2010 Spawning Ground Surveys Kelsey, West Tributary, Richards, and Coal Creeks

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Acronyms and Abbreviations

AUC	Area Under the Curve
cm	Centimeter
CWT	Coded-wire tag
DEA	David Evans and Associates, Inc.
ESA	Endangered Species Act of 1973
ESU	Evolutionarily Significant Units
FL	Fork length
GPS	Global Positioning System
I-405	Interstate 405
INPFC	International North Pacific Fisheries Commission
POH	Postorbital to hypural plate
WDFW	Washington Department of Fish and Wildlife

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1.0 ABSTRACT

The City of Bellevue monitored spawning activity in the Kelsey Creek watershed in 2010, marking the tenth consecutive year that this information has been collected. Weekly spawning ground surveys were conducted for 18 consecutive weeks in Kelsey Creek and the West Tributary from 13 September 2010 through 10 January 2011. A total of nine surveys of Richards Creek were conducted every other week from 14 September 2010 through 11 January 2011. A total of 14 surveys of Coal Creek were conducted weekly from 8 October 2010 through 10 January 2011.

Observations of Chinook salmon in 2010 were limited to a total of one live spawner in Kelsey, one carcass in West Tributary, and one live spawner in Coal Creek. No Chinook salmon were observed in Richards Creek. Due to the lack of intact carcasses recovered during the 2010 survey period, no data on hatchery versus wild utilization in the Kelsey Creek watershed is available. However, enough of the carcass was present to determine it was a four-year-old. No Chinook salmon redds were documented in the Kelsey Creek watershed during 2010, while one redd was observed in Reach 1 of Coal Creek. The 2010 Chinook salmon escapement in Kelsey Creek based on redd counts is zero, which was lower than 2008 (n=20) and 2009 (n=13). The relatively low returns from 2008 through 2010 are in comparison to peak returns in 2006 and 2007 (n=180–193), but similar to the escapement estimates from 2001 through 2005 (n=0-10). No coho salmon or coho salmon redds were observed in the Kelsey Creek watershed during 2010. One live coho was observed in Coal Creek, but no redds were documented. During the 2009 survey period, three (live) coho salmon were observed in Kelsey Creek and six (5 live and 1 carcass) in Coal Creek. Based on the absence of documented redds, the coho salmon escapement estimate for 2010 is zero. Observations of sockeye salmon in 2010 were limited to seven (live) spawners in Kelsey Creek.

The absence of coho salmon in the Kelsey Creek drainage basin during 2010 appears to generally mirror an overall decline in the Puget Sound region and Lake Washington watershed. The 2010 total coho salmon count as measured at the Chittenden Locks (aka Ballard Locks) was 3,608, which is the lowest reported from 2000 through 2010. This could, in part, explain why no coho salmon were documented utilizing Kelsey Creek during 2010. However, the total number of Chinook salmon counted going through the Chittenden Locks during 2010 was double the count from 2009, so Chinook were expected to spawn in Kelsey Creek. Dense milfoil growth in Mercer Slough may have deferred and deflected salmon migration into Kelsey Creek in 2010.

2.0 INTRODUCTION

In the Pacific Northwest, Pacific salmon (*Oncorhynchus* spp.) is an important economic, biological, and cultural resource that embodies the values of the region. Habitat degradation and fragmentation, coupled with harvest and hatchery practices, have led to an acute decline in the abundance of Pacific salmon, culminating in several listings under the Endangered Species Act (ESA). In 1999, the Puget Sound Chinook salmon (*O. tshawytscha*) Evolutionarily Significant Unit (ESU) was listed as threatened under the ESA (Federal Register 1999). In turn, federal, state, local, and tribal governments and citizens have engaged in salmon recovery planning to develop watershed-specific recovery strategies for Chinook salmon within the Puget Sound ESU. The goals of these efforts are to implement scientifically-based recovery plans that will result in

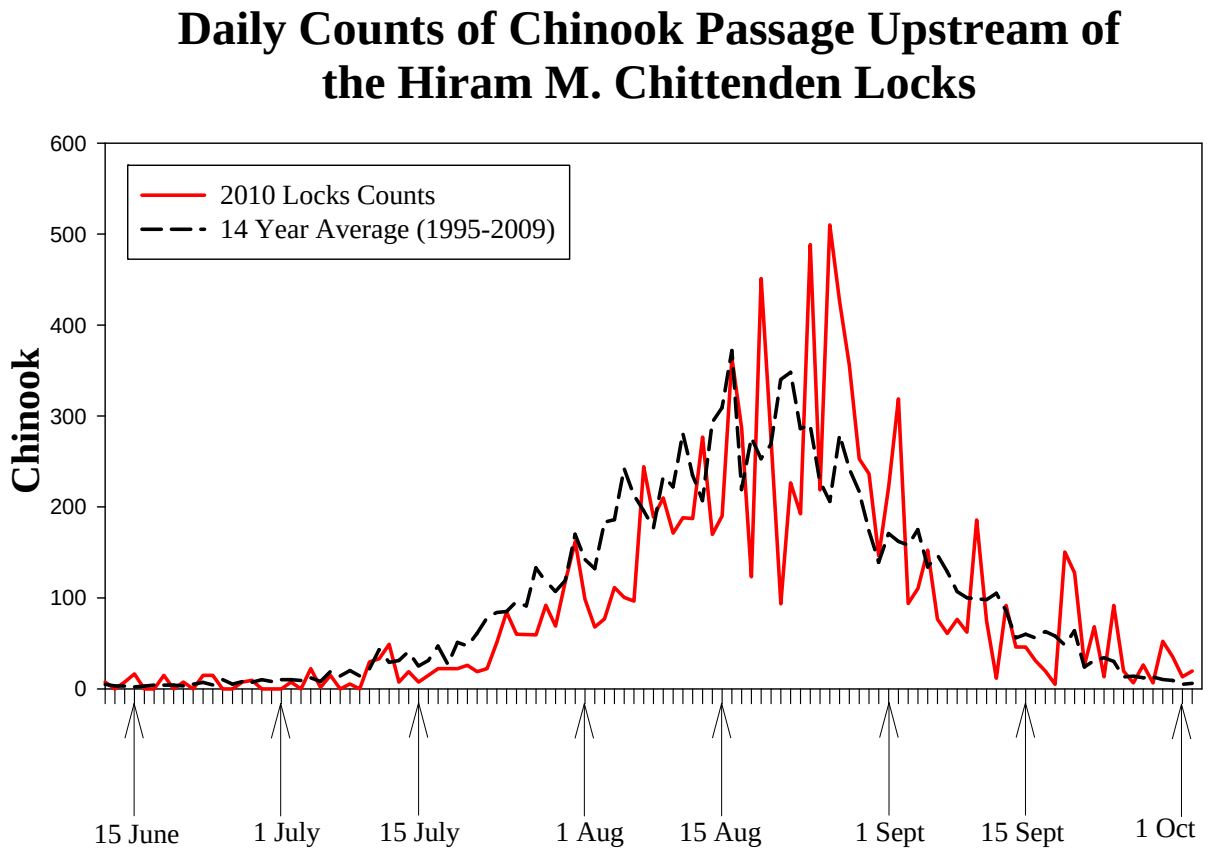
the recovery (de-listing) of Chinook salmon stocks within the Puget Sound ESU, which includes 22 independent and 16 extant populations (Ruckelshaus et al. 2006).

The Cedar/Sammamish watershed is the most highly urbanized watershed within the Puget Sound ESU. Fall Chinook salmon primarily spawn in the Cedar River, Bear Creek, and Issaquah Creek. In addition, there are several sub basins within the watershed that consistently have spawning Chinook salmon, including Kelsey, North, Swamp, May, Lewis, Little Bear, McAleer, and Thornton creeks (Kerwin 2001). Two Chinook hatcheries are operated within the watershed—one at Portage Bay operated by the University of Washington, and the other on Issaquah Creek operated by the Washington Department of Fish and Wildlife (WDFW). Over the past decade, greater attention has been placed on accurately assessing the abundance of spawning salmon across the Cedar/Sammamish watershed, including the Kelsey Creek and Coal Creek basins.

Historically, Kelsey Creek supported runs of Chinook, coho (*O. kisutch*), and sockeye (*O. nerka*) salmon, as well as both cutthroat (*O. clarki*) and steelhead/rainbow (*O. mykiss*) trout. As the watershed became more developed in the 20th century, Kelsey Creek became less hospitable to supporting fish populations (Scott et al. 1986). The combination of altered flow regimes and resulting changes in sediment transport processes are thought to be primarily responsible for the decline in native fishes within the Kelsey Creek Basin (Richey 1982).

Chinook salmon counts at the Chittenden Locks suggested that the return in 2010 would be less than the average over the past 10 years but twice of that recorded during 2009. During the past 10 years, the peak Chinook salmon count was 31,631 during 2007, while the fewest (4,451) were counted in 2000. The average yearly total of returning Chinook salmon during the past 10 years is 13,663. **Figure 1** depicts the timing and abundance of Chinook salmon counted migrating through the locks over the past 14 years.

Figure 1. Counts of Chinook Salmon Migrating Upstream of the Hiram M. Chittenden Locks.



Data provided by Mike Mahovolich, Muckleshoot Indian Tribe, Fisheries Department.

3.0 METHODS

3.1 Survey Protocol

In 2010, spawning ground surveyors from WDFW, City of Bellevue, and David Evans and Associates, Inc. (DEA) surveyed large sections of Kelsey Creek, West Tributary, Richards Creek, and Coal Creek. Weekly salmon spawner surveys were conducted on Kelsey Creek (#080259) from 13 September 2010 through 10 January 2011 (17 surveys), and West Tributary (#080264) from 14 September 2010 through 10 January 2011 (18 surveys). Bi-monthly surveys were conducted on Richards Creek (#080261) from 14 September 2010 through 11 January 2011 (9 surveys), and weekly on Coal Creek (#080268) from 8 October 2010 through 10 January 2011 (14 surveys).

The purpose of this work was to document the timing, abundance, and biological characteristics of naturally spawning salmon in Bellevue streams. Since only a portion of each stream is surveyed, escapement estimates are not possible. Instead, the data included in this report represents an index of escapement, although it is thought that greater than 75 percent of the spawning habitat is included within the index area (Watershed Company 2009).

Polarized sunglasses were worn by surveyors to increase visibility, and all live and dead fish were recorded. When possible, streams were walked starting downstream to increase sampling

effectiveness as described by Ames (1984). Attempts were made during surveys to avoid disturbance of fish on redds. Surveys were not conducted if water conditions were dangerously high or fast; if turbidity impaired visual detection of fish; or above reaches with obvious downstream blockages, especially on Richards Creek. Conditions permitting, the entire stream was sampled on each survey date.

All observed salmon carcasses were retrieved and identified during each spawning ground survey. All carcasses were examined for the presence of external marks (tags or adipose fin-clip), then scanned for presence of a coded-wire tag (CWT) in the snout. If a fish was found to have an adipose fin-clip or a CWT, we considered it to be marked and of hatchery origin. Both postorbital to hypural plate (POH) and fork length (FL) were measured on carcasses to the nearest centimeter, sex was recorded, and females were examined for egg retention (termed spawning success). The body cavity was opened on females and checked for 0, 25, 50, 75, or 100 percent egg retention. Egg retention of 0-5 percent was assigned a 0, 6-25 percent to the 25 category, 26-50 percent to the 50 category, 51-75 percent to the 75 category, and 76-100 percent to the 100 category. The tail of each carcass was removed to ensure it would not be recounted during subsequent survey efforts.

Six scales were removed from each Chinook carcass to determine age. Scales were removed from the area several rows above the lateral line between the posterior end of the dorsal fin and the anterior insertion of the anal fin (INPFC 1963). Scales were mounted on gummed scale cards and read by WDFW staff at the Scale and Otolith Lab in Olympia, Washington. Age notation used the Gilbert-Rich system, with the total age noted normally, and the freshwater age represented as a subscript (Koo 1962). For the purposes of this report, we will use the total age without the freshwater subscript, since greater than 95 percent of the Chinook in the Cedar/Sammamish watershed only spend one year rearing in freshwater. Although an attempt was made to collect all the data on all carcasses, carcasses are often either highly decomposed or preyed upon such that not all data can be collected from every carcass recovered during the various survey events. Redds were noted whenever encountered, and their location was recorded on a Global Positioning System (GPS) receiver. The location of redds was also marked with flagging to ensure redds are not counted again or disturbed during subsequent survey events. Due to the occurrence of sympatric salmon species, redds were positively identified by attending species, size of redd (if no attending species), and timing.

There are several methods of generating escapement estimates, including using cumulative redd counts, determining the area under the curve (AUC) based on live counts, and using peak spawner counts to generate a relative abundance estimate. The AUC escapement method is dependent on an accurate estimate of fish stream residence time, which is generally lacking for the surveyed streams. Therefore, this report uses primarily the redd-based method to generate an escapement estimate by taking the total number of redds documented in each stream, and then multiplying that number by the average number of fish per redd. In this case, the spawning ground escapement, $\boldsymbol{E}\mathbf{r}$, is estimated by:

$$E\mathrm{r} = R * \Phi$$

where R is the total number of redds and Φ represents the average number of fish per redd. In the Cedar/Sammamish watershed, we assume that Φ is 2.5 with one female and 1.5 males per redd. The reason the ratio is 1.5 males per redd is to account for the fact that males often fertilize more than one redd (Briggs 1953; Healey and Prince 1998; Berejikian et al. 2000).

3.2 Study Area and Reach Descriptions

There are eight survey index reaches in Kelsey Creek mainstem, four in the West Tributary, and four in Richards Creek (**Figure 2**). Index reaches have been established over the past decade, and the index reaches in 2010 were the same as those used in 2009 (DEA 2010).

Kelsey Creek

In Kelsey Creek, Reach A begins within the Kelsey Creek Park at the lower extent of stream gravel and ends at a bend within Kelsey Creek, where Reach 1 starts (approximately River Mile 3.2). Reach 1 continues upstream to the footbridge near the boundary of the park, where Reach 2 begins. Reach 2 continues from the footbridge to the southern property boundary of the Glendale Golf Club property, where Reach 3 starts. Reach 3 extends upstream to the first weir adjacent to the pumphouse at Reach 4. Reach 4 ends at a footbridge with an armored bank, and Reach 5 extends upstream to the northern boundary of the Glendale Golf Club at the culvert underneath NE 8th Street. Reach 6 was longer than in previous years due to gaining access permission between NE 8th Street and 134th Avenue NE. Reach 6 began at NE 8th Street and continued to Valley Creek. Reach 7 extends upstream from the confluence of Valley Creek to 148th Avenue NE. **Figure 3** includes typical habitat photos for Kelsey Creek.

West Tributary

In the West Tributary, Reach 1 begins at the confluence with Kelsey Creek and extends upstream to the first footbridge in Kelsey Creek Park. Reach 2 starts at the end of Reach 1 and continues to the second footbridge. Reach 3 continues upstream to the southern boundary of the Glendale Golf Club. Reach 4 begins at the downstream boundary of the golf course and ends at its northern boundary. **Figure 4** includes typical habitat photos and beaver activity in West Tributary.

Richards Creek

Index reaches of Richards Creek begin at its confluence with Kelsey Creek and extend upstream. The Confluence Reach is from the confluence to the intersection of Richards Road and Lake Hills Connector. The area upstream in Bannerwood Park has extensive beaver dams, and is not surveyed. Reach 1 begins at the culvert in Bannerwood Park and continues upstream to the next culvert crossing. Reach 2 extends upstream to the confluence with East Creek, and Reach 3 continues upstream to the culvert underneath Kamber Road. Reach 4 includes the segment of stream between Kamber Road and the confluence of Richards Creek and Sunset Creek. During 2010, surveys were limited to the Confluence Reach due to the presence of at least eight beaver dams between the Confluence Reach and Reach 1, any one of which would constitute a complete barrier to upstream migration.

Figure 2. Map of 2010 Survey Reaches in the Kelsey Creek Basin.

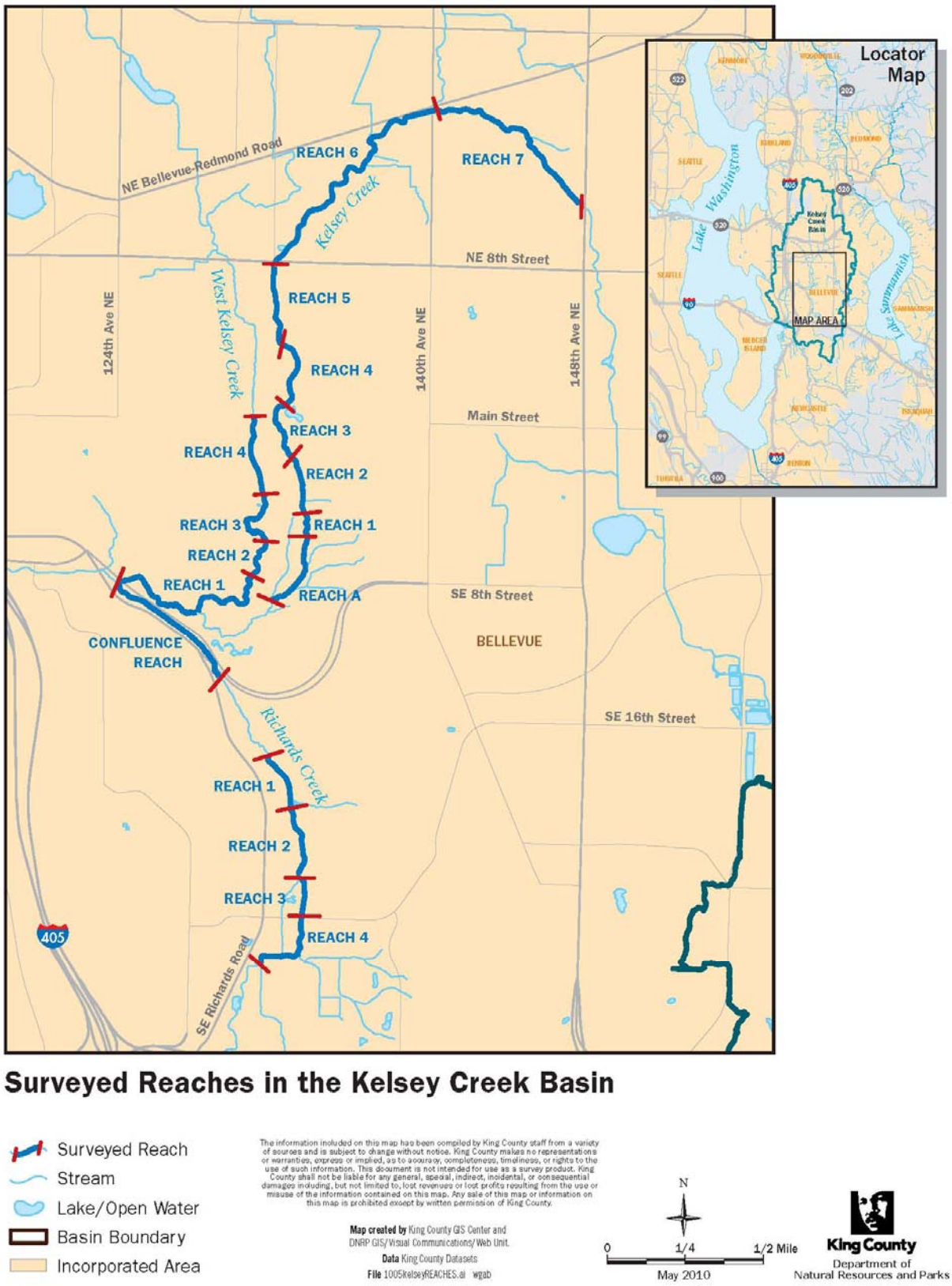


Figure 3. Kelsey Creek Typical Habitat Photos from 2010.

