Public Works Department
City of Bellingham

TECHNICAL MEMORANDUM

To: **Renée LaCroix, Assistant Public Works Director, Natural Resources Division**

From: Analiese Burns, Habitat and Restoration Manager

Subject: **2019 City of Bellingham Fish Barrier Prioritization Update**

Date: **December 15, 2019**

The City of Bellingham encompasses eight watershed and their associated streams (Figure 1). Most stream reaches are fish-bearing and support populations of both anadromous and resident salmon and trout. As documented in the City's Comprehensive Plan, the City is committed to stewarding fish and wildlife habitat, including fish-bearing streams. As part of this commitment, the City has a long history of improving fish passage throughout the City and Urban Growth Area both with independent restoration projects and in conjunction with other capital improvement projects. The City has developed and used prioritization tools to plan for these fish passage improvement projects.

Purpose

This fish barrier prioritization updates prior prioritization efforts with the purpose of identifying high priority barrier improvement projects for planning and implementation. More specifically, the prioritization update is intended to:

- Incorporate the most current Washington Department of Fish and Wildlife (WDFW) barrier assessments;
- Update prioritization methodology consistent with the *Fish Passage Inventory, Assessment and Prioritization Manual* (WDFW, 2019c);
- Reflect barrier improvements completed since 2009;
- Aid in incorporating prioritized culverts in City utility and transportation planning;
- Aid in coordinating City barrier improvements with Washington State Department of Transportation (WSDOT) planned barrier improvements; and
- Aid in coordinating City barrier improvements with other barrier improvements conducted as part of the Water Resource Area (WRIA) 1 Salmon Recovery Plan.

This prioritization is intended to be updated in the future as conditions, opportunities, and standards change.

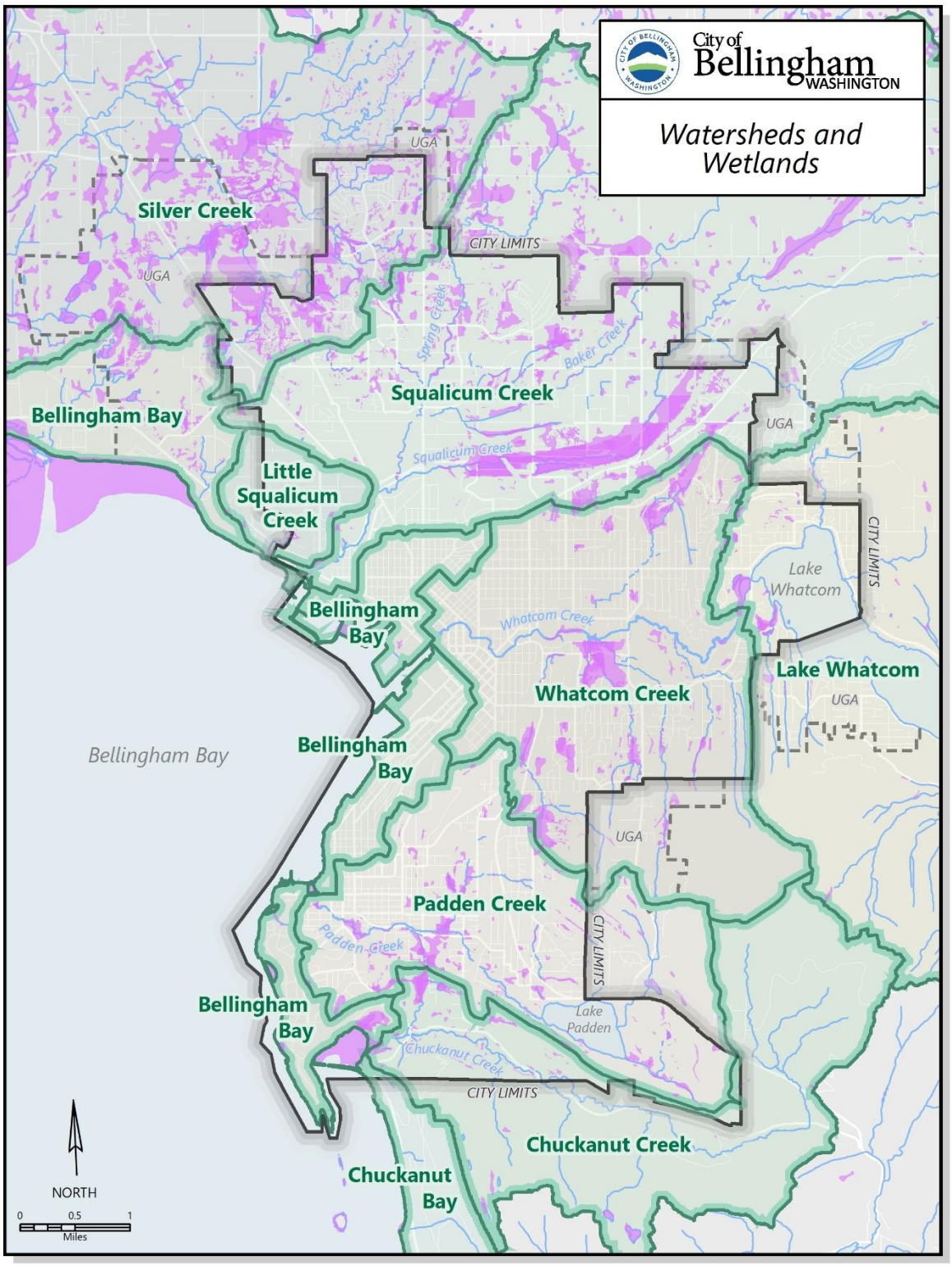

Figure 1. Bellingham Watersheds

Background

The City of Bellingham formally initiated a culvert improvement program in 2003 to address barriers to fish passage in the City limits, including culverts in Padden Creek, the Baker and Spring Creek sub-watersheds of Squalicum Creek; the Bear Creek sub-watershed of Silver Creek; the Lincoln, Cemetery, and Hannah sub-watersheds of Whatcom Creek; and a portion of Chuckanut Creek. This initial effort prioritized culvert improvements using a decision matrix that included replacement benefits, constraints and repairs.

In 2006, Whatcom County completed a county-wide fish passage barrier inventory (Whatcom County Public Works, 2006). The inventory scope was limited to non-state-owned barriers within the County accessible to anadromous fish. Their Chuckanut Foothills Sub-basin analysis included the following Bellingham streams: Squalicum Creek, Whatcom Creek, Padden Creek, and Chuckanut Creek. For these streams, Whatcom County and their partners conducted new field assessments for barriers outside the Bellingham city limits and utilized existing WDFW barrier information within the City limits. New field assessments were conducted in accordance with the *Fish Passage Barrier and Surface Water Diversion Screening Assessment and Prioritization Manual* (WDFW, 2000).

In 2010, the City completed an updated prioritization (Anchor QEA, LLC, 2010). The goal of the 2010 effort was to describe the culvert improvement program to date, document projects completed since 2003, and update the prioritization. The update included analysis of 140 culverts in the City of Bellingham and used a Priority Index (PI) score calculated by the project team based on WDFW guidelines contained in the *Fish Passage Barrier and Surface Water Diversion Screening Assessment and Prioritization Manual* (WDFW, 2009). In 2011, the City completed an addendum to the 2010 prioritization (Confluence Environmental Company, 2012). The addendum expanded the study area to include Lake Whatcom culverts within the City of Bellingham. The addendum also updated the prioritization by accounting for projects completed since 2006. In 2014, the barrier assessment data used in the 2010 prioritization and 2012 addendum became outdated when the WDFW updated barrier data in a 2014 city-wide barrier inventory.

The 2014 city-wide barrier inventory was part of WDFW's state-wide inventory of fish passage barriers. The purpose of this inventory was to fill data gaps in their state system, including updated PI scores for many barriers. The City of Bellingham was one of the select communities chosen for a full barrier inventory. This 2014 inventory, together with subsequent WDFW inventory updates, are available on WDFW's Fish Passage and Diversion Screening Inventory (FPDSI) database (WDFW, 2019a).

In this 2019 City of Bellingham update, the prioritization incorporates the results of the 2014 WDFW full barrier inventory and more recent barrier assessments documented on the FPDSI database. The prioritization is also designed to be consistent with the most recent WDFW prioritization methodology as described in the *Fish Passage Inventory, Assessment and Prioritization Manual* (WDFW, 2019c).

Incorporating the most recent WDFW barrier assessments and prioritization methodology allows improved consistency between the City, State, and a concurrent culvert evaluation effort by Whatcom County.

Coordination

The City has a long history of coordinating barrier improvements with other entities to maximize habitat benefits and cost efficiencies. This coordination is on-going and increasingly important as the State implements barrier improvements to meet a 2013 federal injunction. The injunction requires the State to open 90 percent of the habitat blocked by State-owned fish passage barriers by 2030. Out of the 992 barriers under state highways, the Washington Department of Transportation (WSDOT) prioritized 415 barriers for removal by 2030. The City, WDFW and WSDOT gave a joint presentation and tour to the State's Joint Transportation Committee in October 2018 to highlight recent coordination between the City and State in barrier removal, including the 2015 Padden Creek Daylighting project and Squalicum Creek Re-route Phases 1 and 2 projects. This coordination continued through the fall of 2018 and spring of 2019 as the City and WSDOT discussed the State's plans to improve several fish passage barriers within the City by 2025. The City agreed to incorporate these planned projects into this updated local barrier prioritization to facilitate ongoing coordination between the City and State with the goal of maximizing the effectiveness of barrier improvement investments.

