

Bureau of Fisheries Stream Habitat Surveys

Yakima River Basin

Summary Report

1934 - 1942



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Bonneville Power Administration
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Portland, Oregon 97208

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**SUMMARY REPORT FOR BUREAU OF FISHERIES STREAM
HABITAT SURVEYS**

**YAKIMA RIVER BASIN
1934-1942**

Prepared by;

Bruce A. McIntosh
Sharon E. Clark
James R. Sedell

Pacific Northwest Research Station
USDA-Forest Service
Oregon State University
Corvallis, OR 97331

Prepared for;

US Department of Energy
Bonneville Power Administration
Environment, Fish and Wildlife
P. O. Box 3621
Portland, OR 97208-3621

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INTRODUCTION

This document contains summary reports of stream habitat surveys, conducted in the Yakima River basin, by the Bureau of Fisheries (BOF, now National Marine Fisheries Service) from 1934-1942. These surveys were part of a larger project to survey streams in the Columbia River basin that provided, or had provided, spawning and rearing habitat for salmon and steelhead (Rich, 1948). The purpose of the survey was, as described by Rich, "to determine the present condition of the various tributaries with respect to their availability and usefulness for the migration, breeding, and rearing of migratory fishes".

Current estimates of the loss of anadromous fish habitat in the Columbia River Basin are based on a series of reports published from 1949-1952 by the U.S. Fish and Wildlife Service. The reports were brief, qualitative accounts of over 5000 miles of stream surveys conducted by the BOF from 1934-1946 (Bryant, 1949; Bryant and Parkhurst, 1950; Parkhurst, 1950a-c; Parkhurst et al., 1950). Despite their brevity, these BOF reports have formed the basis for estimating fish habitat losses and conditions in the Columbia River Basin (Fulton, 1968, 1970; Thompson, 1976; NPPC, 1986).

Recently, the field notebooks from the BOF surveys were discovered. The data is now archived and stored in the Forest Science DataBank at Oregon State University (Stafford et al., 1984; 1988). These records are the earliest and most comprehensive documentation available of the condition and extent of anadromous fish habitat before hydropower development in the Columbia River Basin. They provide the baseline data for quantifying changes and setting a benchmark for future restoration of anadromous fish habitat throughout the Basin. The summaries in this book are exact replicates of the originals. Due to discrepancies between the field data and the summaries, the database should be used to assess pool and substrate conditions. This data is available from the Bonneville Power Administration.

The Bureau of Fisheries survey is unique because it is the only long-term data set that quantifies fish habitat in a manner that is replicable over time; no other similar work is known to exist. Other surveys, such as Thompson and Haas (1960), inventoried extensive areas in a manner that was mostly qualitative, subjectively estimating physical characteristics like bank cover and stream shading. Spawning, rearing, and resting habitat were not systematically quantified to allow comparisons over time.

Knowledge of the past and present quantity and quality of anadromous fish habitat in the Columbia River Basin is essential to any effort to enhance fish populations. Habitat condition is a key element in monitoring and evaluating progress towards the doubling goal. Integration of this information into the Columbia River Fish and Wildlife Plan can provide the baseline information to greatly enhance understanding of past, present, and future habitat conditions in the basin to provide for improved management decisions.

METHODS

This description of the survey is taken from Rich (1948). In cases where his meaning was unclear, we have clarified his descriptions where possible.

Most of the field work for the survey was accomplished by teams of two men. Each stream was examined on foot if warranted by its existing or potential value in a program of fishery maintenance. At times, horses and boats were used to conduct the surveys. It was customary to start at the mouth and work up to a point at which the stream ceased to be important. The survey was commonly terminated if the stream became too small to be of value, at total barriers, such as waterfalls, or wherever other conditions were such that the stream was of no present value and there was no reasonable hope of improvement. Beyond such points a more cursory inspection was frequently made although not always.

As the stream was traversed on foot, field observations were recorded on forms provided for the purpose--the "Observation Blank". Records were made at approximately 100-yard intervals. Distances were estimated by counting steps when conditions were favorable for pacing and, otherwise, by estimating short distances by eye. When possible, the sums of such estimated distances have been checked against maps, particularly when surveys were made by boat, and any substantial discrepancy has been noted on the survey record. At the upper end of each 100-yard section a record was made on the Observation Blank of such things as stream size, pools, character of the bottom, fish observed, etc. The location of barriers to upstream migration of fish, such as log jams, falls or dams was also recorded and an estimate made of the degree of obstruction.

Stations were designated, usually at intervals of several miles, at important landmarks or where stream conditions exhibited a marked change. At these stations special data were obtained and recorded on a "Station Blank" that included measurements of width, depth, flow and temperature. Record was also made of general conditions observed between stations that were not recorded on the observation blank. These included such items as the nature of the marginal vegetation (riparian), evidences of erosion and of fluctuations in water level, gradient, character of the valley, type and amount of cultivation and of forest utilization, source and extent of pollution, number and species of fish observed and other pertinent data.

Width was measured by a tape. Average depth was determined from a series of 10 or more actual measurements by a rule (for small streams) or a sounding line. Temperatures were determined by calibrated thermometers shaded from the direct rays of the sun and, immersed at least one inch. Flow, in cubic feet per second, was estimated by the usual method: average width times average depth

times average speed of water in feet per second times a constant correction for drag. The speed was determined by floats traversing a measured distance. The product of the first three factors was corrected for drag by multiplying by 0.8 if the bottom was rough and irregular, and by 0.9 if the bottom was fairly smooth. When available, stream flow records were taken from the Water Supply Papers of the U.S. Geological Survey.

A special blank for obstructions was provided on which to record data relative to obstructions, both natural and artificial. When dams were encountered, measurements were taken or obtained from the operators of the height, length of crest, spill, etc. In the case of power dams the type and speed of the power units was recorded, because these are important factors in the safe passage of downstream migrants. Especial attention was paid to the condition and adequacy of fish ladders and other fish protective devices installed at dams.

On a Diversions blank, data were recorded that included the type of each diversion, its location, description of the headworks, amount of water diverted, character of screens and other fish protective devices if present, etc.

For each stream surveyed, the following data was collected:

1. General

- a. name of river system
- b. name of stream
- c. date of survey and names of surveyors
- d. stream source
- e. general direction of flow
- f. total length
- g. length surveyed

2. Station Data

- a. station designation
- b. landmarks
- c. map locations
- d. distance above previous station
- e. distance above mouth of stream
- f. width
- g. average depth

3. Character of Watershed

- a. the general character of the watershed (mountainous, flat, etc.)
- b. character of the banks (slope, composition, etc)
- c. nature and composition of marginal vegetation
- d. extent of erosion (if any) of banks or watershed

4. Gradient

- a. station elevations
- b. distance between stations
- c. difference in elevation
- d. average slope in feet per mile
- e. source of data (when available, topographic or plan and profile maps were used to determine the gradients. In other cases the observers estimated the gradient.)

5. Stream Flow and Fluctuations

- a. location
- b. date
- c. observed flow
- d. fluctuation in water level as given by Water Supply Papers, the records of operators of dams, reports of local residents or as indicated by debris, erosion, marginal vegetation, etc.
- e. time and variation in seasonal runoff
- f. causes of variation
- g. effects of fluctuations on migratory fish (if published papers are used the reference is given).

6. Temperature

- a. station
- b. location
- c. date and hour
- d. air temperature
- e. water temperature
- f. weather conditions
- g. any observed influence of temperature on fish

7. Pools and Riffles

- a. pools were classified six different ways based on area and depth, the classes were:
 - S1: > 50-yd² and > 6 feet deep
 - S2: 25- to 50-yd² and 3-6 feet deep
 - S3: < 25-yd² and < 3 feet deep
 - S4: 25- to 50-yd² and > 6 feet deep
 - S5: 25- to 50-yd² and < 3 feet deep
 - S6: small pools in cascades (pocket pools)
- b. riffles were classified as "Good", "Fair", and "Poor" on the basis of the observer's judgement as to the relative value for natural spawning purposes. Characteristics on which this classification was based were size, gradient, size of substrate, etc. To date,

we have found this data to be of no use, as it is not replicable and highly qualitative.

8. Character of Bottom

In tables, station totals are given for:

- a. distance between stations
- b. total area of bottom
- c. area and percentage of bottom for substrate classes
- d. substrate classes were:

Large Rubble (LR) = > 6 inches
Medium Rubble (MR) = 3 to 6 inches
Small Rubble (SR) = 1/4 to 3 inches
Mud and Sand (MS) = < 1/4 inches

9. Suitable Spawning Area Available

This is defined as that part of the medium and small rubble that possesses the water conditions and other characteristics that are necessary if the area is to be used for spawning purposes. The station totals are given for:

- a. distance between stations
- b. total area of bottom
- c. area and percentage of suitable spawning substrate available
- d. estimate of the total of suitable spawning area available at low water
- e. estimate of total available at high water only

10. Suitable spawning area not available

Station totals were given for:

- a. distance between stations
- b. total area of bottom
- c. area and percentage of suitable spawning substrate not available
- d. stages of water when the area is inaccessible
- e. reason for unavailability

11. Obstructions

The data recorded on the "obstructions" field form were recorded.

12. Diversions

The data recorded on the "diversions" field form were recorded.

13. Pollution

- a. portion of the stream polluted
- b. type of pollution
- c. source of pollution
- d. effect on fish
- e. recommendations

14. Salmon and Steelhead

The station totals were given for:

- a. distance between stations
- b. date of each observation
- c. visibility at time of observation
- d. number of fish counted alive and dead
- e. number of redds counted that were occupied and unoccupied
- f. estimate of total number of fish present
- g. data on runs secured from local residents
- h. summary estimate of present populations and stream capacity for each species of fish (stream capacities are based on the observation that approximately 20 square yards of suitable spawning substrate is required for the average chinook salmon redd, allowing for the necessary spacing between redds).
- i. time of appearance for runs and approximate spawning periods
- j. information on juvenile fish

15. Fish Other Than Salmon and Steelhead

- a. species
- b. estimates of abundance
- c. observations based on the ecological relations of these fish to the salmon and steelhead
- d. extent of sport fishing

16. Tributaries

All direct tributaries are listed in upstream order by name. The location and size of each is given and any available information on its value as a fish stream.

17. General Remarks

Summaries and miscellaneous field observations not appearing in the other sections are given and the opinions of the surveyors as to the potential development of the fishery resources in the stream in question.

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Rock Creek

River System: Columbia River

Name of Stream: Rock Creek, tributary to Columbia River

Date of Survey: April 21, 1937

Length: Over 20 miles, but mostly intermittent

Location: Klickitat County

Description:

This creek has a large temporary flow and is mostly dry except during the spring run-off. Permanent holes in the upper portion harbor a few trout, but it apparently has no value to salmon. The entire course of the creek lies in a deep V-shaped canyon. The canyon sides are covered with sagebrush and sheep are grazed extensively. Excellent cover is found in a large percentage of the length of the stream. Cottonwoods, alders and scrub oak predominate in the very narrow river valley. The gradient is fairly steep, but good gravel areas are present, and there are no obstructions. When observed, the flow was estimated at 20 cfs.

It's principle tributary, Squaw Creek, is intermittent.

No fish run in this stream. A few trout in permanent pools.

Chapman Creek

River System: Columbia River

Name of Stream: Chapman Creek, tributary to Columbia River

Date of Survey: April 21, 1937

Location: Klickitat County

Description:

This creek has a small flow during spring run-off, but is dry at all other seasons. Entire course lies in a deep V-shaped canyon. When seen, a volume of about 2 cfs was estimated. Steep gradient.

Worthless to fish.

Old Lady Creek

River System: Columbia River

Name of Stream: Old Lady Creek, tributary to Columbia River

Date of Survey: April 21, 1937

Location: Klickitat County

Description:

This creek has a small flow during spring run-off--dry at all other seasons. Entire course lies in a deep V-shaped canyon. When seen, volume was estimated at about 2 cfs. Steep gradient.

Worthless to fish.

Bighorn Creek

River System: Columbia River

Name of Stream: Bighorn Creek, tributary to Wood Creek

Date of Survey: April 21, 1937

Location: Klickitat County

Description:

A small amount of water flows during spring run-off--dry at all other seasons. Its entire course lies in a deep V-shaped canyon with a steep gradient. Volume estimated at about 5 cfs.

Worthless to fish.

Note: According to maps, Bighorn Creek, or Bighorn Canyon Creek is considered a tributary to Wood Creek which empties into the Columbia River just above Roosevelt, Washington, and lies between Rock Creek and Pine Creek. The survey probably considered Wood Creek to be Bighorn Creek. It makes little difference, as both are shown as intermittent on maps.

Pine Creek

River System: Columbia River

Name of Stream: Pine Creek, tributary to Columbia River

Date of Survey: April 21, 1937

Location: Klickitat County

Description:

This creek has a length of about 22 miles. There is a large temporary flow of water during the spring run-off but later the stream is dry except for holes in the upper portion. The entire course lies in a deep V-shaped canyon. The sides are covered with sagebrush and are oftentimes rocky. The entire locality is utilized for rangeland for sheep. When seen, the volume was estimated at about 15 cfs. The gradient is uniformly steep. Excellent cover is found in some sections where alders, cottonwoods and scrub oak predominate.

No fish runs. A few trout in pools.

Alder Creek

River System: Columbia River
Name of Stream: Alder Creek, tributary to Columbia River

Date of Survey: April 21, 1937

Location: Klickitat County

Description:

Although this stream has a large temporary flow of water it becomes virtually dry during the summer except for large permanent pools in the upper portion. Its course lies completely in deep V-shaped canyons with walls of bare rock and sagebrush. When seen, the volume was estimated at about 15 cfs. In the narrow river valley, patches of good cover are afforded by thickets of cottonwoods, alders, and scrub oaks. Good patches of gravel occur and no outstanding obstructions were observed. Alder Creek flows into the left bank of the Columbia River near Alderdale. It flows for a distance of about 30 miles and is fed during periods when there is water by small tributaries in the numerous draws and canyons. The gradient is uniformly steep.

Worthless to migrating salmonids. A few trout in upper reaches.

Yakima River

River System: **Yakima River**
 Stream Surveyed: **Yakima River**

Date of Survey:

Station 1-16: December 4-13, 1936
 Station 17-20: October 11-12, 1938
 Station 21-24: August 11-12, 1936
 Station 25-31: July 21-26, 1936

Source: **Lake Keechelus in vicinity of Snoqualmie Pass**
(S12,T21N,R11E)

Direction of Flow: **Flows southeast to confluence with Columbia River near Kennewick. In Kittitas, Yakima and Benton Counties.**

Total Length: **196 miles total length, 187 miles surveyed.**

Station Location:

Sta	Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
1	Richland-Kennewick bridge	0	0.0	0	0.9	NW4,S24 T9N,R28E	236'	6'4"
2	Richland-Benton City bridge		6.6		7.5	NE4,S5 T9N,R28E	297'	26"
3	Third bridge above mouth		5.3		12.8	NE4,S25 T10N,R27E	313'	12"
4	Richland diversion dam		5.5		18.3	SE4,S3 T10N,R27E	600'	5"
5	Kiona-Benton City bridge		11.0		29.3	NE4,S19 T9N,R27E	243'	23"
6	Prosser Hwy bridge		15.7		45.0	NE4,S2 T8N,R24E	480'	22"
7	Grandview-Mabton bridge		6.0		51.0	SE4,S34 T9N,R23E	300'	32"
8	Sunnyside-Mabton bridge		4.0		55.1	NW4,S31 T9N,R23E	360'	37"
9	Granger-Alfalpa bridge		15.3		70.4	SW4,S21 T10N,R21E	258'	35"
10	Zillah-Toppenish bridge		6.6		77.0	NE4,S35 T11N,R20E	150'	23"
11	Buena-Toppenish bridge		2.3		79.3	SE4,S28 T11N,R20E	390'	19"
12	Donald-Wapato bridge		6.2		85.5	SE4,S2 T11N,R19E	54'	29"

Station Location (cont):

