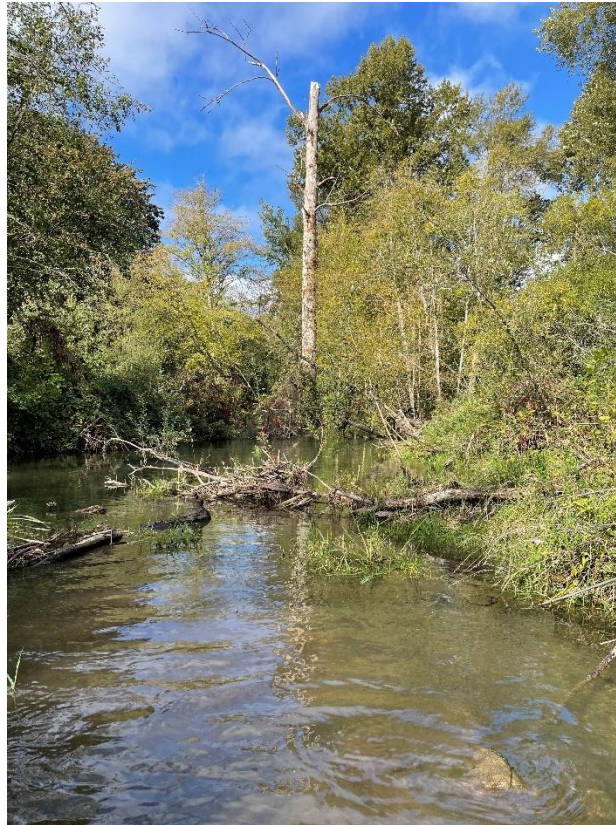


Bellevue Salmon Spawner Surveys 2021

Coal Creek, Kelsey Creek, West Tributary, and Richards Creek



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Introduction

The Coal Creek and Kelsey Creek watersheds, like many tributaries in the Greater Lake Washington Watershed, provide spawning and rearing habitat for Chinook, Sockeye, and Coho salmon. The City of Bellevue has partnered with the Washington Department of Fish and Wildlife (WDFW) to monitor salmon spawning in select Bellevue streams since 1999. Current survey efforts prioritize Coal Creek, Kelsey Creek, and West Tributary, with regular spot checks in lower Richards Creek. This monitoring provides a strong foundation for assessing trends in salmon use within Bellevue's streams and allows for comparison to overall salmon returns throughout the Greater Lake Washington Watershed.

This technical memo summarizes adult salmonid spawning activity observed in the Coal Creek and Kelsey Creek watersheds during the 2021 salmon spawning season (Sept.-Dec. 2021).

Greater Lake Washington Salmon Returns

Salmon returning to the Greater Lake Washington Watershed pass through the Hiram M. Chittenden Locks in Ballard and the Lake Washington Ship Canal during late summer/early fall before migrating to spawning areas or hatchery facilities within the basin between September-December. Most of the Chinook and Coho salmon passing through the Ballard Locks are hatchery-origin fish returning to the Issaquah Salmon Hatchery, but some are natural-origin fish that spawn naturally in the Cedar River or tributaries to the Sammamish River (Bear Creek, Cottage Lake Creek, and Issaquah Creek). Most Sockeye Salmon passing through the Ballard Locks return to the Cedar River or the Cedar Hatchery at Landsburg, while some spawn in tributaries to the Sammamish River. Chinook, Coho, and Sockeye salmon that use Bellevue streams for spawning follow the pathway outlined in Figure 1.