In addition to coordinating with State barrier improvements, the City also participates in the WRIA 1 culvert coordination effort facilitated by Whatcom County through the Salmon Recovery Funding Board Lead Entity. The County re-convened local stakeholders in early 2019 to coordinate and identify synergies between upcoming barrier improvement projects. Participants included the City of Bellingham, Whatcom County, Nooksack Tribe, Lummi Nation, US Forest Service, Washington Department of Natural Resources (WDNR), WSDOT, WDFW, Whatcom Conservation District, Whatcom Land Trust, and the Nooksack Salmon Enhancement Association.

Scope and Methodology

The current prioritization of fish barrier improvements encompasses all City-owned fish barriers within City limits including Silver Creek, Little Squalicum Creek, Squalicum Creek, Whatcom Creek, Padden Creek, and Chuckanut Creek watersheds. This prioritization was completed using existing information and did not include new fieldwork or barrier assessments.

The prioritization follows a seven step process as outlined below. Steps 1 through 5 focus on identifying the City's fish passage barrier sites, Step 6 refines and update barrier information, and Step 7 scores and ranks the sites. During each step, barriers were removed from the list and for subsequent steps if they were upstream of a total natural barrier, evaluated as having a PI=0 due to their location at the upstream extent of the anadromous zone, or were already corrected to fully fish passable.

STEPS 1 -6: Identify Sites

1. Create a Draft Priority List consisting of the top 10 City-owned barriers within City limits identified in the Whatcom County Fish Passage Barrier Inventory (Whatcom County Public Works, 2006), ranked by 2006 PI score and listed by WDFW identifier number.
2. Update PI scores for the 10 barriers identified in 1, above, using the FPDSI database (WDFW, 2019a).
3. Review all City-owned barriers within City limits mapped on the FPDSI database (WDFW, 2019a) and add barriers with PI scores ≥ lowest score identified in 2 (PI score ≥ 15.48).
4. Add barriers to the Draft Priority List if they:
    a. did not have a PI score but were lower in the system than barriers on the Draft Priority List from 3, above and/or
    b. are within 2 miles of a restoration site or barrier removal completed or planned to be complete by 2025. Planned projects are based on the City's adopted Six-Year (2020-2025) Transportation Improvement Program (City of Bellingham, 2019) and the WSDOT 2019 Project Delivery Plan (WSDOT, 2019).
5. Add any top 10 barriers from Anchor 2010 (from PI Ranks for All Barriers list), if not already on Draft Priority List from 4, above.

STEP 6: Refine Site Information

6. Update and add information:
    a. Calculate lineal gain if not provided on WDFW barrier forms by estimating distance in GIS using City of Bellingham stream layer.
    b. Update any data from qualified sources. In 2019, this consisted of updating fish Passability at the City's flood dams based on a habitat assessment conducted by Environmental Science Associates (ESA), Waterfall Engineering, Aspect Consulting, and Wilson Engineering (2019). It also included updating the ESA species presence to include bull trout from WDFW (2019b).

STEP 7: Score and Rank Sites

7. Score and rank all culverts on the Draft Priority List from step 7 using the Prioritization Equation below. The equation uses 12 metrics. These metrics represent key information available for all barriers together with Additional Considerations (species listings, coordination, benefits, juveniles, community support, and funding opportunities) provided in the WDFW *Fish Passage Inventory, Assessment and Prioritization Manual* (WDFW, 2019c, p. 12-5). See the Prioritization Manual for methodologies and descriptions of each of the Additional Considerations.

Prioritization Equation:

SCORE =

Lineal Gain + Passability + ESA + Coord. Barriers + Coord. Other + (Benefits/3) + Juveniles + Comm. Support + Funding Opp. – Cost

The equation metrics represent three general categories:

- Fish Need/Benefit – lineal gain, passability, Endangered Species Act (ESA), juveniles, benefits habitat, benefits surface waters, and benefits restoration
- Coordination with Other Efforts – coordination barriers, coordination other
- Support and Cost Feasibility – Community support, funding opportunity, and cost

The table below shows the maximum possible scores in each category and the percent contribution to the maximum possible score.

Table 1. Prioritization Equation Metric Summary

Category	Maximum Possible Score	Percent of Total Possible Score
Fish Need/Benefit	19	61%
Coordination with Other Efforts	6	19%
Support and Cost Feasibility	6	19%
TOTAL SCORE	**31**	

Below is a description and score value for each metric in the Prioritization Equation.

Lineal Gain:

0 meters = 0
≥1 and ≤ 300 meters = 1
301-1,600 meters = 2
≥1,600 meters = 3

Use lineal gain on existing WDFW barrier forms. If lineal gain not provided, use any existing lineal gain from downstream WDFW barrier form and add additional stream length to extent of anadromous habitat by measuring GIS distance. Measure GIS distance by viewing WDFW SalmonScape map (WDFW, 2019b) and Northwest Indian Fisheries Commission Statewide Integrated Fish Distribution (SWIFD) map (NWIFC, 2019) and determining furthest upstream extent of documented, presumed, or potential for anadromous species. Since all barriers in anadromous fish habitat, measure upstream to extent of anadromous habitat. Distance is calculated in meters for consistency with WDFW barrier forms.

Passability:

67% = 0.5
33% = 2
0% = 3
Unknown is given a default of 1

ESA:

Non-ESA listed salmonids present or potentially present = 1
1 ESA listed species present or potentially present = 2
≥2 ESA listed species present or potentially present = 3

Based on SaSI as shown in SalmonScape (WDFW, 2019b)

Coordination - Barriers:

>5,280 feet upstream of a planned barrier improvement = 0.5
>5,280 feet upstream of a completed barrier improvement = 1
≤5,280 feet upstream of a planned barrier improvement = 1.5
≤5,280 feet upstream of a completed barrier improvement = 2
Downstream of a planned barrier improvement = 2
Downstream of a completed barrier improvement = 2.5
Downstream of >1 completed barrier improvement = 3

Coordination - Other:

At same location as a future transportation, utility, or similar project planned for construction by 2025

Surface only or no improvements = 0
Minor excavation required = 1
Major excavation required = 2
Full roadbed reconfiguration/construction = 3

Benefits - Restoration:

>5,280 feet upstream of a planned restoration project = 0.5
>5,280 feet upstream of a completed restoration project = 1
≤5,280 feet upstream of a planned restoration project = 1.5
≤5,280 feet upstream of a completed restoration project = 2
Downstream of a planned restoration project = 2
Downstream of a completed restoration project = 2.5
Downstream of >1 completed restoration project = 3

Benefits - Surface Waters:

1 point for each:

Increases storage capacity/reduce flood risk = 1
Expands floodplain = 1
Incorporates measures to address Category 5 303(d) listing(s) = 1

Benefits - Habitat:

Barrier in Tier 2 subwatershed = 1
Barrier in Tier 1 subwatershed = 2
Barrier prioritized or within prioritized restoration polygon = 3

Based on Habitat Restoration Technical Assessment, Nearshore and Estuarine Assessment and Restoration Prioritization (MacLennan et al., 2013), Bellingham Bay Action Team, or other similar effort.

Juveniles:

No anadromous juveniles present = 0
Anadromous juveniles present = 1

Presence assumed if barrier is downstream of natural fish passage barrier.

Community Support:
1 point for each:
Educational opportunity associated with correction = 1
Willing non-City stakeholder(s) = 1

Funding Opportunities:
Potential funding source other than Fish Barrier
Removal Board Funding = 1

Includes consideration of other project elements (e.g., habitat restoration, public access, parks) that may be good fits for other grant funding.

Cost:
Incremental funds needed <$1.5M = 0
Incremental funds needed ≥$1.5M to $3.5M = 1
Incremental funds needed >$3.5M to $5M =2
Incremental funds needed >$5M = 3

Rather than WDFW (2009), used cost breaks from WSDOT cost estimation based on width of proposed structure (0-16' = $1.5-$3.5M, 17-26' = $3.5-$5M, >26' = >$7M)

Results

The results of each step of the 2019 prioritization are included in Attachments 1 - 7. The final barriers prioritized for improvement in 2019 are shown in Table 2 and Figure 2.

