Appendix B
Aquatic Supplement

Contents

Hood River Subbasin

Tables and Figures:

Reports:

Hatchery and Genetic Management Plans (HGMP) for Spring Chinook and Steelhead Programs in the Hood River were submitted as electronic files to NWPPC

Lower Oregon Columbia Gorge Tributaries

Tables and Figures:

Coccoli, HRWG, 2/04

Table 1. Current Estimated Peak Summer Diversions in the Hood River

watershed	Diversion Location	Amount	Entity	Return Flow	Location of return flow	Total consumptive diversion
mainstem HR	river mile 4.5	188 average	Pacificorps	tailrace	river mile 1	0
	river mile 11	80	FID	10 cfs fish screen return	river mile 10.7 (10 cfs)	50
				powerhouse discharge	river mile 4.51 (20 cfs)	
	Upper Lenz or Odell cr	no info	Davis water co.			
	Pine creeks	5	FID			5
west fork	Green Point river mile	10	FID			10
	Dead Point cr	10	FID			10
	West Fork river mile 6	13	Dee ID	seepage		13
	cold springs	2	city of HR	overflow?	riverside drive reservoir?	2
	stone springs	4	city of HR		riverside drive reservoir?	4
middle fork	coe branch	15	MFID			15
	clear branch	19	MFID			19
	eliot branch	20	MFID			20
	rogers creek	5	MFID			5
	tony creek	1	Aldridge Ditch Co			1
	ice fountain springs	1	ice fountain WD			1
east fork	river mile 8.6	127	EFID	fish screen return 7 cfs	river mile 8.2	118
	river mile 8.6	14	MT Hood ID	overflow	tieman creek (1 cfs?)	13
	emil creek	1	MFID			1
	trout creek	2	MFID			2
	crystal springs	4	Crystal Sp WD	bypass reach to overflow?	?	4
	dog river	3	City of TD	none		3
		no info	parkdale water co.			
		no info	private withdrawals			
	TOTAL DIVERSION	**524**			**NET DIVERSION**	**296**

Table 2. Historic lake stocking and fish introductions in the Hood River subbasin. Sources: USFS 1996a and 1996b, ODFW and CTWS, 1990.

Release Location	Species	Years Released	Comments
Lost Lake	Rainbow trout	1950s-1960s 1980s	Hood R, Willamette, Oak Springs, Roaring, unknown. Willamette, Deschutes R. stocks
	Brown trout Brook trout	1950s-1960s	
	Coho salmon	1958	
	Kokanee and Sockeye salmon	Sockeye in mid-50s only	
Lake Branch	Rainbow Trout	1962-77	
Green Point Reservoir	Rainbow trout	1962-77	
Green Point Cr	Rainbow trout	1955-56	Hood and Oak Springs stocks
Black Lake	Brook trout		Since 1960
Scout Lake	Brook trout		Since 1950s
Rainy Lake	Brook trout		Since 1960
Ottertail Lake	Brook trout Brown trout		Discontinued
Laurance Lake	Rainbow trout, Kokanee, Sockeye Smallmouth bass		Illegal smallmouth bass introduction first noticed in 1990s
West Fork Hood River	Rainbow trout	1950-56	Hood R, unknown, Oak Springs
Clear Branch	Rainbow trout	1954, 1957	Unknown
Middle Fork Hood River	Rainbow trout	1954-1958	Unknown, Hood R, Oak Springs
East Fork Hood River	Searun Cutthroat trout	1956, 1974-78, 1985- 87	Nehalem, Nestucca, Alsea, Big Cr (540-33,000 smolts/yr)
	Rainbow trout	1954-77, 1979-87	Hood, Oak Springs, Willamette, Roaring R., Diamond Lk, Deschutes
Pollalie Cr	Rainbow trout	1954-55; 1968, 1970	Unknown, Hood, Willamette, Roaring R
Evans Cr	Rainbow trout	1954 -1956, 1970	Unknown, Hood, Oak Springs, Roaring R
Trout Cr	Rainbow trout	1954-56, 1970-71	Unknown, Hood, Oak Springs, Roaring R
Neal Cr	Brown bullhead		Bullhead likely escaped from private ponds
Cedar Cr	Rainbow trout	1986	
Indian Cr	Rainbow trout	1986	

Table 3. Within-subbasin production for three Hood River steelhead populations. (Olson 2004, Table 7)

BROOD YEAR	Female Steelhead Wild	Female Steelhead Hatchery	Female Steelhead Total	Hatchery Adult Exp Rate	Pre Spawning Survival	Effective Female Spawners*	Average Fecundity	Subbasin Egg Dep.**	Smolts	Smolts per Female Spawner	Egg-Smolt Survival
Naturally Spawning Summers											
1993	359	1183	1542	25%	90%	563	4399	2475130	1164	2	0.05%
1994	155	754	909	25%	90%	292	4432	1294964	2750	9	0.21%
1995	142	954	1096	25%	90%	321	4430	1421964	5660	18	0.40%
1996	87	306	393	25%	90%	140	4378	614080	3918	28	0.64%
1997	117	813	930	25%	90%	270	4405	1189053	8748	32	0.74%
1998	44	293	337	25%	90%	99	4391	434413	41825	423	9.63%
1999	74	1	75	0%	90%	67	4375	292556	2774	41	0.95%
								Geometric Mean			0.56%
Naturally Spawning Winters											
1993	220	5	225	0%	95%	214	4094	875093	4275	20	0.49%
1994	212	2	214	0%	95%	203	4017	816656	4539	22	0.56%
1995	83	1	84	0%	95%	80	3905	311619	7663	96	2.46%
1996	132	68	200	5%	95%	187	3887	725975	22531	121	3.10%
1997	145	152	297	20%	95%	253	3943	998644	13957	55	1.40%
1998	114	109	223	20%	95%	191	4044	772970	7167	37	0.93%
1999	164	93	257	0%	95%	244	3958	966346	3012	12	0.31%
								Geometric Mean			0.97%
Hatchery Winters											
1993		16				16		62150	38034	2377	61.20%
1994		26				26		95043	42860	1648	45.10%
1995		18				18		63790	50896	2828	79.79%
1996		24				24		85497	59837	2493	69.99%
1997		27				27		102465	62135	2301	60.64%
1998		21				21		80620	46781	2228	58.03%
1999		29				29		112302	63182	2179	56.26%
								Geometric Mean			60.74%

