 Watershed Condition.....	13
3.3.1 Land Cover	13
3.3.2 Buildable and Vacant Lands.....	14
3.3.3 Cultural Resources	14
3.3.4 Puget Sound Watershed Characterization Model.....	14
3.4 Public Health and the Environment.....	19
3.4.1 Environmental Justice Screening and Mapping Tool.....	19
3.4.2 The Environmental Opportunity Index	19
3.4.3 The Combined Equity Index.....	20
4. STORMWATER MANAGEMENT INFLUENCE (STEP 3).....	22
5. RELATIVE CONDITIONS AND CONTRIBUTIONS (STEP 4)	23
6. RESULTS.....	23
7. REFERENCES	26

TABLE OF CONTENTS (CONTINUED)

LIST OF FIGURES

Figure 1. Receiving Water Basins	3
Figure 2. Water Quality Data Points	12
Figure 3. Land Cover Data	15
Figure 4. City of Renton 2012 Traffic Flow Map	16
Figure 5. PSWCM Sub-Model Input Maps	17
Figure 6. PSWCM Sub-Model City Output Summary	18
Figure 7. Environmental and Social Justice Equity Indices	21

LIST OF TABLES

Table 1. Basin Delineation Element Descriptions	2
Table 2. Receiving Water Drainage Basins	2
Table 3. Receiving Water Condition Assessment Data	6
Table 4. Receiving Water Quality Data Summary	8
Table 5. Puget Sound Watershed Characterization Model Scoring ^a	13
Table 6. EJSSCREEN Tool Indicators	19
Table 7. Environmental Justice and Opportunity Index Scores	20
Table 8. Evaluation of Stormwater Management Influence Conditions	22
Table 9. Receiving Water Influence from PSWCM	23
Table 10. SMAP Watershed Inventory	24

APPENDICES

- A Water Quality Analysis
- B Watershed Characterization Analysis
- C Combined Equity Index

ACRONYMS AND ABBREVIATIONS

ADT	average daily traffic
AU	assessment units
B-IBI	Benthic Index of Biotic Integrity
City	City of Renton
DO	dissolved oxygen
Ecology	Washington State Department of Ecology
EJSCREEN Tool	Environmental Justice Screening and Mapping Tool
EPA	Environmental Protection Agency
LID	low impact development
NPDES	National Pollutant Discharge Elimination System
NPGIS	Non-Pollutant Generating Impervious Surface
Permit	Western Washington Phase II Municipal Stormwater Permit
PSWCM	Puget Sound Watershed Characterization Model
SMAP	Stormwater Management Action Plan
SWUSP	surface water utility system plan
TMDL	total maximum daily load
UGB	urban growth boundary
WQI	Water Quality Index

1. INTRODUCTION

1.1 Purpose

This report documents the Stormwater Management Action Plan (SMAP) receiving waters assessment for the City of Renton (City), required by S5.C.1.d.i of the Washington State Department of Ecology's (Ecology's) National Pollutant Discharge Elimination System (NPDES) Western Washington Phase II Municipal Stormwater Permit (Permit). The receiving waters were assessed using the methodology outlined in the Stormwater Management Action Planning Guidance (Ecology 2019). The results of this assessment will be used to inform the prioritization process required by section S5.C.1.d.ii of the Permit. The steps included in the assessment and this document are identified below.

1.2 Process Summary

1. Basin delineation and identification of receiving waters, including a map of the delineated basins and the associated receiving waters.
2. Assessment of receiving water existing conditions and contributing areas for each delineated receiving water-scale basin and each receiving water body.
3. Assessment of expected stormwater management influence documenting how data sources were used in the assessment of existing conditions and any identified data gaps.
4. Evaluation of relative contributions and conditions summarized in a watershed inventory table, including the list of basins to be included in the prioritization process (S5.C.1.d.ii).

The Watershed Inventory Table and Map will be submitted to Ecology for initial review and approval by February 11, 2022, as part of the conditions of their grant; and the City will submit the Receiving Water Assessment by March 31, 2022.

2. BASIN DELINEATION (STEP 1)

2.1 Methodology

The drainage basins, which were delineated for the City's 2021 Surface Water Utility System Plan (SWUSP), were used as the basis for the receiving water analysis. This included seven major drainage basins and one privately owned basin that lies within the City boundaries. The City basin delineations generally align with King County watershed basin delineations (King County 2018), with some adjustments near the northwest corner of the City to more accurately represent the Black and Duwamish river basin boundaries. The link to the Parametrix-developed GIS Inventory web map is below. The map will be published and publicly available until January 31, 2024.

<https://arcg.is/0HuCeC1>

The data on this map reflects planning-level accuracy and may not represent exact conditions in all locations. As part of the on-going SMAP development, the City will be updating the web map when possible. Also, as part of final basin screening and concept project selection in 2023, the City may conduct field investigations of data discontinuities that appear on the web map.

Attributes were identified for each basin, as listed in Table 1 and described in the following sections.

Table 1. Basin Delineation Element Descriptions

Element	Description
Basin Name	Name of the drainage basin at a receiving water scale delineation. For the SMAP assessment, basins were limited to a scale of approximately 1–20 square miles.
Receiving Water	The water body (stream segment, wetland, lake, large river, Puget Sound, etc.) that receives discharge from the associated basin listed in Table 2. The receiving water has been identified for all delineated basins in Table 2 and may be outside of City boundaries.
Total Drainage Basin Area	The total contributing basin area for the specified receiving water regardless of jurisdiction.
Drainage Basin Area	The contributing basin area for the specified receiving water within City boundaries.
Percent of Total Drainage Basin Area Within City	The percentage of the Total Drainage Basin Area within City boundaries.
Percent of Total City Area Occupied by Drainage Basin	The percentage of the City encompassed by the Total Drainage Basin Area.

2.2 Receiving Water Drainage Basins

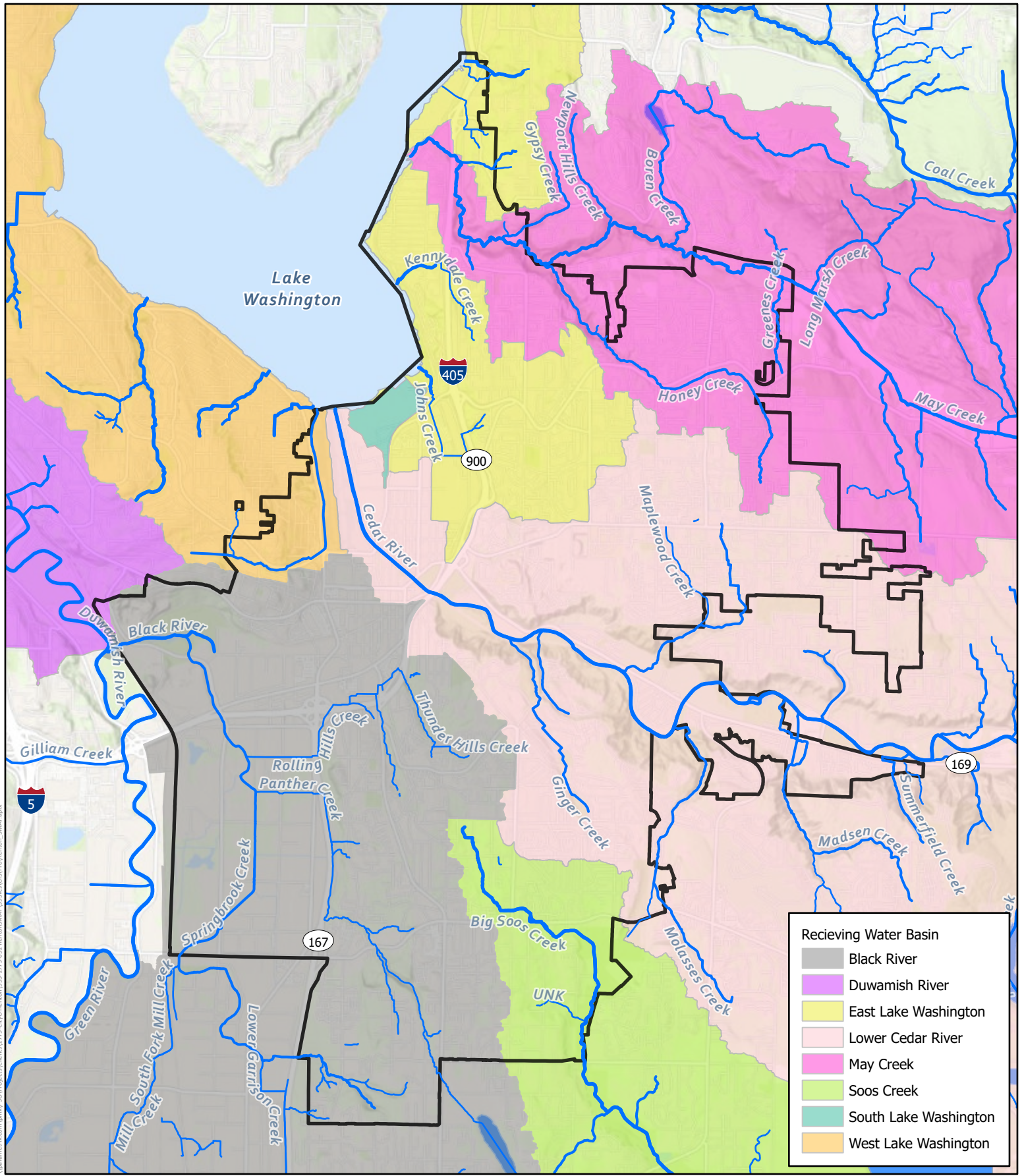
The results of the basin delineation (Step 1) have been summarized in Table 2. A map of the delineated basins is shown in Figure 1.

Table 2. Receiving Water Drainage Basins

Receiving Water Drainage Basin	Receiving Water	Total Drainage Basin Area (square miles)	Percent (%) of Total Drainage Basin Area Within City	Percent (%) of Total City Area Occupied by Drainage Basin
Black River	Black River	26.6	30.6%	34.5%
Duwamish River	Duwamish River	21.6	0.1%	0.1%
East Lake Washington	Lake Washington	4.7	62.3%	12.3%
Lower Cedar River	Cedar River	68.1	11.0%	31.7%
May Creek	May Creek	13.7	21.0%	12.2%
Soos Creek	Soos creek	27.3	5.4%	6.3%
South Lake Washington	Lake Washington	0.2	100.0%	0.7%
West Lake Washington	Lake Washington	16.5	3.2%	2.2%

2.3 Individual Basin Descriptions

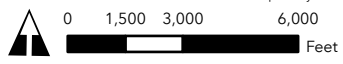
The City’s Draft SWUSP, which was completed in 2021, delineated seven basins that were used for this analysis. An eighth basin—the South Lake Washington Basin—was excluded from the SWUSP study but has been included in this assessment in order to account for 100 percent of the City’s area. Areas outside of the City boundaries and within the Urban Growth Boundary (UGB) were not considered in this analysis. A summary of each basin is presented below, while detailed information on basin characteristics is presented Section 3. Information in these sections is based on individual references cited in addition to the Preliminary Receiving Waters Assessment and Stormwater Management Influence Memorandum prepared for Renton (Otak 2020).



Date: 3/18/2022
 Sources: City of Renton, King County, WA Ecology, WA DNR, USGS, ESRI
 Disclaimer: The data on this map reflects planning-level accuracy and may not represent exact conditions in all locations. As part of the ongoing SMAP development, the City will be updating the web map when possible. Also, as part of final basin screening and concept project selection in 2023, the City may conduct field investigations of data discontinuities that appear on the web map. Therefore, the City assumes no liability to third parties for the data or lack thereof, or any decisions made or action not taken in reliance upon any of the data.

— Stream
 □ Renton City Limits

Figure 1 - Receiving Water Basins
 Renton SMAP
 Receiving Water Assessment



2.3.1 Black River

The Black River formerly drained to Lake Washington, but the basin was extensively modified when the water levels in Lake Washington were lowered, and it is now part of a system that drains to the eastern side of the Green River (City of Renton 2021). The portion of the basin within the City is 8.15 square miles, making up approximately 30.6 percent of the total Black River watershed. The flows from this basin area are collected in the Black River Pump Station forebay, then pumped to the Green/Duwamish River. The pump station regulates flows into the Green River and also acts as a dam during flood events by blocking high flows from the Green River from backwatering up the Black River, Springbrook Creek, and the Earlington Industrial Park in Renton (City of Renton 2021). The Black River runs through the southwestern portion of the City where the land uses are mainly industrial and commercial, with a high fraction of impervious surface area limiting infiltration potential and causing high peak flow rates (City of Renton 2021).

2.3.2 Duwamish River

The Duwamish River basin is located in the northwest corner of the City boundary. The portion of the basin within the City is 0.02 square mile, making up less than 1 percent of the total Duwamish River watershed. The small basin discharges directly to the Duwamish/Green River just downstream of where the Black River system joins them in confluence. Impacts of river channelization are apparent in the area and include ditching, draining, dredging, and filling. These modifications have severely impacted the estuary, which serves as important habitat for the rearing and migration of juvenile salmonids (City of Renton 2021). There are no streams or tributaries in the small basin area that is within City boundaries.

2.3.3 East Lake Washington

The East Lake Washington basin is a subbasin of the larger Lake Washington basin, contributing 2.90 square miles from within the City to the watershed, making up approximately 62.3 percent of the total East Lake Washington watershed. The basin has two major tributaries: John's Creek, a highly developed area near the core of the City, and an unnamed tributary that runs through the residential Kennydale neighborhood. A majority of the drainage in this basin is conveyed in a fully developed pipe system before draining directly to Lake Washington (City of Renton 2021).

2.3.4 South Lake Washington

The South Lake Washington basin, another subbasin of the larger Lake Washington basin, consists entirely of private property and private stormwater conveyance systems; therefore, the City's municipal separate stormwater sewer system does not directly influence the conditions of runoff generated in this basin or any potential water quality issues. The South Lake Washington basin discharges to privately owned treatment systems or directly to Lake Washington. The small, privately owned basin, which is almost entirely impervious surface, occupies approximately 0.17 square mile of the City, with 100 percent of the basin within the City Boundary.

2.3.5 West Lake Washington

The West Lake Washington basin, another subbasin of the larger Lake Washington basin, is highly urbanized, running along the southern shoreline of Lake Washington. The portion of the basin within the City is 0.52 square mile, making up approximately 3.2 percent of the total West Lake Washington watershed. Runoff collected from the basin is conveyed in natural channels and closed pipe systems.

However, nearly all of the runoff is delivered to the Black River Box Culvert, which discharges directly to Lake Washington at the northwest end of Renton Municipal Airport (City of Renton 2021).

2.3.6 Lower Cedar River

The Cedar River, which has headwaters originating in the Cascade Range, was geographically divided into Upper, Middle, and Lower reaches by King County for planning purposes (City of Renton 2021). The Upper basin is forested and relatively untouched and maintained in its natural condition to protect Seattle's drinking water resource. The Middle and Lower basins have been extensively altered, including bank modifications and flow diversions that have contributed to a loss of floodplain and riparian connectivity in the Lower Cedar River, ultimately affecting storage, sediment, and contaminants as well as reducing available in-stream habitat. The portion of the Cedar River that runs through the City falls entirely within the Lower Cedar River basin (City of Renton 2021). This assessment and the subsequent prioritization will only consider the Lower Cedar River basin. The Cedar River runs through the downtown corridor before discharging to Lake Washington. The portion of the basin within the City is 7.47 square miles, making up approximately 11 percent of the total Lower Cedar River watershed.

2.3.7 May Creek

May Creek has headwaters that originate northeast of the City limits on the forested slopes of the Cougar and Squak Mountains and the Renton Plateau. The portion of the basin within the City is 2.87 square miles, making up approximately 21 percent of the total May Creek watershed. May Creek flows to the northwest through the corner of the City before draining into Lake Washington. The upper, eastern portion of the basin contains low density residential and agricultural developments and large regional parks in the highlands (City of Renton 2021). The lowland, western portion of the basin contains fairly dense residential development (King County 2015). The mainstem of May Creek is in parkland that runs through a steep, narrow, wooded, canyon that opens up before reaching its outlet to Lake Washington (City of Renton 2021).

2.3.8 Soos Creek

The Soos Creek basin lies between the Cedar River and Black River basins and is a tributary to the Green River. The portion of the basin within the City is 1.48 square miles, making up approximately 5.4 percent of the total Soos Creek watershed. The headwaters of Big Soos creek originate in the City, flowing south away from the City boundaries, and therefore, flow changes within Big Soos Creek are not likely to impact the City (City of Renton 2021). Development in the upper portion of the basin is almost entirely single-family and multifamily residential, and the basin has areas identified as wetland and related habitat as well as mapped floodplains (City of Renton 2021).

3. CONDITION ASSESSMENT (STEP 2)

3.1 Methodology

The data sources used for the existing condition assessment of the identified receiving waters are outlined in Table 3 below. The analysis has been broken up by water quality and watershed condition.

Table 3. Receiving Water Condition Assessment Data

Data Type	Source	Last Updated	Description of Assessment
Water Quality			
Designated Uses	Chapter 173-201A Washington Administrative Code (WAC Parts IV and II, respectively); Ecology Publication 06-10-038 ^a	2021; 2011	Designated uses for receiving waters were identified, allowable thresholds for pollutant concentrations were recorded, receiving waters with supplemental spawning and incubation protections within the City were identified and mapped accordingly.
Water Quality Conditions	King County Water Quality Index (WQI) ^b	Water Year 2020	Reviewed WQI scores of receiving waters at available King County WQI program monitoring stations in or near City boundaries.
	Ecology Washington State Water Quality Assessment 303(d) Candidate List and Water Quality Atlas ^c	2018	Receiving water impairments were identified and summarized in a water quality table and interactive web map.
	Ecology Directory of Water Quality Improvement Projects ^d	1992–2021	Collected and reviewed watershed specific total maximum daily load (TMDL) studies and water quality improvement projects for receiving waters relevant to the study area.
Biological Condition	Puget Sound Stream Benthos ^e	1994–2021	Collected available data related to biological condition from the Benthic Index of Biotic Integrity (B-IBI), developed by a coalition led by King County, which assesses overall biological condition.
Watershed Condition			
Land Cover	City of Renton GIS	2021	City land cover layer was updated by Parametrix using right-of-way and zoning information to reformat into the land cover categories needed for the analysis. The data was added to the web map.
Buildable and Vacant Lands	Draft information provided by the City	2020	City vacant and buildable lands information to be used in prioritization.
Watershed Characterization	Puget Sound Watershed Characterization Model (PSWCM) ^f	2016	Used the Ecology PSWCM interactive mapping tool to score receiving water basins within the City and their associated watersheds for the ecological value of water flow, water quality, and fish and wildlife habitat using the model.
Public Health and the Environment	EJSCREEN Tool – Demographic Index (U.S. Census Bureau Estimates) ^g	2014–2018	The Combined Equity Index was created by combining Environmental Justice Screening and Mapping Tool (EJSCREEN Tool) Demographic and Environmental Hazards Indices with the Environmental Opportunity Index developed by Parametrix.
	EJSCREEN Tool – Environmental Hazards Index (informed by a combination of collected data and various Environmental Protection Agency (EPA) models, studies and regulations) ^h	2006–2019	
	Environmental Opportunity Index – based on land cover data including tree canopy, parks, open spaces, and golf courses	2018–2020	

Sources: ^a Ecology 2011; ^b King County 2020; ^c Ecology 2018; ^d Ecology 2021; ^e King County 2021; ^f Ecology 2016b; ^g U.S. Census Bureau 2020; ^h EPA 2019

3.2 Water Quality

Water quality for the City’s receiving waters is summarized in Table 4 and discussed in the following sections.

3.2.1 Designated Uses

Ecology has defined four groups of designated uses for surface water within the state of Washington: aquatic life uses, which includes salmonid spawning, rearing and migration, and core summer salmonid habitat; recreational uses, such as primary contact recreation; water supply uses, including domestic, industrial, agricultural, and livestock; and miscellaneous uses, which include wildlife habitat, harvesting, commerce, navigation, boating, and aesthetics. Designated uses for City receiving waters are listed in in Table 4. Water quality criteria have been identified, and thresholds for the relative condition of Washington’s water bodies have been set for each designated use. Appendix A provides additional information regarding the designated uses and applicable thresholds for Washington’s surface waters per WAC 173-201A-200 as well as the City’s receiving waters and assigned uses identified in Table 602 of WAC 173-201A-600. In addition, receiving waters were compared to the maps from Ecology Publication 06-10-038 (Ecology 2011) to determine where additional supplemental spawning standards have been set. Maps indicating waterbodies with additional supplemental spawning standards have been included in Appendix A.

3.2.2 Water Quality Index

The Water Quality Index (WQI) is a score generated by King County using a unitless number ranging from 10 to 100. The index expresses modeled results for temperature, pH, fecal coliform, bacteria, and dissolved oxygen relative to the levels required to maintain uses according to the criteria specified in WAC 173-201A. For nutrient and sediment measures, where standards are not specified, results are specified relative to expected conditions in a given ecoregion. Multiple constituents are then combined and aggregated over periods of time to produce scores for each sampling station, where data is collected (King County 2020).

3.2.3 State Water Quality Assessment

3.2.3.1 Assessment

The federal Clean Water Act requires states to perform a water quality assessment every 2 years to track the health of surface waters such as rivers, lakes, and marine water bodies, with a long-term goal of restoring their water bodies to be “fishable and swimmable.” The assessed water bodies are placed into categories that describe water quality.

For the purposes of this data summary, only waters in Categories 4 and 5 have been considered in assessing the City’s receiving water impairments. Category 4 impairments are not part of the 303(d) list; while they are still impaired, they do not require a state total maximum daily load (TMDL) for the following reasons: impairments in the 4A category have an Environmental Protection Agency (EPA)-approved TMDL; those in the 4B category have a pollution control program that is being actively implemented by a local, state, or federal program or strategy; and those in the 4C category have impairments caused by a type of pollution that cannot be addressed effectively through implementation of a TMDL. Category 5 can be defined as water bodies whose designated uses (such as for drinking, recreation, aquatic habitat, and industrial use) are impaired by a pollutant and require the development of a water quality improvement project to address the pollution. All waters in these categories have persistently failed to meet applicable water quality standards for their impaired parameter(s) (Ecology 2020).

Table 4. Receiving Water Quality Data Summary

Receiving Water	Designated Uses (173-201A WAC)	WQI Score ^a	Water Quality Assessment Listings ^b			Benthic Index of Biotic Integrity (B-IBI) ^c		
			Category	WQ Parameter	TMDLs in the Basin	Stream Name (Site ID)	Overall Score	Biological Condition
Black River	<ul style="list-style-type: none"> • Aquatic Life Uses <ul style="list-style-type: none"> ➢ Salmonid spawning, rearing, and migration • Recreational Uses <ul style="list-style-type: none"> ➢ Primary contact recreation • Water Supply Uses <ul style="list-style-type: none"> ➢ Domestic, industrial, agricultural, and livestock • Miscellaneous Uses <ul style="list-style-type: none"> ➢ Wildlife habitat, harvesting, commerce/navigation, boating, and aesthetics 	Poor (27)	5	Bioassessment (B-IBI)	Green River Watershed Temperature TMDL (2011) – plan to reduce temperature by encouraging low impact development (LID) and restoring riparian vegetation.	Panther Creek (213)	18.1	Very Poor
			5	Dissolved Oxygen		Panther Creek (214)	22.4	Poor
			5	Bacteria (fecal coliform)		Panther Creek (215)	10.6	Very Poor
			4A	Temperature		Rolling Hills Creek (216)	5.0	Very Poor
						Springbrook Creek (2484)	31.8	Poor
						Springbrook Creek (212)	41.0	Fair
Lake Washington	<ul style="list-style-type: none"> • Aquatic Life Uses <ul style="list-style-type: none"> ➢ Salmonid spawning, rearing, and migration^d ➢ Core summer salmonid habitat • Recreational Uses <ul style="list-style-type: none"> ➢ Primary contact recreation • Water Supply Uses <ul style="list-style-type: none"> ➢ Domestic, industrial, agricultural, and livestock • Miscellaneous Uses <ul style="list-style-type: none"> ➢ Wildlife habitat, harvesting, commerce/navigation, boating, and aesthetics 	N/A	5	Bacteria (fecal coliform)	None	West Lake Washington Tributary (207)	5.0	Very Poor
			5	Sediment (bioassay)				
			5	Dissolved Oxygen				
			5	Bioassessment (B-IBI)				
			5	Temperature				

Table 4. Receiving Water Quality Data Summary (continued)

Receiving Water	Designated Uses (173-201A WAC)	WQI Score ^a	Water Quality Assessment Listings ^b			Benthic Index of Biotic Integrity (B-IBI) ^c		
			Category	WQ Parameter	TMDLs in the Basin	Stream Name (Site ID)	Overall Score	Biological Condition
Duwamish River	<ul style="list-style-type: none"> Aquatic Life Uses <ul style="list-style-type: none"> Salmonid rearing and migration Recreational Uses <ul style="list-style-type: none"> Primary contact recreation Water Supply Uses <ul style="list-style-type: none"> Industrial, agricultural, and livestock Miscellaneous Uses <ul style="list-style-type: none"> Wildlife habitat, harvesting, commerce/navigation, boating, and aesthetics 	No data	5	pH	Green River Watershed Temperature TMDL (2011)– plan to reduce temperature by encouraging LID and restoring riparian vegetation.	None		
			5	Temperature				
Lower Cedar River	<ul style="list-style-type: none"> Aquatic Life Uses <ul style="list-style-type: none"> Core summer salmonid habitat Recreational Uses <ul style="list-style-type: none"> Primary contact recreation Water Supply Uses <ul style="list-style-type: none"> Domestic, industrial, agricultural, and livestock Miscellaneous Uses <ul style="list-style-type: none"> Wildlife habitat, harvesting, commerce/navigation, boating, and aesthetics 	Good ^e Good (87) ^f	5	Bioassessment (B-IBI)	None	Cedar River (1838)	73.6	Good
			5	Dissolved Oxygen		Cedar River (1837)	68.1	Good
			5	pH		Cedar River (1909)	74.6	Good
			5	Temperature		Maplewood Creek (120)	23.1	Poor
						Cedar River (1841) ^h	67.9	Good
						Cedar River (1840)	72.7	Good
						Cedar River – Lower Trib. 0307 (943) ^h	57	Fair
						Cedar River – Lower Trib. 0307 (944) ^h	56.9	Fair
						Cedar River – Lower Trib. 0307 (945) ^d	51.6	Fair
						Cedar River Lower Trib. 0311 (123) ^h	54.3	Fair
						Madsen Creek (1995) ^h	22.3	Poor
						Madsen Creek (122) ^h	14.1	Very Poor
						Madsen Creek (1923) ^{dh}	13.7	Very Poor
						Madsen Creek (1076) ^{dh}	38.7	Poor
						Cedar River Lower Trib. 0306 (313) ^h	16.4	Very Poor
		Molasses Creek (121) ^g	49.3	Fair				

Table 4. Receiving Water Quality Data Summary (continued)

Receiving Water	Designated Uses (173-201A WAC)	WQI Score ^a	Water Quality Assessment Listings ^b			Benthic Index of Biotic Integrity (B-IBI) ^c		
			Category	WQ Parameter	TMDLs in the Basin	Stream Name (Site ID)	Overall Score	Biological Condition
May Creek	<ul style="list-style-type: none"> • Aquatic Life Uses <ul style="list-style-type: none"> ➢ Core summer salmonid habitat • Recreational Uses <ul style="list-style-type: none"> ➢ Primary contact recreation • Water Supply Uses <ul style="list-style-type: none"> ➢ Domestic, industrial, agricultural, and livestock • Miscellaneous Uses <ul style="list-style-type: none"> ➢ Wildlife habitat, harvesting, commerce/navigation, boating, and aesthetics 	Good	5	Bacteria		May Creek (1092) ^g	67.2	Good
						May Creek (1969)	57.9	Fair
			5	Temperature		May Creek (132)	47.1	Fair
			5	Bioassessment (B-IBI)		May Creek (133)	60.0	Fair
						May Creek (139) ^g	59.6	Fair
						Honeydew Creek (3078)	23.6	Poor
						May Creek (2259)	14.8	Very Poor
Soos Creek	<ul style="list-style-type: none"> • Aquatic Life Uses <ul style="list-style-type: none"> ➢ Core summer salmonid habitat ➢ Primary contact recreation • Water Supply Uses <ul style="list-style-type: none"> ➢ Domestic, industrial, agricultural, and livestock • Miscellaneous <ul style="list-style-type: none"> ➢ Wildlife habitat, harvesting, commerce/navigation, boating, and aesthetics 	No data	5	Dissolved oxygen ^f	Soos Creek Watershed multiparameter TMDL (in development) – water quality improvement project to improve temperature, dissolved oxygen, and bioassessment issues.	Soos Creek (1928) ^g	39.1	Poor
			5	Bacteria (fecal coliform) ^e		Big Soos Creek (265) ^g	9.5	Very Poor
						Soos Creek (1999) ^g	3.7	Very Poor
						United Nations Creek (344) ^g	52.1	Fair

^a WQI scores and status: **Poor** (below 40) – does not meet expectations, highest concern; **Moderate** (40 to 80) – of moderate concern; **Good** (80 and above) – meets expectations, lowest concern (King County 2020). N/A means that the WQI is not applicable to this receiving water. The WQI was developed to score water quality for streams and rivers using stream monitoring gauge data.

^b Includes all tributaries in the delineated receiving water basin.

^c B-IBI Biological Condition and Overall Score: **Very Poor** [0, 20] overall taxa diversity is very low; **Poor** [20, 40] overall taxa diversity has declined; **Fair** [40, 60] overall taxa richness is reduced; **Good** [60, 80] diverges slightly from least distributed condition; **Excellent** [80, 100] comparable to least disturbed reference condition.

^d Spawning and rearing use designation applies only to West Lake Washington Tributary (207).

^e Monitoring Site located 1.45 river miles upstream from mouth at bridge on Bronson Way.