A summary of the results of each step is as follows:

STEP 1. Create a Draft Priority List consisting of the top 10 City-owned barriers within City limits identified in the Whatcom County Fish Passage Barrier Inventory (Whatcom County Public Works, 2006), ranked by 2006 PI score and listed by WDFW identifier number.
Results: 10 barriers added to the list

STEP 2. Update PI scores for the 10 barriers identified in 1, above, using the FPDSI database (WDFW, 2019a).
Results: 2 barriers removed: 1 barrier is state owned and no longer documented by WDFW as a fish passage barrier and 1 barrier improvement has already been completed.
8 barriers remain

STEP 3. Review all City-owned barriers within City limits mapped on the FPDSI database (WDFW, 2019a) and add barriers with PI scores ≥ lowest score identified in 2 (PI score ≥ 15.48).
Results: 11 barriers added, then 2 of these 11 removed because barrier improvements were completed.
16 barriers remain

STEP 4. Add barriers to the Draft Priority List if they:

a. did not have a PI score but were lower in the system than barriers on the Draft Priority List from 3, above and/or
b. are within 2 miles of a restoration site or barrier removal completed or planned to be complete by 2025. Planned projects are based on the City's adopted Six-Year (2020-2025) Transportation Improvement Program (City of Bellingham, 2019) and the WSDOT 2019 Project Delivery Plan (WSDOT, 2019).

Results: 19 barriers added, then 3 of these 19 removed because barrier improvements were completed.
1 barrier (920649) removed because City believes barrier is natural, <u>needs confirmation (update as necessary in future prioritization)</u>.
31 barriers remain

STEP 5. Add any top 10 barriers from Anchor 2010 (from PI Ranks for All Barriers list), if not already on Draft Priority List from 4, above.
Results: 3 barriers added, then 2 of these 3 barriers removed. 1 was removed because it is no longer documented by WDFW as a fish passage barrier, and the other was removed because the barrier improvement was completed.
32 barriers remain

STEP 6. Update and add information:

a. Calculate lineal gain if not provided on WDFW barrier forms by estimating distance in GIS using City of Bellingham stream layer.
b. Update any data from qualified sources. In 2019, this consisted of updating fish Passability at the City's flood dams based on a habitat assessment conducted by Environmental Science Associates (ESA), Waterfall Engineering, Aspect Consulting, and Wilson Engineering (2019).

Results: Updated or calculated lineal gain on 14 barriers. Updated passability on 2 barriers. Updated bull trout presence on 4 barriers. No barriers removed.
32 barriers remain

STEP 7. Score and rank all culverts on the Draft Priority List from step 7 using the Prioritization Equation.
Results: 32 barriers, ranked. Scores range from 14.7 to 5.0. See summary in Table 2 and Figure 2.

Table 2. 2019 City of Bellingham Prioritized Fish Passage Barriers

RANK	Site ID	Stream	Road Crossing	Total PI (WDFW Form)	Lineal Gain (m)	Passability (%)	ESA*	SCORE
1	993881	SF Baker Cr	James St	**0.00**	3,084	unknown	ST, BT	**15.7**
2	602273	Squalicum Cr	Baker Cr confluence	**unknown**	36,708	33	CH, ST, BT	**14.7**
3	993006	Baker Cr	James St	**15.61**	6,064	67	ST	**14.2**
4	01.0622 0.80	Padden Cr	16th St	**53.96**	11,942	67	CH, ST	**14.0**
5	991104	Squalicum Cr	Roeder Ave	**unknown**	38,933	unknown	CH, ST, BT	**14.0**
6	01.0622 0.70	Padden Cr	14th St	**48.14**	3,701	67	CH, ST	**13.5**
7	991600	Padden Cr	Lake Padden	**30.88**	3,533	0	ST	**13.5**
8	993884	NF Baker Cr	Telegraph Rd Telegraph Flood Dam	**unknown**	1,830	33	ST, BT	**13.3**
9	01.0552 2.00	Squalicum Cr	Meridian St	**unknown**	17,381	67	CH, ST, BT	**13.2**
10	992984	Spring Cr	Kellogg Rd	**21.03**	6,516	unknown	ST, BT	**12.8**
11	992981	Spring Cr	E Bakerview Rd	**25.43**	7,318	67	ST, BT	**12.7**
12	993038	Baker Cr	Telegraph Rd	**unknown**	5,786	0	ST	**12.5**
13	01.0559 0.10	Trib W, Squalicum Cr	Meridian St	**unknown**	0	67	CH, ST, BT	**11.8**
14	993880	SF Baker Cr	E McLeod Rd	**15.48**	1,984	unknown	ST, BT	**11.7**
15	994370	Padden Cr	30th St	**18.01**	1,103	33	ST, BT	**11.3**
16	991599	Padden Cr	39th St ROW	**27.65**	3,917	0	ST	**11.0**
17	993883	Baker Cr	Deemer Rd	**unknown**	2,260	33	ST, BT	**11.0**
18	993093	SF Baker Cr	Strider Lp Hannegan Flood Dam	**24.77**	4,043	67	ST, BT	**9.8**

19	993040	Baker Cr	E Bakerview Rd @ Irongate	**25.04**	5,014	33	ST	**9.5**
20	370678	Lincoln Cr	Lincoln St	**unknown**	2,440	33		**9.0**
21	993443	Baker Cr	Hannegan Rd	**18.26**	3,457	67	ST	**8.5**
22	993821	Baker Cr	Hannegan Rd	**22.6**	2,993	33	ST	**8.3**
23	920634	Whatcom Cr	Woburn St	**unknown**	500	0	CH, ST, BT	**8.2**
24	370683	W Cemetery Cr	Old Lakeway Dr	**unknown**	2,100	0		**8.0**
25	370648	Cemetery Cr	Lopez St	**unknown**	1,110	0		**8.0**
26	370658	W Cemetery Cr	Lakeway Dr	**unknown**	2,260	0		**8.0**
27	993482	Hoags Cr	25th St	**17.78**	263	33	ST	**7.0**
28	993484	Hoags Cr		**16.9**	263	0		**7.0**
29	993483	Hoags Cr	Interurban Trail	**17.81**	283	33		**7.0**
30	1280163	E Bear Cr	Horton Flood Dam	**unknown**	810	67		**6.8**
31	370649	Cemetery Cr	San Juan Blvd	**unknown**	220	0		**6.0**
32	370679	E Cemetery Cr	Woburn St	**unknown**	120	0		**5.0**

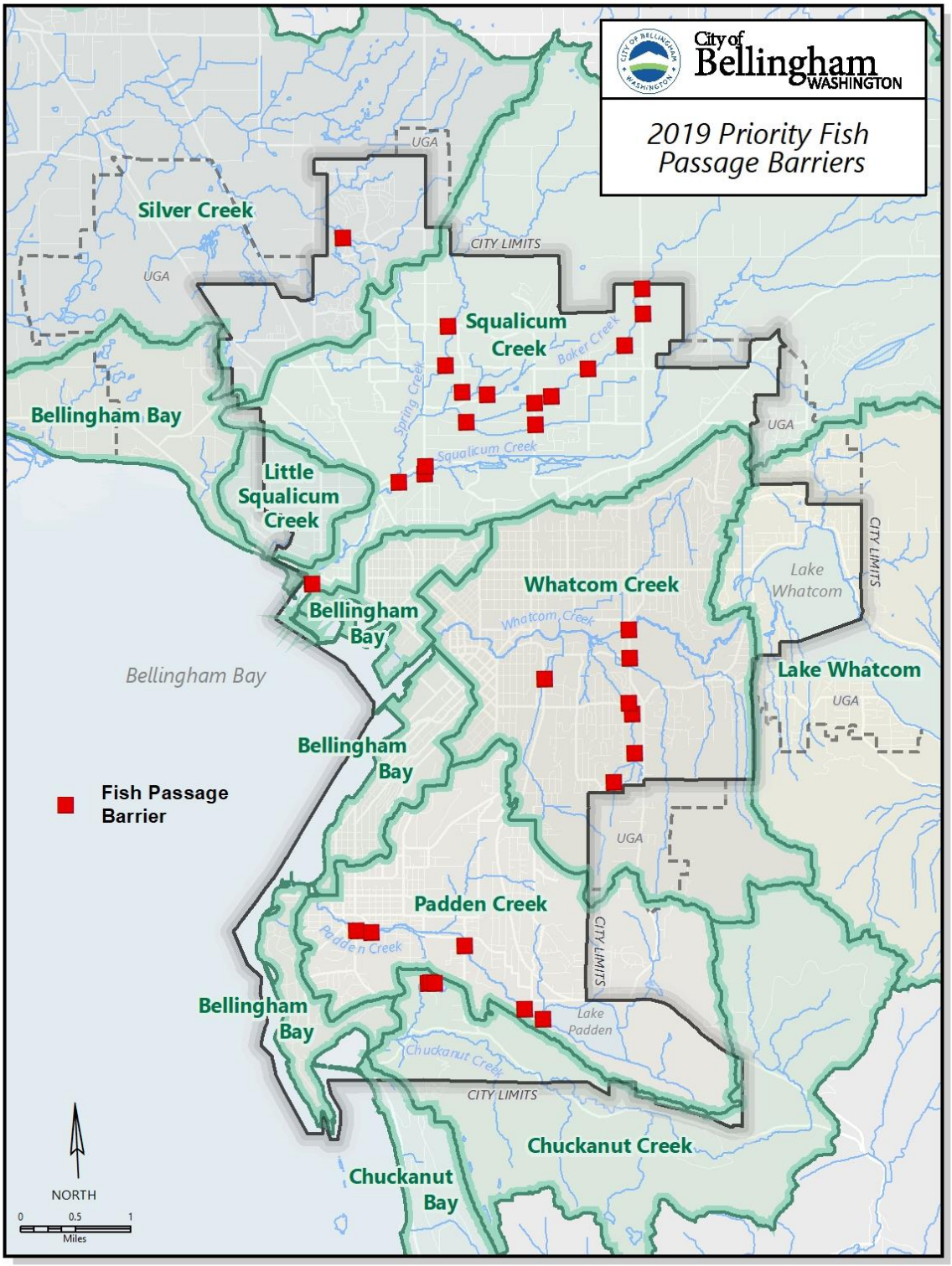

Figure 2. 2019 City of Bellingham Priority Fish Passage Barriers

Update Schedule

The underlying information used to prioritize barriers change as projects are completed, planning efforts change, and new biological information becomes available. Therefore, the City of Bellingham intends to complete an annual update to the prioritization data and ranked barrier list.