* Total returns were adjusted for harvest (hatchery only) and prespawning mortality. Hatchery-origin summer steelhead females (Skamania stock) spawning naturally were considered to be 30% as fit as wild-origin females.

** Egg deposition numbers are those reported by Olson. They do not exactly match the number calculated by multiplying female spawners by average fecundity because of rounding some of the numbers in this table.

Table 4. Out-of-subbasin production for three Hood River steelhead populations. (Olson 2004, Table 32)

		ADULT RETURNS							RETURN RATE	
BROOD YEAR	SMOLTS	1-Ocean	2-Ocean	3-Ocean	4-Ocean	Repeat Spawners	Returns ex Repeat	Returns Inc Repeat	SARS Exc Repeat	SARS Inc Repeat
Naturally Spawning Summers										
1993	1164	8	60	14	0	16	82	98	7.0%	8.4%
1994	2750	8	92	21	0	14	121	135	4.4%	4.9%
1995	5660	20	170	10	1	13	201	214	3.6%	3.8%
1996	3918	32	140	28	0	24	200	224	5.1%	5.7%
1997	8748	61	497	54	0	33	612	645	7.0%	7.4%
1998	41825	90	378	16	0	14	484	498	1.2%	1.2%
1999	2774	67	130	1			198	198	7.1%	7.1%
							Geometric Mean		4.4%	4.8%
Naturally Spawning Winters										
1993	4275	21	231	54	0	46	306	352	7.2%	8.2%
1994	4539	15	158	40	1	9	214	223	4.7%	4.9%
1995	7663	15	198	58	1	37	272	309	3.5%	4.0%
1996	22531	56	913	153	0	131	1122	1253	5.0%	5.6%
1997	13957	22	795	171	0	38	988	1026	7.1%	7.4%
1998	7167	31	681	176	0	26	888	914	12.4%	12.8%
1999	3012	26	423	5		2	454	456	15.1%	15.1%
							Geometric Mean		7.0%	7.5%
Hatchery Winters										
1993	38034	12	251	99	0	13	362	375	1.0%	1.0%
1994	42860	10	526	129	1	10	666	676	1.6%	1.6%
1995	50896	8	258	123	2	13	391	404	0.8%	0.8%
1996	59837	3	167	47	0	14	217	231	0.4%	0.4%
1997	62135	12	220	159	0	29	391	420	0.6%	0.7%
1998	46781	8	711	199	0	11	918	929	2.0%	2.0%
1999	63182	10	723	185		10	918	928	1.5%	1.5%
							Geometric Mean		1.0%	1.0%

Table 5. Life cycle summary for three Hood River steelhead populations.

BROOD YEAR	Effective Female Spawners*	Subbasin Egg Dep.	Smolts	Adult Returns: Ex. Repeat Spawners	Adult Returns: Inc. Repeat Spawners	Egg-Adult Survival: Ex. Repeat Spawners	Egg-Adult Survival: Inc. Repeat Spawners	Returns per Spawner: Ex. Repeat Spawners	Returns per Spawner: Inc. Repeat Spawners
Naturally Spawning Summers									
1993	563	2475130	1164	82	98	0.00%	0.00%	0.15	0.17
1994	292	1294964	2750	121	135	0.01%	0.01%	0.41	0.46
1995	321	1421964	5660	201	214	0.01%	0.02%	0.63	0.67
1996	140	614080	3918	200	224	0.03%	0.04%	1.43	1.60
1997	270	1189053	8748	612	645	0.05%	0.05%	2.27	2.39
1998	99	434413	41825	484	498	0.11%	0.11%	4.89	5.03
1999	67	292556	2774	198	198	0.07%	0.07%	2.96	2.96
				Geometric Mean		0.02%	0.03%	1.08	1.17
Naturally Spawning Winters									
1993	214	875093	4275	306	352	0.03%	0.04%	1.43	1.65
1994	203	816656	4539	214	223	0.03%	0.03%	1.05	1.10
1995	80	311619	7663	272	309	0.09%	0.10%	3.41	3.87
1996	187	725975	22531	1122	1253	0.15%	0.17%	6.01	6.71
1997	253	998644	13957	988	1026	0.10%	0.10%	3.90	4.05
1998	191	772970	7167	888	914	0.11%	0.12%	4.65	4.78
1999	244	966346	3012	454	456	0.05%	0.05%	1.86	1.87
				Geometric Mean		0.07%	0.07%	2.70	2.89
Hatchery Winters									
1993	16	62150	38034	362	375	0.58%	0.60%	22.63	23.44
1994	26	95043	42860	666	676	0.70%	0.71%	25.62	26.00
1995	18	63790	50896	391	404	0.61%	0.63%	21.72	22.44
1996	24	85497	59837	217	231	0.25%	0.27%	9.04	9.63
1997	27	102465	62135	391	420	0.38%	0.41%	14.48	15.56
1998	21	80620	46781	918	929	1.14%	1.15%	43.71	44.24
1999	29	112302	63182	918	928	0.82%	0.83%	31.66	32.00
				Geometric Mean		0.58%	0.60%	21.72	22.48

* Total returns were adjusted for harvest (hatchery only) and prespawning mortality. Hatchery-origin summer steelhead females (Skamania stock) spawning naturally were considered to be 30% as fit as wild-origin females.