^f Monitoring Site located at bridge on East Jones Road at 196th Ave SE.

^g Outside of City boundaries, within the UGA; downstream of an assessed receiving water but may include inputs beyond the City's control.

^h Outside of City boundaries but adjacent to the City boundary and upstream of an assessed receiving water.

ⁱ Impairments are noted outside of City boundaries.

3.2.3.2 303(d) List

The 303(d) list, guided by federal laws, state water quality standards, and Ecology's Water Quality Assessment Policy 1-11 identifies water bodies in the polluted water Category 5. Ecology's 2018 Water Quality Assessment identifies water quality impairments in the receiving water basins (Ecology 2018). The known impairments have been summarized in Table 4, presented in Figure 2, and the full analysis of the available data can be found in Appendix A.

3.2.3.3 Total Maximum Daily Load (TMDL)

The TMDL is a plan for cleaning up polluted waters in order to meet state water quality standards. The federal Clean Water Act requires states to develop water quality improvement projects known as TMDLs for Category 5 impaired waterbodies identified on the 303(d) list. A TMDL plan begins with determination of the highest amount of pollutant loading that a surface water body can receive and still meet water quality standards, followed by monitoring and analysis. Monitoring helps identify sources and amounts of pollutants causing water quality issues, and the technical analysis determines the pollution reduction measures necessary to protect each waterbody (Ecology 2020). Once EPA approves a TMDL, the plan is implemented, and the monitoring process provides data to reflect the status of a water body's health. When water quality standards are met the assessment status is changed to Category 1: Meets tested standards for clean waters. Any known TMDLs associated with a 303(d)-listed water quality impairment that has been identified in one of the City's receiving water basins have been summarized in Table 4.

3.2.4 Biological Condition

The Puget Sound Stream Benthos, a data repository and analysis tool indicating biological health of streams throughout the Puget Sound, was used to aid in the assessment of the biologic condition of the City's receiving waters. The stream benthos indicates the region in or near a streambed. Benthic macroinvertebrates, animals that live within the stream benthos, are crucial to the stream ecosystem and are good indicators of the overall health of a stream. The tool uses benthic macroinvertebrate data to assess stream ecological health. A decline in stream biodiversity can be indicative of altered flow regimes; changes in runoff constituents; organism exposure to flashier hydrographs; elevated levels of contaminants, nutrients, or altered channel stability and morphology (King County 2015).

The database uses the Puget Sound Lowlands Benthic Index of Biotic Integrity (B-IBI) scoring system to assess the relative health of a stream. The overall B-IBI score used in this analysis is the summation of 10 metrics related to the taxa richness of various indicator macroinvertebrates within the stream. Each metric is assigned a score of 1 to 10, and the overall B-IBI score ranges from 1 to 100. A high score is representative of a stream in excellent biological condition, and a low score is a stream in very poor biological condition (King County 2015). Table 4 summarizes available data on the biological condition of monitored streams, and a full description of parameters and scoring elements has been provided with the water quality data included in Appendix A.

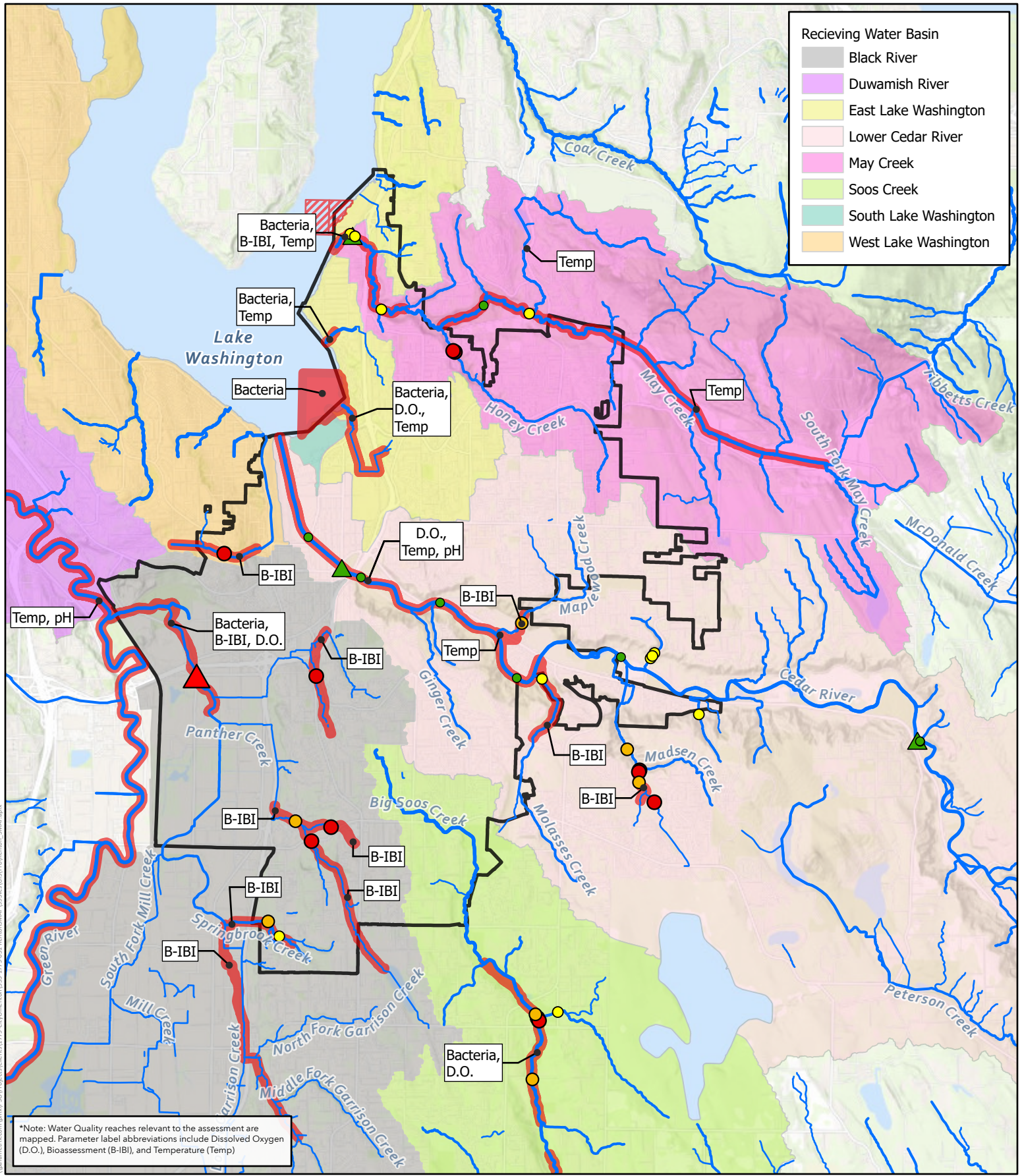


Figure 2 - Water Quality
Renton SMAP
Receiving Water Assessment

Date: 3/18/2022
Sources: WA Ecology, Puget Sound Stream Benthos, City of Renton, King County, WA DNR, USGS, ESRI
Disclaimer: The data on this map reflects planning-level accuracy and may not represent exact conditions in all locations. As part of the on-going SMAP development, the City will be updating the web map when possible. Also, as part of final basin screening and concept project selection in 2023, the City may conduct field investigations of data discontinuities that appear on the web map. Therefore, the City assumes no liability to third parties for the data lack thereof, or any decisions made or action not taken in reliance upon any of the data.

0 2,000 4,000 8,000
Feet

3.3 Watershed Condition

The watershed characteristics are described in this section and summarized in Table 5 and Figures 4, and 5. These characteristics will help inform the prioritization process and subsequent action planning for the ultimately selected priority basin.

Table 5. Puget Sound Watershed Characterization Model Scoring^a

Basin Name	Basin Area Within City Boundary (square miles)	Overall Score Within City Boundary	Total Watershed Area (square miles)	Overall Score of Watershed
Black River	8.15	9.71	26.61	9.91
Duwamish River	0.02	10.52	21.58	9.61
East Lake Washington	2.90	10.30	4.66	9.52
Lower Cedar River	7.47	11.97	68.11	12.34
May Creek	2.87	11.36	13.68	11.65
Soos Creek	1.48	7.87	27.35	9.38
South Lake Washington	0.17	10.73	0.17	10.73
West Lake Washington	0.52	10.81	16.53	8.96

^a Scoring summations would be translated to quartiles as follows: High – 16; Moderate-high – 12; Moderate – 8; and Low – 4

3.3.1 Land Cover

Land cover is based on a Lidar survey conducted by the City in 2018. The layer has been updated for the SMAP process using right-of-way and zoning information and reformatting it into the land cover categories that will be needed for the receiving water prioritization. The land cover is presented in Figure 3.

The City has a mixture of land cover types that includes roads, parking, forest canopy, trees, and grass and landscape. The impervious surfaces (hard surfaces) in the City are mix of pollution-generating roadway and parking areas and non-pollution-generating surfaces, including roofs, sidewalks, and stormwater features such as open channels and ponds (considered impervious during rain events, when filled with water). Impervious surfaces are associated with an increase in runoff volumes and decrease in groundwater recharge, which may increase flooding and flow frequencies. In places where some runoff does infiltrate into the ground, pollutants that can be carried from certain surfaces have the potential to contaminate groundwater. Increased surface flow volumes and water quality impairments can contribute to stream erosion and aquatic habitat degradation. Certain activities associated with pervious surfaces, such as agriculture and landscape that involve the application of fertilizer or pesticides can impact water quality by contributing to pollutant loading. These activities can also contribute to increases in water temperature and decreases in dissolved oxygen levels of receiving water bodies, which is more prevalent in warmer summer months when flows tend to be low as well.

Tree planting and management strategies are another important aspect of land management that can affect watershed condition. While more research is needed to better understand the benefits of urban trees to the rainfall/runoff process and inform tree management decisions (Kuehler 2016), certain benefits of intact forested stream buffers are known. Formal tree management policies that preserve and protect forested stream buffers and identify opportunities to include trees in development projects can result in certain known benefits, including reduced water temperatures and improved infiltration within a watershed.

Development pressures that could impact watershed condition, including the effects of potential future growth and transportation planning, will be assessed in the prioritization process when the receiving water basin delineations are refined into smaller catchment areas. The average daily traffic data will be

considered as part of the prioritization process. The traffic counts, which were mapped by the City (Renton 2012), will be used in the final phase of prioritization to qualitatively compare and identify catchments that could benefit from targeted retrofit actions. The Traffic Flow Map is presented in Figure 4.

3.3.2 Buildable and Vacant Lands

City buildable and vacant lands data is currently undergoing internal City review and approval. In the upcoming prioritization process, the approved data will be used to forecast areas of projected or targeted growth and associated stormwater management upgrades, score and rank sub-catchments, and evaluate impacts to the watershed. This information will be added to the public web map when available.

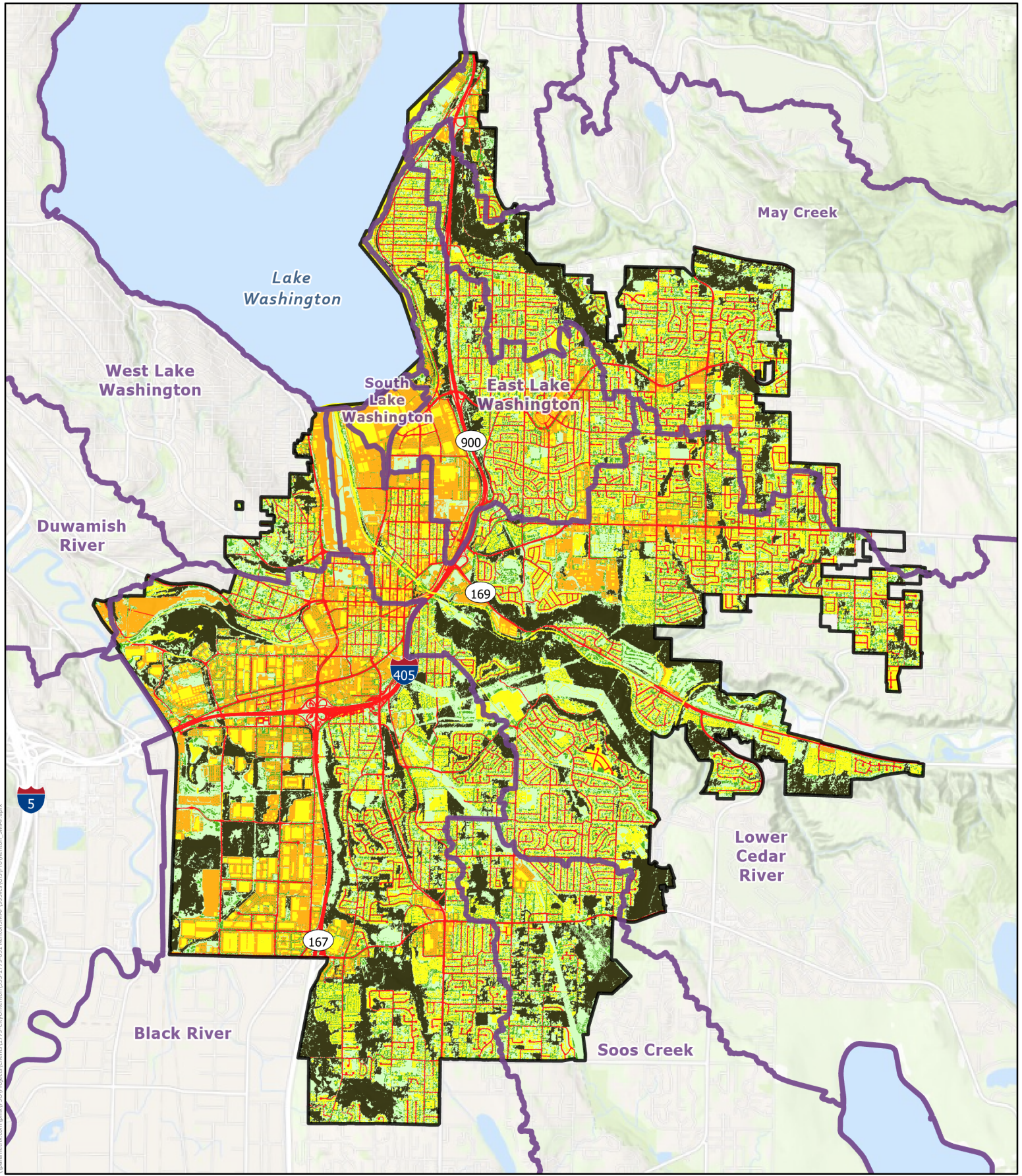
3.3.3 Cultural Resources

The City will follow a five step Cultural Resources Review process defined by the Department of Ecology (Ecology 2021). The City will complete a cultural resource review form. It will also submit an inadvertent discovery plan (IDP) to Ecology for projects that will involve or could result in ground disturbance. Possible projects that involve ground disturbance, such as stormwater facility retrofits, are likely to be included in the SMAP. The City will coordinate with Ecology, tribes, Department of Archaeology and Historic Preservation and other stakeholders to prioritize ground disturbing projects.

3.3.4 Puget Sound Watershed Characterization Model

Ecology has developed a mapping tool, the Puget Sound Watershed Characterization Model (PSWCM), that can be used to support stormwater management planning. The PSWCM includes different categories for water flow, water quality, and fish and wildlife habitats. The PSWCM provides color-coded maps that show the restoration and protection value of small watersheds and marine shorelines in the Puget Sound Basin, also known as assessment units (AUs), by comparing factors based on the assessed importance of flow, water quality, and habitat processes in sub-models (Ecology 2016a and 2016b).

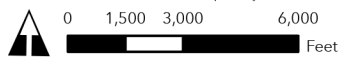
The overall scores for the City were determined by summing the scores for the selected ecological processes or values, which were weighted by sub-model. For the basin area within City boundaries, the model AUs were clipped to the City Boundary and summed according to their relative contribution. The same process was used to find scores for the watersheds, clipping according to the watershed boundaries delineated by King County (King County 2018). The PSWCM and City results are presented in Table 5 and Figures 4 and 5. The methodology of how the model weighted and summed the sub-model inputs for water flow, water quality, and fish and wildlife habitat components—as well as the full description of model parameters, inputs, calculations, maps, and results—are presented in are detailed in Appendix B.

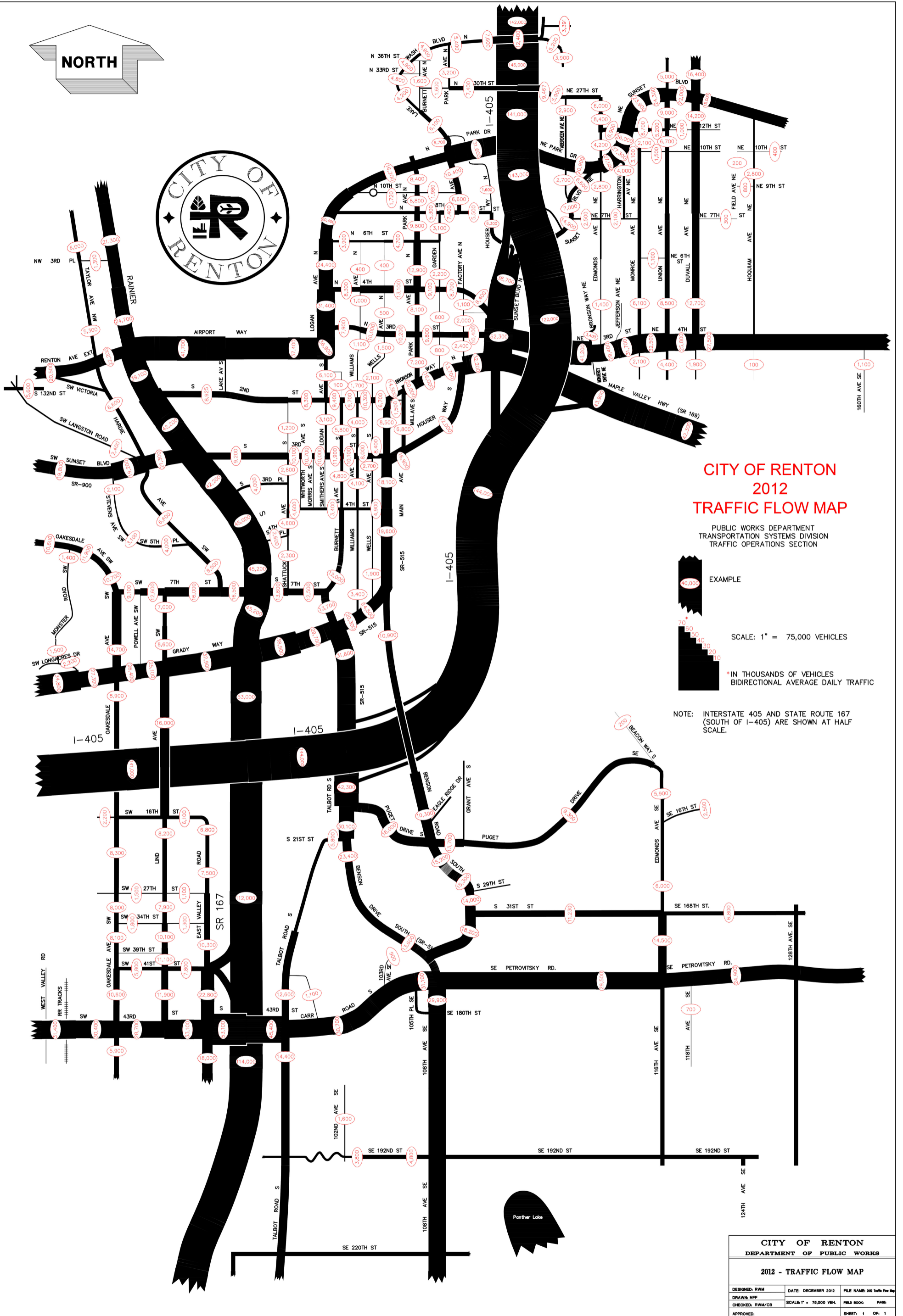
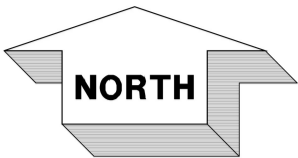


Date: 3/18/2022
 Sources: City of Renton, King County, WA Ecology, WA DNR, USGS, ESRI
 *NPGIS = Non-Pollution Generating Impervious Surfaces
 Disclaimer: The data on this map reflects planning-level accuracy and may not represent exact conditions in all locations. As part of the ongoing SMAP development, the City will be updating the web map when possible. Also, as part of final basin screening and concept project selection in 2023, the City may conduct field investigations of data discontinuities that appear on the web map. Therefore, the City assumes no liability to third parties for the data or lack thereof, or any decisions made or action not taken in reliance upon any of the data.

- Renton City Limits
- Receiving Water Basin
- Road (Highest Water Quality Impact)
- Parking (Higher Water Quality Impact)
- NPGIS (Medium Water Quality Impact)
- Grass/Landscape (Lower Water Quality Impact)
- Trees (Helpful to Water Quality)
- Forest Canopy (Most Helpful to Water Quality)

Figure 3 - Land Cover
 Renton SMAP
 Receiving Water Assessment





CITY OF RENTON 2012 TRAFFIC FLOW MAP

PUBLIC WORKS DEPARTMENT
TRANSPORTATION SYSTEMS DIVISION
TRAFFIC OPERATIONS SECTION



EXAMPLE

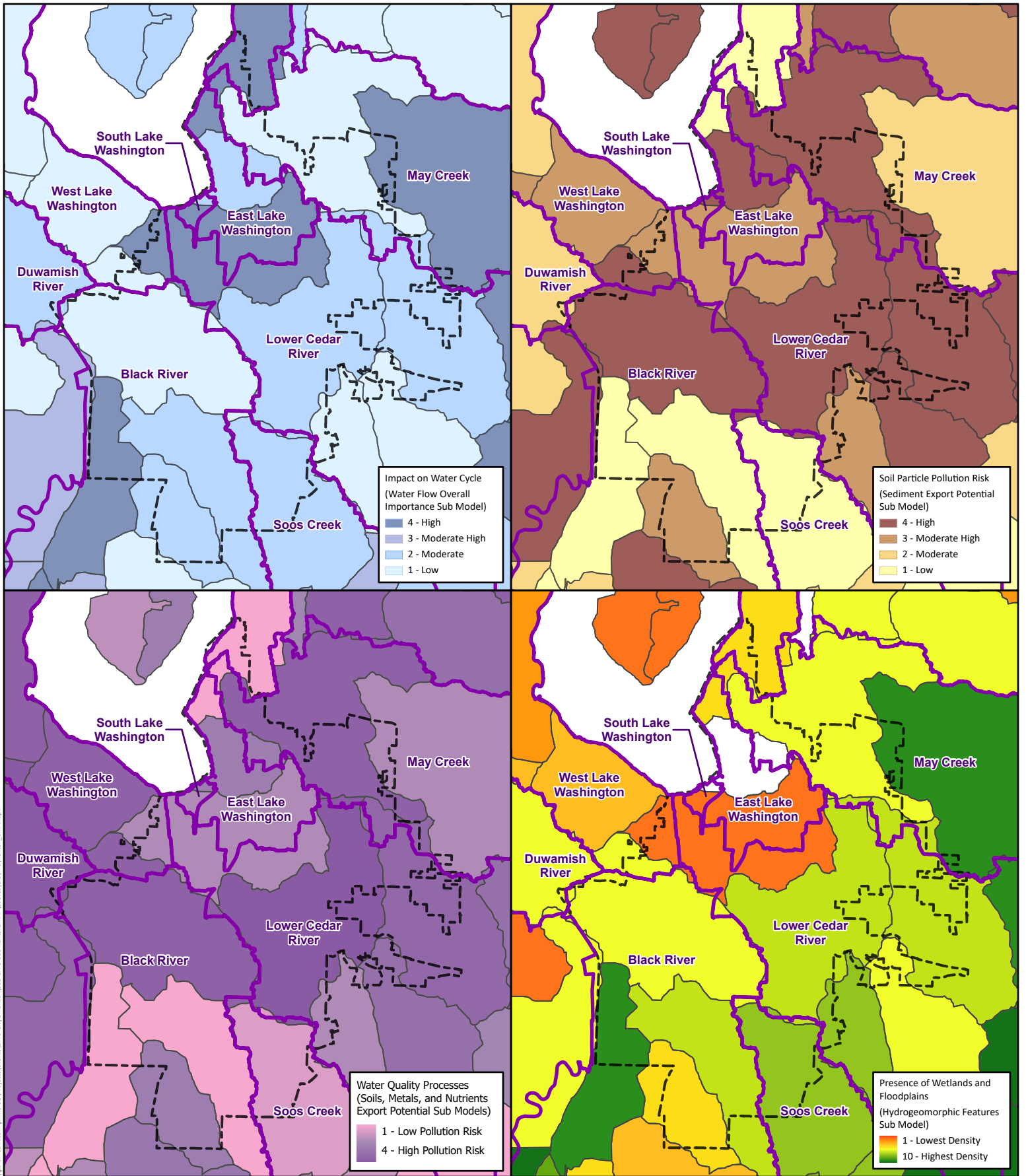
SCALE: 1" = 75,000 VEHICLES

* IN THOUSANDS OF VEHICLES
BIDIRECTIONAL AVERAGE DAILY TRAFFIC

NOTE: INTERSTATE 405 AND STATE ROUTE 167
(SOUTH OF I-405) ARE SHOWN AT HALF
SCALE.

CITY OF RENTON DEPARTMENT OF PUBLIC WORKS		
2012 - TRAFFIC FLOW MAP		
DESIGNED: RWM	DATE: DECEMBER 2012	FILE NAME: 2012 Traffic Flow Map
DRAWN: MFT	SCALE: 1" = 75,000 VEH.	FIELD BOOK: PAGE:
CHECKED: RWM/CB		SHEET: 1 OF 1
APPROVED:		

Figure 4. Traffic Flow Map

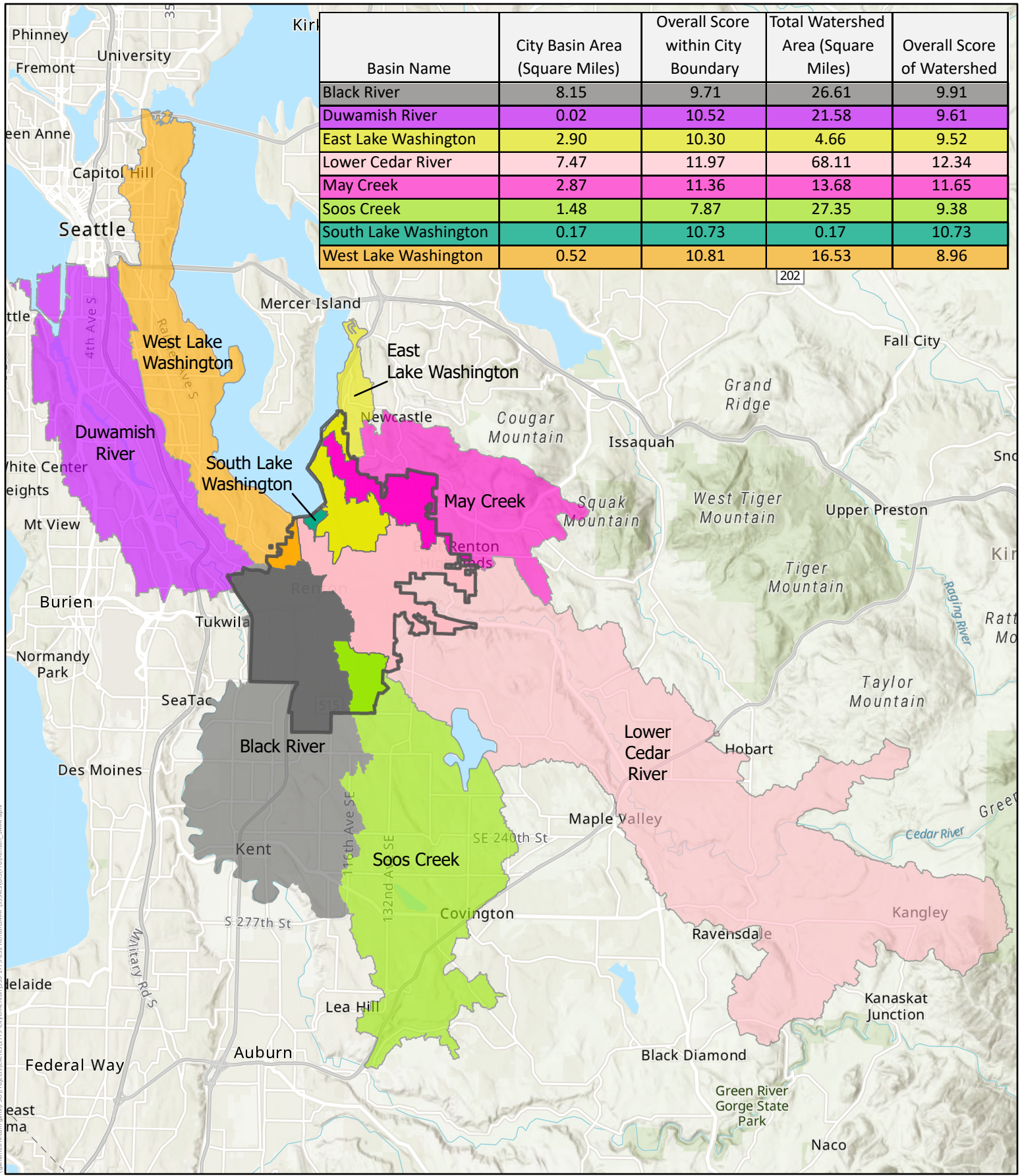


Date: 3/18/2022
 Sources: City of Renton, King County, WA Ecology, WA DNR, USGS, ESRI
 Disclaimer: The data on this map reflects planning-level accuracy and may not represent exact conditions in all locations. As part of the ongoing SMAP development, the City will be updating the web map when possible. Also, as part of final basin screening and concept project selection in 2023, the City may conduct field investigations of data discontinuities that appear on the web map. Therefore, the City assumes no liability to third parties for the data or lack thereof, or any decisions made or action not taken in reliance upon any of the data.