Sta	Location	Distance Above Prev Station		Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
13	Sunnyside diversion dam		3.5	89.0		SE4,S28 T12N,R19E	600'	6"
14	Union Gap Highway bridge		3.2	92.2		NW4,S17 T12N,R19E	190'	6'0"
15	Yakima-Moxee bridge		4.3	96.5		SW4,S28 T13N,R19E	112'	17"
16	Yakima Avenue bridge		1.7	98.2		NE4,S20 T13N,R19E	184'	6'8"
17	North Yakima Highway bridge		2.5	100.7		NW4,S12 T13N,R18E	141'	2'3"
18	Cattle bridge		6.8	107.5			180'	2'6"
19	Suspension bridge		8.5	116.0			140'	1'2"
20	Suspension cable foot bridge		8.9	124.9			170'	2'6"
21	Confl Wilson Creek		6.3	131.2		NE4,S31 T17N,R19E	250'	--
22	Lower Ellensburg bridge		5.2	136.4		NE4,S10 T17N,R18E	185'	23"
23	Upper Ellensburg bridge		2.5	138.9		SW4,S33 T18N,R18E	180'	--
24	Cle Elum-Thorpe bridge (Dudley bridge)		9.2	148.1		NW4,S34 T19N,R17E	140'	3'6"
25	Confl of Swauk Creek		4.9	153.0		NW4,S20 T19N,R17E	175'	3'6"
26	Confl of Teanaway River		6.0	159.0		SW4,S3 T19N,R16E	190'	--
27	South Cle Elum bridge		7.0	166.0		SE4,S27 T20N,R15E	198,	23"
28	Confl Cle Elum River		3.2	169.2		SE4,S32 T20N,R15E	180'	3'0"
29	Cle Elum-Easton Highway bridge		5.1	174.3		NW4,S36 T20N,R14E	158'	15"
30	Easton Highway bridge		8.2	182.5		SE4,S11 T20N,R13E	120'	20"
31	At Easton dam		3.2	185.7		NW4,S10 T20N,R13E	90'	6'0"
32	Source at Lake Keechelus dam		10.0	195.7		NE4,S12 T21N,R11E		

EPA River Reach Codes:

Station	HUC	SEG	Rmi
1	17030003	0001	1.00
2	17030003	0001	5.62
3	17030003	0001	11.74
4	17030003	0001	17.25
5	17030003	0003	6.61
6	17030003	0005	5.36
7	17030003	0005	11.69
8	17030003	0005	14.30
9	17030003	0007	2.07
10	17030003	1934	0.00
11	17030003	0007	12.46
12	17030003	0007	19.60
13	17030003	0007	22.83
14	17030003	0008	0.00
15	17030003	0008	3.06
16			
17	17030001	0001	1.00
18*	17030001	0004	0.21
19*	17030001	0004	7.21
20*	17030001	0009	0.00
21	17030001	0018	0.00
22	17030001	0018	6.53
23	17030001	0019	1.02
24	17030001	0019	9.61
25	17030001	0020	1.89
26	17030001	0024	5.22
27	17030001	0032	5.26
28	17030001	0047	0.00
29	17030001	0047	4.18
30	17030001	0049	4.87
31*	17030001	0059	0.00
32	17030001	0060	8.28

• Station location is not definite and has been estimated

Character of Bottom Between Stations:

Sta	Area		L.R.		M.R.		S.R.		M&S	
	(yd ²)			%		%		%		%
Mt-1	212100	46430	21.89		72320	34.10	64300	30.31	29050	13.70
1-2	1109800	57815	5.21		356425	32.12	416975	37.57	278585	25.10
2-3	1123100	26960	2.40		261065	32.15	542240	48.28	192835	17.17
3-4	1111100	225425	22.99		312750	28.15	313630	28.23	229295	20.64
4-5	2099900	185320	8.83		827380	39.40	706735	33.66	380465	18.12
5-6	2152200	1037980	48.23		589755	27.40	269710	12.53	254755	11.84
6-7	1235520	61776	5.00		61776	5.00	-----	----	1111968	90.00
7-8	980000	38968	3.98		80897	8.25	101745	10.38	758390	77.39
8-9	1660700	7360	0.44		131865	7.94	369385	22.24	1152090	69.37

Character of Bottom Between Stations (cont):

Sta	Area (yd ²)	L.R.	%	M.R.	%	S.R.	%	M&S	%
9-10	556700	24010	4.31	190485	34.22	204345	36.71	378602	4.76
10-11	148700	13540	9.11	56140	37.75	67600	45.46	11420	7.68
11-12	514900	70885	13.77	212780	41.32	194350	37.75	36885	7.16
12-13	348700	77850	22.33	133230	38.21	123300	35.36	14320	4.11
13-14	432900	70275	16.23	179020	41.35	83695	19.33	99910	23.08
14-15	427400	98510	23.05	144610	33.83	1365800	31.96	47700	11.16
15-16	176700	55595	31.46	64555	36.53	45925	25.99	10625	6.01
16-17	249400	73690	29.55	111925	44.88	44685	17.92	19100	7.66
17-18	540800	109670	20.28	139240	25.75	105370	19.48	186520	34.49
18-19	850200	297200	34.96	221840	26.09	121720	14.32	209440	24.63
19-20	888900	885500	25.00	289640	32.60	178490	20.10	198270	22.30
20-21	497500	160800	32.30	122000	24.50	98600	19.80	116100	23.40
21-22	369550	82805	22.41	137885	37.32	129095	34.93	19765	5.34
22-23	240132	73206	30.49	87526	36.45	77275	32.18	2125	0.88
23-24	826034	321800	38.96	297076	35.96	203488	24.63	3670	0.44
24-25	453595	192131	42.36	160171	35.31	101293	22.33		
25-26	681000	168150	24.69	208450	30.61	184302	27.06	120098	17.64
26-27	745500	200080	26.80	271460	36.40	206200	26.80	67760	10.00
27-28	258650	105060	40.60	87010	33.60	60135	23.30	6445	2.50
28-29	407820	75731	18.60	130019	31.90	163413	40.00	38657	9.50
29-30	479500	58590	12.20	177990	37.20	213080	44.40	29840	6.20
<u>30-31</u>	<u>8 0 0</u>	<u>11970</u>	<u>6.08</u>	<u>85210</u>	<u>8.9</u>	<u>77920</u>	<u>39.59</u>	<u>71700</u>	<u>36.43</u>
Tot	21975801	4285082		6252495		5605581		5833643	

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd ²)	Available Spawning		Usable Spawning	
			Area (yd ²) (MR&SR)	% Avail	Area (yd ²)	% Usable
Mouth-1			136,620	64.41		
1-2			773,400	69.69		
2-3			903,305	80.43		
3-4			626,380	56.37		

Total 2,439,705 68.60

Stream available at low water:	18.18 miles	9.77%
Stream unavailable at low water:	167.95 miles	90.23%
Stream available at high water:	186.13 miles	100.00%

Spawning Area Unavailable and Unusable:

Station	Distance (lin yds)	Area (yd ²)	Area Unavail (yd ²)	% Unavail	When Avail	Usable Unavail (yd ²)	% Usable Unavail
4-5			1,534,115	73.06			
5-6			859,465	39.93			
6-7			61,776	5.00			
7-8			182,642	18.64			
8-9			501,250	30.18			
9-10			394,830	70.93			
10-11			123,740	83.21			
11-12			407,130	79.07			
12-13			256,530	73.57			
13-14			262,715	60.69			
14-15			281,190	65.79			
15-16			110,480	62.52			
16-17			156,610	62.79			
17-18			244,610	45.23			
18-19			343,560	40.41			
19-20			468,130	52.70			
20-21			220,600	44.30			
21-22			266,980	72.24			
22-23			164,801	68.63			
23-24			500,564	60.60			
24-25			261,464	57.64			
25-26			392,752	57.67			
26-27			477,660	64.10			
27-28			147,145	56.90			
28-29			293,432	72.00			
29-30			391,070	81.60			
<u>30-31</u>			<u>113,130</u>	<u>57.48</u>			
Total	295,594 (167.95 miles)		9,418,371	51.12			

Character of Watershed:

Mountainous	Between Stations 28-32
Hilly	Between Stations 17-28
Rolling	Between Stations 1-9
Flat	Between Stations 9-17
Swampy	Between Stations 1-5 and 6-9 (river margins only)
Wooded	Between Stations 28-32

Diversions (cont):

No	Miles Above Mouth	Location of Headsates	
20	111.0	Roza ditch	SW,S33,T15N,R19E
21	133.2	Steen & McLeod ditch	NE,S25,T17N,R18E
22	135.8	Tjossem power canal	SW4,S11,T17N,R18E
23	137.0	Grinrod-Doughty ditch	SW4,S3,T17N,R18E
24	139.8	Becker Slough	NE4,S4,T17N,R18E
25	140.0	Reed ditch	SE4,S29,T18N,R18E
26	143.0	Ellensburg power canal	SE4,S13,T18N,R17E
27	144.0	Ellensburg water canal	SE4,S12,T18N,R17E
28	146.6	Mills power canal	NE4,S3,T18N,R17E
29	148.5	West Side Irrigation Co. canal	SE4,S33,T19N,R17E
30	149.9	Dodge-Gleason-Garrison ditch	NE4,S28,T19N,R17E
31	151.8	Cascade ditch	NW4,S28,T19N,R17E
32	156.8	Swauk Creek Irrigation ditch	NW4,S11,T19N,R16E
33	161.9	Teanaway Station irrigation ditch	SE4,S31,T20N,R16E
34	162.0	Irrigation ditch just above Teanaway Station	SE4,S31,T20N,R16E
35	163.7	Cle Elum town ditch	NW4,S36,T20N,R15E
36	185.7	Kittitas Main canal	SE4,S11,T20N,R13E

Artificial Obstructions:

1. Richland diversion dam, diversion #1. Located at Station #4. 5' diversion dam entirely across river. No protective devices. This is the first obstruction above the mouth of the river. This dam, although only five feet high, is a barrier to the upstream migration of fish during low water periods because of the very shallow depth of water over the successive drops and aprons.

2. Prosser power dam, diversion #4. Concrete dam across river, 768' long and 8' high. Three-step ladder in center. Dam is located 100 yards below Station #6. This is a barrier to the upstream migration of fish at low water because of the very small volume of water left in the river bed between the dam and the power house return.

3. Sunnyside diversion dam, diversion #10. 8' concrete dam across river. Center and side ladders. Adequate efficiency.

4. Wapato diversion dam, diversion #12. 10, concrete dam across both channels. Center and side ladders. Adequate efficiency.

5. Kittitas diversion (?).

Natural Obstructions: **None**

Fluctuation in Water Level:

Fluctuation: 8' in the flat valley. Flow usually kept quite even and constant by coordination of the irrigation projects.

Cause of Variation: Spring run-off of heavy snow in mountains; diverting of water from river for irrigation; release through control dams at source at Lakes Keechelus, Cle Elum, Tieton, Kachess, and Bumping.

Stream volumes:

December 14, 1936 (obtained from the US Bureau of Reclamation):		
	Station 5	1,500 cfs
	Station 13	822 cfs
	Station 17	547 cfs
July 26, 1936:	Station 32	700 cfs

Portion of stream bed covered:

December 1936:	Mouth-Station 9	All
December 1936:	Station 9-17	3/4
	Station 17-21	3/4
August 1936:	Station 21-25	3/4+
	Station 25-32	3/4

Pollution:

Location of sources:

City of Ellensburg sewage dumped into Wilson Creek.
 City of Yakima sewage dumped directly into Yakima River between Stations 14 and 15
 Domestic sewage from other small towns, settlements and farms on the river bank is no doubt emptied into the stream

Type of pollution:

Mostly untreated domestic sewage. Chemical pollution does not appear to be great. Ph is highly alkaline throughout length of river, increasing downstream.

General remarks:

Sewage is quite heavily concentrated in river between Ellensburg and Granger. However, the long stretch of quiet water between Granger and Prosser acts as a settling basin, so that the water is clean below the latter point.

Fish (salmon):

Due to visibility, it was very difficult to detect any salmon in the water. However, one silver salmon (Oncorhynchus kisutch) was seen at Station #10 and one at Station #13.

Fish (other than salmon):

<u>Species</u>	<u>Date</u>	<u>Very</u>		<u>Fair No.</u>	<u>Scarce</u>
		<u>Abundant</u>	<u>Abundant</u>		
Whitefish	12/36		X		

General Remarks:

Survey

The main Yakima River was surveyed in four sections at four different times. The stretch between Sta 1-17 was surveyed Dec 4-13, 1936; Sta 17-21 was done in Oct 1938; Sta 21-25, Aug 11-13, 1936; and Sta 25-31, July 21-26, 1936. The river above Sta 21 was done on foot, and below Sta 17 by row boat.

Accessibility

The inland Empire Highway follows the river quite closely throughout its entire length. In addition, numerous farm roads cut into or parallel the river. The bridges occur at fairly frequent intervals. Main and spur lines on the DW and NP Railroads follow the river in most places.

Tributaries

The following tribs, in upstream order have already been surveyed: Satus Creek, Ahtanum Creek, Naches River, Umtanum Creek, Manastash Creek, Taneum Creek, Swauk Creek, Teanaway River, Cle Elum River, and Kachess River.

Tributaries that have not been surveyed because of their unsuitability for spawning purposes are Toppenish Creek, Wenas Creek, Selah Creek, Roza Creek, Squaw Creek, Wilson Creek, Jones Creek, Reeser Creek, Dry Creek, Thornton Creek, Cle Elum Creek, Spexasth Creek, Peterson Creek, Nelson Creek, Little Creek, Big Creek, Tucker Creek, Silver Creek, Cabin Creek, Hudson Creek, Stampede Creek, Telephone Creek, and Mosquito Creek.

Topography

The Yakima River has its source at Lake Keechelus, a large, high mountain lake on the east slope of Snoqualmie Pass. The headwaters of the river above Cle Elum flow through heavily wooded

mountains, which receive deep snows in the winter and moderate rains in the spring and fall. Between Cle Elum and Yakima, the mountains gradually give way to smaller hills and the evergreen forests dwindle to scrub pine and finally the sagebrush characteristic of the dry country. From Yakima to Prosser the river flows through a wide flat valley, bordered on each side by rolling hills which support only sagebrush, grass and occasional wheat ranches. A narrow valley, at times a deep canyon, extends below Prosser to Kiona. From Kiona to the mouth of the river the valley is not so narrow but the same barren, rolling hills occur on all sides.

Being on the leeward slope of the Cascade Mountains, the Yakima River watershed is typically arid country. Cultivation is possible below Cle Elum only where there is irrigation. The hills bordering the valley support a moderate amount of grain and fodder, and the grass which grows up during the spring affords a fair amount of pasturage. Irrigation projects have made four large areas along the river valuable agricultural lands. These are the Kittitas Division near Ellensburg, the Yakima Valley around Yakima, the Wapato Indian Project on the Toppenish Reservation, and the Sunnyside Project from Zillah to Benton City. Numerous smaller irrigation ditches fill in along the river between the main projects. The Roza Irrigation Development, will greatly widen the agricultural belt along the northeast bank of the river from Pomona to Benton City. An estimated 5% of the entire Yakima River watershed is under cultivation.

The elevation at the source of the Yakima is 2,460' above sea level; the mouth, 385'. This is a drop, by no means uniform, of 2,075' in 187 miles or 11 1/10 feet per mile.

Character of Stream

The Yakima River is practically nothing but a great irrigation canal. Diversion dams, unscreened irrigation ditches, and great fluctuation in water level all contribute to its unsuitability as a spawning stream for salmonids. The sewage dumped into the river by the various towns and cities along its banks is probably sufficiently concentrated to spoil the stretch between Ellensburg and Prosser for successful spawning. Furthermore, the bottom between Yakima and Prosser is covered with a coat of silt and algae sufficiently heavy to smother eggs. The gradient from Granger to Prosser is very slight, resulting in the river winding all over the flat valley through swamps and sloughs. Here the current is negligible, the water deep and the bottom 100% mud. The preponderance of large rubble, and the frequency and swiftness of the riffles precludes the possibility of many salmon spawning between Prosser and Kiona and in the canyon between Ellensburg and Yakima.

However, the river below Kiona appears to be excellent spawning ground with a high percentage of spawning rubble, many good riffles, numerous S1 pools, and no evidence of pollution. The margins along nearly the entire river are swampy, with heavy growth of willow and underbrush providing plenty of cover. Above Ellensburg the water is clear and spawning conditions good, except for the great fluctuation in water level due to the spring run-off and release by the control dams. Most of the river bottom has a fairly high percentage of good spawning rubble, and deep pools and good riffles are frequent along most of its length.

Fish Population

The large areas of good spawning ground in the Yakima River itself and in its tributaries once supported great runs of steelhead, sockeye, silver and Chinook salmon. Now, however, the high control dams on all the big lakes at the headwaters of the tributaries have killed the sockeye runs entirely. Diversion dams, impassable during the late summer and fall; unscreened irrigation diversions; pollution; and artificially controlled fluctuations in water level have cut down the other species to comparatively small numbers. Steelheads occur in fair numbers during the winter and early spring. Some spring Chinooks ascend but there is no evidence that any "falls" get into the river. A small run of silvers is reported to occur in late November, although only two specimens were seen during the time of survey.