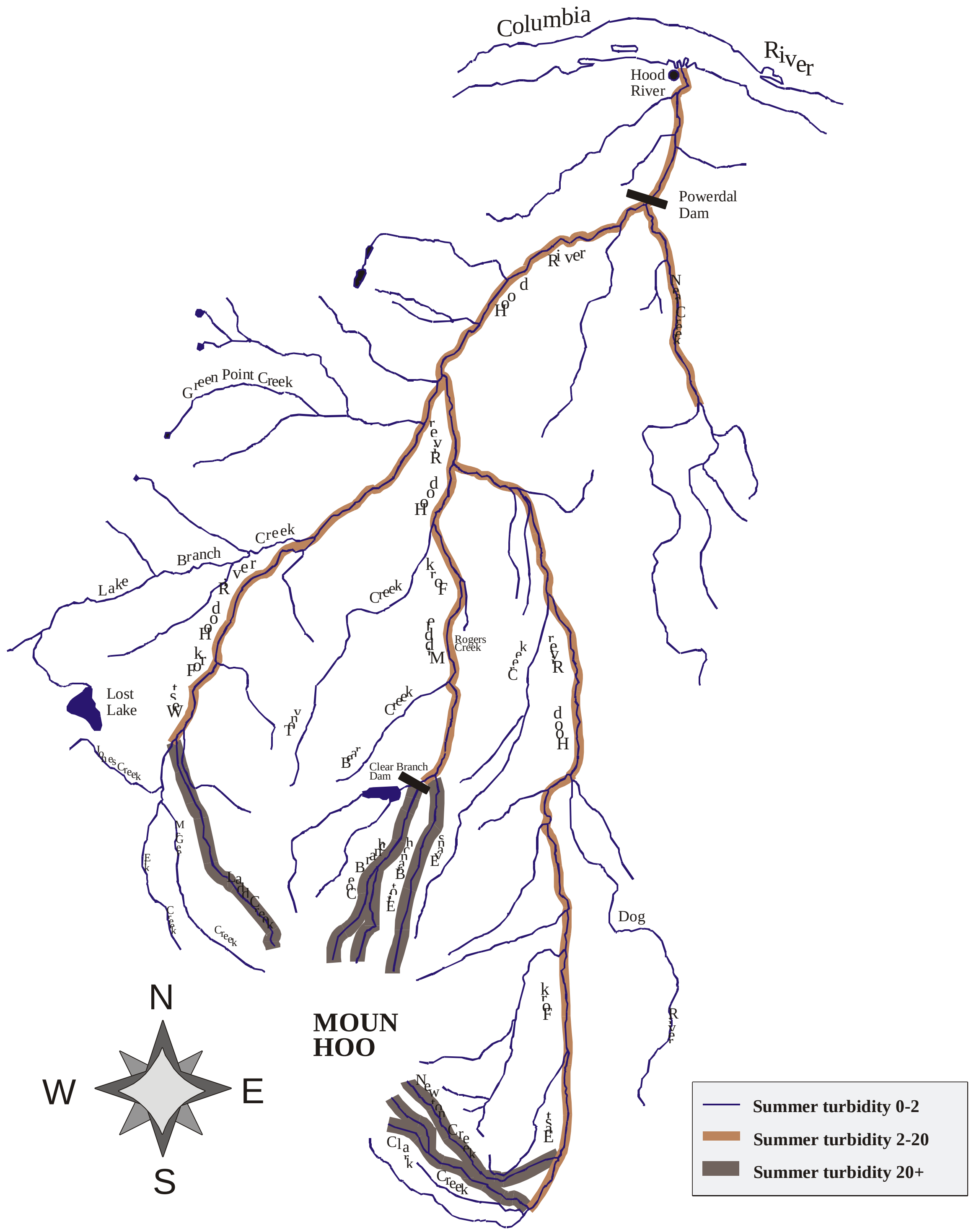
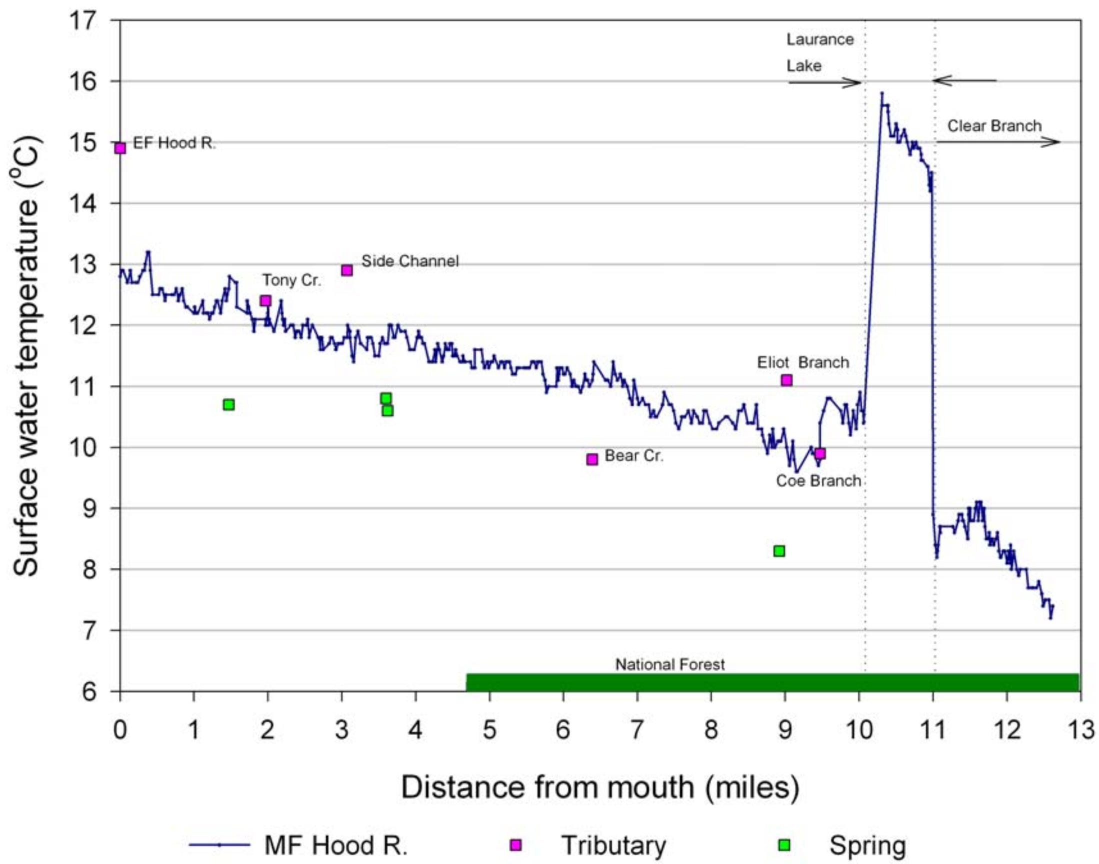


