

cc L. Brown  
JC OK JLC

Jim Spotts  
Rt. 4 Box 274  
Ellensburg, Wa. 98926  
Jan. 16, 1985

Subject: Bull Trout Survey  
To: Larry Brown  
Objective: To Report on Findings of 1984 Region 3 Bull Trout Survey.

The survey concentrated primarily on the identification of spawning and nursery waters of resident bull trout (Salvelinus confluentus) populations and their status. Spawning preference data was also collected.

**Box Canyon Creek**

Water: Lake Kachess

- Stream: Box Canyon Creek
- Date spawning survey: 9/22/84
- # Redds complete: 5
- # False redds: 6 (Generally in close proximity of complete redds)
- # Fish observed: 7 (Plus 1 bomb mortality below barrier)
- # Fish on redds: 2
- # Male: 5 (e.g., 71%)
- # Female: 2 (e.g., 29%)
- Q= 19.6 CFS
- Temp.= 10.5°C

1  
9  
8  
4

The bull trout spawners here were closely monitored during the 84 field season. Juvenile bull trout electroshocking surveys on 8/4/84 produced a large bull trout male approximately 1.5 mile from Lake Kache. No juveniles were observed. On this date fish were also observed at the waterfall, and conversations with 2 local anglers indicated that local folks were aware of the annual bull trout migration in the creek.

I believe the Box Canyon spawning population was decimated, probably reduced by at least 50% by angling and bombing of the hole below the barrier. 25 to 30 spawners were observed in mid-August.

Stream: Kachess River

Electroshocking efforts on 8/15/84 produced several juvenile bull trout below Mineral Creek and above the confluence of Mineral Creek and the Kachess River. No fish were observed in Mineral Creek. I suspect juveniles prefer the Kachess River due to a more stable watershed. Evidence of severe scour and deposition in Mineral Creek probably make it unsuitable for juvenile fish.

Spawning surveys in late September produced no redds or fish. The lack of adults is probably due to intermittent flows near the mouth of the Kachess River, thereby preventing upstream migration. The presence of juveniles indicates that adults apparently are able to migrate up the stream at least some years.

Electroshocking surveys on the other Lake Kachess tributaries produced no bull trout.

Water: Lake Keechelus

Stream: Gold Creek

Gold Creek

Date: 9/25/84

# Redds Complete: 2

# False Redds: 1

# Fish Observed: 2

# Fish on Redds: 0

% Males: 100%

% Females: 0%

Q= 16.24 CFS

Temp.= 9.5 °C

1  
9  
8  
4

Gold Creek was again checked on 10/5/84 and no additional redds were observed. Electroshocking efforts on 7/25/84 and 8/19/84 produced no juvenile bull trout. The absence of juveniles is probably the result of winter and spring flooding. One fish was checked at the mouth of Gold Creek. Only the lower 1.25 mi. is available for spawning due to intermittent flows at the borrow pit.

Coal Creek: Two juvenile bull trout were captured about one mile above the lake on 7/25/84. However, insufficient flows existed by mid-August for upstream adult spawning migrations. Spawning surveys in late September produced no spawners.

Meadow Creek: Electroshocking efforts produced no juvenile bull trout within this watershed. However, cutthroat were present. Low flows at the confluence with lake prevent upstream migration.

Cold Creek: Electroshocking efforts on 7/25/84 produced 1 cutthroat. A few other fish were raised, however, none were captured. Numerous sculpins were captured.

A concrete apron constructed beneath the railroad bridge crossing prevents upstream migrations of adult spawners. Mid-August observations of drop from apron would require a fish to jump 12-14 ft. from reduced storage levels. I suspect Cold Creek may have historically been utilized by bull trout.

Roaring Creek: Aptly named, an 80 to 100 foot waterfall is located approximately 200 yds. above the confluence of the stream and Lake Keechelus. Electroshocking produced only a few cutthroats between the waterfall and lake. Conversations with U.S. Forest Service personnel indicated the possibility of a bull trout population in Lost Lake, however, field checks of anglers produced only a few slow growing brook trout.

Water: Rimrock Lake

Stream: Indian Creek

Dates Spawning Survey: 9/15 and 9/16/84

Redds complete: 29

# False Redds: 22

# Fish observed: 45

# Fish on redds: 20

# Male: 29 (e.g., 65%)

# Female: 16 (e.g., 35%)

Q= 13.2 CFS

Temp.= 11 °C

Indian Creek

1  
9  
8  
4

\*The spawner survey is not complete (e.g., only represents 50% of spawning area).

Electroshocking surveys on 9/8/84 produced numerous juveniles and 3 inadvertant adult mortalities. Approximately 146 adult spawners were observed. Most fish were in the 18 to 24 inch group. Three pair were on redds and three completed redds were present. Six false redds were also observed. One adult mortality was found below a popular horse trail, the result of an apparent clubbing attempt (e.g., broken back).

The South and North Forks of the Tieton River were surveyed in mid-September and no bull trout were observed. I suspect fish may be utilizing these streams or their tributaries, especially the South Fork Tieton. Conversations with local anglers indicated catches of bull trout near the mouth of the South Fork Tieton between mid-July and August.

### Water: Bumping Lake

Time restraints did not allow for stream surveys in this watershed. One bull trout, however, was captured in the lake.

Conversations with local anglers indicated a population utilizing Deep Creek. One angler indicated that when Bumping Lake is drawn down in the fall, fish spawn in the old river channel. This, however, was not confirmed.

### General Observations:

- 1) Conversations with anglers and resort operators indicated catches of bull trout near the mouths of spawning streams between July 15 and August 15.
- 2) Adults enter streams as early or maybe earlier than August 1. I suspect warming water temperatures may be the mechanism triggering the adult migration (e.g., with a warmer season the migration may occur earlier.) This may account for the presence of fish in the streams earlier than we thought.
- 3) Streams utilized by bull trout contain very low populations of other fish species (e.g., especially salmonids).
- 4) All surveyed streams possessed a high gradient and showed evidence of extensive winter and spring flooding.
- 5) Most adult upstream migration probably occurs at night.
- 6) During the day migrating fish are almost always associated with cover (e.g., under rocks, logs or cutbanks).
- 7) Large numbers of pre-spawning fish will share a single piece of cover. Fourteen fish were observed under a single large log on Indian Creek, with no aggressive interaction.
- 8) Adults were observed below a migration barrier in the evening sticking their heads out of the water apparently looking at the barrier to determine the best route to attempt.
- 9) Males and females were often observed together with no redd present. Mate selection may occur early in the migration.
- 10) Ratio of observed males to females was about 2:1.
- 11) Redds are almost always just a few feet from escape cover. Suitable spawning substrate was ignored if cover is not present.
- 12) Aggressive behavior occurred on the redds and only between competing males (e.g., biting, raising dorsal fin, and chasing) but did not seem to occur between females.

13) I suspect egg survival is low, probably due to winter icing and flooding conditions in these high elevation streams.

14) Juveniles probably reside in their nursery water between emergence and up to 3 years if flooding doesn't push them downstream.

15) Electroshocking efforts indicated juveniles preferred reduced current and were often near the bank under rocks or other suitable cover. This was especially true if they coexisted with other salmonids.

Thank you for the opportunity to work on this interesting project. I hope this data will help assess the status and develop regulations to protect our bull trout populations.

Sincerely

Jim Spotts

A handwritten signature in black ink that reads "Jim Spotts". The signature is written in a cursive style with a large, looped initial "J".

Copy: Jim Cummins

24	09/22/84	1200	JS	AS4AS5 BOX CANYON CR	<p style="text-align: center;">★</p> <p>False redds in close proximity to actual redds. Of the 7 adults observed, only 2 were females. Discharge measured as 19.6 cfs. Jim Spotts believes the adult run was decimated by bombs and anglers, probably 50 percent loss based on mid-August observations of adults present at "Peek-a-boo Falls" (25 to 30 fish). One large male was electro-shocked on 8/4 during surveys and several more fish were observed at the falls, indicating early movement into this stream from Lake Kachess.</p>
116	09/08/85		JS	AS4AS5 BOX CANYON CR	<p>DATA FROM OLD 9/14/86 MEMO FROM SPOTTS TO CUMMINS, JUST RECENTLY FOUND.</p> <p>DATA ENTERED INTO DATABASE ON 11/01/93.</p>
545	09/14/85	0952	JS	AS4AS5 BOX CANYON CR	<p>TWO MALES AND ONE FEMALE OBSERVED. THREE REDDS AND 2 FALSE REDDS.</p>
117	09/15/85		JS	AS4AS5 BOX CANYON CR	<p>DATA FROM OLD 9/14/86 MEMO FROM SPOTTS TO CUMMINS, WHICH WAS ONLY RECENTLY LOCATED.</p> <p>DATA ENTERED INTO DATABASE ON 11/01/93.</p>
546	09/20/85	1131	JS	AS4AS5 BOX CANYON CR	<p>RECONSTRUCTED SURVEY NOTES (FROM POCKET CALENDAR) INDICATE FLOW AT MOUTH OF BOX CANYON CREEK ONLY AN INCH OR SO ON 9/14 AND INTERMITTENT ON 9/20.</p>
5	09/22/86	1200	LGB	AS4AS5 BOX CANYON CR	<p>Walked from lake to Peekaboo falls. Low and clear. Stream goes underground about 50 yds short of the lake. No access this season. Observed the 3 redds all in same area from 100-200 yds below Peekaboo falls. No sign of fish or redds from Peekaboo to Bomber falls. No recent blasting activity. Looks like this year is a bust for bull trout reproduction.</p>
20	09/17/87	1300	LGB	AS4AS5 BOX CANYON CR	<p>No fish this year seen. Only 1 to 50 100</p>

