Squalicum Creek Smolt Trap

Data Summary

What is a smolt?

A "smolt" is one of the life stages of a juvenile salmon. This life stage occurs when the juvenile salmon begins its migration from freshwater to the estuary and adjusts to living in saltwater. Different Pacific salmon species spend different amounts of time rearing in freshwater. For example, coho salmon spend one to two years rearing in freshwater after they emerge from the gravel as fry. They reach about 2-4 inches (50-100 millimeters) in length before they begin migration to the estuary as a smolt. The timing of this movement correlates with spring freshets (high water flow from snow melt or spring rains).

What is a smolt trap?

A smolt trap is a standard tool used to quantify how many fish are moving through a water system. The trap is designed to capture juvenile fish during their spring outmigration from freshwater down to the estuary. The trap is a stream-wide V-shaped corral that points downstream. The structure funnels fish into a holding box while allowing stream flow to continue downstream. The holding box is used so fish can be safely held onsite until they are identified, counted, and released. An upstream trap is also installed to allow upstream fish passage. The traps are checked multiple times each day.

Squalicum Creek Smolt Trap Data:

The City of Bellingham has conducted smolt trapping activities on Squalicum Creek, a tributary to Bellingham Bay, during the annual spring outmigration periods of 2001 and 2015. An additional smolt trapping event was also conducted in 1998 by M. Downen[1].

Table 1 shows the total number of fish, by species, caught during each of the years that a smolt trap has been installed on Squalicum Creek. Coho salmon have been the most abundant fish species across all years, with cutthroat trout being the second most abundant.

Figures 1 and 2 show the number of salmonids (salmon and trout species) identified and counted each day during smolt trapping activities conducted by the City of Bellingham on Squalicum Creek. Stream flow is also represented in Figure 2. Smolt traps tend to show an increase in fish numbers when rain events cause increased stream flows. This pattern of outmigration can be seen as a bell-shaped curve centering on peak flow events with fish numbers tapering on either side of the curve. This trend arises from the fact that salmonids have adapted to using high flow rain events as an energy-saving mode of downstream transport.

For more information, please contact:
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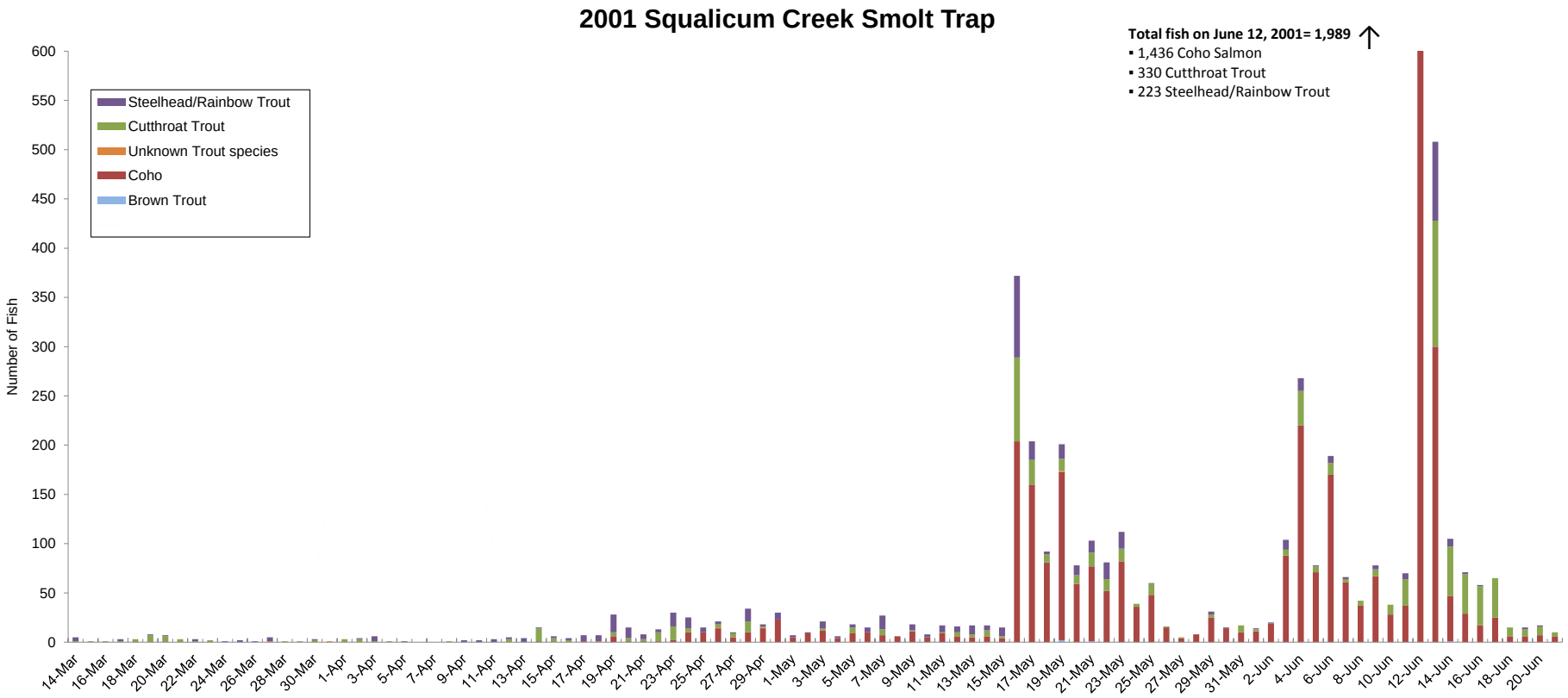
[1] Downen, M. R., 1999. *Relation of Salmonid Survival Growth and Outmigration to Environmental Conditions in a Disturbed, Urban Stream. Squalicum Creek, Washington.* Thesis: Western Washington University, Bellingham, WA.