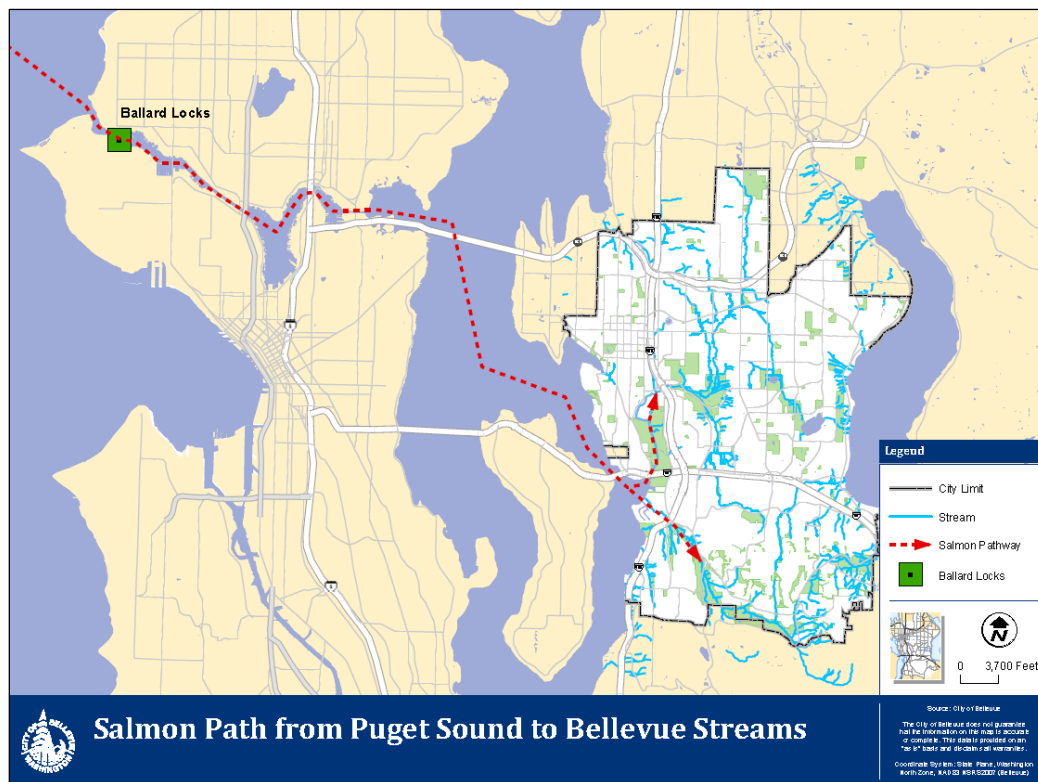


Figure 1. Salmon path from Puget Sound to Bellevue streams.

Survey Methodology

Salmon spawning surveys in Bellevue streams begin in early-September and are conducted weekly until late December. All survey reaches are found in Figures 2 and 3. Surveys in 2021 were conducted by WDFW biologists. The survey methodology employed throughout Bellevue streams is consistent with the methods used in other major salmon spawning streams within the Greater Lake Washington Watershed. West Tributary Reach 5 was not surveyed in 2021 and the Richards Creek Confluence Reach was spot checked regularly, but full surveys were not conducted in 2021.

During the walking surveys, professional biologists walk full survey reaches and enumerate live and dead fish for all salmonid species, and the location of individual redds constructed by Chinook Salmon, Coho Salmon and Cutthroat Trout are recorded using handheld GPS units. Sockeye Salmon redds are not recorded, as this species often spawns close together with numerous overlapping redds that are difficult to accurately count. All recovered salmon carcasses are sampled for length, sex, origin (natural versus hatchery), age, and egg retention (to determine if the female was able to spawn naturally or if it should be counted as a pre-spawn mortality). Photo 1 shows a Chinook Salmon jack that was recovered and sampled in early October 2021 in Coal Creek Reach A.



Photo 1. Chinook Salmon jack recovered in lower Coal Creek, October 2021.



Figure 2. Map of survey reaches in the Coal Creek Watershed.