Sports fishermen have fair success catching whitefish during the winter and get a few steelhead in January, February, and March. Rainbow fingerlings are numerous in the upper river above Cle Elum and the larger sizes figure somewhat in anglers' catches. The river contains rough fish, but not enough evidence was obtained on which to base an estimate of their numbers.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
1	12/13/36	2:30 pm	55 F	42 F	partly cloudy
2	12/13/36	12:00 noon	57	40	cloudy
3	12/13/36	11:15 am	57	40	cloudy
4	12/12/36	3:30 pm	38	37	cloudy
5	12/11/36	4:00 pm	31	38	partly cloudy
6	12/11/36	9:30 am	27	41	heavy fog
7	12/ 8/36	10:30 am	48	43	cloudy
8	12/ 8/36	10:00 am	48	43	partly cloudy
9	12/ 7/36	11:30 am	47	43	overcast
10	12/ 6/36	12:30 pm	55	41	partly cloudy
11	12/ 6/36	1:15 pm	58	41	cloudy
12	12/ 6/36	1:45 pm	57	41	cloudy

Temperature Data (cont):

Sta	Date	Hour	Air Temp	Water Temp	Sky
13	12/ 6/36	2:15 pm	57	39	partly cloudy
14	12; 6/36	2:30 pm	57	41	partly cloudy
15	12/ 6/36	10:00 am	44	37	partly cloudy
16	12/ 5/36	4:30 pm	33	38	cloudy
17	11/10/38	4:20 pm	58	56	partly cloudy
18"	10/11/38	4:45 pm	57	56	partly cloudy
19*	10/12/38	1:00 pm	64	55	mostly cloudy/windy
20*	10/12/38	12:30 pm	63	54	mostly cloudy very windy
21	8/11/36	9:30 am	76	58	clear
22	8/11/36	2:45 pm	87	61	fair
23	8/11/36	5:00 pm	83	61	fair
24	8/12/36	4:00 pm	80	60	fair
25	7/21/36	8:15 am	80	62	clear
26	7/21/36	12:45 pm	90	67	clear
27	7/24/36	4:30 pm	63	55	clear
28	7/22/36	9:30 am	77 F	61 F	clear
29	7/24/36	2:30 pm	67	64	clear
30	7/24/36	12:30 pm	63	61	clear
31	7/25/36	8:15 am	63	50	clear

* Data corrected 11/7/40 by FGB

Pool Grade:

Tot Resting													
Rest Pools	StlT1	StlT2	StlT3	S2T1	S2T2	S2T3	S3T1	S3T2	S3T3	S5T2	S6		
St Pools	/Mile	%	%	%	%	%	%	%	%	%	%	%	%
M-1 (no resting pools: 0.85 mi)													
1-2	7	1	1	6									
6.59 mi			14.0	86.0									
2-3	21	4	4	15	2								
5.23 mi			19.0	71.0	10.0								
3-4	5	1		2	3								
5.51 mi			40.0	60.0									
4-5	33	3	5	21	7								
10.97 mi			15.0	64.0	21.0								
5-6	10	1	1	5	4								
15.68 mi			10.0	50.0	40.0								
6-7 (no resting pools, entire section deep and slussish: 6.0 mi)													
7-8	11	3	2	3	6								
4.03 mi			18.0	27.0	55.0								
8-9	81	6	24	34	23								
15.34 mi			30.0	42.0	28.0								
9-10	21	3	2	13	6								
6.65 mi			10.0	62.0	28.0								

Pool Grade (cont):

St	Tot Rest Pools	Resting Pools /Mile	SlT1 %	SlT2 %	SlT3 %	S2T1 %	S2T2 %	S2T3 %	S3T1 %	S3T2 %	S3T3 %	S5T2 %	S6 %
10-11	3	1			3								
2.27 mi					100.0								
11-12	5	4	1	11	13								
6.19 mi			4.0	44.0	52.0								
12-13	1	3		1	10								
3.47 mi				9.0	91.0								
13-14	8	6		9	9								
3.13 mi				50.0	50.0								
14-15	5	3	8	2	5								
4.32 mi			54.0	13.0	33.0								
15-16	5	3	5										
1.70 mi			100.0										
16-17	4		3	5	1								
2.50 mi			33.0	56.0	11.0								
17-18		17	20	6	26	11	48	9					
6.88 mi			16.5	4.9	21.4	9.0	39.4	7.4					
18-19		27	35	6	58	84	33	15					
8.64 mi			15.1	2.6	25.1	36.4	14.3	6.5					
19-20		18	20	2	33	71	39	10					
9.70 mi			11.4	1.1	18.9	40.6	22.3	5.7					
20-21		13		23			59						
6.30 mi				28.0			72.0						
21-22	1	1		1									
5.15 mi				100.0									
22-23			(no resting pools, river fast and deep: 2.50 mi)										
23-24	2	1		2									
9.15 mi				100.0									
24-25	1	1		1									
4.84 mi				100.0									
25-26		2		6	1								
6.07 mi				55.0	9.0								
26-27		8.6	6	8	6	6	21	10	1	2	1		
7.00 mi			10.0	13.3	10.0	10.0	35.6	16.9	1.7	3.4	1.7		
27-28		18.4	4	2	14	4	21	10	1	2	1		
3.20 mi			6.8	3.4	23.7	6.8	35.6	16.9	1.7	3.4	1.7		
28-29		18.3	31		2	42	9	11					
5.20 mi			48.4		3.1	65.6	14.1	17.2					
29-30	79	9.6	5	9	7	18	16	11	4	4		5	
8.10 mi			6.3	11.4	8.9	22.8	20.2	13.9	5.1	5.1		6.3	
30-31		33.3	32	4		65	5						
3.18 mi			30.2	3.8		61.3	4.7						

Average frequency (excluding S6 pools):

SlT1	SlT2	SlT3	S2T1	S2T2	S2T3	S3T1	S3T2	S3T3	S5T2	
209	197	238	301	251	80	6	8	2	5	
16.1	15.2	18.4	23.2	19.4	6.2	0.5	0.6	.02	0.4	
Total resting pools=					1297	Resting pools/mile=7				

Average frequency (including S6 pools):

<u>SLT1</u>	<u>SLT2</u>	<u>SLT3</u>	<u>S2T1</u>	<u>S2T2</u>	<u>S2T3</u>	<u>S3T1</u>	<u>S3T2</u>	<u>S3T3</u>	<u>S5T2</u>	<u>S6</u>
209	197	238	301	251	80	6	8	2	5	201
13.9	13.2	15.9	20.1	16.8	5.3	0.4	0.5	0.1	0.3	
Total resting pools= 1498						Resting pools/mile=7				
(186.16 miles)										

Gradient:

<u>Sta</u>	<u>Distance (miles)</u>	<u>Total Drop</u>	<u>Avg Drop Per Mile</u>	<u>Source of Data</u>
1-6	45.0	250'	5.6'	USGS Quadrangle Map
6-10	32.0	150'	4.7'	USGS Quadrangle Map
10-14	15.0	180'	12.0'	USGS Water Supply Paper 369
14-17	9.0	125'	13.9'	USGS Water Supply Paper 369
17-21	30.0	355'	11.8'	USGS Water Supply Paper 369
21-22	5.6	80'	14.3'	USGS Water Supply Paper 369
22-24	12.8	180'	14.0'	USGS Water Supply Paper 369
24-26	10.4	140'	13.5'	USGS Water Supply Paper 369
26-28	9.6	140'	14.6'	USGS Water Supply Paper 369
28-30	13.6	190'	14.0'	USGS Water Supply Paper 369
30-32	12.0	320'	26.6'	USGS Water Supply Paper 369

Entire River	196.0	2,110'	10.8'	
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Tributaries:

Tributaries to the Yakima River
(With some of the major dam and diversion locations)

S = Surveyed
I = Inspected

1. Rattlesnake Creek
 - a. Cold Creek

-----Richland Diversion dam; low water barrier-----
 2. Corral Canyon Creek (intermittent)

-----Prosser Dam & power diversion (has fish ladder)-----
 3. Status Creek
 - a. Mule Dry Creek
 - 1) Dry Creek

-----Diversion dam and irrigation canal-----
 - b. North Creek
 - 1) Seattle Creek (mostly intermittent)
 - 2) Lousey Creek (mostly intermittent)
 - 3) Oak Creek
 - a) Third Creek
 - 4) Knockout Creek
 - 5) 40 Day Creek (mostly intermittent)

Tributaries (cont):

- 6) Wall Canyon Ceek.
 - Falls-----
 - 7) White Fir Creek
 - I
 - c. Logy Creek
 - 1) Spring Creek (intermittent)
 - 2) LeTenie Creek (intermittent)
 - Falls-----
 - 3) Yatama Creek
 - 4) North Fork
 - 5) South Fork
 - d. Bull Creek
 - e. Kusshi Creek
 - f. Shenando Creek
 - 4. Toppenish Creek
 - a. Wanity Slough
 - b. Simcoe Creek
 - 1) Agency Creek
 - 2) Wahtum Creek
 - 3) South Fork
 - 4) North Fork
 - C. Mill Creek
 - Dam (L.W. barrier and irrigation canal take off)-----
 - d. North Fork
 - 1) Coon Canyon Creek (intermittent)
 - e. Camp Ceek
 - f. Olney Creek
 - g. Middle Branch
 - h. White Deer Creek
 - i. South Fork
 - j. O'Connor Creek
 - k. Kettle Creek
 - l. Pile-up Creek
 - m. Panther Creek
 - Irrigation canal (Granger) take-off and return-----
 - Sunnyside irrigation canal, dam & take-off (has fish ladders)
 - Wapato & Old Indian Canal, dam & take-off (has fish ladders)
 - Canal returns from Toppenish Cr. diversions
 - S
 - 5. Ahtanum Cr. (Bachelor Cr. channel--northerly diversion of lower Ahtanum Cr.)
(Hatton Cr. channel--southerly diversion of lower Ahtanum Cr.)
 - S
 - a. North Fork
 - 1) Nasty Creek
 - 2) Foundation Creek
 - 3) South Fork (of North Fork)
 - I
 - b. South Fork
 - I
 - 1) Reservation Creek

Tributaries (cont):

6. Naches River

S

Little Naches River

NOTE: The survey used a National Forest map and considered that portion of the Naches River from mouth of Bumping River to confluence of North & South Forks to be the "Little Naches River" & covered it in a separate survey. USGS and other maps consider it all part of the main Naches River. Should be combined with main Naches write-up some time.

S

a. Cowiche Creek

I

1) North Fork

I

2) South Fork

a) McDaniels Canyon Creek

b) Middle Fork

-----Dam and several irrigation take-offs-----

S

b. Tieton River

I

1) Oak Creek

I

2) Milk Creek

I

3) Soup Creek

I

4) Wildcat Creek

a) Thunder Creek

b) Ritten Creek

-----Tieton Dam, impassable-----

Tieton Reservoir

I

5) South Fork, Tieton River

a) Spencer Creek

I

b) Short & Dirty Creek

c) Cedar Creek

d) Corral Creek

I

e) Bear Creek

f) Discovery Creek

g) Tenday Creek

h) Conrad Creek

I

6) Bear Creek

7) Hart Creek

8) Andy Creek

I

9) Indian Creek

I

10) North Fork Tieton River

a) Cold Creek

I

b) Clear Creek

c) Hell Creek

d) Miriam Creek

e) Scatter Creek

S

c. Rattlesnake Creek

I

1) Little Rattlesnake Creek

2) Spring Creek

(intermittent)

I

3) North Fork

I

4) Three Creeks Creek

I

5) Elkhorn Creek

Tributaries (cont):

- I 6) Hindoo Creek
 - a) Dog Creek
- I 7) Little Wildcat Creek
 - d. Dry Creek
 - e. Nile Creek
 - I) Clover Spring Creek
 - I f. Rock Creek
 - 1) Righthand Fork
 - 2) Lefthand Fork
 - I g. Gold Creek
 - 1) North Fork
 - I h. Lost Creek
 - I i. Swamp Creek
 - I j. Devils Creek (or Boulder Creek)
 - I k. Milk Creek
 - S l. Bumping River
 - S 1) American River
 - a) Copper Creek
 - I b) Union Creek
 - i. North Fork
 - c) Timber Creek
 - I d) Morse Creek
 - e) Mesatchee Creek
 - f) Rainier Fork
 - g) Dewey Lake Creek
 - 2) Bumping Lake and Dam (impassable)
 - I a) Deep Creek
 - b) Cougar & Swamp Lakes Creek
 - I m. Crow Creek
 - I n. Quartz Creek
 - O. Sand Creek
 - p. South Fork
 - q. Bear Creek
 - r. Middle Fork
 - s. North Fork
 - 7. Moxee Creek (?)
 - I 8. Wenas Creek
 - a. Kelly Hollow Creek (intermittent)
 - I -----Impassable dam-----
 - b. South Fork
 - c. North Fork
 - I 9. Selah Creek
 - Roza Dam (has fishway)-----
 - I 10. Roza Creek (intermittent)
 - I 11. Squaw Creek
 - S 12. Umptanum Creek
 - Impassable dam (halfway up)-----

Tributaries (cont):

- I 13.* Wilson Creek (see note below)
- I a. Naneum Creek
- I 1) Cherry Creek
- I a) Cook Creek
- I b) Caribou Creek
- I b. Coleman Creek

NOTE 1: On the Wilson Creek-Naneum Creek maze at Ellensburg, WA. It is almost impossible to chart the variable channels of the small intermittent streams tributary to the Yakima around Ellensburg, WA due to the maze of canals involved. None are of importance to fish and therefore it is considered that Wilson Creek is the main tributary and picks up drainage from the following streams.

NOTE 2: A list of water rights on many of the streams in this section are in the survey files.

- I 14. Reeser Creek (May enter part of Wilson Naneum Creek & canal system at times)
- I 15. Jones Creek
- I 16. Dry Creek
- S 17. Manastash Creek <Main Channel, Channel III, Channel IV)
- S a. North Fork
- S b. South Fork (surveyed with main channel)
- S 1) Middle Fork
- S 18. Taneum Creek
- S a. North Fork
- S b. South Fork
- S 19. Swauk Creek
- I a. First Creek
- I b. Williams Creek
- I 1) Lion Gulch Creek
- I 2) Boulder Creek
- I 3) Cougar Gulch Creek
- I c. Mill Creek
- I d. Baker Creek
- I e. Medicine Creek
- I f. Blue Creek
- I g. Hovey Creek
- S h. Iron Creek
- S 20. Teanaway River
- S a. North Fork
- I 1) Stony Creek (Mason Creek)
- I 2) Middle Creek
- I 3) Indian Creek
- I 4) Jack Creek
- I 5) Jungle Creek

Tributaries (cont):

S
I
S
I
I
I
S

- 6) Stafford Creek
 - a) Standup Creek
 - b) Bear Creek
 - i. Miller Creek
- 7) Beverly Creek
 - a) Bean Creek
- 8) DeRoux Creek
- b. Middle Fork
 - 1) Way Creek
 - 2) Jolly Creek
- c. West Fork
 - 1) Dingbat Creek
 - 2) Sandstone Creek
 - 3) Corral Creek
 - 4) Hex Creek
 - 5) Tumble Creek
- 21. Thornton Creek (small; no value)
- 22. Cle Elum Creek (small; no value)
- 23. Spexarth Creek (small; no value)
- 24. Peterson Creek (small; no value)
- 25. Nelson Creek (small; no value)
- 26. Cle Elum River
 - a. Domerie Creek
- Impassable Cle Elum Reservoir Dam-----
- (Cle Elum Lake)
- b. Spring Creek
- c. Bear Creek
- d. Davis Creek
- e. Newport Creek
- (Upper Cle Elum River above Cle Elum Reservoir)
- f. Morgan Creek
- g. Dry Creek
- h. French Cabin Creek
- i. Howson Creek
- j. Thorp Creek
- k. Little Salmon Lasac Creek
 - 1. Salmon Lasac Creek
- m. Big Salmon Lasac Creek
- n. Cooper River
 - 1) Stove Creek
 - 2) Pete Lake Creek
- o. Paris Creek
- p. Waptus River
 - 1) Diamond Lake Creek
 - 2) Terrace Lake Creek
 - 3) Goat Creek
 - 4. Trail Creek
- q. Boulder Creek
- r. Camp Creek
- s. Fortune Creek
- 27. Little Creek

Tributaries (cont):

- 28. Big Creek
- 29. Tucker Creek
- 30. Silver Creek
- Easton Dam and irrigation ditch on main Yakima R.--
(with fish ladder; passable)
- 31. Kachess River
- Kachess Lake and Dam, impassable -----
 - a. Lodge Creek
 - b. Thetis Creek
 - c. Gale Creek
 - d. Box Canyon Creek
 - e. Mineral Creek
- 32. Cabin Creek
- 33. Hudson Creek
- 34. Stampede Creek
- 35. Telephone Creek
- 36. Swamp Creek
- 37. Mosquito Creek
- 38. Keechelus Lake and High Control Dam (impassable)
 - a. Meadow Creek
 - b. Roaring Creek
 - c. Resort Creek
 - d. Wolfe Creek
 - e. Cold Creek
 - f. Rocky Run
 - g. Mill Creek
 - h. Hyak Creek
 - i. Tunnel Creek
 - j. Gold Creek

Map References:

- | | | |
|----------------------|---------------------------|-------------|
| 1. Pasco Quad. | 7. Mt. Stuart Quad. | I=inspected |
| 2. Prosser Quad. | 8. Colockum Pass Quad. | S=surveyed |
| 3. Zillah Quad. | 9. Yakima Indian Res. | |
| 4. Ellensburg Quad. | 10. Mt. Ranier Nat'l For. | |
| 5. Mt. Aix Quad. | 11. Snoqualamie Nat'l For | |
| 6. Snoqualamie Quad. | | |

Rattlesnake Creek

River System: Yakima River

Name of Stream: Rattlesnake Creek, tributary to Yakima River

Description:

Source at T13N R21E in Yakima County. Flows along north side of Rattlesnake Hills 40 miles SE to confluence with Yakima River, just above Richland diversion dam in Benton County.

