

Public Comment Summary: City of Stevenson Locally Approved SMP

Ecology Public Comment Period: May 1 – June 3, 2019

Prepared by Michelle McConnell, WA Dept. of Ecology; June 14, 2019

Reviewed by the Stevenson Planning Commission/Shoreline Advisory Committee on July 8, 2019

Completed by Ben Shumaker, Stevenson Community Development Director on July 29, 2019

Comment Number	SMP Topic / Section	Commenter	Comment – Summarized*	Local Government Response & Rationale
1	Inventory & Characterization Report (ICR)	WA Department of Natural Resources - H. Flores (WDNR)	Recent EPA findings indicate that Rock Creek is a Columbia River tributary that provides cold-water refuge important to steelhead salmon and other species. The City should consider this information and establish additional protections, as necessary, to maintain its ecological functions.	<p>The City reviewed this comment from WDNR, contacted the EPA project lead, and considered inclusion of the project’s findings in the ICR, RP, and SMP. The EPA’s final report on this project is anticipated in late 2019. Its findings were, and remain, unavailable for full inclusion in the City’s program. The City recommends the following:</p> <p>ICR – The City is prepared to amend the ICR based on the new knowledge of the Rock Creek cold water refuge. If amendment is required by Ecology, the changes highlighted in yellow are recommended by the City.</p> <p>RP – Because the project’s final report is not yet available, new restoration projects have not been identified and are not ready for inclusion in the RP. No changes are recommended.</p> <p>SMP – Because the project’s final report is not yet available, new regulatory protections for Rock Creek’s cold waters have not been identified and are not ready for inclusion in the SMP. The City will continue to rely on the system of Shoreline Environment Designations with differential allowances and setbacks (SMP Chapter 3 and SMP Table 5.1), the water quality requirements related to “no net loss of ecological functions (e.g., SMP Section 4.7), and the vegetation removal/mitigation standards (SMP Section 6.4.1 and SMP Table 6.2) to provide protections for the Rock Creek cold water refuge. No changes are recommended.</p> <p>Attachments related to this response include:</p> <p>1 – City/EPA correspondence 2 – Potential changes to ICR</p>

*See original comment letter for complete verbiage.

Ben Shumaker

From: Palmer, John
Sent: Thursday, June 20, 2019 12:40 PM
To: Ben Shumaker
Cc: Wu, Jennifer
Subject: RE: Rock Creek CWR & City of Stevenson
Attachments: EPAR10_11012018_Memo_23_CWR_Areas_Upstream_Extent.pdf; EPAR10_11012018_Memo CWR Volume of 23 Tributaries.pdf

Hi Ben,

Thank you for your email. We really appreciate your input on Rock Creek. We also think linking the Rock Creek CWR function into the City's shoreline management program is an excellent idea. Our plan is to officially release the draft plan for public comment in September. What I can pass on is that Rock Creek is one of the 23 CWR we have identified in the Lower Columbia River. I've attached two technical memo's that address Rock Creek that may be of interest. The first is our estimate of the upper extent of the river that steelhead likely would use as CWR. The second, is a listing of the 23 CWR tributaries and associated estimated CWR volumes. Steelhead use of Rock Creek is suspected but not well documented (I seem to recall some documentation but I can't recall off top of my head). Due to its small size, Chinook use is probably unlikely or very limited.

Our draft plan will include brief watershed assessments of the 12 primary CWR and two others (Umatilla and 15-mile creek) and recommended actions within those watersheds. Due to time limitations, we do not assess the other non-primary CWR, including Rock Creek. However, we will state that the recommended actions that are generally applicable for the 14 watersheds also can apply to the non-primary CWR such as Rock Creek. We will be addressing sediment deposition at the mouths of the CWR. There is concern that sediment deposition is limiting the access to the cold water and limiting the CWR function. So we will be recommending feasibility studies be conducted for the removal of sediment in some CWR areas.

I hope this is helpful. The information you provided on Rock Creek is very helpful to us. Since we are not doing assessments of the non-primary CWRs, including Rock Creek, we may not include the info into the plan directly, but it's very helpful information and may help us develop general recommendations for the non-primary CWR areas and adds more support for sediment removal in general.