- Receiving Water Basin
- PSWCM Boundaries
- Renton City Limits

Figure 5 - Puget Sound Watershed Characterization Sub-Model Inputs
 Renton SMAP
 Receiving Water Assessment





Date: 3/18/2022
 Sources: City of Renton, King County, WA Ecology, WA DNR, USGS, ESRI
 Disclaimer: The data on this map reflects planning-level accuracy and may not represent exact conditions in all locations. As part of the ongoing SMAP development, the City will be updating the web map when possible. Also, as part of final basin screening and concept project selection in 2023, the City may conduct field investigations of data discontinuities that appear on the web map. Therefore, the City assumes no liability to third parties for the data or lack thereof, or any decisions made or action not taken in reliance upon any of the data.

Renton City Limits

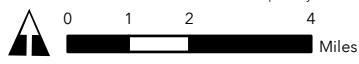


Figure 6 - Puget Sound Watershed Characterization Model Output Summary Renton SMAP Receiving Water Assessment

3.4 Public Health and the Environment

Environmental and socioeconomic stressors, which may act cumulatively to affect health and the environment and contribute to persistent environmental health disparities, have been discussed in the following sections, and the preliminary results of the environmental justice and opportunity scoring have been summarized in Table 7. The environmental justice and opportunity scoring will be refined through the prioritization process and will inform the selection of a priority basin.

3.4.1 Environmental Justice Screening and Mapping Tool

The EPA has developed a web-based tool known as the Environmental Justice Screening and Mapping Tool (EJSCREEN Tool) (EPA 2019). The EJSCREEN Tool provides high-resolution environmental and demographic indicators for locations in the United States and allows users to compare their selected locations to the rest of the state, EPA region, or nation. The indicators listed in Table 6 were selected from the EJSCREEN Tool to be analyzed during prioritization to give a proportional scaling to the amount of impact environmental pollution has on a community. This process includes identifying geographic areas that potentially experience disproportionate environmental harms and risks, which can be the result of greater exposure to environmental hazards that are generated from air, land, and water pollution; lack of opportunity for public participation; or a variety of other compounding socioeconomic factors.

Table 6. EJSCREEN Tool Indicators

Demographic Index Indicators ^a	Environmental Hazard Index Indicators ^b
Low Income	NATA Air Toxics Cancer Risk
Minority	NATA Respiratory Hazard Index
Individuals Over the Age 25 with Less Than a High School Education	NATA Diesel PM
Individuals in Linguistic Isolation	Particulate Matter
Individuals Under Age 5	Ozone
Individuals Over Age 64	Traffic Proximity and Volume
	Proximity to Risk Management Plan Sites
	Proximity to Treatment, Storage, or Disposal Facilities for Hazardous Waste
	Proximity to National Priorities List Sites
	Wastewater Discharge
	Lead Paint Indicator

^a U.S. Census Bureau 2020

^b EPA 2019

3.4.2 The Environmental Opportunity Index

The Environmental Opportunity Index was developed by Parametrix to complement the EJSCREEN indices and create a single overall Combined Equity Index score. This index was developed by scoring park/open space access using GIS data obtained from the City and canopy cover from the GIS layer Parametrix developed. Data was added to the existing block groups to identify areas with the greatest need or areas that could increase access to these resources. In this index, areas with the lowest canopy cover or the least access to parks or open spaces would be identified as having the greatest opportunity.

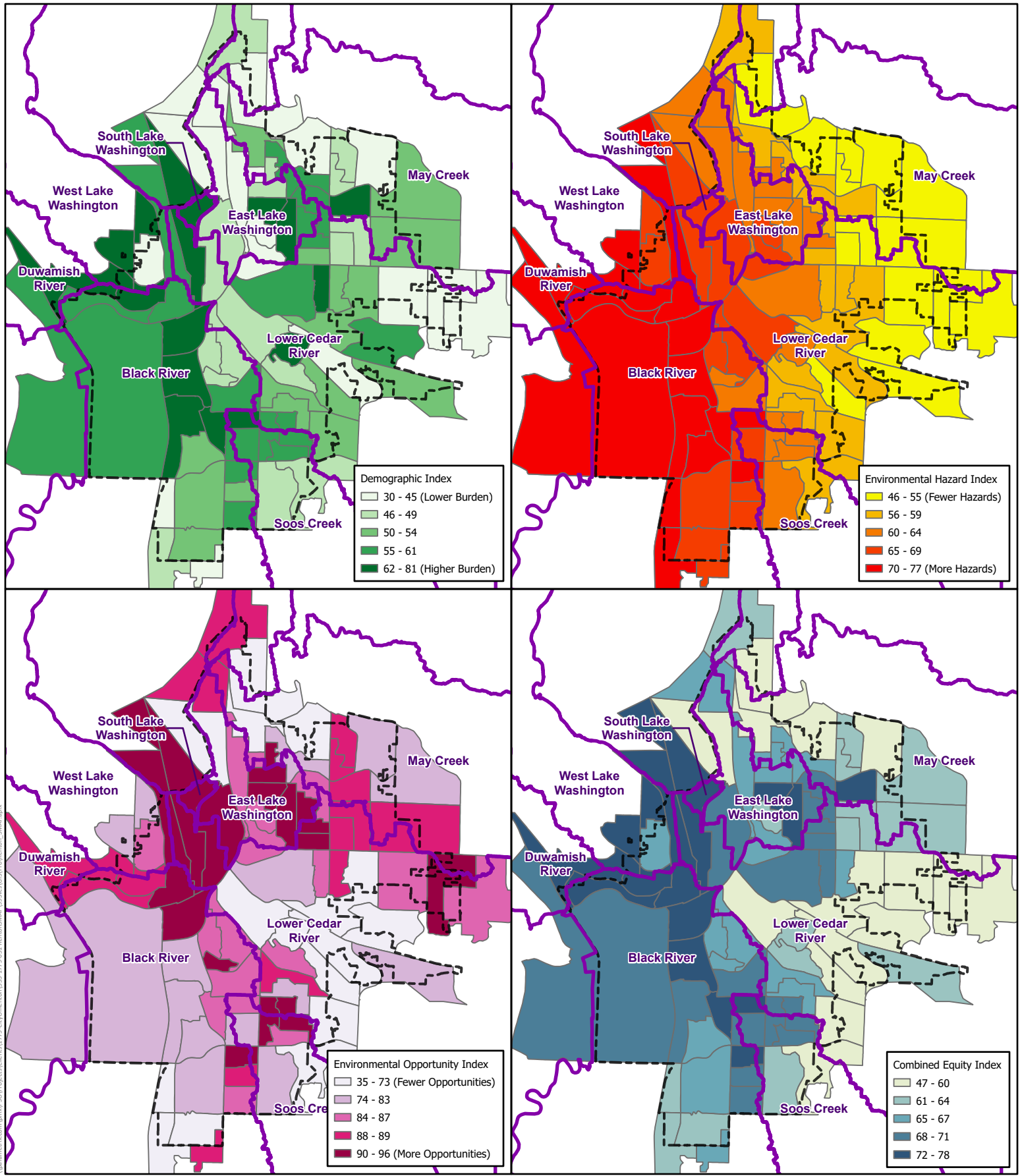
3.4.3 The Combined Equity Index

The equity layer, or the Combined Equity Index, was developed by averaging the scores from the Demographic Index, Environmental Hazard Index, and an Environmental Opportunity Index developed by Parametrix (see Table 7 below). The selected factors for each category were averaged together to generate each index as a summary for consideration. The overall Combined Equity Index score serves as a general check for extreme scenarios or other patterns, but it is reviewed in conjunction with the other three indices not as a surrogate for them. The Demographic Index, Environmental Hazard Index, Environmental Opportunity Index, and Combined Equity Index will be calculated for smaller subcatchment areas during the prioritization process, and each will be reviewed during subcatchment ranking and screening. The environmental justice data for each receiving water subbasin is summarized in Table 7 and Figure 6, and a full description of the inputs and scores are provided in Appendix C. Additionally, indicator scores can be found in the respective web map attribute tables for all indices.

Table 7. Environmental Justice and Opportunity Index Scores

Basin Name	Demographic Index Score	Environmental Hazard Index Score	Environmental Opportunity Index Score	Combined Equity Index Score
Black River	56.9	72.0	80.9	69.9
Duwamish River	61.4	73.0	87.4	73.9
East Lake Washington	48.9	62.4	85.3	65.5
Lower Cedar River	50.6	58.7	77.4	62.2
May Creek	49.9	54.5	80.3	61.6
Soos Creek	52.2	62.9	76.4	63.8
West Lake Washington	52.1	69.7	87.6	69.8

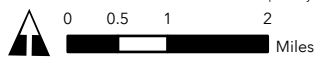
Note: The South Lake Washington basin was not analyzed because it is an industrial facility on private property; therefore, it has no demographics, no opportunity for City to retrofit municipal separate storm sewer system, nor opportunity to improve access to parks and open spaces.



Date: 3/18/2022
 Sources: EPA (EJ Screen), City of Renton, King County, WA Ecology, WA DNR, USGS, ESRI
 Disclaimer: The data on this map reflects planning-level accuracy and may not represent exact conditions in all locations. As part of the ongoing SMAP development, the City will be updating the web map when possible. Also, as part of final basin screening and concept project selection in 2023, the City may conduct field investigations of data discontinuities that appear on the web map. Therefore, the City assumes no liability to third parties for the data or lack thereof, or any decisions made or action not taken in reliance upon any of the data.

 Receiving Water Basin
 Renton City Limits

Figure 7 - Environmental and Social Justice Equity Indices
 Renton SMAP
 Receiving Water Assessment



4. STORMWATER MANAGEMENT INFLUENCE (STEP 3)

The City has reviewed the stormwater management influence of each receiving water basin considering both hydrologic impact and potential pollutant loadings—qualitatively estimated based on existing land cover shown in Figure 3—as described in the Stormwater Management Action Planning Guidance (Ecology 2019). This evaluation is summarized in Table 8 below, and the City has not excluded any receiving water basins based on these criteria.

Table 8. Evaluation of Stormwater Management Influence Conditions

Consideration	City Condition	Include Basin in Prioritization Analysis?
Hydrologic (Flow) Impact – Is basin runoff associated only with:		
Flow-control exempt receiving waters?	Some, but will include in prioritization	Yes
Ephemeral streams?	None. All basins have been delineated based on associated perennial streams, rivers, or lakes, or marine waters	Yes
Receiving waters primarily influenced by groundwater flows?	None	Yes
Pollutant Load (Water Quality Impact) – Is basin runoff generated only from:		
Non-pollutant generating surfaces?	No basins meet this threshold	Yes
Low density residential land uses?	No basins meet this threshold	Yes
Parking areas with up to 100 total trip ends or for up to 300 employees?	No basins meet this threshold	Yes
Roads with average daily traffic (ADT) up to 7,500; limited access highways with ADT up to 15,000?	Some basins may meet this threshold, but the City wishes to include in prioritization	Yes
Other land uses where runoff is already being fully treated to current standards?	No basins meet this threshold	Yes

As part of the receiving water prioritization in the next part of the SMAP process, the City will be evaluating the subbasins based on several factors, including current and forecasted stormwater management. Current stormwater management will be based in part on mapped facilities (see web map for locations). Additional existing stormwater management information will be based on parcel development dates compared with historical dates of stormwater management thresholds adopted by the City, as applicable. Future stormwater management will be forecasted by reviewing buildable lands data and estimating the stormwater management updates that would be triggered by future property development. This information is under development as part of the receiving water prioritization and will be added to the public web map when available.

The PSWCM also includes information on the hydrologic and pollutant loading impacts discussed in Section 3.3. and in Appendix B. Those results are summarized in Table 9. The hydrologic impact values were derived from the water flow importance layer sub-model, while the pollutant loading impact values were calculated by combining the values from the sediment loading, phosphorus, nitrogen, and heavy metal export potential sub-model within the city limits. In general, a basin with a high hydrologic impact is indicative of a basin with greater potential importance to the movement of water based on physical attributes of the landscape. Similarly, a basin with a high pollutant loading impact is indicative

of a basin expected to have a higher potential for the generation and export of pollutants to areas downstream. Further information regarding the sub-models can be found in Appendix B.

Table 9. Receiving Water Influence from PSWCM

Basin Name	Hydrologic Impacts	Pollutant Loading Impacts
Black River	Moderate	Moderate-High
Duwamish River	Moderate	Moderate-High
East Lake Washington	Moderate-High	Moderate-High
Lower Cedar River	Moderate	High
May Creek	Moderate	High
Soos Creek	Moderate	Low
South Lake Washington	Moderate-High	Moderate-High
West Lake Washington	Moderate-High	Moderate-High

Note: Scoring is based on a number scale from 1 (Low) to 4 (High). More information on scoring is given in Appendix B.

Based on this preliminary information from the PSWCM, the City will not exclude any receiving water basins. Furthermore, these results are not a prioritization, but rather a relative comparison of basins that will be considered during the City’s prioritization process.

5. RELATIVE CONDITIONS AND CONTRIBUTIONS (STEP 4)

This step is intended to narrow the number of receiving waters and basins, beyond any that were eliminated in Step 3 above, to a candidate list for inclusion in the Receiving Water Prioritization process. To support this evaluation, the City has considered the Ecology SMAP Guidance (Ecology 2019), the PSWCM (Ecology 2016b), and Building Cities in the Rain - Watershed Prioritization for Stormwater Retrofit (Commerce 2016). These guides and studies look at two overlapping factors for basin evaluation: current condition and level of influence on the receiving water. Of these two factors, the level of influence on the receiving water generally has a higher importance for initial action, whether the condition of the basin warrants either protection (of an excellent current condition) or restoration (of a degraded current condition).

While all receiving water basins in the City have some stormwater management influence, as stated above in Section 4 (Step 3), two basins occupy less than 1 percent of the City area—the Duwamish River and South Lake Washington. Therefore, these basins present the least influence on receiving waters among the area within the City’s control and the least priority opportunities for the City to improve receiving water conditions. The City will not include these basins in the SMAP prioritization process; however, they have been included in the receiving water assessment to account for all areas within the City boundary. For the remaining basins included moving forward, the specific condition —warranting the range of actions from protection to restoration—will be assessed during the Receiving Water Prioritization based on the information summarized in this Receiving Water Assessment.

6. RESULTS

Results of the City’s SMAP Receiving Water Assessment are summarized in Table 9.

Table 10. SMAP Watershed Inventory

Receiving Water Basin	Total Watershed Area (square miles)	Percent of Total Watershed Area Within the City (%)	Relative Water Quality Condition of Receiving Water				Puget Sound Watershed Characterization Model Score ^c within the City	Combined Equity Index Score	Included in Prioritization? Yes/No
			Water Quality Data Points in Basin						
			WQI Rating ^a	303(d) Listings/TMDL	Benthic Index of Biotic Integrity				
					Stream Name (Site ID)	Biological Condition (Overall Score) ^b			
Black River	26.6	30.6%	Poor (27)	Bacteria	Panther Creek (213)	Very Poor (18.1)	9.71	69.9	Yes
				B-IBI	Panther Creek (214)	Poor (22.4)			
				Dissolved oxygen (DO)	Panther Creek (215)	Very Poor (10.6)			
				Temperature	Rolling Hills Creek (216)	Very Poor (5.0)			
				Green River Watershed Temperature TMDL (2011)	Springbrook Creek (2484)	Poor (31.8)			
					Springbrook Creek (212)	Fair (41.0)			
East Lake Washington	4.7	62.3%	N/A	Bacteria	No data	No data	10.30	65.5	Yes
				Sediment (bioassay)					
				DO					
				Temperature					
Duwamish River	21.6	0.1%	No data	pH ^d	No data	No data	10.52	73.9	No
				Temperature ^d					
				Ammonia-N TMDL to remove Renton Metro effluent from the Duwamish River and Waterway (1992)					
				Green River Watershed Temperature TMDL (2011)					
Lower Cedar River	68.1	11.0%	Good (88) ^e Good (87) ^h	B-IBI	Cedar River (1838)	Fair (73.6)	11.97	62.2	Yes
				DO	Cedar River (1837)	Fair (68.1)			
				pH	Cedar River (1909)	Fair (74.6)			
				Temperature	Maplewood Creek (120)	Poor (23.1)			
					Cedar River (1841) ^d	Fair (67.9)			
					Cedar River (1840)	Good (72.7)			
					Cedar River – Lower Trib. 0307 (943) ^e	Fair (57)			
					Cedar River – Lower Trib. 0307 (944) ^e	Fair (56.9)			
					Cedar River – Lower Trib. 0307 (945) ^e	Fair (51.6)			
					Cedar River Lower Trib. 0311 (123) ^e	Fair (54.3)			
					Madsen Creek (1995) ^e	Poor (22.3)			
					Madsen Creek (122) ^e	Very Poor (14.1)			
					Madsen Creek (1923) ^e	Very Poor (13.7)			
					Madsen Creek (1076) ^e	Poor (38.7)			
					Cedar River Lower Trib. 0306 (313) ^e	Very Poor (16.4)			
					Cedar River (1836) ^e	Fair (74.5)			
					Cedar River (1979) ^d	Fair (66.6)			
					Molasses Creek (121) ^e	Fair (49.3)			

Table 9. SMAP Watershed Inventory (continued)

Receiving Water Basin	Total Watershed Area (square miles)	Percent of Total Watershed Area Within the City (%)	Relative Water Quality Condition of Receiving Water				Puget Sound Watershed Characterization Model Score ^c within the City	Combined Equity Index Score	Included in Prioritization? Yes/No	
			Water Quality Data Points in Basin			Benthic Index of Biotic Integrity				
			WQI Rating ^a	303(d) Listings/TMDL	Stream Name (Site ID)					Biological Condition (Overall Score) ^b
May Creek	13.7	21.0%	Moderate (80)	Bacteria	May Creek (1969)	Fair (57.9)	11.36	61.6	Yes	
					May Creek (1092) ^e	Good (67.2)				
				B-IBI	May Creek (132)	Fair (47.1)				
					May Creek (133)	Fair (60.0)				
					May Creek (139) ^e	Fair (59.6)				
				Temperature	Honeydew Creek (3078)	Poor (23.6)				
					May Creek (2259)	Very Poor (14.8)				
Soos Creek	27.3	5.4%	No data	Bacteria	Soos Creek (1928) ^f	Poor (39.1)	7.87	63.8	Yes	
					Big Soos Creek (265) ^f	Very Poor (9.5)				
				DO	Soos Creek (1999)	Very Poor (3.7)				
				Multiparameter TMDL (In development)	United Nations Creek (344) ^f	Fair (52.1)				
West Lake Washington	16.5	3.2%	N/A	B-IBI	West Lake WA Trib (207)	Very Poor (5.0)	10.81	69.8	Yes	
South Lake Washington	0.2	100%	N/A	None	No data	No data	10.73	N/A ^a	No	

Sources: WQI Rating – King County 2020; 303(d) Listings/TMDL – Ecology 2018; Benthic Index of Biotic Integrity – King County 2015; PSWCM Score – Ecology 2016a and 2016b; Combined Equity Index Score – EPA 2019.

^a WQI scores and status: **poor** (40 and below) – does not meet expectations, highest concern; **moderate** (40 to 80) – of moderate concern; **good** (80 and above) – meets expectations, lowest concern (King County 2020). **N/A** means that the WQI is not applicable to this receiving water. The WQI was developed to score water quality for streams and rivers using stream monitoring gauge data.

^b B-IBI Biological Condition and Overall Score: **Very Poor** [0, 20] overall taxa diversity is very low; **Poor** [20, 40] overall taxa diversity has declined; **Fair** [40, 60] overall taxa richness is reduced; **Good** [60, 80] diverges slightly from least distributed condition; **Excellent** [80, 100] comparable to least disturbed reference condition.

^c Scoring summations would be translated to quartiles as follows: High – 16; Moderate - high -12; Moderate– 8; and Low – 4.

^d No listings within City boundaries or associated study area.

^e Monitoring Site locations are located outside of City Boundary, within the Lower Cedar River Watershed upstream of the study area.

^f Monitoring Sites are located outside of City Boundary; within the Soos Creek Watershed downstream of the study area.

^g Monitoring Site located 1.45 river miles upstream from mouth at bridge on Bronson Way.

^h Monitoring Site located at bridge on East Jones Road at 196th Ave SE.

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Appendix A

Water Quality Analysis



DESIGNATED USES & WATER QUALITY CONDITION THRESHOLDS

The Department of Ecology has defined four groups of designated uses for surface water within the state of Washington: Aquatic Life Uses, Recreational Uses, Water Supply Uses, and Miscellaneous Uses. Water quality criteria has been identified, and thresholds for the relative condition of Washington’s water bodies have been set for each designated use. Table A-1 below defines the designated uses, and Table A-2 describes the applicable thresholds for Washington’s surface waters per WAC 173-201A-200.

The state of Washington has been divided into 62 watersheds, otherwise known as Water Resource Inventory Areas (WRIA). The Department of Ecology uses WRIsAs to regulate water bodies. Table 602 in WAC 173-201A-600 lists specific water bodies organized by WRIA along with their assigned designated uses (Table A-3). The City of Renton boundaries are within the Cedar Sammamish watershed (WRIA 8) and the Duwamish-Green watershed (WRIA 9). The receiving waters for the City of Renton listed in Table 602 include the Cedar River in WRIA 8, and the Duwamish River and Green River in WRIA 9. The Duwamish River and Green River are just outside of the City of Renton boundaries to the West, and the Black River, a tributary to the Duwamish-Green, is within City boundaries.

Per Ecology publication 06-10-038, there are waters within Renton City limits that would require supplemental spawning and incubation protection for salmonid species (Ecology 2011). Figures A-1 and A-2 show the location of waters in WRIA 8 and WRIA 9, respectively, with supplemental spawning and incubation criteria. Per WAC 173-201A-200 (1)(c)(iv), the waters identified in Ecology publication 06-10-038 are required to apply the following criteria to protect the reproduction of native char, salmon, and trout:

- Maximum 7-DADMax temperatures of 9°C (48.2°F) at the initiation of spawning and at fry emergence for char; and
- Maximum 7-DADMax temperatures of 13°C (55.4°F) at the initiation of spawning for salmon and at fry emergence for salmon and trout.

Table A-1. Designated Use Definitions

Designated Use	Definition
Aquatic Life	Designated based on the presence of or to provide protection for salmonid and char spawning and rearing, salmonid migration, core summer salmonid habitat, non-anadromous interior redband trout, and indigenous aquatic species. Waters with designated uses in this category have criteria standards for toxic, radioactive, and deleterious materials; aesthetic values; temperature; dissolved oxygen; total dissolved gas; and pH.
Recreational	Designation for waters used as a means of primary contact recreation, where a person would have direct contact with water to the point of complete submergence, including skin diving, swimming, water skiing, etc. Waters with designated uses in this category have criteria standards for toxic, radioactive, and deleterious materials; aesthetic values; and bacteria (<i>E. coli</i>).
Water Supply	Designation for waters used for domestic, agricultural, and/or industrial water supply, and stock watering purposes. Waters with designated uses in this category have criteria standards for toxic, radioactive, and deleterious materials as well as aesthetic values.
Miscellaneous	Designation for waters used as the following: wildlife habitat (those waters that provide food support to aquatic life and wildlife at any life stage or activity); fish harvesting; commerce and navigation; boating; and aesthetics. Waters with designated uses in this category have criteria standards for toxic, radioactive, and deleterious materials as well as aesthetic values.

Source: WAC 172-201A-200

Table A-2. Designated Uses and Standards for Washington Water Bodies per WAC 173-201A-200

Use Designation	Use General Description	Use Standards (see WAC 173-201A-200)				
Aquatic Life Uses:	(see WAC 173-201A-200[1])	Highest 7-DADMax	DO	Turbidity	Total Dissolved Gas	pH
Char Spawning/Rearing	Char spawning and rearing. The key identifying characteristics of this use are spawning or early juvenile rearing by native char (bull trout and Dolly Varden) or use by other aquatic species similarly dependent on such cold water. Other common characteristic aquatic life uses for waters in this category include summer foraging and migration of native char and spawning, rearing, and migration by other salmonid species.	12°C (53.6°F)	9.5 mg/L	Shall not exceed: • 5 NTU over background when the background is 50 NTU or less; or • A 10% increase in turbidity when the background turbidity is more than 50 NTU.	Total dissolved gas shall not exceed 110% of saturation at any point of sample collection.	pH shall be within the range of 6.5 to 8.5, with a human-caused variation within the above range of less than 0.2 units.
Core Summer Habitat	Core summer salmonid habitat. The key identifying characteristics of this use are summer (June 15–September 15) salmonid spawning or emergence, or adult holding; use as important summer rearing habitat by one or more salmonids; or foraging by adult and subadult native char. Other common characteristic aquatic life uses for waters in this category include spawning outside of the summer season, rearing, and migration by salmonids.	16°C (60.8°F)	9.5 mg/L	Same as above.	Same as above.	Same as above.
Spawning/Rearing	Salmonid spawning, rearing, and migration. The key identifying characteristic of this use is salmon or trout spawning and emergence that only occurs outside of the summer season (September 16–June 14). Other common characteristic aquatic life uses for waters in this category include rearing and migration by salmonids.	17.5°C (63.5°F)	8.0 mg/L	Same as above.	Same as above.	pH shall be within the range of 6.5 to 8.5, with a human-caused variation within the above range of less than 0.5 units.
Rearing/Migration Only	Salmonid rearing and migration only. The key identifying characteristic of this use is use only for rearing or migration by salmonids (not used for spawning).	17.5°C (63.5°F)	6.5 mg/L	Shall not exceed: • 10 NTU over background when the background is 50 NTU or less; or • A 20% increase in turbidity when the background turbidity is more than 50 NTU.	Same as above.	Same as above.
Redband Trout	Non-anadromous interior redband trout. For the protection of waters where the only trout species is a non-anadromous form of self-reproducing interior redband trout (<i>O. mykiss</i>) and other associated aquatic life are present.	17.5°C (63.5°F)	8.0 mg/L	Shall not exceed: • 5 NTU over background when the background is 50 NTU or less; or • A 10% increase in turbidity when the background turbidity is more than 50 NTU.	Same as above.	Same as above.
Warm Water Species	Indigenous warm water species. For the protection of waters where the dominant species under natural conditions would be temperature tolerant indigenous non-salmonid species. Examples include dace, redband shiner, chiselmouth, sucker, and northern pikeminnow.	17.5°C (63.5°F)	6.5 mg/L	Shall not exceed: • 10 NTU over background when the background is 50 NTU or less; or • A 20% increase in turbidity when the background turbidity is more than 50 NTU.	Same as above.	Same as above.
Recreational Uses:	(see WAC 173-201A-200[2])	Bacteria Criteria--<i>E. coli</i>				
Primary Contact	Primary contact recreation.	<i>E. coli</i> organism levels within an averaging period must not exceed a geometric mean value of 100 CFU or MPN per 100 mL, with not more than 10% of all samples (or any single sample when less than ten sample points exist) obtained within the averaging period exceeding 320 CFU or MPN per 100 mL.				
Water Supply Uses:	(see WAC 173-201A-200[3])	Toxic, Radioactive, and Deleterious Materials and Aesthetic Values^a				
Domestic Water	Domestic water supply.	General criteria that apply to water supply uses are described in WAC 173-201A-260 (2)(a) and (b), and are for toxic, radioactive, and deleterious materials as well as aesthetic values. A list of toxic and radioactive substances as well as associated thresholds can be found in WAC 173-201A-240, Toxic substances, and WAC 173-201A-250, Radioactive substances.				
Industrial Water	Industrial water supply.					
Agricultural Water	Agricultural water supply.					
Stock Water	Stock watering.					
Miscellaneous Uses:	(see WAC 173-201A-200[4])	Toxic, Radioactive, and Deleterious Materials and Aesthetic Values				
Wildlife Habitat	Wildlife habitat.	General criteria that apply to miscellaneous freshwater uses are described in WAC 173-201A-260 (2)(a) and (b), and are for toxic, radioactive, and deleterious materials as well as aesthetic values. A list of toxic and radioactive substances as well as associated thresholds can be found in WAC 173-201A-240, Toxic substances, and WAC 173-201A-250, Radioactive substances.				
Harvesting	Fish harvesting.					
Commerce/Navigation	Commerce and navigation.					
Boating	Boating.					
Aesthetics	Aesthetic values.					

Notes: CFU = colony forming units; DO = dissolved oxygen; mg/L = milligrams per liter; mL = milliliter; MPN = most probable number; NTU = nephelometric turbidity units

^a Toxic, radioactive, and deleterious materials and aesthetic values listed also apply for all Aquatic Life and Recreational Uses.

Table A-3. Designated Uses for Renton Receiving Waters

WRIA Number	WRIA Name	Receiving Water	Table 602 Location Information	Aquatic Life Uses	Recreation Uses	Water Supply Uses	Misc. Uses	Additional Info for Waterbody
8 ^a	Cedar-Sammamish	Cedar River	Upstream from the confluence with Lake Washington (latitude 47.5005, longitude -122.2159) to the Maplewood Bridge (latitude 47.4693, longitude -122.1596).	Core Summer Habitat	Primary Contact	All	All	173-201A-200 (1)(c)(iv)
			Upstream from the Maplewood Bridge (latitude 47.4693, longitude -122.1596) to Landsburg Dam (latitude 47.3759, longitude -121.9615), including tributaries.	Core Summer Habitat	Primary Contact	All	All	173-201A-200 (1)(c)(iv)
9 ^b	Duwamish-Green	Duwamish River	From mouth, south of a line bearing 254° true from the NW corner of berth 3, terminal No. 37 to the Black River (latitude 47.4737, longitude -122.2521) (Duwamish River continues as the Green River above the Black River). ^c	Rearing/Migration Only	Primary Contact	All, Except Domestic Water	All	-
		Green River	From and including the Black River (latitude 47.4737, longitude -122.2521, and point where Duwamish River continues as the Green River) to latitude 47.3699, longitude -122.246 above confluence with Mill Creek. ^d	Spawning/Rearing	Primary Contact	All	All	-
N/A	N/A	All surface waters not named in Table 602	N/A	Spawning/Rearing or Core Summer Habitat ^e	All	All	All	173-201A-600 (1)

^a This WRIA contains waters requiring supplemental spawning and incubation protection for salmonid species per WAC 173-201A-200 (1)(c)(iv). See Ecology 2011 for further information.