Tributaries: Cold Creek from NW, 22 miles long.

Remarks:

Not surveyed; unsuitable for spawning purposes. Early in December, 1936, the lower reaches of Rattlesnake Creek were but a dry wash. The fall weather had been abnormally dry, but some precipitation had fallen shortly before the creek was observed.

Cold Creek

River System: **Yakima River**

Name of Stream: **Cold Creek, tributary to Rattlesnake Creek**

Description:

Flows SW from source in Yakima County to confluence with Rattlesnake Creek in Benton County. 22 miles long. Flows 5 miles north of the parallel to upper part of Rattlesnake. No important tributaries.

Remarks:

Cold Creek itself has not been investigated, but Rattlesnake Creek was found to be dry at its mouth in December 1936.

Little Rattlesnake Creek

River System: **Yakima River**
Name of Stream: **Little Rattlesnake Creek, tributary to
Rattlesnake Creek**

Description:

Flows twelve miles northeast from source in mountains of Rainier National Forest to confluence with Rattlesnake Creek, a half mile above its mouth on the Naches River.

Very small flow at mouth (estimated 1 cfs) in August 1936, so not surveyed at that time.

Flow 15-18 cfs on 5/5/37, snow run-off. Steep gradient; few pools; dry near mouth in late summer; stream filled with logging debris. Watershed mountainous and well wooded.

Remarks:

Reported to be fair trout stream in upper section. Of little value to migratory fish. None reported.

North Fork of Rattlesnake Creek

River System: Yakima River

Name of Stream: North Fork of Rattlesnake Creek, tributary to
Rattlesnake Creek

Description:

Flows twelve miles easterly from source on Mt. Aix to confluence with main Rattlesnake Creek, 6.5 miles above its mouth. No tributaries.

Remarks:

Very small flow at time of survey in August, 1936, so not surveyed.

Three Creeks

River System: Yakima River

Name of Stream: Three Creeks, tributary of Rattlesnake Creek

Remarks:

Small tributary to Rattlesnake Creek on left bank, 8.5 miles above its mouth. Estimated 1 cfs. in August 1936. Not surveyed.

Elkhorn Creek

River System: Yakima River

Name of Stream: Elkhorn Creek, tributary of Rattlesnake Creek

Description:

Very small tributary to left bank of the upper Rattlesnake Creek, 14.8 miles above mouth. Estimated 1.5 cfs and 5' wide at mouth in August 1936, so not surveyed.

Hindoo Creek

River System: **Yakima River**

Name of Stream: **Hindoo Creek, tributary to Rattlesnake Creek**

Description:

Flows east six miles from source on Mt. Aix to confluence with Rattlesnake Creek, through mountainous country, many branches.

Remarks:

Flowing at 7 cfs and 10' wide at mouth in August 1936. Not surveyed.

Little Wildcat Creek

River System: Yakima River

Name of Stream: Little Wildcat Creek, tributary to Rattlesnake
Creek

Description:

High, mountainous stream at headwaters of Rattlesnake Creek.
Flowing 3 cfs in August, 1936, so not surveyed.

Satus Creek

River System: Yakima River

Stream Surveyed: Satus Creek, tributary to Yakima River

Date of Survey: November 16-19, 1935

Source: Eastern slope of Cascade Mountains, in Klickitat County, Washington

Location: Klickitat and Yakima Counties, Washington.

Total Length: 50 miles; length surveyed 41.2 miles.

Station Location:

Sta	Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
A	Mouth	0	0.0			SW4,SE4,S18 T9N,R22E	45.0'	
B	Railroad bridge at Satus, WA		3.16	3.16	3.16	SW4,SE4,S11 T9N,R21E	21.0'	8.3"
C	Indian Service dam		6.34	9.50	9.50	NE4,SE4,S12 T9N,R20E	140.0'	6.3"
D	First bridge on Yakima-Goldendale Hwy		10.57	20.07	20.07	NE4,SE4,S27 T9N,R19E	28.0'	12.3"
E	Second bridge on Yakima-Goldendale Hwy		3.93	24.00	24.00	SW4,SE4,S6 T8N,R19E	18.0'	13.0"
F	Third bridge on Yakima-Goldendale Hwy		8.69	32.69	32.69	SE4,NW4,S15 T7N,R18E	13.5'	8.0"
G	Fourth bridge on Yakima-Goldendale Hwy		1.83	34.52	34.52	SE4,SE4,S21 T7N,R18E	20.0'	5.8"
H	Last bridge on Yakima-Goldendale Hwy		5.48	40.00	40.00	SE4,SE4,S1 T6N,R17E	11.0'	7.4"
I	Divergence of Ck & Yakima-Goldendale Hwy		1.16	NE4,NE4,S11	112.0'	T6N,R17E		4.7"

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17030003	0027	0.00
B	17030003	0027	0.00

EPA River Reach Codes (cont.):

<u>Station</u>	<u>HUC</u>	<u>SEG</u>	<u>Rmi</u>
C	17030003	3236	0.00
D	17030003	0036	0.85
E	17030003	0010	0.00
F	17030003	0040	8.72
G	17030003	0040	9.94
H	17030003	0042	1.93
I*	17030003	0042	2.73

- Station location is not definite and has been estimated

Character of Bottom Between Stations:

<u>Station</u>	<u>Area (yd²)</u>	<u>L.R.</u>	<u>%</u>	<u>M.R.</u>	<u>%</u>	<u>S.R.</u>	<u>%</u>	<u>M&S</u>	<u>%</u>
A-B						28			72
B-C				4		6			90
C-D		11		38		31			20
D-E		26		34		25			15
E-F		34		36		22			8
F-G		54		33		13			
G-H		47		28		17			8
H-I		44		31		18			7

Spawning Area Usable and Available:

<u>Station</u>	<u>Distance vds</u>	<u>miles</u>	<u>Area (yd²)</u>	<u>Available Spawning Area (yd²) (MR&SR)</u>	<u>% Avail</u>	<u>Usable Spawning Area (yd²)</u>	<u>% Usable</u>
A-B	5,570	3.1		18,352	28		
B-C	11,167	6.4		6,640	10		
C-D	18,510	10.6		111,939	69		
D-E	7,020	3.9		36,849	59		
E-F	15,320	8.7		54,875	58		
F-G	3,115	1.8		8,549	46		
G-H	9,645	5.4		24,729	45		
H-I	2,050	1.2		3,900	49		

Spawning Area Unavailable and Unusable:

<u>Station</u>	<u>Distance</u>	<u>Area (yd²)</u>	<u>Area Unavail (yd²)</u>	<u>% Unavail</u>	<u>When Avail</u>	<u>Usable Unavail (yd²)</u>	<u>% Unavail</u>
H-I	1,631 yd.		3,440	57			

Character of Watershed:

Mountainous	X
Hilly	X
Rolling	
Flat	
Swampy	
Wooded	
Open	X
Cultivated	
Character of Valley	
Character of Banks	
Density of Marginal Vegetation	
Erosion	
a) Banks	
b) Watershed	

Diversions:

Diversion 1: SW4,NE4,S15,TgN,R20E, R.B. Undetermined cfs. At Station C. Indian Service irrigation dam crest 140' drop 14" (flash boards may be added to increase fall). Spill not determined. Abutments; right and left bank each 7' high. Construction--dam and abutments concrete. No fish ladder. Irrigation ditch, width 30', depth 15'. Maximum flow 110 sec. ft. Steel headgates (2) each 7' wide by 6' deep located in right abutment at intake. No protective devices. Flash boards have never been used on dam. No barrier to upstream migrants.

Diversion 2: NW4,NE4,S14,TgN,R20E, L.B. 0 cfs. 1.5 miles above Station C. Sheerar irrigation ditch, width 5', depth 4', not diverting at present, maximum diversion 10.0 sec. ft. Headgate at intake. No protective devices. Temporary brush dam in stream. Remarks: ditch used only during flood stages of river.

Diversion 3: SW4,NE4,S15,T9N,R20E, R.B. 0 cfs. 4,900 paces above Station C. Irrigation ditch, width 4', depth 3', no water being diverted. No headgate. No protective devices. No diversion dam. Ditch apparently used only during flood stages of river.

Diversion 4: NW4,SW4,S15,T9N,R20E, R.B. 0 cfs. 6,490 paces above Station C. Irrigation dam crest 65, drop 24", spill undetermined. Construction dam, log and rock. Irrigation ditch. No water being diverted. Headgate 6.5' wide by 5.5' deep at intake. No protective devices.

Diversion 5: NE4,SW4,S24,T8N,R18E, R.B. 0 cfs. 4,780 paces above Station E. Irrigation ditch, width 6', depth 3', no water being diverted. No headgate. No protective devices. Temporary rock diversion dam in stream.

Diversion 6: NW4,NW4,S25,T8N,R18E, L.B. 8.0 cfs. 5,471 paces above Station E. Satus Stock Ranch irrigation ditch, width 10', depth 2 1/2', estimated flow 8.00 cfs. No headgate. No protective devices. Temporary rock wing dam in stream.

Diversion 7: SE4,SW4,S35,T8N,R18E, L.B. 6.0 cfs. 11,320 paces above E. Irrigation ditch, width 6', depth 20", estimated flow 6.00 cfs. No headgate. No protective devices. Temporary rock dam 30 high extends 50' across stream. Trap for downstream migrants. Barrier at low water.

Note : Total diversion of water for irrigation from Satus Creek at time of survey is 14 cfs.

Artificial Obstructions:

Location	character	height	Protection Devices	
			type	efficiency
1-NE4 SE4 Sec 12 T9N R20E	irrigation diversion	14'	none	
2-NW4 SW4 Sec 15 T9N R20E	irrigation diversion	24"	none	

General remarks: No. 1 and 2: no barrier.

Natural Obstructions:

Location	Character	Height	Degree of Obstruction	
			Impassable	Pass w/diff
1-SE4 SW4 Sec 1 T6N R17E	rock/log slide	6'	X	

Remarks: Jam extends about 100'. Probable complete barrier.

Fluctuation in Water Level:

Feet Variation: 3'-5'

Cause of Variation: melting snow in spring, freshets, etc.

Stream Volumes:

Location	Sec. Ft.	Date
Below Sta B	58.0	Indian Service Records November 1934
Below Sta D	73.0	Indian Service Records November 1934
At Sta H	5.5	November 19, 1935

Pollution: None

Fish (salmon): No longer any runs.

Fish (other than salmon):

Species	Date	Very Abundant	Abundant	Fair No.	Scarce
Steelhead					
Rainbow	reported				X
Whitefish					
Dolly Varden					
Cutthroat	reported				X
Eastern Brook	reported				X
Bass (sp?)	reported		X		
Suckers	11/16/35				X

General Remarks:

Tributaries

Mule Dry Creek enters the Satus in the SE4 NW4 Sec 7 T9N R21E, Yakima County. On November 17, 1935 it was dry, as it is except in times of freshets or melting snow.

Dry Creek enters the Satus in the SW4 NE4 Sec 23 T9N R19E. On Nov. 18, 1935 there was no discharge, and there never is except during spring runoffs.

Log Creek unites with Satus Creek in the NW4 SE4 Sec 6 T8N R19E. On Nov. 18, 1935 it had an estimated flow of 8 cfs.

Topography.

In its lower 9.5 miles the Satus runs through a broad, semi-arid valley which supports a few scattered ranches, but is given over, chiefly, to sage brush. Above Station C the valley suddenly becomes narrow, and proceeds through a narrow box canyon, the walls of which are precipitous, rocky, and entirely barren. This condition persists to Station D, 20.1 miles above the mouth. There is no farming in this section. The surrounding country is barren excepting for sage brush.

From Station D to Station H the valley varies in width from 1/2 to 3 miles in width. The valley walls are moderately steep, and support meager growths of sage brush and buffalo grass. A few scattered ranches in this section demand irrigation for truck gardens and stock. Above Station H the stream enters a narrow mountain valley, which is uninhabited. The walls here are steep, and poorly covered by growths of white and yellow pine.

In the lowest eight miles the creek banks are protected only by a narrow fringe of willows, hawthorne and miscellaneous small brush. From this point to Station I this array of brush persists, augmented by varying growths of cottonwoods. In this second section the creek is unusually well protected from the sun, and from sport fishermen.

Character of Stream

From station A to B the Satus is fairly rapid, and offers much good spawning rubble, and is well supplied by pools. From Station B to C the stream is particularly sluggish, while the bottom is composed almost entirely of mud and sand. Above Station C to the termination of the survey the stream is continuously good as to spawning rubble, but pools are very few and ill-spaced.

There are 249 pools averaging 6 pools per mile in the 41.12 miles surveyed in Satus Creek. 55% of the pools were small, located between cascades or fast water (S6). None of this type was found below "Station E." 12% were between 25-50 sq yds in area, from 3-6 ft. deep near the bank with adequate cover (S2T1). 9% were less than 25 sq yds in area, less than 3 ft. deep near the bank with adequate cover (S3T1). The remaining 24% was composed of miscellaneous types none of which composed more than 6% of the total.

Diversions and Obstructions

There are seven diversions on the Satus, one of which has a permanent diversion dam and belongs to the Indian Service Department. The others have temporary diversion dams or wing dams. One is barrier at low water. Flows at the time of the survey were impossible as water was no longer being diverted.

Only one natural barrier exists, being in the form of a log and boulder slide midway between Stations H and I at 40.5 miles. This jumble is only 4-5 feet high, but extends upstream for approximately 100 ft. It is a complete barrier in low water, and is probably so in high water. However, the stream at this point is very small, and is probably worthless as a steelhead or salmon spawning stream above the barrier. At Station H the flow on November 19, 1935 was 5.5 cfs.

Statistics compiled by the United States Indian Service show that the Satus discharges a minimum of 27 cfs (Oct. 1934) and a maximum in January of 348 cfs (Jan. 1934). At their gauge house some three miles below Station D, flows were recorded 22 cfs (Oct. 1934).

Fish Population

No fish were observed anywhere on the Satus excepting below Station B. Here a few suckers 1-2" long were seen in backwater. Local residents report good bass fishing up as far as Station C, but in recent years, very few trout. Those present are apparently eastern brook and rainbow. In the upper waters rainbow and cutthroat are taken in small numbers. Steelhead and salmon are never taken or seen in the stream, though both are reported to have formed runs prior to about 1910, although the approximate size of these runs could not be determined.

Remarks: There is no apparent reason why runs of steelhead and chinooks could not be maintained if these fish could be induced to pass through the quiet waters between Stations B - C.