Thanks,
John

From: Ben Shumaker <ben@ci.stevenson.wa.us>
Sent: Wednesday, June 19, 2019 3:38 PM
To: Palmer, John <Palmer.John@epa.gov>
Subject: Rock Creek CWR & City of Stevenson

Hi John-

To follow up on my phone message from earlier today, the City of Stevenson is in the final stages of wrapping up a comprehensive update to our state-required Shoreline Management Program. As part of this process, Hugo Flores with the State Department of Natural Resources informed us of your Cold Water Refuges Project and the article you wrote

for the October 15, 2017 issue of *The Water Report*. It's fascinating! I was particularly struck by the individual fish's journey tracked by the University of Idaho. Similarly, I was amazed about how easily environmental conditions—such as the CWR at Drano Lake—explain human behavior—i.e., the abundance of fishermen there.

Other than the plaudits, I'm reaching out to you for 3 reasons.

1. Mr. Flores is requesting that we acknowledge Rock Creek's and Rock Cove's functions as CWRs and that we adopt appropriate protections for those functions. Incorporating the information on the temperature variations is easily done, but I am hopeful that you might be able to provide some advanced information on the range of protections that will be included in your upcoming plan. If you are unable to do that, then potentially you could offer some guidance to validate our approach. As that approach relates to temperature regulation, we are primarily concerned with 1) the amount and character of urban runoff, 2) the amount and character of riparian vegetation, and 3) the proximity of buildings to the water's edge. For the runoff, we are relying on the State Department of Ecology's *Stormwater Management Manual for Western Washington*. For shoreline vegetation, we rely on a mitigation sequence (avoid, minimize, compensate, monitor, etc.). When removal can't be avoided, the attached table provides mitigation actions/ratios. We also ask developments to "prioritize south and west banks of waterbodies to provide shade" when selecting the mitigation planting area. For building proximity, we have a differentiated system of setbacks that depends on whether the proposal requires a location near the water and the current and future character of the reach where it's located.
2. Our state requirements include the development of a restoration plan identifying how we can improve ecological functions. Because the CWR designation/program is new to us here, our Restoration Plan is silent on any potential projects that could directly improve that function. If you've developed any specific restoration actions that apply to the Rock Creek CWR, and if you can share those actions in advance of the report's release, I would love to include them in our Shoreline Restoration Plan.
3. Finally, on the flip side of this, because you're still in the draft stage, I thought the attached information might help influence the final product. Specifically if there is nothing currently related to the Rock Creek CWR.

The 5 PDFs help tell Rock Creek's sedimentation story at the Columbia River confluence. That story involves a system overwhelmed with sediments as a result of continued ground instability associated with the geologically young Bonneville Landslide Complex. It is my opinion or maybe just my fear, that this stream is nowhere close to finding its steady state and the City will be forever confronted with the impacts and threats of landslides, aggradation, and flooding. The first pdf also tells how Rock Creek's story involves is exacerbated by the presence of the Bonneville Dam, which causes the sediments to drop out farther up in the Rock Creek stream system. The sedimentation reduces the system's Dredging these sediments is continually pushed as a local solution to this issue. Your article in *The Water Report* is silent on whether dredging would be considered an ecologically-based restoration action. I hope that your plan will address dredging as an approach that is ecologically appropriate for this overwhelmed eco-system. I also hope that landslide and/or streambank stabilization along Rock Creek can be added as an action that will reduce the amount of sediment that may otherwise be added to this sick system.

Appendix B in the 5th PDF and the State Department of Ecology information at this link <https://fortress.wa.gov/ecy/eap/flows/station.asp?sta=29A070#block4> provide some point-in-time data that may be helpful if the CWR model needs any calibration.

Thank you in advance for any assistance you can offer. Currently, I have a 45-day period to provide a City response to DNR's request. That period ends on July 29th, but I am hopeful that you will provide guidance in advance of our July 8th City Planning Commission meeting. A response by the beginning of July would be ideal.