**Stream Lake Fish Database**

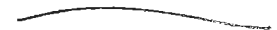
**Box Canyon 1984**

Year	Wa_nam	Date	Temp	New Redds	False_redds	Total_visible
1984	BOX CANYON CR	22-Sep-84	10	5	6	5

1  
9  
8  
4

09/08/84 1200 JS Y58Y59 INDIAN CR

09/15/84 1200 JS Y58Y59 INDIAN CR



This survey only represents approximately 50 percent of the spawning area of Indian Creek. Of the 45 adults observed, 16 were females (35%) and most fish were from 18" to 24" in length. Discharge was measured at 13.2 cfs.

09/12/85 JS Y58Y59 INDIAN CR

DATA FROM JIM CUMMINS FILES.



1047	09/10/92	0900	EA	38		Z16Z17	R	DEEP CR	46F	DV	BULL			3	0		78	7	MEMO		
1107	08/13/93	0845	EA	38		Z16Z17	R	DEEP CR	47F	DV	BULL	0	0	0	0		0	0	MEMO		
1108	08/24/93	0900	EA	38		Z16Z17	R	DEEP CR	44F	DV	BULL	9	0	9	0		15	2	MEMO		
1109	09/02/93	0900	EA	38		Z16Z17	R	DEEP CR	45F	DV	BULL	13	0	13	3		2FM, 1STR	37	9	MEMO	
1110	09/10/93	0830	EA	38		Z16Z17	R	DEEP CR	46F	DV	BULL	0	0	0	1		STRANDED	45	9	MEMO	
1037	07/07/92	1200	LGB	39		AT3AT4	R	GOLD CR		DV	BULL	MEMO	ONLY	0						MEMO	
27	09/25/84	1200	JS	39	20	AT3AT4	R	GOLD CR (LOWER)	9.5C	DV	BULL	0	2	2	0				2	1	memo
28	10/05/84	1200	JS	39	20	AT3AT4	R	GOLD CR (LOWER)		DV	BULL	0	0	0	0				2	1	memo
541	09/09/85	0833	JS	39	20	AT3AT4	R	GOLD CR (LOWER)		DV	BULL	0	0	0	0				0	0	memo
542	09/13/85	0951	JS	39	20	AT3AT4	R	GOLD CR (LOWER)		DV	BULL			1					2	0	memo
1114	09/14/85		JS	39		AT3AT4	R	GOLD CR (LOWER)		DV	BULL	0	0	0	0				0	0	MEMO
543	09/20/85	0831	JS	39	20	AT3AT4	R	GOLD CR (LOWER)		DV	BULL			0	0				2	0	memo
1115	09/30/85		JS	39		AT3AT4	R	GOLD CR (LOWER)		DV	BULL	0	0	0	0				0	0	MEMO
6	09/22/86	1500	LGB	39	20	AT3AT4	R	GOLD CR (LOWER)		DV	BULL	3	9	12	1		SPEARED	21	3	MEMO	
17	08/27/87	1300	LGB	39	20	AT3AT4	R	GOLD CR (LOWER)		DV	BULL	0	0	1	0				0	0	MEMO
19	09/17/87	1000	LGB	39	20	AT3AT4	R	GOLD CR (LOWER)	53F	DV	BULL	0	4	4	0				1	0	MEMO
22	10/05/87	1030	LGB	39	20	AT3AT4	R	GOLD CR (LOWER)	52F	DV	BULL	0	7	7	0				15	43	MEMO
550	09/15/88	1200	LGB	39	20	AT3AT4	R	GOLD CR (LOWER)	56F	DV	BULL	0	4	4	0				4	3	MEMO
553	09/22/88	1100	LGB	39	20	AT3AT4	R	GOLD CR (LOWER)	52F	DV	BULL	0	6	6	0				12	70	MEMO
558	09/15/89	0900	LGB	39	20	AT3AT4	R	GOLD CR (LOWER)	52F	DV	BULL	0	4	4	0				1	0	MEMO
560	09/20/89	1000	LGB	39	20	AT3AT4	R	GOLD CR (LOWER)	52F	DV	BULL	0	4	4	0				2	17	MEMO
568	09/27/90	1330	LGB	39	20	AT3AT4	R	GOLD CR (LOWER)	58F	DV	BULL	0	0	0	0				2	0	MEMO
573	09/13/91	1400	LGB	39	20	AT3AT4	R	GOLD CR (LOWER)		DV	BULL			0	MEMO	---	NO COUNT				MEMO
593	09/20/91	NBRD	FG	39	20	AT3AT4	R	GOLD CR (LOWER)		DV	BULL			16	0				6	0	MEMO
1120	09/18/92	from	FRI	39		AT3AT4	R	GOLD CR (LOWER)		DV	BULL			0					3		MEMO
1038	09/30/92	1017	BDB	39		AT3AT4	R	GOLD CR (LOWER)	51F	DV	BULL	0	0	0	0				0	5	MEMO
1040	10/20/92	1000	BDB	39		AT3AT4	R	GOLD CR (LOWER)	48F	DV	BULL			0	SURVEY	CANCELLED	RAIN	YUK			MEMO
1119	09/23/93	1201	FRI	39		AT3AT4	R	GOLD CR (LOWER)	11.2C	DV	BULL			2					2	0	memo
564	09/18/90	1000	LGB	39	20	AT3AT4	R	GOLD CR (UPPER)	52F	DV	BULL	0	2	2	0				9	0	MEMO
594	09/19/91	CERD	KS	39	20	AT3AT4	R	GOLD CR (UPPER)		DV	BULL	0	0	2	2		ANGLERS	3	0	MEMO	
1025	09/20/91	NBRD	FG	39	20	AT3AT4	R	GOLD CR (UPPER)		DV	BULL			20					10		MEMO
1121	09/18/92	from	FRI	39		AT3AT4	R	GOLD CR (UPPER)		DV	BULL			0					11	3	MEMO
1039	10/09/92	1015	BDB	39		AT3AT4	R	GOLD CR (UPPER)	8.0C	DV	BULL	0	0	0	0				2	0	MEMO
1118	09/23/93	1200	FRI	39		AT3AT4	R	GOLD CR (UPPER)	9.6C	DV	BULL			2	LOST 15	OF 17			9	6	MEMO
629	09/18/90		WDW	38	30	Y74Y75	R	HINDOO CR	48F	DV	BULL	0	0	0	0				3	0	MEMO
30	09/08/84	1200	JS	38	23	Y58Y59	R	INDIAN CR		DV	BULL	6	140	146	1		CLUBBED	3	6	memo	
29	09/15/84	1200	JS	38	23	Y58Y59	R	INDIAN CR	11C	DV	BULL	20	25	45	0				29	22	MEMO
1111	09/12/85		JS	38		Y58Y59	R	INDIAN CR		DV	BULL			90	FALSE IN	CLUDED			69	INC	MEMO
547	09/17/85	0943	JS	38	23	Y58Y59	R	INDIAN CR		DV	BULL			62	0				37	18	MEMO
1112	09/03/86		JS	38		Y58Y59	R	INDIAN CR		DV	BULL			45	PARTIAL	SURVEY			16	8	MEMO
1113	09/12/87		JS	38		Y58Y59	R	INDIAN CR		DV	BULL			20					35		MEMO
584	09/02/88	1101	EA	38	23	Y58Y59	R	INDIAN CR	43F	DV	BULL			25	0				8	0	MEMO
585	09/09/88	1103	EA	38	23	Y58Y59	R	INDIAN CR	45F	DV	BULL			25	0				22	0	MEMO
586	09/16/88	1105	EA	38	23	Y58Y59	R	INDIAN CR	48F	DV	BULL	0	0	23	1		unknown	25	0	MEMO	
587	09/26/88	1107	EA	38	23	Y58Y59	R	INDIAN CR	43F	DV	BULL	0	0	0	0				25	0	MEMO
588	09/14/89	1201	EA	38	23	Y58Y59	R	INDIAN CR	?	DV	BULL	0	0	36	0				30	0	MEMO
589	09/28/89	1203	EA	38	23	Y58Y59	R	INDIAN CR	47F	DV	BULL	0	0	5	0				39	0	MEMO
590	09/25/90	1207	EA	38	23	Y58Y59	R	INDIAN CR	45F	DV	BULL	0	0	27	0				69	21	MEMO
592	10/01/91	1301	EA	38	23	Y58Y59	R	INDIAN CR	45F	DV	BULL	0	0	61	FALSE IN	CLUDED			108	INC	MEMO
1045	09/04/92	1300	JLC	38		Y58Y59	R	INDIAN CR	46F	DV	BULL	0	0	15	FALSE IN	CLUDED			123	INC	MEMO
1041	09/09/92		CWU	38		Y58Y59	R	INDIAN CR	42F	DV	BULL	LOTS	LOTS	0	NONE	NO COUNT	UNK	UNK			MEMO
1043	09/14/92	0830	EA	38		Y58Y59	R	INDIAN CR		DV	BULL			40	0				78	0	memo
1042	09/15/92		CWU	38		Y58Y59	R	INDIAN CR	46F	DV	BULL			37	0				125	13	MEMO
1044	09/25/92		CWU	38		Y58Y59	R	INDIAN CR		DV	BULL			30	0				135	6	memo
1104	09/09/93	0915	EA	38		Y58Y59	R	INDIAN CR		DV	BULL			0	0				142	2	memo
1105	09/21/93	0930	EA	38		Y58Y59	R	INDIAN CR	47F	DV	BULL	46	7	53	0				95	13	MEMO
1106	10/01/93	1000	EA	38		Y58Y59	R	INDIAN CR	46F	DV	BULL	1	2								MEMO
1019	10/18/91		WNE	45	23	*JAMES R		JAMES CR	39F	DV	BULL			0							MEMO
51	10/07/80	1200	LGB	39	21	A56A57	R	KACHESS R		DV	BULL	0	2	2	0				0	0	MEMO
25	09/25/87	1200	JS	39	21	A56A57	R	KACHESS R		DV	BULL	0	0	0	0				0	0	MEMO
1053	08/31/93	1200	LGB	39		AS6AS7	R	KACHESS R (Upper)	47F	DV	BULL	0	0	0	0				0	0	MEMO
1062	09/16/93	1500	LGB	39		AS6AS7	R	KACHESS R (Upper)	49F	DV	BULL	0	0	0	0				0	0	MEMO
1077	09/30/93	1430	LGB	39		AS6AS7	R	KACHESS R (Upper)	48F	DV	BULL	0	0	0	0				0	0	MEMO
1083	10/18/93	1400	LGB	39		AS6AS7	R	KACHESS R (Upper)	43F	DV	BULL	0	0	0	0				0	0	MEMO
53	09/12/84	1100	LGB	45	40	BD8BD9	R	LITTLE WENATCHEE R		DV	BULL	0	0	0	0				0	0	MEMO

