Shelly Creek Smolt Trap 2013

Introduction:

Shelly Creek drains from the base of Little Mountain in Parksville, B.C. It flows northeast into the Englishman River, approximately 2km from the Strait of Georgia. The confluence is located 200m upstream of the Island Highway Bridge. This channel is approximately 10km long, including its headwater tributaries and ditches. The lower reaches of Shelly Creek have been negatively impacted by agriculture and urbanization in the area. There are resident cutthroat trout found in Shelly Creek throughout the entire length of the stream, currently Cutthroat migration is now limited because of several man-made obstructions. Anadromous access ends 1000m from the confluence, where there is a 5m waterfall.

The 2013 trap project was funded through a D.F.O. public involvement program with support from D.F.O. community advisor, Dave Davies. Support was also provided by the Qualicum Beach Streamkeepers Society and M.V.I.H.E.S. (Mid Vancouver Island Habitat Enhancement Society).

Objectives:

This report covers the installation and operation of the Shelly Creek smolt trap in 2013.

Methods:

The smolt trap was installed approximately 200m upstream from the confluence with the Englishman River (Fig. 1). It was placed downstream of the Martindale Road culverts, which drain an upstream pond. The purpose of this location was to ascertain the anadromous use of this channel during months of high flow.

Figure 1. Shelly Creek, Parksville BC Trap Location

A V-weir trap design was decided upon for this site. The site was cleared of twigs and branches and prepared for trap installation. The trap was composed of wood panels placed in the bed of the creek. The panels were 4 feet high and 6 feet long and composed of a 2x4 wooden frame covered with ¼ inch galvanized mesh (Fig. 2). The trap was anchored into the streambed via sandbags and wooden backstays. Plastic sheets were placed on the streambed and covered with gravel, to encourage all of the water as well as fish, to pass through the trap.

The panels were angled to encourage smolts to enter a 6 inch collection pipe located in the middle of the trap. The pipe discharged into a 4ft x 6ft wooden trap box. Inside the trap box, a shelf was built to hold inventory supplies. A raft was also installed within the trap box for captured amphibians to crawl on top of, before they were released. The water velocity of Shelly Creek was not high enough to require baffles inside the trap box. During trap inspections, the screens were cleaned to prevent build up of debris. Debris build-up can cause increased water pressure on the trap and is a common cause of trap failure. A deck was built for the storage of counting pails. Access to the trap was improved with the construction of steps as well as a guide rope. The sign located next to the trap was installed by the MVIHES.