Reach 1A: Behind beaver dam (October 11, 2010)

Reach 4: Weirs (September 27, 2010)

Reach 5: NE 8th culvert (September 27, 2010)

Reach 6: Riparian restoration (September 27, 2010)

Reach 6: Riffle habitat

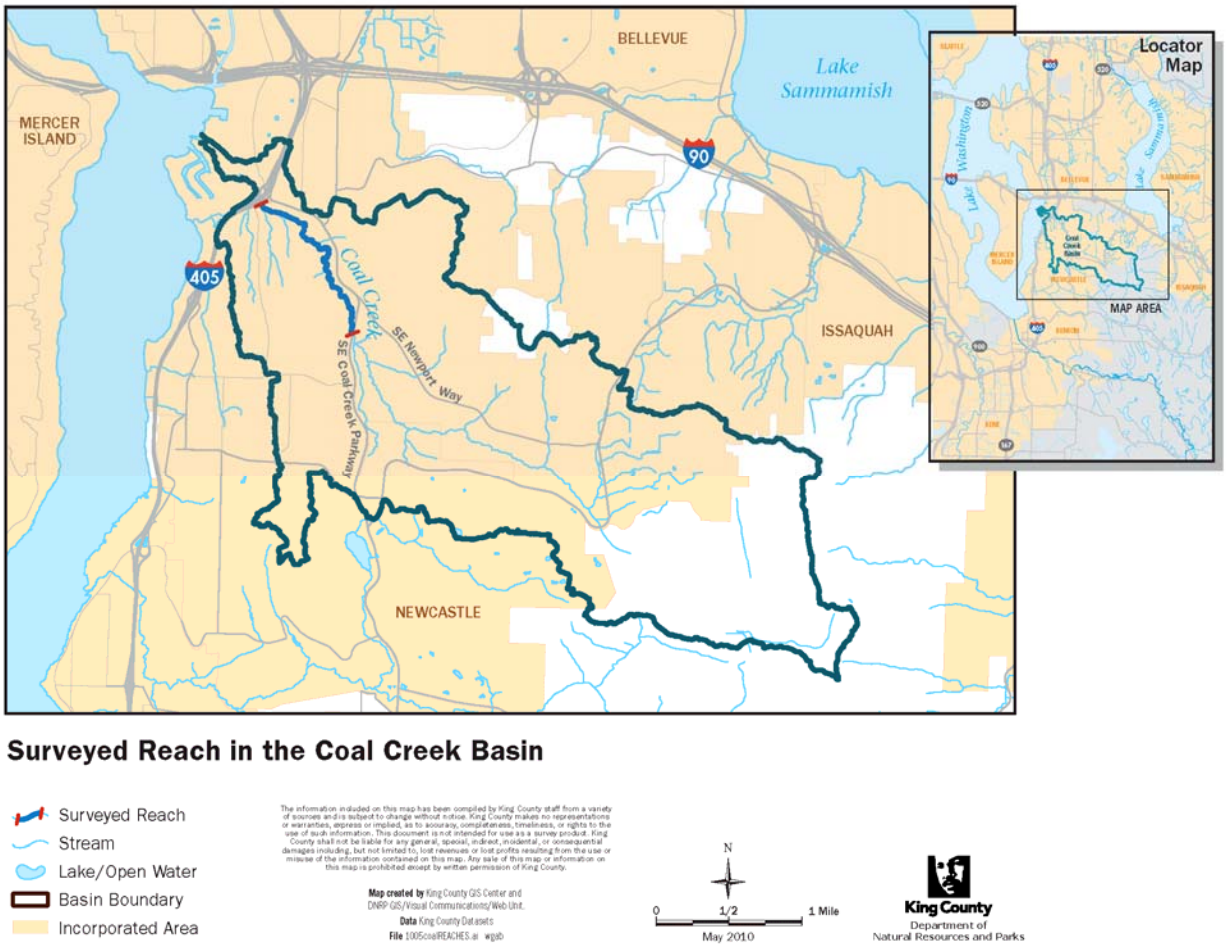
Reach 7: Survey end point

Figure 4. West Tributary Typical Habitat Photos from September 10, 2010.

Coal Creek Basin

The index reach in Coal Creek starts at the upstream side of Interstate 405 (I-405) and continues upstream to the culvert at Coal Creek Parkway, approximately 1.5 miles upstream (**Figure 5**).

Figure 5. Map of 2010 Survey Reaches in the Coal Creek Basin.



4.0 RESULTS

The City of Bellevue, King County, Washington Department of Fish and Wildlife, and numerous volunteers have been conducting salmon spawning surveys with various tributaries for over 10 years. Over this time period, the sampling frequency and number of streams surveyed has increased in order to improve the quality and quantity of data available to resource managers. The following report documents the salmon spawning results for 2010 within the mainstem of Kelsey Creek and its major tributaries (West Tributary and Richards creeks), and Coal Creek. Coal Creek has historically not been surveyed systematically over the entire spawning season. However, in 2010 Coal Creek was surveyed weekly from 8 October 2010 through 10 January 2011. The level of survey effort, timing, and general results are summarized in **Table 1**. Surveys in the Kelsey Creek basin began on 13 September 2010 and continued until 10 January 2011. Results of the 2010 spawning ground surveys indicate that salmon use within the Kelsey Creek and Coal Creek basins was extremely low. A total of seven live sockeye, one live Chinook, and one Chinook carcass were observed in the Kelsey Creek watershed (including Kelsey Creek, West Tributary, and Richards Creek). All seven live sockeye and the Chinook were observed in Kelsey Creek. The one Chinook carcass was observed in Reach 1 of West Tributary on 13 October 2010, while no salmon were documented in Richards Creek. No coho salmon or salmonid redds from any species were observed in the Kelsey Creek watershed during 2010. Documented salmon use in Coal Creek during 2010 was limited to one live coho, one live Chinook, and one Chinook redd. The Chinook salmon redd in Coal Creek was encountered in Reach 1 approximately 0.32 mile upstream from I-405.

Table 1. 2010 Spawning Ground Surveys

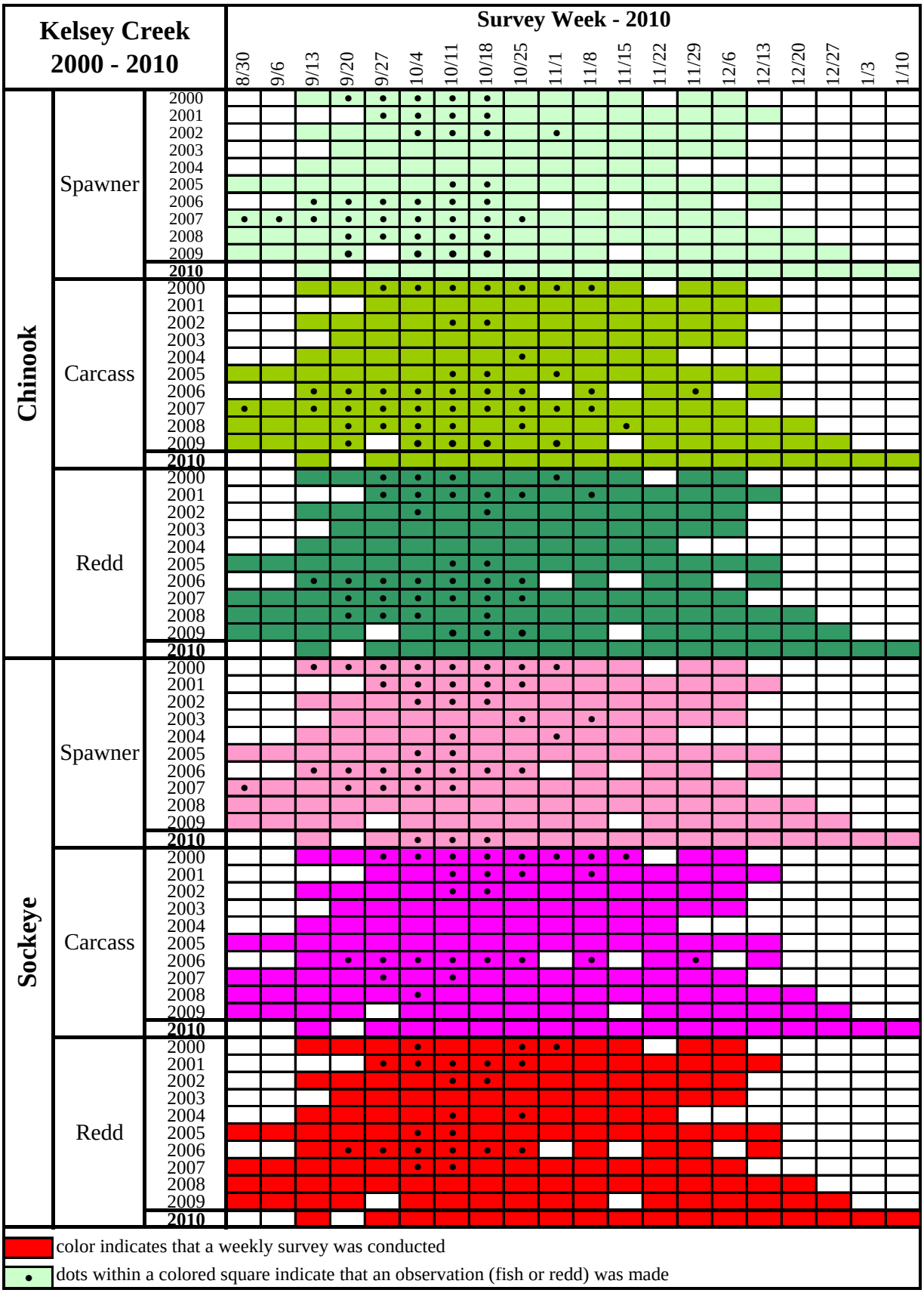


Table 1. 2010 Spawning Ground Surveys (continued)

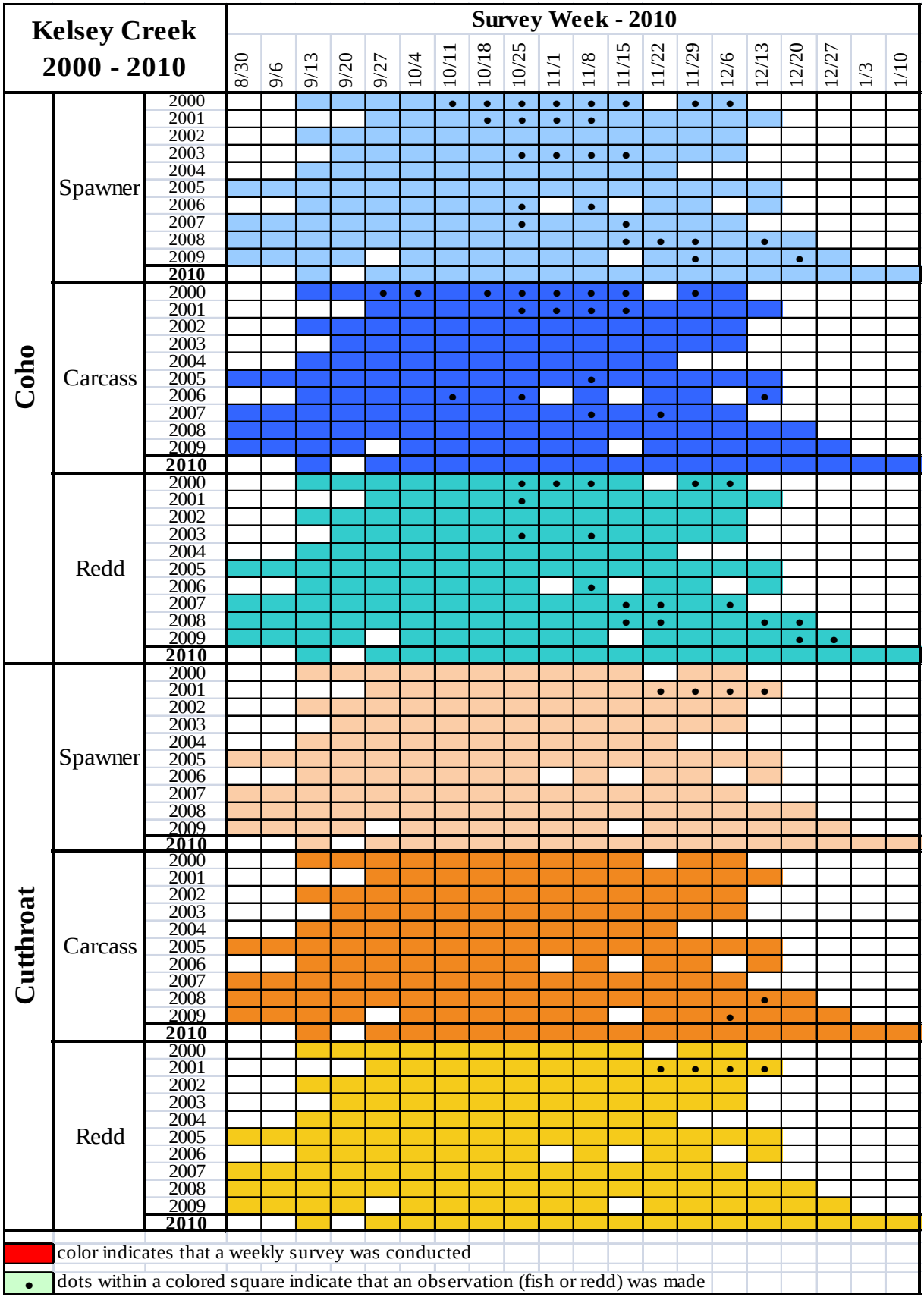


Table 1. 2010 Spawning Ground Surveys (continued)

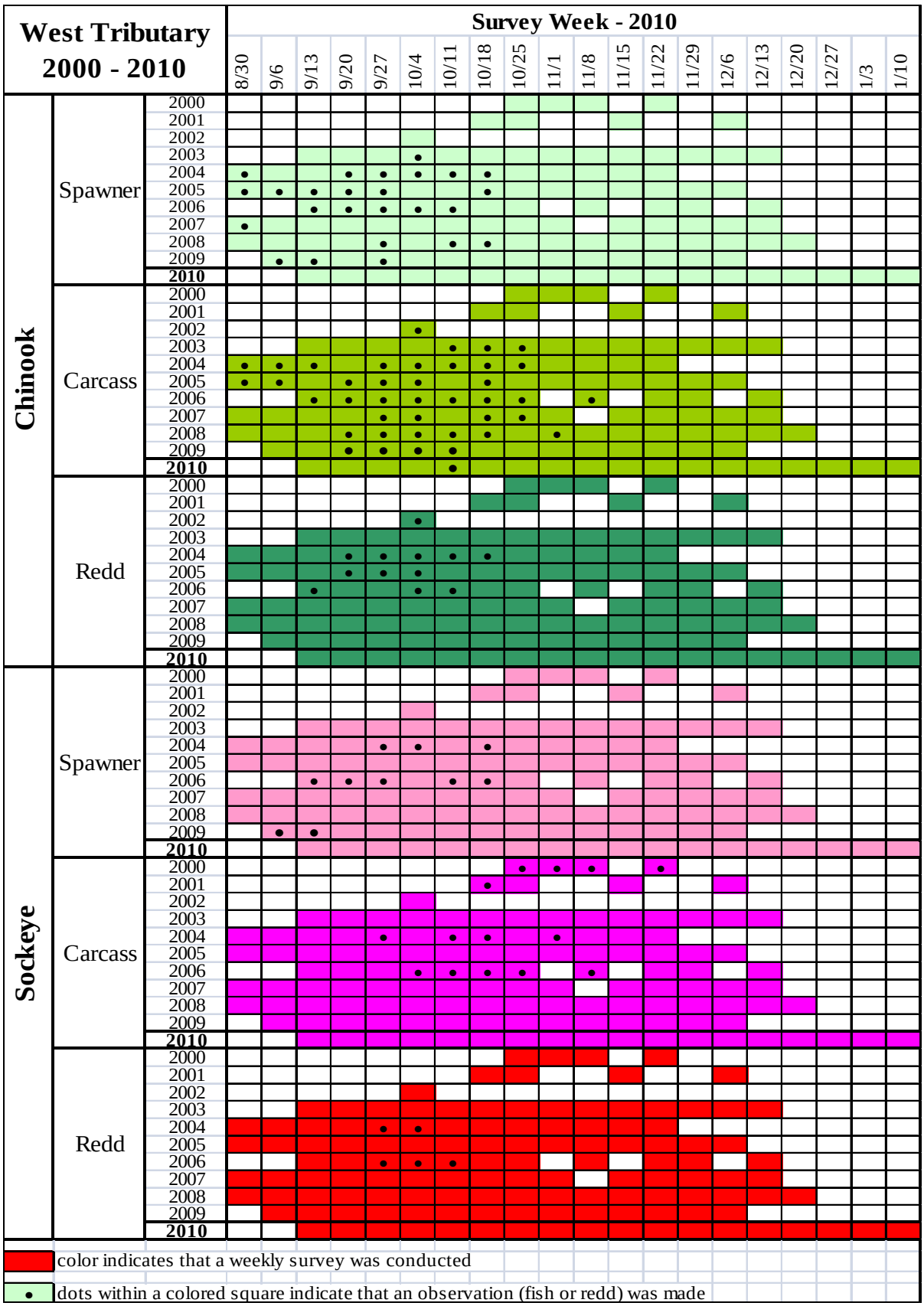


Table 1. 2010 Spawning Ground Surveys (continued)