Table 1. Squalicum Creek smolt trap counts by species and by year.

Common Name	Species	1998 (Mar 20-Jun 21)*	2001 (Mar 14-Jun 21)	2015 (Feb 27-Jun 22)
Coho	*Onchorynchus kisutch*	7,168	3,939	1,394
Cutthroat	*Onchorynchus clarkii*	1,270	1,121	237
Chinook	*Onchorynchus tshawytscha*	6	-	-
Steelhead/ Rainbow	*Onchorynchus mykiss*	185	771	141
Brown Trout	*Salmo trutta*	-	4	8
Unknown Trout sp.	*Onchorynchus sp.*	-	1	7
Three-spine stickleback	*Gasterosteus aculeatus*	-	27	45
Pacific Lamprey	*Entosphenus tridentatus*	-	-	30
Western Brook Lamprey	*Lampetra richardsoni*	-	-	33
Lamprey sp.	*Lampetra sp.*	-	18	106
Bluegill	*Lepomis macrochirus*	-	412	36
Yellow Perch	*Perca flavescens*	-	11	1
Sunfish sp.	*Lepomis sp.*	-	-	4
Largemouth bass	*Micropterus salmoides*	-	131	3
Brown Bullhead	*Ameiurus nebulosus*	-	-	5
Yellow Bullhead	*Ameiurus natalis*	-	8	1
Bullhead/Catfish sp.	*Ameiurus sp.*	-	-	5
Sculpin	*Cottus sp.*	-	2	-
	TOTAL	8,629	6,445	2,056

* Only salmonid species were reported in the 1998 Squalicum Creek smolt trap data. Data source: Downen, M. R., 1999. *Relation of Salmonid Survival Growth and Outmigration to Environmental Conditions in a Disturbed, Urban Stream. Squalicum Creek, Washington.* Thesis: Western Washington University, Bellingham, WA.


