

# MEMORANDUM

## State of Alaska

Department of Fish and Game  
Division of Habitat

TO: Jackie Timothy  
Southeast Region Supervisor

DATE: 10/1/2012

THRU:

FILE NO: 1973

SUBJECT: Indian River Coho Fry Index  
Trapping Report  
8/28 – 8/30/2012

FROM: Greg Albrecht  
Habitat Biologist

PHONE NO: (907) 465-6384

### Background

The US Forest Service (USFS) Sitka Ranger District has conducted salmon enhancement activities on the Indian River (ADF&G Stream no. 112-42-10080; CHp, COp, Pp) beginning in the late 1990s. Following the installation two fish passes in 1999 and modification to a partial barrier falls in 2005, over 140,000 coho fry were transported during 2001 to 2005 into the upper reaches of the Indian River (Miller 2010). Beginning in 2002, the USFS established eight index fry trapping locations in a variety of upstream habitats to monitor coho numbers.

In 2011, ADF&G Habitat issued a Fish Habitat Permit (FH12-I-0125) to the City of Tenakee for a run-of-the-river hydroelectric project to be installed near the fish pass at falls number four on Indian River (Fig 1). The USFS has not conducted fry monitoring since 2010; however, ADF&G Habitat has a shared interest in monitoring the drainage to assess potential impacts from the hydroelectric project and is seeking to continue monitoring through a cooperative effort involving both USFS and the City of Tenakee.

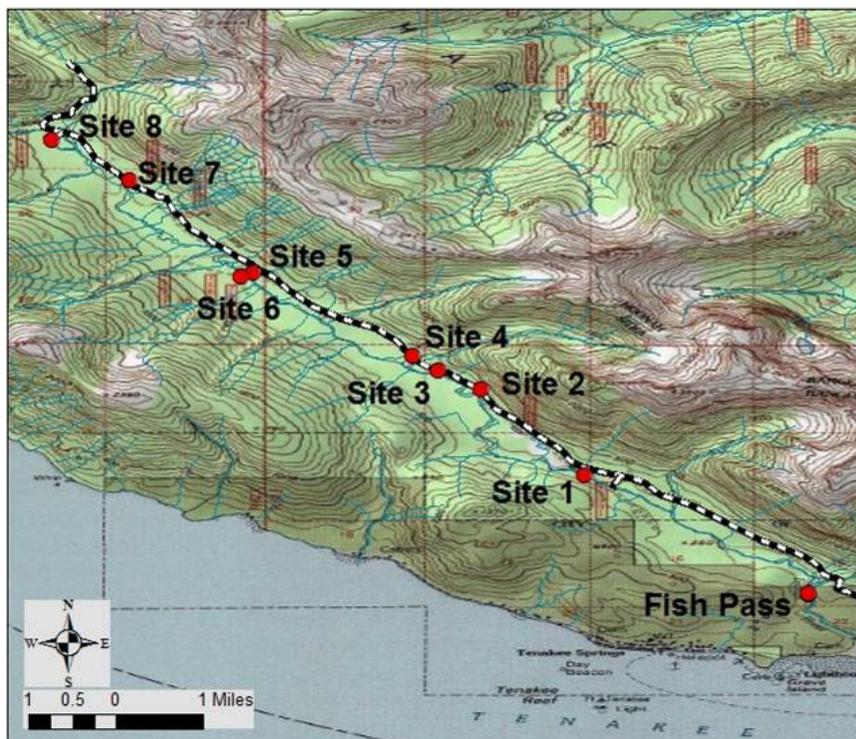


Figure 1 Map of Indian River showing index trapping site and fish pass locations

## Methods

We followed methods from Miller (2010) which include soaking 30 1/8" Gee minnow traps, baited with freshly punctured Whirl-paks® of salmon eggs at each of the eight sites for approximately 2 hours. All traps were set in the best available habitat, including woody debris, cut banks, and pools. We did not take all the metrics described in Miller (2010), but only recording Fork Length (FL) measurements for individual coho captures and a FL range for all Dolly Varden (DV) char captured at one site.