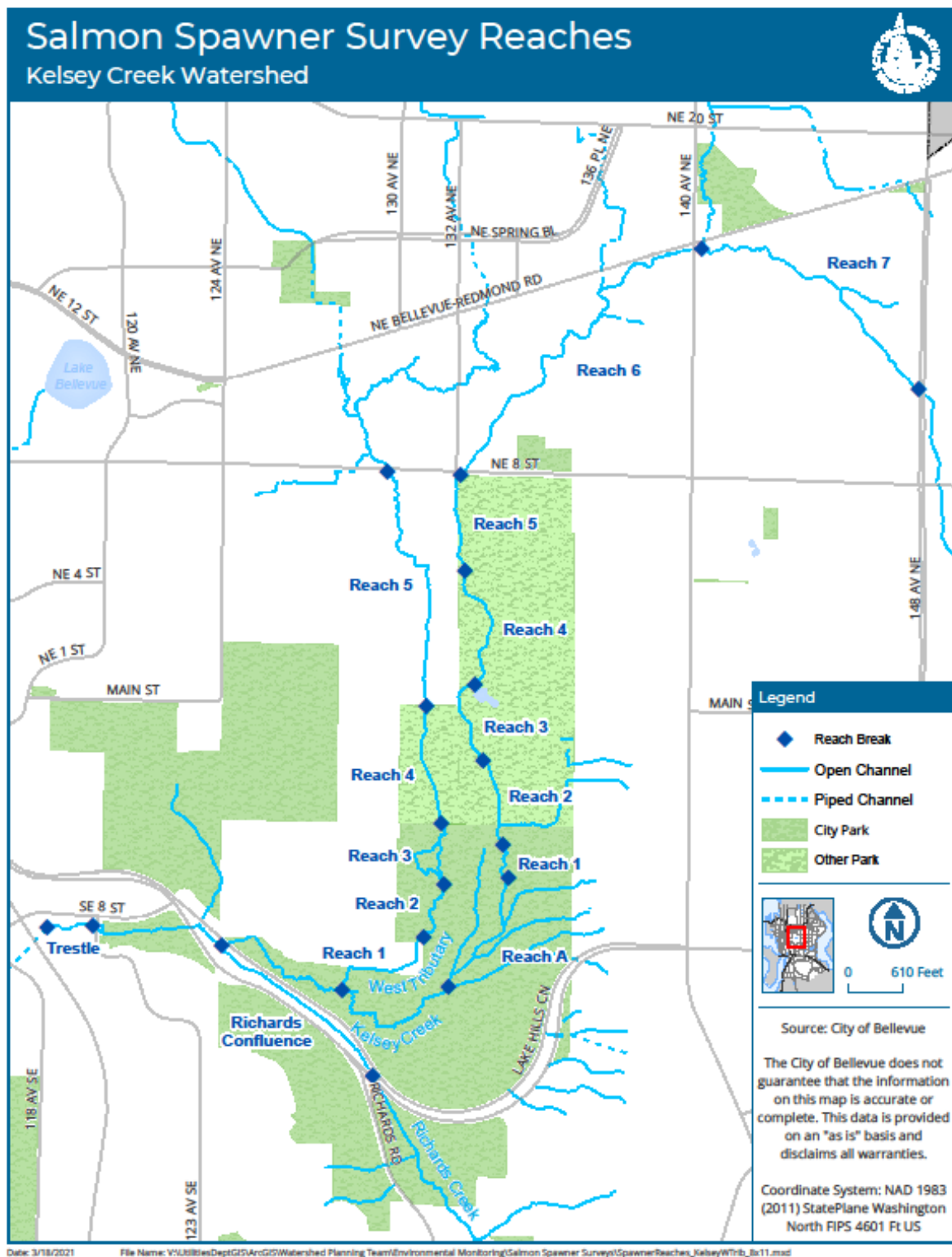


Figure 3. Map of survey reaches in the Kelsey Creek Watershed.

Note: West Tributary Reach 5 was not surveyed in 2021 and the Richards Confluence Reach was only spot checked for salmon activity.

Summary of 2021 Salmon Returns

Coal Creek Watershed: Similar to trends of the past decade, most of Bellevue's salmon escapement took place in Coal Creek in 2021. Salmon redds (or egg nests), and live and dead fish observations were counted during weekly walking surveys and are summarized with previous years' observations in Table 1. Similar to previous years, small numbers of Chinook Salmon continue to spawn naturally in Coal Creek. However, adult Sockeye Salmon were not observed in Coal Creek in 2021. In November of 2021, 598 surplus adult hatchery-origin Coho Salmon from the Issaquah Hatchery were transported and released into Coal Creek (to the Coal Creek Parkway Sediment Pond found in Reach 2) to increase natural spawning and smolt production. This Coho Salmon out-planting effort is responsible for the large number of Coho Salmon, including redds, and live and dead fish observations, recorded in Coal Creek in 2021 (Table 2). Progeny, or offspring, from the 2019 out-planting effort are anticipated to return in the fall of 2022 and progeny from 2021 are anticipated to return 2024. In addition to salmon observations, two Cutthroat Trout redds were observed in November of 2021.



Photo 2. Adult Coho Salmon from the Issaquah Hatchery were out-planted to Coal Creek Reach 2, November 2021.