Again, thank you,

BEN SHUMAKER

PLANNING DIRECTOR

CITY OF STEVENSON, WASHINGTON

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60 **3.1.3 Temperature Regulation**

Important to the lifecycle needs of fish and wildlife and the maintenance of other water quality functions, temperature regulation varies according to climate processes based on diurnal (daily) and annual cycles, but can also be heavily influenced by geologic processes (hot springs), shoreline morphology, and vegetative cover.

<p>PROCESS FUNCTION INDICATORS</p>	<p>Geologic Processes, Climate Processes, Bonneville Dam Processes —Temperature Regulation— Riparian Vegetation, Impervious Surface Area, Urban Runoff, Permanently Protected Areas, 303(d) List, Floodplain Area</p>
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65 The temperature regulation function is often considered impaired when shade-producing vegetative cover is removed from a shoreline or when point sources, hot springs, and/or urban runoff increase ambient stream temperatures and cold water refuges. The Columbia River, Rock Cove, and Rock Creek systems demonstrate higher than normal temperatures for shorelines of their type as indicated in Section 4. However a cold water
 70 refuge helps migrating salmonids at the mouth of Rock Creek.

3.2 Water Quantity Functions

Water quantity functions deal with the supply of water provided by climate and hydrological processes. Water quantity functions are valued because they moderate the distribution of the water supply over time. Reducing peak flood levels during high flows and maintaining streamflow and water availability during low
 75 flows.

Water storage occurs in depressional wetlands, lakes, floodplains, and in subsurface aquifers along or under shoreline systems. Water storage is valued as a shoreline ecological function because of its ability to regulate flows, maintain lifecycle needs for habitat, moderate flood risks to human life, and provide water for consumptive purposes.


<p>PROCESS FUNCTION INDICATORS</p>	<p>Geologic Processes, Climate Processes, Hydrologic Processes, Bonneville Dam Processes —Water Storage & Flow Regulation— Riparian Vegetation, Impervious Surface Area, Urban Runoff, Permanently Protected Areas, Floodplain Area, Wetland Acreage</p>
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80 Water storage and flow regulation functions vary greatly depending on the underlying geologic, and hydrologic processes and some areas are naturally unsuited for the storage of water. Areas with naturally permeable soils, connected floodplains and associated wetlands, and few impervious surfaces are considered well suited to water storage and flow regulation functions. Impairment occurs when these types of natural
 85 conditions are not present or are diminished. The Stevenson’s Rock Creek shoreline areas contains some complex stream bottom, plunge pit, and snags of large woody material (LWM), these shoreline reaches are largely ill-suited for water storage and flow regulation functions. The Bonneville Dam places a daily demand on the water storage functions of the Columbia River and Rock Cove shorelines. This process creates a well-functioning flow regulation, but partially impairs the interrelated water storage function of these shorelines as
 90 a result.

3.3 Habitat Functions


The rocks, soils, sediments, and waters of Stevenson’s shorelines host a number of terrestrial, aquatic, and amphibious plant and animal species. Some of these species attract flocks of visiting bird watchers, some are a boon for backyard naturalists, some spark the imagination of the city’s children, some are a veritable

310 protective agreements between the Port and the City. The remainder of the reach is privately owned and not subject to permanent conservation covenants.

 **Priority Habitat & Species-** A lacustrine littoral habitat at the outlet of Kanaka Creek borders this reach on the east and habitat supporting waterfowl concentrations borders the western edge. PHS species within this reach include the salmonids of the Columbia River, white sturgeon, and northern spotted owl. Monitored
315 non-PHS species within the reach include the ring-necked snake and sand roller. Some threat to aquatic habitat exists based on the spread of milfoil. The condition of these habitat and species types has not been evaluated, but their presence is a positive ecological indicator, and, like the other Columbia River reaches, justify a “Good” rating.

 **Wetland Acreage-** There is one wetland from the local inventory in this reach; it is adjacent to Cascade
320 Avenue, totals 0.21 acres, drains to the Columbia River, and is considered an associated wetland. The presence of this wetland is a positive ecological indicator and justifies the “Good” rating of this reach.