Temperature Data:

<u>Sta</u>	<u>Date</u>	<u>Hour</u>	<u>Air Temp</u>	<u>Water Temp</u>	<u>Sky</u>
A	11-16-35	11:00 am	45 F	46 F	Clear
B	11-16-35	11:00 am	49	44	Clear
C	11-17-35	11:30 am	49	40	Clear
D	11-18-35	10:15 am	37	42	Cloudy
E	11-18-35	11:50 am	45	43	Cloudy
F	11-18-35	4:00 Pm	34	35	Cloudy
G	11-19-35	9:40 am	32	35.5	Clear
H	11-19-35	10:50 am	34.5	35.5	Ptly cloudy
I	11-19-35	11:30 am	34.5	35.5	Ptly cloudy

Tributary Temperature Data:

<u>Tributary</u>	<u>Date</u>	<u>Hour</u>	<u>Air Temp</u>	<u>Water Temp</u>	<u>Skv</u>
Satus Creek	4-29-37	3:30 pm	65 F	51 F	Clear, water high

Tributary Temperature Data (cont.):

<u>Tributary</u>	<u>Date</u>	<u>Hour</u>	<u>Air Temp</u>	<u>Water Temp</u>	<u>Skv</u>
Dry Creek	4-29-37	4:00 pm	65	52	Clear, 15-20 cfs
Toppenish Ck	4-30-37	4:00 pm	72 F	52 F	Approx. 20 cfs; good spawning riffles (south of White Swan), moderate gradient, clear bottom. Medium rubble 20%, small rubble 70%, sand 10%.
Logy Creek	5-01-37	9:15 am	68	48	Clear, 18-20 cfs. Thick brush cover; good pools & riffles. (Spring Ck (tributary of Logy Ck) 5-6 cfs intermittent water 30 plus cfs. Snow run-off. Gradient steep. More large rubble, pools farther apart, planted with brook trout. (Mr. Carter)
Upper Logy Ck (near Spring Ck)	5-02-37				Almost entirely large rubble boulders, bedrock, torrential, little spawning area, 700' V-shaped canyon, rock slides, scattered cover, falls below forks 55' drop, another impassable falls reported about one mile below this. (Mr. Carter)
Upper Logy Creek	5-04-37				20-25 cfs. Good riffles, more
Upper Dry Creek	5-02-37				large.

Pool Grade:

<u>Sta</u>	<u>Resting</u>											
	<u>Pools</u>	<u>Pools</u>	<u>slT1</u>	<u>slT2</u>	<u>slT3</u>	<u>S2T1</u>	<u>S2T2</u>	<u>S2T3</u>	<u>S3T1</u>	<u>S3T2</u>	<u>S3T3</u>	<u>S6</u>
	<u>/Mile</u>	<u>%</u>	<u>%</u>	<u>%</u>	<u>%</u>	<u>%</u>	<u>%</u>	<u>%</u>	<u>%</u>	<u>%</u>	<u>%</u>	<u>%</u>
A-B	2	1				1	1					
(3.16 mi)						50.0	50.0					

Pool Grade (cont):

Sta	Resting Pools		Resting									
	Pools	/Mile	S1T1 %	S1T2 %	S1T3 %	S2T1 %	S2T2 %	S2T3 %	S3T1 %	S3T2 %	S3T3 %	S6 %
B-C (6.34 mi)	2	1	1					1				
C-D (10.57 mi)	38	4	6	2		12	3	1	12	1	1	
D-E (3.93 mi)	12	3	1		1	4			5	1		
E-F (8.69 mi)	26	.75	6	2		7	4	2	3	1	1	35
F-G (1.83 mi)	6	3				2	1		1	1	1	
G-H (5.48 mi)	23	.25	1	2		4	2	2	2	4	6	89
H-I (1.16 mi)	2	.17			1			1				
Grand Tot (41.12 mi)	111/249	3/3	15	6	2	30	11	7	23	8	9	138
			14.0	5.0	2.0	27.0	10.0	6.0	21.0	7.0	8.0	

Gradient:

Station	Distance (miles)	Total Drop	Avg Drop Per Mile	Source of Data
A-B	3.16 M	50'	16'	Topographic map
B-C	6.34 M	60'	9'	" "
C-D	10.57 M	230'	22'	" "
D-E	3.93 M	170'	43'	" "
E-Kussi Ck Above	12.50 M	755'	60'	Yakima Co map, bench marks
Kussi Ck	14.00 M	?	steep	Survey crews observations
Totals	36.50 M	1265'	35'	

Mule Dry Creek

River System: **Yakima River**

Name of Stream: **Mule Dry Creek, tributary to Satus Creek**

Description:

Flows 18 miles in northerly direction from source at T7N R20E to confluence with Satus Creek, 8 miles above the mouth of the latter. No important tributaries.

Remarks:

Unsuitable for spawning purposes. Dry throughout year, except at times of snow runoffs and freshets.

Dry Creek

River System: Yakima River

Stream Surveyed: Dry Creek, tributary to Mule Dry Creek of Satus
Creek

Date of Survey: April 29 and May 2, 1937

Description:

Stream heads in high hills--barren except for occasional pine woods--flow 15-25 cfs when observed--snow runoff. Lower section dry in summer. Watershed almost entirely dry sheep lands. Stream flows through deep valley and canyons, thick brush cover on banks. Middle section of stream maintains small flow through the summer. Reported by Mr. Tom Carter (Indian Service) to have been planted with Eastern Brook trout. At highway, 4:00 pm, air 65 F, water 52 F.

Remarks:

Stream is too low in summer to be of much value as a fish producer.

Logy Creek

River System: **Yakima River**
 Stream Surveyed: **Logy Creek, a tributary of Status Creek, a tributary of Yakima River**

Date of Survey: **May 1,2,4, 1937 by Hanavan and Lobell.**

Source: **West of Status Pass**

Direction of Flow:

Total Length: **27 miles long, 13 miles observed, lower 2.2 miles surveyed.**

Location: **NW4,SE4,S6,T8N,R19E**

EPA River Reach Code:

<u>Station</u>	<u>HUC</u>	<u>SEG</u>	<u>Rmi</u>
A	17030003	37	0.00
B*	17030003	37	1.32

• Station location is not definite and has been estimated

Character of Bottom:

<u>Station</u>	<u>Area (yd²)</u>	<u>L.R.</u>	<u>%</u>	<u>M.R.</u>	<u>%</u>	<u>S.R.</u>	<u>%</u>	<u>M&S</u>	<u>%</u>
--	21,700	6,230	28.8	7,300	33.7	5,100	23.5	3,070	14.1

Spawning Area Usable and Available:

<u>Station</u>	<u>Distance vds miles</u>	<u>Area (yd²)</u>	<u>Available Spawning Area (yd²) (MRC SR)</u>	<u>% Avail</u>	<u>Usable Spawning Area (yd²)</u>	<u>% Usable</u>
--			12,400	56.2		

Note: In the next mile the bottom was estimated to be 4,400 sq yds or 50% large rubble and 50% spawning rubble. The spawning rubble dwindles rapidly above this point as the gradient increases and lava bedrock increases.

General Remarks:

18-20 cfs snow runoff, reported dry near mouth in late summer. S5 and S2 pools are numerous with occasional S1 and S3. All pools are T1 as the marginal vegetation is composed of a dense growth of over-hanging brush, willows and cottonwoods. There are several

impassable falls. The first of these, located 14 miles above the mouth is 15' high. A steep canyon extends from three miles above the mouth to the headwaters. This section of the stream is surrounded by high, barren lava plateaus. The stream bottom is rough and contains many bedrock cascades. No salmon or steelhead are known to enter Logy Creek. Brook trout have been planted near the falls, but no catch reports were available.

Temperature Data: 9:15 am, weather clear: air 68 F, water 48 F.

Toppenish Creek

River System: Yakima River

Stream Surveyed: Toppenish Creek, tributary of Yakima River

Date of Survey: April 29, 1937

Description:

Lower 25 miles of stream flows through flat swamp lands, where it acts as a drainage canal. Next ten miles, (from Simcoe Creek confluence to dam) stream is diverted into many small channels for irrigation. This section is reported to be dry in the summer; contains much good spawning area, and has a moderate gradient. Above the dam the stream extends 25 miles to source. This section has a permanent channel and flows the entire year. A large ditch is diverted at the dam (right bank). Two headgates about 3' wide, stone and cement abutments, no returns, no screens. Crest of dam 40' drop 4', spill 6", no apron, rock and cement construction and abutments. Steelhead reported to pass dam at high water. During dry season all water diverted at dam. The section of stream above the dam is well covered by alders, etc., and contains good spawning areas.

Remarks:

Toppenish Creek supports a small run of steelhead at the present time. Unrestricted Indian fishing, particularly at the dam, makes it doubtful if a very large run could be maintained. Other hazards are the character of the lower section of the stream, and the summer diversion of the entire flow.

Rainbow trout are reported to be taken from the extensive Toppenish drainage system. Most of these canals maintain a constant turbid flow--have little cover, few pools and no riffles. Some have clear water, weed beds, brush cover, and appear to be adapted to brook trout.

Ahtanum Creek

River System: **Yakima River**

Stream Surveyed: **Ahtanum Creek, a tributary to Yakima River**

Date of Survey: **October 20 and November 8-13, 1935.**

Source:

North and South Forks; both from the eastern slope of the Cascade Mountains, Rainier National Forest, Yakima County, Washington

Location: **Yakima County, Washington**

Total Length:

21.4 miles (to confluence of North and South Forks); total length surveyed.

Station Location:

Sta	Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
A	Inland Empire Highway bridge 355 yds above confl Yakima R	0	0.0	0	0.0	SW4,SW4,S8 T12N,R19E	30.0'	7.2"
B	Bridge		1.98		1.98	SW4,SW4,S2 T12N,R18E	9.5'	4.2"
C	Bridge		6.30		8.28	NE4,SE4,S7 T12N,R18E	7.0'	6.1"
D	Lynch Lane Bridge		7.78		16.06	NW4,SE4,S18 T12N,R16E	0.0'	0.0"
E	Confl North and South forks		5.37		21.43	SE4,SW4,S17 T12N,R16E	22.0'	9.8"

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17030003	0009	0.00
B*	17030003	0009	0.00
c*	17030003	0009	9.67
D*	17030003	0009	9.67
E	17030003	0009	20.62

• Station location is not definite and has been estimated

Character of Bottom Between Stations:

Station	Area (yd ²)		L.R.		M.R.		S.R.		M&S	
				%		%		%		%
A-B			4		28		33		35	
B-C					18		43		39	
C-D			10		36		33		21	
D-E			20		38		33		9	

Spawning Area Usable and Available:

Station	Distance		Area (yd ²)	Available Spawning Area (yd ²)		Usable Spawning Area (yd ²)	%	
	vds	miles		(MR&SR)	Avail		Usable	Usable
A-B	3,495			14,930	61			
B-C	11,100			23,065	61			
C-D	13,690			24,753	69			
D-E	9,450			38,255	71			

Total 101,003

Spawning Area Unavailable and Unusable: **None**

Character of Watershed:

Mountainous

Hilly X

Rolling X

Flat

Swampy

Wooded

Open X

Cultivated 50%

Character
of Valley

Character
of Banks

Character of Watershed (cont):

 Density of
 Marginal
 Vegetation

Erosion

- a) Banks
- b) Watershed

Diversions:

Diversion 1: SE4,S3,T12N-R18E, R.B. 0 cfs. 5,091 paces above Station B. Irrigation ditch, width 2,, depth 2'. No water being diverted. No headgate. Return 1, wide by 1, deep located 30 yards below intake. Temporary earth dam across stream. No protective devices.

Diversion 2: SW4,SW4,S4,T12N-R18E, R.B. 0 cfs. 7,263 paces above Station B. Irrigation ditch, width 3,' depth 3,. No water being diverted. Intake through concrete pipe 2, in diameter discharging into ditch. Headgate at pipe intake. No protective devices. Rock and mortar dam 8" high across stream.

Diversion 3: SW4,SW4,S4,T12N-R18E, R.B. 0 cfs. 7,810 paces above Station B. Irrigation pipe, diameter 2', not diverting at present. Headgate at intake. No protective devices. Wood and earth dam 8" high across stream.

Diversion 4: SW4,SE4,S4,T12N-R18E, R.B. 0.87 cfs. 8,600 paces above Station B. Irrigation ditch, width 5,, depth 3,, average water depth 4". Headgate 100 yards below intake. Earth and wood dam across stream. Possible to divert entire stream flow during low water.

Diversion 5: NE4,SW4,S7,T12N,R18E, R.B. 0 cfs. 565 paces above Station C. Concrete irrigation dam crest 19,, drop 40". Headgate in dam (7, wide by 28" high, open 1") controls stream flow. Wooden irrigation conduit, diameter 14". No water being diverted. Intake in face of dam. No headgate. No protective devices.

Diversion 6: SE4,SE4,S12,T12N-R17E, R.B. 1.0 cfs. 2,188 paces above Station C. Two irrigation pipes, diameter (each).12", estimated diversion 1.0 cfs. No headgate. No protective devices. No diversion dam. Pipes divert entire stream flow.

Diversion 7: SW4,SE4,S12,T12N-R17E, R.B. 0 cfs. 2,545 paces above Station C. Irrigation ditch, width 4,, depth 2'8". No water being diverted. No headgate. No protective devices. Log, plank,

and earth diversion dam 2' high, crest 24' extends across stream.

Diversion 8: SW4,NW4,S14,T12N-R17E, R.B. 0 cfs. 5,970 paces above Station C. Irrigation ditch, width 33", depth 18". No water being diverted. Headgate at intake. No protective devices. Temporary earth dam in stream.

Diversion 9: SW4,NE4,S15,T12N-R17E, R.B. 0 cfs. 7,060 paces above Station C. Irrigation ditch, width 40", depth 48". No water being diverted. Headgate at intake. No protective devices. No diversion dam. No water in stream bed.

Diversion 10: SE4,NW4,S15,T12N-R17E, R.B. 0 cfs. 8,330 paces above Station C. Irrigation ditch, width 7,, depth 1,. No water being diverted. Headgate 40 yards below intake. No protective devices. Temporary dam in stream bed.

Diversion 11: SE4,NE4,S16,T12N-R17E, R.B. 0 cfs. 8,923 paces above Station C. Irrigation ditch, width 4,, depth 3,. No water being diverted. No headgate. No protective devices. No diversion dam.

Diversion 12: SW4,NE4,S16,T12N-R17E, R.B. 0 cfs. 9,360 paces above Station C. Irrigation ditch, width 3', depth 3'. No water being diverted. Headgate at intake. No protective devices. No diversion dam.

Diversion 13: NW4,SW4,S16,T12N-R17E, R.B. 0 cfs. 10,300 paces above Station C. Irrigation ditch, width 3', depth 2'. No water being diverted. No headgate. No protective devices. No diversion dam.

Diversion 14: SW4,NE4,S17,T12N-R17E, R.B. 0 cfs. 11,500 paces above Station C. Irrigation ditch, width 6', depth 28". No water being diverted. No headgate. No protective devices. No diversion dam in stream.

Diversion 15: SW4,NE4,S17,T12N-R17E, R.B. 0 cfs. 11,536 paces above Station C. Irrigation ditch, width 12,: depth 3'. No water being diverted. No headgate. No protective devices. Rock and sand bag diversion dam in stream bed 3' high with 20, crest, in stream bed.

Diversion 16: NE4,SW4,S18,T12N-R17N, R.B. 0 cfs. 436 paces above Station D. Irrigation ditch, width 2,, depth 2,. No water being diverted. No headgate. No protective devices. No diversion dam in stream.

Diversion 17: NW4,SW4,S13,T12N-R16E, L.B. 0 cfs. 2,878 paces above Station D. Indian Service irrigation ditch, width 15', depth 3'. No water being diverted. Steel headgate 6' wide by 4.5'

deep in concrete abutment at intake. Protective devices: two us Bureau of Fisheries rotary type fish screens installed 300 paces below intake. No diversion dam in stream. Screens apparently effective. Ditch had just been shut off on day of survey. Fish observed above screens but none below. Paddle wheels in disrepair. Indian ditch may divert maximum of 70 cfs but when stream flow drops below 100 cfs ditch may divert but 1/4 of aggregate flow of North and South Forks.

Diversion 18: SW4,NE4,S14,T12N-R16E, L.B. 0 cfs. 3,300 paces above Station D. Irrigation ditch, width 2" depth 2'. No water being diverted. No headgate. No protective devices. No diversion dam in stream.

Diversion 19: SE4,NW4,S14,T12N-R16E, R.B. 5.82 cfs. 3,650 paces above Station D. Irrigation ditch, width 8,, depth 1.5,, average water depth 7". Headgate at intake not in use. No protective devices. Plank and rock diversion dam 1' high, 24' long across stream.

Diversion 20: SW4,NW4,S14,T12N-R16E, R.B. 0 cfs. 4,387 paces above Station D. Irrigation ditch, discharges 500 paces from intake into 8" pipe, not diverting at present. Ditch returns to stream 600 paces below intake. No headgate. No protective devices. Temporary plank and earth dam 1, high, 18' long across stream.