^b Per WAC 173-201A-600(1).

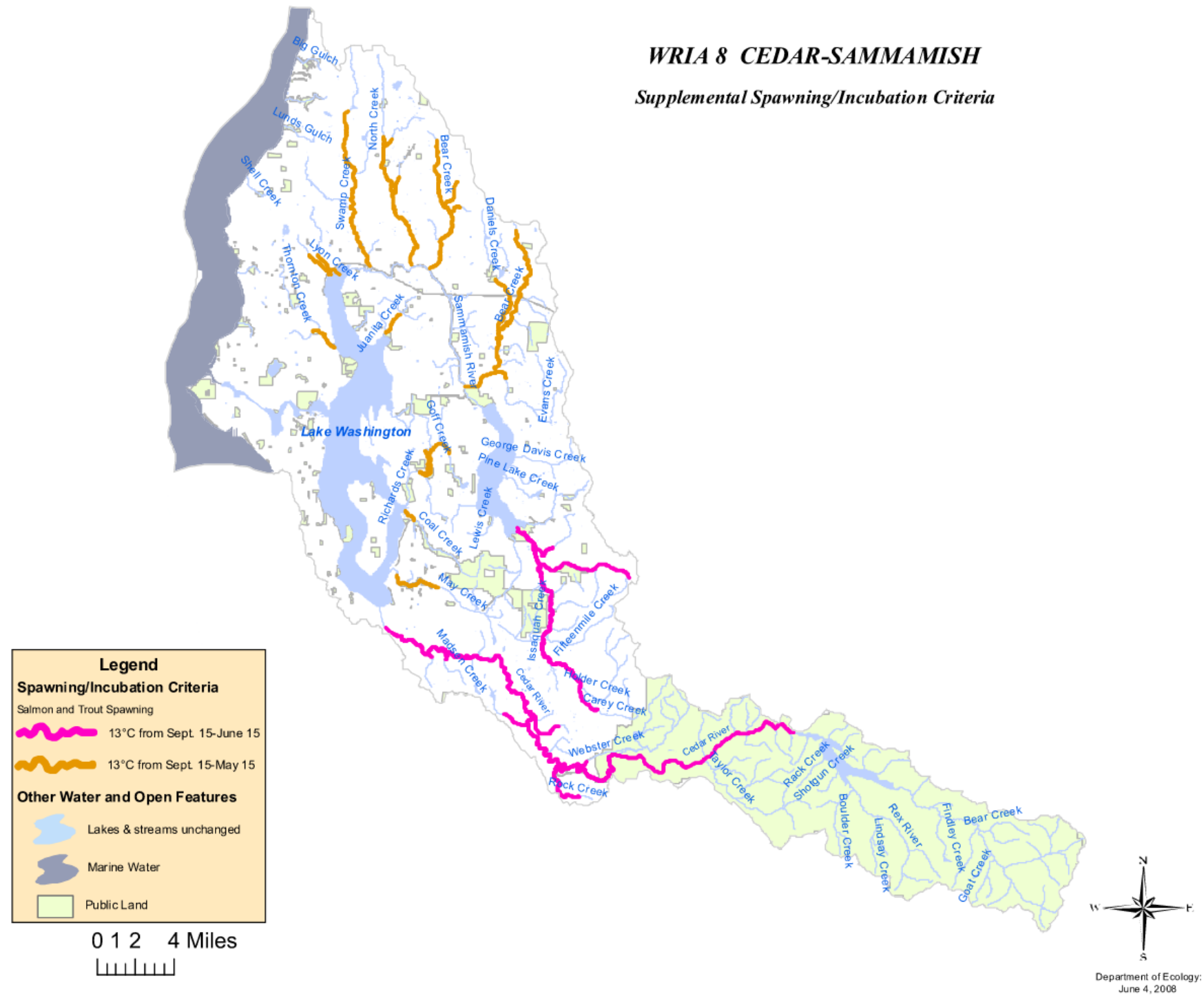
^c The confluence with the Black River is just outside the City of Renton boundaries at latitude 47.4737, longitude -122.2521.

^d The Black River is within the City of Renton boundaries.

^e Per WAC 173-201A-600 (1)(a), all waters not in Table 602 will be protected for the salmonid spawning, rearing, and migration designated uses. Additionally, the following waters are also to be protected for core summer habitat: all surface waters in national parks, national forests, and/or wilderness areas; all lakes and all feeder streams to lakes; all surface waters that are tributaries to waters designated core summer salmonid habitat; all fresh surface waters that are tributaries to extraordinary aquatic life marine waters.

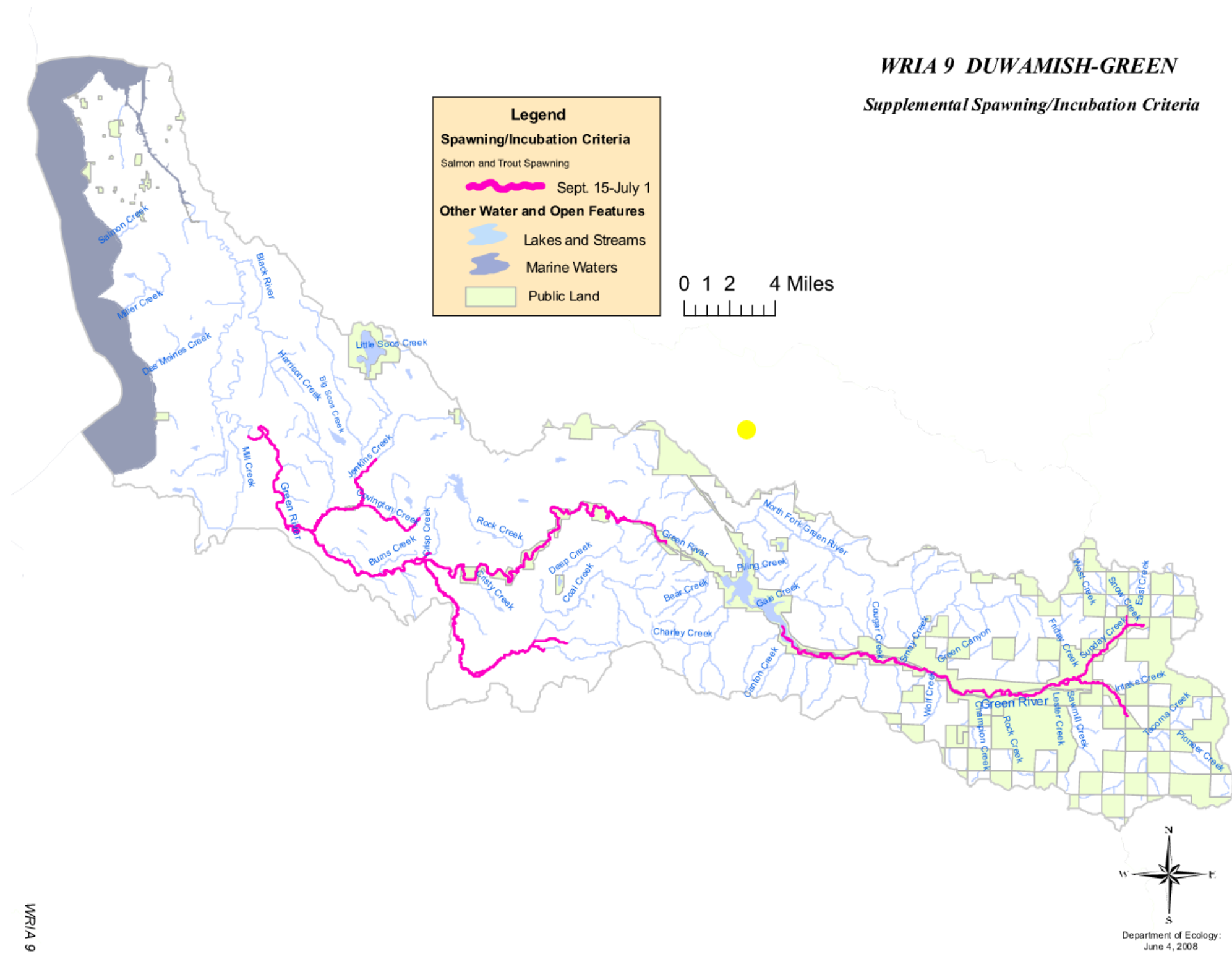
WRIA 8

WRIA 8 CEDAR-SAMMAMISH
Supplemental Spawning/Incubation Criteria



Source: Ecology 2011

Figure A-1. Waters in WRIA 8 with Supplemental Spawning/Incubation Criteria (per Ecology 2011).



Source: Ecology 2011

Figure A-2. Waters in WRIA 9 with Supplemental Spawning/Incubation Criteria (per Ecology 2011).

WATER QUALITY INDEX

The Water Quality Index (WQI) attempts to integrate a series of key water quality parameters into a single number that can be used to compare different sampling locations over time. Originally, the WQI was developed by the Environmental Protection Agency (EPA) Region 10 and was based on curves that relate concentrations or measurements of eight constituents to index scores and then aggregates scores into a single number. The EPA curves were a synthesis of national criteria, state standards, and technical guidelines. Ecology adapted this index for use in Washington State by adjusting the curves to reflect local water quality standards and/or guidelines. In 2009, Ecology modified the WQI to reflect revised state water quality rules for the protection of native fish and aquatic resources reflected in supplemental temperature criteria for many of the Puget Sound basins. In addition to modifications for revised state criteria, the WQI was further modified in 2009 by Ecology to reflect conditions more directly in Puget Sound lowland streams. King County is using Ecology’s Puget Sound lowland stream version of the WQI . For purposes of year-to-year comparison, results from previous years were recalculated using the new Puget Sound Lowland Stream WQI (King County 2020).

Table A-4. Water Quality Index (WQI) Scoring and Status Index

WQI Score	Status
80 and above	Good – meets expectations - lowest concern
40 to 80	Moderate – of moderate concern
below 40	Poor – does not meet expectations – highest concern

Source: Ecology 2002

REFERENCES

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Attachment A1

King County DNRP Water Quality Index



King County DNRP Water Quality Index

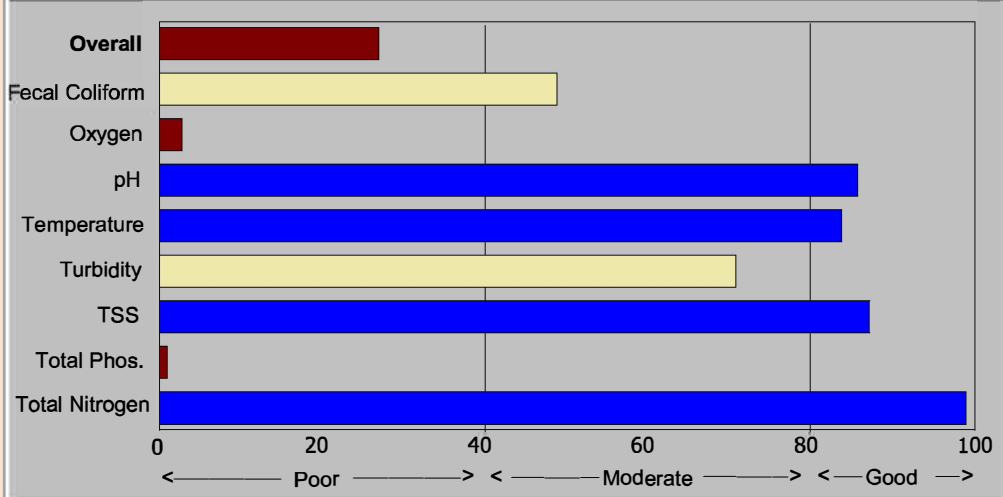
STATION **317** WATER YEAR **2020**

GAUGE # 03G Springbrook Creek at Grady Way Overall Index **27**

King County monitors water quality in Springbrook Creek at Station 0317, located near the mouth of the creek at the bridge. Monitoring at this site began in 1971 and continues today. The Springbrook Creek basin encompasses 15,763 acres near the Cities of Kent and Renton. The mainstem flows 12 miles before joining the Black River then ultimately flows into the Green River at river mile 11.0. The creek is on the Washington State Department of Ecology's 303(d) list, Category 5, for violations of dissolved oxygen and fecal coliform bacteria standards. Springbrook Creek is also listed for bioassessment scores that indicate that biological integrity is degraded. And the creek has a Category 4a listing as part of the Green River TMDL for fecal coliform bacteria.

Annual Water Quality Index Scores

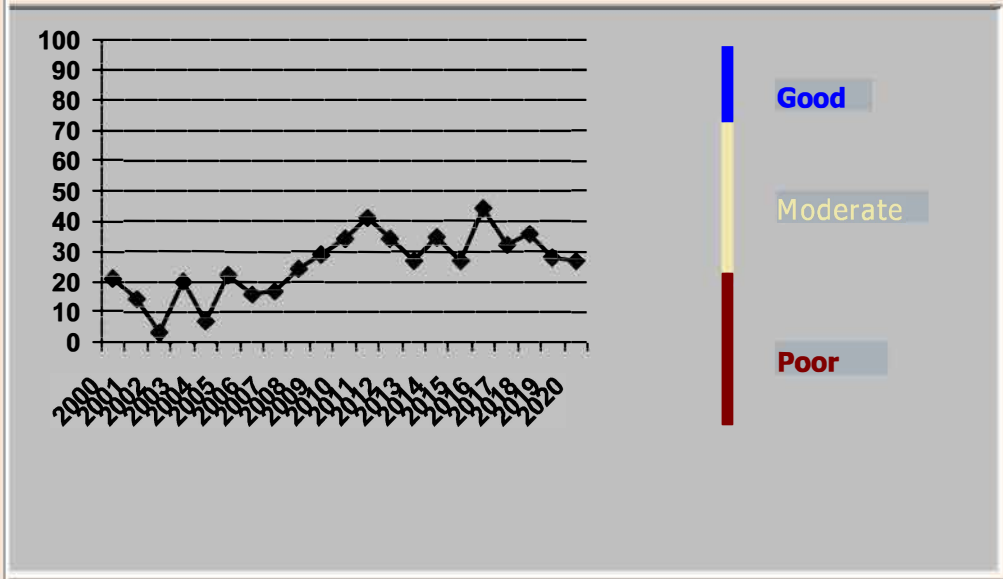
Water quality was POOR based on data collected 10/1/2019 to 9/30/2020.



Monthly Scores For Water Year 2020

Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
54	31	80	86	75	81		31	44	19	37	31

WQI Score Comparison By Water Year



About The Water Quality Index:

The Water Quality Index (WQI) score is a unit-less number ranging from 10 to 100: the higher the number, the higher the water quality. Scores are calculated from data collected during the monthly routine sampling. For temperature, pH, fecal coliform bacteria, turbidity, and dissolved oxygen, the index expresses results relative to levels required to maintain beneficial uses according to criteria in Washington's Water Quality Standards, WAC 173-201A. For nutrient and sediment measures where there are no standard, results are expressed relative to guidelines for this eco-region. Results from the eight parameters are aggregated over time to produce a single score for each sample station. In general, stations scoring 80 and above did not fail water quality standards or guidelines and are of "low concern", scores 40 to 80 indicate "moderate concern", and water quality at stations with scores below 40 are of "high concern". For more information about the WQI please visit <https://green2.kingcounty.gov/streamsdata/WQI.aspx>

For more information about this creek please visit our website at <http://green.kingcounty.gov/WLR/Waterres/StreamsData/streamlist.aspx>

King County DNRP Water Quality Index

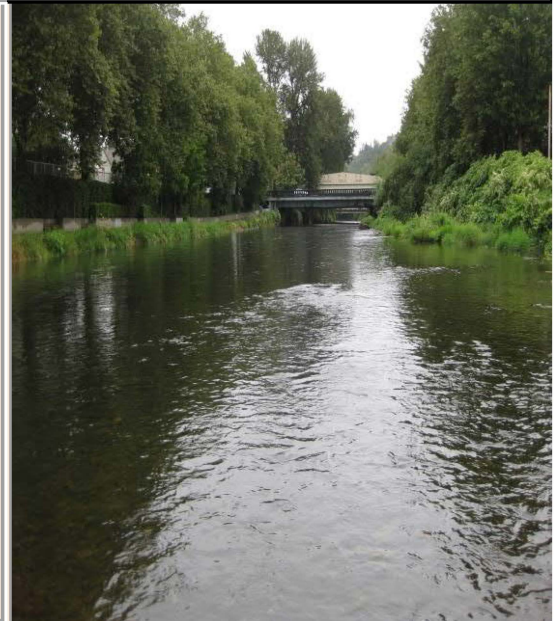
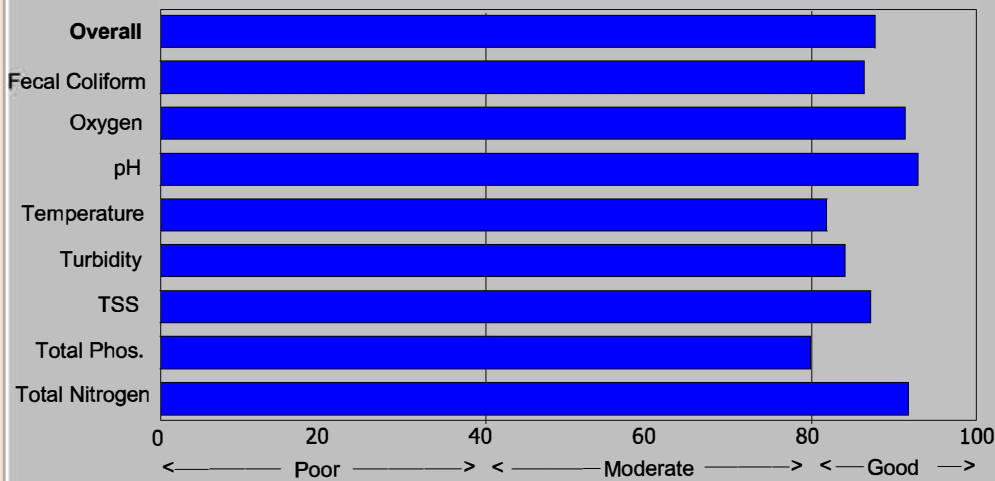
STATION **438** WATER YEAR **2020**

GAUGE # 31ab Cedar River at River Mile 1.46 Overall Index **88**

Station 0438 is 1.45 River Miles upstream from the mouth at the bridge on Bronson Way. This station replaced station X438 in 2009 which had been located just above where the river enters Lake Washington. From 1972 through 2008 water quality samples were also collected monthly from an upstream station (A438), located at the bridge on East Jones Road at 196th Ave SE. The Upper Cedar River encompasses roughly 79,951 acres and runs 25 miles from Meadow Mountain near Cascade Crest to the Landsburg Diversion Dam. The City of Seattle owns most of this upper basin - upstream of where the City diverts the drinking water supply from the Landsburg Dam. The Lower Cedar River drains 42,240 acres and runs approximately 21.7 miles from below the Landsburg Dam to Lake Washington.

Annual Water Quality Index Scores

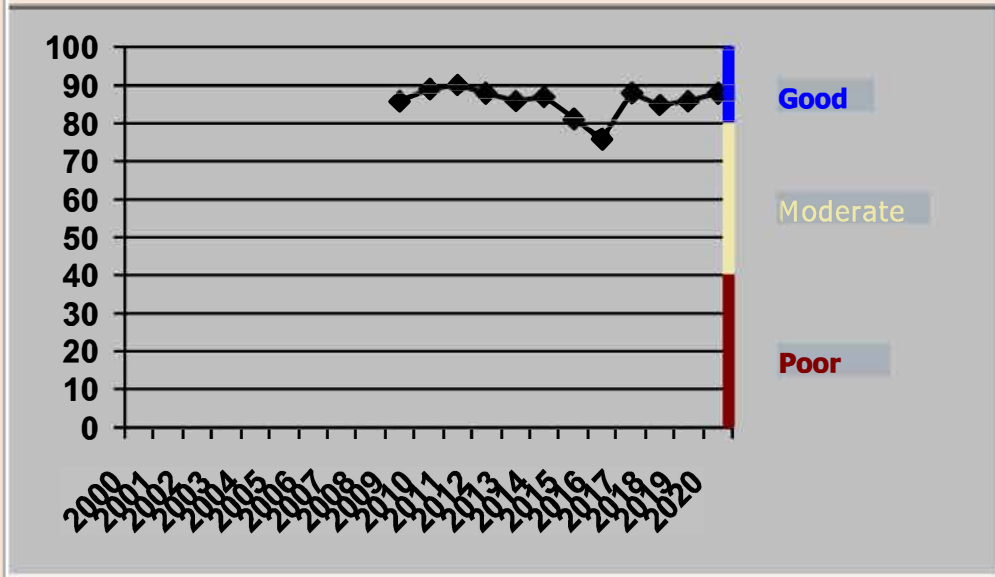
Water quality was GOOD based on data collected 10/1/2019 to 9/30/2020.



Monthly Scores For Water Year 2020

Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
93	97	99	98	79	99		93	93	94	92	92

WQI Score Comparison By Water Year



About The Water Quality Index:

The Water Quality Index (WQI) score is a unit-less number ranging from 10 to 100: the higher the number, the higher the water quality. Scores are calculated from data collected during the monthly routine sampling. For temperature, pH, fecal coliform bacteria, turbidity, and dissolved oxygen, the index expresses results relative to levels required to maintain beneficial uses according to criteria in Washington's Water Quality Standards, WAC 173-201A. For nutrient and sediment measures where there are no standard, results are expressed relative to guidelines for this eco-region. Results from the eight parameters are aggregated over time to produce a single score for each sample station. In general, stations scoring 80 and above did not fail water quality standards or guidelines and are of "low concern", scores 40 to 80 indicate "moderate concern", and water quality at stations with scores below 40 are of "high concern". For more information about the WQI please visit <https://green2.kingcounty.gov/streamsdata/WQI.aspx>

For more information about this creek please visit our website at <http://green.kingcounty.gov/WLR/Waterres/StreamsData/streamlist.aspx>

King County DNRP Water Quality Index

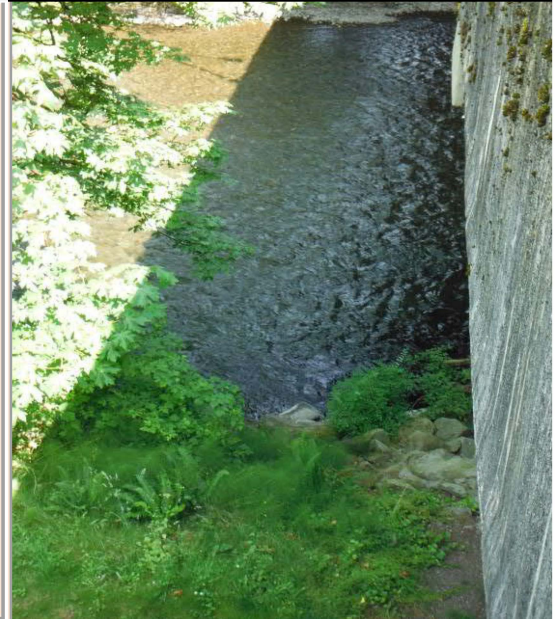
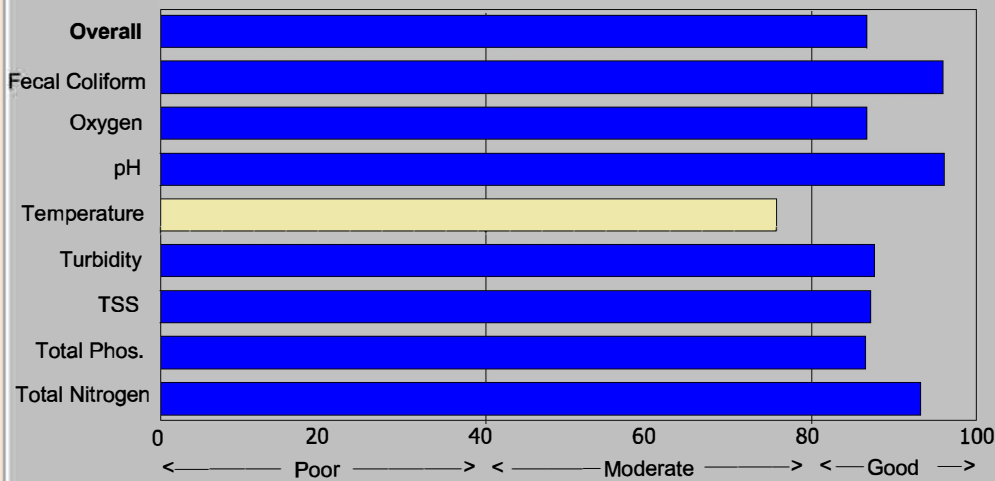
STATION **A438** WATER YEAR **2020**

GAUGE # 31ea Cedar River at Jones Road Overall Index **87**

Sampling began at station A438, the upstream site on the Cedar River located at the bridge on East Jones Road at 196th Ave SE, in 1972. Sampling was discontinued from 2008 through 2014 when budget cutbacks reduced the breadth of King County's water quality monitoring program. The Upper Cedar River encompasses roughly 79,951 acres and runs 25 miles from Meadow Mountain near Cascade Crest to the Landsburg Diversion Dam. The City of Seattle owns most of this upper basin - upstream of where the City diverts the drinking water supply from the Landsburg Dam. The Lower Cedar River drains 42,240 acres and runs approximately 21.7 miles from below the Landsburg Dam to Lake Washington.

Annual Water Quality Index Scores

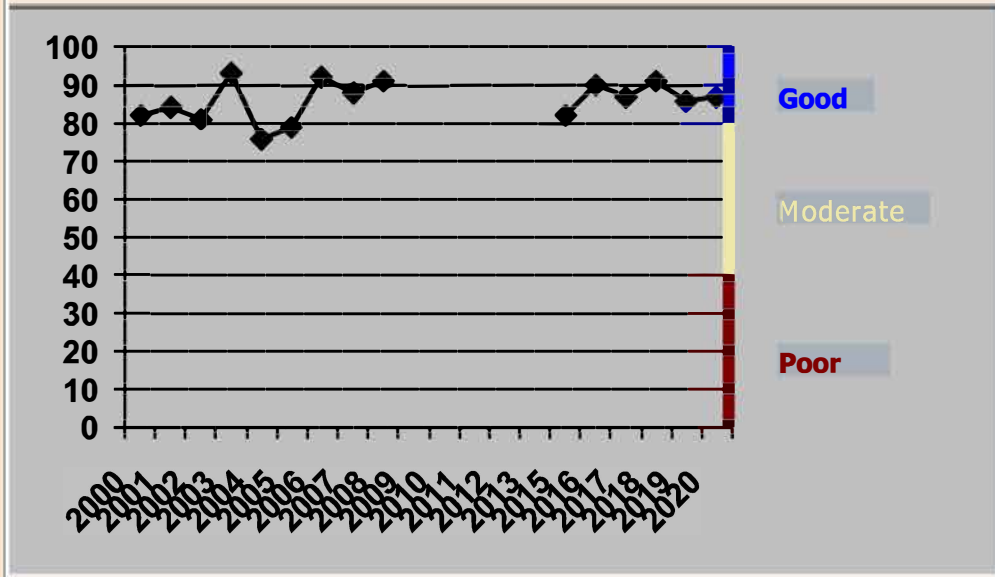
Water quality was GOOD based on data collected 10/1/2019 to 9/30/2020.