Additionally, only 25 traps were set at site four and were allowed to soak for 6.5 hours to accommodate our need to survey the proposed hydro bypass reach in our allotted field time. A per-trap-average, calculated from the site, was used to supplement totals to reflect a 30 trap effort. Swales (1987) showed that fish captures in low density areas continue to increase after 2 hours; however, for the rate at which this occurs, the number of fish captured, and the scope of the project, this was not adjusted for. Deployment and recovery of traps at all other sites was between two and four hours.

## Results

A total of 291 coho (80 coho < 70 mm and 211 coho ≥70 mm) and 1635 Dolly Varden were captured (Tables 1-8; Fig 2). A size frequency analysis of coho captured indicates fish <70 mm are likely age 0 and that fish ≥70 mm are at least one year old (Fig 3). Totals were combined with previous data to show trends over time (Tables 9 & 10; Fig 3).

**Table 1 Site 1 results**

<b>Date</b>	8/28/2012	<b>Traps</b>	30
<b>Crew</b>	G. Albrecht, A. Bloom, J. Zutz	<b>Soak Time</b>	1115-1315
<b>Flow</b>	~ 24 inches below OHW, moderately low	<b>Coho ≤65 mm</b>	2
<b>Weather</b>	Rain, Heavy at times	<b>Coho ≥70 mm</b>	2
<b>Notes</b>	Slow section of river 3-5 feet deep in Thalweg. 15 traps placed < 500 feet upstream and downstream of flagged tree. Waypoint S1 – Walk upstream on river left for about 10-15 minutes to access site. Downed tree with flagging. 57.8083, -135.2246	<b>Total Dolly Varden</b>	41 (40-120 mm)
		<b>Pictures</b>	1189-1190

**Table 2 Site 2 results**

<b>Date</b>	8/28/2012	<b>Traps</b>	30
<b>Crew</b>	G. Albrecht, A. Bloom, J. Zutz	<b>Soak Time</b>	1500-1700
<b>Flows</b>	~ 24 inches below OHW, moderately low	<b>Coho ≤65 mm</b>	51
<b>Weather</b>	Rain, Heavy at times	<b>Coho ≥70 mm</b>	62
<b>Notes</b>	Large bend in stream with lots of LWD. 15 traps placed upstream and 16 placed downstream within 300 feet of gravel bar at bend. Waypoint S2 – Directly off road, staged on gravel bars. 57.8232, -135.2492	<b>Total Dolly Varden</b>	521 (50-140 MM)
		<b>Pictures</b>	1194-1196

**Table 3 Site 3 results**

<b>Date:</b>	8/28/2012	<b>Traps (adjusted)</b>	29 (30)
<b>Crew:</b>	G. Albrecht, A. Bloom, J. Zutz	<b>Soak Time</b>	1535-1810
<b>Flows</b>	~ 24 inches below OHW, moderately low	<b>Coho <math>\leq</math>65 mm</b>	24
<b>Weather</b>	Rain, Heavy at times	<b>Coho <math>\geq</math>70 mm</b>	87
<b>Notes</b>	Large bend with nice gravel bar and good habitat containing LWD. 10 traps were place downstream within 300 feet of site entry and 20 were placed within 400 feet upstream. One bait package was unpunctured and this trap did not fish. One per-trap average (3 CO, 15 DV) was added to the total. Waypoint S3 – Directly off road, staged on gravel bars. 57.8261, -135.2558	<b>Total Dolly Varden</b>	453 (40-155mm)
		<b>Pictures</b>	1198, 1200

**Table 4 Site 4 results**

<b>Date:</b>	8/30/2012	<b>Traps (adjusted)</b>	25 (30)
<b>Crew:</b>	G. Albrecht and J. Zutz	<b>Soak Time</b>	1000-1430
<b>Flows</b>	~ 24 inches below OHW, moderately low	<b>Coho <math>\leq</math>65 mm</b>	0
<b>Weather</b>	Hot, sunny, and clear	<b>Coho <math>\geq</math>70 mm</b>	1
<b>Notes</b>	Beaver pond area. Only 25 traps were set around the road side perimeter of the pond, due to limited resources. Five per-trap averages (2.5 DV) added. Waypoint S4 – Left side of road about 100 feet through grass meadow. 57.8284, -135.2601	<b>Total Dolly Varden</b>	77 (80-1500mm)
		<b>Pictures</b>	1240-1241