Figure 1. Map of the Hood River indicating turbidity levels by stream reach, from Underwood, K. D et al., 2003. Elevated summer turbidity in Neal Creek is from its use as an inter-basin transfer of irrigation water from the glacially-influenced East Fork Hood River.

Figure 2. Forward Looking Infrared Radiometry (FLIR) flight data from August, 2002



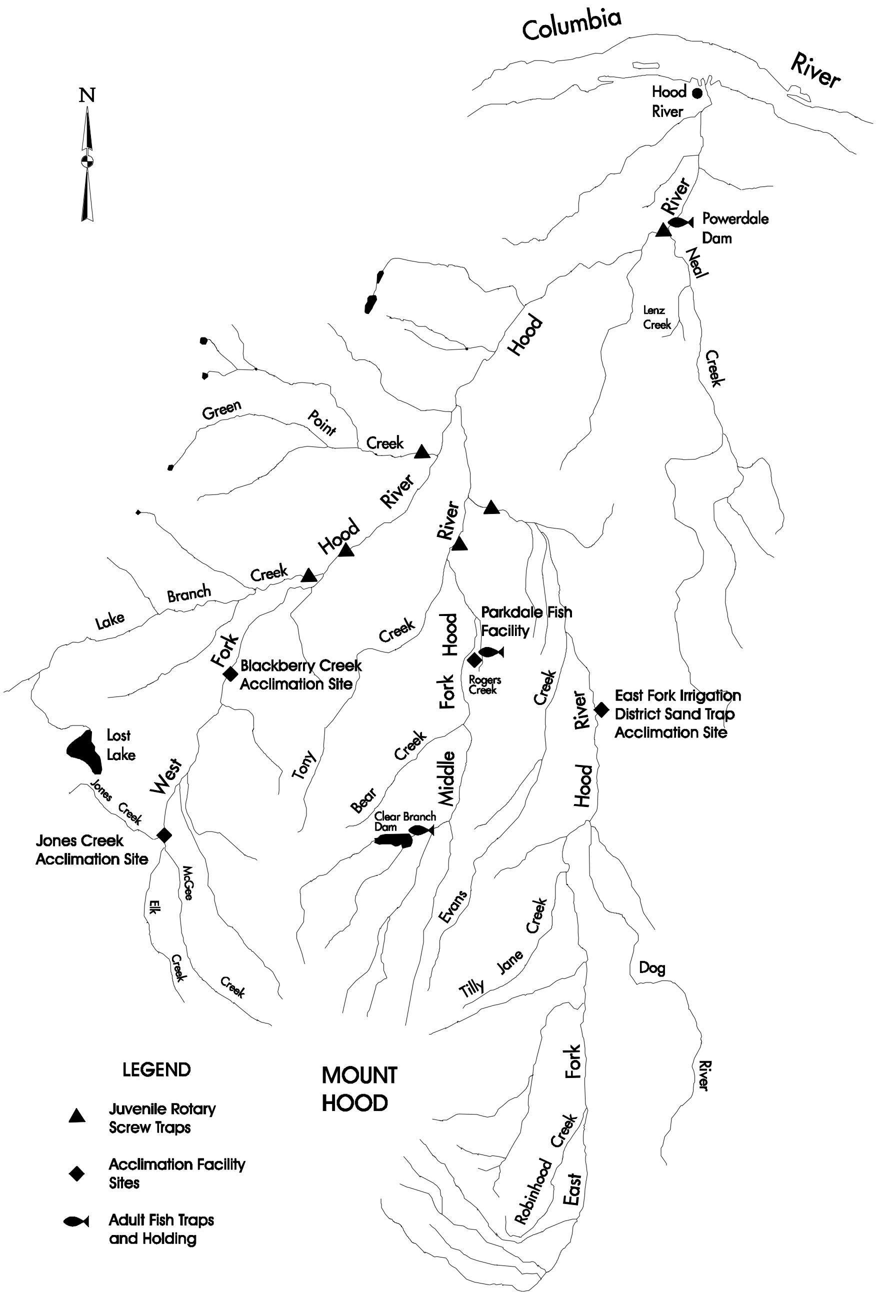


Figure 3. Location of BPA-funded support facilities for the Hood River Production Program within the Hood River subbasin (source: CTWSRO).

