

Tables

Tucannon River Programmatic Report

Project #: 2010-077-00

Annual Report
(Reporting Period January 2017 to December 2017)

Contract: # 75494

Tables 1-5



PA-14 2017 Winter Flows

Table 1: Tucannon Programmatic Habitat (2010-077-00) Objectives 2017 as defined in the 2010 project proposal in cbfish.org (<https://www.cbfish.org/Proposal.mvc/Summary/GEOREV-2010-077-00>)

Reduce channel confinement/increase floodplain connectivity so that no more than 30% river length is unnaturally confined. (OBJ-4)	The desired outcome of this objective is improved channel function, increase stream length and side channel habitat, restored hyporheic conditions and riparian survival.
Increase pool frequency to 15% of stream area (OBJ-3)	The desired outcome of this objective is to increase stream depth, habitat complexity, substrate sorting, and promote stable pool-out habitat for spawning.
Increase large woody debris to 2 or more pieces per channel width (OBJ-2)	Add LWD to increase pool quantity and quality, promote development of side channel and backwater habitat and streambed aggradation to increase floodplain connectivity.
Increase riparian function to 75% of maximum (OBJ-1)	Restore and protect riparian species composition and density to improve canopy cover, riparian area (acreage) and riparian structure.
Reduce maximum daily water temperature so that it does not exceed 72F at confluence of Pataha Creek (RM 11.8) (OBJ-5)	The outcome of this objective is to improve water temperature, increase useable habitat, and expand the geographic range of spring Chinook.
Decrease substrate embeddedness to 20% in all reaches above confluence of Pataha Creek (RM 11.8). (OBJ-6)	The outcome of this objective is to increase egg survival, improve invertebrate species diversity and abundance, and increase interstitial spaces.



Table 2 (Continued):

Project Area	Length Treated for Floodplain in Conect. (mile) (ff)	Levees/Riprap (ft)		Perennial Main Channel (miles)			Perennial & Highflow Side Channels (mile)								New Floodplain (ac)
		Remove	Set Back	Pre-project	Post-project	Follow up Survey	Pre-project		Restoration Implemented			Rapid Hab Follow Up			
							Perennial	High Flow	Enhance	New	Reconnect	Follow Up Date	Perennial	High Flow	
1	0.59	0	0	0.64	0.64	0.66	0.15	0	0.15	0.14	0.26	9/16/17	0.62	0.29	7.5
3	1.36	0	0	1.38	1.38	1.45	0.34	0	0.34	0	0	9/22/17	0.68	0.27	0.59
6	0.54	0	0	0.54	0.54	N/A	0.22	0.02	0.22	0.22	0.07	9/27/17	0.29	0.22	N/A
8	0.71	0	0	0.71	0.71	N/A	0	0	0.00	0.21	0.00	9/27/17	0.21	0.09	N/A
9	0.71	0	0	0.71	0.71	N/A	0.18	0	0.18	0.00	0.44	9/27/17	0.58	0.04	N/A
10	1.47	1305	0	1.46	1.46	1.5	0.07	0.16	0.00	0.74	0.57	10/11/17	1.05	1.15	5.83
11	1.56	0	0	1.86	1.84	1.84	1.3	0.17	1.10	0.06	0.23	7.7/17	1.88	0.42	N/A
14	1.64	0	0	1.56	1.56	3.1	0.1	0	0.15	1.22	0.17	7/12/17	1.45	0.84	17.77
15	0.63	192	0	0.67	0.67	0.71	0	0.14	0.14	0.32	0.00	10/6/17	0.40	1.15	5.94
18a	1.12	146	0	1.23	1.23		1.10	0.41	0.66	0.66	1.00	10/17/17	1.10	1.60	
22	0	0	0	0.63	0.63	N/A	0	0	0		0				0
23	0.5	520													8.21
24	0.86	380	0	0.86	0.87	0.87	0.06	0.09	0.13	0.19	0.13	9/1/15	0.35	0.19	5.04
26	1.5	8305	12217.65						-	-	-				120
28a	1.95	660	3168	2.29	2.29		0.52	0.73	0.68	0.12	0.64	9/11/17	1.37	1.10	



Table 3: Changes in habitat reported below were captured in 2017 for change between the time of implementation and 201 including the following project areas; 1, 3, 6, 8, 9, 15, 18a, and 28. The remaining projects areas reflect change from pre-to post project only. LWD key pieces are > 6 m long and 0.3 m dia, pool areas is estimated in the field and channels and side channels were delineated during rapid habitat surveys.