Live Dead

Redds False

002668

2668

611	10/05/89	WDW	46	11	BH7BH8 R	MAD R		DV BULL		7		15		MEMO		
612	10/16/89	WDW	46	11	BH7BH8 R	MAD R	44F	DV BULL		1		15	0	MEMO		
628	10/16/90	WDW	46	11	BH7BH8 R	MAD R	32F	DV BULL	0	0	2	0	17	0	MEMO	
641	10/17/91	WNF	46	11	BH7BH8 R	MAD R	43F	DV BULL	0	0	1	0	21	0	MEMO	
1048	10/01/92	1500 WNF	46		BH7BH8 R	MAD R (partial 1 of 3)	47F	DV BULL	0	0	0	0	6	0	MEMO	
1049	10/02/92	1300 WNF	46		BH7BH8 R	MAD R (partial 2 of 3)	47F	DV BULL	0	0	0	0	2	0	MEMO	
1050	10/09/92	1400 WNF	46		BH7BH8 R	MAD R (partial 3 of 3)	41F	DV BULL	0	0	0	0	8	2	MEMO	
1094	09/09/93	1300 WNF	46		BH7BH8 R	MAD R (partial, level I)	52F	DV BULL			0	0	2	0	MEMO	
1095	09/14/93	1300 WNF	46		BH7BH8 R	MAD R (partial, level I)	47F	DV BULL			0	0	1	0	MEMO	
1096	09/22/93	1300 WNF	46		BH7BH8 R	MAD R (partial, level II)	39F	DV BULL			0	0	2	0	MEMO	
1097	10/19/93	1300 WNF	46		BH7BH8 R	MAD R (partial, level II)	41F	DV BULL			0	0	0	0	MEMO	
1098	10/20/93	1300 WNF	46		BH7BH8 R	MAD R (partial, level II)	39F	DV BULL			0	0	5	0	MEMO	
616	09/29/89	WDW	39	20	*MEADO R	MEADOW CR	52F	DV BULL			0				memo	
619	09/18/89	WDW	45	22	BD6BD7 R	MILL CR	45F	DV BULL	0	0	0	0	1	0	MEMO	
620	09/21/89	WDW	45	22	BD6BD7 R	MILL CR		DV BULL	0	0					memo	
621	10/12/89	WDW	45	22	BD6BD7 R	MILL CR		DV BULL	0	0					memo	
642	10/16/91	WNF	45	22	BD6BD7 R	MILL CR	43F	DV BULL	0	0	1	0	1	0	MEMO	
643	10/07/80	LGB	39	21	A58A59 R	MINERAL CR		DV BULL			3	0	0	0	MEMO	
26	08/15/84	1500 JS	39	21	A58A59 R	MINERAL CR		DV BULL	0	0	0	0	0	0	memo	
544	09/09/85	1133 JS	39	21	A58A59 R	MINERAL CR		DV BULL	0	0	0	0	0	0	memo	
1	08/27/86	0900 LGB	39	21	A58A59 R	MINERAL CR		DV BULL	0	0	0	0	0	0	MEMO	
638	10/16/91	NTS	39	21	A58A59 R	MINERAL CR	44F	DV BULL	0	0	0	0	0	0	MEMO	
1052	08/31/93	1045 LGB	39		AS8AS9 R	MINERAL CR	49F	DV BULL	0	0	0	0	0	0	MEMO	
1061	09/16/93	1400 LGB	39		AS8AS9 R	MINERAL CR	51F	DV BULL	0	0	0	0	0	0	memo	
1078	09/30/93	1330 LGB	39		AS8AS9 R	MINERAL CR	49F	DV BULL	0	0	0	0	0	0	MEMO	
1084	10/18/93	1405 LGB	39		AS8AS9 R	MINERAL CR	44F	DV BULL	0	0	0	0	0	0	MEMO	
55	09/18/84	1200 LGB	45	22	BC9CD1 R	NASON CR		DV BULL	0	0	0	0	4	0	MEMO	
42	09/27/83	1200 LGB	45	50	BF4BF5 R	PANTHER CR		DV BULL	12	2	14	1	POACHER	46	0	MEMO
50	08/18/84	1200 LGB	45	50	BF4BF5 R	PANTHER CR		DV BULL	0	0	0	0		0	0	MEMO
52	09/11/84	1500 LGB	45	50	BF4BF5 R	PANTHER CR	48F	DV BULL	7	3	10	0		8	7	MEMO
56	09/19/84	1100 LGB	45	50	BF4BF5 R	PANTHER CR	48.2F	DV BULL	8	6	14	0		20	11	MEMO
548	09/23/85	1102 JS	45	50	BF4BF5 R	PANTHER CR		DV BULL	0	0	8	1	POACHER	6	5	MEMO
2	09/09/86	1300 LGB	45	50	BF4BF5 R	PANTHER CR	51.8F	DV BULL	0	0	0	0		2	1	memo
3	09/16/86	1230 LGB	45	50	BF4BF5 R	PANTHER CR	48.2F	DV BULL	0	0	0	0		2	1	MEMO
18	08/31/87	1200 LGB	45	50	BF4BF5 R	PANTHER CR	58F	DV BULL	0	0	0	0		0	0	MEMO
21	09/18/87	1030 LGB	45	50	BF4BF5 R	PANTHER CR	47F	DV BULL	0	3	3	0		0	0	MEMO
23	10/05/87	1400 LGB	45	50	BF4BF5 R	PANTHER CR	48F	DV BULL	0	0	0	0		11	11	MEMO
549	09/12/88	1330 LGB	45	50	BF4BF5 R	PANTHER CR	50F	DV BULL	0	0	0	0		0	0	MEMO
552	09/20/88	1200 LGB	45	50	BF4BF5 R	PANTHER CR	46.5F	DV BULL	7	9	16	0		8	4	MEMO
555	09/27/88	1200 LGB	45	50	BF4BF5 R	PANTHER CR	46F	DV BULL	5	7	12	0		19	3	MEMO
556	10/03/88	1100 LGB	45	50	BF4BF5 R	PANTHER CR	49F	DV BULL	0	0	0	0		32	8	MEMO
557	09/13/89	1100 LGB	45	50	BF4BF5 R	PANTHER CR	50F	DV BULL	2	7	9	0		2	2	MEMO
562	09/21/89	1330 LGB	45	50	BF4BF5 R	PANTHER CR	48.5F	DV BULL	9	6	15	0		27	5	MEMO
563	10/03/89	1230 LGB	45	50	BF4BF5 R	PANTHER CR	45F	DV BULL	2	2	4	0		33	3	MEMO
566	09/20/90	1100 LGB	45	50	BF4BF5 R	PANTHER CR	50F	DV BULL	0	0	0	0		2	0	MEMO
570	09/28/90	1200 LGB	45	50	BF4BF5 R	PANTHER CR	50F	DV BULL	2	0	2	1	UNKNOWN	7	3	MEMO
572	10/04/90	1400 LGB	45	50	BF4BF5 R	PANTHER CR		DV BULL	HIGH	WATER	0	NO	SURVEY	POSS	0	MEMO
576	09/17/91	1100 LGB	45	50	BF4BF5 R	PANTHER CR	51F	DV BULL	7	9	16	0		12	3	MEMO
577	09/25/91	1100 LGB	45	50	BF4BF5 R	PANTHER CR	50F	DV BULL	2	3	5	0		31	3	MEMO
578	10/01/91	1030 LGB	45	50	BF4BF5 R	PANTHER CR	48F	DV BULL	4	1	5	?	ROTTEN SMELL	36	5	MEMO
580	10/15/91	0915 LGB	45	50	BF4BF5 R	PANTHER CR	45F	DV BULL	0	0	0	0		37	2	MEMO
1030	08/04/92	1200 BDB	45		BF4BF5 R	PANTHER CR		DV BULL	0	6	6	0		0	0	MEMO
1026	09/09/92	1000 LGB	45		BF4BF5 R	PANTHER CR	9C	DV BULL	0	1	1	0		2	0	MEMO
1027	09/18/92	1030 LGB	45		BF4BF5 R	PANTHER CR	7.5C	DV BULL	8	7	15	0		21	8	MEMO
1028	09/23/92	1100 LGB	45		BF4BF5 R	PANTHER CR	10.8C	DV BULL	1	6	7	0		24	10	MEMO
1029	10/02/92	0915 LGB	45		BF4BF5 R	PANTHER CR	9.5C	DV BULL	2	0	2	0		26	12	MEMO
1051	08/27/93	1000 LGB	45		BF4BF5 R	PANTHER CR	51F	DV BULL	0	15	15	0		0	0	MEMO
1055	09/03/93	1000 LGB	45		BF4BF5 R	PANTHER CR	52F	DV BULL	4	8	12	0		2	2	MEMO
1059	09/13/93	1200 LGB	45		BF4BF5 R	PANTHER CR	49F	DV BULL	4	14	18	0		10	3	MEMO
1064	09/22/93	1100 LGB	45		BF4BF5 R	PANTHER CR	44F	DV BULL	17	2	19	1	(SKIN) UNKNOWN	37	6	MEMO
1079	10/01/93	0900 LGB	45		BF4BF5 R	PANTHER CR	48F	DV BULL	3	2	5	0		45	8	MEMO
1080	10/15/93	0945 LGB	45		BF4BF5 R	PANTHER CR	47F	DV BULL	0	0	0	0		41	12	MEMO
603	09/19/89	1401 WDW	45	23	H27H28 R	PHELPS CR		DV BULL			1	0		0	0	MEMO
604	09/28/89	1402 WDW	45	23	H27H28 R	PHELPS CR	47F	DV BULL			12	0		18	0	MEMO
605	10/11/89	1403 WDW	45	23	H27H28 R	PHELPS CR	46F	DV BULL			0	0		23	0	memo
625	10/11/90	WDW	45	23	H27H28 R	PHELPS CR	36F	DV BULL	0	0	0	0		7	0	MEMO