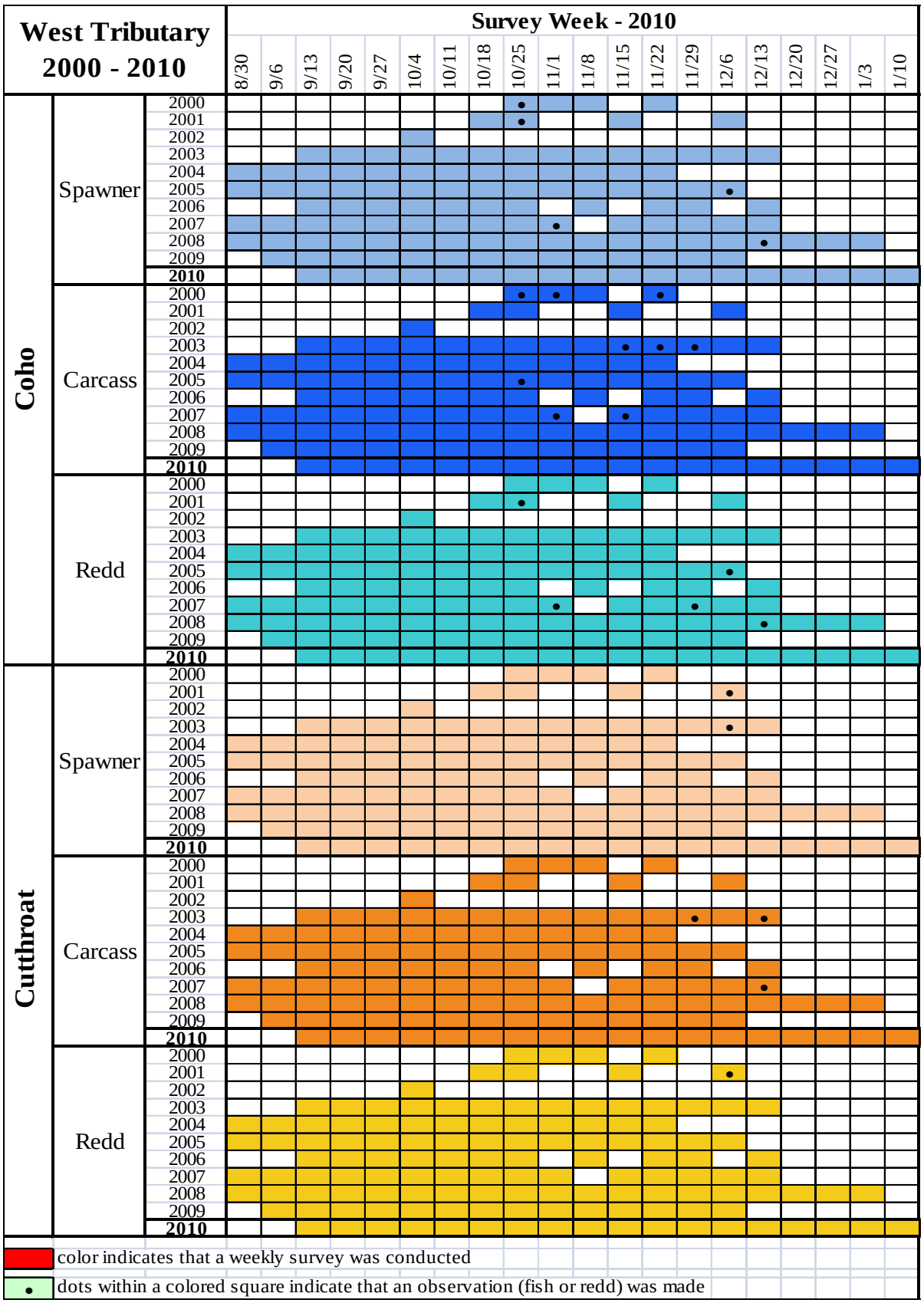


Table 1. 2010 Spawning Ground Surveys (continued)

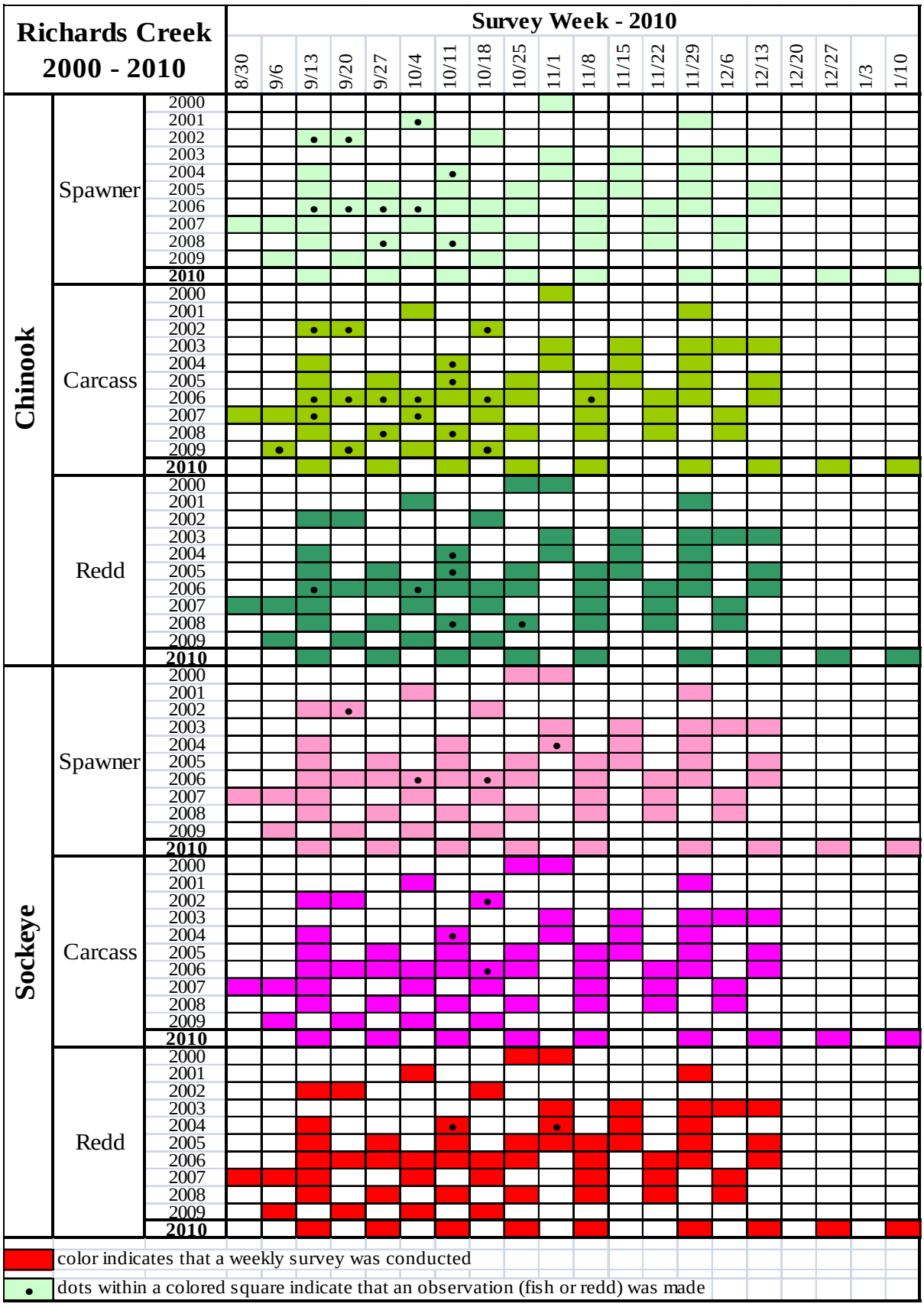


Table 1. 2010 Spawning Ground Surveys (continued)

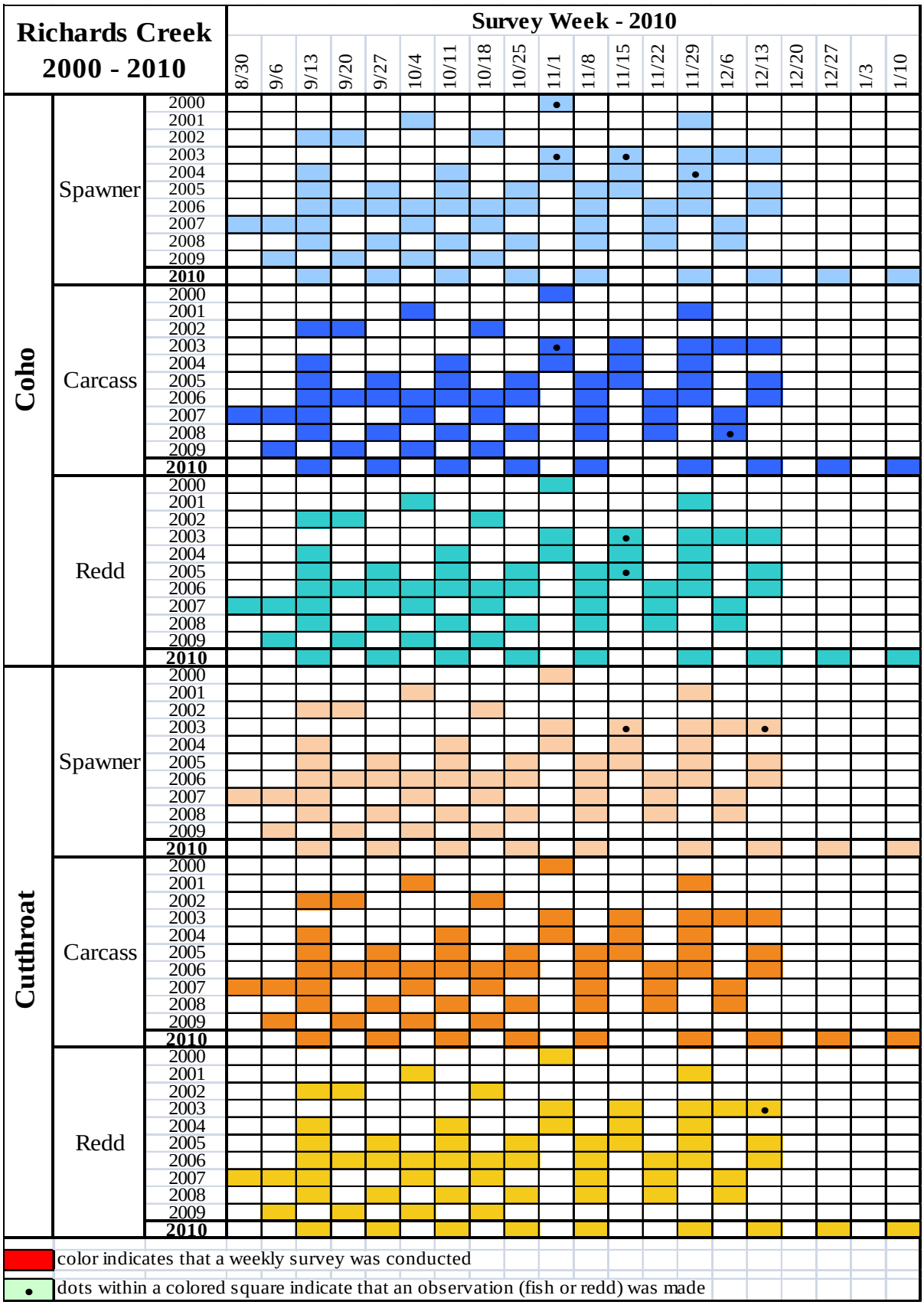


Table 1. 2010 Spawning Ground Surveys (continued)

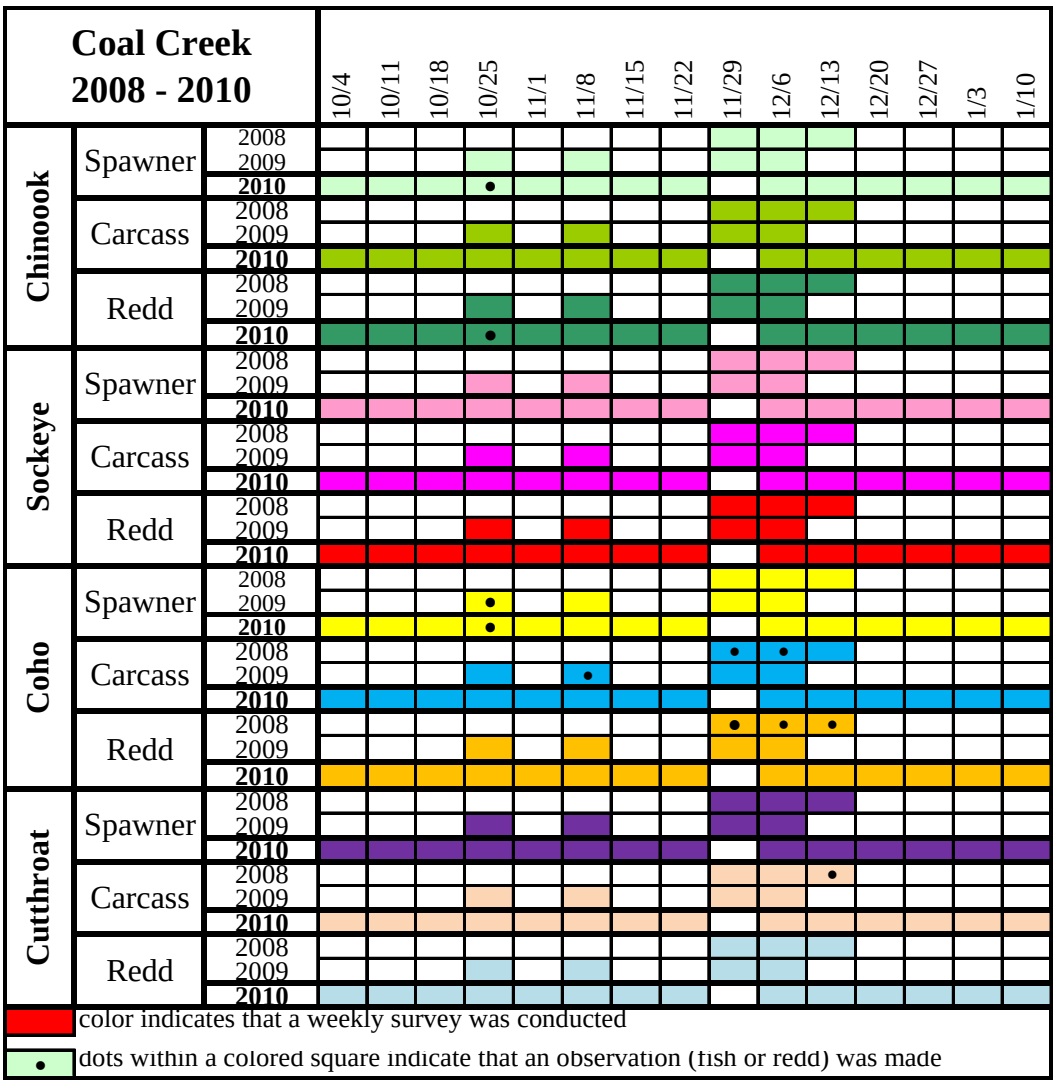


Table 2 summarizes redd-based escapement estimates for Kelsey Creek from 2000 through 2010. No salmonid redds were documented during 2010 in Kelsey Creek, although six live sockeye and two live Chinook were observed during the survey period.