Monthly Scores For Water Year 2020

Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
96	98	100	99	83	99		94	90	90	95	89

WQI Score Comparison By Water Year



About The Water Quality Index:

The Water Quality Index (WQI) score is a unit-less number ranging from 10 to 100: the higher the number, the higher the water quality. Scores are calculated from data collected during the monthly routine sampling. For temperature, pH, fecal coliform bacteria, turbidity, and dissolved oxygen, the index expresses results relative to levels required to maintain beneficial uses according to criteria in Washington's Water Quality Standards, WAC 173-201A. For nutrient and sediment measures where there are no standard, results are expressed relative to guidelines for this eco-region. Results from the eight parameters are aggregated over time to produce a single score for each sample station. In general, stations scoring 80 and above did not fail water quality standards or guidelines and are of "low concern", scores 40 to 80 indicate "moderate concern", and water quality at stations with scores below 40 are of "high concern". For more information about the WQI please visit <https://green2.kingcounty.gov/streamsdata/WQI.aspx>

For more information about this creek please visit our website at <http://green.kingcounty.gov/WLR/Waterres/StreamsData/streamlist.aspx>

King County DNRP Water Quality Index

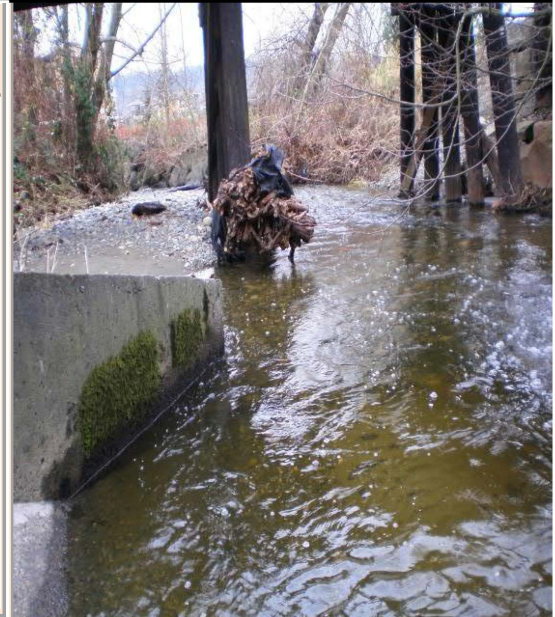
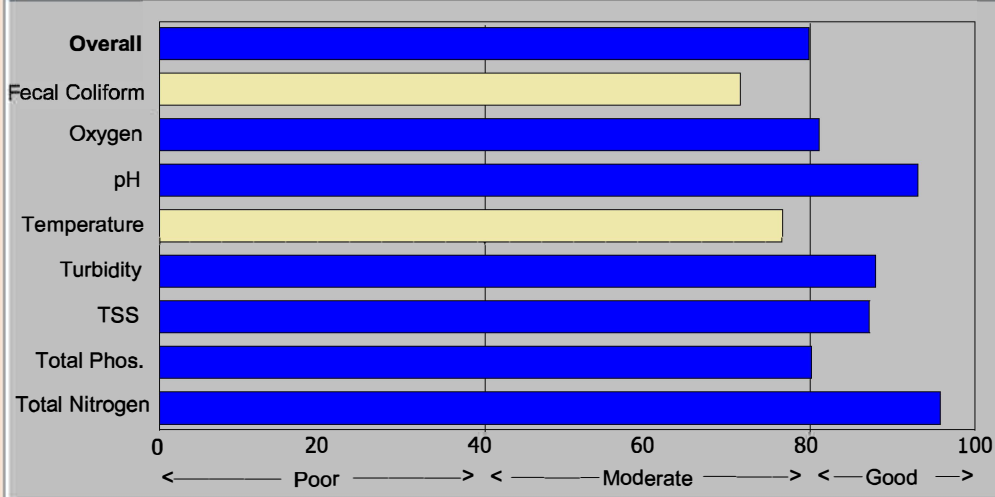
STATION **440** WATER YEAR **2020**

GAUGE # 37a May Creek @ Mouth Overall Index **80**

King County monitors water quality in May Creek at station 0440, located at the gaging station near the bridge on Lake Washington Blvd and SE 80th Street. King County has collected monthly water quality samples at this location since 1972. The May Creek basin encompasses roughly 8,960 acres and includes 26 miles of mapped streams, two small lakes, and over 400 acres of wetlands. The upper, eastern portion of the basin is characterized by less dense residential and agricultural development, and includes a significant portion of the undeveloped parkland on Cougar Mountain. The lower, western portion of the basin is inside the Urban Growth Boundary and is primarily dense urban residential development. May Creek is on the 2012 Washington Department of Ecology's 303(d) list for violation of bacteria standards. May Creek supports five species of salmonids.

Annual Water Quality Index Scores

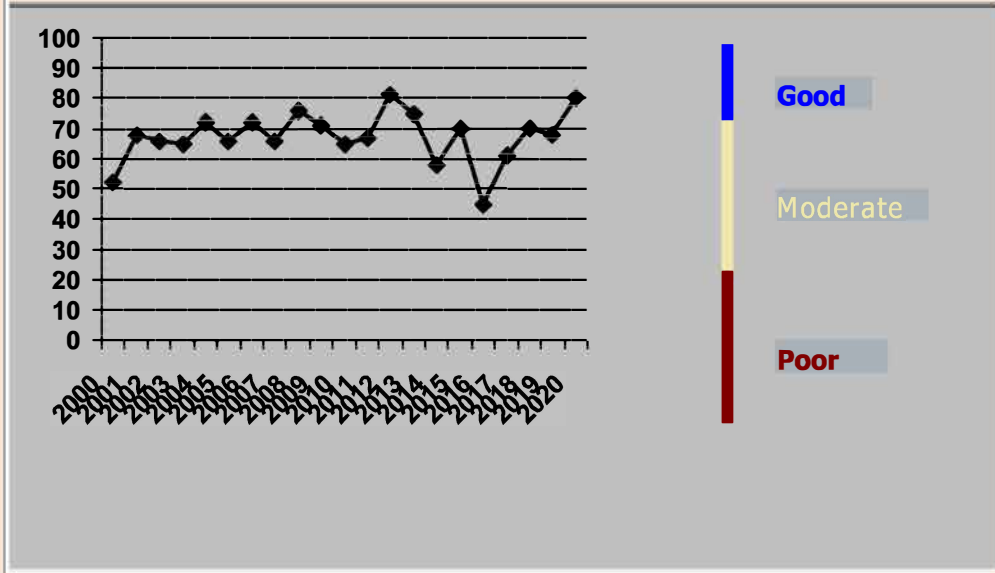
Water quality was GOOD based on data collected 10/1/2019 to 9/30/2020.



Monthly Scores For Water Year 2020

Month	Score
Oct	80
Nov	87
Dec	96
Jan	79
Feb	94
Mar	97
Apr	91
May	86
Jun	81
Jul	92
Aug	88
Sep	88

WQI Score Comparison By Water Year



About The Water Quality Index:

The Water Quality Index (WQI) score is a unit-less number ranging from 10 to 100: the higher the number, the higher the water quality. Scores are calculated from data collected during the monthly routine sampling. For temperature, pH, fecal coliform bacteria, turbidity, and dissolved oxygen, the index expresses results relative to levels required to maintain beneficial uses according to criteria in Washington's Water Quality Standards, WAC 173-201A. For nutrient and sediment measures where there are no standard, results are expressed relative to guidelines for this eco-region. Results from the eight parameters are aggregated over time to produce a single score for each sample station. In general, stations scoring 80 and above did not fail water quality standards or guidelines and are of "low concern", scores 40 to 80 indicate "moderate concern", and water quality at stations with scores below 40 are of "high concern". For more information about the WQI please visit <https://green2.kingcounty.gov/streamsdata/WQI.aspx>

For more information about this creek please visit our website at <http://green.kingcounty.gov/WLR/Waterres/StreamsData/streamlist.aspx>

WATER QUALITY ASSESSMENTS

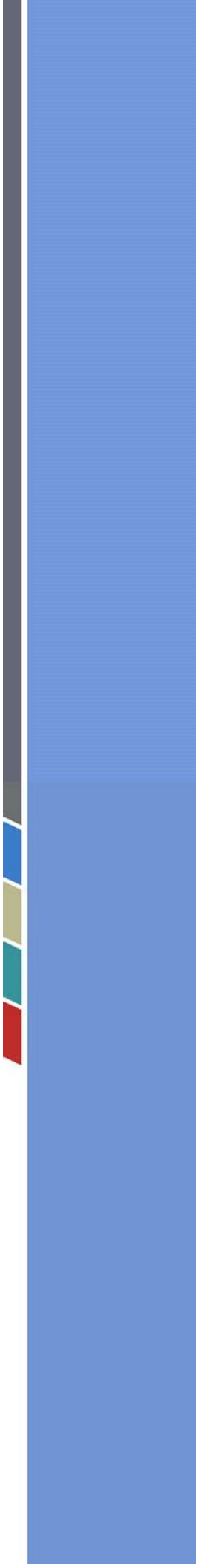
Table A-5. 303(d) List

Category Rank	Category	Category Definition
1	Meets Tested Criteria	Recent data is sufficient in showing attainment of the applicable water quality standard for the assessed parameter. Placement in this category does not mean the assessment unit is compliant with standards for any other purpose (i.e., permitting). Not part of the 303(d) list.
2	Water of Concern	If Ecology determines that the data for an assessment unit parameter indicate credible concern but there are fewer exceedances than necessary for placement in Category 5, then the assessment unit will be placed in this category. Not part of the 303(d) list.
3	Insufficient Data to Make Determination	Assessment units with insufficient data to determine whether the water quality parameter in question has met the use standard. Not part of the 303(d) list.
4	Impaired but Does Not Require a TMDL	Not part of the 303(d) list but still impaired. Category 4 is broken up into 4A, 4B, and 4C.
4A	Has a TMDL Approved by EPA	When a TMDL for a parameter in an impaired assessment unit is approved by the EPA, Ecology reassigns the parameter for that assessment unit from Category 5 to Category 4A. If Ecology deems the TMDL is not being implemented, then the assessment unit parameter may be moved by to Category 5 to flag it for further action.
4	4B Has a Pollution Control Program that is Being Actively Implemented	When Ecology determines that a local, state, or federal program/strategy is implementing a pollution control program with the expectation of attaining water quality standards for an impaired assessment unit parameter, Ecology will place the Category 5 listing in question into Category 4B for review by the EPA.
4C	Impaired by a Non-Pollutant	When an assessment unit parameter fails to meet applicable water quality standards but the cause is by a type of pollution not adequately addressed by development of a TMDL. Impaired designated uses caused by degradation but not resulting in the exceedance of a pollutant criterion would be placed here. Non-pollutant factors that cause impairment would be placed in this category and include physical habitat alterations and/or fish migration barriers, invasive exotic species, flow alterations, and degraded biological integrity.
5	The 303(d) List	Ecology will place an assessment unit parameter in Category 5 when data shows water quality criteria are not persistently attained, or narrative evidence indicates designated use impairment by a pollutant. Placement in this category means the associated designated use of the waterbody segment in question is impaired. If an assessment unit is projected to exceed applicable water quality standards through trend analysis, Ecology may preemptively move the assessment unit to this category. Only assessment units ranked as Category 5 are included in the 303(d) list for review by the EPA. All assessment units in Category 5 will need a TMDL, pollution control program, or other action to bring the waterbody into compliance.

Source: (Ecology 2020)

Attachment A2

Water Quality Assessment Listings by Receiving Water and
Main Listing Information



Water Quality Assessment Listings by Receiving Water

Receiving Water	Category	Listing ID	Listing Parameter
Black River	5	12567	Bacteria
Black River	5	70141	B-IBI
Black River	5	70143	B-IBI
Black River	5	70145	B-IBI
Black River	5	70146	B-IBI
Black River	5	70147	B-IBI
Black River	5	70148	B-IBI
Black River	5	10678	Dissolved Oxygen
Black River	4A	7039	Temperature
Black River	4A	72607	Temperature
Black River	4A	72608	Temperature
Duwamish River	5	7475	pH
Duwamish River	5	7036	Temperature
Lake Washington	5	12193	Bacteria
Lake Washington	5	74338	Bacteria
Lake Washington	5	70140	B-IBI
Lake Washington	5	78045	Dissolved Oxygen
Lake Washington	5	500009	Sediment Bioassay
Lake Washington	5	73156	Temperature
Lower Cedar River	5	70077	B-IBI
Lower Cedar River	5	70078	B-IBI
Lower Cedar River	5	10654	Dissolved Oxygen
Lower Cedar River	5	10655	pH
Lower Cedar River	5	4816	Temperature
May Creek	5	13124	Bacteria
May Creek	5	70087	B-IBI
May Creek	5	4818	Temperature
May Creek	5	7445	Temperature
May Creek	5	72574	Temperature
Soos Creek	5	15870	Bacteria
Soos Creek	5	15866	Dissolved Oxygen

Main Listing Information

Listing ID: 12567
Waterbody Name: BLACK RIVER
Medium: Water
Parameter: Bacteria
WQI Project: None
Designated Use: None

Year	Category
2014	5
2012	5
2008	5
2004	4A
1998	N
1996	N

Assessment Unit

Assessment Unit ID: 17110013000129 **County:** King

WRIA: 9 - Duwamish-Green

Basis Statement

Location ID: [KCM-0317], [09H090], [KCM-A317] -- In water year 2010, 5 of 12 sample values (42%) showed an excursion of the % criterion for this waterbody (200 cfu/100mL). The geometric mean of 114 exceeds the geometric mean criterion (100 cfu/100mL).

Location ID: [KCM-0317], [09H090], [KCM-A317] -- In water year 2009, 10 of 24 sample values (42%) showed an excursion of the % criterion for this waterbody (200 cfu/100mL). The geometric mean of 151.6 exceeds the geometric mean criterion (100 cfu/100mL).

Location ID: [KCM-0317], [09H090], [KCM-A317] -- In water year 2008, 0 of 12 sample values (0%) showed an excursion of the % criterion for this waterbody (200 cfu/100mL). The geometric mean of 74.2 does not exceed the geometric mean criterion (100 cfu/100mL).

Location ID: [KCM-0317], [09H090], [KCM-A317] -- In water year 2007, 7 of 12 sample values (58%) showed an excursion of the % criterion for this waterbody (200 cfu/100mL). The geometric mean of 277.2 exceeds the geometric mean criterion (100 cfu/100mL).

Location ID: [KCM-0317], [09H090], [KCM-A317] -- In water year 2006, 5 of 13 sample values (38%) showed an excursion of the % criterion for this waterbody (200 cfu/100mL). The geometric mean of 147.6 exceeds the geometric mean criterion (100 cfu/100mL).

Location ID: [KCM-0317], [09H090], [KCM-A317] -- In water year 2005, 5 of 13 sample values (38%) showed an excursion of the % criterion for this waterbody (200 cfu/100mL). The geometric mean of 211.3 exceeds the geometric mean criterion (100 cfu/100mL).

Location ID: [KCM-0317], [09H090], [KCM-A317] -- In water year 2004, 8 of 12 sample values (67%) showed an excursion of the % criterion for this waterbody (200 cfu/100mL). The geometric mean of 301.5 exceeds the geometric mean criterion (100 cfu/100mL).

King County unpublished data from station 317 (Springbrook Creek RM 1.0) show standards were not met each year in samples collected between 1998 and 2002.

Hallock (2001) Dept. of Ecology Ambient Monitoring Station 09H090 (Black R @ Renton) shows a geometric mean of 253 exceeds the criterion and that 62% of the samples exceeds the percentile criterion from 8 samples collected during 1994.

Hallock (2001) Dept. of Ecology Ambient Monitoring Station 09H090 (Black R @ Renton) shows a geometric mean of 324 exceeds the criterion and that 67% of the samples exceeds the percentile criterion from 3 samples collected during 1993.

Remarks

Impairment was determined by exceedance of the geometric mean criterion in water year(s) 2010, 2009, 2007, 2006, 2005, 2004 and calendar year(s) 1994 and 1993, and the percent criterion in water year(s) 2010, 2009, 2007, 2006, 2005, 2004 and calend
This listing contains E.coli data. E. coli is a subset of Fecal coliform bacteria therefore E.coli levels above the Fecal coliform standard can be used to infer an exceedance of this water quality standard.
Policy 1-11 was revised in July 2012 to specify that bacteria is assessed according to water year (Oct-Sept 30) from the previous assessment period of calendar year. the water water assessment is only applied to newly assessed data. Therefore, this listing contains data assessed by both water year and calendar year.
Changed from Category 4A to Category 5. This listing is in WRIA 9 and is not part of the Black River TMDL.
The GNIS name for this NHD reach is Black River but the station descriptions on the upper portion of the reach call it Springbrook Creek. There appears to be a change in the name partway down the NHD reach.
Combined Listing: Listing ID 13155 was rolled into this listing

Data Sources

Study Id	Location Id

AMS001E	09H090
KCstrm-1	KCM-0317

Map Link

[Map Link \(https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstd=12567\)](https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstd=12567)

Main Listing Information

Listing ID: 70141
Waterbody Name: BLACK RIVER
Medium: Other
Parameter: Bioassessment
WQI Project: None
Designated Use: None

Year	Category
2014	5
2012	3
2008	3
2004	3
1998	N
1996	N

Assessment Unit

Assessment Unit ID: 17110013000129 **County:** King

WRIA: 9 - Duwamish-Green

Basis Statement

Location ID [09BLA0675] was sampled by King County - the Benthic Index of Biotic Integrity (B-IBI) score was 18 in 2006, 18 in 2007, 24 in 2008, 24 in 2009, 22 in 2010

Remarks

The GNIS name for this NHD reach is Black River but the station descriptions on the upper portion of the reach call it Springbrook Creek. There appears to be a change in the name partway down the NHD reach.

The listing has been placed in Category 5 because the two most recent data points indicate that biological integrity is degraded or because two or more B-IBI/RIVPACS data points in the most recent five data points indicate biological degradation and the scores do not qualify for Category 1 or Category 2. A B-IBI score ≤ 27 and a RIVPACS score less than 0.73 indicates degraded biological integrity.

The listing has been reassessed under the current Policy 1-11 and has been moved from Category 3 to Category 5 based on new data.

The source of the benthic macroinvertebrate community data and associated B-IBI scores is the Puget Sound Stream Benthos database, which is maintained by King County.

Data Sources

No Source Records

Map Link

 [Map Link \(https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=70141\)](https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=70141)

Main Listing Information

Listing ID: 70143
Waterbody Name: HARRISON CREEK
Medium: Other
Parameter: Bioassessment
WQI Project: None
Designated Use: None

Year	Category
2014	5
2012	3
2008	3
2004	3
1998	N
1996	N

Assessment Unit

Assessment Unit ID: 17110013002284 **County:** King
WRIA: 9 - Duwamish-Green

Basis Statement

Location ID [09BLA0722] was sampled by King County - the Benthic Index of Biotic Integrity (B-IBI) score was 14 in 2006, 20 in 2007, 22 in 2008, 18 in 2009, 18 in 2010

Remarks

The listing has been placed in Category 5 because the two most recent data points indicate that biological integrity is degraded or because two or more B-IBI/RIVPACS data points in the most recent five data points indicate biological degradation and the scores do not qualify for Category 1 or Category 2. A B-IBI score ≤ 27 and a RIVPACS score less than 0.73 indicates degraded biological integrity.

The listing has been reassessed under the current Policy 1-11 and has been moved from Category 3 to Category 5 based on new data.

The source of the benthic macroinvertebrate community data and associated B-IBI scores is the Puget Sound Stream Benthos database, which is maintained by King County.

Data Sources

No Source Records

Map Link

 [Map Link \(https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=70143\)](https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=70143)

Main Listing Information

Listing ID: 70145

Waterbody Name: UNNAMED CREEK (TRIB TO SPRINGBROOK CREEK)

Medium: Other

Parameter: Bioassessment

WQI Project: None

Designated Use: None

Year	Category
2014	5
2012	3
2008	3
2004	3
1998	N
1996	N

Assessment Unit

Assessment Unit ID: 17110013007648 **County:** King

WRIA: 9 - Duwamish-Green

Basis Statement

Location ID [09BLA0771] was sampled by King County - the Benthic Index of Biotic Integrity (B-IBI) score was 24 in 2006, 24 in 2007, 30 in 2008, 28 in 2009, 26 in 2010

Remarks

The listing has been placed in Category 5 because the two most recent data points indicate that biological integrity is degraded or because two or more B-IBI/RIVPACS data points in the most recent five data points indicate biological degradation and the scores do not qualify for Category 1 or Category 2. A B-IBI score ≤ 27 and a RIVPACS score less than 0.73 indicates degraded biological integrity.

The listing has been reassessed under the current Policy 1-11 and has been moved from Category 3 to Category 5 based on new data.

The source of the benthic macroinvertebrate community data and associated B-IBI scores is the Puget Sound Stream Benthos database, which is maintained by King County.

Data Sources

No Source Records

Map Link

 [Map Link \(https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=70145\)](https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=70145)

Main Listing Information

Listing ID: 70146
Waterbody Name: UNNAMED CREEK (TRIB TO SPRINGBROOK CREEK)
Medium: Other
Parameter: Bioassessment
WQI Project: None
Designated Use: None

Year	Category
2014	5
2012	3
2008	3
2004	3
1998	N
1996	N

Assessment Unit

Assessment Unit ID: 17110013000468 **County:** King
WRIA: 9 - Duwamish-Green

Basis Statement

Location ID [09BLA0772] was sampled by King County - the Benthic Index of Biotic Integrity (B-IBI) score was 14 in 2006, 18 in 2007, 20 in 2008, 20 in 2009, 22 in 2010

Remarks

The listing has been placed in Category 5 because the two most recent data points indicate that biological integrity is degraded or because two or more B-IBI/RIVPACS data points in the most recent five data points indicate biological degradation and the scores do not qualify for Category 1 or Category 2. A B-IBI score ≤ 27 and a RIVPACS score less than 0.73 indicates degraded biological integrity.

The listing has been reassessed under the current Policy 1-11 and has been moved from Category 3 to Category 5 based on new data.

The source of the benthic macroinvertebrate community data and associated B-IBI scores is the Puget Sound Stream Benthos database, which is maintained by King County.

Data Sources

No Source Records

Map Link

 [Map Link \(https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=70146\)](https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=70146)

Main Listing Information

Listing ID: 70147
Waterbody Name: UNNAMED CREEK (TRIB TO SPRINGBROOK CREEK)
Medium: Other
Parameter: Bioassessment
WQI Project: None
Designated Use: None

Year	Category
2014	5
2012	3
2008	3
2004	3
1998	N
1996	N

Assessment Unit

Assessment Unit ID: 17110013007714 **County:** King
WRIA: 9 - Duwamish-Green

Basis Statement

Location ID [09BLA0813] was sampled by King County - the Benthic Index of Biotic Integrity (B-IBI) score was 14 in 2006, 14 in 2007, 18 in 2008, 16 in 2010

Remarks

The listing has been placed in Category 5 because the two most recent data points indicate that biological integrity is degraded or because two or more B-IBI/RIVPACS data points in the most recent five data points indicate biological degradation and the scores do not qualify for Category 1 or Category 2. A B-IBI score ≤ 27 and a RIVPACS score less than 0.73 indicates degraded biological integrity.

The listing has been reassessed under the current Policy 1-11 and has been moved from Category 3 to Category 5 based on new data.

The source of the benthic macroinvertebrate community data and associated B-IBI scores is the Puget Sound Stream Benthos database, which is maintained by King County.

Data Sources

No Source Records

Map Link

 [Map Link \(https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=70147\)](https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=70147)

Main Listing Information

Listing ID: 70148
Waterbody Name: ROLLING HILLS CREEK
Medium: Other
Parameter: Bioassessment
WQI Project: None
Designated Use: None

Year	Category
2014	5
2012	3
2008	3
2004	3
1998	N
1996	N

Assessment Unit

Assessment Unit ID: 17110013007619 **County:** King
WRIA: 9 - Duwamish-Green

Basis Statement

Location ID [09BLA0817] was sampled by King County - the Benthic Index of Biotic Integrity (B-IBI) score was 14 in 2006, 16 in 2007, 14 in 2008, 16 in 2009, 14 in 2010

Remarks

Public comment indicated that this is a tributary to Springbrook Creek in the Duwamish. The NHD line proceeds north and ends in downtown Renton, but the stream does not continue north to the Cedar River. Station 09BLA0817 is located at intersection of S 515 and Puget Drive.

The listing has been placed in Category 5 because the two most recent data points indicate that biological integrity is degraded or because two or more B-IBI/RIVPACS data points in the most recent five data points indicate biological degradation and the scores do not qualify for Category 1 or Category 2. A B-IBI score ≤ 27 and a RIVPACS score less than 0.73 indicates degraded biological integrity.

The listing has been reassessed under the current Policy 1-11 and has been moved from Category 3 to Category 5 based on new data.

The source of the benthic macroinvertebrate community data and associated B-IBI scores is the Puget Sound Stream Benthos database, which is maintained by King County.

Data Sources

No Source Records

Map Link

 [Map Link \(https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=70148\)](https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=70148)

Main Listing Information

Listing ID: 10678
Waterbody Name: BLACK RIVER
Medium: Water
Parameter: Dissolved Oxygen
WQI Project: None
Designated Use: None

Year	Category
2014	5
2012	2
2008	2
2004	2
1998	N
1996	N

Assessment Unit

Assessment Unit ID: 17110013000129 **County:** King

WRIA: 9 - Duwamish-Green

Basis Statement

Location ID: [KCM-0317] -- In 2010, 11 of 12 sample values (92%) showed an excursion of the criterion (8 mg/L) for this waterbody;

Location IDs: [KCM-0317], [09H090] -- In 2009, 18 of 21 sample values (86%) showed an excursion of the criterion (8 mg/L) for this waterbody;

Location IDs: [KCM-0317], [09H090] -- In 2008, 14 of 15 sample values (93%) showed an excursion of the criterion (8 mg/L) for this waterbody;

Location ID: [KCM-0317] -- In 2007, 11 of 12 sample values (92%) showed an excursion of the criterion (8 mg/L) for this waterbody;

Location ID: [KCM-0317] -- In 2006, 10 of 12 sample values (83%) showed an excursion of the criterion (8 mg/L) for this waterbody;

Location ID [KCM-0317] -- In 2005, 12 of 13 samples (92.3%) showed an excursion of the criterion for this waterbody, (criterion = 8.0 mg/L).

Location ID [KCM-0317] -- In 2004, 12 of 13 samples (92.3%) showed an excursion of the criterion for this waterbody, (criterion = 8.0 mg/L).

Hallock (2001) Dept. of Ecology Ambient Monitoring Station 09H090 (Black R @ Renton) shows 8 excursions beyond the criterion out of 11 samples collected between 1993 - 2001 measured on these dates: [93/10/20, 93/11/17, 93/12/21, 94/01/19, 94/04/20, 94/05/18, 94/06/22, 94/09/21

King County unpublished data from station 317 (Springbrook Creek RM 1.0) show excursions beyond the dissolved oxygen criterion in years 1998, 1999 2000, 2001 and 2002.

Remarks

Historic Remarks: This listing changed from Category 2 to Category 5 due to the inclusion of data from Listing ID 12705 during the conversion to NHD.

Ten percent or more of the samples collected in a single year were excursions of the criterion, and at least 3 excursions exist from all data considered.

The GNIS name for this NHD reach is Black River but the station descriptions on the upper portion of the reach call it Springbrook Creek. There appears to be a change in the name partway down the NHD reach.

Combined Listing: Listing IDs 12705, 47536 were rolled into this listing

Data Sources

Study Id	Location Id
AMS001E	09H090
KCstrm-1	KCM-0317
KCstrm-1	KCM-0317

Map Link

[Map Link \(https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=10678\)](https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=10678)

Main Listing Information

Listing ID: 7039
Waterbody Name: BLACK RIVER
Medium: Water
Parameter: Temperature
WQI Project: Green River Temperature Watershed
Designated Use: None

Year	Category
2014	4A
2012	2
2008	2
2004	2
1998	Y
1996	Y

Assessment Unit

Assessment Unit ID: 17110013000129 **County:** King
WRIA: 9 - Duwamish-Green

Basis Statement

Location ID: KCM-0317 -- In 2010, 0 of 12 sample values (0%) showed an excursion of the criteria (17.5°C) for this waterbody;

Location IDs: KCM-0317 / 09H090 -- In 2009, 3 of 21 sample values (14%) showed an excursion of the criteria (17.5°C) for this waterbody;

Location IDs: KCM-0317 / 09H090 -- In 2008, 1 of 18 sample values (6%) showed an excursion of the criteria (17.5°C) for this waterbody;

Location ID: KC_T_03G -- In 2008, between 1/1/2008 and 9/10/2008, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (17.5°C) on 48 of 247 days (19%); The maximum exceedance during this period was 19.18°C for the 7-day period centered on 8/17/2008 ;
 (External Data Source: King County Database)

Location ID: KCM-0317 -- In 2007, 1 of 12 sample values (8%) showed an excursion of the criteria (17.5°C) for this waterbody;

Location ID: KC_T_03G -- In 2007, between 1/5/2007 and 12/31/2007, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (17.5°C) on 21 of 314 days (7%); The maximum exceedance during this period was 19.16°C for the 7-day period centered on 7/13/2007 ;
 (External Data Source: King County Database)

Location ID: KCM-0317 -- In 2006, 0 of 12 sample values (0%) showed an excursion of the criteria (17.5°C) for this waterbody;

Location ID: KC_T_03G -- In 2006, between 1/1/2006 and 8/16/2006, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (17.5°C) on 18 of 228 days (8%); The maximum exceedance during this period was 19.06°C for the 7-day period centered on 7/24/2006 ;
 (External Data Source: King County Database)

Location IDs: KC_T_03G / KC_T_GRT18 -- In 2005, between 1/1/2005 and 12/31/2005, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (17.5°C) on 27 of 279 days (10%); The maximum exceedance during this period was 18.27°C for the 7-day period centered on 7/29/2005 ;
 (External Data Source: King County Database)

Location IDs: KC_T_03G / KC_T_GRT18 -- In 2004, between 1/1/2004 and 12/31/2004, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (17.5°C) on 80 of 366 days (22%); The maximum exceedance during this period was 22.53°C for the 7-day period centered on 7/26/2004 ;
 (External Data Source: King County Database)

Hallock (2001) Dept. of Ecology Ambient Monitoring Station 09H090 (Black R @ Renton) shows 1 excursions beyond the criterion out of 11 samples collected between 1993 - 2001 measured on these dates: 94/07/20,

King County unpublished data from station 317 (Springbrook Creek RM 1.0) show temperature criterion was exceeded in 1998 and 2000.

Remarks

The impairment determination is based on data showing an exceedance of the temperature criterion in years 2004 through 2009. As a result of merging of two stream reaches into a single assessment unit in 2014, this record was merged with the record formerly associated with the Listing ID 10677.

The TMDL set a load allocation downstream of the subject segment and requires implementation of the entire area to produce measured reductions that will allow the most downstream segment to meet the allocation. Therefore, this segment is associated with the TMDL load allocations and can be moved to Category 4A.

Part of the Green River Temperature TMDL

Combined Listing: Listing ID 10677 was rolled into this listing

Data Sources

Study Id	Location Id
AMS001E	09H090
KCstrm-1	KCM-0317

Map Link

 [Map Link \(https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=7039\)](https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=7039)

Main Listing Information

Listing ID: 72607
Waterbody Name: PANTHER CREEK
Medium: Water
Parameter: Temperature
WQI Project: Green River Temperature Watershed
Designated Use: None

Year	Category
2014	4A
2012	3
2008	3
2004	3
1998	N
1996	N

Assessment Unit

Assessment Unit ID: 17110013000468 **County:** King
WRIA: 9 - Duwamish-Green

Basis Statement

Location ID: KC_T_GRT34 -- In 2005, between 1/1/2005 and 4/3/2005, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (17.5°C) on 0 of 93 days (0%); (External Data Source: King County Database)

Location ID: KC_T_GRT34 -- In 2004, between 1/1/2004 and 12/31/2004, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (17.5°C) on 53 of 366 days (14%); The maximum exceedance during this period was 19.54°C for the 7-day period centered on 7/26/2004 ;
(External Data Source: King County Database)

Location ID: KC_T_GRT34 -- In 2003, between 1/1/2003 and 12/31/2003, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (17.5°C) on 56 of 365 days (15%); The maximum exceedance during this period was 19.11°C for the 7-day period centered on 8/19/2003 ;
(External Data Source: King County Database)

Location ID: KC_T_GRT34 -- In 2002, between 7/31/2002 and 12/31/2002, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (17.5°C) on 2 of 154 days (1%); The maximum exceedance during this period was 17.61°C for the 7-day period centered on 8/14/2002 ;
(External Data Source: King County Database)

Remarks

Data for 2002 and 2005 does not cover the core critical season for temperature. Maximum temperatures may be higher than observed data; The TMDL either set a load allocation for this segment, OR downstream of the subject segment and requires implementation of the entire area to produce measured reductions that will allow the most downstream segment to meet the allocation. Therefore, this segment can be moved to Category 4A.

