



Skagit River System Cooperative

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Re: Results for all fish by areas within the Fisher Slough Project during the 2013 monitoring period as stipulated in Contract WA-S-131022-001-2, Task - 2013 Fish Technical Memo

Fish monitoring at Fisher Slough was conducted from February 8 through August 13, 2013. The fish sampling methods and site selection are described in detail in Beamer et al. (2013). This technical memo gives the results of the fish species captured in 2013 and includes a brief summary of the salmonid species captured. Figure 1 shows the location of sample site groupings referred to in this report. This memo does not include details of the wild sub-yearling Chinook salmon. They will be reported in a separate report.



Figure 1. Location of sample site groupings at Fisher Slough used for the 2013 monitoring.

Fish assemblage

There were 61,270 fish representing 20 fish species found in the sampling at Fisher Slough from February 8 to August 13, 2013. In addition to the fish species, two non-fish species, rough-skinned newts and freshwater mussels, were identified and counted. The catch for all species is shown in Table 1.

Table1. Total catch by species at Fisher Slough sites February 8 through August 13, 2013. Mean catch per unit effort (beach seine set or fyke trap daily catch) is in parentheses.

Gear:	beach seine					fyke trap
Strata:	Upstream of floodgate				Downstream of floodgate	
Strata2:	Blind Ch 1 sites	Blind Ch 2 sites	Blind Ch 3 sites	Main channel sites	Main channel sites	Fisher Sl Blind Ch
Salmonid species:						
Chinook salmon, unmarked subyearling <i>Oncorhynchus tshawytscha</i>	1137 (15.79)	243 (3.38)	91 (3.79)	36 (0.75)	115 (3.19)	296 (24.67)
Chinook salmon, hatchery origin, all marks and ages combined <i>Oncorhynchus tshawytscha</i>	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.03)	0 (0.00)
Coho salmon, unmarked subyearling <i>Oncorhynchus kisutch</i>	702 (9.75)	1368 (19.00)	1830 (76.25)	340 (7.08)	117 (3.25)	156 (13.00)
Coho salmon, unmarked yearling <i>Oncorhynchus kisutch</i>	4 (0.06)	8 (0.110)	14 (0.58)	0 (0.00)	0 (0.00)	5 (0.42)
Chum salmon subyearling <i>Oncorhynchus keta</i>	24 (0.33)	8 (0.110)	0 (0.00)	5 (0.10)	5 (0.14)	6 (0.50)
Cutthroat trout, all ages <i>Oncorhynchus clarki</i>	1 (0.01)	7 (0.10)	5 (0.21)	16 (0.33)	6 (0.17)	3 (0.25)
Native Char, all ages Salvelinus sp. (malma or confluentus)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	3 (0.25)
Steelhead salmon, unmarked yearling <i>Oncorhynchus mykiss</i>	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.02)	0 (0.00)	0 (0.00)
Unidentified trout, subyearling <i>Oncorhynchus mykiss or clarki</i>	49 (0.68)	18 (0.25)	4 (0.17)	1 (0.02)	1 (0.03)	0 (0.00)
Whitefish, all ages <i>Prosopium williamsoni</i>	6 (0.08)	2 (0.28)	3 (0.13)	0 (0.00)	4 (0.11)	1 (0.08)
Total salmonids:	1923	1654	1947	399	249	470
Other fish species:						
Three-spine stickleback <i>Gasterosteus aculeatus</i>	17505 (242.13)	22935 (318.54)	1621 (67.54)	9113 (189.85)	44 (1.22)	557 (46.42)
Peamouth chub <i>Mylocheilus caurinus</i>	6 (0.08)	1677 (23.29)	15 (0.63)	11 (0.23)	3 (0.08)	395 (32.92)
Fathead minnow <i>Pimephales promelas</i>	0 (0.00)	4 (0.06)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Redside shiner <i>Richardsonius balteatus</i>	137 (1.90)	124 (1.72)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Prickly sculpin <i>Cottus asper</i>	11 (0.15)	3 (0.04)	8 (0.33)	16 (0.33)	15 (0.42)	192 (16.00)
Pacific staghorn sculpin <i>Leptocottus armatus</i>	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.02)	0 (0.00)	0 (0.00)
Starry flounder <i>Platichthys stellatus</i>	14 (0.19)	22 (0.31)	3 (0.13)	14 (0.29)	7 (0.19)	1 (0.08)
Pumpkinseed <i>Lepomis gibbosus</i>	0 (0.00)	4 (0.06)	7 (0.29)	0 (0.00)	0 (0.00)	0 (0.00)
Unidentified juvenile sunfish	0 (0.00)	127 (1.76)	19 (0.70)	0 (0.00)	0 (0.00)	0 (0.00)
Largescale sucker <i>Catostomus macrocheilus</i>	6 (0.08)	2 (0.03)	3 (0.13)	0 (0.00)	0 (0.00)	2 (0.17)
Brown bull head	0 (0.00)	2 (0.03)	1 (0.04)	0 (0.00)	0 (0.00)	0 (0.00)
Yellow perch	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.08)
Total other fish:	17679	24900	1677	9155	69	1148
Total fish catch:	19602	26554	3624	9554	318	1618
Other non-fish species:						
Roughskin newt <i>Taricha granulosa</i>	0 (0.00)	0 (0.00)	6 (0.25)	0 (0.00)	0 (0.00)	0 (0.00)
Freshwater mussel <i>Anodonta spp.</i>	0 (0.00)	0 (0.00)	1 (0.04)	0 (0.00)	0 (0.00)	1 (0.08)
Total non-fish:	0	0	7	0	0	1
Total catch:	19602	26554	3631	9554	318	1619