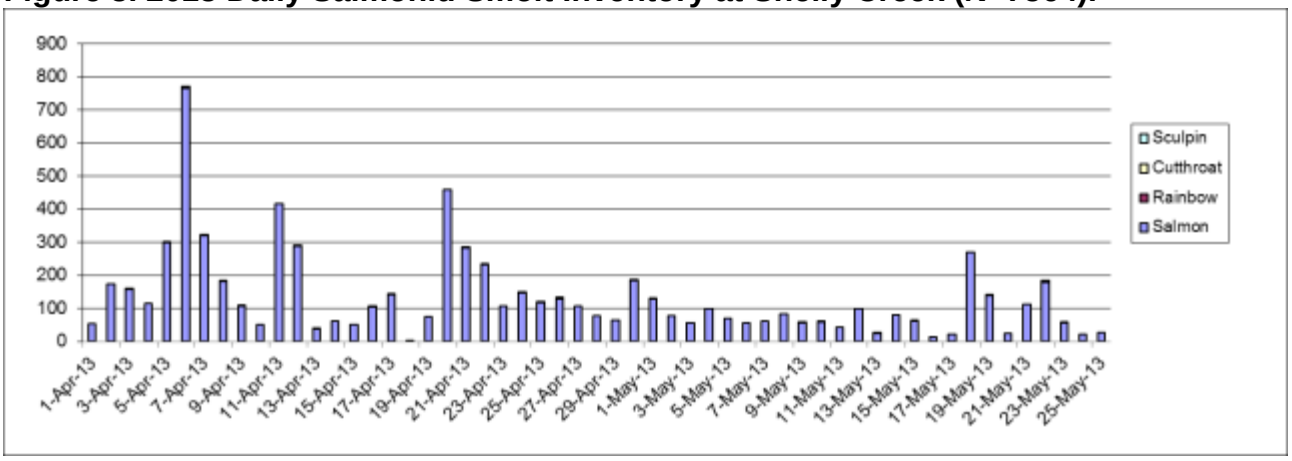
Figure 2. Shelly Creek Smolt Trap 2013

The trap box was checked daily by teams of volunteers. Daily inventory and fork lengths were recorded for coho smolts. Daily inventory was also recorded, for rainbow and cutthroat trout, sculpin and stickleback. Water level, water temperature and air temperature data was also gathered.

Results:

Smolt Numbers: The trap was in operation between April 1st and May 25th, 2013. Total fish counted during this period was 7564. Total counts for Coho smolts were 7265. There were 21 trout (both rainbow and cutthroat) caught in the trap during this time. Peak migration occurred shortly after the trap was installed on April 7th with 771 smolts counted in the trap (Fig 3).

Figure 3. 2013 Daily Salmonid Smolt Inventory at Shelly Creek (N=7564).



Temperature: Figure four shows daily water temperature readings for Shelly Creek during the trap operation (April 1st and May 26th, 2013). The peak temperature was 15.0°C on May 8th, 2013. The average temperature for this period was 8.9°C.

Figure 4. 2013 Daily Temperature Readings from Shelly Creek.

Discussion:

This was the third consecutive year that the trap was in place on Shelly Creek. With a total of 7564 smolts captured in 2013, this is down from 8094 in 2012 but within 7% and up considerably up from 2881 in 2011. The last two years have had records for precipitation and cool weather in spring resulting in the high smolt output. In dry, warm years the beaver dam ponds upstream are too warm and anoxic for long term use by the Coho smolts and they either die, leave earlier of never enter. The trap results prove the importance of offchannel habitat along the Englishman River. These areas offer winter flood refuge as well as spring feeding areas.

The reach where these smolts come from is along a farm pasture. This reach is less than optimal in fish habitat values such as shade and riparian input as it is mostly grass and willow along the edges of a wide historically dug channel. It is apparent that these poor habitat values are superseded by the importance of the refuge and feeding from the mainstem. The farm pasture is likely a high nutrient source to the pools and drives a high aquatic invertebrate biomass which feeds all of the refuge fish until they are ready to head to the ocean. A byproduct of the rich production is that the water quality ultimately fails in late spring or early summer and any remaining fish have to migrate down to the mainstem Englishman River for the summer period. These fish may come back in fall for refuge as rainfall and floods make the mainstem intolerable but resuscitate Shelly Creek. It is an apparent trade off that works, the fish have the highly productive Shelly farm reach for up to 9 months of the year and the Englishman River during the summer. With this unique habitat condition, Shelly Creek is producing way more fish than it would do on its own.

Improvements to the habitat in this reach should be carefully (i.e. “it works-don’t break it”) chosen after a thorough assessment of the year round water and habitat qualities. The ponds need to be measured, they are quite deep and may require a boat. The water quality regime needs to be monitored through a year. Fish in the ponds need to be assessed; when do they show up, and do they come and go, as well as what species. A minnow trap program and mark/recapture is an obvious method. Invertebrate sampling should be assessed with a Streamkeepers macro-invertebrate index in spring when the feeding is important.

At present the only suggestion I would make to help the smolt migration process is install temporary pipes in the beaver dams to ensure the fish can get out readily. These pipes should be tried with caution that they do not cause dewatering of the ponds and only carry enough water to accommodate fish travel. This effort may assist fish in getting down past the beaver dams when the flow is low and sticks are spread across a broad outlet crest with no defined exit.