4.2.4 Altered Conditions

 **303(d) Listings-** The Columbia River within this reach has a Category 5 listing for temperature and through a 3-state memorandum of understanding the EPA is developing total maximum daily load (TMDL)
325 protocols to address the water quality deficiency. As part of this effort, the EPA has identified cold water refuges (CWRs) within the system. The confluence of this reach with Rock Creek provides a minor CWR for migrating salmonids in high temperature months. This reach is also subject to pollution from Dioxin as a Category 4A pollutant subject to a TMDL from the EPA. The Columbia is also a Category 2 water of concern for pH, PCBs, Chlordane, and 4,4'-DDE. The “Very Poor” rating results from these multiple listings.




 **Impervious Surface Area-** This reach is the most urbanized and the most degraded (“Very Poor”) in terms of impervious surfaces. The 7.7 ac of impervious land cover is the most of any reach, and the average coverage of this reach’s small lots is also greater than any other reach or the Stevenson’s overall shoreline jurisdiction.

Table 4.2-3 – Columbia River Reach 2 Impervious Surface Comparison

Impervious Surface Areas				
	Total Impervious Area	% Land Covered by Impervious Surfaces	Mean Impervious % of Developed Lots	Median Impervious % of Developed Lots
Reach	7.7 ac	21.9%	60.6%	74.8%
Total Jurisdiction	29.4 ac	14.4%	46.3%	36.2%

 **Overwater Roads & Structures-** The Port of Skamania County maintains 3 public overwater structures in this reach (denoted on Map 15 as E, F, and G). The Stevenson Landing pier at Russell Street at 3,500 sf is the biggest of these, and its flanking dolphins provide moorage for tourboats on the river. While some cosmetic upgrades have been proposed for Stevenson Landing, no structural or in-water work is currently being
340 considered. This reach also contains a number of old pilings, some of which are programmed for removal during the Port’s waterfront restoration project. Until that time, the reach will remain ranked as “Poor”.

 **Setbacks to OHWM-** Though more urbanized in terms of impervious surfaces close to the OHWM, this reach has surprisingly large setbacks for buildings. The “Good” rating is based on central tendencies for

been evaluated, but their presence is a positive ecological indicator, and, like the other Columbia River reaches, justify a “Good” rating.

485 **1 Wetland Acreage-** The “Fair” rating is applied as a placeholder to this reach which contains no mapped local inventory or NWI wetlands (Map 8).

4.3.4 Altered Conditions

490 **303(d) Listings-** The Columbia River within this reach has a Category 5 listing for temperature and through a 3-state memorandum of understanding the EPA is developing total maximum daily load (TMDL) protocols to address the water quality deficiency. **As part of this effort, the EPA has identified cold water refuges (CWRs) within the system. The confluence of this reach with Rock Creek provides a minor CWR for migrating salmonids in high temperature months.** This reach is also subject to pollution from Dioxin as a Category 4A pollutant subject to a TMDL from the EPA. The Columbia is also a Category 2 water of concern for pH, PCBs, Chlordane, and 4,4'-DDE. The “Very Poor” rating results from these multiple listings.

495 **2 Impervious Surface Area-** Large areas of the formerly industrial sites in this reach contain extensive impervious surfaces, which cover 6.6 ac in total. A comparison of developed lot coverage is not available for this reach or the Ashes Lake reach based on the aggregation of certain data used in the analysis. However, visual reconnaissance indicates that impervious coverage in this reach is similar to the Rock Cove reach and has been rated as “Poor”.

Table 4.3-3 – Columbia River Reach 3 Impervious Surface Comparison

Impervious Surface Areas				
	Total Impervious Area	% Land Covered by Impervious Surfaces	Mean Impervious % of Developed Lots	Median Impervious % of Developed Lots
Reach	6.6 ac	19.3%	??	??
Total Jurisdiction	29.4 ac	14.4%	46.3%	36.2%

500 **1 Overwater Roads & Structures-** A private ~1,000 sf pier with a building (denoted on Map 15 as A) is located in the western portion of this reach. The aquatic area of the shoreline also includes a number of derelict pilings at various locations in this reach, including a high concentration east west of the former Co-Ply site. There are no overwater roads and this reach has been rated as “Fair”.