Table 2. Kelsey Creek Redd-Based Escapement Summary from 2000 - 2010

Year	Chinook Escapement	Coho Escapement	Sockeye Escapement	Yearly Total Salmon Escapement
2000	25	40	113	178
2001	10	5	38	53
2002	10	0	38	48
2003	0	15	0	15
2004	0	0	5	5
2005	10	0	5	15
2006	180	3	488	671
2007	193	25	20	238
2008	20	25	0	45
2009	13	15	0	28
2010	0	0	0	0
Total	501	128	707	1336

4.1 Chinook Salmon

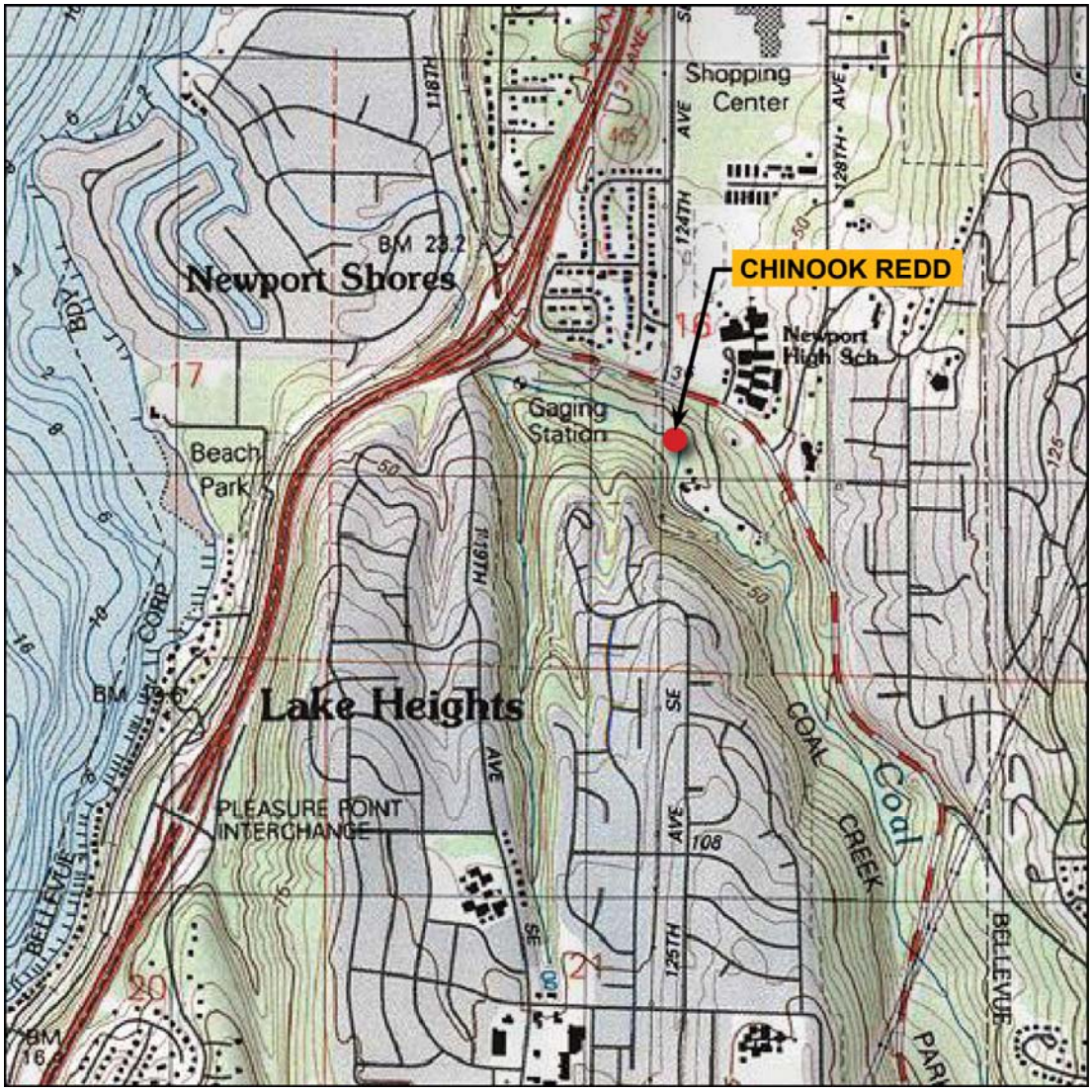
A Chinook salmon spawner was first observed on 12 October 2010 in Kelsey Creek, and the last live Chinook was observed on 28 October 2010 in Coal Creek (**Appendix A**). A total of one Chinook spawner (i.e., live) was observed in Kelsey Creek (**Table 3**), in Reach 4.

Table 3. 2010 Chinook Salmon Survey Summary

Stream	Total Surveys	Total Live Count	Total Carcass Count	Total Redd Count	Pre-spawn mortality	Redd-Based Escapement Estimate
Kelsey	17	1	0	0	0	0
West Trib.	18	0	1	0	unknown	0
Richards Creek	9	0	0	0	0	0
Coal Creek	14	1	0	1	0	2.5
Total	58	2	1	1	0	2.5

One Chinook spawner and one redd were documented in Coal Creek during 2010. The Chinook salmon redd in Coal Creek was encountered in Reach 1 approximately 0.32 mile upstream from I-405 at latitude 47.33.902 North by longitude 122.10.452 West (**Figure 6**).

Figure 6. Coal Creek Chinook Redd Location Map for 2010.



Based on the available data, the redd-based escapement estimate for Chinook salmon in the Kelsey Creek watershed during 2010 was zero. The redd-based escapement for Coal Creek was 2.5, based on the observation of one redd in Reach 1. A total of one Chinook salmon carcass was counted in West Tributary, while none were observed in Kelsey, Richards, or Coal creeks during 2010. The carcass had a FL of 104 cm, POH of 78 cm, and was a four-year-old male.

4.2 Sockeye Salmon

Observations of sockeye salmon within the surveyed streams were limited to six spawners in Kelsey Creek (**Table 4**). No carcasses or redds were observed during 2010. The first spawner was documented on 4 October 2010, and the last live sockeye was seen on 18 October 2010. Since no redds were observed, the redd-based escapement estimate for sockeye in all streams surveyed is zero.

Table 4. 2010 Sockeye Salmon Survey Summary

Stream	Total Surveys	Total Live Count	Total Carcass Count	Total Redd Count	Pre-spawn mortality	Redd-Based Escapement Estimate
Kelsey	17	7	0	0	0	0
West Trib.	18	0	0	0	0	0
Richards Creek	9	0	0	0	0	0
Coal Creek	14	0	0	0	0	0
Total	58	7	0	0	0	0

Sockeye spawners were distributed throughout Kelsey Creek and documented as far upstream as Reach 7 (**Table 5**).

Table 5. 2010 Sockeye Salmon Distribution in Kelsey Creek

Stream Reach	Number of Observations	Date of Observation (m/d/y)
A	0	NA
1	2	10/11/10 & 10/18/10
2	0	NA
3	0	NA
4	0	NA
5	1	10/12/10
6	2	10/18/10
7	1	10/4/10

4.3 Coho Salmon

No coho salmon were observed in Kelsey Creek, West Tributary, or Richards Creek during 2010 (**Table 6**). One coho salmon was documented in Coal Creek on 28 October 2010. No redds or carcasses were reported for any stream during 2010.

Table 6. 2010 Coho Salmon Survey Summary

Stream	Total Surveys	Total Live Count	Total Carcass Count	Total Redd Count	Pre-spawn mortality	Redd-Based Escapement Estimate
Kelsey	17	0	0	0	0	0
West Trib.	18	0	0	0	0	0
Richards Creek	9	0	0	0	0	0
Coal Creek	14	1	0	0	0	0
Total	58	1	0	0	0	0

4.4 Cutthroat Trout

Resident cutthroat trout are the most abundant year-round salmonid species in the surveyed streams. They have diverse life history strategies including resident, fluvial (matures in a river), adfuvial (matures in a lake), and anadromous (matures in the ocean [sea-run]). According to Wydoski and Whitney (2003), adfluvial races of cutthroat spawn between late March and early May, resident fluvial fish likely spawn from May to July, and searun cutthroat spawn primarily

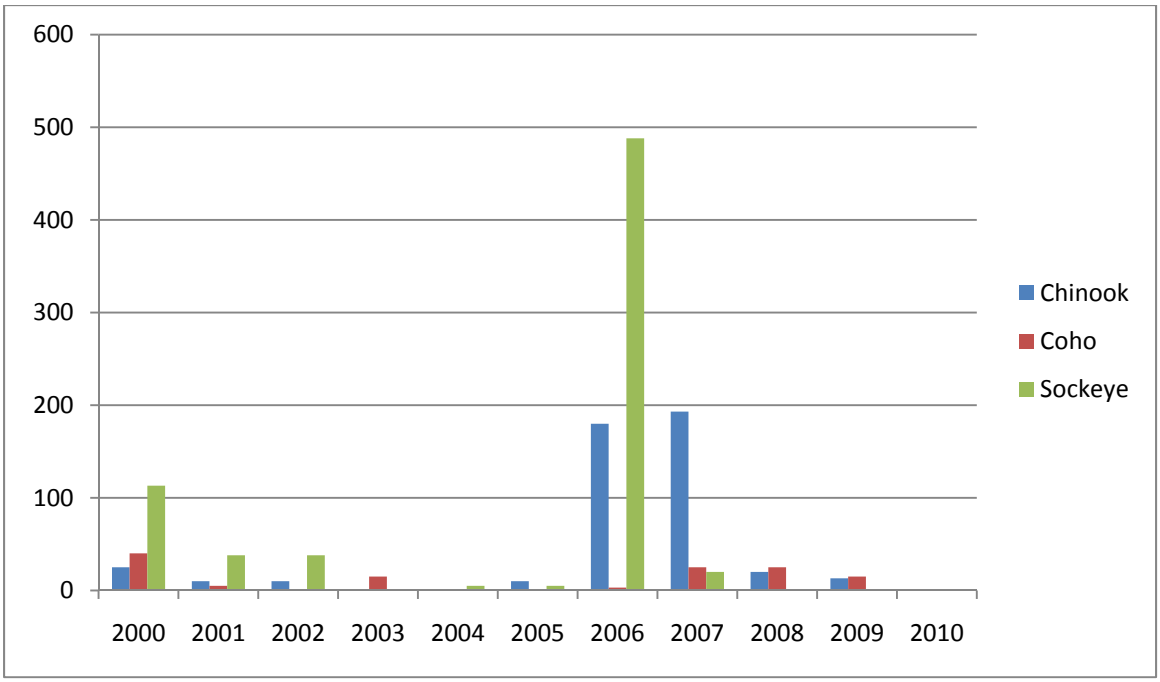
from late December to February. Therefore, the probability of observing spawning cutthroat trout during the survey period is low. Although spawning cutthroat trout are occasionally observed in Kelsey Creek, none were observed during 2010.

5.0 DISCUSSION

5.1 Spawning Escapement and Redd Distribution

In 2010, salmon spawning escapement (redd-based) for Kelsey Creek was estimated at zero Chinook, zero sockeye, and zero coho. Although two Chinook spawners and six sockeye spawners were observed, no redds were recorded during 17 surveys. Similar results were documented during 2003 and 2004, and overall salmon escapement in Kelsey Creek last year (2009) was also low (**Figure 7**). Survey conditions were good to fair in 2010, and Chinook redd counts are thought to be relatively accurate.

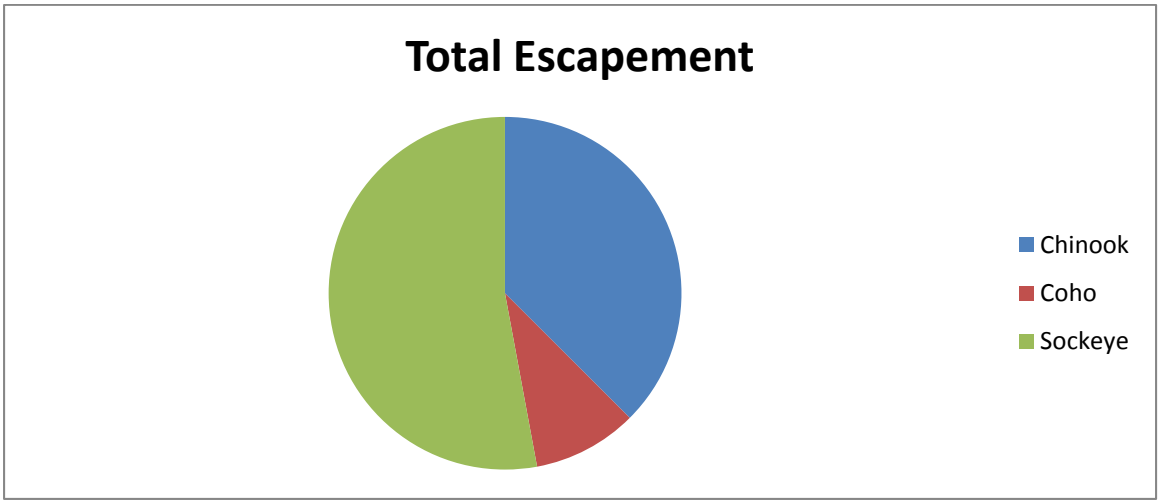
Figure 7. Kelsey Creek Salmon Redd-Based Escapement.



Chinook salmon escapement in the Kelsey Creek basin is typically below 20, while the arithmetic mean is approximately 46. The mean of 46 is skewed due to high escapement estimates in 2006 and 2007 that ranged from 180 to 193. Coho salmon escapement is variable, and ranged from zero in 2002, 2004, 2005, and 2010, to a peak of 40 during 2000. Sockeye salmon escapement is also variable, ranging from zero in 2003, 2008, 2009, and 2010, to a peak of 488 in 2006 and 178 in 2000. The peak sockeye escapement estimates in 2000 and 2006 mirror peak counts through the Chittenden Locks when 414,976 were counted in 2000 and 418,015 in 2006 (WDFW 2010). Based on the available data from 2000 through 2010, the arithmetic mean escapement for sockeye salmon in Kelsey Creek is approximately 71, while the mean passing through the Chittenden Locks during this same time period is 240,516.

Overall, salmon abundance based on summing redd-based escapement for each species from 2000 through 2010 indicates Kelsey Creek produces mostly sockeye salmon (n=707), followed by Chinook salmon (n=501), and then coho salmon (n=128). This overall trend is graphically depicted in **Figure 8**.

Figure 8. Total Escapement in Kelsey Creek from 2000 through 2010.



Since no redds were documented in the Kelsey watershed during 2010, a brief summary of past results is presented. Past Chinook salmon redd distribution by reach within the mainstem Kelsey Creek from 2000 through 2009 was variable; however, some trends are evident (**Figure 9**). The distribution of Chinook salmon redds in mainstem Kelsey Creek during 2009 was restricted to the lower most reaches. This is in contrast to the overall redd distribution trend based on data from 2000 through 2009, which indicates the predominance of spawning has historically occurred primarily in Reaches 4, 5, 6, and 7, and to a lesser degree in Reach A. The use of Reach A for spawning spiked in 2006 when a total of 14 Chinook redds were counted. Chinook salmon spawning in Reaches 1, 2, and 3 has been limited during all survey years (**Figure 10**). This may be due to the low gradients, the presence of beaver dams, the lack of riparian canopy, or other issues.

Figure 9. Yearly Kelsey Creek Chinook Salmon Redd Distribution by Reach from 2000 through 2010.

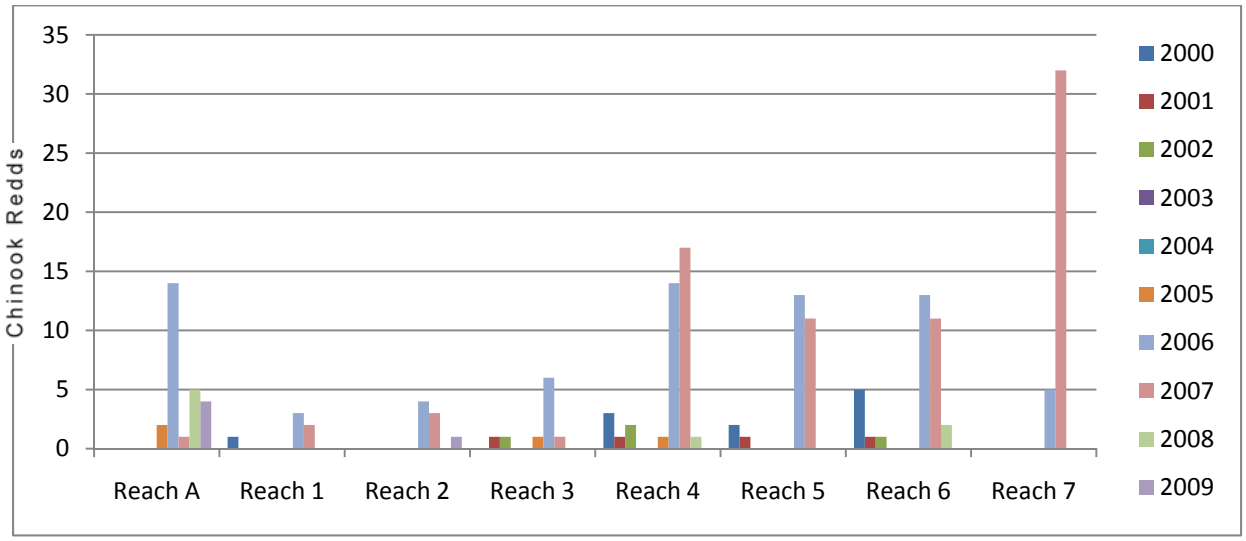
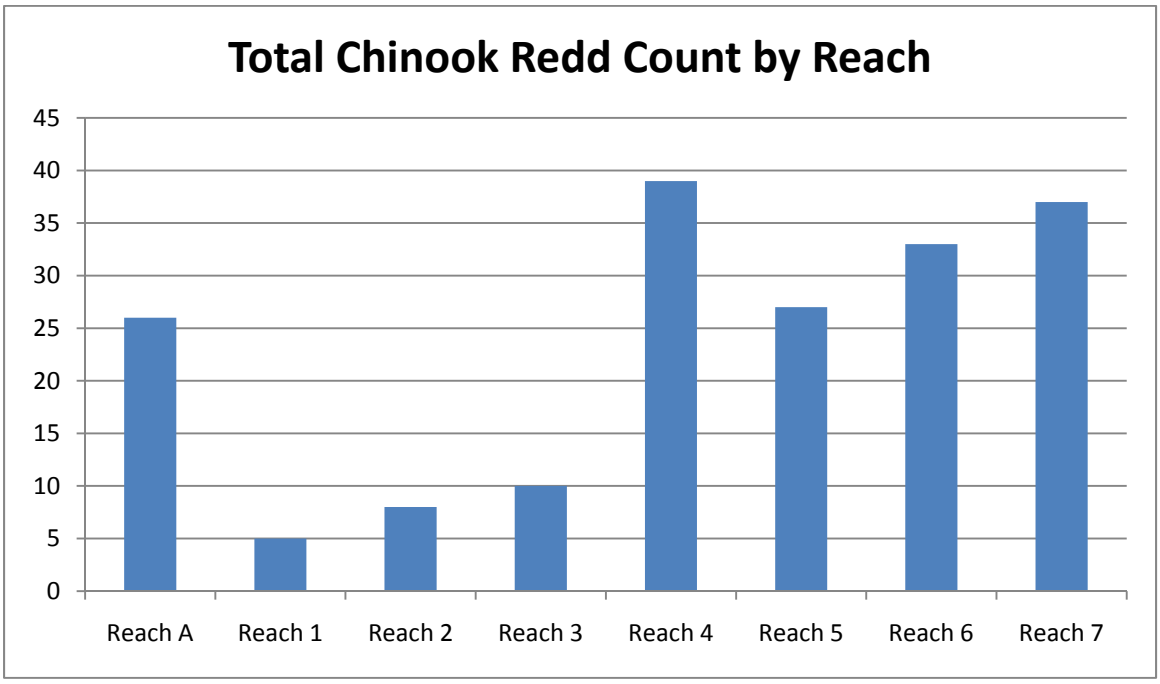


Figure 10. Total Kelsey Creek Chinook Salmon Redd Count by Reach from 2000 through 2010.