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Whatcom County Public Works, 2006. Whatcom County Fish Passage Barrier Inventory Final Report, IAC Project Number 01-1258 N. Bellingham, Washington.

STEP 1: Create a Draft Priority List consisting of the top 10 City-owned barriers (on City property or ROW) identified in the Whatcom County Fish Passage Barrier Inventory (2006), ranked by 2006 PI score and listed by WDFW identifier number.

	Site ID	Stream	Road Crossing	**Total PI 2016 (Form)**	Lineal Gain (m)	Barrier Reason	Passability (%)	ESA*	Notes
1	992979	Baker Cr	unknown	**25.69**					
2	992981	Spring Cr	E Bakerview Rd	**25.43**	7318	velocity	67	ST	
3	993093	SF Baker Cr	Strider Lp	**24.77**	4043	other	0	ST, BT	Irongate flood dam
4	992984	Spring Cr	Kellogg Rd	**21.03**	6516	unknown	unknown	ST	upstream of Irongate flood dam
5	993443	Baker Cr	Hannegan Rd	**18.26**	3457	velocity	67	ST	upstream of Irongate flood dam
6	993110	Baker Cr	Hannegan Rd	**18.26**			67		
7	993821	Baker Cr	Hannegan Rd	**17.61**	2993	slope	33	ST	upstream of Irongate flood dam and other culverts
8	993880	SF Baker Cr	E McLeod Rd	**15.48**	1984			ST	
9	993006	Baker Cr	James St	**14.12**	6064	other	67	ST	
10	993487	Hoags Cr	Hoags Pond trail	**13.85**	100		0	ST	
	*ESA species benefiting (as documented on WDFW fish barrier field form): CH = Chinook, ST = steelhead, BT = bull trout								

Attachment 2: Step 2

STEP 2: Update PI scores, other stats using FPDSI database

	Site ID	Stream	Road Crossing	**Total PI 2019 (Form)**	Lineal Gain (m)	Barrier Reason	Passability (%)	ESA*	Notes
1	992978	Spring Creek	**SR 539**	**22.64**	**9015**	**depth**	**67**	ST	No record of this culvert on WDFW map, believe it is error and should be 992978, state owned. Remove from list.
2	992981	Spring Cr	E Bakerview Rd	**25.43**	7318	velocity	67	ST	
3	993093	SF Baker Cr	Strider Lp	**24.77**	4043	other	0	ST, BT	Irongate flood dam
4	993821	Baker Cr	Hannegan Rd	**22.6**	2993.00	slope	33.00	ST	upstream of Irongate flood dam and other culverts
5	992984	Spring Cr	Kellogg Rd	**21.03**	6516	unknown	unknown	ST	upstream of Irongate flood dam
6	993443	Baker Cr	Hannegan Rd	**18.26**	3457	velocity	67	ST	upstream of Irongate flood dam
7	993006	Baker Cr	James St	**15.61**	6064	other	67	ST	
8	993880	SF Baker Cr	E McLeod Rd	**15.48**	1984		unknown	ST	

*ESA species benefiting (as documented on WDFW fish barrier field form): CH = Chinook, ST = steelhead, BT = bull trout

REMOVED IN THIS STEP

1	993487	Hoags Cr	Hoags Pond trail	**0**	100	N/A	100	ST	dam, repaired as of 2011
2	993110	Baker Cr		**0**		N/A	100		no longer listed as a barrier, remove from list

STEP 3: Add barriers on City property or ROW from FPDSI database with PI score **≥ lowest PI score from Step 2** (PI score ≥15.48)

	Site ID	Stream	Road Crossing	**Total PI 2019 (Form)**	Lineal Gain (m)	Barrier Reason	Passability (%)	ESA*	Notes
1	01.0622 0.80	Padden Cr	16th St	**53.96**	11942	WS drop	67	CH, ST	
2	01.0622 0.70	Padden Cr	14th St	**48.14**	3701	depth	67	CH, ST	
3	991600	Padden Cr	Lake Padden	**30.88**	3533	WS drop	0.00	ST	
4	991599	Padden Cr	39th St ROW	**27.65**	3917	slope	0.00	ST	
5	992981	Spring Cr	E Bakerview Rd	**25.43**	7318	velocity	67	ST	
6	993040	Baker Cr	E Bakerview Rd	**25.04**	5014	depth	33	ST	
7	993093	SF Baker Cr	Strider Lp	**24.77**	4043	other	0	ST, BT	Irongate flood dam
8	993821	Baker Cr	Hannegan Rd	**22.6**	2993	slope	33.00	ST	upstream of Irongate flood dam and other culverts
9	992984	Spring Cr	Kellogg Rd	**21.03**	6516	unknown	unknown	ST	upstream of Irongate flood dam
10	993443	Baker Cr	Hannegan Rd	**18.26**	3457	velocity	67	ST	upstream of Irongate flood dam
11	994370	Padden Cr	30th St	**18.01**	1103	slope	33	ST	
12	993483	Hoags Cr	Interurban Trail	**17.81**	283	slope	33		
13	993482	Hoags Cr	25th St	**17.78**	263	slope	33	ST	
14	993484	Hoags Cr		**16.9**	263	slope	0		
15	993006	Baker Cr	James St	**15.61**	6064	other	67	ST	
16	993880	SF Baker Cr	E McLeod Rd	**15.48**	1984		unknown	ST	

*ESA species benefiting (as documented on WDFW fish barrier field form): CH = Chinook, ST = steelhead, BT = bull trout

REMOVED IN THIS STEP

1	01.0622 0.30	Padden Cr	10th St	**49.64**	3445	depth	67	CH, ST	COB retrofit EV-23. Submit repair to WDFW so shows on database. Remove from list.
2	01.0622 0.50	Padden Cr	12th St	**49.16**	4023	WS drop	67	CH, ST	Retrofit completed EV-23. Submit repair to WDFW so shows on database. Remove from list.

STEP 4: Add barriers if did not have a PI score but were: a. lower in the system than barriers on the Draft Priority List from 3, above and/or
b. are within 2 miles of a restoration site or barrier removal completed or planned to be complete by 2025 (and not above a natural barrier).