The temperature impairment in this Assessment Unit is addressed by the Green River Temperature TMDL

Data Sources

No Source Records

Map Link

 [Map Link \(https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=72607\)](https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=72607)

Main Listing Information

Listing ID: 72608

Waterbody Name: SPRINGBROOK (MILL) CREEK

Medium: Water

Parameter: Temperature

WQI Project: Green River Temperature Watershed

Designated Use: None

Year	Category
2014	4A
2012	3
2008	3
2004	3
1998	N
1996	N

Assessment Unit

Assessment Unit ID: 17110013008361 **County:** King

WRIA: 9 - Duwamish-Green

Basis Statement

Location ID: KC_T_GRT33 -- In 2005, between 1/1/2005 and 4/3/2005, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (17.5°C) on 0 of 93 days (0%); (External Data Source: King County Database)

Location ID: KC_T_GRT33 -- In 2004, between 1/1/2004 and 12/31/2004, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (17.5°C) on 72 of 366 days (20%); The maximum exceedance during this period was 19.54°C for the 7-day period centered on 7/22/2004 ;
(External Data Source: King County Database)

Location ID: KC_T_GRT33 -- In 2003, between 1/1/2003 and 12/31/2003, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (17.5°C) on 62 of 365 days (17%); The maximum exceedance during this period was 19.47°C for the 7-day period centered on 7/21/2003 ;
(External Data Source: King County Database)

Location ID: KC_T_GRT33 -- In 2002, between 7/31/2002 and 12/31/2002, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (17.5°C) on 7 of 154 days (5%); The maximum exceedance during this period was 18.28°C for the 7-day period centered on 8/13/2002 ;
(External Data Source: King County Database)

Remarks

Data for 2002 and 2005 does not cover the core critical season for temperature. Maximum temperatures may be higher than observed data;

The temperature impairment in this Assessment Unit is addressed by the Green River Temperature TMDL

The TMDL either set a load allocation for this segment, OR downstream of the subject segment and requires implementation of the entire area to produce measured reductions that will allow the most downstream segment to meet the allocation. Therefore, this segment can be moved to Category 4A.

Data Sources

No Source Records

Map Link

 [Map Link \(https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstdid=72608\)](https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstdid=72608)

Main Listing Information

Listing ID: 70077

Waterbody Name: UNNAMED CREEK (TRIB TO CEDAR RIVER)

Medium: Other

Parameter: Bioassessment

WQI Project: None

Designated Use: None

Year	Category
2014	5
2012	3
2008	3
2004	3
1998	N
1996	N

Assessment Unit

Assessment Unit ID: 17110012001715 **County:** King

WRIA: 8 - Cedar-Sammamish

Basis Statement

Location ID [08CED2433] was sampled by King County - the Benthic Index of Biotic Integrity (B-IBI) score was 32 in 2006, 16 in 2007, 20 in 2008, 26 in 2009, 20 in 2010

Remarks

The listing has been placed in Category 5 because the two most recent data points indicate that biological integrity is degraded or because two or more B-IBI/RIVPACS data points in the most recent five data points indicate biological degradation and the scores do not qualify for Category 1 or Category 2. A B-IBI score ≤ 27 and a RIVPACS score less than 0.73 indicates degraded biological integrity.

The listing has been reassessed under the current Policy 1-11 and has been moved from Category 3 to Category 5 based on new data.

The source of the benthic macroinvertebrate community data and associated B-IBI scores is the Puget Sound Stream Benthos database, which is maintained by King County.

Data Sources

No Source Records

Map Link

 [Map Link \(https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=70077\)](https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=70077)

Main Listing Information

Listing ID: 70078
Waterbody Name: MOLASSES CREEK
Medium: Other
Parameter: Bioassessment
WQI Project: None
Designated Use: None

Year	Category
2014	5
2012	3
2008	3
2004	3
1998	N
1996	N

Assessment Unit

Assessment Unit ID: 17110012005166 **County:** King
WRIA: 8 - Cedar-Sammamish

Basis Statement

Location ID [08CED2518] was sampled by King County - the Benthic Index of Biotic Integrity (B-IBI) score was 24 in 2006, 24 in 2007, 26 in 2008, 34 in 2009, 28 in 2010

Remarks

The listing has been reassessed under the current Policy 1-11 and has been moved from Category 3 to Category 5 based on new data.

The listing has been placed in Category 5 because the two most recent data points indicate that biological integrity is degraded or because two or more B-IBI/RIVPACS data points in the most recent five data points indicate biological degradation and the scores do not qualify for Category 1 or Category 2. A B-IBI score ≤ 27 and a RIVPACS score less than 0.73 indicates degraded biological integrity.

The source of the benthic macroinvertebrate community data and associated B-IBI scores is the Puget Sound Stream Benthos database, which is maintained by King County.

Data Sources

No Source Records

Map Link

 [Map Link \(https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=70078\)](https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=70078)

Main Listing Information

Listing ID: 10654
Waterbody Name: CEDAR RIVER
Medium: Water
Parameter: Dissolved Oxygen
WQI Project: None
Designated Use: None

Year	Category
2014	5
2012	3
2008	3
2004	1
1998	N
1996	N

Assessment Unit

Assessment Unit ID: 17110012000024 **County:** King
WRIA: 8 - Cedar-Sammamish

Basis Statement

Location ID: [KCM-0438] -- In 2010, 0 of 12 sample values (0%) showed an excursion of the criterion (9.5 mg/L) for this waterbody;

Location IDs: [KCM-0438] [08C070] [KCM-X438] -- In 2009, 0 of 20 sample values (0%) showed an excursion of the criterion (9.5 mg/L) for this waterbody;

Location IDs: [KCM-X438] [08C070] -- In 2008, 1 of 24 sample values (4%) showed an excursion of the criterion (9.5 mg/L) for this waterbody;

Location IDs: [KCM-X438] [08C070] -- In 2007, 1 of 24 sample values (4%) showed an excursion of the criterion (9.5 mg/L) for this waterbody;

Location IDs: [KCM-X438] [08C070] -- In 2006, 0 of 24 sample values (0%) showed an excursion of the criterion (9.5 mg/L) for this waterbody;

Location ID [08C070] -- In 2005, 12 samples showed no excursions of the criterion for this waterbody, (criterion = 8.0 mg/L).
 Location ID [KCM-X438] -- In 2005, 4 of 13 sample values (30.8%) showed an excursion of the criterion for this waterbody, (criterion = 9.5 mg/L).

Location ID [08C070] -- In 2004, 12 samples showed no excursions of the criterion for this waterbody, (criterion = 8.0 mg/L).
 Location ID [KCM-X438] -- In 2004, 3 of 13 sample values (23.1%) showed an excursion of the criterion for this waterbody, (criterion = 9.5 mg/L).

Hallock (2001) Dept. of Ecology Ambient Monitoring Station 08C070 (CEDAR RIVER AT LOGAN ST/RENTON) shows 0 excursions beyond the criterion out of 60 samples collected between 1993 - 2001

King County unpublished data from station X438 (Cedar River RM 0.2) show excursions beyond the dissolved oxygen criterion in 2000 and 2001

Remarks

Historic Remarks: This listing changed from Category 3 to Category 5 due to the inclusion of data from Listing ID 12673 during the conversion to NHD.
Data from earlier years was compared to a different criteria because the assigned designated use for the waterbody segment was either incorrectly identified or updated in the 2006 standards revisions. Assessment against the current criteria does not change the impairment status of this waterbody.
Ten percent or more of the samples collected in a single year were excursions of the criterion, and at least 3 excursions exist from all data considered.
Data from earlier years was compared to a different criteria because the assigned designated use for the waterbody segment was either incorrectly identified or updated in the 2006 standards revisions. Assessment against the current criteria does not change the impairment status of this waterbody.
Historical Remarks: (public) This listing changed from Category 3 to Category 5 due to the inclusion of data from Listing ID 12673 during the conversion to NHD.
Category 5 based on ten percent or more of the samples collected in a single year were excursions of the criterion, and at least 3 excursions exist from all data considered.
Combined Listing: Listing IDs 47560, 47561, 12673 were rolled into this listing

Data Sources

Study Id	Location Id
AMS001	08C070
AMS001E	08C070
KCstrm-1	KCM-0438

Map Link

 [Map Link \(https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=10654\)](https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=10654)

Main Listing Information

Listing ID: 10655
Waterbody Name: CEDAR RIVER
Medium: Water
Parameter: pH
WQI Project: None
Designated Use: None

Year	Category
2014	5
2012	5
2008	5
2004	2
1998	N
1996	N

Assessment Unit

Assessment Unit ID: 17110012000024 **County:** King
WRIA: 8 - Cedar-Sammamish

Basis Statement

Location ID [KCM-0438], [08C070] -- In 2010, 1 of 24 sample values (4%) showed an excursion of the criteria for this waterbody;
 Location ID [KCM-0438], [08C070] -- In 2009, 2 of 22 sample values (9%) showed an excursion of the criteria for this waterbody;
 Location ID [KCM-X438], [08C070] -- In 2008, 1 of 27 sample values (4%) showed an excursion of the criteria for this waterbody;
 Location ID [KCM-X438], [08C070] -- In 2007, 1 of 24 sample values (4%) showed an excursion of the criteria for this waterbody;
 Location ID [KCM-X438], [08C070] -- In 2006, 0 of 24 sample values (0%) showed an excursion of the criteria for this waterbody;
 Location ID [KCM-X438] -- In 2006, 0 of 8 samples (0.0%) showed an excursion of the criteria for this waterbody.
 Location ID [KCM-X438] -- In 2005, 0 of 14 samples (0.0%) showed an excursion of the criteria for this waterbody.
 Location ID [08C070] -- In 2005, 1 of 12 samples (8.3%) showed an excursion of the criteria for this waterbody: 1 high pH excursion.
 Location ID [KCM-X438] -- In 2004, 1 of 13 samples (7.7%) showed an excursion of the criteria for this waterbody: 1 low pH excursion.
 Location ID [08C070] -- In 2004, 2 of 12 samples (16.7%) showed an excursion of the criteria for this waterbody: 2 high pH excursions.
 King County unpublished data from station X438 show 0 excursions beyond the criteria out of 80 all samples collected between 1998 and 2002.
 Hallock (2004), Dept. of Ecology ambient station 08C070 shows that 1 of 31 samples exceed the criterion.
 Hallock (2001) Dept. of Ecology Ambient Monitoring Station 08C070 (CEDAR RIVER AT LOGAN ST), [RENTON) shows 1 excursions beyond the criterion out of 59 samples collected between 1993 - 2001.

Remarks

High pH Excursions
The Category 5 designation is based on data from 2004, 2007, 2008, 2009, and 2010. An assessment unit is assigned a Category 5 designation for pH when at least three values in the dataset being considered do not meet the pH criteria and at least 10% of the values in a given year do not meet the criteria.
As a result of merging of stream assessment units in 2014, this record was merged with the record formerly associated with Listing ID 12630.
Combined Listing: Listing IDs 50844, 50843, 12630 were rolled into this listing

Data Sources

Study Id	Location Id
AMS001	08C070
AMS001-2	08C070
AMS001E	08C070
KCstrm-1	KCM-X438
KCstrm-1	KCM-X438
KCstrm-1	KCM-0438

Map Link

 [Map Link \(https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=10655\)](https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=10655)

Main Listing Information

Listing ID: 4816
Waterbody Name: CEDAR RIVER
Medium: Water
Parameter: Temperature
WQI Project: None
Designated Use: None

Year	Category
2014	5
2012	5
2008	5
2004	5
1998	N
1996	N

Assessment Unit

Assessment Unit ID: 17110012000024 **County:** King
WRIA: 8 - Cedar-Sammamish

Basis Statement

Location ID: KCM-0438 -- In 2010, 0 of 3 sample values (0%) showed an excursion of the criteria (16°C) for this waterbody;

{Supplemental Spawning Period}: Location ID: KCM-0438 -- In 2010, 0 of 9 sample values (0%) showed an excursion of the criteria (13°C) for this waterbody;

Location IDs: KCM-0438 / 08C070 / KCM-X438 -- In 2009, 3 of 13 sample values (23%) showed an excursion of the criteria (16°C) for this waterbody;

{Supplemental Spawning Period}: Location ID: KCM-0438 -- In 2009, 1 of 8 sample values (13%) showed an excursion of the criteria (13°C) for this waterbody;

Location IDs: KCM-X438 / 08C070 -- In 2008, 2 of 27 sample values (7%) showed an excursion of the criteria (16°C) for this waterbody;

Location ID: 08C070 -- In 2008, between 7/8/2008 and 9/30/2008, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (16°C) on 36 of 85 days (42%); The maximum exceedance during this period was 18.46°C for the 7-day period centered on 8/15/2008 ;

Location IDs: KCM-X438 / 08C070 -- In 2007, 1 of 24 sample values (4%) showed an excursion of the criteria (16°C) for this waterbody;

Location ID: 08C070 -- In 2007, between 7/23/2007 and 9/19/2007, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (16°C) on 48 of 59 days (81%); The maximum exceedance during this period was 18.77°C for the 7-day period centered on 8/2/2007 ;

Location IDs: KCM-X438 / 08C070 -- In 2006, 1 of 24 sample values (4%) showed an excursion of the criteria (16°C) for this waterbody;

Location ID: 08C070 -- In 2006, between 6/19/2006 and 9/15/2006, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (16°C) on 81 of 89 days (91%); The maximum exceedance during this period was 20.26°C for the 7-day period centered on 7/24/2006 ;

Location ID: 08C070 -- In 2005, between 7/18/2005 and 9/19/2005, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (16°C) on 48 of 64 days (75%); The maximum exceedance during this period was 19.7°C for the 7-day period centered on 8/6/2005 ;

Location ID: 08C070 -- In 2004, between 6/21/2004 and 9/30/2004, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (16°C) on 78 of 102 days (76%); The maximum exceedance during this period was 20.73°C for the 7-day period centered on 7/25/2004 ;

King County unpublished data from station X438 (Cedar River RM 0.2) show temperature criterion was exceeded in all years between 1998 and 2002.

Dept. of Ecology unpublished data from core ambient monitoring station 08C070 (Cedar R. at Logan St. Bridge) shows a 7-day mean of daily maximum values of 19.1 for mid-week 11 August 2001.

Hallock (2001) Dept. of Ecology Ambient Monitoring Station 08C070 (CEDAR RIVER AT LOGAN ST/RENTON) shows 1 excursions beyond the criterion out of 62 samples collected between 1993 - 2001

Remarks

Data for 2005 and 2007 does not cover the core critical season for temperature. Maximum temperatures may be higher than observed data;
As a result of merging of two stream reaches into a single assessment unit in 2014, this record was merged with the record formerly associated with the Listing ID 6573. This does not affect the existing Category 5 determination for this assessment unit.
The Core Summer Salmonid Habitat temperature criterion (16°C) applies to this assessment unit.
Supplemental Spawning Criterion (13°C) applies from Sept. 15 through June 15.
Combined Listing: Listing ID 6573 was rolled into this listing

Data Sources

Study Id	Location Id
AMS001E	08C070
AMS004	08C070
AMSXXX	08C070
KCstrm-1	KCM-0438
KCstrm-1	KCM-X438

Map Link

 [Map Link \(https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=4816\)](https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=4816)

Main Listing Information

Listing ID: 7475
Waterbody Name: DUWAMISH RIVER
Medium: Water
Parameter: pH
WQI Project: None
Designated Use: None

Year	Category
2014	5
2012	5
2008	5
2004	5
1998	Y
1996	Y

Assessment Unit

Assessment Unit ID: 17110013000013 **County:** King

WRIA: 9 - Duwamish-Green

Basis Statement

Location ID [DUWAMISH-PB] -- In 2010, 0 of 4 sample values (0%) showed an excursion of the criteria for this waterbody;

Location ID [DUWAMISH-PB] -- In 2009, 0 of 4 sample values (0%) showed an excursion of the criteria for this waterbody;

Location ID [KCM-0309] -- In 2008, 0 of 12 sample values (0%) showed an excursion of the criteria for this waterbody;

Location ID [KCM-0309] -- In 2007, 0 of 12 sample values (0%) showed an excursion of the criteria for this waterbody;

Location ID [KCM-0309], [09-GRE-COM] -- In 2006, 0 of 13 sample values (0%) showed an excursion of the criteria for this waterbody;

Location ID [KCM-0309] -- In 2005, 0 of 12 samples (0.0%) showed an excursion of the criteria for this waterbody.

Location ID [KCM-0309] -- In 2004, 0 of 11 samples (0.0%) showed an excursion of the criteria for this waterbody.

U.S.Geological Survey data from NWIS database station 12113390 (Duwamish R at Golf Course at Tukwila) shows 0 excursions beyond the criterion out of 71 samples collected between Jan. 1993 and Oct. 2000.

Muckleshoot Indian Tribal data (submitted by Karen Walter on March 1, 1996) show 5 excursions beyond the criterion out of 5 samples at Station 9 (Dairy Farm) during 1994 and 1995.

Remarks

The Category 5 designation is based on 1994 and 1995 data from the Muckleshoot Tribe. An assessment unit is assigned a Category 5 designation for pH when at least three values in the dataset being considered do not meet the pH criteria and at least 10% of the values in a given year do not meet the criteria.

As a result of merging of stream assessment units in 2014, this record was merged with the records formerly associated with Listing IDs 12649, 15498, and 51507.

Combined Listing: Listing IDs 51507, 15498, 12649 were rolled into this listing

Data Sources

Study Id	Location Id
KCStrm-1	KCM-0309
MROB003	09-GRE-COM
PbTrends09	DUWAMISH-PB
PbTrends10	DUWAMISH-PB

Map Link

 [Map Link \(https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=7475\)](https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=7475)

Main Listing Information

Listing ID: 7036
Waterbody Name: DUWAMISH RIVER
Medium: Water
Parameter: Temperature
WQI Project: None
Designated Use: None

Year	Category
2014	5
2012	2
2008	2
2004	2
1998	N
1996	Y

Assessment Unit

Assessment Unit ID: 17110013000013 **County:** King

WRIA: 9 - Duwamish-Green

Basis Statement

Location ID: DUWAMISH-PB -- In 2010, 0 of 4 sample values (0%) showed an excursion of the criteria (17.5°C) for this waterbody;

Location ID: DUWAMISH-PB -- In 2009, 0 of 4 sample values (0%) showed an excursion of the criteria (17.5°C) for this waterbody;

Location ID: KCM-0309 -- In 2008, 1 of 12 sample values (8%) showed an excursion of the criteria (17.5°C) for this waterbody;

Location ID: KCM-0309 -- In 2007, 1 of 12 sample values (8%) showed an excursion of the criteria (17.5°C) for this waterbody;

Location ID [09-GRE-COM] -- between 7/21/2006 and 9/5/2006 there were 5 occurrences in which the 7-day mean of daily maximum values (7DADmax) exceeded the temperature criterion for this waterbody, (criterion = 21.0°C); the maximum exceedance during this period was 23.14°C for the 7-day period ending July 28, 2006.

Location IDs: KCM-0309 / 09-GRE-COM -- In 2006, 3 of 13 sample values (23%) showed an excursion of the criteria (17.5°C) for this waterbody;

Location ID: 09-GRE-COM -- In 2006, between 7/21/2006 and 9/5/2006, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (17.5°C) on 41 of 47 days (87%); The maximum exceedance during this period was 23.14°C for the 7-day period centered on 7/25/2006 ;

King County unpublished data from station 309 (Green River RM 7.0) show temperature criterion was exceeded in 1998 and 2000.

U.S.Geological Survey data from NWIS database station 12113390 (Duwamish R at Golf Course at Tukwila) shows 1 excursions beyond the criterion out of 71 samples collected between 01/93 - 10/00.

Remarks

As a result of merging two stream reaches into a single assessment unit in 2014, this Listing has changed from Category 2 to Category 5 due to the inclusion of data formerly associated with Listing IDs 15499 and 48618.

Data for 2006 does not cover the core critical season for temperature. Maximum temperatures may be higher than observed data; ;

Combined Listing: Listing IDs 48618, 15499 were rolled into this listing

Data Sources

Study Id	Location Id
KCstrm-1	KCM-0309
MROB003	09-GRE-COM
MROB003	09-GRE-COM
PbTrends09	DUWAMISH-PB
PbTrends10	DUWAMISH-PB

Map Link

 [Map Link \(https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=7036\)](https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=7036)

Main Listing Information

Listing ID: 12193
Waterbody Name: WASHINGTON LAKE
Medium: Water
Parameter: Bacteria
WQI Project: None
Designated Use: None

Year	Category
2014	5
2012	5
2008	5
2004	5
1998	Y
1996	N

Assessment Unit

Assessment Unit ID: 47122F2A0 **County:** King
WRIA: 8 - Cedar-Sammamish

Basis Statement

King County unpublished data from station 0828SB show a geometric mean of 220 cfu/100mL with 53% exceeding the percentile criterion during 1998. King County unpublished data from station 0828SB show a geometric mean of 82 cfu/100mL with 35% exceeding the percentile criterion during 1999. King County unpublished data from station 0828SB show a geometric mean of 94 cfu/100mL with 56% exceeding the percentile criterion during 2000. King County unpublished data from station 0828SB show a geometric mean of 31 cfu/100mL with 20% exceeding the percentile criterion during 2001. King County unpublished data from station 0828SB show a geometric mean of 105 cfu/100mL with 50% exceeding the percentile criterion during 2002.

Remarks

No Remarks Entered

Data Sources

No Source Records

Map Link

 [Map Link \(https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=12193\)](https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=12193)

Main Listing Information

Listing ID: 74338
Waterbody Name: JOHNS CREEK
Medium: Water
Parameter: Bacteria
WQI Project: None
Designated Use: None

Year	Category
2014	5
2012	3
2008	3
2004	3
1998	N
1996	N

Assessment Unit

Assessment Unit ID: 17110012001528 **County:** King
WRIA: 8 - Cedar-Sammamish

Basis Statement

Location ID: [08N070] -- In water year 2009, 5 of 12 sample values (42%) showed an excursion of the % criterion for this waterbody (100 cfu/100mL). The geometric mean of 106.7 exceeds the geometric mean criterion (50 cfu/100mL).

Remarks

Impairment was determined by exceedance of the geometric mean criterion in water year(s)2009, and the percent criterion in water year(s) 2009.

Data Sources

Study Id	Location Id
AMS001E	08N070

Map Link

 [Map Link \(https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?!stid=74338\)](https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?!stid=74338)

Main Listing Information

Listing ID: 70140
Waterbody Name: UNNAMED CREEK (TRIB TO LAKE WASHINGTON)
Medium: Other
Parameter: Bioassessment
WQI Project: None
Designated Use: None

Year	Category
2014	5
2012	3
2008	3
2004	3
1998	N
1996	N

Assessment Unit

Assessment Unit ID: 17110012006025 **County:** King

WRIA: 8 - Cedar-Sammamish

Basis Statement

Location ID [08WES1579] was sampled by King County - the Benthic Index of Biotic Integrity (B-IBI) score was 16 in 2006, 12 in 2007, 12 in 2008, 12 in 2009, 12 in 2010

Remarks

The listing has been reassessed under the current Policy 1-11 and has been moved from Category 3 to Category 5 based on new data.

The listing has been placed in Category 5 because the two most recent data points indicate that biological integrity is degraded or because two or more B-IBI/RIVPACS data points in the most recent five data points indicate biological degradation and the scores do not qualify for Category 1 or Category 2. A B-IBI score ≤ 27 and a RIVPACS score less than 0.73 indicates degraded biological integrity.

The source of the benthic macroinvertebrate community data and associated B-IBI scores is the Puget Sound Stream Benthos database, which is maintained by King County.

Data Sources

No Source Records

Map Link

 [Map Link \(https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=70140\)](https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=70140)

Main Listing Information

Listing ID: 78045
Waterbody Name: JOHNS CREEK
Medium: Water
Parameter: Dissolved Oxygen
WQI Project: None
Designated Use: None

Year	Category
2014	5
2012	3
2008	3
2004	3
1998	N
1996	N

Assessment Unit

Assessment Unit ID: 17110012001528 **County:** King

WRIA: 8 - Cedar-Sammamish

Basis Statement

Location ID: [08N070] -- In 2009, 7 of 9 sample values (78%) showed an excursion of the criterion (9.5 mg/L) for this waterbody;

Location ID: [08N070] -- In 2008, 2 of 3 sample values (67%) showed an excursion of the criterion (9.5 mg/L) for this waterbody;

Remarks

Ten percent or more of the samples collected in a single year were excursions of the criterion, and at least 3 excursions exist from all data considered.

Data Sources

Study Id	Location Id
AMS001E	08N070

Map Link

 [Map Link \(https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=78045\)](https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=78045)

Main Listing Information

Listing ID: 500009
Waterbody Name: WASHINGTON LAKE
Medium: Sediment
Parameter: Sediment Bioassay
WQI Project: None
Designated Use: None
Collection Date: 6/1/2001

Year	Category
2014	5
2012	5
2008	5
2004	2
1998	N
1996	N

Assessment Unit

Assessment Unit ID: 47122F2D0_SW **County:** King
WRIA: 8 - Cedar-Sammamish

Basis Statement

Data from the Department of Ecology SEDQUAL information system stations
H=QUEDAL00*9*SD0011*6/1/2001
M=QUEDAL00*7*SD0007*5/31/2001
L=QUEDAL00*8*SD0008*5/31/2001
indicate a total of 5 points for 3 samples collected on or before June 01 2001
exceed the Sediment Management Standards CSL bioassay criterion.

Remarks

No Remarks Entered

Data Sources

No Source Records

Map Link

 [Map Link \(https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=500009\)](https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=500009)

Main Listing Information

Listing ID: 73156
Waterbody Name: JOHNS CREEK
Medium: Water
Parameter: Temperature
WQI Project: None
Designated Use: None

Year	Category
2014	5
2012	3
2008	3
2004	3
1998	N
1996	N

Assessment Unit

Assessment Unit ID: 17110012001528 **County:** King

WRIA: 8 - Cedar-Sammamish

Basis Statement

Location ID: 08N070 -- In 2009, 4 of 9 sample values (44%) showed an excursion of the criteria (16°C) for this waterbody;

Location ID: 08N070 -- In 2008, 0 of 3 sample values (0%) showed an excursion of the criteria (16°C) for this waterbody;

Remarks

No Remarks Entered

Data Sources

Study Id	Location Id
AMS001E	08N070

Map Link

 [Map Link \(https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstdid=73156\)](https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstdid=73156)

Main Listing Information

Listing ID: 13124
Waterbody Name: MAY CREEK
Medium: Water
Parameter: Bacteria
WQI Project: None
Designated Use: None

Year	Category
2014	5
2012	5
2008	5
2004	5
1998	Y
1996	Y

Assessment Unit

Assessment Unit ID: 17110012000228 **County:** King
WRIA: 8 - Cedar-Sammamish

Basis Statement

Location ID: [KCM-0440] -- In water year 2010, 3 of 12 sample values (25%) showed an excursion of the % criterion for this waterbody (100 cfu/100mL). The geometric mean of 47.5 does not exceed the geometric mean criterion (50 cfu/100mL).

Location ID: [KCM-0440] -- In water year 2009, 3 of 12 sample values (25%) showed an excursion of the % criterion for this waterbody (100 cfu/100mL). The geometric mean of 50.9 exceeds the geometric mean criterion (50 cfu/100mL).

Location ID: [KCM-0440] -- In water year 2008, 3 of 12 sample values (25%) showed an excursion of the % criterion for this waterbody (100 cfu/100mL). The geometric mean of 42 does not exceed the geometric mean criterion (50 cfu/100mL).

Location ID: [KCM-0440] -- In water year 2007, 7 of 12 sample values (58%) showed an excursion of the % criterion for this waterbody (100 cfu/100mL). The geometric mean of 113.7 exceeds the geometric mean criterion (50 cfu/100mL).

Location ID: [KCM-0440] -- In water year 2006, 7 of 13 sample values (54%) showed an excursion of the % criterion for this waterbody (100 cfu/100mL). The geometric mean of 77.8 exceeds the geometric mean criterion (50 cfu/100mL).

Location ID: [KCM-0440] -- In water year 2005, 5 of 13 sample values (38%) showed an excursion of the % criterion for this waterbody (100 cfu/100mL). The geometric mean of 91.5 exceeds the geometric mean criterion (50 cfu/100mL).

Location ID: [KCM-0440] -- In water year 2004, 7 of 10 sample values (70%) showed an excursion of the % criterion for this waterbody (100 cfu/100mL). The geometric mean of 114 exceeds the geometric mean criterion (50 cfu/100mL).

King County unpublished data from station 440 (May Creek RM 0.2) show standards were not met each year in samples collected between 1998 and 2002.

Remarks

This listing contains E.coli data. E. coli is a subset of Fecal coliform bacteria therefore E.coli levels above the Fecal coliform standard can be used to infer an exceedance of this water quality standard.

Policy 1-11 was revised in July 2012 to specify that bacteria is assessed according to water year (Oct 1-Sept 30) from the previous assessment period of calendar year. The water year assessment is only applied to newly assessed data. Therefore, this listing contains data assessed by both water year and calendar year.