**Table 5 Site 5 results**

<b>Date:</b>	8/29/2012	<b>Traps</b>	30
<b>Crew:</b>	G. Albrecht, A. Bloom, J. Zutz	<b>Soak Time</b>	0920-1120
<b>Flows</b>	~ 24 inches below OHW, moderately low	<b>Coho <math>\leq</math>65 mm</b>	3
<b>Weather</b>	Hot, sunny, and clear	<b>Coho <math>\geq</math>70 mm</b>	16
<b>Notes</b>	Good rearing habitat in mainstem stretch of river. 15 traps were set within 300 feet upstream and 400 feet downstream (around the bend) of the collapsed LSB. Waypoint S5 – 300 feet down spur road on left side of road. 57.8423, -135.2866	<b>Total Dolly Varden</b>	143 (60-160mm)
		<b>Pictures</b>	1206, 1207, 1209

**Table 6 Site 6 results**

<b>Site # 6</b>			
<b>Date:</b>	8/29/2012	<b>Traps</b>	30
<b>Crew:</b>	G. Albrecht, A. Bloom, J. Zutz	<b>Soak Time</b>	1220-1620
<b>Flows</b>	~ 24 inches below OHW, moderately low	<b>Coho <math>\leq</math>65 mm</b>	0
<b>Weather</b>	Hot, sunny, and clear	<b>Coho <math>\geq</math>70 mm</b>	5
<b>Notes</b>	Good rearing habitat through meadow side channel. 15 traps were set within 250 feet up and downstream of bridge. Waypoint S6 – continue down spur road past failing LSB about 300 feet. 57.8415, -135.2886	<b>Total Dolly Varden</b>	127 (50-140mm)
		<b>Pictures</b>	1220,1222

**Table 7 Site 7 Results**

<b>Site # 7</b>			
<b>Date:</b>	8/29/2012	<b>Traps</b>	30
<b>Crew:</b>	G. Albrecht, A. Bloom, J. Zutz	<b>Soak Time</b>	1030-1240
<b>Flows</b>	~ 24 inches below OHW, moderately low	<b>Coho <math>\leq</math>65 mm</b>	0
<b>Weather</b>	Hot, sunny, and clear	<b>Coho <math>\geq</math>70 mm</b>	36
<b>Notes</b>	Beaver ponds on both sides of road. Right side appears to have no fish access. 10 traps were set on the upstream side of the beaver dam; however, no fish captured. 15 were set on the downstream and 5 near the confluences with the mainstem. Waypoint S7 – Adjacent to road with large fence post stuck in tree stump. 57.8577, -135.3070	<b>Total Dolly Varden</b>	25 (50-110mm)
		<b>Pictures</b>	1217-1218

**Table 8 Site 8 results**

<b>Site # 8</b>			
<b>Date:</b>	8/29/2012	<b>Traps</b>	30
<b>Crew:</b>	G. Albrecht, A. Bloom, J. Zutz	<b>Soak Time</b>	1330-1530
<b>Flows</b>	~ 24 inches below OHW, moderately low	<b>Coho <math>\leq</math>65 mm</b>	0
<b>Weather</b>	Hot, sunny, and clear	<b>Coho <math>\geq</math>70 mm</b>	2
<b>Notes</b>	Primarily spawning habitat here, rearing habitat was more spread out. 14 traps were placed within 500 feet upstream of the bridge and 16 were placed within 500 feet downstream of the bridge. Waypoint S8 – Walk down alder choked spur road about 200 feet to failing LSB. 57.8642, -135.3200	<b>Total Dolly Varden</b>	248 (25-120mm)
		<b>Pictures</b>	1223, 1224, 1227