	Site ID	Stream	Road Crossing	Total PI 2019 (Form)	Lineal Gain (m)	Barrier Reason	Passability (%)	ESA*	Coordination	Notes
1	01.0622 0.80	Padden Cr	16th St	**53.96**	11942	WS drop	67	CH, ST		
2	01.0622 0.70	Padden Cr	14th St	**48.14**	3701	depth	67	CH, ST		
3	991600	Padden Cr	Lake Padden	**30.88**	3533	WS drop	0.00	ST		
4	991599	Padden Cr	39th St ROW	**27.65**	3917	slope	0.00	ST		
5	992981	Spring Cr	E Bakerview Rd	**25.43**	7318	velocity	67	ST		
6	993040	Baker Cr	E Bakerview Rd	**25.04**	5014	depth	33	ST		
7	993093	SF Baker Cr	Strider Lp	**24.77**	4043	other	0	ST, BT		Irongate flood dam
8	993821	Baker Cr	Hannegan Rd	**22.6**	2993	slope	33.00	ST		upstream of Irongate flood dam and other culverts
9	992984	Spring Cr	Kellogg Rd	**21.03**	6516	unknown	unknown	ST		upstream of Irongate flood dam
10	993443	Baker Cr	Hannegan Rd	**18.26**	3457	velocity	67	ST		upstream of Irongate flood dam
11	994370	Padden Cr	30th St	**18.01**	1103	slope	33	ST		
12	993483	Hoags Cr	Interurban Trail	**17.81**	283	slope	33			
13	993482	Hoags Cr	25th St	**17.78**	263	slope	33	ST		
14	993484	Hoags Cr		**16.9**	263	slope	0			
15	993006	Baker Cr	James St	**15.61**	6064	other	67	ST		
16	993880	SF Baker Cr	E McLeod Rd	**15.48**	1984	unknown	unknown	ST		
17	993881	SF Baker Cr	James St	**unknown**	3084	unknown	unknown	ST	1 mi upstream of COB barrier improvement on Baker Cr at McLeod 2015, location of the James St Multimodal Study	Transpo Group estimated $1 million for full width
18	1280163	E Bear Cr	N/A	**unknown**		velocity	67		1.5 mi upstream of City Mitigation Bank site (Bear Cr), 1.5 mi upstream of Whatcom County planned improvement for barrier 1280204	Horton flood dam
19	370683	W Cemetery Cr	Old Lakeway Dr	**unknown**		WS drop	0			
20	370648	Cemetery Cr	Lopez St	**unknown**		slope	0			
21	370658	W Cemetery Cr	Lakeway Dr	**unknown**		slope	0			
22	370679	E Cemetery Cr	Woburn St	**unknown**		WS drop	0			
23	370649	Cemetery Cr	San Juan Blvd	**unknown**		slope	0			
24	991104	Squalicum Cr	Roeder Ave	**unknown**		tides	unknown	CH, ST, BT	downstream of private McLeod 2007, COB Willow Spring 2010/2018, COB Squal Ph 1/2 2015, COB McLeod2015, WSDOT prioritized 2025, COB Squal Ph 3/4 2020, COBlower Squal restoration sites,	Renee: Partial design COB/Port, $millions
25	602273	Squalicum Cr	Baker Cr confluence	**unknown**		WS drop	33	CH, ST, BT	downstream of private McLeod 2007, COB Squal Ph 1/2 2015, COB McLeod2015, WSDOT prioritized 2025, COB Squal Ph 3/4 2020; upstream of COB Willow Spring 2010/2018, COB lower Squal	flood "dam" (weir)
26	920634	Whatcom Cr	Woburn St	**unknown**		slope	0	CH, ST, BT	downstream of Boulder Bend and Whatcom Falls Park 1999 restoration; upstream of COB Red Tail Reach, COB Salmon Park, COB Cemetery Cr, COB Whatcom Cr Estuary	need to confirm 0% passability
27	993038	SF Baker Cr	Telegraph Rd	**unknown**	5786	slope	0	ST	upstream of WSDOT prioritized 2025, COB McLeod 2015, COB Baker Cr restoration site, lower Squal restoration sites, COB Willow Spring 2010/2018, COB lower Squal restoration sites	adjacent to Filippini donation
28	993883	Baker Cr	Deemer Rd	**unknown**		slope	33	ST, BT	upstream of WSDOT prioritized 2025, COB McLeod 2015, COB Spring Cr restoration site, lower Squal restoration sites, COB Willow Spring 2010/2018, COB lower Squal restoration sites	downstream of Telegraph flood dam
29	993884	Baker Cr	Telegraph Rd	**unknown**		other	67	ST, BT	upstream of WSDOT prioritized 2025, COB McLeod 2015, lower Squal restoration sites, COB Willow Spring 2010/2018, COB lower Squal restoration sites	Telegraph flood dam
30	01.0552 2.00	Squalicum Cr	Meridian St	**unknown**	17381	WS drop	67	CH, ST, BT	downstream COB Squal Ph 1/2 2015, COB Squal Ph 3/4 2020; upstream of COB Willow Spring 2010/2018, COB lower Squal restoration sites	
31	01.0559 0.10	Trib W, Squalicum Cr	Meridian St	**unknown**		WS drop	67	CH, ST, BT	downstream COB Squal Ph 1/2 2015, COB Squal Ph 3/4 2020; upstream of COB Willow Spring 2010/2018, COB lower Squal restoration sites	lineal gain based on WDFW decision that Trib

*ESA species benefiting (as documented on WDFW fish barrier field form): CH = Chinook, ST = steelhead, BT = bull trout

REMOVED IN THIS STEP

1	920649	Squalicum Cr	ornwall Park ped bridg	**unknown**		WS drop	unknown	CH, ST, BT	downstream COB Squal Ph 1/2 2015, COB Squal Ph 3/4 2020; upstream of COB Willow Spring 2010/2018, COB lower Squal restoration sites	Believe is a natural rock barrier. Remove from list, but confirm in field.
2	991105	Squalicum Cr	West St	**unknown**		velocity	33	CH, ST, BT	downstream of private McLeod 2007, COB Willow Spring 2010/2018, COB Squal Ph 1/2 2015, COB McLeod2015, WSDOT prioritized 2025, COB Squal Ph 3/4 2020; upstream of COB lower Squal restoration sites,	Retrofit completed in 2005 EV-18. WDFW AHB confirmed low priority, retrofit addressed primary species/timing. Submit repair to WDFW so shows on database. Remove from list.
3	920646	Squalicum Cr	Northwest Ave	**unknown**		depth	unknown	CH, ST, BT	downstream of private McLeod 2007, COB Squal Ph 1/2 2015, COB McLeod2015, WSDOT prioritized 2025, COB Squal Ph 3/4 2020; upstream of COB Willow Spring 2010/2018, COB lower Squal restoration sites,	Retrofit completed in 2005 EV-18. WDFW AHB confirmed low priority, retrofit addressed primary species/timing. Submit repair to WDFW so shows on database. Remove from list.
4	1280168	Bear Creek	Mahogany Ave	**unknown**		slope	67	ST	0.7 mi upstream of City Mitigation Bank site (Bear Cr)	City installed box culvert 2018 (ES-489). Remove from list.

Attachment 4: Step 4

STEP 5: Add any top 10 barriers from Anchor 2010 (from PI Ranks for All Barriers list), if not already on spreadsheet

	Site ID	Anchor, 2010 ID	Stream	Road Crossing	Total PI 2019 (Form)	Lineal Gain (m)	Barrier Reason	Passability (%)	ESA*	Coordination	Notes
1	01.0622 0.80	Padden 7	Padden Cr	16th St	**53.96**	11942	WS drop	67	CH, ST		
2	01.0622 0.30	Padden 3	Padden Cr	10th St	**49.64**	3445	depth	67	CH, ST		
3	01.0622 0.50	Padden 4	Padden Cr	12th St	**49.16**	4023	WS drop	67	CH, ST		
4	01.0622 0.70	Padden 6	Padden Cr	14th St	**48.14**	3701	depth	67	CH, ST		
5	991600	N/A	Padden Cr	Lake Padden	**30.88**	3533	WS drop	0.00	ST		
6	991599	Padden 13	Padden Cr	39th St ROW	**27.65**	3917	slope	0.00	ST		
7	992981	Spring 2	Spring Cr	E Bakerview Rd	**25.43**	7318	velocity	67	ST		
8	993040	Baker 9	Baker Cr	E Bakerview Rd	**25.04**	5014	depth	33	ST		
9	993093	Hannegan Detention	SF Baker Cr	Strider Lp	**24.77**	4043	other	0	ST, BT		Irongate flood dam
10	993821	Baker 13	Baker Cr	Hannegan Rd	**22.6**	2993	slope	33.00	ST		upstream of Irongate flood dam and other culverts
11	992984	Spring 4	Spring Cr	Kellogg Rd	**21.03**	6516	unknown	unknown	ST		upstream of Irongate flood dam
12	993443	Baker 12	Baker Cr	Hannegan Rd	**18.26**	3457	velocity	67	ST		upstream of Irongate flood dam
13	994370	Padden 11	Padden Cr	30th St	**18.01**	1103	slope	33	ST		
14	993483	Hoags 3	Hoags Cr	Interurban Trail	**17.81**	283	slope	33			
15	993482	Hoags 4	Hoags Cr	25th St	**17.78**	263	slope	33	ST		
16	993484	Hoags 5	Hoags Cr		**16.9**	263	slope	0			
17	993006	Baker 7	Baker Cr	James St	**15.61**	6064	other	67	ST		
18	993880	SF Baker 1	SF Baker Cr	E McLeod Rd	**15.48**	1984		unknown	ST		
19	370678	Lincoln 5	Lincoln Cr	Lincoln St	**unknown**		slope	33			
20	993881	SF Baker 2	SF Baker Cr	James St	**unknown**	3084	unknown	unknown	ST	1 mi upstream of COB barrier improvement on Baker Cr at McLeod 2015, location of the James St Multimodal Study	Transpo Group estimated $1 million for full width
21	1280163		E Bear Cr	N/A	**unknown**		velocity	67		1.5 mi upstream of City Mitigation Bank site (Bear Cr), 1.5 mi upstream of Whatcom County planned improvement for barrier 1280204	Horton flood dam
22	370683	W Cemetery 3	W Cemetery Cr	Old Lakeway Dr	**unknown**		WS drop	0			
23	370648	W Cemetery 4	Cemetery Cr	Lopez St	**unknown**		slope	0			
24	370658	W Cemetery 2	W Cemetery Cr	Lakeway Dr	**unknown**		slope	0			
25	370679	Magnolia 1	E Cemetery Cr	Woburn St	**unknown**		WS drop	0			
26	370649	W Cemetery 5	Cemetery Cr	San Juan Blvd	**unknown**		slope	0			
27	991104	Squalicum 2	Squalicum Cr	Roeder Ave	**unknown**		tides	unknown	CH, ST, BT	downstream of private McLeod 2007, COB Willow Spring 2010/2018, COB Squal Ph 1/2 2015, COB McLeod2015, WSDOT prioritized 2025, COB Squal Ph 3/4 2020, COB lower Squal restoration sites	Renee: Partial design COB/Port, $millions
28	602273	Baker 1	Squalicum Cr	Baker Cr confluence	**unknown**		WS drop	33	CH, ST, BT	downstream of private McLeod 2007, COB Squal Ph 1/2 2015, COB McLeod2015, WSDOT prioritized 2025, COB Squal Ph 3/4 2020; upstream of COB Willow Spring 2010/2018, COB	flood "dam" (weir)
29	920634	N/A	Whatcom Cr	Woburn St	**unknown**		slope	0	CH, ST, BT	downstream of Boulder Bend and Whatcom Falls Park 1999 restoration; upstream of COB Red Tail Reach, COB Salmon Park, COB Cemetery Cr, COB Whatcom Cr Estuary	need to confirm 0% passability
30	993038	N/A	SF Baker Cr	Telegraph Rd	**unknown**	5786	slope	0	ST	upstream of WSDOT prioritized 2025, COB McLeod 2015, COB Baker Cr restoration site, lower Squal restoration sites, COB Willow Spring 2010/2018, COB lower Squal restoration sites	adjacent to Filippini donation
31	993883	NF Baker 2	Baker Cr	Deemer Rd	**unknown**		slope	33	ST, BT	upstream of WSDOT prioritized 2025, COB McLeod 2015, COB Spring Cr restoration site, lower Squal restoration sites, COB Willow Spring 2010/2018, COB lower Squal restoration sites	downstream of Telegraph flood dam
32	993884	legraph Detenti	Baker Cr	Telegraph Rd	**unknown**		other	67	ST, BT	upstream of WSDOT prioritized 2025, COB McLeod 2015, lower Squal restoration sites, COB Willow Spring 2010/2018, COB lower Squal restoration sites	Telegraph flood dam
33	01.0552 2.00	N/A	Squalicum Cr	Meridian St	**unknown**	17381	WS drop	67	CH, ST, BT	downstream COB Squal Ph 1/2 2015, COB Squal Ph 3/4 2020; upstream of COB Willow Spring 2010/2018, COB lower Squal restoration sites	
34	01.0559 0.10	N/A	ib W, Squalicum (	Meridian St	**unknown**		WS drop	67	CH, ST, BT	downstream COB Squal Ph 1/2 2015, COB Squal Ph 3/4 2020; upstream of COB Willow Spring 2010/2018, COB lower Squal restoration sites	lineal gain based on WDFW decision that Trib W not suitable fish habitat in Squal Re-route Ph 1-2