Impairment was determined by exceedance of the geometric mean criterion in water year(s)2007, 2004, and the percent criterion in water year(s)2010, 2009, 2008, 2007, 2006, 2005, 2004.

Data Sources

Study Id	Location Id
KCstrm-1	KCM-0440
KCstrm-1	KCM-0440

Map Link

 [Map Link \(https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=13124\)](https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=13124)

Main Listing Information

Listing ID: 70087
Waterbody Name: MAY CREEK
Medium: Other
Parameter: Bioassessment
WQI Project: None
Designated Use: None

Year	Category
2014	5
2012	3
2008	3
2004	3
1998	N
1996	N

Assessment Unit

Assessment Unit ID: 17110012000228 **County:** King
WRIA: 8 - Cedar-Sammamish

Basis Statement

Location ID [08EAS1964] was sampled by King County - the Benthic Index of Biotic Integrity (B-IBI) score was 26 in 2006, 22 in 2007, 28 in 2008, 28 in 2009, 30 in 2010;
Location ID [08EAS2058] was sampled by King County - the Benthic Index of Biotic Integrity (B-IBI) score was 30 in 2006, 34 in 2007, 28 in 2008, 28 in 2009, 28 in 2010

Remarks

The listing has been reassessed under the current Policy 1-11 and has been moved from Category 3 to Category 5 based on new data.
Category 5 listing based upon the lowest scores from 2006 and 2007.
The listing has been placed in Category 5 because the two most recent data points indicate that biological integrity is degraded or because two or more B-IBI/RIVPACS data points in the most recent five data points indicate biological degradation and the scores do not qualify for Category 1 or Category 2. A B-IBI score ≤ 27 and a RIVPACS score less than 0.73 indicates degraded biological integrity. A data point is the lowest bioassessment score observed for a given year.
The source of the benthic macroinvertebrate community data and associated B-IBI scores is the Puget Sound Stream Benthos database, which is maintained by King County.

Data Sources

No Source Records

Map Link

 [Map Link \(https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=70087\)](https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=70087)

Main Listing Information

Listing ID: 4818
Waterbody Name: MAY CREEK
Medium: Water
Parameter: Temperature
WQI Project: None
Designated Use: None

Year	Category
2014	5
2012	3
2008	3
2004	1
1998	N
1996	N

Assessment Unit

Assessment Unit ID: 17110012000228 **County:** King
WRIA: 8 - Cedar-Sammamish

Basis Statement

Location ID: KC_T_37a -- In 2010, between 3/26/2010 and 12/31/2010, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (16°C) on 13 of 281 days (5%); The maximum exceedance during this period was 16.83°C for the 7-day period centered on 8/14/2010 ; (External Data Source: King County Database)

Location ID: KC_T_37a -- In 2008, between 1/1/2008 and 10/24/2008, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (16°C) on 20 of 298 days (7%); The maximum exceedance during this period was 16.94°C for the 7-day period centered on 8/17/2008 ; (External Data Source: King County Database)

Location ID: KC_T_37a -- In 2007, between 1/1/2007 and 12/31/2007, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (16°C) on 24 of 365 days (7%); The maximum exceedance during this period was 17.21°C for the 7-day period centered on 7/12/2007 ; (External Data Source: King County Database)

Location ID: KC_T_37a -- In 2006, between 7/21/2006 and 12/31/2006, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (16°C) on 6 of 164 days (4%); The maximum exceedance during this period was 17.96°C for the 7-day period centered on 7/24/2006 ; (External Data Source: King County Database)

Location ID: KC_T_37a -- In 2005, between 1/1/2005 and 10/19/2005, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (16°C) on 26 of 292 days (9%); The maximum exceedance during this period was 16.81°C for the 7-day period centered on 7/28/2005 ; (External Data Source: King County Database)

King County unpublished data from station 440 (May Creek RM 0.2) show temperature criterion was met in all years between 1998 and 2002.

Remarks

Unknown if critical temporal period adequately captured to conclude non-impairment based on WQP Policy 1-11. -mh
There is insufficient data to meet minimum requirements according to Policy 1-11.
Historical Remarks: There is insufficient data to meet minimum requirements according to Policy 1-11. Unknown if critical temporal period adequately captured to conclude non-impairment based on WQP Policy 1-11. -mh
Data for 2006 does not cover the core critical season for temperature. Maximum temperatures may be higher than observed data;

Data Sources

Study Id	Location Id
KCstrm-1	KCM-0440

Map Link

 [Map Link \(https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstdid=4818\)](https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstdid=4818)

Main Listing Information

Listing ID: 7445
Waterbody Name: MAY CREEK
Medium: Water
Parameter: Temperature
WQI Project: None
Designated Use: None

Year	Category
2014	5
2012	2
2008	2
2004	2
1998	Y
1996	Y

Assessment Unit

Assessment Unit ID: 17110012000239 **County:** King

WRIA: 8 - Cedar-Sammamish

Basis Statement

Location ID: KC_T_37G -- In 2010, between 1/1/2010 and 12/31/2010, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (16°C) on 49 of 365 days (13%); The maximum exceedance during this period was 19°C for the 7-day period centered on 8/15/2010 ;
 {Supplemental Spawning Period}: Location ID: KC_T_37b -- In 2010, during the supplemental criteria period, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (13°C) on 0 of 135 days (0%); ; (External Data Source: King County Database)

Location ID: KC_T_37G -- In 2009, between 2/26/2009 and 12/31/2009, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (16°C) on 95 of 309 days (31%); The maximum exceedance during this period was 23.41°C for the 7-day period centered on 7/29/2009 ;
 {Supplemental Spawning Period}: Location ID: KC_T_37b -- In 2009, during the supplemental criteria period, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (13°C) on 8 of 216 days (4%); The maximum exceedance during this period was 14.2°C for the 7-day period centered on 9/18/2009 ; (External Data Source: King County Database)

Location ID: KC_T_37b -- In 2008, between 5/16/2008 and 9/14/2008, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (16°C) on 22 of 122 days (18%); The maximum exceedance during this period was 17.61°C for the 7-day period centered on 8/16/2008 ;
 {Supplemental Spawning Period}: Location ID: KC_T_37b -- In 2008, during the supplemental criteria period, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (13°C) on 2 of 244 days (1%); The maximum exceedance during this period was 13.37°C for the 7-day period centered on 9/18/2008 ; (External Data Source: King County Database)

Location ID: KC_T_37b -- In 2007, between 5/16/2007 and 9/14/2007, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (16°C) on 15 of 122 days (12%); The maximum exceedance during this period was 17.33°C for the 7-day period centered on 7/13/2007 ;
 {Supplemental Spawning Period}: Location ID: KC_T_37b -- In 2007, during the supplemental criteria period, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (13°C) on 5 of 243 days (2%); The maximum exceedance during this period was 13.24°C for the 7-day period centered on 5/10/2007 ; (External Data Source: King County Database)

Location ID: KC_T_37E -- In 2006, between 1/1/2006 and 10/23/2006, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (16°C) on 71 of 296 days (24%); The maximum exceedance during this period was 19.51°C for the 7-day period centered on 7/25/2006 ;
 {Supplemental Spawning Period}: Location ID: KC_T_37b -- In 2006, during the supplemental criteria period, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (13°C) on 8 of 243 days (3%); The maximum exceedance during this period was 13.39°C for the 7-day period centered on 9/27/2006 ; (External Data Source: King County Database)

King County Surface Water Management (1995) shows 2 excursions beyond the criterion at the confluence with the North Fork on 7/8/94 and 7/29/94.
 King County Surface Water Management (1995) shows 2 excursions beyond the criterion at the station a 164th Ave SE on 7/8/94 and 7/29/94;

Remarks

The daily maximum excursions are for one year only and do not meet the WQ Program Policy 1-11 (updated 9/02) for showing persistent temperature impairment. Listing will be placed in waters of concern category until further study and monitoring indicates the status of the water.

Historical Remarks: The daily maximum excursions are for one year only and do not meet the WQ Program Policy 1-11 (updated 9/02) for showing persistent temperature impairment. Listing will be placed in waters of concern category until further study and monitoring indicates the status of the water.

Supplemental Criteria apply from Sep 15 - May 15

Combined Listing: Listing ID 15764 was rolled into this listing

Data Sources

Study Id	Location Id
AJOH0028	UPPERMAY

Map Link

 [Map Link \(https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstdid=7445\)](https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstdid=7445)

Main Listing Information

Listing ID: 72574

Waterbody Name: UNNAMED CREEK (TRIB TO UPPER MAY CREEK)

Medium: Water

Parameter: Temperature

WQI Project: None

Designated Use: None

Year	Category
2014	5
2012	3
2008	3
2004	3
1998	N
1996	N

Assessment Unit

Assessment Unit ID: 17110012001481 **County:** King

WRIA: 8 - Cedar-Sammamish

Basis Statement

Location ID: KC_T_37f -- In 2007, between 1/9/2007 and 9/30/2007, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (16°C) on 122 of 251 days (49%); The maximum exceedance during this period was 23.16°C for the 7-day period centered on 7/4/2007 ; (External Data Source: King County Database)

Location ID: KC_T_37f -- In 2006, between 1/1/2006 and 10/20/2006, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (16°C) on 153 of 293 days (52%); The maximum exceedance during this period was 23.02°C for the 7-day period centered on 7/26/2006 ; (External Data Source: King County Database)

Location ID: KC_T_37f -- In 2005, between 1/1/2005 and 12/31/2005, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (16°C) on 144 of 363 days (40%); The maximum exceedance during this period was 23.06°C for the 7-day period centered on 7/29/2005 ; (External Data Source: King County Database)

Location ID: KC_T_37f -- In 2004, between 5/5/2004 and 12/31/2004, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (16°C) on 138 of 241 days (57%); The maximum exceedance during this period was 21.61°C for the 7-day period centered on 8/29/2004 ; (External Data Source: King County Database)

Location ID: KC_T_37f -- In 2003, between 1/1/2003 and 12/23/2003, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (16°C) on 40 of 357 days (11%); The maximum exceedance during this period was 17.99°C for the 7-day period centered on 6/27/2003 ; (External Data Source: King County Database)

Remarks

FLAG! Review core critical season for 2007 for complete dataset; FLAG! Review core critical season for 2005 for complete dataset;

Data Sources

No Source Records

Map Link

 [Map Link \(https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=72574\)](https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=72574)

Main Listing Information

Listing ID: 15870
Waterbody Name: BIG SOOS CREEK
Medium: Water
Parameter: Bacteria
WQI Project: None
Designated Use: None

Year	Category
2014	5
2012	5
2008	5
2004	5
1998	Y
1996	N

Assessment Unit

Assessment Unit ID: 17110013000102 **County:** King
WRIA: 9 - Duwamish-Green

Basis Statement

King County unpublished data from station L320 (Soos Creek RM 10.5) show excursions beyond the geometric mean criterion in 1996.

Remarks

Name was SOOS CREEK SYSTEM on 1998 list. -kk

Data Sources

No Source Records

Map Link

 [Map Link \(https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=15870\)](https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=15870)

Main Listing Information

Listing ID: 15866
Waterbody Name: BIG SOOS CREEK
Medium: Water
Parameter: Dissolved Oxygen
WQI Project: None
Designated Use: None

Year	Category
2014	5
2012	5
2008	5
2004	5
1998	Y
1996	Y

Assessment Unit

Assessment Unit ID: 17110013000102 **County:** King
WRIA: 9 - Duwamish-Green

Basis Statement

King County unpublished data from station L320 (Soos Creek RM 10.5) show excursions beyond the criterion each year between 1993 and 1997.
King County unpublished data from station M320 (Soos Creek RM 10.0) show excursions beyond the criterion in 1993, 1994, 1995 and 1996.

Remarks

Combined Listing: Listing ID 15867 was rolled into this listing

Data Sources

No Source Records

Map Link

 [Map Link \(https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstd=15866\)](https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstd=15866)

TMDL

The following links have been provided for the known TMDLs that have been identified as part of the Receiving Water Assessment:

Duwamish River Basin:

[Duwamish Waterway and River Ammonia-Nitrogen Total Maximum Daily Load](#)

Black River Basin:

[Green River Temperature TMDL Water Quality Improvement Report: Combined Report Template](#)

Soos Creek Basin:

[Soos Creek Multi-Parameter TMDL - Washington State Department of Ecology](#)

BIOLOGIC INTEGRITY (B-IBI)

The table below describes the biological condition for identified overall score ranges as they were applied to the water quality analysis. For the purpose of this analysis, the classification of no data was added to identify areas within a basin that lack sufficient data to provide a score

Table A-6. Range Definitions for Biological Condition Scores

Overall Score Range	Biological Condition	Description
[80, 100]	Excellent	Comparable to least disturbed reference condition. High overall diversity in taxa (mayflies, caddisflies, stoneflies, long-lived, clingers, and intolerant species specifically measured), high relative abundance of predators.
[60, 80)	Good	Diverges slightly from least disturbed condition. Absence of some long-lived and intolerant species; noticeable decline in mayflies, stoneflies, and caddisflies; the proportion of tolerant taxa is greater than the Excellent condition.
[40, 60)	Fair	Overall taxa richness is reduced, especially intolerant, long-lived, stonefly, and clinger species. The proportion of tolerant taxa is greater than the Good condition. Relative abundance of predator taxa is lower than the Good condition.
[20, 40)	Poor	Overall taxa diversity has declined. The proportion of predators and long-lived species has greatly reduced. Few stoneflies and intolerant species identified. The three most abundant taxa are shown to be dominant.
[0, 20)	Very Poor	Overall taxa diversity is very low and dominated by a few highly tolerant taxa. Mayfly, stonefly, caddisfly, clinger, long-lived, and intolerant taxa are largely absent. The relative abundance of predators is very low.

Source: King County 2021

Attachment A3

Puget Sound Stream Benthos



Puget Sound Stream Benthos

Row	Site Code, Location	Year, Project	Quantities										Scores												
			Taxa Richness	Ephemeroptera Richness	Plecoptera Richness	Trichoptera Richness	EPT Richness	Clinger Richness	Long-Lived Richness	Intolerant Richness	Percent Dominant	Predator Percent	Tolerant Percent	Organisms	Overall Score	Taxa Richness	Ephemeroptera Richness	Plecoptera Richness	Trichoptera Richness	Clinger Richness	Long-Lived Richness	Intolerant Richness	Percent Dominant	Predator Percent	Tolerant Percent
1	09BLA0771, Panther Creek (Black River)	2020, Ambient Monitoring	32	2	3	3	8	7	4	0	1	0	0	500	18.1	1.7	1.4	2.9	2.5	0.0	2.5	0.0	0.6	2.5	4.0
2	09BLA0772, Panther Creek (Black River)	2020, Ambient Monitoring	30	2	3	3	8	9	6	0	1	0	0	500	22.4	1.0	1.4	2.9	2.5	1.2	5.0	0.0	0.0	8.3	0.1
3	09BLA0813, Panther Creek (Black River) tributary	2011, Ambient Monitoring	10	1	2	1	4	1	0	0	1	0	0	182	10.6	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.1	9.1
4	09BLA0817, Springbrook Creek tributary (0006B)	2020, Ambient Monitoring	29	1	1	0	2	5	2	0	1	0	0	500	5.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0	2.1
5	RSM06600-025331, 47.486077, -122.209401	2015, Regional Stormwater Monitoring Program Puget Lowland Ecoregion Streams	26	1	4	3	8	10	5	0	1	0	0	158	31.8	0.0	0.0	4.3	2.5	1.8	3.8	0.0	0.4	10.0	9.1
6	09BLA0768, Springbrook Creek (Black River)	2020, Ambient Monitoring	39	1	4	5	10	11	6	0	1	0	0	500	41.0	4.1	0.0	4.3	5.0	2.4	5.0	0.0	2.2	10.0	8.0
7	08WES1579, Lake Washington tributary	2021, Ambient Monitoring	23	1	1	0	2	3	2	0	1	0	0	500	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	0.0	2.9
8	CED_LOGANRD, Cedar River	2013, Rivers	55	8	5	7	20	27	7	2	0	0	0	500	73.6	9.7	10.0	5.7	7.5	10.0	6.2	2.9	9.6	2.4	9.6
9	CED_RM1.7, Cedar River	2013, Rivers	59	8	4	6	18	27	5	2	0	0	0	500	68.1	10.0	10.0	4.3	6.2	10.0	3.8	2.9	9.6	1.9	9.4
10	WAM06600-008099, Cedar River	2013, WatershedHealth_WAM0	65	14	4	6	24	32	6	3	0	0	0	500	74.6	10.0	10.0	4.3	6.2	10.0	5.0	4.3	10.0	4.9	9.9
11	08CED2433, Maplewood Creek	2020, Ambient Monitoring	28	2	5	5	12	10	5	1	1	0	1	500	23.1	0.3	1.4	5.7	5.0	1.8	3.8	1.4	0.0	3.7	0.0
12	CED_149, Cedar River	2013, Rivers	52	8	6	4	18	24	7	4	0	0	0	500	67.9	8.6	10.0	7.1	3.8	10.0	6.2	5.7	6.1	1.0	9.4
13	Stewart Lower, Cedar River - Lower tributary (0307)	2014, CIP Support	44	3	4	6	13	14	6	2	0	0	0	500	57.0	5.9	2.9	4.3	6.2	4.1	5.0	2.9	9.4	10.0	6.5
14	Stewart Upper, Cedar River - Lower tributary (0307)	2014, CIP Support	39	5	5	7	17	14	5	2	0	0	0	253	56.9	4.1	5.7	5.7	7.5	4.1	3.8	2.9	8.6	7.2	7.3
15	Stewart Background, Cedar River - Lower tributary (0307)	2014, CIP Support	44	1	6	6	13	11	6	0	0	0	0	281	51.6	5.9	0.0	7.1	6.2	2.4	5.0	0.0	9.6	10.0	5.4
16	08CED2898, Cedar River - Lower tributary (0311)	2021, Ambient Monitoring	51	3	5	4	12	11	6	1	0	0	0	500	54.3	8.3	2.9	5.7	3.8	2.4	5.0	1.4	10.0	8.7	6.2
17	Cedar09, Madsen Creek	2002, KC Historical	20	2	2	4	8	5	3	0	1	0	0	500	22.3	1.9	1.4	1.4	3.8	0.0	1.2	0.0	4.6	1.0	6.9
18	08CED2711, Madsen Creek	2020, Ambient Monitoring	26	3	3	3	9	9	4	0	1	0	1	500	14.1	0.0	2.9	2.9	2.5	1.2	2.5	0.0	0.0	2.2	0.0
19	cedar10, Madsen Creek	2000, KC Historical	17	2	1	0	3	5	4	0	1	0	0	207	13.7	0.5	1.4	0.0	0.0	0.0	2.5	0.0	2.1	0.0	7.2
20	WAM06600-092899, Madsen Creek	2013, WRIA08_WS_Survey	26	1	5	4	10	12	5	0	1	0	0	499	38.7	2.6	0.0	5.7	3.8	3.1	3.8	0.0	6.7	9.5	3.5
21	E725, Cedar River - Lower tributary (0306)	2010, ESA Water Quality	12	2	2	0	4	3	1	1	1	0	0	76	16.4	0.0	1.4	1.4	0.0	0.0	0.0	1.4	4.6	0.0	7.6
22	08CED2518, Molasses Creek	2020, Ambient Monitoring	37	1	5	3	9	14	8	0	0	0	0	498	49.3	3.4	0.0	5.7	2.5	4.1	7.5	0.0	6.4	10.0	9.7
23	CED_RIVERSIDE, Cedar River	2013, Rivers	57	8	5	6	19	29	7	4	0	0	0	500	72.7	10.0	10.0	5.7	6.2	10.0	6.2	5.7	7.9	1.1	9.7
24	0440 May, May Creek (Lake Washington)	2001, KC Historical	34	7	5	5	17	14	6	1	1	0	0	500	57.9	8.6	8.6	5.7	5.0	5.3	5.0	1.4	5.4	4.1	8.9
25	08EAS1964, May Creek (Lake Washington)	2020, Ambient Monitoring	45	4	7	4	15	18	7	1	1	0	0	500	47.1	6.2	4.3	8.6	3.8	6.5	6.2	1.4	4.2	3.9	2.0
26	08EAS2058, May Creek (Lake Washington)	2020, Ambient Monitoring	50	3	7	6	16	18	5	2	0	0	0	500	60.0	7.9	2.9	8.6	6.2	6.5	3.8	2.9	8.6	8.0	4.7
27	PSS05515-029907, Honey Dew Creek	2020, Stormwater Action Monitoring for Puget Small Streams	28	1	3	3	7	11	4	0	1	0	0	164	23.6	0.3	0.0	2.9	2.5	2.4	2.5	0.0	2.8	5.9	4.3
28	May Creek Trib - Honey Creek, May Creek (Lake Washington)	2015, Stormwater Retrofit	21	3	3	1	7	6	2	1	1	0	0	187	14.8	0.0	2.9	2.9	0.0	0.0	0.0	1.4	0.0	0.5	7.1
29	WAM06600-081267, May Creek (Lake Washington)	2013, WRIA08_WS_Survey	37	3	8	5	16	20	9	2	0	0	0	500	67.2	7.4	2.9	10.0	5.0	8.1	8.8	2.9	10.0	6.6	5.6
30	08EAS2631, May Creek (Lake Washington)	2021, Ambient Monitoring	40	3	6	5	14	20	8	3	0	0	0	500	59.6	4.5	2.9	7.1	5.0	7.6	7.5	4.3	7.1	5.9	7.7
31	soos01, Soos Creek	1999, KC Historical	35	3	5	5	13	14	3	2	0	0	0	500	39.1	2.8	2.9	5.7	5.0	4.1	1.2	2.9	6.1	1.5	6.9
32	09SOO1040, Big Soos Creek	2002, Ambient Monitoring	16	2	2	3	7	6	2	0	1	0	0	500	9.5	0.0	1.4	1.4	2.5	0.6	0.0	0.0	0.2	0.9	2.5
33	L320_MK, Soos Creek	1996, KC Historical	25	3	0	1	4	7	2	0	1	0	1	500	3.7	0.0	2.9	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0
34	E234, United Nations Creek	2010, ESA Water Quality	23	5	6	5	16	12	4	3	1	0	0	500	52.1	3.3	5.7	7.1	5.0	4.1	2.5	4.3	4.9	5.1	10.0

Legend:	Excellent	Excellent/Good – Good	Good/Fair – Fair	Fair/Poor – Poor	Poor/Very Poor – Very Poor
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Appendix B

Watershed Characterization Analysis



PUGET SOUND WATERSHED CHARACTERIZATION PROJECT

The Washington State Department of Ecology has developed a mapping tool, the Puget Sound Watershed Characterization Project, that can be used to support stormwater management planning. The watershed characterization project mapping tool includes different categories for water flow, water quality, and fish and wildlife habitats. The Watershed Characterization tool provides color-coded maps that show the relative value of small watersheds and marine shorelines in the Puget Sound Basin. The relative value is determined by the potential importance of the area to ecological processes or values, such as water delivery, sediment delivery, or habitat/species conservation. For purposes of a map display, the assessment units are grouped into evenly distributed quartiles, which are labeled high, moderate-high, moderate and low. For this analysis the quartile rankings were converted to numeric values to sum for each ecological process value as well as for an overall assessment unit score. The quartiles were converted as follows:

- High – 4
- Moderate-high – 3
- Moderate – 2
- Low – 1

Water Flow Assessments

The water-flow model integrates two distinct sub-models, one sub-model for importance and one sub-model for degradation. For this analysis, the degradation sub-model has not been included because it evaluates the watershed in an “altered” state by considering the impact of human actions on flow processes across all landscape groups, but it fails to consider the presence of existing mitigation to offset the impacts of those actions. The importance sub-model evaluates each assessment unit in an unaltered state, based on its physical attributes of topography, soil, geology, and hydrology and without any consideration of land use changes or human modifications that may have occurred. The importance sub-model considers the following four fundamental groups of water-flow processes, including the “important areas” which have characteristics that maintain these flow processes:

- Delivery – This group assesses the physical features that control how precipitation is delivered to the landscape. This includes the quantity of precipitation, area of forest cover, and rain on snow zones. Changes to these controls are also evaluated including percent of forest and impervious cover. “Important areas” would include mapping average annual precipitation and the location of areas that regulate the timing of the delivery of water.
- Surface storage – This group assesses features that control the movement of water at the surface, including depressional wetlands and floodplains. Changes to storage are assessed based on the type of adjoining development and the changes to areas that decrease the capacity to store water. “Important areas” would include mapping depressional wetlands and floodplains because they influence the magnitude of downstream discharge.
- Recharge – This group assesses areas that control the infiltration of precipitation into groundwater. The model calculates the decrease in recharge based on the intensity of development. “Important areas” would include mapping the permeability of surface deposits and precipitation, which are primary determinants on the amount.

- Discharge – This group assesses areas that control the movement of groundwater back to the surface, including the area of slope wetlands and floodplains with permeable deposits. Changes to discharge controls are evaluated based on road density, number of water wells, and type of adjacent development. “Important areas” would include mapping areas of slope wetlands and permeable floodplains, which are considered primary indicators that represent the most likely areas where groundwater will resurface.

Although the sub-model generates importance scores along a continuous range, for purpose of a map display the assessment units are grouped into evenly distributed quartiles, which are labeled high, moderate-high, moderate and low. On the map the darkest colors indicate the most important quartile relative to the others. (Ecology 2016a)

Water Quality Assessments

Export Potentials and Combined Effect

Water Quality is a key element used to inform resource management decisions when performing a watershed-level assessment. The model has five individual water quality models, each of which has an export potential sub-model and a degradation sub-model. The degradation model has not been included because it evaluates the capacity of an area to generate load pollutant constituents but does not account for existing treatment or infrastructure in place providing mitigation for the effects of the loading.

The model defines export potential as a measure of an assessment unit’s relative capacity (if it were disturbed) to generate and transport contaminants to aquatic areas downstream and ultimately to Puget Sound. The export potential sub-model evaluates each analysis without any consideration of land use changes or human modifications, and it considers four fundamental groups of processes: delivery, storage, movement, and loss of a particular water quality constituent in any given watershed (Ecology 2016a). The export potential sub-model was selected for this analysis because it is analogous to the selection of the importance sub-model for water flow.

This analysis evaluated water quality using sub-models for sediments, metals, phosphorus, and nitrogen constituents. These constituents were chosen because, in excess quantities, they degrade beneficial uses of the state’s aquatic ecosystems.

Sediment Sub-Model

The Sediment Export Potential sub-model assesses the relative capacity of an area under natural conditions to transport sediment and to potentially act as a sink for sediment. The transport of soil particles downstream is based on the density of streams and connected wetlands and the relative area of sources of sediment (soil erosivity and landslides). The sub-model also considers the relative area that can remove sediment, which is achieved by evaluating areas with potential to act as sources and sinks of sediment. Sources of sediment can be from land clearing activities associated with land development, forestry, and agriculture.

Metals Sub-Model

The Metals Export Potential sub-model assesses the relative capacity of an area to generate and transport toxic metals downstream, based on an evaluation of areas that act as sinks that can trap metals. Analysis for metals in the Watershed Characterization tool include copper and zinc. Copper can be introduced into the environment through natural sources, such as volcanic eruptions, windblown

dust, and forest fires. Copper can also be introduced from copper mining activities, metal manufacturing, agricultural and domestic use of pesticides and fungicides, leather processing, and automotive brake pads. Zinc can be introduced into the environment through tire wear and from leaching of galvanized surfaces.

Areas with high export potential for metals have relatively fewer lakes, wetlands, and floodplain storage areas and less extent of soils with high organic and clay content

Phosphorus and Nitrogen Sub-models

The Phosphorous Export Potential sub-model assesses the relative capacity of an area under natural conditions to transport phosphorous downstream based on areas that act as sources and sinks of phosphorous. The Nitrogen Export Potential sub-model assesses the relative capacity of an area to transport nitrogen downstream, based on an evaluation of areas that act as sinks that facilitate denitrification. Sources of nutrients, such as nitrogen, can be from fertilizers and animal waste. Phosphorus is present in soil and geologic materials, is typically generated by the same sources as sediments, and enters water bodies along with sediments through processes such as surface erosion, mass wasting, and in-channel erosion. The analysis gives a reduced weighting factor to each constituent so that the combined nutrient transport effect is equal to that of metal elements when scoring.

Areas with high export potential for phosphorus typically have relatively:

- Higher intensity rainfall
- Steeper topography
- More erosive soils
- Greater extent of areas subject to landslide hazards and higher stream density
- More erosive stream channels
- Fewer depressional wetlands, lakes, and floodplain storage areas to trap phosphorus
- Less extent of soils with a high clay content

Areas with high export potential for nitrogen are typically:

- Wetlands and lakes
- Riparian areas with hydric soils

Fish and Wildlife Habitats

Hydrogeomorphic Features

The Freshwater Index Components considered for this analysis were hydrogeomorphic features, which are crucial to maintaining the quality of salmonid habitats. The scoring for hydrogeomorphic features is based on the relative extent of all existing wetlands and undeveloped floodplains in the assessment unit. The Index was created using Ecology's spatial data that was refined through overlays onto land cover data layers from various sources and removing areas coincident with urban, agricultural, or developed lands (WDFW 2013). A data gap was noted in a portion of the West Lake Washington Basin for the index when performing the analysis. For hydrogeomorphic features, the index is arranged from 0 to 10, with 0 being the lowest density and 10 being the highest density, meaning that high scores have a relatively

greater extent of wetlands and floodplains than other assessment units. The 0 to 10 values were normalized based on the same 1 to 4 scale used for other sub-models.

Overall Score

The overall scores were determined by summing the scores for the selected ecological processes or values, which were weighted by sub-model according to the details in Table B-1. For the basin area within City boundaries, the model AUs were clipped to the City Boundary and summed according to their relative contribution (see Table B-2). The same process was used to find scores for the watersheds, clipping the model AUs according to the watershed boundaries delineated by King County (King County 2018). Figures B-1, B-2, and B-3 show the respective sub-model inputs and model outputs for the basins within the City boundary and for the watersheds. Moving forward, the specific condition – warranting the range of actions from protection to restoration – will be assessed during the Receiving Water Prioritization based on the watershed characterization scoring information summarized in this assessment.