Yearling coho salmon

Upstream of the floodgate

Yearling coho salmon were present in Fisher Slough upstream of the floodgate when sampling started in February but were found only in Blind Channel 1 at that time. Coho salmon were present in April and May in Blind Ch 2 and Blind Ch 3. The peak density for the upstream floodgate area occurred in Blind Ch 3 in May, with a monthly average density of 242 fish per hectare of area seined (Figure 1, panel A). Coho salmon were not found in the blind channel areas after the sampling in May. Coho salmon were not found in the main channel area upstream of the floodgate at any time in 2013.

Downstream of the floodgate

Yearling coho salmon were only found downstream of the floodgate at the Reference Blind Channel site and were present from March through May. The peak abundance was 338 fish per hectare occurring in April (Figure 1, panel A).

Sub-yearling coho salmon

Upstream of the floodgate

Coho salmon fry were found in beach seine catches upstream of the floodgate when sampling began in February (Figure 1, panel B). Density steadily increased, peaking in July in Blind Ch 3 with 39,308 fish per hectare of area seined. This value was driven by a catch of 1,395 fish in one set made on July 10. Coho salmon were still found in Blind Ch 3 when sampling ended in August.

Downstream of the floodgate

Sub-yearling coho salmon were found at sites downstream of the floodgate starting in March at Downstream Reference Blind Channel and in April at the Main Channel sites (Figure 1, panel B). Peak density occurred in July with an average of 8,765 fish per hectare of area sampled at the Reference Blind Ch site. Coho salmon fry were still present when sampling stopped in August with a monthly average density of 362 and 196 fish per hectare in the Main Channel sites and Reference Blind Ch site, respectively.

Chum salmon

Upstream of the floodgate

Chum salmon were observed upstream of the floodgate from March through June. The peak density was in April in Blind Ch 1 with a monthly average of 636 fish per hectare of area seined. Chum salmon were not found during July or August, nor were they found in Blind Ch 3 (Figure 2, panel A).

Downstream of the floodgate

Chum salmon were observed downstream of the floodgate only in March and April. The peak density was in April with a monthly average of 636 fish per hectare of area seined in Reference Blind Ch (Figure 2, panel A).

Cutthroat trout

Cutthroat trout were present in the catch upstream of the floodgate every month during sampling except February. The peak catch was in August in the combined Main Channel sites, with a monthly average density of 154 fish per hectare of area seined. Cutthroat trout were found downstream of the floodgate in every month except April. The downstream peak density of cutthroat trout, 111 fish per hectare of area seined, was in February at the Reference Blind Ch site (Figure 2, panel B).

Hatchery-origin salmon

There was one hatchery-origin Chinook salmon caught at Fisher Slough in 2013, found downstream of the floodgate during June. It was sacrificed in order to read the Coded Wire Tag (CWT) located in its snout and it was determined that it was released from the WDFW hatchery at Marblemount on the Skagit River.

Steelhead

One juvenile yearling steelhead salmon was found during sampling in 2013. It was captured upstream of the floodgate in the Main Channel sites in July.

Native Char

Three native char were found during sampling in 2013. They were caught downstream of the floodgate at the Reference Blind Ch site in March (n=1) and April (n=2).

White fish

Sixteen white fish were found during sampling in 2013. They were caught upstream of the floodgate in all three blind channel areas from February to May (Blind Ch 1 n= 6, Blind Ch 2 n=2 and Blind Ch 3 n= 3) as well as downstream of the floodgate at the Reference Blind Ch site (n=1 in March) and in the main channel areas (n=4 in June).