Finally, it may be desirable to make improvements to the trap site for safety, installation and operation. I make the following suggestions respectfully without knowing if the trap crew have already thought these aspects out and determined what they can and can’t do. 1.) The access trail is very rough and steep, another access off the low lying south property should be investigated as it would be less visible to strangers looking to vandalize the site. Perhaps a board walk over the wetland could be built. 2.) The trap sill is only semi permanent and made fish proof by a sealing sheet of poly. A more permanent trap base of wood frame could be an option- it would have to be built in summer, but would allow a much

quicker installation in the cold deep spring period. 3.) The operation could be made safer with the addition of more area to the portable flat deck for all the trap operators to stand on. Currently access is over rough ground and standing in the fish release water happens.

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Appendix 1. 2013 Shelly Creek Smolt Trap Data

Date	Salmon	Rainbow	Cutthroat	Sculpin	Stickle Back	Total Fish	Air Temp.	Water Temp.
	Coho						degrees C	degrees C
1-Apr	53				1	54	6.00	7.25
2-Apr	174			1	3	178	9.50	7.50
3-Apr	157				3	160	9.00	8.20
4-Apr	115			1	2	9	8.00	9.00
5-Apr	300	1	1	1	4	307	9.25	9.00
6-Apr	767			1	3	771	8.00	9.00
7-Apr	321			1	2	324	7.00	8.00
8-Apr	183			1	3	187	8.00	8.00
9-Apr	107				6	113	7.00	8.25
10-Apr	50				2	52	7.50	8.25
11-Apr	417			2	2	421	7.00	8.50
12-Apr	289		1	2	3	295	9.00	7.50
13-Apr	37					37	4.50	6.75
14-Apr	63				2	65	6.00	7.00
15-Apr	51			1	1	53	5.50	7.00
16-Apr	105		1		2	108	8.00	7.80
17-Apr	141					141	8.00	8.00
18-Apr	4				1	5	8.00	8.50
19-Apr	76					76	8.20	9.00
20-Apr	458		1		3	462	9.00	9.25
21-Apr	284			1	4	289	9.50	9.00
22-Apr	232				3	235	10.00	8.00
23-Apr	106		1		2	109	10.00	8.00
24-Apr	147		1		2	150	10.50	8.00
25-Apr	119		5		3	127	10.50	8.50
26-Apr	128				2	130	10.00	8.50
27-Apr	108					108	11.00	9.25
28-Apr	79					79	7.00	7.80
29-Apr	64	1			1	66	7.00	8.50
30-Apr	185			1	4	190	6.25	7.50
1-May	129				4	133	8.00	7.25
2-May	77				1	78	10.00	8.00
3-May	57				4	61	8.00	8.25
4-May	100				21	121	13.50	9.00
5-May	71				19	90	15.00	9.00
6-May	57				20	77	15.00	9.00
7-May	62				9	71	15.00	9.50
8-May	83			1	1	85	14.00	10.00
9-May	57	1			9	67	13.25	9.00
10-May	59				16	75	15.00	9.25
11-May	44				11	55	13.00	10.00
12-May	99		1		3	103	15.00	11.00
13-May	25				10	35	12.00	10.00
14-May	81	1			9	91	10.00	9.50
15-May	61				6	67	10.00	10.00

16-May	13				4	17	10.50	10.00
17-May	22				9	31	11.00	10.50
18-May	271	2			6	279	11.00	11.00
19-May	139				8	147	11.50	10.50
20-May	25				12	37	10.50	10.00
21-May	112	1	1	1	19	134	8.00	11.00
22-May	180	1			16	197	9.50	10.50
23-May	56				24	80	9.00	10.50
24-May	23				24	47	11.00	10.50
25-May	26				13	39	9.25	10.25
26-May	16			1	29	46	10.50	10.25
Totals	7265	8	13	16	371	7564		8.90