Hood River Basin EDT Actions and Scenarios

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May 2004

The following is a brief outline of the actions developed for use as scenarios. Each action can be run on its own as a single scenario or actions can be combined (with a few conditions) to create scenarios that affect a wide variety of problems. For each action outlined below I've noted the attributes affected, the degree of positive or negative change, and the reaches where the scenario was applied.

Unless otherwise stated, the attributes and degree of change is the same for all reaches where it was applied. I realize this is somewhat of a "one glove fits all" approach, and this can be modified in the future if desired.

A note on the "Degree of Change": the percent improvement or degradation of that attribute from the current to the template condition. There are several attributes where template and current conditions were the same or there was no rating for either; in these cases the degree of change had no effect.

Action: Basin-wide LWD Addition

This action targeted restoring large wood amounts to the template condition primarily in depositional reaches outlined in watershed analysis or based on professional judgment. There are a few other reaches where I felt wood levels would have been much higher naturally but weren't necessarily depositional (McGee, Robinhood, and Green Point are examples)

Attribute Affected	Degree of Change	Note
Low flow	10%	
Minimum width	50%	Not applied to Neal 2&4 and WF Neal 1
Confinement (Hydro)	50%	Amount of incision
Pool habitat	50%	
Pool tail habitat	50%	
Small cobble riffle	50%	
Large cobble riffle	**-50%**	
Off channel habitat	50%	
Bed scour	20%	
Riparian Function	50%	
Max. temperature	10%	
Harassment	25%	
Large woody debris	100%	

Reaches where applied

- Hood River reaches 8–11
- Neal reaches 2 & 4
- WF Neal reach 1
- West Fork HR reaches 3–9, 11–14

Green Point reaches 1-2
Lake Branch reaches 2-4
Red Hill reach 1
McGee reach 1
Middle Fork HR reaches 2-5
Clear Branch reaches 1, 5, 6
East Fork HR reaches 3-12, 14, 18-26
Evans reaches 1, 3, 5
Culvert reach 1
Robinhood reach 1

Action: Powerdale Dam Obstruction Removal

This action models the restoration of unimpeded up and downstream migration once the dam is removed. This action was designed to be combined into a single scenario with the flow restoration action from Powerdale removal (see below).

Attribute Affected	Degree of Change	Note
Passage survival	100%	

Reaches where applied
Hood River reach 5 (the dam) only

Action: Powerdale Dam Removal – Flow Restoration

This action models the restoration of average low stream flows (188 cfs or an estimated 65-70% of the total natural low flow) once Powerdale is removed and the habitat and water quality benefits.

Attribute Affected	Degree of Change	Note
Low flow	70%	No change for reach 6
Minimum width	50%	No change for reach 6
Riparian function	50%	No change for reach 6
Fine sediment	10%	50% for HR reach 6
Nutrient enrichment	50%	No change for reach 6
Max. temperature	30%	No change for reach 6
Harassment	20%	No change for reach 6
Pool habitat	100%	HR reach 6 only
Glide habitat	100%	HR reach 6 only
Confinement (hydro)	50%	HR reach 6 only

Reaches where applied
Hood River reaches 1-4, 6

Action: Passage Obstruction Removal

This action models the restoration of fish passage at irrigation diversions and culverts. Culverts that were located at the upper end of anadromy were not included. Natural barriers also were not included.

Attribute Affected	Degree of Change	Note
Passage survival	100%	25% at Clear Branch Dam

Reaches where applied

Lenz reach 2 – Ehrck Hill Drive culvert
Neal reach 3 – Creek lateral diversion dam
West Fork HR reach 8 – Dee diversion
McGee reach 2 – 1800 Road culvert
Tony reach 2 – Dee hardboard diversion
Eliot reach 2 – MFID diversion
Coe reach 2 – MFID diversion
Clear Branch reach 2 – Clear Branch Dam
Graham reach 2 – Leasure Road culvert
Baldwin reach 3 – Miller Road culvert
Tieman reaches 2 & 4 – Woodworth Road and Highway 281 culverts
Evans reaches 2, 4, 6 – Various culverts

Action: Flow Restoration – 20%

This action models the increase of low stream flows by reducing irrigation withdrawals by 20% at selected diversions and the associated habitat and water quality benefits. We assumed increases in flow would not occur below municipal water diversions because the human population will likely increase hence the need for water will remain the same or even increase.

The effect of flow restoration on stream reaches varied depending on location and the relative size of stream. For example, although the EFHR water savings were large compared to other streams the amount of water kept in the river was relatively small compared to the estimated total flow based on DEQ information. Therefore the degree of change was smaller than in some smaller streams.

Flow improvements associated with Powerdale Dam are included in this action. Therefore, the estimated water saved from upstream sources was added to projected savings modeled alone in the “Powerdale Dam Removal – Flow Restoration” action outlined above.