8/15/84

Live Dead

Redds False

10/1/91

how to enter ask lang

002669

2669

10/07/80	LGB	A58A59 MINERAL CR LISTED AS AS8AS9 IN MUDEF	SHOCKER SURVEY WITH JUDITH PARSONS, CLE ELUM RD. FOUND 3 LARGE MALES (21, 28, 26 INCHES TL) FROM KACHESS RIVER TO APPARENT IMPASSE IN CATARACTS. ALSO SAMPLED 3 JUVENILE BULL TROUT 8-10 INCHES. NO SIGN OF ANY FEMALES OR REDDS. THIS IS THE FIRST RECORDS OF AFLUVIAL BULL TROUT HERE. NOTED THAT LOWER KACHESS CHANNEL GOES SUBTERRANEAN ANNUALLY NEAR TRAIL CROSSING, OFTEN STRANDING ADULT BULL TROUT IN THE FALL.
08/15/84	1500 JS	A58A59 MINERAL CR	
<del>09/09/85</del>	<del>1133 JS</del>	<del>A58A59 MINERAL CR</del>	
08/27/86	0900 LGB	A58A59 MINERAL CR	Surveyed Kachess R and Mineral Cr. No adult bull trout found. Flows very low. Goes dry within 300 yds of leaving forested area and flowing across alluvial plain. Fished Mineral Cr from barrier falls to alluvium area. Caught 3 CT 16,17,19 cm and 2 DV 19,15 cm. Observed fry from 1-2" from Mineral Cr to where goes intermittent (about 500 yds.)
10/16/91	NTS	A58A59 MINERAL CR	NATAPOC TIMBER SERVICES UNDER CONTRACT W/USFS. SURVEYED FROM MOUTH TO IMPASSE ABOUT 2000 FT. FLOW INTERRUPTS NEAR WILDERNESS BNDRY. 5 HOUR SURVEY. 44F @1245.
08/31/93	1045 LGB	AS8AS9 MINERAL CR	SET UP NEW SPAWNING INDEX AREA FROM MOUTH OF MINERAL CREEK TO IMPASSABLE VERTICAL 20ft FALLS ABOUT 1/2 MILE UPSTREAM.
09/16/93	1400 LGB	AS8AS9 MINERAL CR	
09/30/93	1330 LGB	AS8AS9 MINERAL CR	STILL NOTHING IN THIS CREEK OR IN UPPER KACHESS R.
10/18/93	1405 LGB	AS8AS9 MINERAL CR	SAW NO ADULT BLC OR REDDS THIS SEASON.
			THE ONLY CHANCE IS FOR EARLY FALL FAINS TO RE-WATER THE CHANNEL OF KACHESS RIVER, ALLOWING BULL TROUT (AND KOKANEE) ACCESS TO THE SYSTEM FOR SPAWNING.

Overall 135 5 0 3 (2 on redd, 1 off redd)

019 51	10/18/91 10/07/80 1200 LGB	WNF LGB	*JAMES JAMES CR A56A57 KACHESS R	Backpack shocker sampling with Judith Parsons (USFS). 2 DV found below Mineral Cr jct. and 3 DV in Mineral Cr itself. All were males, no females in the run this year. Kachess R dried up about 1/4 mi. below the jct with Mineral Cr. (Total lengths were 27, 25, 26, 28, and 21 inches). Lots of DV juveniles in Kachess R below and above Mineral Cr. from fry to 11 inches. Few DV and CT in Mineral Creek itself. Fair no. CT and DV juveniles in old east bank channel, which stays wetted through summer/fall due to influence of beaver dam/ponds.
25	09/25/87 1200 JS	JS	A56A57 KACHESS R A56A57	No redds and no fish found. Earlier shocker survey (8/15/84) produced a number of juvenile bull trout below the barrier falls, but no migratory adults. Stream channel went underground again this year, precluding adult entry.
053	08/31/93 1200 LGB	LGB	AS6A57 KACHESS R (Upper)	SET UP NEW SPAWNING INDEX AREA FROM MINERAL CREEK TRAIL CROSSING TO CONFLUENCE WITH MINERAL CREEK, THEN UP KACHESS RIVER TO IMPASSABLE VERTICAL 50 ft FALLS ABOUT 1/2 MILE UPSTREAM.
062	09/16/93 1500 LGB	LGB	AS6A57 KACHESS R (Upper)	STILL NOTHING IN THIS CREEK OR IN MINERAL CREEK. SAW NO ADULT BLC OR REDDS ENTIRE SEASON.
077	09/30/93 1430 LGB	LGB	AS6A57 KACHESS R (Upper)	
083	10/18/93 1400 LGB	LGB	AS6A57 KACHESS R (Upper)	
53	09/12/84 1100 LGB	LGB	BD8BD9 LITTLE WENATCHEE R	THE ONLY CHANCE IS FOR EARLY FALL RAINS TO RE-WATER THE CHANNEL AND LET FISH UP FROM KACHESS LAKE. Attempted to find dolly spawners below the falls for about one mile. No fish observed and no spawning activity.