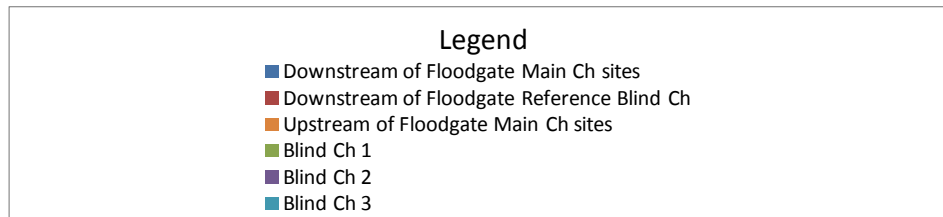
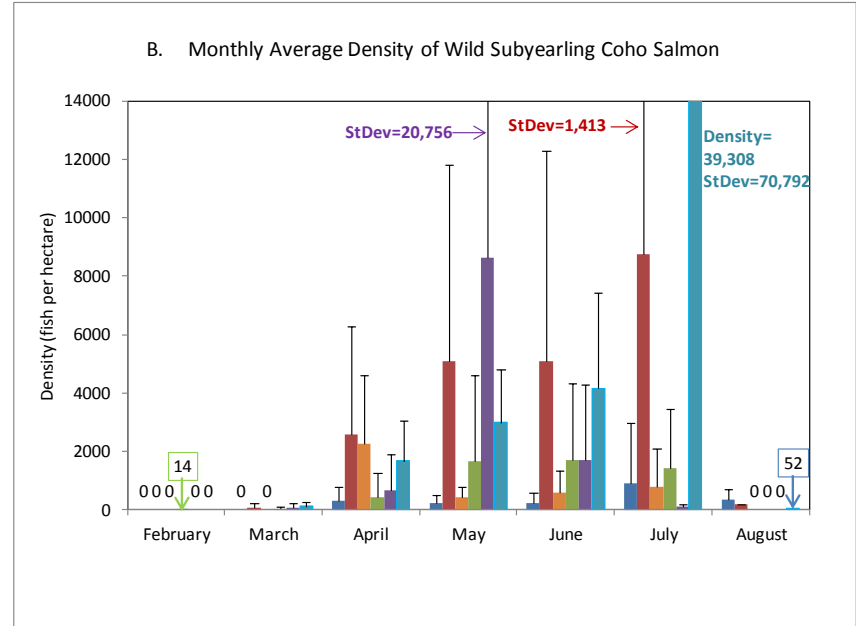
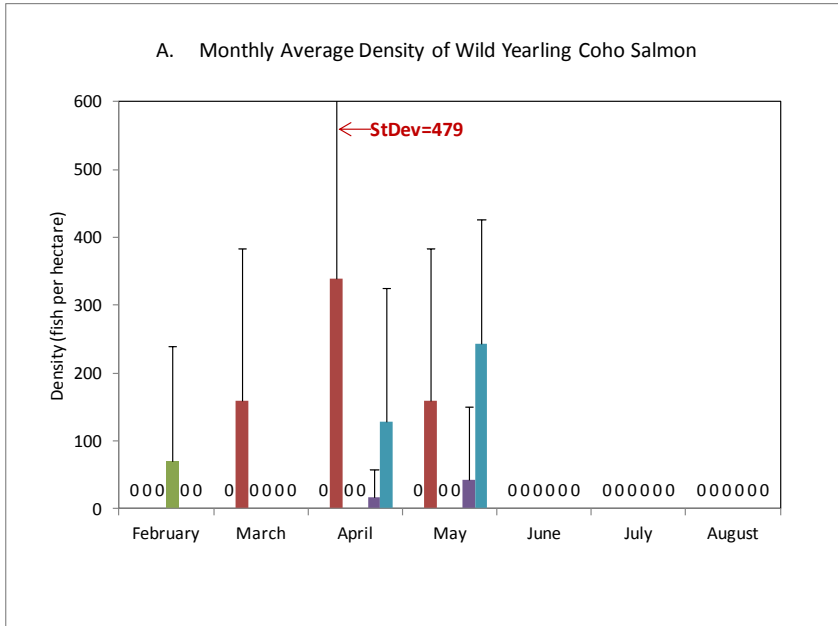


Figure 1. Comparison of the monthly average density of coho salmon found in the combined upstream main channel sites, the blind channel sites, the combined downstream main channel sites and the Reference Blind Channel at Fisher Slough in 2013. Error bars are one standard deviation. Note the different scales on the y axes.