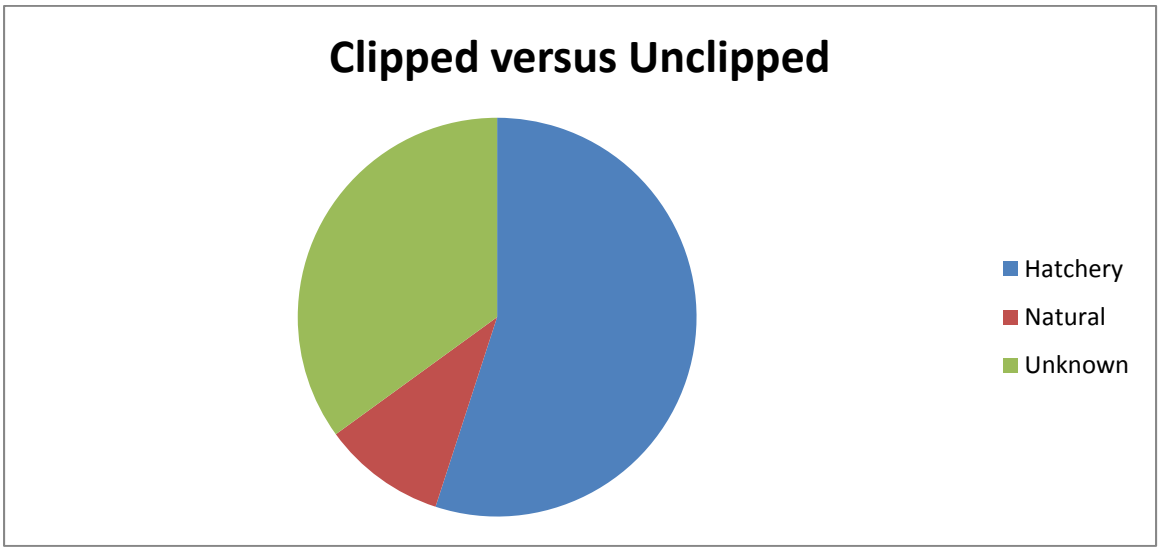


Very few Chinook salmon have been observed spawning in Coal Creek and none have previously been documented spawning upstream of I-405. The documentation of a Chinook salmon redd at approximate river mile 0.32 in Coal Creek (Figure 6) during 2010 represents the first time they have been documented spawning upstream of I-405. Chinook salmon have likely always spawned upstream of I-405, but recently, salmon spawning surveys in Coal Creek have been conducted earlier in the season and more frequently, which is providing additional information on the abundance and distribution of Chinook within the Coal Creek basin.

5.2 Wild/Hatchery Origin and Gender

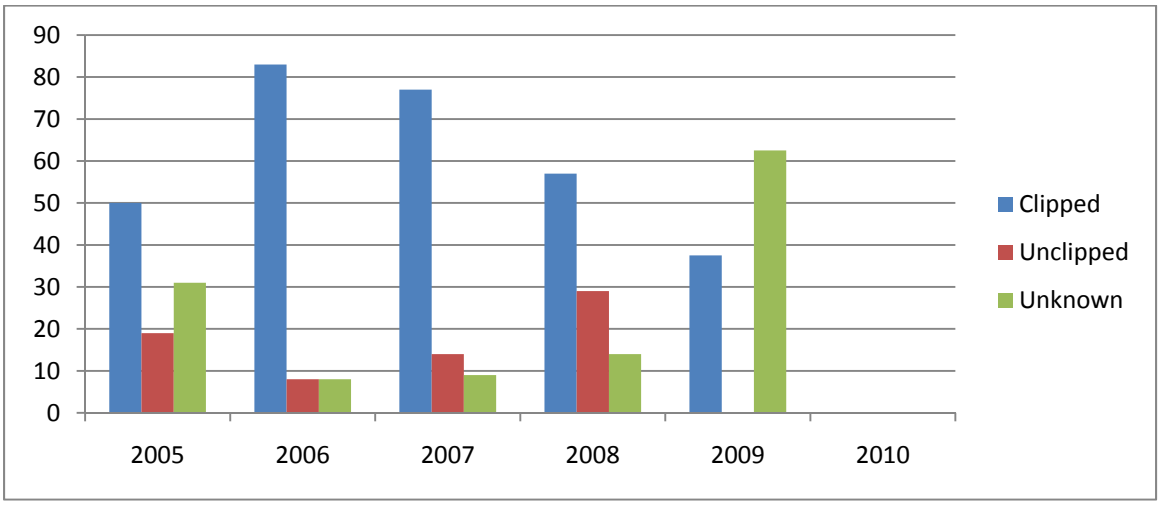
Due to the absence of carcasses, no data on hatchery origin versus natural production is available for 2010. One male was documented in Kelsey Creek, but the data set is too small to draw any meaningful conclusions. In past years, a large percentage of the Chinook salmon observed in Kelsey Creek were of hatchery origin. A total of 20 Chinook salmon carcasses were observed during 2009. Eleven were clipped, two were not clipped, and seven were unknown (**Figure 11**). The high degree of unknown origin was due to the carcasses being partially consumed or decayed. Based on 13 carcasses being in good enough condition to determine origin, 85 percent were of hatchery origin and 15 percent presumed natural origin.

Figure 11. Percent Clipped, Unclipped, and Unknown Origin Chinook Salmon in 2009.



Based on data from eight carcasses recovered from the mainstem of Kelsey Creek from 2005 through 2009, 37.5 percent were clipped, 0 percent were unclipped, and 62.5 percent were undetermined (due to high degree of decomposition or predation). A comparison based on percentage clipped versus unclipped for the mainstem Kelsey Creek from 2005 through 2009 is outlined in **Figure 12.**

Figure 12. Chinook Salmon Origin (Percentage) in Mainstem Kelsey Creek.



The analysis of scales collected from one male Chinook in West Tributary during the 2010 surveys revealed it was a 4-year-old spawner. The available data for 2010 is insufficient to produce a male to female ratio. The past male to female ratio for Chinook salmon in the West Tributary is summarized below in **Table 7**.

Table 7. Relative Abundance of Male and Female Salmonids in West Tributary

Species	Year	Total Observed	Male	Female
Chinook	2003	6	33%	67%
	2004	81	30%	70%
	2005	40	43%	58%
	2006	59	49%	51%
	2007	7	33%	67%
	2008	16	50%	50%
	2009	5	40%	60%
	2010	1	100%	0%
Sockeye	2003	0	NA	NA
	2004	10	30%	70%
	2005	0	NA	NA
	2006	37	35%	65%
	2007	0	NA	NA
	2008	0	NA	NA
	2009	0	NA	NA
	2010	0	NA	NA
Coho	2003	2	50%	50%
	2004	0	NA	NA
	2005	2	0%	100%
	2006	1	0%	100%
	2007	3	33%	67%
	2008	0	NA	NA
	2009	0	NA	NA
	2010	0	NA	NA

5.3 Pre-spawn Mortality

Each year, in Kelsey Creek (as in other urban streams), a number of salmon experience pre-spawn mortality, that is, die before they have a chance to spawn. Female salmon that die before they spawn typically have 100 percent egg retention, unless subject to predation or decomposition. Inspection of female carcasses is typically done to determine pre-spawn mortality, but male pre-spawn mortality is not tracked because it is difficult to determine by carcass inspection. Some pre-spawn mortality may be missed because surveys are only conducted once per week.

In 2010, only one Chinook carcass was recovered; it was a male, so pre-spawn mortality was not reported. However, in 2009, a total of five female Chinook carcasses were recovered; pre-spawn mortality was variable, ranging from 0 percent in Kelsey Creek, 50 percent in West Tributary, and 100 percent in Richards Creek. The overall rate of pre-spawn mortality for all species in 2009 was 33 percent. What were causes, if known? In recent years – many were subject to stranding and/or predation near beaver dams.

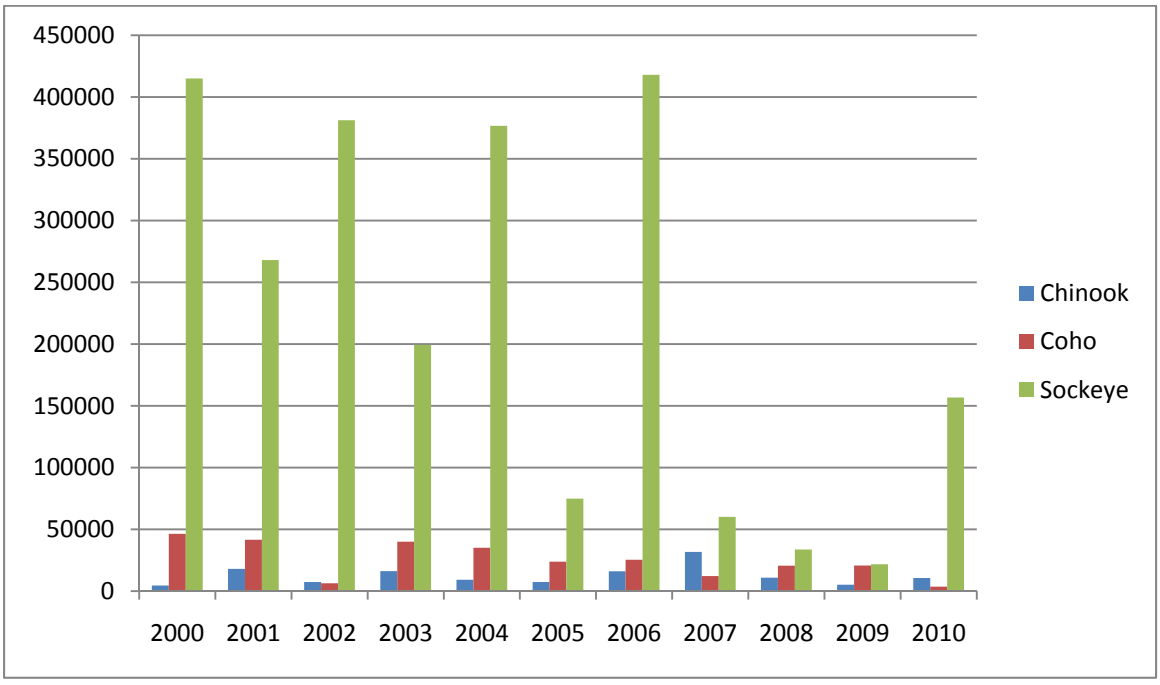
For purposes of comparison, Chinook pre-spawn mortality in the Cedar River ranged from 1.5 percent in 2003, 3 percent in 2004, and 0.8 percent in 2005 (Berge et al. 2006). Pre-spawn mortality in Bear Creek ranged from 8 percent in 2003, 4 percent in 2004, and 6.5 percent in

2005. Pre-spawn mortality in Issaquah Creek ranged from 23 percent in 2003 to 22.7 percent in 2005. Bellevue rates of pre-spawn mortality are higher, perhaps due to the small number of fish, passage barriers, and urban water quality. Within the surveyed streams pre-spawn mortality is frequently observed below the beaver dams where adult salmon become stranded in the dam debris while attempting to pass the structure. The stranded fish then become easy prey for opportunistic predators such as coyotes or raccoons. The dams also act as a choke-point that, depending on flow, will result in some salmon holding below the dam until higher flows improve upstream passage. This may result in an ideal situation for river otters to feed upon adult salmon congregated below the dams.

5.4 Conclusions and Recommendations

The results of the 2010 salmonid spawning surveys indicate production of anadromous salmonids in the Kelsey Creek and Coal Creek basins was lower than expected for all species. The absence of coho salmon mirrors the overall decline of this species based on total counts at the Chittenden Locks from 2000 through 2010 (**Figure 13**). Although 2010 experienced extremely poor returns of coho salmon, the WDFW has forecasted a return of approximately 28,000 to the Lake Washington watershed in 2011. Sockeye continue to be the most abundant anadromous salmon to utilize the Kelsey Creek basin. Yearly count data from the Chittenden Locks is summarized in **Figure 13**.

Figure 13. Chinook, Coho, and Sockeye Salmon Counts from the Chittenden Locks from 2000 through 2010.



Chinook salmon have not declined as drastically as coho salmon in the Lake Washington watershed, but their numbers are dependent on hatchery production as well as natural production in the Cedar River and other streams in the Sammamish basin. The low abundance of Chinook salmon in Kelsey Creek is likely due to several factors. On the local scale, Kelsey Creek does not contain an independent population of Chinook salmon, but is part of the Sammamish population and receives strays from other systems/hatcheries. Other factors that could potentially reduce or

limit the use of Kelsey Creek by Chinook salmon include the presence of numerous natural and artificial blockages, elevated stream temperatures, poor water quality, and predation. The blockages, especially the beaver dams or milfoil in the lower reaches, would primarily impact Chinook that return early in the season prior to the fall rains.

Based on the available data, the following recommendations are proposed:

1. Continue annual salmon spawner surveys. Conduct surveys two times per week in Kelsey Creek, per NOAA and USGS recommendations for documenting pre-spawn mortality.
2. Map beaver dam location, condition, and document if they are potential barriers.
3. Monitor summer growth of milfoil in Mercer Slough and control if necessary.
4. Work with USGS and NOAA on identifying pre-spawn mortality issues and solutions.
5. Continue stream habitat enhancement efforts focusing on improving riparian habitat, increasing large woody debris, and improving water quality/quantity.
6. Continue improving access for both adult and juvenile fish resources by removing or fixing migration barriers.
7. Conduct thorough stream habitat surveys. The purpose of these surveys should be to increase knowledge of existing conditions and guide future restoration efforts.

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Appendix A: Survey Data

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2010 Bellevue Stream Survey Data

2010 Bellevue Stream Surveys	Sock Live	Sock Morts	Chnk Live	Chnk Mort	Chnk Redds	Coho Live	Coho Dead	Coho Redd	Other Live	Other Redd
Kelsey Crk										
Sep 2010 Total	0	0	0	0	0	0	0	0	0	0
Oct 2010 Total	7	0	1	0	0	0	0	0	0	0
Nov 2010 Total	0	0	0	0	0	0	0	0	0	0
Dec 2010 Total	0	0	0	0	0	0	0	0	0	0
Jan 2011 Total	0	0	0	0	0	0	0	0	0	0
Survey Total	7	0	1	0	0	0	0	0	0	0
West Trib										
Sep 2010 Total	0	0	0	0	0	0	0	0	0	0
Oct 2010 Total	0	0	0	1	0	0	0	0	0	0
Nov 2010 Total	0	0	0	0	0	0	0	0	0	0
Dec 2010 Total	0	0	0	0	0	0	0	0	0	0
Jan 2011 Total	0	0	0	0	0	0	0	0	0	0
Survey Total	0	0	0	1	0	0	0	0	0	0
Richards Crk										
Sep 2010 Total	0	0	0	0	0	0	0	0	0	0
Oct 2010 Total	0	0	0	0	0	0	0	0	0	0
Nov 2010 Total	0	0	0	0	0	0	0	0	0	0
Dec 2010 Total	0	0	0	0	0	0	0	0	0	0
Jan 2011 Total	0	0	0	0	0	0	0	0	1	1
Survey Total	0	0	0	0	0	0	0	0	1	1
Coal Crk										
Oct 2010 Total	0	0	1	0	1	1	0	0	0	0
Nov 2010 Total	0	0	0	0	0	0	0	0	0	0
Dec 2010 Total	0	0	0	0	0	0	0	0	0	0
Jan 2011 Total	0	0	0	0	0	0	0	0	0	0
Survey Total	0	0	1	0	1	1	0	0	0	0