08/24/93	0900	EA	38		Z16Z17 R	DEEP CR			44F	DV BULL	9	0	9 0		15	2
09/02/93	0900	EA	38		Z16Z17 R	DEEP CR			45F	DV BULL	13	0	13 3		37	9
09/10/93	0830	EA	38		Z16Z17 R	DEEP CR			46F	DV BULL	0	0	0 1	2FM,1STR	45	9
07/07/92	1200	LGB	39		AT3AT4 R	GOLD CR				DV BULL	MEMO	ONLY	0			
09/25/84	1200	JS	39	20	AT3AT4 R	GOLD CR (LOWER)		9.50		DV BULL	0	2	2 0		2	1
10/05/84	1200	JS	39	20	AT3AT4 R	GOLD CR (LOWER)				DV BULL	0	0	0 0		2	1
09/09/85	0833	JS	39	20	AT3AT4 R	GOLD CR (LOWER)				DV BULL	0	0	0 0		0	0
09/13/85	0951	JS	39	20	AT3AT4 R	GOLD CR (LOWER)				DV BULL			1		2	0
09/14/85		JS	39		AT3AT4 R	GOLD CR (LOWER)				DV BULL	0	0	0 0		0	0
09/20/85	0831	JS	39	20	AT3AT4 R	GOLD CR (LOWER)				DV BULL			0 0		2	0
09/30/85		JS	39		AT3AT4 R	GOLD CR (LOWER)				DV BULL	0	0	0 0		0	0
09/22/86	1500	LGB	39	20	AT3AT4 R	GOLD CR (LOWER)				DV BULL	3	9	12 1	SPEARED	21	3
08/27/87	1300	LGB	39	20	AT3AT4 R	GOLD CR (LOWER)				DV BULL	0	0	1 0		0	0
09/17/87	1000	LGB	39	20	AT3AT4 R	GOLD CR (LOWER)		53F		DV BULL	0	4	4 0		1	0
10/05/87	1030	LGB	39	20	AT3AT4 R	GOLD CR (LOWER)		52F		DV BULL	0	7	7 0		15	43
09/15/88	1200	LGB	39	20	AT3AT4 R	GOLD CR (LOWER)		56F		DV BULL	0	4	4 0		4	3
09/22/88	1100	LGB	39	20	AT3AT4 R	GOLD CR (LOWER)		52F		DV BULL	0	6	6 0		12	70
09/15/89	0900	LGB	39	20	AT3AT4 R	GOLD CR (LOWER)		52F		DV BULL	0	4	4 0		1	0
09/20/89	1000	LGB	39	20	AT3AT4 R	GOLD CR (LOWER)		52F		DV BULL	0	4	4 0		2	17
09/27/90	1330	LGB	39	20	AT3AT4 R	GOLD CR (LOWER)		58F		DV BULL	0	0	0 0		2	0
09/13/91	1400	LGB	39	20	AT3AT4 R	GOLD CR (LOWER)				DV BULL			0 MEMO ---	NO COUNT		
09/20/91	NBRD	FG	39	20	AT3AT4 R	GOLD CR (LOWER)				DV BULL			16 0		6	0
09/18/92	from	FRI	39		AT3AT4 R	GOLD CR (LOWER)				DV BULL			0		3	
09/30/92	1017	BDB	39		AT3AT4 R	GOLD CR (LOWER)		51F		DV BULL	0	0	0 0		0	5
10/20/92	1000	BDB	39		AT3AT4 R	GOLD CR (LOWER)		48F		DV BULL			0 SURVEY	CANCELLED	RAIN	YUK
09/23/93	1201	FRI	39		AT3AT4 R	GOLD CR (LOWER)		11.20		DV BULL			2		2	0
09/18/90	1000	LGB	39	20	AT3AT4 R	GOLD CR (UPPER)		52F		DV BULL	0	2	2 0		9	0
09/19/91	CERD	KS	39	20	AT3AT4 R	GOLD CR (UPPER)				DV BULL	0	0	2 2	ANGLERS	3	0
09/20/91	NBRD	FG	39	20	AT3AT4 R	GOLD CR (UPPER)				DV BULL			20		10	
09/18/92	from	FRI	39		AT3AT4 R	GOLD CR (UPPER)				DV BULL			0		11	3
10/09/92	1015	BDB	39		AT3AT4 R	GOLD CR (UPPER)		8.00		DV BULL	0	0	0 0		2	0
09/23/93	1200	FRI	39		AT3AT4 R	GOLD CR (UPPER)		9.60		DV BULL			2 LOST 15	OF 17	9	6
09/18/90		WDW	38	30	Y74Y75 R	HINDOO CR		48F		DV BULL	0	0	0 0		3	0
09/08/84	1200	JS	38	23	Y58Y59 R	INDIAN CR				DV BULL	6	140	146 1	CLUBBED	3	6
09/15/84	1200	JS	38	23	Y58Y59 R	INDIAN CR		110		DV BULL	20	25	45 0		29	22
09/12/85		JS	38		Y58Y59 R	INDIAN CR				DV BULL			90 FALSE IN	CLUDED	69	INC
09/17/85	0943	JS	38	23	Y58Y59 R	INDIAN CR				DV BULL			62 0		37	18
09/03/86		JS	38		Y58Y59 R	INDIAN CR				DV BULL			45 PARTIAL	SURVEY	16	8
09/12/87		JS	38		Y58Y59 R	INDIAN CR				DV BULL			20		35	
09/02/88	1101	EA	38	23	Y58Y59 R	INDIAN CR		43F		DV BULL			25 0		8	0
09/09/88	1103	EA	38	23	Y58Y59 R	INDIAN CR		45F		DV BULL			25 0		22	0
09/16/88	1105	EA	38	23	Y58Y59 R	INDIAN CR		48F		DV BULL	0	0	23 1	unknown	25	0
09/26/88	1107	EA	38	23	Y58Y59 R	INDIAN CR		43F		DV BULL	0	0	0 0		25	0
09/14/89	1201	EA	38	23	Y58Y59 R	INDIAN CR		?		DV BULL	0	0	36 0		30	0
09/28/89	1203	EA	38	23	Y58Y59 R	INDIAN CR		47F		DV BULL	0	0	5 0		39	0
09/25/90	1207	EA	38	23	Y58Y59 R	INDIAN CR		45F		DV BULL	0	0	27 0		69	21
10/01/91	1301	EA	38	23	Y58Y59 R	INDIAN CR		45F		DV BULL	0	0	61 FALSE IN	CLUDED	108	INC
09/04/92	1300	JLC	38		Y58Y59 R	INDIAN CR		46F		DV BULL	0	0	15 FALSE IN	CLUDED	123	INC
09/09/92		CWU	38		Y58Y59 R	INDIAN CR		42F		DV BULL	LOTS	LOTS	0 NONE	NO COUNT	UNK	UNK
09/14/92	0830	EA	38		Y58Y59 R	INDIAN CR				DV BULL			40 0		78	0
09/15/92		CWU	38		Y58Y59 R	INDIAN CR		46F		DV BULL			37 0		125	13
09/25/92		CWU	38		Y58Y59 R	INDIAN CR				DV BULL			30 0		135	6
09/09/93	0915	EA	38		Y58Y59 R	INDIAN CR				DV BULL			0 0		142	2
09/21/93	0930	EA	38		Y58Y59 R	INDIAN CR		47F		DV BULL	46	7	53 0		95	13
10/01/93	1000	EA	38		Y58Y59 R	INDIAN CR		46F		DV BULL			16 0		133	2
10/18/91		WNF	45	23	*JAMES R	JAMES CR		39F		DV BULL	1	2	3 0		140	0
10/07/80	1200	LGB	39	21	A56A57 R	KACHESS R				DV BULL	0	2	2 0		0	0
09/25/87	1200	JS	39	21	A56A57 R	KACHESS R				DV BULL	0	0	0 0		0	0
08/31/93	1200	LGB	39		AS6AS7 R	KACHESS R (Upper)		47F		DV BULL	0	0	0 0		0	0
09/16/93	1500	LGB	39		AS6AS7 R	KACHESS R (Upper)		49F		DV BULL	0	0	0 0		0	0
09/30/93	1430	LGB	39		AS6AS7 R	KACHESS R (Upper)		48F		DV BULL	0	0	0 0		0	0
10/18/93	1400	LGB	39		AS6AS7 R	KACHESS R (Upper)		43F		DV BULL	0	0	0 0		0	0
09/12/84	1100	LGB	45	40	BD8BD9 R	LITTLE WENATCHEE R				DV BULL	0	0	0 0		0	0

March 1, 1994

GOLD CREEK BULL TROUT SPAWNING SURVEYS

YEAR	LOWER CREEK (INCLUDING POND)		UPPER CREEK (ABOVE POND)	
	Total Redds Counted	Most Adult Bull Trout Observed	Total Redds Counted	Most Adult Bull Trout Observed
1984	2	(2)	no data	
1985	<b>2</b>	(2)	no data	
1986	21	(13)	no data	
1987	15	(7)	no data	
1988	12	(6)	no data	
1989	2	(4)	no data	
1990	2	(0)	9	(2)
1991	6	(16)	10	(20)
1992	3	(0)	11	(0)
1993	2	(2)	9	(17)

lgb

Larry Brown, Area Fish Biologist  
Washington Department of Fish and Wildlife

1500 LGB

Dolly Varden Survey H<sub>2</sub>O ✓

9-11-84

Panther creek - 3 PM Temp 48F

From Trail (2819) upstream

<u>False Redds</u>	<u>Unatt. Redds</u>	<u>Attend. Redds</u>	<u>♂</u>	<u>♀</u>	<u>UNK</u>
2	2	1	1	1	
2					
1		1	1	1	
1		1		1	
			1		
1		1	1	1	
	1				

2

Trail downstream to mouth

Total counts

(7)

(4)

(4)

(4)

(4)

(2)

of the 10 fish observed

2 were about 18-20"

2 were about 20-24"

4 were about 24-28"

2 were well over 30"-32" and likely went over 12 lbs.