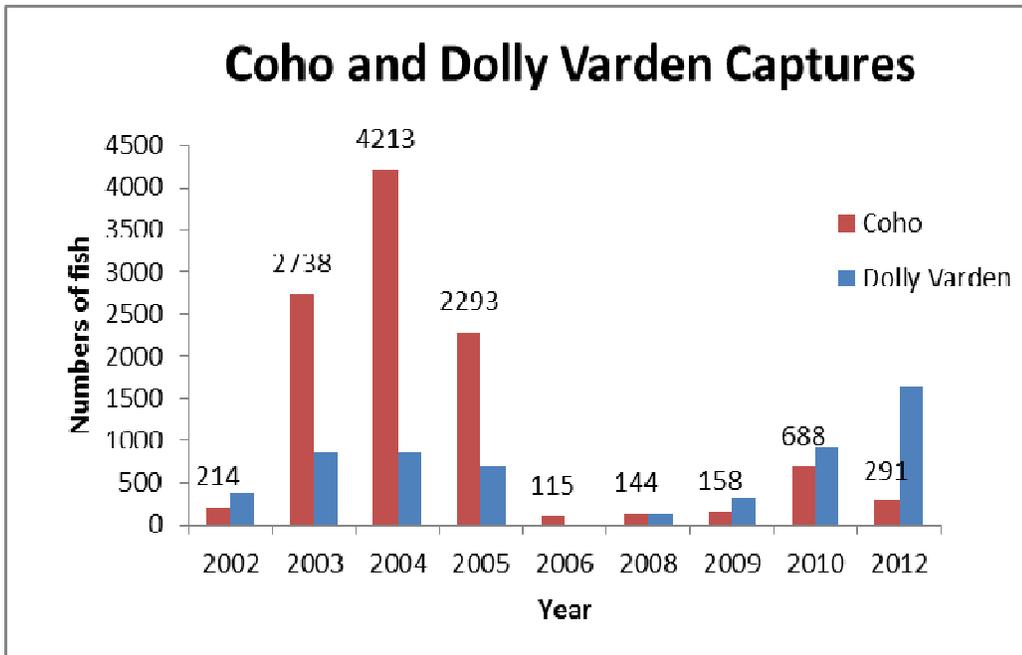


Figure 2 Total juvenile coho salmon (red) and Dolly Varden char (blue) captured during index trapping efforts from 2002 to 2012. Data from Miller (2010), 2006 Dolly Varden information unavailable.

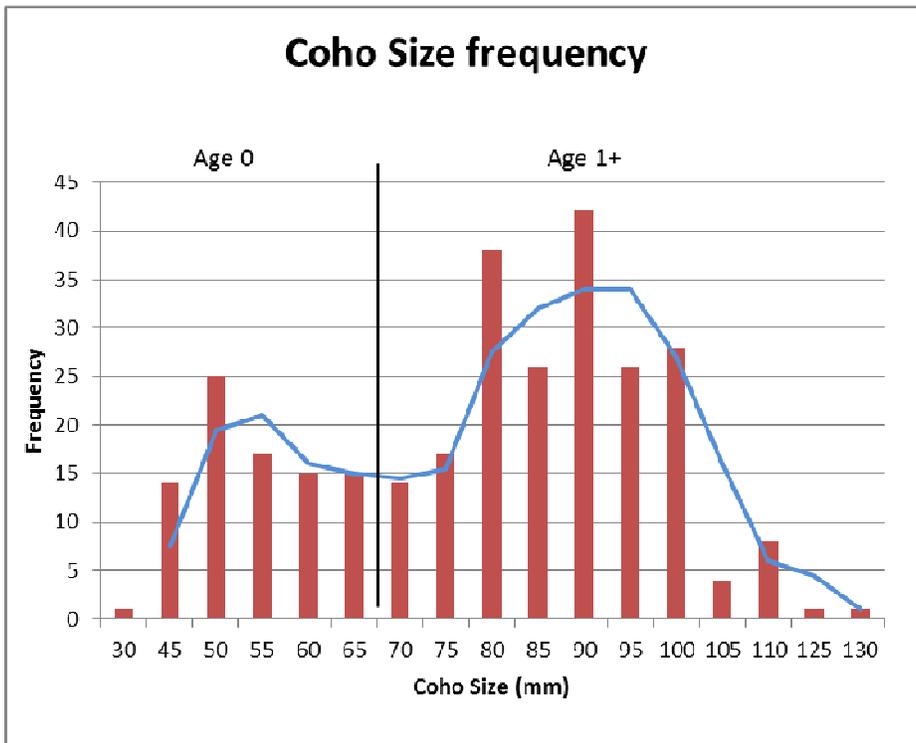


Figure 3 Length frequency distribution for all coho captures to determine approximate sizes for age class 0 and 1+ individuals.