2010 Bellevue Stream Survey Data

Kelsey Creek

Survey Date	Stream	Stream Code	Reach Description	RM Start	RM Stop	Section	Sock Live	Sock Morts	Chnk Live	Chnk Mort	Chnk Redds	Coho Live	Coho Dead	Coho Redd	Other Live	Other Redd	Weather	Flows	Vis Riffles	Vis Pools	Survey Crew	Comments
9/13/2010	Kelsey Creek		Reach A	3	3.2	KSY-1	0	0	0	0	0	0	0	0	0	0					A. Bosworth, E. Bosman-Clark	
9/13/2010	Kelsey Creek		Reach 1	3.2	3.4	KSY-2	0	0	0	0	0	0	0	0	0	0					AB, EBC	
9/13/2010	Kelsey Creek		Reach 2	3.4	3.6	KSY-3	0	0	0	0	0	0	0	0	0	0					AB, EBC	
9/13/2010	Kelsey Creek		Reach 3	3.6	3.8	KSY-4	0	0	0	0	0	0	0	0	0	0					AB, EBC	
9/13/2010	Kelsey Creek		Reach 4	3.8	4	KSY-5	0	0	0	0	0	0	0	0	0	0					AB, EBC	
9/13/2010	Kelsey Creek		Reach 5	4	4.3	KSY-6	0	0	0	0	0	0	0	0	0	0					AB, EBC	
9/13/2010	Kelsey Creek		Reach 6	4.4	5.1	KSY-7	n/s	n/s	n/s	n/s	n/s	n/s	n/s								AB, EBC	not surveyed due to restoration construction
9/13/2010	Kelsey Creek		Reach 7	5.1	5.8	KSY-8	n/s	n/s	n/s	n/s	n/s	n/s	n/s								AB, EBC	not surveyed due to restoration construction
9/21/2010	Kelsey Creek		Reach A	3	3.2	KSY-1	n/s	n/s	n/s	n/s	n/s	n/s	n/s								EBC, L Jeroue	walked from bottom of Reach A to WT confluence in search of blockages
9/21/2010	Kelsey Creek		Reach 1	3.2	3.4	KSY-2	n/s	n/s	n/s	n/s	n/s	n/s	n/s								EBC, LJ	
9/21/2010	Kelsey Creek		Reach 2	3.4	3.6	KSY-3	n/s	n/s	n/s	n/s	n/s	n/s	n/s								EBC, LJ	
9/21/2010	Kelsey Creek		Reach 3	3.6	3.8	KSY-4	n/s	n/s	n/s	n/s	n/s	n/s	n/s								EBC, LJ	
9/21/2010	Kelsey Creek		Reach 4	3.8	4	KSY-5	n/s	n/s	n/s	n/s	n/s	n/s	n/s								EBC, LJ	
9/21/2010	Kelsey Creek		Reach 5	4	4.3	KSY-6	n/s	n/s	n/s	n/s	n/s	n/s	n/s								EBC, LJ	
9/21/2010	Kelsey Creek		Reach 6	4.4	5.1	KSY-7	n/s	n/s	n/s	n/s	n/s	n/s	n/s								EBC, LJ	
9/21/2010	Kelsey Creek		Reach 7	5.1	5.8	KSY-8	n/s	n/s	n/s	n/s	n/s	n/s	n/s								EBC, LJ	
9/27/2010	Kelsey Creek		Reach A	3	3.2	KSY-1	0	0	0	0	0	0	0	0	0	0	Overcast, lt rain	Low	Good	Good	EBC K. Conlon	
9/27/2010	Kelsey Creek		Reach 1	3.2	3.4	KSY-2	0	0	0	0	0	0	0	0	0	0	Overcast, lt rain	Low	Good	Good	EBC, KC	beaver dam with large pool behind notched for fish passage
9/27/2010	Kelsey Creek		Reach 2	3.4	3.6	KSY-3	0	0	0	0	0	0	0	0	0	0	Overcast, lt rain	Low	Good	Good	EBC, KC	
9/27/2010	Kelsey Creek		Reach 3	3.6	3.8	KSY-4	0	0	0	0	0	0	0	0	0	0	Overcast, lt rain	Low	Good	Good	EBC, KC	
9/27/2010	Kelsey Creek		Reach 4	3.8	4	KSY-5	0	0	0	0	0	0	0	0	0	0	Overcast, lt rain	Low	Good	Good	EBC, KC	
9/27/2010	Kelsey Creek		Reach 5	4	4.3	KSY-6	0	0	0	0	0	0	0	0	0	0	Overcast, lt rain	Low	Good	Good	EBC, KC	
9/27/2010	Kelsey Creek		Reach 6	4.4	5.1	KSY-7	0	0	0	0	0	0	0	0	0	0	Sunny	Low	Good	Good	EBC, KC	
9/27/2010	Kelsey Creek		Reach 7	5.1	5.8	KSY-8	0	0	0	0	0	0	0	0	0	0	Sunny	Low	Good	Good	EBC, KC	
10/4/2010	Kelsey Creek		Reach A	3	3.2	KSY-1	0	0	0	0	0	0	0	0	0	0	Sunny	Low	Good	Good	EBC, M. Reeder	
10/4/2010	Kelsey Creek		Reach 1	3.2	3.4	KSY-2	0	0	0	0	0	0	0	0	0	0	Sunny	Low	Good	Good	EBC, MR	
10/4/2010	Kelsey Creek		Reach 2	3.4	3.6	KSY-3	0	0	0	0	0	0	0	0	0	0	Sunny	Low	Good	Good	EBC, MR	
10/4/2010	Kelsey Creek		Reach 3	3.6	3.8	KSY-4	0	0	0	0	0	0	0	0	0	0	Sunny	Low	Good	Good	EBC, MR	
10/4/2010	Kelsey Creek		Reach 4	3.8	4	KSY-5	0	0	0	0	0	0	0	0	0	0	Sunny	Low	Good	Good	EBC, MR	
10/4/2010	Kelsey Creek		Reach 5	4	4.3	KSY-6	0	0	0	0	0	0	0	0	0	0	Sunny	Low	Good	Good	EBC, MR	
10/4/2010	Kelsey Creek		Reach 6	4.4	5.1	KSY-7	0	0	0	0	0	0	0	0	0	0	Sunny	Low	Good	Good	EBC, MR	
10/4/2010	Kelsey Creek		Reach 7	5.1	5.8	KSY-8	1	0	0	0	0	0	0	0	0	0	Sunny	Low	Good	Good	EBC, MR	
10/11/2010	Kelsey Creek		Reach A	3	3.2	KSY-1	0	0	0	0	0	0	0	0	0	0		High	Poor	Poor	E. Ostergaard, SS	Stopped surveys in Reach 1 due to high flows and low visibility
10/11/2010	Kelsey Creek		Reach 1	3.2	3.3	KSY-2	1	0	0	0	0	0	0	0	0	0		High	Poor	Poor	EO, SS	Live male sockeye pulled out of dam debris at large beaver dam, released downstream.
10/12/2010	Kelsey Creek		Reach A	3	3.2	KSY-1	0	0	0	0	0	0	0	0	0	0	Sunny	Mod	Mod	Mod	EBC, S. Swarts	surveyed Tues instead of Mon due to rain over weekend.
10/12/2010	Kelsey Creek		Reach 1	3.2	3.4	KSY-2	0	0	0	0	0	0	0	0	0	0	Sunny	Mod	Mod	Mod	EBC, SS	
10/12/2010	Kelsey Creek		Reach 2	3.4	3.6	KSY-3	0	0	0	0	0	0	0	0	0	0	Sunny	Mod	Mod	Mod	EBC, SS	
10/12/2010	Kelsey Creek		Reach 3	3.6	3.8	KSY-4	0	0	0	0	0	0	0	0	0	0	Sunny	Mod	Mod	Mod	EBC, SS	
10/12/2010	Kelsey Creek		Reach 4	3.8	4	KSY-5	0	0	1	0	0	0	0	0	0	0	Sunny	Mod	Mod	Mod	EBC, SS	
10/12/2010	Kelsey Creek		Reach 5	4	4.3	KSY-6	1	0	0	0	0	0	0	0	0	0	Sunny	Mod	Mod	Mod	EBC, SS	UNIDENTIFIED LIVE FISH
10/12/2010	Kelsey Creek		Reach 6	4.4	5.1	KSY-7	0	0	0	0	0	0	0	0	0	0	Sunny	Mod	Good	Good	EBC, SS	
10/12/2010	Kelsey Creek		Reach 7	5.1	5.8	KSY-8	0	0	0	0	0	0	0	0	0	0	Sunny	Mod	Good	Good	EBC, SS	
10/18/2010	Kelsey Creek		Reach A	3	3.2	KSY-1	0	0	0	0	0	0	0	0	0	0	Mostly sunny	Low	Good	Good	EBC, MR	
10/18/2010	Kelsey Creek		Reach 1	3.2	3.4	KSY-2	2	0	0	0	0	0	0	0	0	0	Mostly sunny	Low	Good	Good	EBC, MR	
10/18/2010	Kelsey Creek		Reach 2	3.4	3.6	KSY-3	0	0	0	0	0	0	0	0	0	0	Mostly sunny	Low	Good	Good	EBC, MR	
10/18/2010	Kelsey Creek		Reach 3	3.6	3.8	KSY-4	0	0	0	0	0	0	0	0	0	0	Mostly sunny	Low	Good	Good	EBC, MR	
10/18/2010	Kelsey Creek		Reach 4	3.8	4	KSY-5	0	0	0	0	0	0	0	0	0	0	Mostly sunny	Low	Good	Good	EBC, MR	
10/18/2010	Kelsey Creek		Reach 5	4	4.3	KSY-6	0	0	0	0	0	0	0	0	0	0	Mostly sunny	Low	Good	Good	EBC, MR	
10/18/2010	Kelsey Creek		Reach 6	4.4	5.1	KSY-7	2	0	0	0	0	0	0	0	0	0	Mostly sunny	Low	Good	Good	EBC, MR	
10/18/2010	Kelsey Creek		Reach 7	5.1	5.8	KSY-8	0	0	0	0	0	0	0	0	0	0	Mostly sunny	Low	Good	Good	EBC, MR	
10/25/2010	Kelsey Creek		Reach A	3	3.2	KSY-1	0	0	0	0	0	0	0	0	0	0		Mod	Poor	Poor	EBC, MR	
10/25/2010	Kelsey Creek		Reach 1	3.2	3.4	KSY-2	0	0	0	0	0	0	0	0	0	0		Mod	Poor	Poor	EBC, MR	
10/25/2010	Kelsey Creek		Reach 2	3.4	3.6	KSY-3	0	0	0	0	0	0	0	0	0	0		Mod	Poor	Poor	EBC, MR	

2010 Bellevue Stream Survey Data

Kelsey Creek

Survey Date	Stream	Stream Code	Reach Description	RM Start	RM Stop	Section	Sock Live	Sock Morts	Chnk Live	Chnk Mort	Chnk Redds	Coho Live	Coho Dead	Coho Redd	Other Live	Other Redd	Weather	Flows	Vis Riffles	Vis Pools	Survey Crew	Comments
10/25/2010	Kelsey Creek		Reach 3	3.6	3.8	KSY-4	0	0	0	0	0	0	0	0	0	0		Mod	Poor	Poor	EBC, MR	Walked on bank around weirs
10/25/2010	Kelsey Creek		Reach 4	3.8	4	KSY-5	0	0	0	0	0	0	0	0	0	0		Mod	Poor	Poor	EBC, MR	Walked on bank around weirs
10/25/2010	Kelsey Creek		Reach 5	4	4.3	KSY-6	0	0	0	0	0	0	0	0	0	0		Mod	Poor	Poor	EBC, MR	Walked on bank around weirs. LOWER PART OF REACH 6 NOT SURVEYED (end of gold course to 134th)
10/25/2010	Kelsey Creek		Reach 6	4.4	5.1	KSY-7	0	0	0	0	0	0	0	0	0	0		Mod	Poor	Poor	EBC, MR	
10/25/2010	Kelsey Creek		Reach 7	5.1	5.8	KSY-8	0	0	0	0	0	0	0	0	0	0		Mod	Poor	Poor	EBC, MR	
							7	0	1	0	0	0	0	0	0	0						
11/3/2010	Kelsey Creek		Reach A	3	3.2	KSY-1	0	0	0	0	0	0	0	0	0	0	Sunny		Good	Good	EBC, J.Parr	Survey moved date pushed back due to rain on Monday
11/3/2010	Kelsey Creek		Reach 1	3.2	3.4	KSY-2	0	0	0	0	0	0	0	0	0	0	Sunny		Good	Good	EBC, JP	
11/3/2010	Kelsey Creek		Reach 2	3.4	3.6	KSY-3	0	0	0	0	0	0	0	0	0	0	Sunny		Good	Good	EBC, JP	
11/3/2010	Kelsey Creek		Reach 3	3.6	3.8	KSY-4	0	0	0	0	0	0	0	0	0	0	Sunny		Good	Good	EBC, JP	
11/3/2010	Kelsey Creek		Reach 4	3.8	4	KSY-5	0	0	0	0	0	0	0	0	0	0	Sunny		Good	Good	EBC, JP	
11/3/2010	Kelsey Creek		Reach 5	4	4.3	KSY-6	0	0	0	0	0	0	0	0	0	0	Sunny		Good	Good	EBC, JP	
11/4/2010	Kelsey Creek		Reach 6	4.4	5.1	KSY-7	0	0	0	0	0	0	0	0	0	0	Sunny		Good	Good	EBC, JP	
11/4/2010	Kelsey Creek		Reach 7	5.1	5.8	KSY-8	0	0	0	0	0	0	0	0	0	0	Sunny		Good	Good	EBC, JP	
11/8/2010	Kelsey Creek		Reach A	3	3.2	KSY-1	0	0	0	0	0	0	0	0	0	0		Mod	Good	Good	EBC, MR	
11/8/2010	Kelsey Creek		Reach 1	3.2	3.4	KSY-2	0	0	0	0	0	0	0	0	0	0		Mod	Good	Good	EBC, MR	
11/8/2010	Kelsey Creek		Reach 2	3.4	3.6	KSY-3	0	0	0	0	0	0	0	0	0	0		Mod	Good	Good	EBC, MR	
11/8/2010	Kelsey Creek		Reach 3	3.6	3.8	KSY-4	0	0	0	0	0	0	0	0	0	0		Mod	Good	Good	EBC, MR	
11/8/2010	Kelsey Creek		Reach 4	3.8	4	KSY-5	0	0	0	0	0	0	0	0	0	0		Mod	Good	Good	EBC, MR	
11/8/2010	Kelsey Creek		Reach 5	4	4.3	KSY-6	0	0	0	0	0	0	0	0	0	0		Mod	Good	Good	EBC, MR	
11/8/2010	Kelsey Creek		Reach 6	4.4	5.1	KSY-7	0	0	0	0	0	0	0	0	0	0		Mod	Good	Good	EBC, MR	
11/8/2010	Kelsey Creek		Reach 7	5.1	5.8	KSY-8	0	0	0	0	0	0	0	0	0	0		Mod	Good	Good	EBC, MR	
11/15/2010	Kelsey Creek		Reach A	3	3.2	KSY-1	0	0	0	0	0	0	0	0	0	0	Overcast, Lt rain	mod to high	Mod	Mod	LJ, JP	
11/15/2010	Kelsey Creek		Reach 1	3.2	3.4	KSY-2	0	0	0	0	0	0	0	0	0	0	Overcast, Lt rain	mod to high	Mod	Mod	LJ, JP	
11/15/2010	Kelsey Creek		Reach 2	3.4	3.6	KSY-3	0	0	0	0	0	0	0	0	0	0	Overcast, Lt rain	mod to high	Mod	Mod	LJ, JP	
11/15/2010	Kelsey Creek		Reach 3	3.6	3.8	KSY-4	0	0	0	0	0	0	0	0	0	0	Overcast, Lt rain	mod to high	Mod	Mod	LJ, JP	
11/15/2010	Kelsey Creek		Reach 4	3.8	4	KSY-5	0	0	0	0	0	0	0	0	0	0	Overcast, Lt rain	mod to high	Mod	Mod	LJ, JP	
11/15/2010	Kelsey Creek		Reach 5	4	4.3	KSY-6	0	0	0	0	0	0	0	0	0	0	Overcast, Lt rain	mod to high	Mod	Mod	LJ, JP	
11/15/2010	Kelsey Creek		Reach 6	4.4	5.1	KSY-7	0	0	0	0	0	0	0	0	0	0	Mod Rain	High	Poor	Poor	LJ, JP	
11/15/2010	Kelsey Creek		Reach 7	5.1	5.8	KSY-8	0	0	0	0	0	0	0	0	0	0	Mod Rain	High	Poor	Poor	LJ, JP	
11/22/2010	Kelsey Creek		Reach A	3	3.2	KSY-1	0	0	0	0	0	0	0	0	0	0	Overcast	Mod	Mod	Mod	LJ, JP	
11/22/2010	Kelsey Creek		Reach 1	3.2	3.4	KSY-2	0	0	0	0	0	0	0	0	0	0	Overcast	Mod	Mod	Mod	LJ, JP	
11/22/2010	Kelsey Creek		Reach 2	3.4	3.6	KSY-3	0	0	0	0	0	0	0	0	0	0	Overcast	Mod	Mod	Mod	LJ, JP	
11/22/2010	Kelsey Creek		Reach 3	3.6	3.8	KSY-4	0	0	0	0	0	0	0	0	0	0	Overcast	Mod	Mod	Mod	LJ, JP	
11/22/2010	Kelsey Creek		Reach 4	3.8	4	KSY-5	0	0	0	0	0	0	0	0	0	0	Overcast	Mod	Mod	Mod	LJ, JP	
11/22/2010	Kelsey Creek		Reach 5	4	4.3	KSY-6	0	0	0	0	0	0	0	0	0	0	Overcast	Mod	Mod	Mod	LJ, JP	
11/22/2010	Kelsey Creek		Reach 6	4.4	5.1	KSY-7	0	0	0	0	0	0	0	0	0	0	Overcast	Mod	Mod	Mod	LJ, JP	
11/22/2010	Kelsey Creek		Reach 7	5.1	5.8	KSY-8	0	0	0	0	0	0	0	0	0	0	Overcast	Mod	Mod	Mod	LJ, JP	
11/30/2010	Kelsey Creek		Reach A	3	3.2	KSY-1	0	0	0	0	0	0	0	0	0	0	Overcast	Mod	Mod	Mod	LJ, JP	
11/30/2010	Kelsey Creek		Reach 1	3.2	3.4	KSY-2	0	0	0	0	0	0	0	0	0	0	Overcast	Mod	Mod	Mod	LJ, JP	
11/30/2010	Kelsey Creek		Reach 2	3.4	3.6	KSY-3	0	0	0	0	0	0	0	0	0	0	Overcast	Mod	Mod	Mod	LJ, JP	
11/30/2010	Kelsey Creek		Reach 3	3.6	3.8	KSY-4	0	0	0	0	0	0	0	0	0	0	Overcast	Mod	Mod	Mod	LJ, JP	
11/30/2010	Kelsey Creek		Reach 4	3.8	4	KSY-5	0	0	0	0	0	0	0	0	0	0	Overcast	Mod	Mod	Mod	LJ, JP	
11/30/2010	Kelsey Creek		Reach 5	4	4.3	KSY-6	0	0	0	0	0	0	0	0	0	0	Overcast	Mod	Mod	Mod	LJ, JP	
11/30/2010	Kelsey Creek		Reach 6	4.4	5.1	KSY-7	0	0	0	0	0	0	0	0	0	0	Overcast	Mod	Mod	Mod	LJ, JP	
11/30/2010	Kelsey Creek		Reach 7	5.1	5.8	KSY-8	0	0	0	0	0	0	0	0	0	0	Overcast	Mod	Mod	Mod	LJ, JP	
							0	0	0	0	0	0	0	0	0	0						
12/6/2010	Kelsey Creek		Reach A	3	3.2	KSY-1	0	0	0	0	0	0	0	0	0	0	Overcast	Moderate	Good	Good	EBC, JP	
12/6/2010	Kelsey Creek		Reach 1	3.2	3.4	KSY-2	0	0	0	0	0	0	0	0	0	0	Overcast	Moderate	Good	Good	EBC, JP	
12/6/2010	Kelsey Creek		Reach 2	3.4	3.6	KSY-3	0	0	0	0	0	0	0	0	0	0	Overcast	Moderate	Good	Good	EBC, JP	
12/6/2010	Kelsey Creek		Reach 3	3.6	3.8	KSY-4	0	0	0	0	0	0	0	0	0	0	Overcast	Moderate	Good	Good	EBC, JP	
12/6/2010	Kelsey Creek		Reach 4	3.8	4	KSY-5	0	0	0	0	0	0	0	0	0	0	Overcast	Moderate	Good	Good	EBC, JP	
12/6/2010	Kelsey Creek		Reach 5	4	4.3	KSY-6	0	0	0	0	0	0	0	0	0	0	Overcast	Moderate	Good	Good	EBC, JP	
12/6/2010	Kelsey Creek		Reach 6	4.4	5.1	KSY-7	0	0	0	0	0	0	0	0	0	0	Overcast	Moderate	Good	Good	EBC, JP	
12/6/2010	Kelsey Creek		Reach 7	5.1	5.8	KSY-8	0	0	0	0	0	0	0	0	0	0	Overcast	Moderate	Good	Good	EBC, JP	