15 redds or false redds as compared to 46 last year (9/27)

✓  
for spawning preference Curves  
Panther Creek - 18 cfs

Preferred velocity 0.94 ft/s (0.3-1.6)

Preferred Depth 11.2" (6"-19")

Preferred gravel 3" minus (sand to 6" mixed)

No. 310

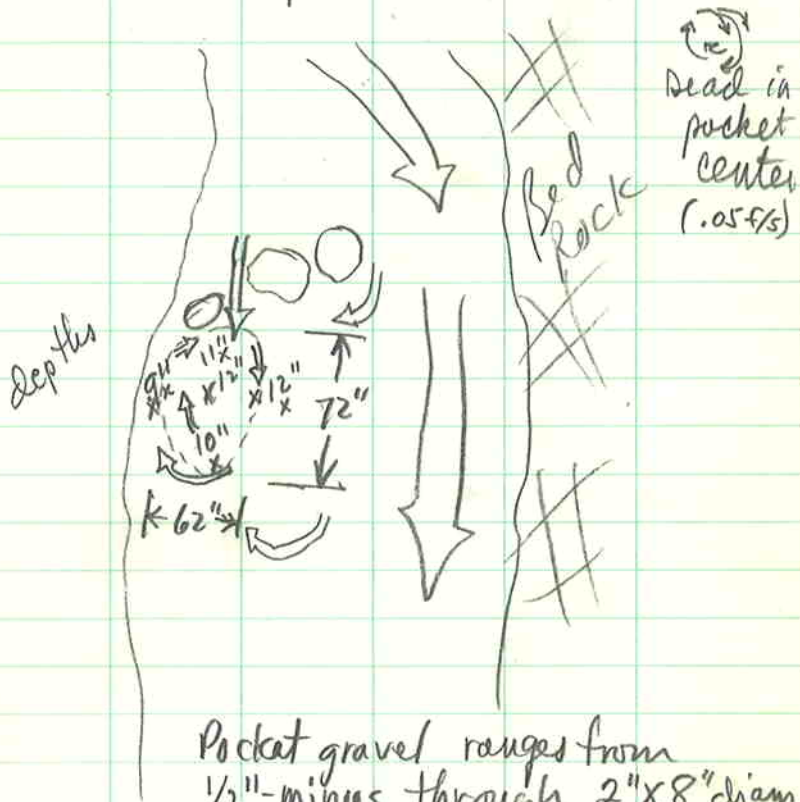
WATERBURY

1. DRAWING COPY  
JACOB WALKER



Redd measurements #1

Current almost negligible - 30 f/s eddy  
72" long 62" wide clockwise



Pocket gravel ranges from  
 $\frac{1}{2}$ "-minus through 2" x 8" diam  
flat rock

majority (over 50%) 1"-3"

no real tailings piled up  
as no current to carry them  
Maybe false redd (??)



Pocket 28" L

25" W

23" deep

Tailings 24" L

~~40~~ 40" W

18" deep

$a = 19''$

$B = 30''$

Pocket gravel 3/4" to 4"

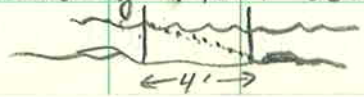
tailings gravel Sand to 3"

Surface Velocity over 6' drift avg of 10

6.246 sec

5 waterlogged sticks averaged 5.1 sec over

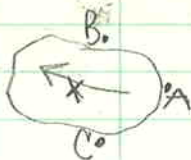
a descending 4 foot drift 0.78 ft/sec



0.9606 (.8)  
0.77 ft/sec

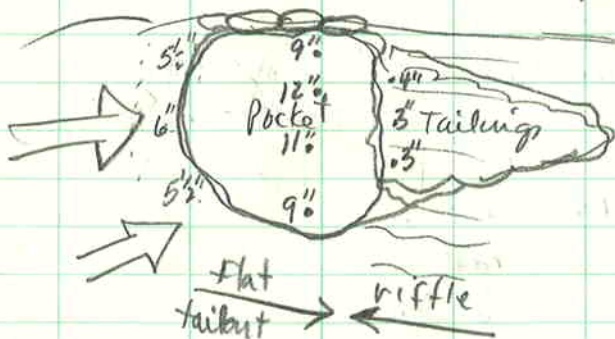
#3 Redd typical "Tailout" next  
to left bank - false redd at center ✓

false Redd - 49" wide  
incl. tailings → 75" long  
x = 11" deep



A = 10" B = 10" C = 7" deep!

	Redd	Tailings	
length	64"	72"	(11.3ft) <sup>1/2</sup>
width	72"	70" → 12" tapering	



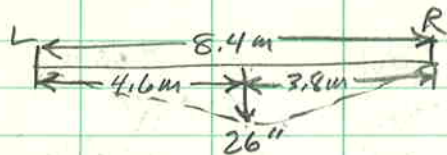
Pocket substrate sand to 4" flat  
tailings substrate mostly 1/2" - 1 1/2"  
but some to 3"

Velocity across redd for 6' -  $\bar{x}$  of 10 - 7.19 sec.

Velocity in front of redd for 6' -  $\bar{x}$  of 10 - 9.09 sec.

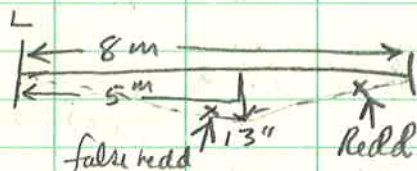
Redd	in front
0.8345 (.8)	0.6601 (.8)
= 0.67 ft/sec	0.53 ft/sec.

# Discharge Measurement in front of Redd #3



$$\begin{array}{r} 16.35 \\ 13.51 \\ \hline 29.86 \text{ ft}^2 \end{array}$$

6 ft apart.



$$\begin{array}{r} 8.89 \\ 5.33 \\ \hline 14.2 \text{ 2ft}^2 \end{array}$$

$$\begin{array}{r} 23.59 \text{ cfs} \\ 11.23 \text{ cfs} \\ \hline \end{array}$$

$x = 17.4 \text{ cfs}$

avg of 10 floats = 6.08 sec  
gravel/cobble - use 0.8 factor

$$0.9868(1.8) = 0.79 \text{ ft/sec}$$

Redd #4 in beginning stages so just measured velocity and "selected" depth - good spot so not likely false redd - female digging and male attending.

8' drift avg of 10 = 7.2 sec

$$\text{correct } \times 0.8 = 0.89 \text{ ft/sec}$$



Redd Roundish at 48" diam, tailings + 24"

No. 312  
L. DARLING CORP.  
ACQUA WATER USA

Read # 5 - unattended - ✓  
much faster current & deeper

depth 12" above 10" on tailings  
16" center of packet

Substrate 1-5" gravel / flat cobble

Tailings 3" minus

packet 1 1/2 - 5" with some 1/2 - 1 1/2  
mixed-in

Surface times over 10 feet  
avg of 5 floats = 5.1 sec,  
correct x .08

$$1.96(.8) = 1.57 \text{ ft/sec.}$$

✓

Redd Measurement summary

	Depth			Water Velocity <sup>ft/sec</sup>	
	at front edge	in pocket	on tailings	upstream edge	between redd
#1	11"	12	10	0.05	none
#2	19"	23"	18"	0.77	0.78
#3	6"	12"	4"	0.53	0.67
#4	9	12	7	—	0.89
#5	12	16	10	—	1.57
False	10	11	7	—	0.79
	$\bar{x} = 11.2"$	$\bar{x} = 14.3"$	$\bar{x} = 9.3"$		$\bar{x} = 0.94$

	Substrate		Redd Size	
	Pocket	Tailings	Pocket	Tailings
#1	1-4+	incl.	62" x 72" L	incl
#2	3/4-4	1/8-3	25" x 28" L	40" x 24" L
#3	1/8-3/4	1/2-1 1/2	72 x 64 L	42 x 72 L
#4	1/2-6	1/8-3	48 x 48 L	48 x 24 L
#5	1-5 flat	3" minus	48 x 72 L	incl
False	1-6	—	49 x 75 L	incl

	Pocket Only		Total Redd	
	width	length	width	length (incl. tailings)
1	62	—	62	72
2	25	28	40	52
3	72	64	72	136
4	48	48	48	72
5	48	—	48	72

No. 312

"Return the River"  
WEATHERPROOF

J. L. GARLING CORP.  
YACOMA, WASH. U.S.A.

Tuesday 9/18 ✓

w/ Jim Cummins

Hook & line samples Nason Cr.  
about 1.0 miles West Rest Area

1.5 hrs for 1 RB 14.8 cm 32g

Imm ♂

quite a few chk fry drowning fly

1/2 way up Whitepine Rd

1.0 hrs for ⌀

chk fry not as numerous here

mouth Whitepine upstream Total 5 hrs.