East Fork HR reaches 1-7, Green Point reach 1

Attribute Affected	Degree of Change	Note
Low flow	15%	
Minimum width	15%	
Riparian function	5%	
Nutrient enrichment	10%	
Max. temperature	10%	

Clear Branch reach 1, Coe reach 1, Eliot reach 1, Rogers Springs reach 1

Attribute Affected	Degree of Change	Note
Low flow	20%	
Minimum width	20%	No change in Clear Branch
Riparian function	10%	
Nutrient enrichment	10%	No change in Clear Branch
Max. temperature	10%	No change in Clear Branch

Middle Fork HR reaches 1-7, Hood River reaches 6-11

Attribute Affected	Degree of Change	Note
Low flow	5%	
Minimum width	5%	
Riparian function	5%	
Nutrient enrichment	5%	
Max. temperature	5%	No change in Middle Fork HR

West Fork HR reaches 1-7

Attribute Affected	Degree of Change	Note
Low flow	1%	
Minimum width	1%	
Riparian function	1%	
Nutrient enrichment	1%	
Max. temperature	1%	

Hood River reaches 1-4

Attribute Affected	Degree of Change	Note
Low flow	80%	
Minimum width	60%	
Riparian function	55%	
Fine sediment	15%	
Nutrient enrichment	55%	
Max. temperature	35%	
Harassment	25%	

Action: Flow Restoration – 10%

This action is the same as above except the degree of change are half of those modeled above in the 20% flow restoration action.

Table 6. Resident and anadromous fish distribution in Lower Oregon Columbia Gorge Tributaries with survey notes, current natural and artificial barriers. Contributed by Chuti Fiedler, USFS-CRGNSA for subbasin plan.

STREAM NAME	CURRENT USE (TO RIVER MILE)	HISTORIC USE (POST DAM)	COMMENTS
Eagle	Ch/coho 0.8 St 0.8 Rb rm ≥8 Rb @ Wahtum	Ch/coho 2.0 St 2.0 Rb rm ≥8 Wahtum Lk unk.	Falls at rm 2.0 Bonneville dam inundated ~0.2 miles Hatchery diversion @ rm 0.5 stops nearly all anadromous fish, except at very high flows.
Ruckel	potential St 0.2 Ch/coho 0.2	potential St 0.2 Ch/coho 0.2	Intermittent flow. coho documented. Falls at rm 0.2.
Rudolph	No survey data.	?	Stream flows through western edge of city of Cascade Locks.
Dry	potential St 2.2 potential Ch/coho likely Ct ≥ 2.2	potential St 2.2 potential Ch/coho 2.2 likely Ct ≥ 2.2	Intermittent flow below rm 2. Falls at rm 2.2. Unknown fish use above. Low flow barriers at RR, and Frontage road culvert. Dredged regularly to maintain hwy and maintain channel location through CL.
Herman	St 3.5 Ch/coho 2.8 Rb 8	St 3.5 Ch/coho 2.8 Rb 8	Perennial stream from Hicks Lake. Bonneville dam inundated ~0.7 miles Hatchery diversion @ rm 0.8 impedes upstream fish passage at upper and lower flow regimes. 7' falls at rm 2.8 (coho/Chinook barrier). 33' falls at rm 3.5 (all anad. barrier)
E. Fork Herman	potential Rb 4.0	potential Rb 4.0	Perennial to headwaters at Mud Lake. Numerous waterfalls.
Grays	?	?	Intermittent above I-84 (1993 photos). No formal survey. Habitat looks poor.
Gorton	St 0.26 Ch/coho 0.11 Rb ≥ 1.0	St 0.8 Ch/coho 0.11 Rb ≥ 1.0	Perennial except 1500' above/below I-84 I-84/RR culvert @ rm 0.26 is fish barrier. Series of impassable waterfalls at rm 0.8. Bonneville dam inundated ~0.2 miles Mouth of stream in impounded pond by RR fill.
Harphan	St 0.2 Ch 0	St 1.0 Ch 0 Rb unknown	Perennial, except mouth to rm 0.3. No formal survey. Falls (60') at rm 1.0 I-84 culvert @ rm 0.2 impassable (45^{o} ramp)
Summit	St 0.1 Ch 0	St 0.15 Ch 0 Rb unknown	Intermittent rm 0-0.1. Culvert @ rm 0.1 impassable No surveys beyond rm 0.15 (50' falls)
Lindsey	St 0.18 Ch/coho 0.18 Ct/Rb ≥ 0.86	St 0.18 Ch/coho 0.18 Ct/Rb ≥ 0.86	Perennial ≥ rm 0.86. No surveys above this pt. Falls @ rm 0.18, high anadromous use below. Bonneville dam inundated ~0.36 miles. Headwater is North and Bear Lks. (brook trout) Mouth of stream in impounded pond by RR fill.

Table 6. Resident and anadromous fish distribution in Lower Oregon Columbia Gorge Tributaries with survey notes, current natural and artificial barriers. Contributed by Chuti Fiedler, USFS-CRGNSA for subbasin plan.