505 **2 Setbacks to OHWM-** No properties in this reach have buildings in shoreline jurisdiction, but nearly half are developed with roads, paved or gravel parking areas and the railroad. This pre-designated reach has the closest combined central tendencies for setbacks to the OHWM at 20 ft. The “Poor” rating of the reach reflects the proximity of structures to the OHWM and lack of buildings.

Table 4.3-4 – Columbia River Reach 3 Development Proximity to OHWM

620 **1 Wetland Acreage-** The “Fair” rating is applied as a placeholder to this reach which contains no mapped local inventory or NWI wetlands (Map 8).

4.4.4 Altered Conditions

625 **303(d) Listings-** The lower portion of this reach below Rock Creek Drive is subject to the same Category 5 temperature listing as the Columbia River. The EPA has not yet developed total maximum daily load (TMDL) protocols to address this water quality deficiency. **As part of this effort, the EPA has identified cold water refuges (CWRs) within the Columbia River system. The mouth of Rock provides a minor CWR for migrating salmonids in high temperature months.** This listing does not include the upper portion of the reach, and there are no other types of 303(d) listings occur within this reach.

630 **2 Impervious Surface Area-** This highly urbanized reach contains 6.6 ac of total impervious surfaces, which exist at a higher proportion than the overall shorelines reviewed in this report. However, individual developed lots have less impervious surfaces when compared to the shorelines of the entire Stevenson Urban Area. Impervious surfaces are concentrated near and south of the bridge at Rock Creek Drive. The reach has been rated “Poor”.

Table 4.4-2 – Rock Creek Reach 1 Impervious Surface Comparison


Impervious Surface Areas				
	Total Impervious Area	% Land Covered by Impervious Surfaces	Mean Impervious % of Developed Lots	Median Impervious % of Developed Lots
Reach	6.6 ac	15.1%	22.1%	17.3%
Total Jurisdiction	29.4 ac	14.4%	46.3%	36.2%

640 **3 Overwater Roads & Structures-** This “Very Poor” reach has the most overwater roads & structures in Stevenson’s shoreline jurisdiction. The Rock Creek Drive bridge, a pedestrian-only bridge and the SR 14 bridge are existing public structures. A deteriorating private deteriorating dock (denoted on Map 15 as D) is located on private property between SR 14 and the BNSF railroad. Additionally, the BNSF railroad bridge marks the southern extent of this reach. In total, these structures cover ~14,000 sf of the stream. The Rock Creek Drive and SR 14 bridges both have piers placed in the water. The City is seeking grant funding to replace the Rock Creek Drive bridge with a freespan structure. The BNSF bridge is proposed for replacement and preliminary designs indicate a removal of the bridgehead piers/revetments that constrict the channel under the bridge. The replacement project may also provide for the removal of some pilings and other dilapidated structures in the vicinity.





650 **4 Setbacks to OHWM-** Nearly half of the properties in this reach are developed in some fashion and most of the developed lots contain some type of building. The central tendencies for the location of these buildings combine to ~100 ft from the OHWM, and structures are typically located slightly closer. This reach is rated as “Good” and contrasts interestingly with the development setback trends of Rock Creek Reach 2 which has a lesser rating.

Table 4.4-3 – Rock Creek Reach 1 Development Proximity to OHWM



Setbacks to OHWM				
	% of Lots with Construction	Smallest Setback	Mean Setback	Median Setback
Buildings	40.4%	11 ft	93 ft	87 ft
Any Structure	47.4%	6 ft ⁶⁰	88 ft	77 ft

- 835  **Shoreline Stability-** A mix of natural shoreline and armored slopes are present in this reach, with the natural areas located primarily along the islands and the Columbia Gorge Interpretive Center property. The reach's soil types include Arents, Bonneville and Steever soils. Arents soils are composed of gravelly sandy loams. Bonneville soils are stony sandy loams. Steever soils are stony or gravelly clay loams. Arents and Steever soils both are Well Drained, and have Moderate availability of water storage. Bonneville soils are Somewhat Excessively Drained, have a Very Low availability of water storage, and a Slight erosion hazard.
- 840 The Rock Cove reach is rated as "Good" and has limited Geologic Hazards. The slopes greater than 25% present a Moderate Hazard as potentially unstable slopes (Map 5A). The greatest hazard in the reach is the High liquefaction potential of the railroad/highway berm if an earthquake were to occur.