*ESA species benefiting (as documented on WDFW fish barrier field form): CH = Chinook, ST = steelhead, BT = bull trout

REMOVED IN THIS STEP

1	unknown	Spring 3	Spring Cr	Prince St	**0**	7032	N/A	100	ST		100% passable, not a barrier. Remove from list.
2	370673	Lincoln 1	Lincoln Cr	Frasier St	**unknown**		unknown	unknown	CH, ST, BT		Mis-labeled as COB, should be private. Submitted correction to WDFW 3/18/19. Remove from list.

Attachment 5: Step 5

STEP 6: Update any data from qualified sources (in 2019 = ESA fish passability at City's flood dams), calculate lineal gain if not provided by WDFW barrier forms

	Site ID	Lat	Long	Anchor, 2010 ID	Stream	Road Crossing	Total PI 2019 (Form)	Lineal Gain (m)	Lineal Gain Calc	Barrier Reason	Passability (%)	ESA*	Coordination- Barriers	Coordination- Transportation	Notes
1	602273	48.77	-122.49	Baker 1	Squalicum Cr	Baker Cr confluence	**unknown**	36708	WDFW 01.0552 1.80 plus 15 m	WS drop	33	CH, ST, BT	downstream of private McLeod 2007, COB Squal Ph 1/2 2015, COB McLeod2015, WSDOT prioritized 2025, COB Squal Ph 3/4 2020; upstream of COB Willow Spring 2010/2018, COB lower Squal restoration sites,	None	flood "dam" (riser). Retrofit completed in 2005 EV-18. Riser may not have been included in retrofit. Minor adjustment to riser?
2	01.0622 0.70	48.72	-122.5	Padden 6	Padden Cr	14th St	**48.14**	3701		depth	67	CH, ST	downstream of COB 16thSt repair 2016, WSDOT 2014 bridge, WSDOT prioritized project 2025	None	
3	01.0552 2.00	48.78	-122.49	N/A	Squalicum Cr	Meridian St	**unknown**	17381		WS drop	67	CH, ST, BT	downstream COB Squal Ph 1/2 2015, COB Squal Ph 3/4 2020; upstream of COB lower Squal fish barrier improvements near Squal Cr Park	None	Transpo Group estimated $1 million for full width bridge (2019
4	993006	48.78	-122.46	Baker 7	Baker Cr	James St	**15.61**	6064		other	67	ST	upstream of private McLeod 2007, COB McLeod2015, WSDOT prioritized 2025, COB Willow Spring 2010/2018, COB lower Squal restoration sites	James St Multimodal project, 2025 at earliest	
5	01.0622 0.80	48.72	-122.5	Padden 7	Padden Cr	16th St	**53.96**	11942		WS drop	67	CH, ST	downstream of WSDOT 2014 bridge, WSDOT prioritized project 2025	None	Completed repair of pool in 2016. Full fish passage requires replacing fish ladder and culvert.
6	1280163	48.81	-122.5	N/A	E Bear Cr	Horton Flood Dam	**unknown**	810	GIS measure	velocity	67		1.5 mi upstream of City Mitigation Bank site (Bear Cr), 1.5 mi upstream of Whatcom County planned improvement for barrier 1280204	None	Horton flood dam
7	993038	48.79	-122.46	N/A	SF Baker Cr	Telegraph Rd	**unknown**	5786		slope	0	ST	upstream of WSDOT prioritized 2025, COB McLeod 2015, COB Baker Cr restoration site, lower Squal restoration sites	None	immediately upstream to Filippini donation
8	991600	48.7	-122.46	N/A	Padden Cr	Lake Padden	**30.88**	3533		WS drop	0	ST	upstream of COB 16thSt repair 2016, WSDOT 2014 bridge (9,500'), 2 WSDOT prioritized projects 2025 (4,250')	none	at outlet of Lake Padden- dam
9	993093	48.79	-122.45	Hannegan Detention	SF Baker Cr	Strider Lp	**24.77**	4043		other	67	ST, BT	upstream of WSDOT prioritized 2025, COB McLeod 2015, COB Willow Spring 2010/2018, COB lower Squal restoration sites	None	Irongate flood dam, fish passability from ESA 2019
10	993883	48.79	-122.48	NF Baker 2	Baker Cr	Deemer Rd	**unknown**	2260	GIS measure	slope	33	ST, BT	upstream of WSDOT prioritized 2025, COB McLeod 2015, COB lower Squal restoration sites	None	Upstream of long private culvert under Home Depot
11	991599	48.71	-122.47	Padden 13	Padden Cr	39th St ROW	**27.65**	3917		slope	0	ST	upstream of WSDOT prioritized 2025, WSDOT Padden Daylighting	none	in Padden Gorge
12	992984	48.8	-122.48	Spring 4	Spring Cr	Kellogg Rd	**21.03**	6516		unknown	unknown	ST, BT	upstream of WSDOT prioritized 2025, COB McLeod 2015, COB lower Squal restoration sites	None	upstream of Irongate flood dam
13	992981	48.79	-122.48	Spring 2	Spring Cr	E Bakerview Rd	**25.43**	7318		velocity	67	ST, BT	upstream of WSDOT prioritized 2025, COB McLeod 2015, COB lower Squal restoration sites; downstream of 2001 culvert repair at Van Wyck Rd	None	
14	993880	48.78	-122.48	SF Baker 1	SF Baker Cr	E McLeod Rd	**15.48**	1984		unknown	unknown	ST, BT	upstream of private McLeod 2007, COB McLeod2015, WSDOT prioritized 2025, COB Willow Spring 2010/2018, COB lower Squal restoration sites	none	
15	993881	48.78	-122.46	SF Baker 2	SF Baker Cr	James St	**unknown**	3084		unknown	unknown	ST, BT	1 mi upstream of COB barrier improvement on Baker Cr at McLeod 2015, location of th	James St Multimodal project, 2025 at earliest	Transpo Group estimated $1 million for full width bridge (2019 James St Mulitmodal Study)
16	991104	48.76	-122.51	Squalicum 2	Squalicum Cr	Roeder Ave	**unknown**	38933	WDFW 01.0552	tides	unknown	CH, ST, BT	downstream of private McLeod 2007, COB Willow Spring 2010/2018, COB Squal Ph 1/2 2015, COB McLeod2015, WSDOT prioritized 2025, COB Squal Ph 3/4 2020,	None	Partial design COB/Port
17	993040	48.79	-122.45	Baker 9	Baker Cr	E Bakerview Rd @ Irongate	**25.04**	5014		depth	33	ST	upstream of WSDOT prioritized 2025, COB McLeod 2015, lower Squal restoration sites, COB Willow Spring 2010/2018, upstream of Filippini donation to COB 2018 for	None	
18	993884	48.79	-122.47	Telegraph Detention	NF Baker Cr	Telegraph Rd	**unknown**	1830	GIS measure	other	33	ST, BT	upstream of WSDOT prioritized 2025, COB McLeod 2015, COB lower Squal restoration sites	ES-0537 Telegraph Rd project, 2021,	Telegraph flood dam, fish passability from ESA 2019
19	01.0559 0.10	48.78	-122.49	N/A	ib W, Squalicum (	Meridian St	**unknown**	0	See notes	WS drop	67	CH, ST, BT	upstream of COB lower Squal fish barrier improvements near Squal Cr Park	ES-0551 Meridian/Birchwood/Squalicum roundabout study,	lineal gain based on WDFW decision that Trib W not suitable fish habitat in Squal Re-route Ph 1-2
20	993443	48.8	-122.44	Baker 12	Baker Cr	Hannegan Rd	**18.26**	3457		velocity	67	ST	upstream of WSDOT prioritized 2025, COB McLeod 2015, COB Baker Cr restoration site, lower Squal restoration sites	proposed secondary arterial	upstream of Irongate flood dam
21	994370	48.71	-122.48	Padden 11	Padden Cr	30th St	**18.01**	5317	GIS measure + WDFW 991599	slope	33	ST	upstream and downstream of WSDOT prioritized 2025, upstream of WSDOT 2014 Padden Daylighting	none	
22	993821	48.8	-122.44	Baker 13	Baker Cr	Hannegan Rd	**22.6**	2993		slope	33	ST	upstream of WSDOT prioritized 2025, COB McLeod 2015, COB Baker Cr restoration site, lower Squal restoration sites	none	upstream of Irongate flood dam and other culverts
23	370683	48.74	-122.44	W Cemetery 3	W Cemetery Cr	Old Lakeway Dr	**unknown**	2100	GIS measure	WS drop	0			ES-0547 2019 TBD project, creating a	
24	370648	48.74	-122.44	W Cemetery 4	Cemetery Cr	Lopez St	**unknown**	1110	GIS measure from Old Lakeway	slope	0			none	
25	920634	48.76	-122.45	N/A	Whatcom Cr	Woburn St	**unknown**	500	GIS measure to natural barrier	slope	0	CH, ST, BT		None	Ask WDFW, confirm 0% passability
26	370678	48.75	-122.46	Lincoln 5	Lincoln Cr	Lincoln St	**unknown**	2440	GIS measure	slope	33			none	downstream of fred meyer tunnel.
27	370679	48.75	-122.45	Magnolia 1	E Cemetery Cr	Woburn St	**unknown**	0	GIS measure	WS drop	0			none	upstream of natural barrier 920643
28	993483	48.71	-122.49	Hoags 3	Hoags Cr	Interurban Trail	**17.81**	283		slope	33			None	assume WSDOT prioritized list for Chuckanut Cr barrier impr. (mainstem, not Hoags Creek)
29	993482	48.71	-122.48	Hoags 4	Hoags Cr	25th St	**17.78**	263		slope	33	ST		None	
30	993484	48.71	-122.48	Hoags 5	Hoags Cr		**16.9**	263		slope	0			None	
31	370649	48.73	-122.45	W Cemetery 5	Cemetery Cr	San Juan Blvd	**unknown**	0	GIS measure	slope	0			none	
32	370658	48.75	-122.45	W Cemetery 2	W Cemetery Cr	Lakeway Dr	**unknown**	2260	GIS measure from Old Lakeway	slope	0			none	