Diversion 21: SW4,S15,T12N-R16E, R.B. 0 cfs. 6,150 paces above Station D. Irrigation ditch, width 32', depth 18". No water being diverted. Headgate at intake. No protective devices. Temporary irrigation dam 10" high extends 10' across stream.

Diversion 22: SE4,S16,T12N-R16E, L.B. 0 cfs. 6,960 paces above Station D. Irrigation ditch, width 3', depth 18". No water being diverted. No headgate. No protective devices. Temporary rock dam 18 high extends 12, across stream.

Diversion 23: SW4,S16,T12N-R16E, R.B. 1.54 cfs. 8,220 paces above Station D. Irrigation dam, crest 46' drop (variable) 3.5'-4.5' (flash boards give additional feet), water at spill undetermined, downstream apron 3' wide, construction dam and apron concrete. No fish ladder. Irrigation ditch, width 6', depth 3,, average water depth 4.5" over 2' Cippoletti Weir. Headgate 100' below intake. No protective devices. Dam complete barrier during low water periods. Total diversion of water for irrigation from Ahtanum Creek at time of survey 9.23 cfs.

Artificial Obstructions:

1. Diversion 823, SW1/4,S16,T12N,R16E. Concrete diversion dam, 3.5'. No protective device.

2. Diversion #5, 565 paces above Station C. Concrete diversion dam, 40". Barrier at low water.

Natural Obstructions: None

Fluctuation in Water Level:

Variation: 3-5'

Cause of Variation: melting snow, freshets, etc., and diverting of water from or to Bachelor and Hatton Creeks.

Stream Volumes:

Date	Location	Cfs
11/12/35	At Station B	16.9
11/12/35	Between D-E	25.9

Pollution: None

Fish (salmon):

Few chinooks reported to enter stream at flood stages only.

Fish (other than salmon):

Species	Date	Very Abundant	Abundant	Fair No.	Scarce
Steelhead					
Rainbow	(reported)				X
Whitefish	11/13/35			X	
Dolly Varden	11/13/35				X
Cutthroat	(reported)				X

Note: All fish in upper reaches of stream. Trout present only at high water in spring.

General Remarks:

Topography

Ahtanum Creek flows through a broad, fertile valley which varies in width from one half to six miles at its widest and narrowest points. The principal crops are hay, hops and small grains with a large portion of the valley being utilized as pasturage for dairy cattle.

The Ahtanum valley lies in an easterly direction, with Ahtanum Creek flowing on the southern boundary. Bachelor and Hatton Creeks are channels of this stream which flow through the northern and middle portions of the valley. These creeks, although but channels of the main stream, were surveyed individually and are handled as such in the reports (See Stream Survey Hatton Creek and Bachelor Creek).

The Ahtanum proper is protected by a dense growth of alder, willow and miscellaneous brush along the stream banks. The side slopes of the valley are not steep and are covered with scattered patches of sage brush and prairie grasses.

Character of the River

There are two dams with headgates to control the flow of water down Ahtanum Creek. One is located at the divergence of Bachelor Creek, the other at the divergence of Hatton Creek. By this means it is possible to control the flow of water down any of the streams. At the time of the survey the main stream was dry except for seepage picked up from springs and irrigation returns. The entire stream flow had been diverted through Hatton and Bachelor Creeks. This situation was not unusual, all three creeks being dry intermittently, during low water periods.

Spawning gravel composes approximately 65% of the stream bottom but between Stations A and C there was a high percentage of mud which destroyed this area as a spawning grounds. Above this point (Station C) if there were a continuous flow in the stream the creek would afford a fair amount of good spawning area.

There are 73 pools averaging three pools per mile for the 21.43 miles surveyed on Ahtanum Creek. 85% of these were less than 25 square yards in area, less than three feet deep located in the center of the stream, without adequate cover (S3T3). 10% were from 25-50 square yards in area, from 3-6 feet deep located near the bank with adequate cover (S2T1). The remaining 5% was composed of miscellaneous types none of which represented more than 3% of the total (see "Pool Grade"). Portions of the creek were dug at the time of the survey. If water were running throughout the course of the stream the pool grade would be considerably higher.

With the exception of the section of the creek extending one half mile above the mouth, the riffles may be considered good for the entire course of the stream.

There are 23 irrigation diversions on the Ahtanum Creek, not including the points of divergence of Hatton and Bachelor Creeks. Four of the diversions have permanent dams. None of the ditches is screened with the exception of the Indian Service Ditch (see "Diversions").

The water of Ahtanum Creek has been greatly over appropriated and in addition to the usual litigation over prior and riparian rights, conditions have been further complicated by claims of the Yakima Indians. An agreement between the US Indian Office and the white water users has defined the rights of the Indians as 1/4 of the natural flow of the stream at the Narrows. The division is based on the sum of the discharges of the North and South Forks of Ahtanum Creek as measured above diversions. The share of water belonging to the Water Users Association is used to irrigate about 7,000 acres of land which is vested with prior water rights. An additional 4,000 acres in the vicinity of Tampico vested with subsequent rights is irrigated from Ahtanum Creek when the aggregate flow of the two forks is more than 90 cfs. The discharge seldom exceeds this limit after the first of July.

Fish Population

With the exception of one Dolly Varden and several whitefish seen above the screens in the Indian Service ditch when the water was shut off. No fish were observed in Ahtanum Creek.

Chinooks are reported to ascend the Ahtanum during flood years as far as Station B. Above that point no salmon have been reported since 1900. Prior to that time a good run is said to have entered the stream.

No steelhead run has ever been observed in this creek.

Rainbow and cutthroat trout are said to be present in Ahtanum above the divergence of Bachelor Creek and in Bachelor Creek, in the early spring months. Whitefish are scattered through the upper stretches of all three streams.

The three channels of this stream, Bachelor Creek, Hatton Creek, and the middle portion of the main Ahtanum are extremely hazardous for any fish life due to the fact that water may be diverted from any of these streams leaving any of the channels dry.

The Ahtanum is worthless as a salmon producer due to the extensive irrigation system present on the stream. The creek is small, being able to support but a small run under the most favorable conditions. All fish life in this stream leads a very

precarious existence at best.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Skv
E	11/13/3	10:30 am	39.0 F	34.5 F	Clear

Pool Grade:

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S2T1 %	S2T2 %	S2T3 %	S3T1 %	S3T3 %
A-B	1.98	no restins pools						
B-C	6.30	15	2	2	1		2	10
				13.0	7.0		13.0	67.0
C-D	7.78	no restina pools						
D-Fk	5.37	58	11	5		1		53
				8.0		2.0		90.0
Grand Tot	21.43	73	3	7	1	1	2	62
				10.0	1.0	1.0	3.0	85.0

Gradient:

Station	Distance (miles)	Total Drop	Avg Drop Per Mile	Source of Data
A-C	8.47	280'	33'	Topographic Map
C-D	7.78	360'	46'	Topographic Map
D-E	5.37	510'	95'	Topographic Map
Total	15.70	1,150'	11'	

Bachelor Creek

River System: **Yakima River**

Stream Surveyed: **Bachelor Creek, tributary to Ahtanum Creek**

Date of Survey: **November 8-12, 1935**

Source:

Ahtanum Creek, 16.8 miles above the mouth of the latter, in Yakima County, Washington

Location: **Yakima County, Washington, 2.6 miles above the mouth of Ahtanum Creek**

Total Length: **17.2 miles, all surveyed.**

Station Location:

Sta	Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
A	Lower confl Ahtanum Ck	0	0.0	0	0.0	SW4,S1 T12N,R18E	9'	10.3"
B	Bridge at Sorenson Rd		3.61		3.61	SW4,NW4,S3 T12NfR18E	9'	5.4"
C	Bridge on section line between ranges 17 & 18		4.72		8.33	NE4,NE4,S1 T12N,R17E	11'	7.4"
D	Mark Lane bridge		3.63		11.96	SE4,NE4,S9 T12NfR17E	24'	22.8"
E	Lynch Lane bridge		3.19		15.15	NE4,NE4,S18 T12N,R17E	19'	25.2"
F	Upper confl Ahtanum Ck		2.07		17.22	NW4,SE4,S13 T12N,R16E	11'	6.0"

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17030003	0812	0.00
B*	17030003	0799	0.00
c*	17030003	0799	0.00
D*	17030003	0799	0.00
E*	17030003	0826	0.00
F	17030003	0840	0.00

• Station location is not definite and has been estimated

Character of Bottom Between Stations:

Station	Area (yd ²)	L.R.	%	M.R.	%	S.R.	%	M&S	%
A-B					4		26		70
B-C					16		32		52
C-D			2		23		37		38
D-E			1		35		35		29
E-F			8		38		42		12

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd ²)	Available Spawning Area (yd ²) (MR&SR)	% Avail	Usable Spawning Area (yd ²)	% Usable
A-B	6,360		5,381	30		
B-C	8,310		12,709	48		
C-D	6,385		16,286	60		
D-E	5,607		19,800	70		
E-F	3,650		12,495	80		

Spawning Area Unavailable and Unusable:

None at high water. All unavailable except 4,251 square yards in the first 5,360 yards between Stations A and B at low water.

Character of Watershed:

Mountainous

Hilly	X
Rolling	X
Flat	
Swampy	
Wooded	
Open	X
Cultivated	50%
Character of Valley	

Character of Watershed (cont):

Character
of BanksDensity of
Marginal
Vegetation

Erosion

a) Banks

b) Watershed

Diversions:

Diversion 1: NE4,S2,T12N-R18E, L.B. 0 cfs. 3,100 paces above Station A. Irrigation ditch, width 6', depth 2'. No water being diverted. No headgate. No protective devices. Temporary earth and timber cribs in stream.

Diversion 2: NE4,S3,T12N,R18E, R.B. 0 cfs. 5,347 paces above Station A. Irrigation ditch, width 2', depth 4'. No water being diverted. No headgate. No protective devices. Board and earth dam 2' high across stream. No spillover dam. Complete barrier at present.

Diversion 3: NW4,S3,T12N,R18E, L.B. 0.75 cfs. At Station B. Irrigation ditch, width 4', depth 4'. Headgate at intake. No protective devices. Temporary board and earth diversion dam in stream.

Diversion 4: SE4,S4,T12N,R18E, L.B. Undetermined flow. 1,057 paces above Station B. Irrigation pipe, diameter 1'. No headgate. Temporary board diversion dam in stream. No spill of water over dam.

Diversion 5: SW4,S4,T12N,R18E, R.B. 2.38 cfs. 2,660 paces above Station B. Irrigation ditch, width 5', depth 4', average water depth 6". Headgate 200 yards below intake. No protective devices. Temporary rock wing dam in stream.

Diversion 6: SW4,S5,T12N,R18E, R.B. 0.575 cfs. 4,100 paces above Station B. Irrigation ditch, width 30", average water depth 4.5". Headgate at intake 4' wide by 30" high. No protective devices. Temporary plank upstream apron dam 10" high extends 18' across stream.

Diversion 7: SE4,S6,T12N,R18E, R.B. 1.18 cfs. 5,481 paces above Station B. Irrigation ditch, width 3.5', depth 2', average

water depth 7". Headgate at intake 30" wide by 22" deep. No protective devices. No diversion dam.

Diversion 8: SW4,S6,T12N,R18E, L.B. 0 cfs. 7,372 paces above Station B. Irrigation ditch, width 6,, depth 20". No water being diverted. No headgate. No protective devices. Concrete diversion dam 18" high extends 20, across stream. Plank headgate in dam, width 7', depth 20".

Diversion 9: SE4,S1,T12N,R17E, R.B. 0 cfs. 620 paces above Station C. Irrigation ditch. No water being diverted. Headgate 30" wide by 33" deep at intake. No protective devices. Log diversion dam 10" high extends 12, across stream.

Diversion 10: NE4,S12,T12N,R17E, L.B. 0 cfs. 800 paces above Station C. Irrigation ditch, width 3,, depth 20". No water being diverted. No headgate. No protective devices. Plank dam and headgate 8' wide by 4, deep in stream. Headgate open at present. Drop 8".

Diversion 11: NW4,S12,T12N,R17E, L.B. 0 cfs. 1,260 paces above Station C. Irrigation ditch, width 36", depth 20". No water being diverted. No headgate. No protective devices. No diversion dam in stream.

Diversion 12: NW4,S12,T12N,R17E, 0 cfs. 1,260 paces above Station C. Irrigation flume, abandoned, 5' above present stream level. No headgate. No protective devices. No diversion dam in stream.

Diversion 13: NW4,S12,T12N,R17E, R.B. 0 cfs. 2,450 paces above Station C. Irrigation ditch. No water being diverted. Headgate 24" wide by 20 deep located at intake. No protective devices. Headgate 6, wide by 5' high located in stream bed, open at present.

Diversion 14: NW4,S12,T12N,R17E, L.B. 0 cfs. 2,450 paces above Station C. Irrigation ditch. No water being diverted. Headgate 18" wide by 20 deep located at intake. (See Diversion 13.)

Diversion 15: NE4,S11,T12N,R17E, L.B. 0 cfs. 2,717 paces above Station C. Irrigation pipe (wooden), diameter 8". No water being diverted. No headgate. No protective devices. Temporary rock diversion in stream.

Diversion 16: NE4,S11,T12N,R17E, R.B. 0 cfs. 2,936 paces above Station C. Irrigation ditch, width 2.5,' depth 3,' above stream level at present. No headgate. No protective devices. Temporary board diversion dam in stream.

Diversion 17: NW4,S11,T12N,R17E, R.B. 0 cfs. 3,694 paces

above Station C. Irrigation ditch, width 2', depth 2'. No water being diverted. Headgate 150 yards below intake. No protective devices. Permanent plank dam 3' high across stream.

Diversion 18: NW4,S11,T12N,R17E, R.B. Undetermined flow. 4,273 paces above Station C. Irrigation pipe, diameter 1'. Headgate at intake. No protective devices. Permanent plank dam 2' high, 20' crest in stream.

Diversion 19: NE4,S10,T12N,R17E, L.B. 0 cfs. 4,479 paces above Station C. Irrigation ditch, width 30", depth 1'. No water being diverted. Headgate at intake. No protective devices. No diversion dam in stream.

Diversion 20: NW4,S10,T12N,R17E, R.B. 1.28 cfs. 5,645 paces above Station C. Irrigation ditch, width 6', depth 4', average water depth 2.5" over 4'. Cippoletti Weir headgate (6' wide by 4.5' high) set in concrete abutments located 35 yards below intake. No protective devices. No diversion dam in stream. Ditch not diverting maximum.

Diversion 21: NW4,S10,T12N,R17E, R.B. 0 cfs. 6,172 paces above Station C. Irrigation ditch, width 2', depth 2', no water being diverted. Headgate at intake. No protective devices. No diversion dam in stream.

Diversion 22: NE4,Sg,T12N,R17E, R.B. 0 cfs. 376 paces above Station D. Irrigation ditch, width 30", depth 12", intake above present stream level. No headgate. No protective devices. Temporary board wing dam extends 12' into stream.

Diversion 23: NE4,Sg,T12N,R17E, L.B. 0 cfs. 660 paces above Station D. Irrigation ditch, width 4', depth 2'6". No water being diverted. Headgate located 50' below intake. No protective devices. Temporary brush dam in stream.

Diversion 24: NW4,Sg,T12N,R17E, R.B. 0 cfs. 1,985 paces above Station D. Irrigation ditch, width 4', depth 3'. No water being diverted. Headgate 18" wide by 18" deep, located 150 yards from intake. Return to stream located in front of headgate. Temporary plank diversion dam in stream.

Diversion 25: SE4,S8,T12N,R17E, L.B. 0 cfs. 2,219 paces above Station D. Irrigation ditch, width 48", depth 30". No water being diverted. Headgate 4' wide by 4' deep at intake. No protective devices. No diversion dam at present.

Diversion 26: SE4,S8,T12N,R17E, L.B. 0 cfs. 2,872 paces above Station D. Irrigation ditch. No water being diverted. Headgate 24" wide by 15" deep at intake. No protective devices. Temporary plank dam 12" high extends 12' across stream.

Diversion 27: SW4,S8,T12N,R17Ef R.B. 0.39 cfs. 3,577 paces above Station D. Irrigation ditch, width 18", depth 24", average water depth 4". No headgate. No protective devices. No diversion dam in stream.

Diversion 28: SW4,S8,T12N,R17E, L.B. 0 cfs. 3,686 paces above Station D. Irrigation ditch. No water being diverted. Headgate 18" wide by 18" deep located at intake. No protective devices. No diversion dam in stream.