4.6.3 Biological Environment

- 845  **Fish-Blocking Culverts-** There are no culverts identified on the WDFW inventory within this reach, however, local reconnaissance identified a culvert in the western portion of this reach for Foster Creek. The ability of fish to pass through this culvert is unknown. The presence of this culvert is all that prevents application of the "Excellent" rating.
- 850  **Permanently Protected Areas-** Between the Columbia Gorge Interpretive Center, Skamania County, and rights-of-way for the City's Rock Creek Drive and WSDOT's SR 14, the entire shoreline is stewarded by public or non-profit entities. These public and non-profit entities will ensure that a degree of responsible environmental protection during shoreline use and development within this "Good" rated reach; however, no areas in this reach are subject to permanent protective covenants or environmentally protective deed restrictions.
- 855  **Priority Habitat & Species-** The PHS priority habitat types within the reach support waterfowl concentrations and palustrine aquatic habitat. The PHS species within the reach include northern spotted owl, Canada goose, Chinook, steelhead, and resident and rainbow trout and coastal cutthroat. The only monitored non-PHS species within the reach is the ringneck snake. Some threat to aquatic habitat exists based on the spread of milfoil. This reach shares the "Good" rating with the Columbia River reaches which also serve several species and habitat purposes.
- 860  **Wetland Acreage-** A locally performed wetland inventory identifies a 0.03-acre wetland upland of Rock Creek Drive near the Ryan Allen Road intersection and a 0.27 acre emergent wetland on the upland side of Rock Creek Drive near the Rock Cove Assisted Living Facility. Neither is identified on the NWI maps (Map 8). The presence of these wetlands is a positive ecological indicator and justifies the "Good" rating of this reach.

4.6.4 Altered Conditions

- 865  **303(d) Listings-** This reach is subject to the same Category 5 temperature listing as the Columbia River. The EPA has not yet developed total maximum daily load (TMDL) protocols to address this water quality deficiency. As part of this effort, the EPA has identified cold water refuges (CWRs) within the Lower Columbia River system. Rock Cove is included as part of Rock Creek's minor CWR where migrating salmonids may rest during high temperature months. No other 303(d) listings occur within this reach.
- 870  **Impervious Surface Area-** A total of 5.7 ac of impervious areas are located in this reach which has a higher proportion of such surfaces than that of the overall jurisdiction characterized in this report. However,

Watershed Professionals Network & Mark Yinger Associates. 2002. *WRIA 29 Hydrology and Geology Assessment*. Prepared for Envirovision Corp. & WRIA 29 Planning Unit.

2.4 Bonneville Dam

Carriker, Robert C. 2001. "Ten Dollars a Song: Woody Guthrie Sells His Talent to the Bonneville Power Administration. *Columbia Magazine*. Spring 2001, 15(1), 32-36. Washington State Historical Society.

Carson Land Company. 1974. "Easement Deed, from Corporation, For and in Consideration of the Sum of Nine Thousand Four Hundred Fifty and no/100". Recorded in the Office of the Skamania County Auditor at Book 68 Page 54-57.

Daubenspeck, Frank et ux. 1936. "Flowage Easement," recorded in the Office of the Skamania County Auditor at Book Z. pp. 61-62.

Guthrie, Woody. 1936. "Roll On Columbia," Woody Guthrie Publications, Inc. & TRO-Ludlow Music, Inc. (BMI).

Interfluve, Inc. 2005. "Rock Creek Bridge—Stevenson, WA, Geomorphic Investigations," hydraulic modeling and photos prepared for Curt Vanderzanden, PE.

4.0 Reach Level Characterization

The JD White Company, Inc., KPFF Consulting Engineers, and E.D. Hovee & Associates. 1995. *Fatal flaw analysis for watercraft recreation sites*. Prepared for Skamania County. August 1995.

Palmer, John. 2017. "Cold Water Fish Refuges: EPA's Columbia River Cold Water Refuges Project." *The Water Report*, 164, 1-8.