Released 14 RB 12.0 23.0 20.0

18.5 16.0 17.5 17.5 19.0 21.0 14.5

21.0 22.0 - Retained 10 as below:

CT 12.6 (cm) 20 (g) ? Imm.

RB 10.3 9 Imm.

13.2 24 M imm

17.9 64 M mat.

15.3 40 M mat.

17.0 48 F imm.

20.8 85 F mat.

19.7 87 M mat.

18.9 66 M mat.

24.9 135 F mat.

(8")

(10")

L. DANKS CORP  
INCORPORATED  
WEATHERING  
No. 312

observed 4 good redds and one ✓  
false redd above confluence with  
Whitepine Creek. for about  $\frac{3}{4}$  mile.

Assume Bull Trout, not observed.

Could have been spring chinook  
redds, but seemed too small.



Wednesday Sept. 19, 1984 ✓  
with Jim Spotts Dolly spawning  
survey - Panther Creek.

Water temp. 9C = 48.2F

observed 3 D.V. Redds at tail out  
of White River Pool above Island.

one redd attended by pair and  
one extra male (all  $\approx$  4-6 lbs.).

(Note: ♀ Chinook still on Redd since Aug. 22)

Panther Creek from mouth to falls

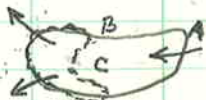
	<u>Att. Redds</u>	<u>Unatt. Redds</u>	<u>False Redds</u>	<u>Fish</u>
below Trail	1	3	2	2
above Trail	3	13	9	12
Total	4	16	11	14
Compared to 9/11	4	4	7	10

Made some random redd measurements  
except redds actively attended.  
Two are repeat measurements  
of last week because finished  
redd quite a bit larger and  
different shape (packet mostly  
filled-in with tailings).

Discharge down to about 12-14 cfs  
Compared to about 17 cfs on 9/11

#2 measured 9/11 ✓

Deep Pool



Pair on this redd now as  
last year - not there 9/11.

"typical" substrate composition, but  
deeper than usual.

$A = 2.0 \text{ ft}$   $B = 2.1 \text{ ft}$   $C = 2.5 \text{ ft}$

velocity light and varied - about 0.5 f/s  
but Price meter not working correctly.

Redd length = 7.2'

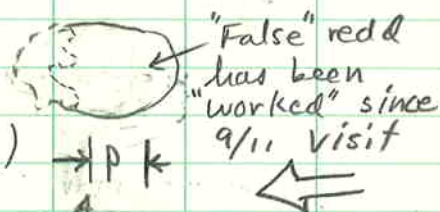
width = 3.9'

about 60% 1-3"

20% larger

Remeasured Redd No. 3 (9/11) as  
 now completed and abandoned.  
 Pocket filled-in with tailings.  
 (Got Price Meter working again)

(See 9/11 Photo)  
 Print

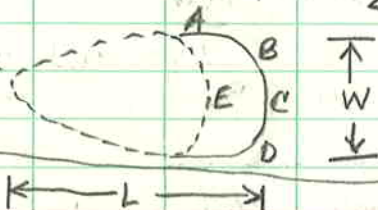


Substrate Code ( )

60% (1"-3")

30% smaller

All IFIM



9/11 visit

$\bar{v}$  = vel. at  $0.6d$  = mean velocity

SV = vel. at surface

bv = vel. at bottom

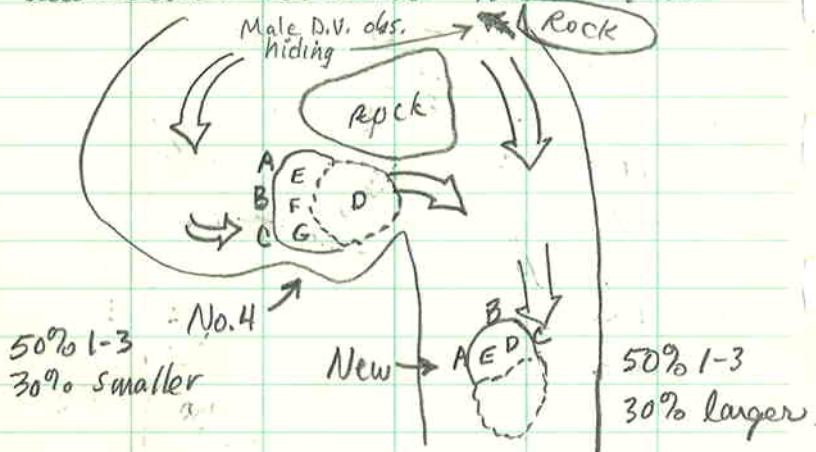
Point	depth	Mean velocity	Surface velocity
A	.35'	.731	-
B	.33'	.594	-
C	.35'	.527	.552
D	.30'	.594	-
E	.78'	-	-

length = 13.8'

width = 7.2'

Pocket = 2.95'

Remeasured Redd No. 4 (now finished ✓ and pocket filled-in) and one additional redd not there 9/11.



Redd	length	width
No. 4	8.2'	7.2'
New	7.5'	3.9'

No. 4	depth	Mean Velocity	New Redd	depth	Mean Velocity	SV	BV
A	.30'	.817		.53'	.988	-	-
B	.30'	.701		.91'	1.61	1.47	1.11
C	.34'	.547		1.22'	1.65	-	-
D	.30'	.552		1.05'	-	-	-
E	.80'	-		1.02'	-	-	-
F	.65'	-		-	-	-	-
G	.55'	-		-	-	-	-

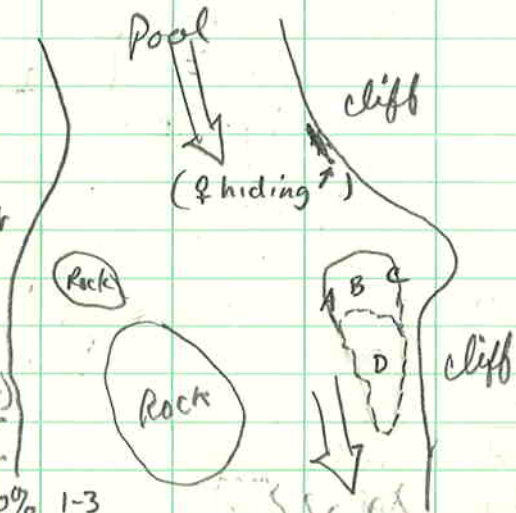
length = 8.2'  
width = 7.2'

length = 7.5'  
width = 3.9'

Measured Redd which was being ✓  
 constructed on 9/11 - tailout area  
 with high percentage flat cobble  
 (shist) from 4"-8"

NOTE:

♂♀ obs. at D  
 on 9/11 - Redd  
 much smaller  
 then. was  
 enlarged  
 "upstream".  
 (See photo print)  
 (taken 9/11)



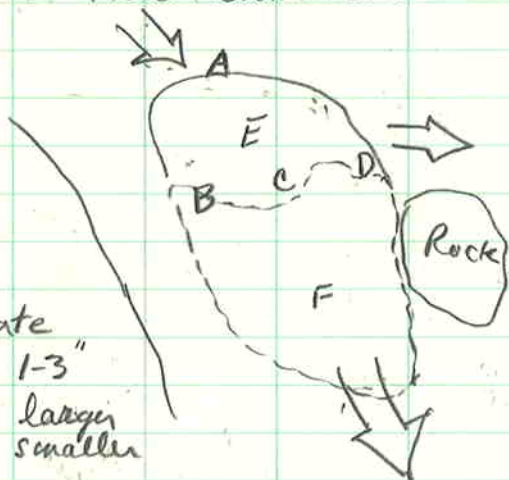
Substrate 40% 1-3  
 50% larger

Point	depth	Mean Velocity
A	.77'	.967
B	.82'	.780
C	.85'	.701
D	.80'	1.61

} little discernable  
 Pocket "depth"  
 so measured  
 across pocket

length = 11.8'  
 width = 5.25'

A "classic" redd - new since 9/11 ✓  
 and appeared complete - just  
 above trail entrance.