Project Area	# of Key Pieces			# of Pools			Pool Area M ²			Miles of Side Channel			Increase in Perennial Reach Length (Miles)		
	Pre Project	Post Project Current	% Increase	Pre Project #	Post Project	% Increase	Pre Project	Post Project	% Increase	Pre Project	Post Project	% Increase	Pre Project	Post Project	% Increase
1	44	221	402%	14	30	114%	535	644	20%	0.15	0.91	84%	0.77	1.26	39%
3	108	327	203%	29	50	72%	652	1419	118%	0.34	0.95	64%	1.72	2.06	17%
6	38	278	632%	10	13	30%	227	294	30%	0.24	0.51	53%	0.76	0.83	8%
8	74	186	151%	12	16	33%	180	604	236%	0	0.30	100%	0.71	0.92	23%
9	38	276	626%	8	29	263%	120	1143	853%	0.18	0.62	71%	0.76	1.29	41%
10	99	468	373%	N/A	N/A	N/A	N/A	N/A	N/A	0.23	2.20	90%	1.53	2.55	40%
11	61	770	1162%	23	85	270%	293	1927	558%	1.47	2.30	36%	3.14	3.72	16%
14	64	697	989%	30	43	43%	757	1236	63%	0.1	2.29	96%	1.66	3.01	45%
15	55	525	855%	18	49	172%	1036	1722	66%	0.14	1.55	91%	0.67	1.07	37%
18a	55	577	949%	28	53	89%	950	2487	162%	1.51	2.70	44%	2.20	2.33	6%
22	10	46	360%	14	14	0%	N/A	N/A	N/A	0	0.00	0%	0.63	0.63	0%
23	35	86	146%	N/A	N/A	N/A	0	0	N/A	0	0.00	0%	0.75	0.75	0%
24	43	377	777%	13	30	131%	142	486	242%	0.15	0.54	72%	0.92	1.22	25%
26	N/A	N/A	N/A	N/A	0	N/A	N/A	851	N/A	0	0.00	N/A	0.00	0.00	N/A
28a	162	564	248%	57	107	88%	1897	2812	48%	1.25	2.47	49%	1.89	3.66	48%

Table 4: Project implementation 2011-2017 for the Tucannon River spring Chinook priority areas identified in the Tucannon Geomorphic Assessment (Anchor QEA 2011 April). All project implemented during the time period were identified in the Tucannon Conceptual Restoration Plan (Anchor QEA 2011 Nov) as one of the 28 projects located in the Tucannon Programmatic. Projects highlighted in green were supported financially through the Programmatic while project highlighted orange were provided technical support only. The project metric table displaying # of LWD key pieces (>6m long and 0.3m dia), pool counts, and side channel improvements for all projects complete projects. Additionally, Work to be completed in 2017 has been included in the table denoted as pre-construction estimates(~). The calculations of increased perennial reach length is represented in the pre/post project change in perennially wet stream length including both main channel and side channels. The programmatic has estimated costs to the Programmatic and matching funds either Non-BPA or from other BPA projects where available to the Programmatic, provided in the last five columns. Total project costs reflect the cost of achieving the associated project but are not in all cases complete with non-Programmatic funded projects.