Table 1. Summary of salmon observations in the Coal Creek Watershed.

Coal Creek								
Year	Chinook			Sockeye		Coho		
	Redds	Live Fish	Carcasses	Live Fish	Carcasses	Redds	Live Fish	Carcasses
2008	0	0	0	0	0	6	0	3
2009	0	0	0	0	0	0	5	1
2010	1	1	0	0	0	0	1	0
2011	0	0	0	1	0	1	2	1
2012	1	19	1	66	8	2	17	2
2013	3	8	2	1	1	152*	921*	340*
2014	2	1	0	2	0	174*	1032*	210*
2015	2	10	3	0	0	2	8	1
2016	7	13	4	17	8	13	43	15
2017	3	9	8	6	4	21	48	12
2018	0	0	2	0	0	34	39	11
2019	7	21	11	2	0	114*	521*	259*
2020	3	11	9	0	0	7	1	2
2021	3	41	15	0	0	108*	191*	96*

(* indicates years when returned Coho Salmon adults were out-planted from the Issaquah Hatchery)

Table 2. Location and dates of adult Coho Salmon out-planted from Issaquah Hatchery to the Coal Creek and Greater Kelsey Creek watersheds in 2013, 2014, 2019 and 2021.

Year	Stream	Dates planted	Planting location	Number of Coho planted
2013	Kelsey Creek	11/13-11/20	Reach A and 1	1,150
	Coal Creek	11/21	Reach 1	742
	West Tributary	11/13	Reach 2	100
2014	Kelsey Creek	10/23-10/24	Reach A and 1	643
	Coal Creek	10/30-11/7	Reach 1	1,573
2019	Coal Creek	11/4-11/14	Reach 1 and 2	1,049
2021	Coal Creek	11/3	Reach 2	598

Greater Kelsey Creek Watershed: Little salmon spawning activity occurred throughout the Greater Kelsey Creek Watershed in the fall of 2021. Beaver activity persists throughout much of lower Kelsey Creek as seen in Photo 3. Only three Coho Salmon redds were observed in the mainstem of Kelsey Creek and one pre-spawn mortality was recovered in Kelsey Creek Reach 3 in early November (Photo 4). No Coho Salmon or redds were observed in West Tributary or Richards Creek. No Chinook or Sockeye salmon were observed in the Greater Kelsey Creek Watershed in 2021 (Table 3). Despite the lack of salmon activity, adfluvial Cutthroat Trout use continues to be prevalent throughout the watershed. Eighteen Cutthroat Trout redds were recorded in November and December 2021.



Photo 3. Beaver dam observed in Kelsey Creek Reach 1, October 2021.



Photo 4. Coho Salmon pre-spawn mortality observed in Kelsey Creek Reach 3, November 2021.

Table 3. Summary of salmon observations in the Greater Kelsey Creek Watershed.

Kelsey Creek (including Richards Creek and West Tributary)								
Year	Chinook			Sockeye		Coho		
	Redds	Live Fish	Carcasses	Live Fish	Carcasses	Redds	Live Fish	Carcasses
1999	76	111	117	0	0	0	0	0
2000	1	17	13	207	103	0	18	13
2001	4	9	0	46	10	3	12	7
2002	5	16	12	23	6	0	0	0
2003	0	1	6	1	0	8	14	5
2004	17	20	88	12	6	0	1	0
2005	14	27	37	3	0	1	1	2
2006	90	168	220	430	162	2	2	2
2007	77	221	155	14	5	8	5	9
2008	8	25	38	0	1	12	8	0
2009	5	11	15	4	0	6	3	0
2010	0	1	1	6	0	0	0	0
2011	0	0	1	1	1	0	0	0
2012	0	0	0	0	0	9	30	2
2013	0	1	1	0	0	123*	294*	261*
2014	0	0	0	0	0	0*	138*	91*
2015	0	0	0	0	0	0	0	0
2016	0	0	0	0	0	0	0	0
2017	2	13	10	0	0	22	0	0
2018	0	0	0	0	0	4	0	0
2019	0	0	0	0	0	5	1	0
2020	0	0	0	0	0	3	0	0
2021	0	0	0	0	0	3	0	1

(* indicates years when returned Coho Salmon adults were out-planted from the Issaquah Hatchery)