**Table 9 Annual coho fry captures at each index site. Data from Miller (2010).**

	2002	2003	2004	2005	2008	2009	2010	2012
Site 1	0	6	53	23	0	0	4	4
Site 2	9	885	751	321	4	1	140	113
Site 3	120	333	1009	333	15	4	284	111
Site 4	1	135	85	53	0	2	4	1
Site 5	38	640	1165	409	38	130	221	19
Site 6	3	236	254	437	26	21	7	5
Site 7	3	110	359	373	18	0	28	36
Site 8	40	393	486	344	22	0	0	2
<b>TOTAL</b>	214	2738	4162	2293	123	158	688	291

**Table 10 Annual Dolly Varden captures at each index site. Data from Miller (2010).**

	2002	2003	2004	2005	2008	2009	2010	2012
Site 1	34	70	76	202	1	15	62	41
Site 2	76	203	265	111	5	66	208	521
Site 3	39	156	109	58	20	60	192	453
Site 4	92	323	140	111	15	70	116	77
Site 5	21	24	106	45	10	11	122	143
Site 6	41	26	21	43	50	49	75	127
Site 7	7	9	18	25	0	7	30	25
Site 8	74	55	121	88	15	50	128	248
<b>TOTALS</b>	384	866	856	683	116	328	933	1635

## Discussion

Previous index trapping results were combined with results from this effort and show that coho juvenile numbers are holding at relatively low and consistent numbers. Coho captures from 2003 to 2005 were large due to juvenile transplants made to the river from 2001 to 2005. Stocked coho can be identified by a clipped adipose fin; however, adipose fin clipped individuals have not been captured since 2006. The overall trend since 2006 is still positive and demonstrates that adult fish can navigate the falls; however, this year's total is lower than 2010 and the magnitude of juvenile coho is still relatively low.

In our survey we trapped approximately 5,800 linear feet of river. The USFS estimates there are 34 stream miles available for habitat on the Indian River. If we assuming the 8 index sites represent a subsample of the 34 miles of habitat and juvenile coho densities therein, the total number of juvenile coho would be somewhere in the neighborhood of 9,000, 2500 of which would be age 0. Bradford (2000) estimates average fry production for one female coho to be 413, indicating that about 6 coho pair successfully spawned last fall. A simple estimate based on historical stocking and trapping results provides similar results, where the number of coho trapped during 2002 – 2006 efforts (9,787) represents about 15% of the total stocked during 2001 – 2005 (140,000). Therefore, a capture of 291 would indicate a population of 1,940 juvenile coho in the entire system.

Coho and Dolly Varden captures at each site followed trends from previous years, with the exception of site five, where fewer coho were captured than in previous years (Table 9). Dolly Varden captures have continued to increase in recent years and appear to track with coho numbers. Although Dolly Varden are predators of coho fry, research shows that coho are a small portion of their diet. Therefore, the correlation between Dolly Varden and coho captures is only partly explained by predation and may be more indicative of river conditions affecting both species.

### **Literature Cited**

- Bradford, MJ, Myers, RA, & Irvine, JR. 2000. Reference points for coho salmon (*Onchorhynchus kisutch*) harvest rates and escapement goals based on freshwater production. *Can. J. Fish. Aquat. Sci.* 57:677-686.
- Miller, RJ. 2010. Indian River Fry Monitoring 2010. US Forest Service Report.

**Appendix A**



**1189**



**1195**



**1190**



**1196**



**1194**



**1198**



1200



1209



1206



1217



1207



1218



1220



1223



1222



1224



1227



1240



1241

cc:

Al Ott, ADF&G Habitat, Fairbanks

Brian Glynn, ADF&G/SF, Juneau

David Harris, ADF&G/CF, Juneau

Ryan Scott, ADF&G/WC, Juneau

All, Douglas Habitat staff

Steve Brockmann, USFWS, Juneau

Randy Vigil, USACE, Juneau

Rob Miller, USFS, Sitka

Art Bloom, City of Tenakee