STREAM NAME	**CURRENT USE** (TO RIVER MILE)	**HISTORIC USE** (POST DAM)	**COMMENTS**
Wonder			Steep trib to Warren Creek w/ falls near mouth. No formal surveys.
Warren	St 0.2 Ch 0	St 0.2 Ch 0	Intermittent from mouth to rm 0.15. Poor fish habitat (low flow and steep gradient). No survey above rm 0.2 (50' falls) Bonneville dam inundated ~1.12 miles. Headwater at Warren Lake. Mouth of stream in impounded pond by RR fill.
Cabin	St 0.07 Ch 0	St 0.07 Ch 0	Intermittent from mouth to 0.05, then Perrenial. Falls (200') at rm 0.07. Poor fish habitat due to low flow/steep gradient.
Starvation	St 0.15 Ch/coho 0.15 Ct $\geq$ 0.15	St 0.15 Ch/coho 0.15 Ct $\geq$ 0.15	Perennial to end of surveys at 120' falls @ rm 0.15, likely at least lower mile. I84 and Historic hwy culverts cover significant length of creek available for anadromous fish. Bonneville dam inundated ~1.48 miles.
Viento	St 0.8 Ch/coho 0.8 Ct $\geq$ 1.4 Rb 0.5 Lamprey	St 0.8 Ch/coho 0.8 Ct $\geq$ 1.4 Rb 0.5 Lamprey	Perennial to survey end at rm 1.4. No survey above this point. Sm. cascade at rm 0.5 may be coho barrier, then rm 0.8 a barrier for all anadromous fish. Bonneville dam inundated ~0.58 miles. Mouth of stream in impounded pond by RR fill.
Perham	St Coho Rb Lamprey	St Coho Rb Lamprey	No stream survey data. Where is 1st falls barrier?
Mitchell			No survey data
Phelps	Rb Ct	Rb ?	207' Wah Gwin Gwin falls at mouth. Bonneville dam inundated ~0.95 miles.
Post Canyon			Tributary to Phelps Creek. No survey data