2001 Squalicum Creek Smolt Trap
Total fish on June 12, 2001= 1,989
▪ 1,436 Coho Salmon
▪ 330 Cutthroat Trout
▪ 223 Steelhead/Rainbow Trout
Steelhead/Rainbow Trout
Cutthroat Trout
Unknown Trout species
Coho
Brown Trout
Number of Fish
0
50
100
150
200
250
300
350
400
450
500
550
600
14-Mar
16-Mar
18-Mar
20-Mar
22-Mar
24-Mar
26-Mar
28-Mar
30-Mar
1-Apr
3-Apr
5-Apr
7-Apr
9-Apr
11-Apr
13-Apr
15-Apr
17-Apr
19-Apr
21-Apr
23-Apr
25-Apr
27-Apr
29-Apr
1-May
3-May
5-May
7-May
9-May
11-May
13-May
15-May
17-May
19-May
21-May
23-May
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2-Jun
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20-Jun

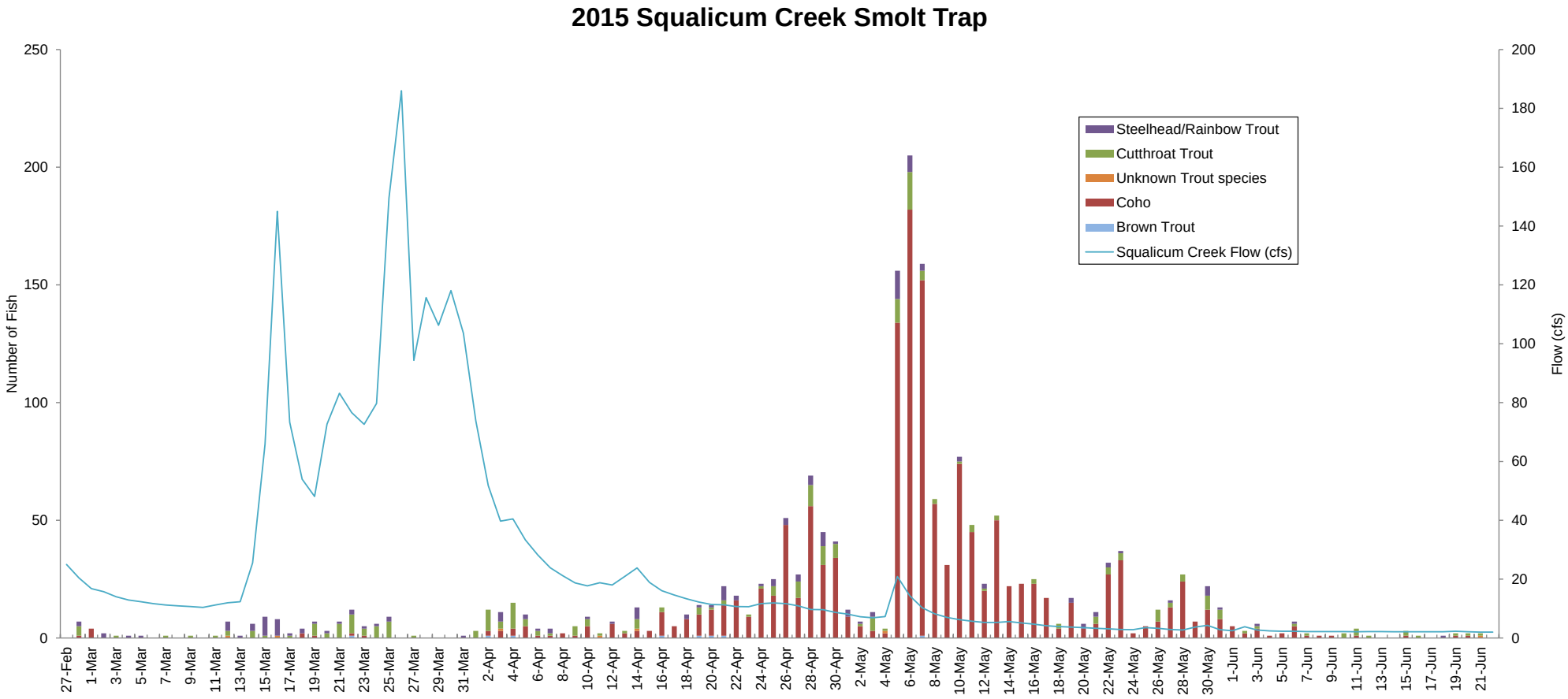

Figure 2. Daily salmonid counts during the 2015 outmigration at the smolt trap on Squalicum Creek in Bellingham, WA.