*ESA species benefiting (as documented on WDFW fish barrier field form): CH = Chinook, ST = steelhead, BT = bull trout

Attachment 6: Step 6

STEP 7: Score and rank using COB scoring equation

RANK	Site ID	Lat	Long	Anchor, 2010 ID	Stream	Road Crossing	Total PI 2019 (Form)	Lineal Gain (m)	Barrier Reason	Passability (%)	ESA*	Coordination- Barriers	Coordination- Transportation	Benefits	Cost Estimate	Notes	SCORE
1	993881	48.78	-122.46	SF Baker 2	SF Baker Cr	James St	**unknown**	3084	unknown	unknown	ST, BT	1 mi upstream of COB barrier improvement on Baker Cr at McLeod 2015, location of the James St Multimodal Study	James St Multimodal project, 2025 at earliest	wider floodplain	$ 1,000,000	Transpo Group estimated $1 million for full width bridge (2019 James St Mulitmodal	**15.7**
2	602273	48.77	-122.49	Baker 1	Squalicum Cr	Baker Cr confluence	**unknown**	36708	WS drop	33	CH, ST, BT	downstream of private McLeod 2007, COB Squal Ph 1/2 2015, COB McLeod2015, WSDOT prioritized 2025, COB Squal Ph 3/4 2020; upstream of COB Willow Spring 2010/2018, COB lower Squal restoration sites,	None		$ 200,000	flood "dam" (riser). Retrofit completed in 2005 EV-18. Riser may not have been included in retrofit. Minor adjustment to riser?	**14.7**
3	993006	48.78	-122.46	Baker 7	Baker Cr	James St	**15.61**	6064	other	67	ST	upstream of private McLeod 2007, COB McLeod2015, WSDOT prioritized 2025, COB Willow Spring 2010/2018, COB lower Squal restoration sites	James St Multimodal project, 2025 at earliest (unfunded), result of 2019 study will	upstream of COB Baker Cr, COB Willow Spring 2010/2018, COB lower Squal restoration sites; upstream of COB planned restoration at Filippini; in Tier 1 subwatershed, in priority restoration polygon	$ 1,000,000		**14.2**
4	01.0622 0.80	48.72	-122.5	Padden 7	Padden Cr	16th St	**53.96**	11942	WS drop	67	CH, ST	downstream of WSDOT 2014 bridge, WSDOT prioritized project 2025	None	downstream of COB 2015 Padden Daylighting, COB 16th St repair 2016, WSDOT 2014 SR 11 Tier 1	$ 1,000,000	Completed repair of pool in 2016. Full fish passage requires	**14.0**
5	991104	48.76	-122.51	Squalicum 2	Squalicum Cr	Roeder Ave	**unknown**	38933	tides	unknown	CH, ST, BT	downstream of private McLeod 2007, COB Willow Spring 2010/2018, COB Squal Ph 1/2 2015, COB McLeod2015, WSDOT prioritized 2025, COB Squal Ph 3/4 2020, COBlower Squal restoration sites,	None	downstream of COB Willow Spring 2010/2018, COB Squal Ph 1/2 2015, COB Squal Ph 3/4 2020, COBlower Squal restoration sites; in Tier 1	$ 4,000,000	Partial design COB/Port, $millions	**14.0**
6	01.0622 0.70	48.72	-122.5	Padden 6	Padden Cr	14th St	**48.14**	3701	depth	67	CH, ST	downstream of COB 16thSt repair 2016, WSDOT 2014 bridge, WSDOT prioritized project 2025	None	downstream of COB 2015 Padden Daylighting, Tier 1 subwatershed, in priority restoration polygon	$ 200,000		**13.5**
7	991600	48.7	-122.46	N/A	Padden Cr	Lake Padden	**30.88**	3533	WS drop	0	ST	upstream of COB 16thSt repair 2016, WSDOT 2014 bridge (9,500'), 2 WSDOT prioritized projects 2025 (4,250')	none		$ 500,000	at outlet of Lake Padden	**13.5**
8	993884	48.79	-122.47	Telegraph Detention	NF Baker Cr	Telegraph Rd	**unknown**	1830	other	33	ST, BT	upstream of WSDOT prioritized 2025, COB McLeod 2015, COB lower Squal restoration sites	ES-0537 Telegraph Rd project, 2021, this is a road construction	upstream of lower Squal restoration sites, COB Willow Spring 2010/2018, in Tier 1 subwatershed and in priority restoration polygon	$ 1,000,000	Telegraph flood dam, fish passability from ESA 2019	**13.3**
9	01.0552 2.00	48.78	-122.49	N/A	Squalicum Cr	Meridian St	**unknown**	17381	WS drop	67	CH, ST, BT	downstream COB Squal Ph 1/2 2015, COB Squal Ph 3/4 2020; upstream of COB lower Squal fish barrier improvements near Squal Cr Park	None	upstream of COB Willow Spring 2010/2018 and COB/NSEA lower Squalicum restoration;	$ 1,000,000		**13.2**
11	992984	48.8	-122.48	Spring 4	Spring Cr	Kellogg Rd	**21.03**	6516	unknown	unknown	ST, BT	upstream of WSDOT prioritized 2025, COB McLeod 2015, COB lower Squal restoration sites	None	upstream of COB Spring Cr restoration site, lower Squal restoration sites, COB Willow Spring	$ 1,000,000	upstream of Irongate flood dam	**12.8**
13	992981	48.79	-122.48	Spring 2	Spring Cr	E Bakerview Rd	**25.43**	7318	velocity	67	ST, BT	upstream of WSDOT prioritized 2025, COB McLeod 2015, COB lower Squal restoration sites; downstream of 2001 culvert repair at Van Wyck Rd	None	upstream of Spring Creek restoration site 2004, lower Squal restoration sites, COB Willow Spring	$ 1,000,000		**12.7**
10	993038	48.79	-122.46	N/A	Baker Cr	Telegraph Rd	**unknown**	5786	slope	0	ST	upstream of WSDOT prioritized 2025, COB McLeod 2015, COB Baker Cr restoration site, lower Squal restoration sites	None	upstream of lower Squal restoration sites, COB Willow Spring 2010/2018	$ 500,000	immediately upstream to Filippini donation	**12.5**
12	01.0559 0.10	48.78	-122.49	N/A	ib W, Squalicum	Meridian St	**unknown**	0	WS drop	67	CH, ST, BT	upstream of COB lower Squal fish barrier improvements near Squal Cr Park	ES-0551 Meridian/Birchwood/Squalicum roundabout study,	upstream of COB Willow Spring 2010/2018 and COB/NSEA lower Squalicum restoration (not downstream of Squalicum Re-route Phases 1 and 2 2015 because isolated fish habitat as part of	$ 500,000	lineal gain based on WDFW decision that Trib W not suitable fish habitat in Squal Re-route Ph 1-2	**11.8**
16	993880	48.78	-122.48	SF Baker 1	SF Baker Cr	E McLeod Rd	**15.48**	1984		unknown	ST, BT	upstream of private McLeod 2007, COB McLeod2015, WSDOT prioritized 2025, COB Willow Spring 2010/2018, COB lower Squal restoration sites	none	upstream of COB Baker Cr, COB Willow Spring 2010/2018, COB lower Squal restoration sites;	$ 500,000		**11.7**