Soliz, Cyndi. 2018. Teleconference with City Planning Director regarding presence of milfoil and other noxious weeds. February, 13, 2018.

United States Soil Conservation Service (USFS). 1990. *Soil Survey of Skamania County Area, Washington*. In cooperation with Washington State Department of Natural Resources and Washington State University Agriculture Research Center.

5.3 Projected Shoreline Use and Potential Use Conflicts

Shumaker, Ben. 2015. Teleconference with BergerABAM regarding shoreline uses and trends. June 2, 2015.

The JD White Company, Inc., KPFF Consulting Engineers, and E.D. Hovee & Associates. 1995. *Fatal flaw analysis for watercraft recreation sites*. Prepared for Skamania County. August 1995.

Appendix C Map Portfolio

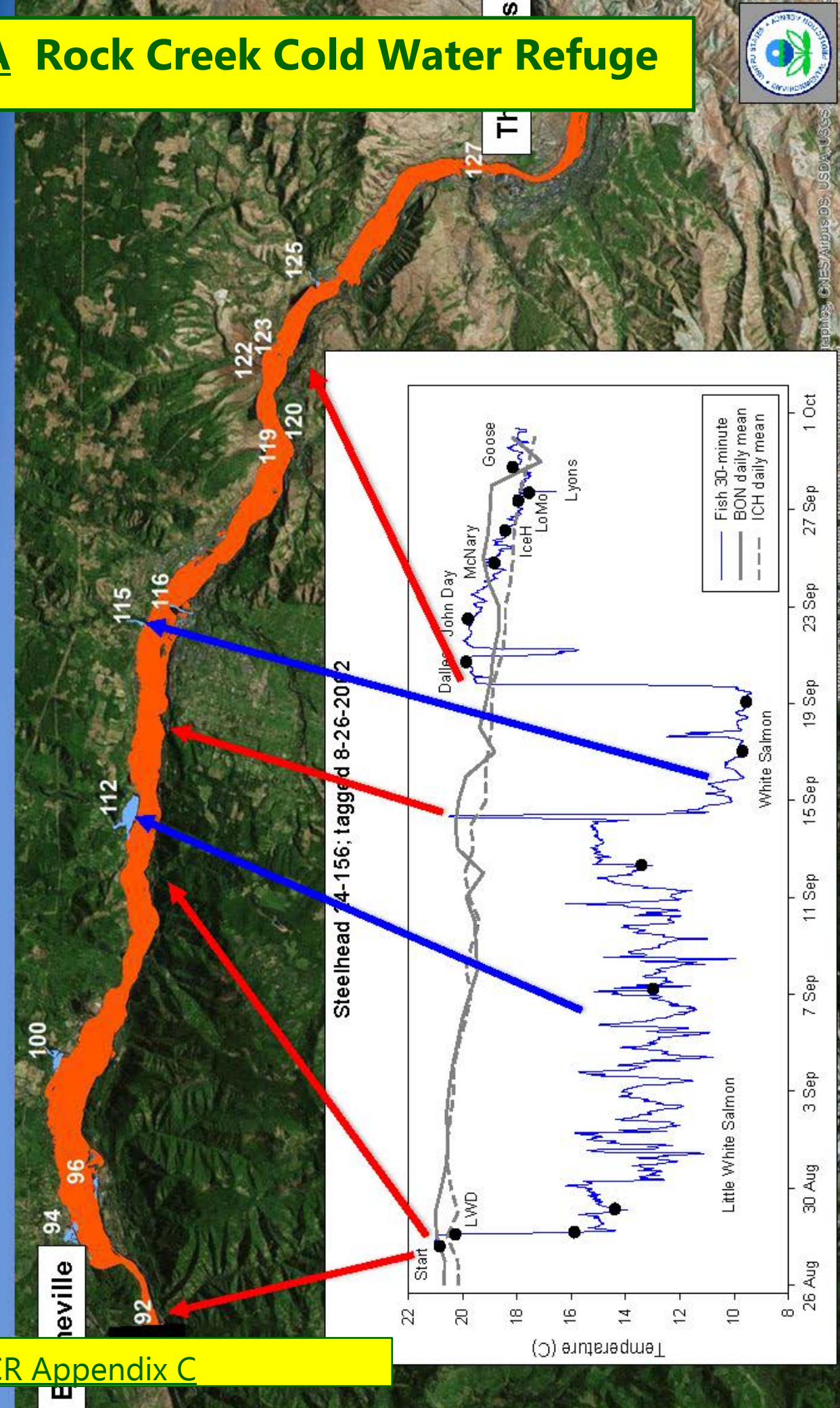
This appendix includes the following figures:

Reach-scale Attribute	Description	Map Number
Preliminary Shoreline Jurisdiction	Approximate extent of SMP jurisdiction (current), approximate extent of SMP jurisdiction (predesignation), approximate extent of landslide hazard areas considered for optional jurisdiction.	1
Physical Environment		
Land Cover	USGS gap analysis program (GAP) data showing forested, shrub-covered, grass-covered, non-vegetated, and water areas. Includes tabular summary of vegetation/land cover.	2
Soil	USGS Soil Survey Geographic Database (SSURGO) and US Forest Service data.	3
Contours	LiDAR-derived 10- and 100-foot contours provided by Skamania County GIS.	4
Liquefaction Hazards	Displays hazard categories for land movement during earthquakes.	5
Geologic Hazards	Stevenson Critical Areas Hazard Map showing potentially unstable slopes, landslide hazard areas, scarps, and unstable soils. Includes memo from PBS Engineering, 2007.	5A
Floodplains	FEMA FIRM, Zone A on Map 530161 A, Panels 01-02 (Red) and Map 530160, Panel 425 (Yellow).	6
Channel Migration Zones	Department of Ecology Map and coarse-scale analysis of likely Channel Migration Zones (CMZs) in Skamania County. Includes memo.	6A
Flowage Easements	Based on County easements records and shows vertical elevation of all flowage easements maintained by the Corps of Engineers for the Bonneville Dam Project.	6B
Biological Resources		
PHS Data	WDFW Priority Habitat and Species (PHS) Wildlife GIS data. Includes species list by reach.	7
Wetlands	USFWS National Wetlands Inventory and Stevenson Critical Areas Wetland Map showing potential wetlands as identified by JD White and Associates in 2007. Includes acreage of wetlands.	8
Cold Water Refuges	US EPA maps showing upstream extent and approximate location of the Rock Creek Cold Water Refuge.	8A
Land Use & Altered Conditions		
Existing Land Use	County parcel data using Department of Revenue (DOR) codes (derived and categorized from Skamania County Assessor's database).	9
Future Land Use	Map from 2013 Stevenson Comprehensive Plan designating areas for different types of residential and trade uses.	9A
Zoning	Map developed by Skamania County GIS using County and City maps.	10
Archeology/Historic Resources	Washington State Department of Archaeology and Historic Preservation (DAHP), includes publicly available information, excludes sensitive information.	14
Public Access		
Public Ownership	Public land includes all land owned by federal, state, or local government agencies. "Rights-of-way" were not classified as "Public". Areas not covered by parcel dataset (i.e., large portion of the Columbia River) were classified as "Public". Data for length and area in public ownership included and specific recreation areas also noted.	11
Restoration Opportunities		
Impervious Surfaces	County data was used to calculate impervious area (square feet) and linear distance of impervious surface (feet). Includes tabular data for impervious surface types.	12
Rooftops	County data on rooftops within shoreline area and measuring rooftop distance to OHWM. Includes tabular data for building number and size.	13
Shoreline Modifications	Aerial photo-derived data by Skamania County GIS. Includes tabular data on armoring length, island dimensions, and size of docks/piers.	15
Fish Passage Barriers	WDFW Fish Passage and Diversion Screening Inventory Database. Includes reports for identified barriers.	16

FIGURE 8A Rock Creek Cold Water Refuge

Steelhead use of CWR

Columbia River between Bonneville Dam and The Dalles



The upstream extent was set at a riffle 0.15 miles (0.24 km) upstream that constrains movement (depth of 0.8 meter or less), based on a site visit conducted on 8/17/17.



The upstream extent was set at the shallow channel above the pool north of WA-14, 0.13 miles (0.21 km) upstream from the confluence.