Diversion 29: SW4,S8,T12N,R17Ef L.B. 0 cfs. 3,957 paces above Station D. Irrigation ditch, width 6', depth 1'. No water being diverted. No headgate. No protective devices. No diversion dam.

Diversion 30: SW4,S8,T12N,R17E, R.B. 0.30 cfs. 4,304 paces above Station D. Irrigation pipe, diameter 8". Headgate 30" wide by 12" deep at intake. No protective devices. No diversion dam in stream.

Diversion 31: SW4,S8,T12N,R17E, L.B. 0 cfs. 4,357 paces above Station D. Irrigation ditch (probably abandoned). No water being diverted. No headgate. No protective devices. No diversion dam in stream.

Diversion 32: SW4,S8,T12N,R17E, R.B. 0 cfs. 4,437 paces above Station D. Irrigation ditch, width 16", depth 10". No water being diverted. No headgate. No protective devices. Temporary rock diversion dam 8" high by 20, long in stream.

Diversion 33: SE4,S7,T12NfR17E, R.B. 0 cfs. 4,607 paces above Station D. Irrigation ditch. No water being diverted. Headgate 24" wide by 24" deep at intake. No protective devices. Temporary earth and plank diversion dam 12" high by 25' long in stream.

Diversion 34: SE4,S7,T12N,R17E, R.B. 0 cfs. 5,583 paces above Station D. Irrigation ditch, width 3', depth 3'. No water being diverted. No headgate. No protective devices. No diversion dam.

Diversion 35: NE4,S18,T12N,R17E, R-B. 0 cfs. 670 paces above Station E. Irrigation ditch, width 6', depth 2'. No water being diverted. No headgate. No protective devices. No diversion dam in stream.

Diversion 36: NW4,S18,T12N,R17E, R.B. 0 cfs. 1,960 paces above Station E. Irrigation ditch. No water being diverted. Headgate 14" wide by 14" deep at intake. No protective devices. No diversion dam in stream at present.

Diversion 37: NE4,S13,T12N,R16E, L.B. 0 cfs. 3,000 paces above Station E. Irrigation pipe, diameter 12". No water being diverted. Headgate at intake. No protective devices. No diversion dam.

Diversion 38: NE4,S13,T12N,R16E, L.B. 0 cfs. 3,640 paces above Station E. Irrigation pipe, diameter 12". No water being diverted. No headgate. No protective devices. No diversion dam.

Note : Total water (measured and estimated) diverted for irrigation from Bachelor Creek at time of survey is 6.855 cfs.

Artificial Obstructions:

1. Diversion #2. 2' board and earth diversion dam. No protective devices. Barrier at low water.

Natural Obstructions: None

Fluctuation in Water Level:

Fluctuation: 3-5'

Cause of Variation: melting snow, rains, and diverting of water to and from other channels.

Stream Volumes: Variation of 0'-4'

Location	Date	Cfs
Station A	11/12/35	9.8
Station B	11/12/35	4.3
Station F	11/12/35	17.5

Pollution: None

Fish (salmon): None

Fish (other than salmon):

Species	Date	Very Abundant	Abundant	Fair No.	Scarce
Rainbow	reported			X	
Cutthroat	reported			X	
Dolly Varden	reported			X	
Eastern Brook	reported				X
Whitefish	reported		X		

General Remarks:

Topography

For its entire course of 17.2 miles, Bachelor Creek flows through farming and pasture lands of the Ahtanum Valley. This channel of the Ahtanum may be considered as an irrigation ditch, the flow of water being controlled by a headgate at the point of divergence from the Ahtanum proper. 38 irrigation diversions occur on Bachelor Creek, and any water remaining below the last ditch is returned to the Ahtanum channel 2.6 miles from its mouth.

Bachelor Creek is well protected by alders, cottonwood and miscellaneous underbrush throughout most of its length.

Character of River

From Station A to Station B the bottom is about 30% small rubble, and 70% mud or sand. The riffles vary from poor to good. Above Station B the bottom is composed of about 40% mud and sand, the other 50% being divided more or less equally between small and medium rubble. This condition persists for the remainder of the stream. Riffles here are usually good. The current throughout is generally about two feet per second.

There were 138 pools averaging eight pools per mile in the 17.22 miles surveyed on Bachelor Creek. Of these 89% of the pools were less than 25 square yards in area, less than three feet deep in the center of the stream without adequate cover (S3T3); 5% were less than 25 square yards in area, less than three feet deep near the bank with adequate cover (S3T1). The remaining 6% were miscellaneous types, none of which represent more than 2% of the total.

Diversions and Obstructions

Bachelor Creek supplies 38 irrigation diversions. Six of these have permanent diversion dams of plank or concrete only one of which is a barrier, diversion #2 (see "Diversions"). The remaining dams are of a temporary nature, being erected, when needed, with earth, rocks or brush. None of the diversions are protected, by screens or otherwise, but nearly all are equipped with makeshift headgates of plank.

Fish Population

No salmon or steelhead are known to occur in Bachelor Creek. The creek was non-existent when salmon runs did occur in the Ahtanum. During early spring months fair catches of rainbow, cutthroat and dolly varden are reported from this channel. In recent years the State Fish and Game Department has planted Bachelor Creek with Eastern Brook trout, but these have almost

disappeared. Local farmers report that these fish were removed at once by Indians. Whitefish occur in considerable numbers.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Skv
A	11/ 8/35	2:30 pm	50.0 F	52.0 F	Cloudy
B	11/ 8/35	3:55 pm	49.5 F	52.0 F	Cloudy
C	11/ 9/35	10:15 am	44.5 F	39.0 F	Clear
D	11/11/35	10:10 am	35.0 F	38.0 F	Cloudy
E	11/11/35	10:30 am	33.0 F	37.0 F	Cloudy
F	11/11/35	11:50 am	35.0 F	39.0 F	Clear

Pool Grade:

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S2T1 %	S2T2 %	S2T3 %	S3T1 %	S3T2 %	S3T3 %
A-B	3.61	17	5			1			16
						6.0			94.0
B-C	4.72	21	4						21
									100.0
C-D	3.63	20	6	1	3		1	1	14
				5.0	15.0		5.0	5.0	70.0
D-E	3.19	36	11	1			6	1	28
				3.0			17.0	3.0	77.0
E-F	2.07	44	21						44
									100.0
Grand Total	17.22	138	8	2	3	1	7	2	123
				1.5	2.0	1.0	5.0	1.5	89.0

Gradient:

Station	Distance (miles)	Total Drop	Avg Drop Per Mile	Source of Data
A-B	3.61	85'	24'	Topographic Map
B-C	4.72	170'	36'	Topographic Map
C-D	3.63	180'	50'	Topographic Map
D-E	3.19	175'	55'	Topographic Map
E-F	2.07	70'	34'	Topographic Map
Total	17.22	680'	39'	

Hatton Creek

River System: **Yakima River**

Stream Surveyed: **Hatton Creek, a tributary of Ahtanum Creek**

Date of Survey: **November 11-12, 1935**

Source: **Ahtanum Creek, 16.8 miles above the mouth of the latter.**

Location: **Yakima County, Washington; 7.5 miles above the mouth of Ahtanum Creek.**

Total Length: **10.0 miles, all surveyed.**

Station Location:

Sta	Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
A	Lower confl Ahtanum Ck	0	0.0	0	0.0	NE4,NE4,S8 T12N,R18E	8.0'	7.4"
B	Meadowbrook Road bridge		3.42		3.43	SW4,NW4,S12 T12N,R17E	6.0'	7.8"
C	Rutherford Road bridge		2.92		6.35	NE4,NE4,S17 T12N,R17E	7.5'	1.3"
D	Upper confl		2.55		8.90	NW4,SW4,S18	14.0'	11.0"

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17030003	0841	0.00
B*	17030003	0841	0.00
c*	17030003	0841	0.00
D	17030003	0853	0.00

• Station location is not definite and has been estimated

Character of Bottom Between Stations:

Station	Area (vd ²)	L.R.		M.R.		S.R.		M&S	
			%		%		%		%
A-B					9		15		76
B-C		2			19		17		62
C-D		2			24		28		46

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd ²)	Available Spawning Area (yd ²) (MR&SR)	% Avail	Usable Spawning Area (yd ²)	% Usable
A-B	8,435		3,229	24		
B-C	7,460		7,108	36		
C-D	3,970		7,527	52		

Spawning Area Unavailable and Unusable: **None**

Character of Watershed:

Mountainous

Hilly

Rolling

Flat

X

Swampy

Wooded

Open

Cultivated

95%

Character
of Valley

Character
of Banks

Density of
Marginal
Vegetation

Erosion

a) Banks

b) Watershed

Diversions:

Diversion 1: SE4,S5,T12N,R18E, R.B. 0 cfs. 135 paces above Station A. Irrigation ditch. No water being diverted. Headgate 30" wide by 26' deep at intake. No protective devices. Diversion dam 12" high, 12' long in stream.

Diversion 2: SE4,S5,T12N,R18E, R.B. 0 cfs. 215 paces above Station A. Irrigation ditch. No water being diverted. Headgate 3' wide by 4' deep at intake. No protective devices. Plank diversion dam in stream 24" high, 10' long. Barrier at present.

Diversion 3: NW4,S8,T12N,R18E, R.B. Undetermined flow. 1,500 paces above Station A. Irrigation ditch. Headgate 7' wide by 5' high at intake. No diversion dam in stream.

Diversion 4: NE4,S7,T12N,R18E, R.B. 0 cfs. 2,549 paces above Station A. Irrigation ditch, width 36", depth 42". No water being diverted. Headgate at intake. No protective devices. Plank dam; drop variable (maximum 42"). No barrier.

Diversion 5: NW4,S7,T12NfR18E, R.B. 0 cfs. 3,059 paces above Station A. Irrigation ditch, width 3', depth 2'. No water being diverted. Headgate 2' wide by 2' deep located 50' below intake. No protective devices. No diversion dam in stream.

Diversion 6: NW4,S7,T12N,R18E, L.B. Est. 0.3 cfs. 3,528 paces above Station A. Irrigation ditch, width 12", depth 6". No headgate. No protective devices. No diversion dam.

Diversion 7: NW4,S7,T12N,R18E, L.B. 0 cfs. 3,665 paces above Station A. Irrigation ditch, width 4', depth 3'. No water being diverted. Headgate at intake. No protective devices. Headgate to control stream flow in creek bed.

Diversion 8: SW4,S12,T12NfR17E, L.B. 0 cfs. 4,876 paces above Station A. Irrigation ditch. No water being diverted. Headgate 28" wide by 20" deep at intake. No protective devices. No diversion dam.

Diversion 9: NW4,S12,T12NfR17E, R.B. 0 cfs. 5,771 paces above Station A. Irrigation ditch. No water being diverted. Headgate 2, wide by 2, deep at intake. No protective devices. Temporary plank and earth dam 15' crest 6" drop in stream.

Diversion 10: SE4,S11,T12N,R17E, R.B. 0 cfs. 375 paces above Station B. Irrigation ditch, width 3', depth 20". No water being diverted. No headgate. No protective devices. Temporary brush diversion dam 10" high extends 10' across stream.

Diversion 11: SE4,S11,T12N,R17E, L.B. 0 cfs. 445 paces above Station B. Irrigation ditch. No water being diverted. Headgate 24" wide by 20" deep at intake. No protective devices.

Temporary plank and sand bag diversion dam 10" high by 12' long in stream.

Diversion 12: SE4,S11,T12N,R17E, L.B. 0 cfs. 475 paces above Station B. Irrigation ditch, width 26", depth 10". No water being diverted. No headgate. No protective devices. No diversion dam in stream.

Diversion 13: SE4,S11,T12N,R17E, R.B. 0 cfs. 510 paces above Station B. Irrigation flume, width 22", depth 11". No water being diverted. No headgate. No protective devices. No diversion dam in stream.

Diversion 14: SE4,S11,T12N,R17E, R.B. 0 cfs. 550 paces above Station B. Irrigation ditch. No water being diverted. Headgate 14" wide by 11" deep at intake. No protective devices. No diversion dam in stream.

Diversion 15: SW4,S11,T12N,R17E, R.B. 0 cfs. 1,320 paces above Station B. Irrigation ditch, width 8,, depth 2'. No water being diverted. No headgate. No protective devices. No diversion dam.

Diversion 16: SW4,S11,T12N,R17E, L.B. 0 cfs. 1,940 paces above Station B. Irrigation ditch, width 4" depth 16". No water being diverted. No headgates. No protective devices. Temporary plank diversion dam 10 high extends 17' across stream.

Diversion 17: SE4,S10,T12N,R17E, R.B. 0 cfs. 2,969 paces above Station B. Irrigation ditch, width 3', depth 4'6". No water being diverted. Headgate 3' wide by 4' deep at intake. No protective devices. No diversion dam.

Diversion 18: SW4,S10,T12N,R17E, R.B. 0 cfs. 4,062 paces above Station B. Irrigation ditch, width 5', depth 3'. No water being diverted. Headgate 3' wide by 2' deep at intake. No protective devices. Temporary board dam 8" high in stream.

Diversion 19: SW4,Sg,T12N,R17E, L.B. 0 cfs. 5,230 paces above Station B. Irrigation ditch. No water being diverted. Headgate at intake 14" wide by 14" deep. No protective devices. Temporary plank and earth diversion dam 2, high extends 12' across stream.

Diversion 20: SW4,S9,T12N,R17E, R.B. 0 cfs. 5,315 paces above Station B. Irrigation ditch, width 28", depth 22". No water being diverted. No headgate. No protective devices. Temporary plank dam 1' high extends 20' across stream.

Diversion 21: SW4,S9,T12N,R17E, L.B. 0.24 cfs. 6,650 paces above Station B. Irrigation ditch, average water depth 10". Headgate 18" wide by 18" deep at intake. No protective devices.

Temporary rock dam 1' high extends 15' across stream.

Diversion 22: SW4,S9,T12N,R17E, R.B. 0 cfs. 7,490 paces above Station B. Irrigation ditch, width 30", depth 18". No water being diverted. No headgate. No protective devices. No diversion dam in stream.

Diversion 23: NE4,S17,T12N,R17E L.B. 1.25 cfs. At Station C. Irrigation ditch, width 5" depth 18", average water depth 15". Headgate 6' wide by 30" deep at intake. No protective devices. Temporary plank diversion dam in stream.

Diversion 24: NE4,S17,T12N,R17E, R.B. 0 cfs. 136 paces above Station C. Irrigation ditch, width 2', depth 1'. No water being diverted. Headgate 3' wide by 2, deep at headgate. No protective devices. No diversion dam in stream.

Diversion 25: NE4,S17,T12N,R17E, R.B. 0 cfs. 378 paces above Station C. Irrigation ditch, width 1', depth 1'. No water being diverted. Headgate at intake. No protective devices. No diversion dam.

Diversion 26: NE4,S17,T12N,R17E, R.B. 0 cfs. 385 paces above Station C. Irrigation ditch, width 3', depth 4'. No water being diverted. Headgate at intake. No protective devices. Plank diversion dam (3' drop) across stream. No barrier.

Diversion 27: NW4,S17,T12N,R17E, R.B. 0 cfs. 1,047 paces above Station C. Irrigation ditch, width 5', depth 4'. No water being diverted. Headgate located 50, below intake. No protective devices. No diversion dam in stream.

Diversion 28: NW4,S17,T12N,R17E, R.B. 0 cfs. 1,337 paces above Station C. Irrigation ditch, width 2" depth 18". No water being diverted. Headgate located 100' below intake. No protective devices. No diversion dam in stream.

Diversion 29: NW4,S17,T12N,R17E, R.B. 0 cfs. 1,610 paces above Station C. Irrigation ditch, width 2', depth 2'. No water being diverted. No headgate. No protective devices. No diversion dam in stream. Apparently abandoned.

Diversion 30: NE4,S18,T12N,R17E, L.B. 0 cfs. 2,745 paces above Station C. Irrigation ditch. No water being diverted. Headgate 34" wide by 34" deep located at intake. No protective devices. Temporary plank dam 16" high extends 18' across stream.

Diversion 31: NW4,S18,T12N,R17E, R.B. 0 cfs. 3,100 paces above Station C. Irrigation ditch. No water being diverted. Headgate 17 wide by 19" high at intake. No protective devices. Temporary brush and log dam 20" high extends 15, across stream.

Diversion 32: NW4,S18,T12NfR17E, L.B. 0 cfs. 3,140 paces above Station C. Irrigation ditch, width 36", depth 30". No water being diverted. No headgate. No protective devices. Temporary brush dam 4' high extends 12' across stream.