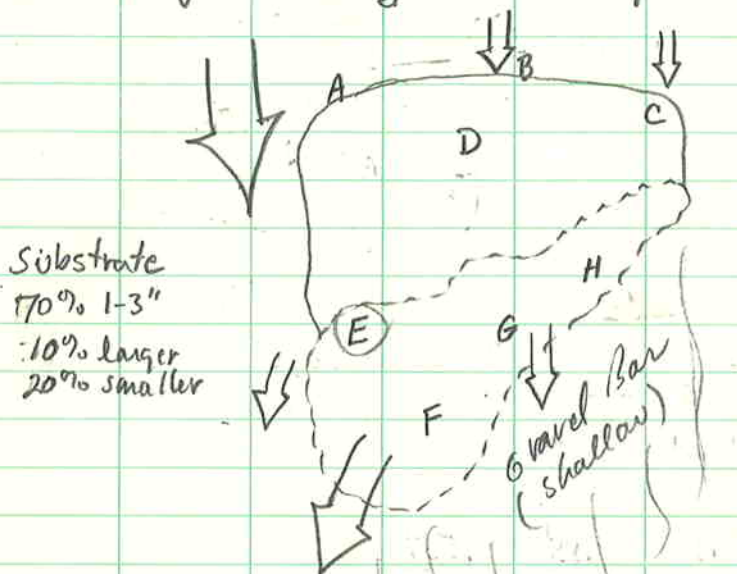
Substrate

60% 1-3"  
 30% larger  
 10% smaller

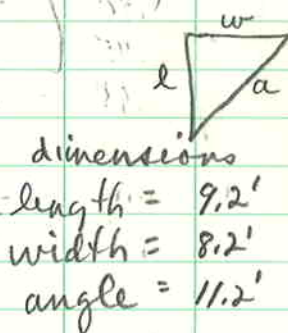
<u>Point</u>	<u>depth</u>	<u>Mean velocity</u>
A	.97'	1.91
B	.79'	1.08
C	.83'	1.65
D	.94'	1.47
E	1.05'	—
F	.75'	1.50

length = 9.2'  
 width = 5.6'

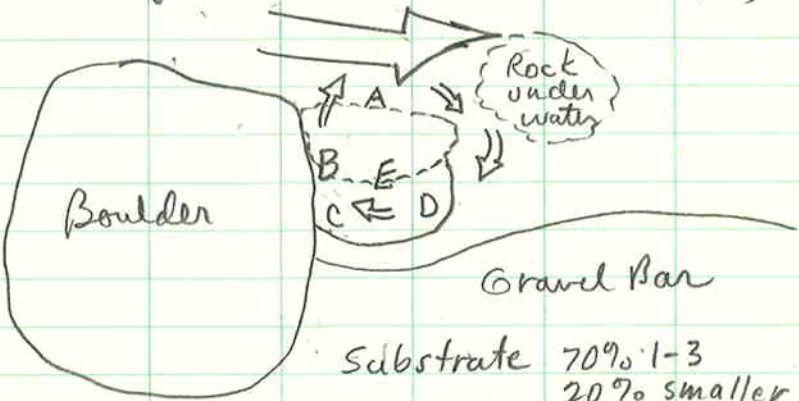
An odd-shaped redd build against angular gravel bar. Eggs were dislodged easily in tailings at (E)



Point	depth	mean Velocity
A	1.05'	.465
B	.55'	.716
C	.64'	.527
D	1.01'	—
(E)	.87'	.457
F	.25	—
G	.32	—
H	.40	—



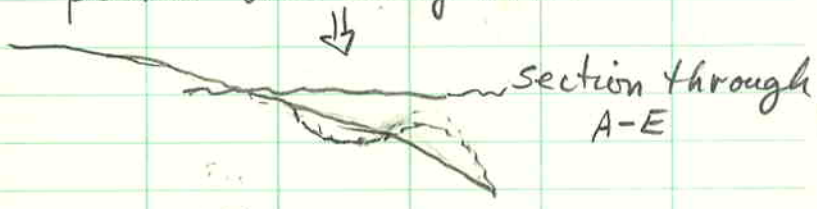
Very compact redd built against gravel bar in back-eddy behind large boulder. (new since 9/11)



Substrate 70% 1-3  
20% smaller

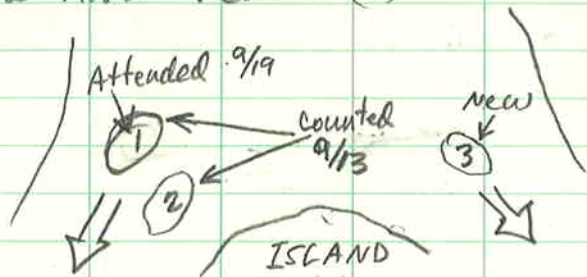
Point	depth	mean velocity
A	1.27'	-
B	.85'	.537
C	.90'	-
D	.95'	-
E	.98'	.417

Estimate pre-digging depth at pocket was only .4 to .5'

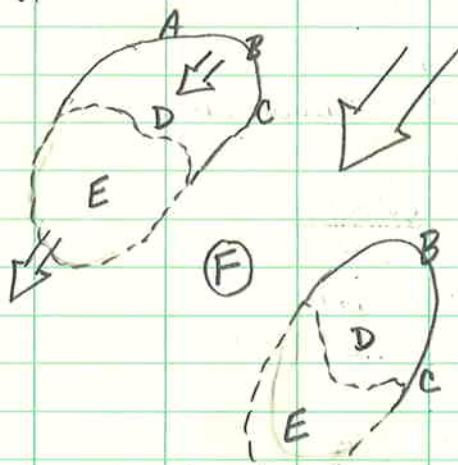




# White River Redds (3) ✓



## "Typical" Tail-out Redds



Substrate  
for both

1-3" 75%

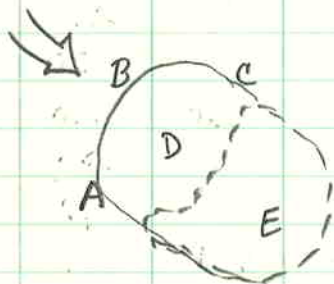
20% larger

temp 9.5

Redd Sizes

Point	No. 1		No. 2		No. 1 L=8.5' W=5.9'
	depth	mean Velocity	depth	mean Velocity	
A	1.48	1.29	—	—	No. 2 L=9.8' W=4.9'
B	1.50	1.45	1.50	1.01	
C	1.70	1.32	1.10	1.15	
D	1.70	—	1.54	—	
E	1.33	1.29	1.05	1.91	
ⓕ	1.15	1.29	1.15	1.29	

White River Readd No. 3 (new) ✓



Substrate 60% 1-3"

30% larger

Point	depth	Mean Velocity
A	1.2	1.06
B	1.1	.988
C	.71	.837
D	.90	—
E	.60	1.18

length = 8.9'  
width = 6.2'

HB Lead Test  
H Lead Test

✓

Redd depth summary (feet)

	center Pocket	front edge	shore edge	mid- stream edge	center of Tailings
--	------------------	---------------	---------------	------------------------	-----------------------

9/18	2.5	✓ 2.0	1.90	2.1	2.0
	.78	✓ .35	.30	.35	.25
	.65	✓ .34	.34	.30	.30
	1.05	✓ .91	.53	1.22	.85
	.82	✓ .82	.85	.77	.80
	1.05	✓ .97	.79	.94	.75
	1.01	✓ .75	.64	.87	.32
	.90	✓ .50	.50	1.27	.70
	1.70	✓ 1.50	1.48	1.70	1.33
	1.54	✓ 1.50	1.10	1.15	1.91
	.90	1.10	.71	1.20	.60

means 1.17(II) .976(II)

9/11	1.00	.83	.75	1.0	.92
	1.92	1.58	1.50	1.92	1.50
	.92	.50	.45	.45	.25
	1.00	.75	.67	.83	.58
	1.33	1.00	1.00	1.17	.83

? false .92 .83 .58 .83 .50

means 1.18(6) .915(6)

grand  
mean of  
edge depths

combined 1.17(11) .954(11)

Std. dev.

high 2.50 2.00

low 0.65 0.34

Redd velocity summary (at 0.6 d) - f/s ✓

	full length	front point	shoreside point	centerside point	Average
9/11	0.30				0.30
	0.78				0.78
full stream $\bar{v} = 0.79$	0.67	across 6 ft. 0.53			0.67
	0.89				0.89
	1.57				1.57

above are surface  $v$  corrected for substrate

tailout  $\langle S_v(1.8) = \bar{v} \rangle$

9/18		0.50			.50
		0.527	0.594	0.731	.617
	.552	0.701	0.547	0.817	.654
	1.161	0.780	0.701	0.967	*1.01
	1.50	1.91	1.08	1.47	1.49
	.457	.716	.527	.465	.541
		.417		.517	.467
	1.29	1.45	1.29	1.32	1.34
	1.91	1.01	1.15	1.29	1.34
	1.18	.988	.837	1.06	1.02
		1.61	.988	1.65	*1.42