2010 Bellevue Stream Survey Data

Kelsey Creek

Survey Date	Stream	Stream Code	Reach Description	RM Start	RM Stop	Section	Sock Live	Sock Morts	Chnk Live	Chnk Mort	Chnk Redds	Coho Live	Coho Dead	Coho Redd	Other Live	Other Redd	Weather	Flows	Vis Riffles	Vis Pools	Survey Crew	Comments
12/17/2010	Kelsey Creek		Reach A	3	3.2	KSY-1	0	0	0	0	0	0	0	0	0	0	Sunny	High	Good	Good	EBC, Elissa	heavy weekend rain and very high flows. Reaches A and 1 spot checked due to high flows
12/17/2010	Kelsey Creek		Reach 1	3.2	3.4	KSY-2	0	0	0	0	0	0	0	0	0	0	Sunny	High	Good	Good	EBC, Elissa	
12/17/2010	Kelsey Creek		Reach 2	3.4	3.6	KSY-3	0	0	0	0	0	0	0	0	0	0	Sunny	High	Good	Good	EBC, Elissa	
12/17/2010	Kelsey Creek		Reach 3	3.6	3.8	KSY-4	0	0	0	0	0	0	0	0	0	0	Sunny	High	Good	Good	EBC, Elissa	
12/17/2010	Kelsey Creek		Reach 4	3.8	4	KSY-5	0	0	0	0	0	0	0	0	0	0	Sunny	High	Good	Good	EBC, Elissa	
12/17/2010	Kelsey Creek		Reach 5	4	4.3	KSY-6	0	0	0	0	0	0	0	0	0	0	Sunny	High	Good	Good	EBC, Elissa	
12/17/2010	Kelsey Creek		Reach 6	4.4	5.1	KSY-7	0	0	0	0	0	0	0	0	0	0	Sunny	High	Good	Good	EBC, Elissa	
12/17/2010	Kelsey Creek		Reach 7	5.1	5.8	KSY-8	0	0	0	0	0	0	0	0	0	0	Sunny	High	Good	Good	EBC, Elissa	
12/21/2010	Kelsey Creek		Reach A	3	3.2	KSY-1	0	0	0	0	0	0	0	0	0	0		Mod	Good	Good	EBC, Katie	carcass scrap found on log just above beaver pond
12/21/2010	Kelsey Creek		Reach 1	3.2	3.4	KSY-2	0	0	0	0	0	0	0	0	0	0		Mod	Good	Good	EBC, Katie	
12/21/2010	Kelsey Creek		Reach 2	3.4	3.6	KSY-3	0	0	0	0	0	0	0	0	0	0		Mod	Good	Good	EBC, Katie	
12/21/2010	Kelsey Creek		Reach 3	3.6	3.8	KSY-4	0	0	0	0	0	0	0	0	0	0		Mod	Good	Good	EBC, Katie	
12/21/2010	Kelsey Creek		Reach 4	3.8	4	KSY-5	0	0	0	0	0	0	0	0	0	0		Mod	Good	Good	EBC, Katie	
12/21/2010	Kelsey Creek		Reach 5	4	4.3	KSY-6	0	0	0	0	0	0	0	0	0	0		Mod	Good	Good	EBC, Katie	
12/22/2010	Kelsey Creek		Reach 6	4.4	5.1	KSY-7	0	0	0	0	0	0	0	0	0	0		Mod	Good	Good	EBC, Katie	
12/22/2010	Kelsey Creek		Reach 7	5.1	5.8	KSY-8	0	0	0	0	0	0	0	0	0	0		Mod	Good	Good	EBC, Katie	
12/28/2010	Kelsey Creek		Reach A	3	3.2	KSY-1	0	0	0	0	0	0	0	0	0	0	Overcast, Lt rain	Mod	Good	Good	EBC, JP	
12/28/2010	Kelsey Creek		Reach 1	3.2	3.4	KSY-2	0	0	0	0	0	0	0	0	0	0	Overcast, Lt rain	Mod	Good	Good	EBC, JP	
12/28/2010	Kelsey Creek		Reach 2	3.4	3.6	KSY-3	0	0	0	0	0	0	0	0	0	0	Overcast, Lt rain	Mod	Good	Good	EBC, JP	
12/28/2010	Kelsey Creek		Reach 3	3.6	3.8	KSY-4	0	0	0	0	0	0	0	0	0	0	Overcast, Lt rain	Mod	Good	Good	EBC, JP	
12/28/2010	Kelsey Creek		Reach 4	3.8	4	KSY-5	0	0	0	0	0	0	0	0	0	0	Overcast, Lt rain	Mod	Good	Good	EBC, JP	
12/28/2010	Kelsey Creek		Reach 5	4	4.3	KSY-6	0	0	0	0	0	0	0	0	0	0	Overcast, Lt rain	Mod	Good	Good	EBC, JP	
12/28/2010	Kelsey Creek		Reach 6	4.4	5.1	KSY-7	0	0	0	0	0	0	0	0	0	0	Showers	Mod	Good	Good	EBC, JP	
12/28/2010	Kelsey Creek		Reach 7	5.1	5.8	KSY-8	0	0	0	0	0	0	0	0	0	0	Showers	Mod	Good	Good	EBC, JP	
							0	0	0	0	0	0	0	0	0	0						
1/3/2011	Kelsey Creek		Reach A	3	3.2	KSY-1	0	0	0	0	0	0	0	0	0	0	Sunny	Low	Good	Good	EBC, JP	
1/3/2011	Kelsey Creek		Reach 1	3.2	3.4	KSY-2	0	0	0	0	0	0	0	0	0	0	Sunny	Low	Good	Good	EBC, JP	
1/3/2011	Kelsey Creek		Reach 2	3.4	3.6	KSY-3	0	0	0	0	0	0	0	0	0	0	Sunny	Low	Good	Good	EBC, JP	
1/3/2011	Kelsey Creek		Reach 3	3.6	3.8	KSY-4	0	0	0	0	0	0	0	0	0	0	Sunny	Low	Good	Good	EBC, JP	
1/3/2011	Kelsey Creek		Reach 4	3.8	4	KSY-5	0	0	0	0	0	0	0	0	0	0	Sunny	Low	Good	Good	EBC, JP	
1/3/2011	Kelsey Creek		Reach 5	4	4.3	KSY-6	0	0	0	0	0	0	0	0	0	0	Sunny	Low	Good	Good	EBC, JP	
1/3/2011	Kelsey Creek		Reach 6	4.4	5.1	KSY-7	0	0	0	0	0	0	0	0	0	0	Sunny	Low	Good	Good	EBC, JP	
1/3/2011	Kelsey Creek		Reach 7	5.1	5.8	KSY-8	0	0	0	0	0	0	0	0	0	0	Sunny	Low	Good	Good	EBC, JP	
1/10/2011	Kelsey Creek		Reach A	3	3.2	KSY-1	0	0	0	0	0	0	0	0	0	0	Sunny	Low	Good	Good	EBC, JP	
1/10/2011	Kelsey Creek		Reach 1	3.2	3.4	KSY-2	0	0	0	0	0	0	0	0	0	0	Sunny	Low	Good	Good	EBC, JP	
1/10/2011	Kelsey Creek		Reach 2	3.4	3.6	KSY-3	0	0	0	0	0	0	0	0	0	0	Sunny	Low	Good	Good	EBC, JP	
1/10/2011	Kelsey Creek		Reach 3	3.6	3.8	KSY-4	0	0	0	0	0	0	0	0	0	0	Sunny	Low	Good	Good	EBC, JP	
1/10/2011	Kelsey Creek		Reach 4	3.8	4	KSY-5	0	0	0	0	0	0	0	0	0	0	Sunny	Low	Good	Good	EBC, JP	
1/10/2011	Kelsey Creek		Reach 5	4	4.3	KSY-6	0	0	0	0	0	0	0	0	0	0	Sunny	Low	Good	Good	EBC, JP	
1/10/2011	Kelsey Creek		Reach 6	4.4	5.1	KSY-7	0	0	0	0	0	0	0	0	0	0	Sunny	Low	Good	Good	EBC, JP	
1/10/2011	Kelsey Creek		Reach 7	5.1	5.8	KSY-8	0	0	0	0	0	0	0	0	0	0	Sunny	Low	Good	Good	EBC, JP	
							0	0	0	0	0	0	0	0	0	0						
						Sep 2010 Total	0	0	0	0	0	0	0	0	0	0						
						Oct 2010 Total	7	0	1	0	0	0	0	0	0	0						
						Nov 2010 Total	0	0	0	0	0	0	0	0	0	0						
						Dec 2010 Total	0	0	0	0	0	0	0	0	0	0						
						Jan 2011 Total	0	0	0	0	0	0	0	0	0	0						
						Survey Total	7	0	1	0	0	0	0	0	0	0						

2010 Bellevue Stream Survey Data

West Tributary

Survey Date	Stream	Stream Code	Reach Description	RM Start	RM Stop	Section	Sock Live	Sock Morts	Chnk Live	Chnk Mort	Chnk Redds	Coho Live	Coho Dead	Coho Redd	Other Live	Other Redd	Weather	Flows	Vis Riffles	Vis Pools	Survey Crew	Comments
9/14/2010	West Tributary (Kelsey)		Reach 1	0	0.3	KWT-1	0	0	0	0	0	0	0	0	0	0					A. Bosworth, E. Bosman-Clark	
9/14/2010	West Tributary (Kelsey)		Reach 2	0.3	0.5	KWT-2	0	0	0	0	0	0	0	0	0	0					AB, EBC	
9/14/2010	West Tributary (Kelsey)		Reach 3	0.5	0.7	KWT-3	0	0	0	0	0	0	0	0	0	0					AB, EBC	
9/14/2010	West Tributary (Kelsey)		Reach 4	0.7	0.9	KWT-4	0	0	0	0	0	0	0	0	0	0					AB, EBC	
9/21/2010	West Tributary (Kelsey)		Reach 1	0	0.3	KWT-1	0	0	0	0	0	0	0	0	0	0		Low	Good	Good	EBC, L Jeroue	very soft silty substrate due to beaver dams. beaver dams in first two reaches probably not passable
9/21/2010	West Tributary (Kelsey)		Reach 2	0.3	0.5	KWT-2	0	0	0	0	0	0	0	0	0	0		Low	Good	Good	EBC, LJ	
9/21/2010	West Tributary (Kelsey)		Reach 3	0.5	0.7	KWT-3	0	0	0	0	0	0	0	0	0	0		Low	Good	Good	EBC, LJ	
9/21/2010	West Tributary (Kelsey)		Reach 4	0.7	0.9	KWT-4	0	0	0	0	0	0	0	0	0	0		Low	Good	Good	EBC, LJ	
9/29/2010	West Tributary (Kelsey)		Reach 1	0	0.3	KWT-1	0	0	0	0	0	0	0	0	0	0	Sunny	Low	Good	Good	EBC, M. Reeder	
9/29/2010	West Tributary (Kelsey)		Reach 2	0.3	0.5	KWT-2	0	0	0	0	0	0	0	0	0	0	Sunny	Low	Good	Good	EBC, MR	
9/29/2010	West Tributary (Kelsey)		Reach 3	0.5	0.7	KWT-3	0	0	0	0	0	0	0	0	0	0	Sunny	Low	Good	Good	EBC, MR	
9/29/2010	West Tributary (Kelsey)		Reach 4	0.7	0.9	KWT-4	0	0	0	0	0	0	0	0	0	0	Sunny	Low	Good	Good	EBC, MR	
							0	0	0	0	0	0	0	0	0	0						
10/6/2010	West Tributary (Kelsey)		Reach 1	0	0.3	KWT-1	0	0	0	0	0	0	0	0	0	0		Low	Good	Good	EBC, MR	silty substrate
10/6/2010	West Tributary (Kelsey)		Reach 2	0.3	0.5	KWT-2	0	0	0	0	0	0	0	0	0	0		Low	Good	Good	EBC, MR	growing dam in park near farm.
10/6/2010	West Tributary (Kelsey)		Reach 3	0.5	0.7	KWT-3	0	0	0	0	0	0	0	0	0	0		Low	Good	Good	EBC, MR	
10/6/2010	West Tributary (Kelsey)		Reach 4	0.7	0.9	KWT-4	0	0	0	0	0	0	0	0	0	0		Low	Good	Good	EBC, MR	
10/13/2010	West Tributary (Kelsey)		Reach 1	0	0.3	KWT-1	0	0	0	1	0	0	0	0	0	0	Sunny	Low	Good	Good	EBC, MR	
10/13/2010	West Tributary (Kelsey)		Reach 2	0.3	0.5	KWT-2	0	0	0	0	0	0	0	0	0	0	Sunny	Low	Good	Good	EBC, MR	
10/13/2010	West Tributary (Kelsey)		Reach 3	0.5	0.7	KWT-3	0	0	0	0	0	0	0	0	0	0	Sunny	Low	Good	Good	EBC, MR	
10/13/2010	West Tributary (Kelsey)		Reach 4	0.7	0.9	KWT-4	0	0	0	0	0	0	0	0	0	0	Sunny	Low	Good	Good	EBC, MR	
10/20/2010	West Tributary (Kelsey)		Reach 1	0	0.3	KWT-1	0	0	0	0	0	0	0	0	0	0			Good	Good	EBC, MR	
10/20/2010	West Tributary (Kelsey)		Reach 2	0.3	0.5	KWT-2	0	0	0	0	0	0	0	0	0	0			Good	Good	EBC, MR	
10/20/2010	West Tributary (Kelsey)		Reach 3	0.5	0.7	KWT-3	0	0	0	0	0	0	0	0	0	0			Good	Good	EBC, MR	
10/20/2010	West Tributary (Kelsey)		Reach 4	0.7	0.9	KWT-4	0	0	0	0	0	0	0	0	0	0			Good	Good	EBC, MR	
10/27/2010	West Tributary (Kelsey)		Reach 1	0	0.3	KWT-1	0	0	0	0	0	0	0	0	0	0		Low	Good	Good	EBC, MR	
10/27/2010	West Tributary (Kelsey)		Reach 2	0.3	0.5	KWT-2	0	0	0	0	0	0	0	0	0	0		Low	Good	Good	EBC, MR	
10/27/2010	West Tributary (Kelsey)		Reach 3	0.5	0.7	KWT-3	0	0	0	0	0	0	0	0	0	0		Low	Good	Good	EBC, MR	
10/27/2010	West Tributary (Kelsey)		Reach 4	0.7	0.9	KWT-4	0	0	0	0	0	0	0	0	0	0		Low	Good	Good	EBC, MR	
							0	0	0	1	0	0	0	0	0	0						
11/3/2010	West Tributary (Kelsey)		Reach 1	0	0.3	KWT-1	0	0	0	0	0	0	0	0	0	0	Sunny	Low	Good	Good	EBC, MR	
11/3/2010	West Tributary (Kelsey)		Reach 2	0.3	0.5	KWT-2	0	0	0	0	0	0	0	0	0	0	Sunny	Low	Good	Good	EBC, MR	
11/3/2010	West Tributary (Kelsey)		Reach 3	0.5	0.7	KWT-3	0	0	0	0	0	0	0	0	0	0	Sunny	Low	Good	Good	EBC, MR	
11/3/2010	West Tributary (Kelsey)		Reach 4	0.7	0.9	KWT-4	0	0	0	0	0	0	0	0	0	0	Sunny	Low	Good	Good	EBC, MR	
11/9/2010	West Tributary (Kelsey)		Reach 1	0	0.3	KWT-1	0	0	0	0	0	0	0	0	0	0	Lt rain	Low	Good	Good	EBC, MR	
11/9/2010	West Tributary (Kelsey)		Reach 2	0.3	0.5	KWT-2	0	0	0	0	0	0	0	0	0	0	Lt rain	Low	Good	Good	EBC, MR	
11/9/2010	West Tributary (Kelsey)		Reach 3	0.5	0.7	KWT-3	0	0	0	0	0	0	0	0	0	0	Lt rain	Low	Good	Good	EBC, MR	
11/9/2010	West Tributary (Kelsey)		Reach 4	0.7	0.9	KWT-4	0	0	0	0	0	0	0	0	0	0	Lt rain	Low	Good	Good	EBC, MR	
11/16/2010	West Tributary (Kelsey)		Reach 1	0	0.3	KWT-1	0	0	0	0	0	0	0	0	0	0	Overcast	Low	Good	Good	EBC, LJ	
11/16/2010	West Tributary (Kelsey)		Reach 2	0.3	0.5	KWT-2	0	0	0	0	0	0	0	0	0	0	Overcast	Low	Good	Good	EBC, LJ	
11/16/2010	West Tributary (Kelsey)		Reach 3	0.5	0.7	KWT-3	0	0	0	0	0	0	0	0	0	0	Overcast	Low	Good	Good	EBC, LJ	
11/16/2010	West Tributary (Kelsey)		Reach 4	0.7	0.9	KWT-4	0	0	0	0	0	0	0	0	0	0	Overcast	Low	Good	Good	EBC, LJ	
11/22/2010	West Tributary (Kelsey)		Reach 1	0	0.3	KWT-1	0	0	0	0	0	0	0	0	0	0		Low	Good	Good	EBC, J. Parr	
11/22/2010	West Tributary (Kelsey)		Reach 2	0.3	0.5	KWT-2	0	0	0	0	0	0	0	0	0	0		Low	Good	Good	EBC, JP	
11/22/2010	West Tributary (Kelsey)		Reach 3	0.5	0.7	KWT-3	0	0	0	0	0	0	0	0	0	0		Low	Good	Good	EBC, JP	
11/22/2010	West Tributary (Kelsey)		Reach 4	0.7	0.9	KWT-4	0	0	0	0	0	0	0	0	0	0		Low	Good	Good	EBC, JP	
11/30/2010	West Tributary (Kelsey)		Reach 1	0	0.3	KWT-1	0	0	0	0	0	0	0	0	0	0		Low	Good	Good	EBC, JP	
11/30/2010	West Tributary (Kelsey)		Reach 2	0.3	0.5	KWT-2	0	0	0	0	0	0	0	0	0	0		Low	Good	Good	EBC, JP	
11/30/2010	West Tributary (Kelsey)		Reach 3	0.5	0.7	KWT-3	0	0	0	0	0	0	0	0	0	0		Low	Good	Good	EBC, JP	
11/30/2010	West Tributary (Kelsey)		Reach 4	0.7	0.9	KWT-4	0	0	0	0	0	0	0	0	0	0		Low	Good	Good	EBC, JP	
							0	0	0	0	0	0	0	0	0	0						