Project Area (PA)	Treated Length miles aa	# of Key Pieces			# of Pools			Miles of Side Channel			Increase in Perennial Reach Length (Miles)			BPA Programmatic Costs Est by Programmatic		Including Other BPA Projects		Total Project Costs
		Pre Project bb	Post Project dd	% Increase	Pre Project	Post Project	% Increase	Pre Project	Post Project	% Increase	Pre Project	Post Project	% Increase	BPA Project Cost to Date	BPA-FY	Project Match Grants	Donated Trees	
1	0.81	44	248	464%	14	17	21%	0.19	0.55	65%	0.78	1.14	32%	\$400,000	FY14	\$70,000	\$100,000	\$570,000
3	1.36	101	441	337%	29	51	76%	0.4	0	0%	1.76	1.76	0%	\$495,815	FY13	\$70,000	\$53,769	\$619,584
10	2.03	100	468	368%	N/A	N/A	N/A	0.62	1.83	66%	2.18	2.68	19%	\$492,778	FY-11	\$400,000	\$100,000	\$992,778
11	2.35	96	657	584%	23	85	270%	1.1	1.39	21%	2.66	2.86	7%	\$688,969	FY-14 & 15	\$200,000	\$100,000	\$988,969
14	1.64	64	697	989%	30	43	43%	0.23	1.61	86%	1.87	2.64	29%	\$1,170,960	FY12	\$312,023	\$0	\$1,482,983
15	0.89	55	472	758%	18	54	200%	0.2	0.46	57%	0.36	0.62	42%	\$1,115,847	FY12, 13 & 14	\$68,171	\$0	\$1,184,018
22^	1.01	10	46	360%	14	14	0%	0	0	0%	0	0		N/A	N/A	N/A	N/A	N/A
23^	0.98	35	86	146%	N/A	N/A	N/A	0	0	0%	0	0		N/A	N/A	N/A	N/A	N/A
24	0.99	43	377	777%	13	30	131%	0.1	0.54	81%	0.96	1.25	23%	\$763,476	FY14&15	\$344,571	\$0	\$1,108,047
26^	0.76	N/A	78	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A		N/A	N/A	N/A	N/A	N/A
28*	2.44	162	564	248%	10	34	240%	1.25	2.47	49%	1.89	3.66	48%	\$364,000	FY16/17	\$618,000	\$0	\$982,000
PA-6-9**	1.78	150	740	393%	30	48	60%	0.42	1.43	240%	2.23	3.04	36%	\$954,000	FY16&17	\$400,000	0	\$1,354,000
PA-18**	1.26	55	549	949%	28	53	89%	1.51	2.7	44%	2.2	2.33	6%	\$700,000	FY16/17	\$546,000	\$0	\$1,246,000
Sums ^^	12.51	665	3924		137	314		4.09	8.85		12.46	16.61		\$7,145,845		\$3,382,534		\$10,528,379
Sums ^/^	18.30	915	5423		209	429		6.02	12.98		16.89	21.98		\$7,145,845				\$10,528,379

Table 5. Tucannon River stream and floodplain restoration action in relation the life-cycle of spawning spring chinook 2011 into the future. Restoration projects are listed in the left column, beginning in 2011 (through 2020). The columns to the right indicate the years that will pass as chinook brood years through time from September spawning, a winter-spring summer and 2nd winter of rearing and spring smolting. In the Tucannon spring Chinook begin to return as 3-yr old sub-adults up to 5-yr old adult. The take home messages is that the first fish to experience a restored reach are spawning adults the September following the July-August restoration work-window. Due to flow timing, and the type of restoration actions we employ in the Tucannon, positive impacts from restoration may not be realized until the flowing spring flood flows. The five project years highlighted red in the far left column are projects that were constructed prior to the significant flow volume in 2017 – the first flow to approach a stage large enough to activate river processes, with a significant volume of restoration actions in place. The rows highlighted blue indicate the life stages impacted by the flow event. Note: it is plausible the flood flow in 2013/14 (which occurred before most restoration actions had been implemented) had a negative impact on fish, due to redd scour – a symptom our restoration action hope to alleviate. The orange rows highlight life stages impacted by the drought and extreme temperatures that occurred in 2014-15.

Major Restoration in Spawning Areas	Year	Seasonal Condiiotns		Production Year (September)																
		Winter Flood	Drought	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
PA-26 Levee	2011			Spawn	Rear	Smolt	3yr	4yr	5yr											
PA-10	2012				Spawn	Rear	Smolt	3yr	4yr	5yr										
PA-26 LWD	2013	1,390cfs				Spawn	Rear	Smolt	3yr	4yr	5yr									
PA 1, 3, 14, 22, 40	2014		Drought			Spawn	Rear	Smolt	3yr	4yr	5yr									
PA - 15 11, 24, 23	2015		Drought			Spawn*	Rear	Smolt	3yr	4yr	5yr									
PA-28 Phase I, Little Tucannon	2016	1,400cfs						Spawn*	Rear	Smolt	3yr	4yr	5yr							
PA - 6, 8, 9, 18, 28 Phase II	2017								Spawn*	Rear	Smolt	3yr	4yr	5yr						
PA-28 Phase III, Little Tucannon	2018									Spawn	Rear	Smolt	3yr	4yr	5yr					
PA-13 Phase I, 17	2019										Spawn	Rear	Smolt	3yr	4yr	5yr				
PA-13 Phase II,	2020											Spawn	Rear	Smolt	3yr	4yr	5yr			
	2021												Spawn	Rear	Smolt	3yr	4yr	5yr		
	2022													Spawn	Rear	Smolt	3yr	4yr	5yr	
	2023														Spawn	Rear	Smolt	3yr	4yr	

Spawn Year (September)

Time Laps for Channel Shapping Flow