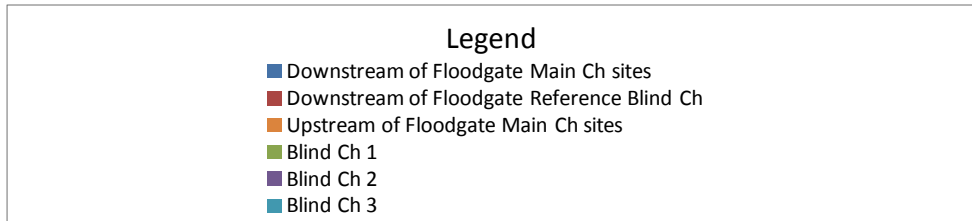
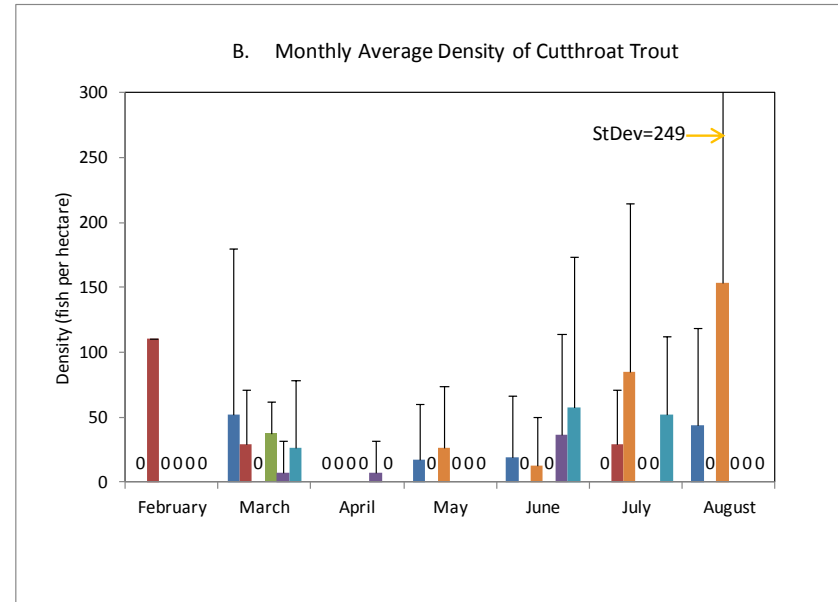
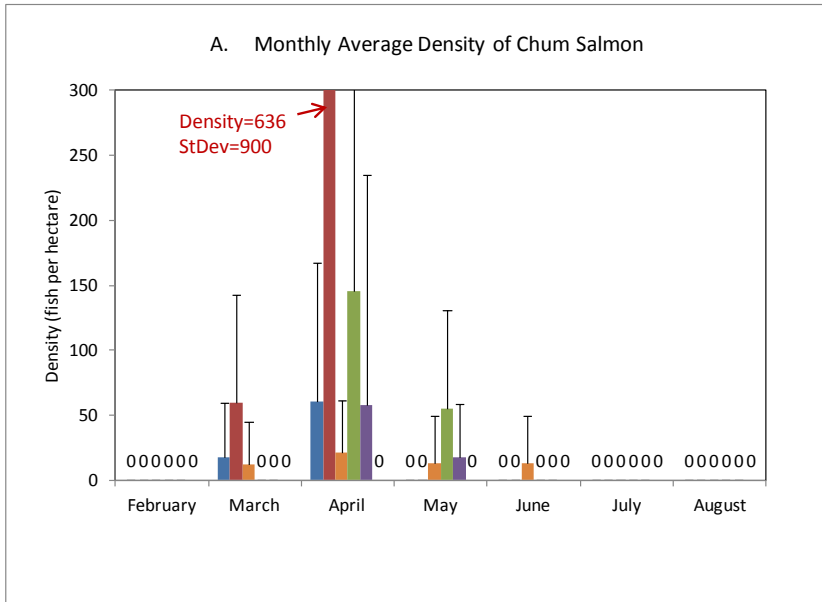


Figure 2. Comparison of the monthly average density of chum salmon and cutthroat trout found in the combined upstream main channel sites, the blind channel sites, the combined downstream main channel sites and Reference Blind Channel at Fisher Slough in 2013. Error bars are one standard deviation. There was only one sampling event in February; hence there is no error bar for that month at the Downstream of Floodgate Reference Blind Ch site.

References

Beamer, E, R Henderson, and K Wolf. 2013. Juvenile salmon, estuarine, and freshwater fish utilization of habitat associated with the Fisher Slough Restoration Project in 2012. Report prepared for The Nature Conservancy, Washington.