17	994370	48.71	-122.48	Padden 11	Padden Cr	30th St	**18.01**	5317	slope	33	ST	upstream and downstream of WSDOT prioritized 2025, upstream of WSDOT 2014 Padden Daylighting	none	upstream of COB 2015 Padden Daylighting 2015, COB 16th St repair 2016, WSDOT 2014 SR 11; in	$ 3,000,000		**11.3**
14	991599	48.71	-122.47	Padden 13	Padden Cr	39th St ROW	**27.65**	3917	slope	0	ST	upstream of WSDOT prioritized 2025, WSDOT Padden Daylighting	none	upstream of COB 2015 Padden Daylighting 2015, COB 16th St repair 2016, WSDOT 2014 SR 11; in Tier 1 subwatershed, in priority restoration polygon	$ 1,500,000	in Padden Gorge	**11.0**
15	993883	48.79	-122.48	NF Baker 2	Baker Cr	Deemer Rd	**unknown**	2260	slope	33	ST, BT	upstream of WSDOT prioritized 2025, COB McLeod 2015, COB lower Squal restoration sites	None	upstream of lower Squal restoration sites, COB Willow Spring 2010/2018	$ 3,000,000	Upstream of long private culvert under Home Depot	**11.0**
18	993093	48.79	-122.45	Hannegan Detention	SF Baker Cr	Strider Lp	**24.77**	4043	other	67	ST, BT	upstream of WSDOT prioritized 2025, COB McLeod 2015, COB Willow Spring 2010/2018, COB lower Squal restoration sites	None	CB Baker Cr restoration site, lower Squal restoration sites,	$ 1,000,000	Irongate flood dam, fish passability from ESA 2019	**9.8**
19	993040	48.79	-122.45	Baker 9	Baker Cr	E Bakerview Rd @ Irongate	**25.04**	5014	depth	33	ST	upstream of WSDOT prioritized 2025, COB McLeod 2015, lower Squal restoration sites, COB Willow Spring 2010/2018, upstream of Filippini donation to COB 2018 for restoration	None	downstream of COB Spring Cr restoration site 2004; upstream of lower Squal restoration sites, COB Willow Spring 2010/2018, COB lower Squal restoration sites; in Tier 1 subwatershed and within prioritized restoration polygon	$ 1,000,000	no juveniles present because upstream of total barrier	**9.5**
20	370678	48.75	-122.46	Lincoln 5	Lincoln Cr	Lincoln St	**unknown**	2440	slope	33			none	upstream of COB 2006 Red Tail Reach, COB Whatcom Creek Estuary	$ 1,000,000	downstream of fred meyer tunnel.	**9.0**
21	993443	48.8	-122.44	Baker 12	Baker Cr	Hannegan Rd	**18.26**	3457	velocity	67	ST	upstream of WSDOT prioritized 2025, COB McLeod 2015, COB Baker Cr restoration site, lower Squal restoration sites	proposed secondary arterial	upstream of COB Willow Spring 2010/2018, COB lower Squal restoration sites, COB planned restoration at Filippini, COB restoration at Baker Cr; in Tier 1 subwatershed	$ 1,000,000	upstream of Irongate flood dam, no juveniles present because upstream of total barrier	**8.5**
22	993821	48.8	-122.44	Baker 13	Baker Cr	Hannegan Rd	**22.6**	2993	slope	33	ST	upstream of WSDOT prioritized 2025, COB McLeod 2015, COB Baker Cr restoration site, lower Squal restoration sites	none	upstream of COB Willow Spring 2010/2018, COB lower Squal restoration sites, COB planned restoration at Filippini, COB restoration at Baker Cr	$ 1,000,000	upstream of Irongate flood dam and other culverts, no juveniles present because upstream of total barrier	**8.3**
23	920634	48.76	-122.45	N/A	Whatcom Cr	Woburn St	**unknown**	500	slope	0	CH, ST, BT		None	downstream of Boulder Bend and Whatcom Falls Park 1999 restoration; upstream of COB Red Tail Reach, COB Salmon Park, COB Cemetery Cr, COB Whatcom Cr Estuary	$ 7,000,000	Ask WDFW, confirm 0% passability	**8.2**
24	370683	48.74	-122.44	W Cemetery 3	W Cemetery Cr	Old Lakeway Dr	**unknown**	2100	WS drop	0			ES-0547 2019 TBD project, creating a 10-foot wide two-way bicycle connection at Lakeway/Old	upstream of COB 2006 Red Tail Reach, COB Whatcom Creek Estuary, planned W Cemetery Cr WQ improvements	$ 500,000	no juveniles present because upstream of total barrier	**8.0**
25	370648	48.74	-122.44	W Cemetery 4	Cemetery Cr	Lopez St	**unknown**	1110	slope	0			none	upstream of COB 2006 Red Tail Reach, COB Whatcom Creek Estuary	$ 500,000		**8.0**
26	370658	48.75	-122.45	W Cemetery 2	W Cemetery Cr	Lakeway Dr	**unknown**	2260	slope	0			none	upstream of COB 2006 Red Tail Reach, COB Whatcom Creek Estuary	$ 5,000,000	PW Ops concerned about integrity of road due to culvert failure	**8.0**
27	993482	48.71	-122.48	Hoags 4	Hoags Cr	25th St	**17.78**	263	slope	33	ST		None	in Tier 1 subwatershed, in priority restoration polygon	$ 500,000	no juveniles present because upstream of total barrier	**7.0**
28	993484	48.71	-122.48	Hoags 5	Hoags Cr		**16.9**	263	slope	0			None	in Tier 1 subwatershed, in priority restoration polygon	$ 75,000	no juveniles present because upstream of total barrier	**7.0**
29	993483	48.71	-122.49	Hoags 3	Hoags Cr	Interurban Trail	**17.81**	283	slope	33			None	in Tier 1 subwatershed, in priority restoration polygon	$ 250,000	assume WSDOT prioritized list for Chuckanut Cr barrier impr. (mainstem, not Hoags Creek), no juveniles present because upstream of total barrier.	**7.0**
30	1280163	48.81	-122.5	N/A	E Bear Cr	Horton Flood Dam	**unknown**	810	velocity	67		1.5 mi upstream of City Mitigation Bank site (Bear Cr), 1.5 mi upstream of Whatcom County planned improvement for barrier 1280204	None	1.5 mi upstream of City Mitigation Bank site (Bear Cr), 1.5 mi upstream of Whatcom County planned improvement for barrier 1280204	$ 1,000,000	Horton flood dam	**6.8**
31	370649	48.73	-122.45	W Cemetery 5	Cemetery Cr	San Juan Blvd	**unknown**	0	slope	0			none	upstream of COB 2006 Red Tail Reach, COB Whatcom Creek Estuary, planned W Cemetery Cr	$ 500,000	no juveniles present because upstream of total barrier	**6.0**
32	370679	48.75	-122.45	Magnolia 1	E Cemetery Cr	Woburn St	**unknown**	0	WS drop	0			none	upstream of COB 2006 Red Tail Reach, COB Whatcom Creek Estuary	$ 5,000,000	upstream of natural barrier 920643	**5.0**
														TOTAL	$ 45,225,000		

*ESA species benefiting (as documented on WDFW fish barrier field form): CH = Chinook, ST = steelhead, BT = bull trout

Attachment 7: Step 7