Table B-1. Combined Score Weighting

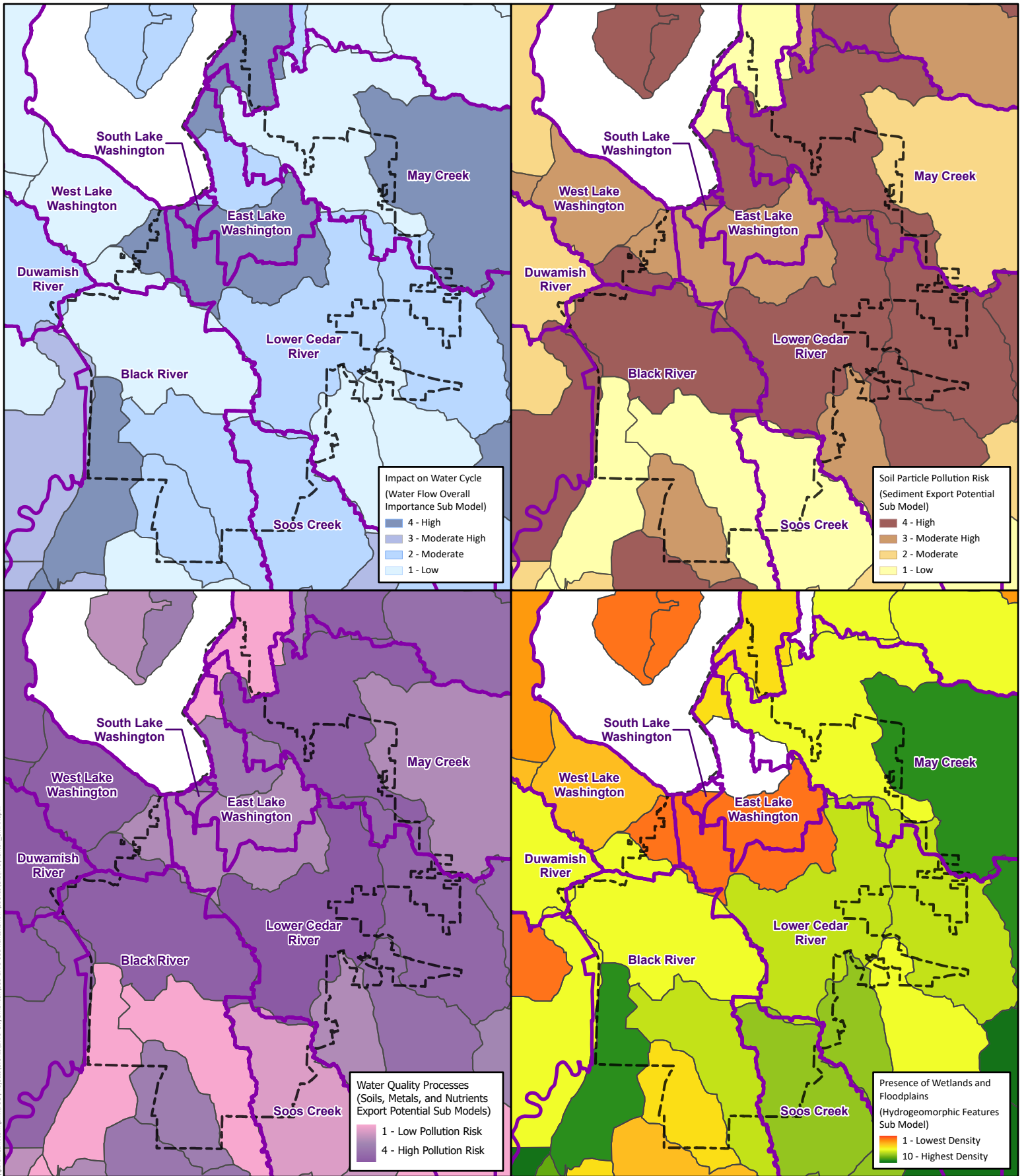
Ecological Process/Value	Sub-Model	Weighting Factor	Potential Scoring Range	
			Low	High
Water Flow	Overall Importance	1.00	1.00	4.00
Water Quality	Sediment Export Potential	1.00	1.00	4.00
Water Quality	Metals Export Potential	0.50	0.5	2.00
Water Quality	Nitrogen Export Potential	0.25	0.25	1.00
Water Quality	Phosphorus Export Potential	0.25	0.25	1.00
Fish and Wildlife Habitat	Hydrogeomorphic Features	1.00	1.00	4.00
Summed Total		4.00	4.00	16.00

Scoring summations would be translated to quartiles as follows: High – 16; Moderate-high -12; Moderate – 8; and Low – 4

Table B-2. Puget Sound Watershed Characterization Model Outputs

Basin Name	Basin Area Within City Boundary (square miles)	Overall Score Within City Boundary	Total Watershed Area (square miles)	Overall Score of Watershed
Black River	8.15	9.71	26.61	9.91
Duwamish River	0.02	10.52	21.58	9.61
East Lake Washington	2.90	10.30	4.66	9.52
Lower Cedar River	7.47	11.97	68.11	12.34
May Creek	2.87	11.36	13.68	11.65
Soos Creek	1.48	7.87	27.35	9.38
South Lake Washington	0.17	10.73	0.17	10.73
West Lake Washington	0.52	10.81	16.53	8.96

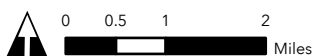
Source: Ecology 2016b

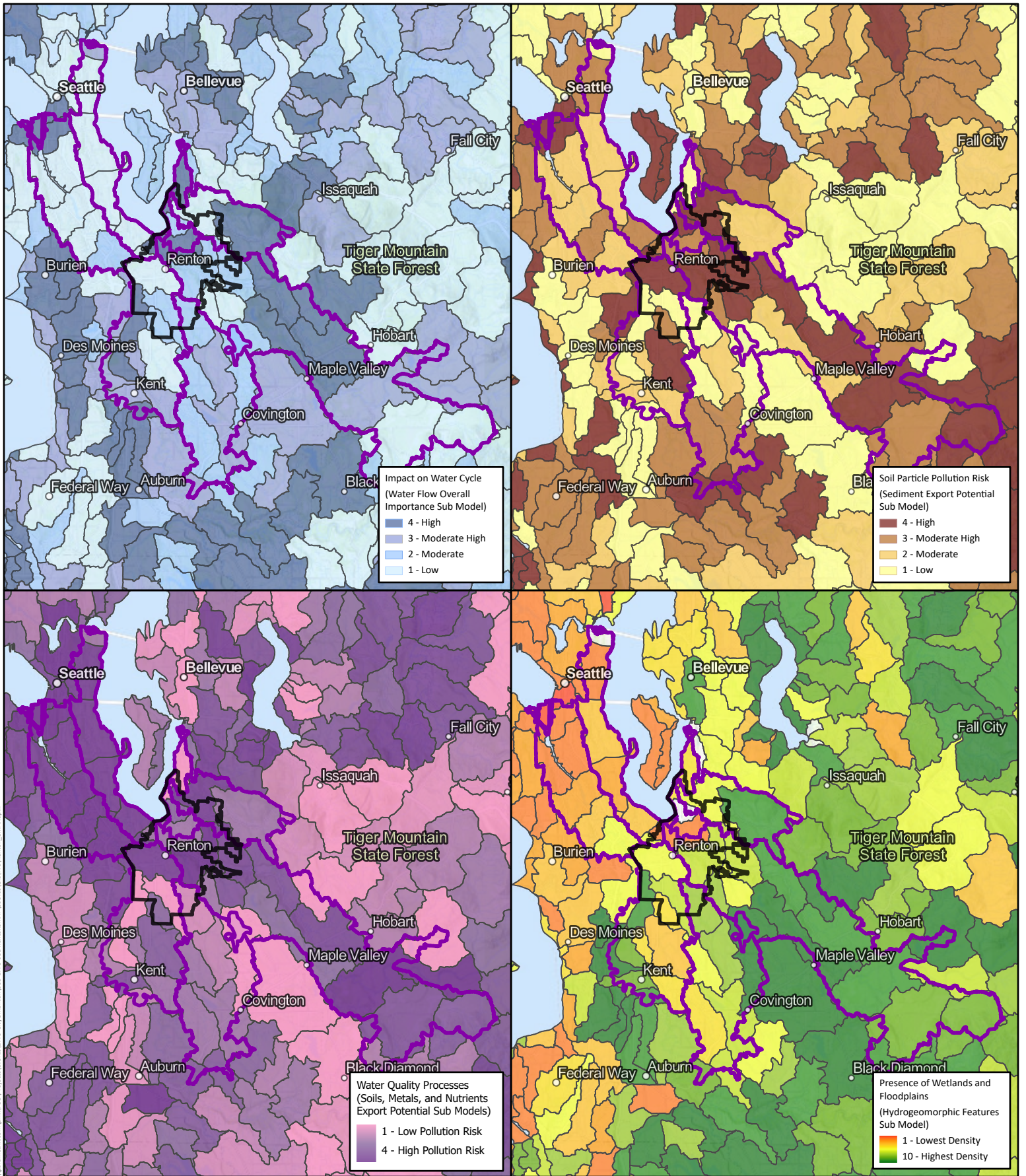


Date: 3/18/2022
 Sources: City of Renton, King County, WA Ecology, WA DNR, USGS, ESRI
 Disclaimer: The data on this map reflects planning-level accuracy and may not represent exact conditions in all locations. As part of the ongoing SMAP development, the City will be updating the web map when possible. Also, as part of final basin screening and concept project selection in 2023, the City may conduct field investigations of data discontinuities that appear on the web map. Therefore, the City assumes no liability to third parties for the data or lack thereof, or any decisions made or action not taken in reliance upon any of the data.

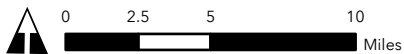
- Receiving Water Basin
- PSWCM Boundaries
- Renton City Limits

Figure B-1 - Puget Sound Watershed
 Characterization Sub-Model Inputs
 Renton SMAP
 Receiving Water Assessment



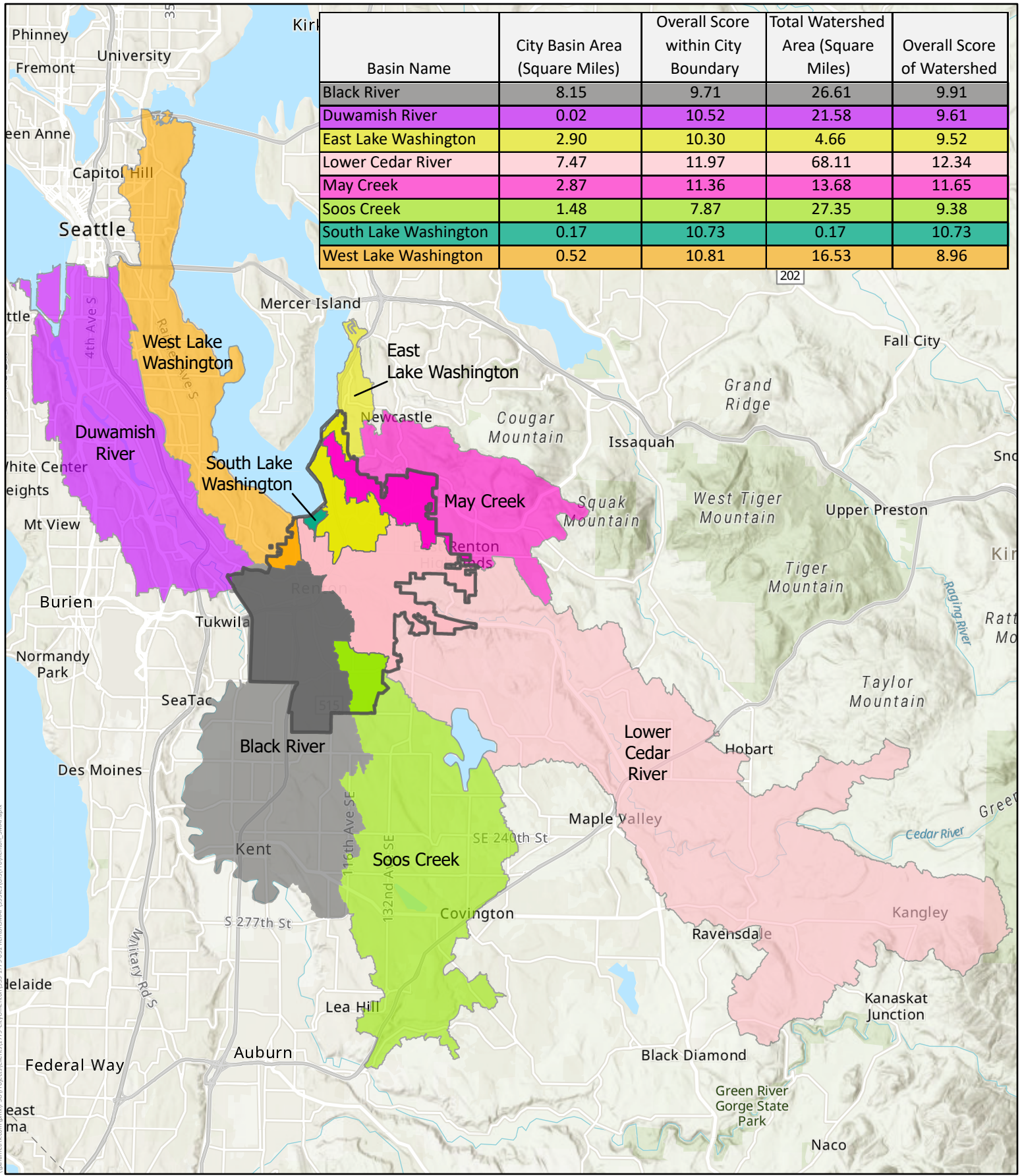


Date: 3/18/2022
 Sources: City of Renton, King County, WA Ecology, WA DNR, USGS, ESRI
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- Receiving Water Basin
- PSWCM Boundaries
- Renton City Limits

Figure B-2 - Puget Sound Watershed Characterization Sub-Model Inputs
 Watershed Scale
 Renton SMAP
 Receiving Water Assessment



Date: 3/18/2022
 Sources: City of Renton, King County, WA Ecology, WA DNR, USGS, ESRI
 Disclaimer: The data on this map reflects planning-level accuracy and may not represent exact conditions in all locations. As part of the ongoing SMAP development, the City will be updating the web map when possible. Also, as part of final basin screening and concept project selection in 2023, the City may conduct field investigations of data discontinuities that appear on the web map. Therefore, the City assumes no liability to third parties for the data or lack thereof, or any decisions made or action not taken in reliance upon any of the data.

Renton City Limits

Figure B-3 - Puget Sound Watershed Characterization Model Output Summary
 Renton SMAP Receiving Water Assessment



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Appendix C

Combined Equity Index



PUBLIC HEALTH AND THE ENVIRONMENT

Environmental and socioeconomic stressors, which may act cumulatively to affect health and the environment and contribute to persistent environmental health disparities, have been considered to develop an environmental justice and opportunity scoring tool: the Equity Layer, or the Combined Equity Index. The Combined Equity Index was developed by averaging the scores from three separate indices: a Demographic Index, an Environmental Hazard Index, and an Environmental Opportunity Index. The data for the Demographic Index and Environmental Hazard Index were sourced from the Environmental Protection Agency’s (EPA’s) web-mapping tool, the Environmental Justice Screening and Mapping Tool (EJSCREEN Tool) (EPA 2019). The Environmental Opportunity Index was developed by Parametrix to complement the demographic and environmental hazards-based analyses by scoring canopy cover and access to parks and open spaces using GIS data obtained from the City.

Environmental Justice Screening and Mapping Tool

The Environmental Protection Agency (EPA) has developed a web-based tool known as the Environmental EJSCREEN Tool that provides high-resolution environmental and demographic indicators for locations in the United States and allows users to compare their selected locations to the rest of the state, EPA region, or nation (EPA 2019). EJSCREEN puts each indicator or index value in perspective by reporting the value as a percentile. A percentile in EJSCREEN indicates roughly what percent of the U.S. population lives in a block group that has a lower value (or in some cases, a tied value). Block groups are defined by the U.S. Census Bureau as statistical divisions within a census tract and generally contain between 600 and 3,000 people. This means that 100 minus the percentile tells us roughly what percent of the U.S. population has a higher value (EPA 2019). The following indicators from the EJSCREEN Tool were included for further analysis during watershed prioritization.

Demographic Index

EJSCREEN Tool focuses on demographics, using them as an indicator of potential susceptibility or vulnerability to environmental pollution, recognizing that historically certain minority populations have been subject to disproportionate burdens of environmental harms. The demographic indicators that define overburdened communities in the context of this analysis have been summarized in Table C-1.

Table C-1. Summary of Demographic Indicators

Indicator	Detail
Minority	The number or percent of individuals in a block group who list their racial status as a race other than white alone and/or list their ethnicity as Hispanic or Latino. That is, all people other than non-Hispanic white-alone individuals. The word “alone” in this case indicates that the person is of a single race, since multiracial individuals are tabulated in another category—a non-Hispanic individual who is half white and half American Indian would be counted as a minority by this definition.
Low Income	The number or percent of a block group’s population in households where the household income is less than or equal to twice the federal “poverty level.”
Less Than High School Level of Education	The number or percent of people aged 25 or older in a block group whose education is short of a high school diploma.
Households (interpreted as individuals) in Linguistic Isolation	The number or percent of people in a block group living in linguistically isolated households. A household in which all members aged 14 years and over speak a non-English language and also speak English less than “very well” (have difficulty with English) is linguistically isolated.
Individuals under Age 5	The number or percent of people in a block group under the age of 5.
Individuals over Age 64	The number or percent of people in a block group over the age of 64.

Source: U.S. Census Bureau 2020

Environmental Hazards Index

The Environmental Hazards Index analysis considered the following environmental indicator, as areas with greatest amounts of compounding exposure to environmental hazards, which have been summarized in Table C-2. The environmental indicators in EJSCREEN quantify proximity to, and the numbers of certain types of potential sources of exposure to environmental pollutants. EPA developed the indicators through a review of data availability, health disparity information, risk-ranking studies, and a variety of other sources within the federal government (EPA 2019).

Table C-2. Summary of Environmental Indicators

Medium	Indicator	Detail	Key Exposure Source
Air	NATA Air Toxics Cancer Risk	Lifetime cancer risk from inhalation of air toxics.	Most air toxics originate from transportation and industry, including motor vehicles, industrial facilities, and power plants, and people are exposed in their daily activities. In some cases, these substances react with other constituents in the atmosphere or break down to other chemicals.
Air	NATA Respiratory Hazard Index	Air toxics respiratory hazard index (ratio of exposure concentration to health-based reference concentration).	
Air	NATA Diesel PM	Diesel particulate matter level in air, $\mu\text{g}/\text{m}^3$.	
Air	Particulate Matter	$\text{PM}_{2.5}$ levels in air, $\mu\text{g}/\text{m}^3$ annual average (2016).	Common sources of $\text{PM}_{2.5}$ emissions include power plants and industrial facilities. Secondary $\text{PM}_{2.5}$ can form from gases, such as NO_x or SO_2 , reacting in the atmosphere.
Air	Ozone	Ozone summer seasonal average of daily maximum 8-hour concentration in air in parts per billion (2016).	O_3 is not usually emitted directly into the air but is created at ground level by a chemical reaction between NO_x and volatile organic compounds in the presence of sunlight. These ozone precursors are emitted by motor vehicles, industrial facilities, and power plants as well as natural sources. Ground-level ozone is the primary constituent of smog.
Air/Other	Traffic Proximity and Volume	Count of vehicles (AADT) at major roads within 500 meters, divided by distance in meters (not km).	Increased exposures to ambient noise, toxic gases, and particulate matter, including diesel particulates.
Dust/Lead paint	Lead Paint Indicator	The percentage of occupied housing units built before 1960 was selected as an indicator of the likelihood of having significant lead-based paint hazards in the home.	A key source of exposure to lead is through lead paint and lead-containing dust that accumulates indoors, in homes or in other buildings where lead paint was used. Exterior structures painted with lead-based paint are also a source of ambient lead through chipping exterior paint. Elevated short-term lead dust loadings have also been observed following demolition of old buildings. Lead-based paint was banned in the U.S. by the Consumer Product Safety Commission in 1978, but lead-based paint used in housing before the ban remains a significant source of exposure to lead for children and adults.

Table C-2. Summary of Environmental Indicators (continued)

Medium	Indicator	Detail	Key Exposure Source
Waste/Air/Water	Proximity to RMP Sites	Count of RMP (potential chemical accident management plan) facilities within 5 km (or nearest one beyond 5 km), each divided by distance in km.	The primary concerns with RMP facilities are the accidental release of substances and fires or explosions. The sudden release of relatively large quantities of acutely toxic substances can cause serious health effects, including death after inhalation or dermal exposure. These effects may be prompt or may occur or persist for some time after exposure. Fires may affect neighboring areas, and the associated smoke may expose people to toxic combustion products. Explosions may cause material damage and injuries to people in neighboring areas. Local residents, as well as workers and emergency responders, may suffer severe adverse effects.
Waste/Air/Water	Proximity to TSDFs for Hazardous Waste	Count of TSDFs (hazardous waste management facilities) within 5 km (or nearest beyond 5 km), each divided by distance in km.	Volatile contaminants may enter the atmosphere and reach individuals via the inhalation route. Particularly in dry climates or seasons, contaminants on the surface of some sites can become airborne and reach people directly through inhalation or indirectly after being deposited on surfaces that people may contact. Contaminants can also enter the food chain if the wind disperses them onto land used for agriculture. Some contaminants may migrate into groundwater. People may be exposed via drinking water derived from the aquifer, through vapor intrusion into their residences, or through other routes.
Waste/Air/Water	Proximity to NPL Sites	Count of proposed and listed NPL sites within 5 km (or nearest one beyond 5 km), each divided by distance in km.	People may be exposed to the discharged pollutants either directly or through indirect pathways. People swimming in the downstream waters or engaging in water-based recreation may be directly exposed dermally, orally, or through inhalation of volatilized substances. If the released substances reach a downstream drinking water intake, consumers of the finished waters may consume whatever portion of the substances is not removed by the drinking water utility. Some portion of the discharged materials may enter the groundwater of neighboring areas and reach people through drinking water derived from wells that draw upon that aquifer.

Source: EPA 2019

Notes: AADT = average annual daily traffic; km = kilometers; NATA = National Air Toxics Assessment; NO_x = nitrogen oxides; NPL = National Priorities List; O₃ = ozone; PM_{2.5} = fine particulate matter, less than 2.5 micrometers wide; RMP = Risk Management Plan; SO₂ = sulfur dioxide; TSDFs = Treatment, Storage, or Disposal Facilities; ug/m³ = microgram per cubic meter

Environmental Opportunity Index

The Environmental Opportunity Index was developed by Parametrix to complement the analyses performed using the EJSCREEN tool in order to create a single combined score. This Index was developed by scoring canopy cover, and access to parks and open space using GIS data obtained from the City; and then joining it to the existing block groups to identify areas with the greatest need or areas that could benefit the most from gaining greater access to these resources. In this index, areas with the lowest amount of canopy cover or the least access to parks or open spaces would be identified as having greatest opportunities for environmental improvement projects.

Combined Equity Index

The Combined Equity Index Scores were derived by averaging the scores of the Demographic, Environmental Hazards, and Environmental Opportunity Indices to create an overall score for the purpose of high-level comparison. Each indicator within its respective index was averaged to create the index scores, and then each of the three indices was averaged again to create the combined score. The equations below demonstrate how the scoring was derived:

$$\text{Demographic Index} = \frac{\text{Sum}(\text{percentile Demographic Indicators})}{6 \text{ Demographic Indicators}}$$

$$\text{Environmental Hazard Index} = \frac{\text{Sum}(\text{percentile Env. Hazard Indicators})}{11 \text{ Env. Hazard Indicators}}$$

$$\text{Environmental Opportunity Index} = \frac{(\text{percent tree canopy} + \text{percent access parks \& open space})}{2}$$

$$\text{Combined Equity Index} = \frac{(\text{Demographic Index} + \text{Env. Hazards Index} + \text{Env. Opportunity Index})}{3}$$

The overall Combined Equity Index score serves as a general check for extreme scenarios or other patterns, but it is reviewed in conjunction with the other three indices not as a surrogate for them. The Demographic Index, Environmental Hazard Index, Environmental Opportunity Index, and Combined Equity Index will be calculated for smaller subcatchment areas during the prioritization process, and each will be reviewed during subcatchment ranking and screening. The environmental justice data for each receiving water subbasin is presented in Table C-3 and Figure C-1.

Table C-3. Environmental Justice and Opportunity Index Scores

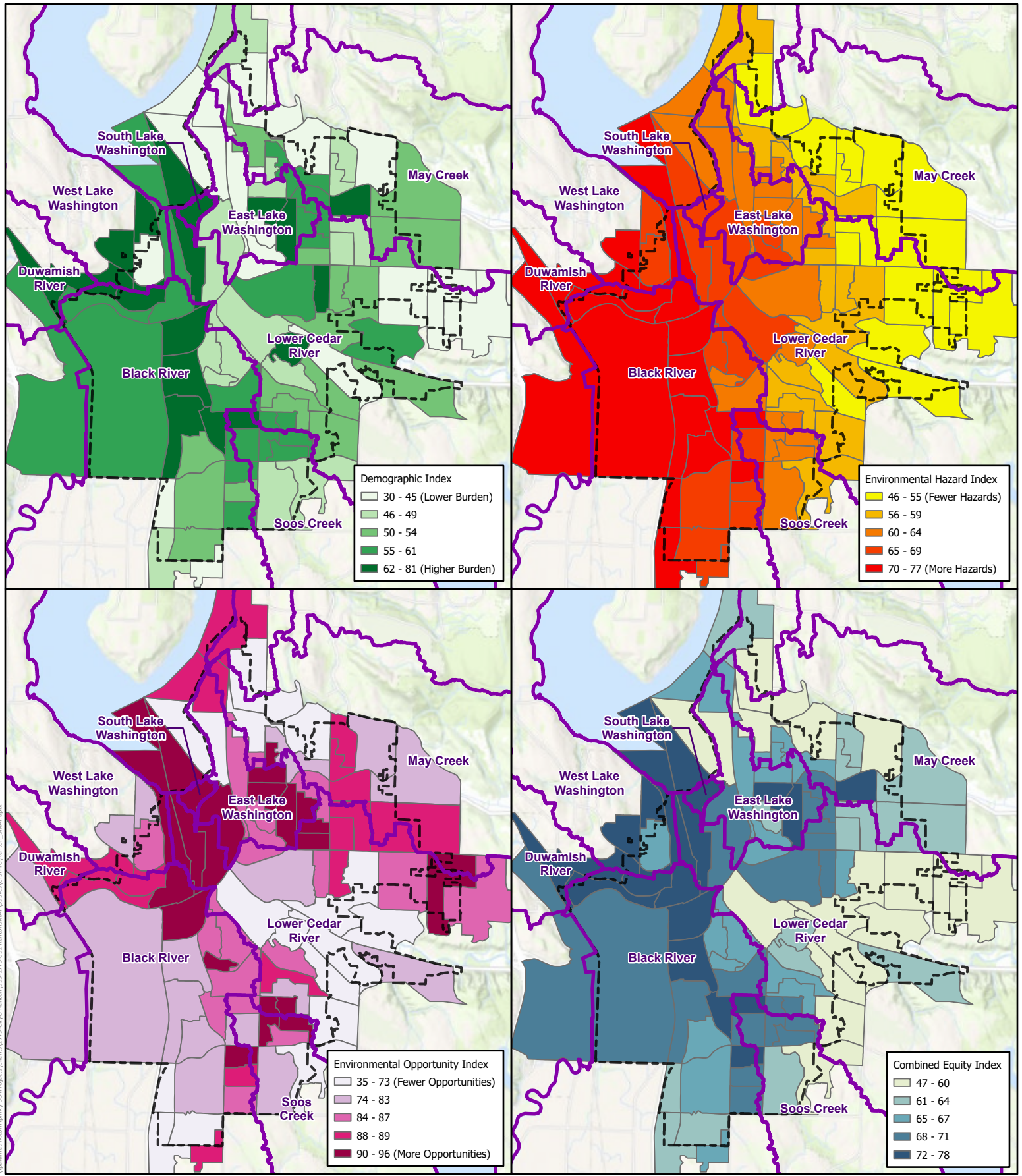
Basin Name	Demographic Index Score	Environmental Hazard Index Score	Environmental Opportunity Index Score	Combined Equity Index Score
Black River	56.9	72.0	80.9	69.9
Duwamish River	61.4	73.0	87.4	73.9
East Lake Washington	48.9	62.4	85.3	65.5
Lower Cedar River	50.6	58.7	77.4	62.2
May Creek	49.9	54.5	80.3	61.6
Soos Creek	52.2	62.9	76.4	63.8
West Lake Washington	52.1	69.7	87.6	69.8

Note: The South Lake Washington basin was not analyzed because it is an industrial facility on private property; therefore, it has no demographics nor opportunity to improve access to parks and open spaces.

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Date: 3/18/2022
 Sources: EPA (EJ Screen), City of Renton, King County, WA Ecology, WA DNR, USGS, ESRI
 Disclaimer: The data on this map reflects planning-level accuracy and may not represent exact conditions in all locations. As part of the ongoing SMAP development, the City will be updating the web map when possible. Also, as part of final basin screening and concept project selection in 2023, the City may conduct field investigations of data discontinuities that appear on the web map. Therefore, the City assumes no liability to third parties for the data or lack thereof, or any decisions made or action not taken in reliance upon any of the data.

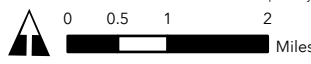


Figure C-1 - Environmental and Social Justice Equity Indices
 Renton SMAP Receiving Water Assessment