2010 Bellevue Stream Survey Data

West Tributary

Survey Date	Stream	Stream Code	Reach Description	RM Start	RM Stop	Section	Sock Live	Sock Morts	Chnk Live	Chnk Mort	Chnk Redds	Coho Live	Coho Dead	Coho Redd	Other Live	Other Redd	Weather	Flows	Vis Riffles	Vis Pools	Survey Crew	Comments
12/6/2010	West Tributary (Kelsey)		Reach 1	0	0.3	KWT-1	0	0	0	0	0	0	0	0	0	0		Mod	Good	Good	EBC, JP	
12/6/2010	West Tributary (Kelsey)		Reach 2	0.3	0.5	KWT-2	0	0	0	0	0	0	0	0	0	0		Mod	Good	Good	EBC, JP	
12/6/2010	West Tributary (Kelsey)		Reach 3	0.5	0.7	KWT-3	0	0	0	0	0	0	0	0	0	0		Mod	Good	Good	EBC, JP	
12/6/2010	West Tributary (Kelsey)		Reach 4	0.7	0.9	KWT-4	0	0	0	0	0	0	0	0	0	0		Mod	Good	Good	EBC, JP	
12/17/2010	West Tributary (Kelsey)		Reach 1	0	0.3	KWT-1	0	0	0	0	0	0	0	0	0	0		Mod	Mod	Poor	EBC, JP	
12/17/2010	West Tributary (Kelsey)		Reach 2	0.3	0.5	KWT-2	0	0	0	0	0	0	0	0	0	0		Mod	Mod	Poor	EBC, JP	
12/17/2010	West Tributary (Kelsey)		Reach 3	0.5	0.7	KWT-3	0	0	0	0	0	0	0	0	0	0		Mod	Mod	Poor	EBC, JP	
12/17/2010	West Tributary (Kelsey)		Reach 4	0.7	0.9	KWT-4	0	0	0	0	0	0	0	0	0	0		Mod	Mod	Poor	EBC, JP	
12/20/2010	West Tributary (Kelsey)		Reach 1	0	0.3	KWT-1	0	0	0	0	0	0	0	0	0	0	Lt rain	Low	Good	Good	EBC, JP	
12/20/2010	West Tributary (Kelsey)		Reach 2	0.3	0.5	KWT-2	0	0	0	0	0	0	0	0	0	0	Lt rain	Low	Good	Good	EBC, JP	
12/20/2010	West Tributary (Kelsey)		Reach 3	0.5	0.7	KWT-3	0	0	0	0	0	0	0	0	0	0	Lt rain	Low	Good	Good	EBC, JP	
12/20/2010	West Tributary (Kelsey)		Reach 4	0.7	0.9	KWT-4	0	0	0	0	0	0	0	0	0	0	Lt rain	Low	Good	Good	EBC, JP	
12/29/2010	West Tributary (Kelsey)		Reach 1	0	0.3	KWT-1	0	0	0	0	0	0	0	0	0	0	Snow/rain	Low	Good	Good	EBC, JP	
12/29/2010	West Tributary (Kelsey)		Reach 2	0.3	0.5	KWT-2	0	0	0	0	0	0	0	0	0	0	Snow/rain	Low	Good	Good	EBC, JP	
12/29/2010	West Tributary (Kelsey)		Reach 3	0.5	0.7	KWT-3	0	0	0	0	0	0	0	0	0	0	Snow/rain	Low	Good	Good	EBC, JP	
12/29/2010	West Tributary (Kelsey)		Reach 4	0.7	0.9	KWT-4	0	0	0	0	0	0	0	0	0	0	Snow/rain	Low	Good	Good	EBC, JP	
							0	0	0	0	0	0	0	0	0	0						
1/3/2011	West Tributary (Kelsey)		Reach 1	0	0.3	KWT-1	0	0	0	0	0	0	0	0	0	0	Sunny	Low	Good	Good	EBC, JP	
1/3/2011	West Tributary (Kelsey)		Reach 2	0.3	0.5	KWT-2	0	0	0	0	0	0	0	0	0	0	Sunny	Low	Good	Good	EBC, JP	
1/3/2011	West Tributary (Kelsey)		Reach 3	0.5	0.7	KWT-3	0	0	0	0	0	0	0	0	0	0	Sunny	Low	Good	Good	EBC, JP	
1/3/2011	West Tributary (Kelsey)		Reach 4	0.7	0.9	KWT-4	0	0	0	0	0	0	0	0	0	0	Sunny	Low	Good	Good	EBC, JP	
1/10/2011	West Tributary (Kelsey)		Reach 1	0	0.3	KWT-1	0	0	0	0	0	0	0	0	0	0	Overcast	Low	Good	Good	EBC, JP	
1/10/2011	West Tributary (Kelsey)		Reach 2	0.3	0.5	KWT-2	0	0	0	0	0	0	0	0	0	0	Overcast	Low	Good	Good	EBC, JP	
1/10/2011	West Tributary (Kelsey)		Reach 3	0.5	0.7	KWT-3	0	0	0	0	0	0	0	0	0	0	Overcast	Low	Good	Good	EBC, JP	
1/10/2011	West Tributary (Kelsey)		Reach 4	0.7	0.9	KWT-4	0	0	0	0	0	0	0	0	0	0	Overcast	Low	Good	Good	EBC, JP	
							0	0	0	0	0	0	0	0	0	0						
					Sep 2010 Total		0	0	0	0	0	0	0	0	0	0						
					Oct 2010 Total		0	0	0	1	0	0	0	0	0	0						
					Nov 2010 Total		0	0	0	0	0	0	0	0	0	0						
					Dec 2010 Total		0	0	0	0	0	0	0	0	0	0						
					Jan 2011 Total		0	0	0	0	0	0	0	0	0	0						
					Survey Total		0	0	0	1	0	0	0	0	0	0						

2010 Bellevue Stream Survey Data

Richards Creek

Survey Date	Stream	Stream Code	Reach Description	RM Start	RM Stop	Section	Sock Live	Sock Morts	Chnk Live	Chnk Mort	Chnk Redds	Coho Live	Coho Dead	Coho Redd	Other Live	Other Redd	Weather	Flows	Vis Riffles	Vis Pools	Survey Crew	Comments
	Richards Creek		Confluence Reach	0	0.3	RCD-1																
	Richards Creek		Beaver Pond Reach	0.3	0.6	RCD-2	N/s	N/s	N/s	N/s	N/s	N/s	N/s									
	Richards Creek		Reach 1	0.6	0.9	RCD-3	N/s	N/s	N/s	N/s	N/s	N/s	N/s									
	Richards Creek		Reach 2	0.9	1.3	RCD-4	N/s	N/s	N/s	N/s	N/s	N/s	N/s									
	Richards Creek		Reach 3	1.3	1.5	RCD-5	N/s	N/s	N/s	N/s	N/s	N/s	N/s									
	Richards Creek		Reach 4	1.5	1.8	RCD-6	N/s	N/s	N/s	N/s	N/s	N/s	N/s									
9/14/2010	Richards Creek		Confluence Reach	0	0.3	RCD-1	0	0	0	0	0	0	0	0	0	0					A. Bosworth, E. Bosman-Clark	
9/30/2010	Richards Creek		Confluence Reach	0	0.3	RCD-1	0	0	0	0	0	0	0	0	0	0					EBC, J. Parr	
							0	0	0	0	0	0	0	0	0	0						
10/13/2010	Richards Creek		Confluence Reach	0	0.3	RCD-1	0	0	0	0	0	0	0	0	0	0	Sunny		Good	Good	EBC, JP	
10/27/2010	Richards Creek		Confluence Reach	0	0.3	RCD-1	0	0	0	0	0	0	0	0	0	0		Lower flows	Good	Good	EBC, JP	
							0	0	0	0	0	0	0	0	0	0						
11/9/2010	Richards Creek		Confluence Reach	0	0.3	RCD-1	0	0	0	0	0	0	0	0	0	0					EBC, JP	
11/30/2010	Richards Creek		Confluence Reach	0	0.3	RCD-1	0	0	0	0	0	0	0	0	0	0			Good	Good	EBC, JP	
							0	0	0	0	0	0	0	0	0	0						
12/17/2010	Richards Creek		Confluence Reach	0	0.3	RCD-1	0	0	0	0	0	0	0	0	0	0			Good	Good	EBC, JP	
12/29/2010	Richards Creek		Confluence Reach	0	0.3	RCD-1	0	0	0	0	0	0	0	0	0	0	Rain/Snow		Good	Good	EBC, JP	
							0	0	0	0	0	0	0	0	0	0						
1/11/2011	Richards Creek		Confluence Reach	0	0.3	RCD-1	0	0	0	0	0	0	0	0	1	1	Cold, Sunny	Low	Good	Good	EBC, JP	1 CutThroat A, on redd created in ponded area, heavy silt build up
							0	0	0	0	0	0	0	0	1	1						

Sep 2010 Total	0	0	0	0	0	0	0	0	0	0
Oct 2010 Total	0	0	0	0	0	0	0	0	0	0
Nov 2010 Total	0	0	0	0	0	0	0	0	0	0
Dec 2010 Total	0	0	0	0	0	0	0	0	0	0
Jan 2011 Total	0	0	0	0	0	0	0	0	1	1
Survey Total	0	0	0	0	0	0	0	0	1	1

2010 Bellevue Stream Survey Data

Coal Creek

Survey Date	Stream	Stream Code	Reach Description	RM Start	RM Stop	Section	Sock Live	Sock Morts	Chnk Live	Chnk Mort	Chnk Redds	Coho Live	Coho Dead	Coho Redd	Other Live	Other Redd	Weather	Flows	Vis Riffles	Vis Pools	Survey Crew	Comments
10/08/10	Coal Creek		I-405 to end of 125th (New restoration site)			Coal-1	0	0	0	0	0	0	0	0	0	0		Low	Good	Good	J. Parr/E. Bosman-Clark	Anecdotal evidence; 3 Sockeye, 1 Coho sighted day prior by resident
10/08/10	Coal Creek		End of 125th to Coal Crk Parkway			Coal-2	0	0	0	0	0	0	0	0	0	0			Mod	Poor	JP, EBC	
10/13/10	Coal Creek		I-405 to end of 125th (New restoration site)			Coal-1	0	0	0	0	0	0	0	0	0	0		Low	Good	Good	JP, EBC	
10/13/10	Coal Creek		End of 125th to Coal Crk Parkway			Coal-2	0	0	0	0	0	0	0	0	0	0		Low	Good	Good	JP, EBC	
10/20/10	Coal Creek		I-405 to end of 125th			Coal-1	0	0	0	0	0	0	0	0	0	0		Low	Good	Good	JP, EBC	
10/20/10	Coal Creek		End of 125th to Coal Creek Parkway			Coal-2	0	0	0	0	0	0	0	0	0	0		Low	Good	Good	JP, EBC	
10/28/10	Coal Creek		I-405 to end of 125th			Coal-1	0	0	1	0	1	1	0	0	0	0		Mod	Mod	Mod	JP, EBC	
10/28/10	Coal Creek		End of 125th to Coal Creek Parkway			Coal-2	0	0	0	0	0	0	0	0	0	0		Mod	Good	Good	JP, EBC	
							0	0	1	0	1	1	0	0	0	0						
11/02/10	Coal Creek		I-405 to end of 125th			Coal-1	0	0	0	0	0	0	0	0	0	0	Sunny	Mod	Mod	Mod	EBC, M. Reeder	
11/02/10	Coal Creek		End of 125th to Coal Creek Parkway			Coal-2	0	0	0	0	0	0	0	0	0	0	Sunny	Mod	Mod	Mod	EBC, MR	
11/10/10	Coal Creek		I-405 to end of 125th			Coal-1	0	0	0	0	0	0	0	0	0	0		Low	Good	Good	JP, EBC	
11/10/10	Coal Creek		End of 125th to Coal Creek Parkway			Coal-2	0	0	0	0	0	0	0	0	0	0		Low	Good	Good	JP, EBC	
11/15/10	Coal Creek		I-405 to end of 125th			Coal-1	0	0	0	0	0	0	0	0	0	0	Rainy	High	Poor	Poor	JP, EBC	
11/15/10	Coal Creek		End of 125th to Coal Creek Parkway			Coal-2	0	0	0	0	0	0	0	0	0	0		High	Poor	Poor	JP, EBC	
11/22/10	Coal Creek		I-405 to end of 125th			Coal-1	0	0	0	0	0	0	0	0	0	0		Low	Good	Good	JP, EBC	
11/22/10	Coal Creek		End of 125th to Coal Creek Parkway			Coal-2	0	0	0	0	0	0	0	0	0	0		Low	Good	Good	JP, EBC	
							0	0	0	0	0	0	0	0	0	0						
12/06/10	Coal Creek		I-405 to end of 125th			Coal-1	0	0	0	0	0	0	0	0	0	0		High	Poor	Poor	JP, EBC	
12/06/10	Coal Creek		End of 125th to Coal Creek Parkway			Coal-2	0	0	0	0	0	0	0	0	0	0		High	Poor	Poor	JP, EBC	
12/18/10	Coal Creek		I-405 to end of 125th			Coal-1	0	0	0	0	0	0	0	0	0	0	Lt Rain	Mod	Poor	Poor	JP, EBC	
12/18/10	Coal Creek		End of 125th to Coal Creek Parkway			Coal-2	0	0	0	0	0	0	0	0	0	0		Mod	Poor	Poor	JP, EBC	
12/22/10	Coal Creek		I-405 to end of 125th			Coal-1	0	0	0	0	0	0	0	0	0	0		Low	Mod	Mod	JP, EBC	
12/22/10	Coal Creek		End of 125th to Coal Creek Parkway			Coal-2	0	0	0	0	0	0	0	0	0	0		Low	Mod	Mod	JP, EBC	
12/28/2010	Coal Creek		I-405 to end of 125th			Coal-1	0	0	0	0	0	0	0	0	0	0	Overcast	Mod	Mod	Mod	JP, EBC	
12/28/2010	Coal Creek		End of 125th to Coal Creek Parkway			Coal-2	0	0	0	0	0	0	0	0	0	0		Mod	Mod	Mod	JP, EBC	
							0	0	0	0	0	0	0	0	0	0						
1/3/2011	Coal Creek		I-405 to end of 125th			Coal-1	0	0	0	0	0	0	0	0	0	0		Mod	Poor	Poor	JP, EBC	
1/3/2011	Coal Creek		End of 125th to Coal Creek Parkway			Coal-2	0	0	0	0	0	0	0	0	0	0		Mod	Poor	Poor	JP, EBC	
1/10/2011	Coal Creek		I-405 to end of 125th			Coal-1	0	0	0	0	0	0	0	0	0	0		Mod	Mod	Poor	JP, EBC	
1/10/2011	Coal Creek		End of 125th to Coal Creek Parkway			Coal-2	0	0	0	0	0	0	0	0	0	0		Mod	Mod	Poor	JP, EBC	
							0	0	0	0	0	0	0	0	0	0						

Oct 2010 Total	0	0	1	0	1	1	0	0	0	0
Nov 2010 Total	0	0	0	0	0	0	0	0	0	0
Dec 2010 Total	0	0	0	0	0	0	0	0	0	0
Jan 2011 Total	0	0	0	0	0	0	0	0	0	0
Survey Total	0	0	1	0	1	1	0	0	0	0