Key:
Rb=rainbow trout
Ct= cutthroat trout
St= steelhead trout
Ch= chinook salmon

RR= railroad
rm= river mile

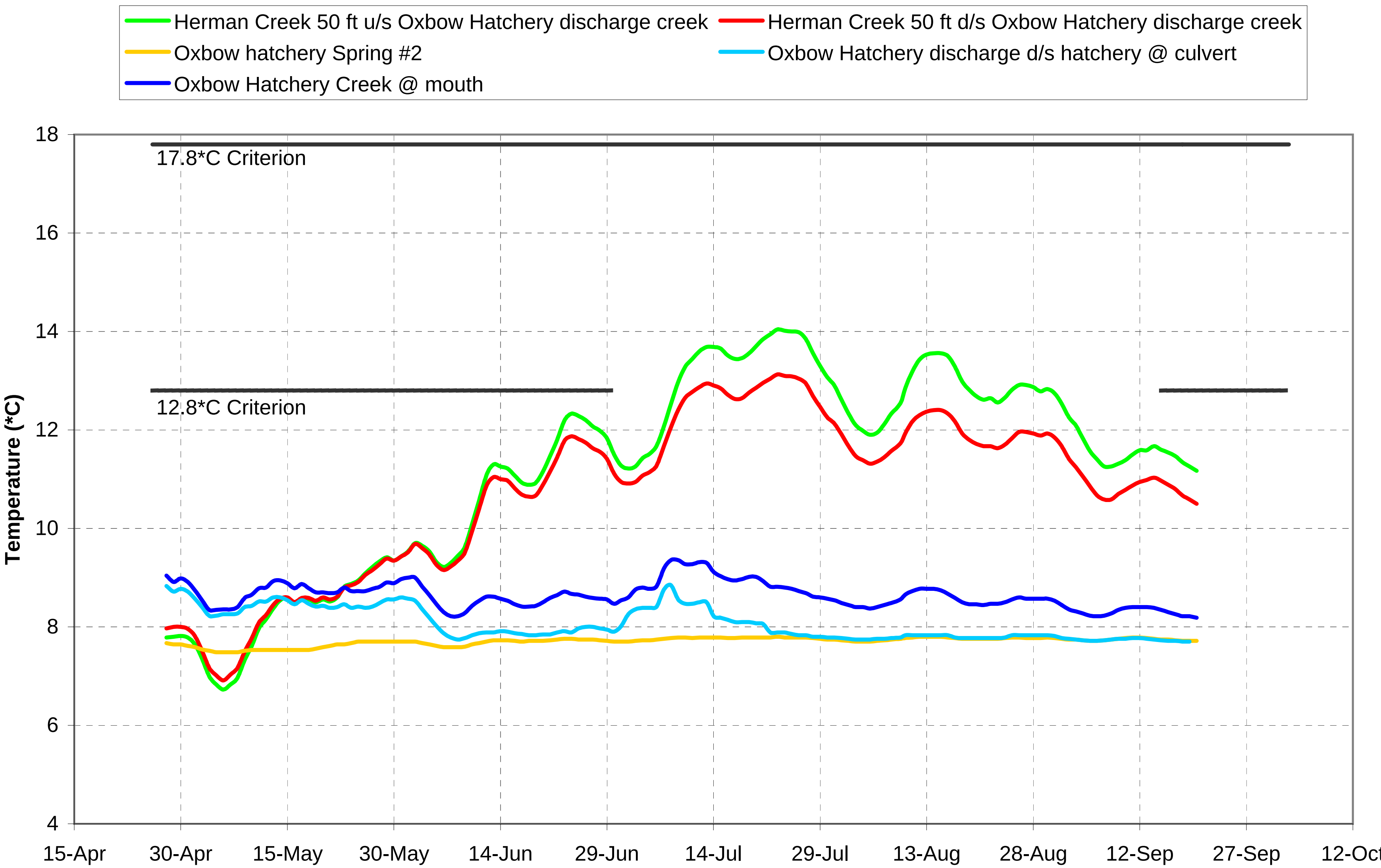
Kreiter / April 2004

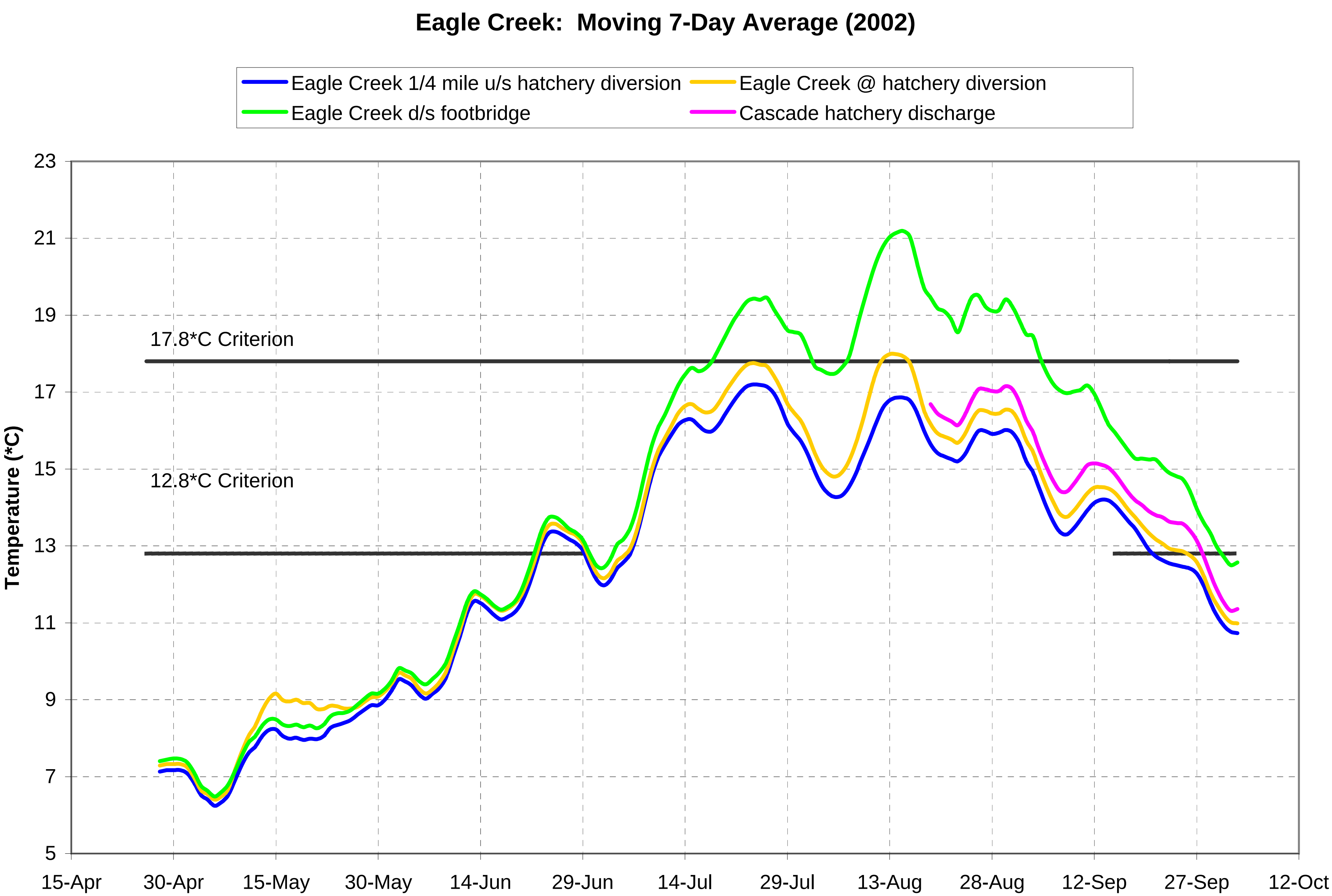
Max Monthly water temp

Oregon Streams	Jul-00	Aug-00	Jul-01	Aug-01	Jul-02	Aug-02	Jul-03	Aug-03	ave	
Lindsey Creek		12.9							12.9	
Tanner Creek	14.47	14.09	15.38	17.12	14.43	13.81	16.49	15.22	15.1	
Tanner Creek			13.02	13.48	13.48	12.71	13.48	12.71	13.1	
McCord Creek		14.8							14.8	
Eagle Creek *			18.02	19.16	21.27	17.86	20.44	19.16	19.3	
Herman Ck-140	14.47	14.85	13.98	14.45	14.29	13.83	14.45	14.14	14.3	
Wash Streams										
Woodard Creek	16.3	15.9	16.79	16.79	17.43	16.16	15.05	15.37	16.2	
Goodbear Creek	15.62	15.23					16.42	16.58	16.0	0.9
Hamilton Creek	17.9	17.9	17.12	17.93	17.93	17.44	18.57	17.93	17.8	
* an anomoly (above the diversion)										
blanks indicate no data collected										4.9
										3.5

	Jul-00	Aug-00	Jul-01	Aug-01	Jul-02	Aug-02	Jul-03	Aug-03
Herman Ck-160			12.73	12.73	13.51	12.42	12.89	12.27
Herman Ck-150					13.81	12.89	13.35	12.89

Herman Creek (Oxbow Hatchery): 7-Day Moving Average (2002)





Eagle Creek: Moving 7-Day Average (2002)
Eagle Creek 1/4 mile u/s hatchery diversion
Eagle Creek @ hatchery diversion
Eagle Creek d/s footbridge
Cascade hatchery discharge
Temperature (*C)
23
21
19
17
15
13
11
9
7
5
17.8*C Criterion
12.8*C Criterion
15-Apr
30-Apr
15-May
30-May
14-Jun
29-Jun
14-Jul
29-Jul
13-Aug
28-Aug
12-Sep
27-Sep
12-Oct