Diversion 33: NW4,S18,T12N,R17Ef R.B. 0 cfs. 3,940 paces above Station C. Irrigation ditch. No water being diverted. Headgate 22" wide by 12" high at intake. No protective devices. No diversion dam.

Note : Total (measured and estimated) diversion of water for irrigation from Hatton Creek at time of Survey 1.79 cfs.

Artificial Obstructions:

1. Diversion #2. 24" irrigation diversion dam of plank. No protective devices.

Natural Obstructions: None

Fluctuation in Water Level:

Fluctuation: 3' to 5'

Cause of Variation: freshets and diverting of water from or to Ahtanum and Bachelor Creeks.

Stream Volumes: At Station A on 11/12/35: 1.6 cfs.

Pollution: None

Fish (salmon): None

Fish (other than salmon):

<u>Species</u>	<u>Date</u>	<u>Very Abundant</u>	<u>Abundant</u>	<u>Fair No.</u>	<u>Scarce</u>
Steelhead					
Rainbow	reported				X
Whitefish	reported				X
Dolly Varden					
Cutthroat	reported				X

General Remarks:

Topography

This entire creek lies between Ahtanum and Bachelor Creeks in the Ahtanum Valley. The surrounding land is all given over to farming and pasturage. Hay, hops and small grains are the principal crops. The hills adjoining the valley do not contribute to Hatton Creek, flanked as it is by other channels.

This creek is well protected by cottonwoods, alders, willow, hawthorns and miscellaneous small brush.

Character of River

In the lower eight miles the bottom is composed of about 60% mud or sand, the remainder being small or medium rubble. The upper one mile presents fair spawning areas. Throughout the riffles are good, but pools are almost entirely lacking.

There are 19 pools averaging two pools per mile in the 8.9 miles surveyed on Hatton Creek. 80% of those are less than 25 square yards in area less than three feet deep in the center of the stream without adequate cover (S3T3). The remaining 20% is divided among four types of pool none of which compose more than 5% of the total (see "Pool Grade").

As with Bachelor and Ahtanum Creeks, Hatton Creek may be dry each few days during irrigating seasons. In low water months it may be permanently dry.

Diversions and Obstructions

Hatton Creek, only nine miles long, supplies 33 irrigation diversions. Only one of these, diversion #2, offers a complete barrier. This is a dam of plank, 10' long and 2' high. Other dams in the creek are of a temporary nature and, while not actual barriers, must retard any migration.

Remarks

See remarks for Ahtanum Creek.

Temperature Data:

Sta	Date	Hour	Air		Water		Sky
			Temw		Temw		
A	11/11/35	1:30 pm	35.5	F	39.0	F	Cloudy
B	11/11/35	3:15 pm	46.0	F	39.5	F	Clear
C	11/12/35	10:00 am	52.0	F	38.0	F	Clear

Pool Grade:

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S2T1 %	S2T2 %	S3T1 %	S3T2 %	S3T3 %
A-B	3.43	8	2					8
								100.0
B-C	2.92	3	1		1	1	1	
					34.0	33.0	33.0	
C-D	2.55	8	3	1				7
				12.0				88.0
Grand Total	8.90	19	2	1	1	1	1	15
				5.0	5.0	5.0	5.0	80.0

Gradient:

Station	Distance (miles)	Total Drop	Avg Drop Per Mile	Source of Data
A	3.43	135'	39'	Topographic Map
B	2.92	155'	53'	Topographic Map
C	2.55	125'	49'	Topographic Map
Total	8.90	415'	47'	

North Fork Ahtanum Creek

River System: **Yakima River**

stream Surveyed: **North Fork Ahtanum Creek, tributary to Ahtanum Creek**

Date of Survey: **November 13-14, 1935 and July 30, 1936**

Source: **East slope Cascade Mountains**

Location: **Rainier National Forest, Yakima County, Washington**

Total Length: **20 miles, 13.2 miles surveyed (incomplete survey)**

Station Location:

Sta	Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
A	Mouth	0	0.00	0	0.00	SE4,SW4,S17 T12N,R16E	14'	4.7"
B	Bridge 1.2 mi above Tampico		2.43		2.43	SW4,NE4,S12 T12N,R15E	19'	7.2"
C	Bridge 4 mi above Tampico		2.74		5.17	SW4,NE4,S3 T12N,R15E	11'	10.8"
D	Bridge 5.8 mi above Tampico		1.85		7.02	NW4,SE4,S4 T12N,R15E	19'	10.4"
E	Soda Springs Foot Bridge		1.11		8.13	SW4,SW4,S8 T12N,R15E	18'	8.3"
F	Confl Middle Fork		2.12		10.25	NE4,SW4,S24 T12N,R14E	13'	4.6"
G	5,200 paces above Station F		2.95		13.20	SE4,NE4,S21 T12N,R14E	13'	9.0"

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17030003	0010	0.35
B*	17030003	0010	2.30
C*	17030003	0010	4.91
D*	17030003	0010	6.63
E*	17030003	0010	8.27
F	17030003	0014	0.00
G*	17030003	0014	0.88

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

Station	Area (yd ²)	L.R.	%	M.R.	%	S.R.	%	M&S	%
A-B			24		31		39		6
B-C			37		38		23		2
C-D			30		35		35		
D-E			35		38		27		
E-F			50		37		14		
F-G			50		37		13		

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd ²)	Available Spawning Area (yd ²) (MR&SR)	% Avail	Usable Spawning Area (yd ²)	% Usable
A-B	4,275		17,370	70		
B-C	4,830		17,663	61		
C-D	3,250		17,866	70		
D-E	1,950		8,650	65		
E-F	3,735		9,444	50		
F-G	5,200		10,205	50		

Spawning Area Unavailable and Unusable: **None**

Character of Watershed:

Mountainous

X

Hilly

Rolling

Flat

Swampy

Wooded

X

Open

Cultivated

Character
of Valley

Character of Watershed (cont):

**Character
of Banks**
**Density of
Marginal
Vegetation****Erosion**

a) Banks

b) Watershed

Diversions:

Diversion 1: SW4,S17,T12N,R16E, L.B. 0 cfs. 267 paces above Station A. Irrigation ditch, width 18", depth 6", no water being diverted. No headgate. No protective devices. No diversion dam.

Diversion 2: NE4,S13,T12N,R15E, L.B. 0 cfs. 2,681 paces above Station A. Irrigation ditch, no water being diverted. Headgate width 4', depth 3', located 200 paces below intake. No protective devices. No diversion dam in stream.

Diversion 3: SE4,S12,T12N,R15E, R.B. 2.13 cfs. 3,625 paces above Station A. Irrigation ditch, average water depth 4 1/4" over 3' Cippoletti Weir. Headgate 6' wide by 5' high at intake. Plank diversion dam, 4' drop in stream. REMARKS: Dam probable barrier to upstream migrants during low water periods, also trap for downstream migrants during same periods.

Diversion 4: NW4,S12,T12N,R15E, R.B. 3.18 cfs. 30 paces above Station B. Irrigation ditch, width 7' depth 18", average water depth 5". No headgate. No protective devices. Plank and boulder wing dam 12" high extends 20' into stream.

Diversion 5: NE4,SW4,S24,T12N,R14E, R.B. 0.3 cfs. 128 paces above Station F. Irrigation ditch, width 18", depth 18", average water depth 6". No headgate. No protective devices. Temporary sand and bag wing dam.

Note : Total diversion of water for irrigation from the North Fork of Ahtanum Creek, at time of survey 5.61 cfs.

Artificial Obstructions:

<u>Location</u>	<u>Character</u>	<u>Height</u>	<u>Protection Devices type</u>	<u>efficiency</u>
SE4,S12,T12N,R15E	Irrigation dam	4'	none	
General remarks: probable barrier only during low water periods.				

Natural Obstructions: **None**

Fluctuation in Water Level:

Feet Variation: 2'-3'

Cause of Variation: spring run-off

Stream Volumes: At Station A on 11/13/35, estimated 20 cfs

Pollution: **None**

Fish (salmon): **No salmon runs**

Fish (other than salmon):

Species	Date	Very Abundant	Abundant	Fair No.	Scarce
Steelhead					
Rainbow	reported				X
Whitefish					
Dolly Varden					
Cutthroat	reported				X

General Remarks:

Tributaries

Nasty Creek, Foundation Creek (unimportant)

Topography

This fork of the Ahtanum flows through a relatively narrow valley. A few pines grow on the slopes of the lower valley, but are not very numerous in any area below Soda Springs. The banks of the stream especially in lower valley support an extremely heavy growth of tangled underbrush including hawthorne, scrub alder, willow and other miscellaneous brush. A few cottonwoods line the banks farther upstream. A very small percentage of this watershed is under cultivation, only two or three small farms being present near the mouth.

Character of Stream

For the first three miles above the confluence with the South Fork, the stream is rather slow moving (1' per sec.) often running in several channels over flat areas. Many places in this stretch beaver dams have diverted the water into shallow ponds, however,

small areas of good spawning gravels do occur, intermittently. Above Sta B to Soda Springs fair spawning gravels are present, consisting of about 60% of the total area available. From Soda Springs to terminus of survey good spawning areas occur, about 50% of the bottom being medium and small rubble.

There were 150 pools averaging 3 resting pools and 8 S6 pools per mile in the 13.2 miles surveyed on the North Fork of the Ahtanum. 73% of the pools were small, located between cascades or in fast water (S6). 17% were less than 25 sq yds in area, less than 3 ft deep, near the bank, with adequate cover (S3T1). 5% were from 25-50 sq yds in area, from 3-6 ft deep near the bank with adequate cover (S2T1). The remaining 5% were miscellaneous types none of which represented more than 2% of the total. Ice from Sta D to Sta E hampered accurate determination of pools.

In general, the riffles are good, but pools and holes are infrequent. The discharge on Nov. 13, 1935, was approximately 20 cfs.

There is one only possible barrier in this stream, that is a small irrigation dam 4' high about a mile and one-half above the mouth. Of course this is no obstacle during high water, but when the water recedes, this becomes an impassable obstruction for upstream migrants and the ditch intake a serious menace to downstream migrants.

Fish Population

No fish were seen in this stream during the time of survey; however, reports from fishermen indicate that a few rainbows and cutthroats were present. Salmon and steelhead probably never get into this fork of the stream because it is only accessible through the main river which is merely a network of irrigation dams and diversions.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Skv
A	11/13/35	10:30a	39 F	34.0F	clear
B	11/14/35	11:05a	36	34.0	cloudy
C	11/14/35	10:55a	35	33.5	cloudy
D	11/14/35	10:40a	35	33.5	cloudy
E	11/14/35	10:30a	32	33.5	cloudy
F	7/30/36	10:05a	78	52.0	fair
G	7/30/36	2:oop	72	54.0	fair

Pool Grade:

Sta	Resting Pools	Resting Pools/Mile	S2T1 %	S2T2 %	S2T3 %	S3T1 %	S3T2 %	S3T3 %	S6	Total
A-B (2.43 mi)	10	4	5		1	2	2			10
			50.0		10.0	20.0	20.0			
B-C (2.74 mi)	1	1/18						1	48	49
								100.0		
C-D (1.85 mi)	11	3/8	2	1		7		1	29	40
			18.0	9.0		63.0		9.0		
D-E			(no resting pools)							
E-F (2.12 mi)	16	8/15				15	1		32	48
						94.0	6.0			
F-G (2.95)	4	1	1			2				3
			33.0			67.0				
Grand Total	41	3/8	8	1	1	26	3	2	109	150
(13.20 mi)			19.0	2.0	2.0	64.0	7.0	5.0		

Gradient:

Station	Distance (miles)	Total Drop	Avg Drop Per Mile	Source of Data
A-B	2.43	200'	82'	Topographic Map
B-C	2.74	182'	66'	Topographic Map
C-D	1.85	138'	75'	Topographic Map
D-E	2.00*	250'	125'	Topographic Map
E-F	2.12	280'	132'	Topographic Map
F-G	2.95	470'	159'	Topographic Map
Totals	14.09	1,520'	108'	

* measured on map

Nasty Creek

River System: Yakima River

Name of Stream: Nasty Creek, tributary to North Fork of Ahtanum
Creek

Description:

Flows east 5 miles from mountain source to confluence
with the North Fork of Ahtanum Creek, 3 miles below Soda Springs.

Remarks: Too small to be suitable for spawning.

Foundation Creek

River System: **Yakima River**

Name of Stream: **Foundation Creek, tributary to North Fork of
Ahtanum Creek**

Description:

Flows east 10 miles from source in Rainier National Forest to confluence with the North Fork of Ahtanum Creek, one mile above Soda Springs.

Remarks: **Too small and too steep gradient to be spawning stream.**

South Fork of North Fork of Ahtanum Creek

River System: **Yakima River**

Name of Stream: **South Fork of North Fork of Ahtanum Creek,
tributary to North Fork of Ahtanum Creek**

Description:

**Flows NE 10 miles from source in Rainier National
Forest to confluence with North Fork of Ahtanum Creek, 3 miles
above Soda Springs.**

Remarks:

**Too small and too steep gradient to be good spawning
stream.**

South Fork of Ahtanum Creek

River System: **Yakima River**

Stream Surveyed: **South Fork of Ahtanum Creek, tributary to Ahtanum Creek**

Date of Survey: **November 14, 1935**

Source:

Location: **Yakima County, Washington**

Total Length: **13 miles; 5.3 miles surveyed.**

Station Location:

Sta	Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
A	Confl with North fork	0	0.0	0	0.0	SE4,SW4,S17 T12N,R16E	11'	6.4"
B	First Highway bridge		4.66		4.66	SW4,SW4,S23 T12N,R15E	12'	13.2"
C	Bridge 0.8 mi above Sta B		0.68		5.34	NW4,SW4,S27	14'	13.2"

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17030003	0015	0.03
B*	17030003	0015	7.70
c*	17030003	0015	9.73

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

Station	Area (yd ²)	L.R.		M.R.		S.R.		M&S	%
		%		%		%			
A-B		21		27		28		24	
B-C		14		34		49		3	

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd ²)	Available Spawning Area (yd ²)		Usable Spawning Area (yd ²)	
			(MR&SR)	% Avail		% Usable
A-B	8,208		14,245	55		
B-C	1,200		3,670	83		

Spawning Area Unavailable and Unusable: **None**

Character of Watershed:

Mountainous

Hilly X

Rolling

Flat

Swampy

Wooded X

Open

Cultivated 1%

Character
of Valley

Character
of Banks

Density of
Marginal
Vegetation

Erosion

a) Banks

b) Watershed

Diversions:

Diversion 1: SW4,S17,T12N,R16E, L.B. 0 cfs. 404 paces above Station A. Irrigation ditch, width 30", depth 24", no water being diverted. No headgate. No protective devices. Temporary wing dam in stream.

Diversion 2: SE4,.513,T12N,R15E, R.B. 0 cfs. 4,178 paces above Station A. Irrigation ditch, width 12", depth 12", no water being diverted. No headgate. No protective devices. No diversion dam in stream.

Diversion 3: NW4,S24,T12N,R15E, R.B. 0 cfs. 5,468 paces above Station A. Irrigation ditch, width 30", depth 20", no water being diverted. No headgate. No protective devices. No diversion

dam in stream.

Diversion 4: NE4,S23,T12N,R15E, R.B. 0 cfs. 6,278 paces above Station A. Irrigation ditch, no water being diverted. Headgate, 18" wide by 14" deep at intake. No protective devices. No diversion dam in stream.

Diversion 5: SE4,S23,T12N,R15E, R.B. 0 cfs. 7,238 paces above Station A. Irrigation ditch, width 30" depth 20". No water being diverted. No headgate. No protective devices. Temporary brush dam 24" high extends 10' across stream.

Diversion 6: SW4,S23,T12N,R15E, R.B. 0 cfs. 7,838 paces above Station A. Irrigation ditch, width 36" depth 26". No water being diverted. No headgate. No protective devices. No diversion dam in stream.

Note : No diversion of water for irrigation from South Fork of Ahtanum Creek at time of survey.

Artificial Obstructions: None

Natural Obstructions: None

Fluctuation in Water Level:

Feet Variation: 2'-4'

Cause of Variation: melting snow, freshets, etc.

Stream Volumes: At Station A on 11/14/35, est. 8 cfs

Pollution: None

Fish (Salmon): No longer any runs

Fish (other than salmon):

<u>Species</u>	<u>Date</u>	<u>Very Abundant</u>	<u>Abundant</u>	<u>Fair No.</u>	<u>Scarce</u>
Steelhead					
Rainbow	reported				X
Whitefish					
Dolly Varden					
Cutthroat	reported				X

General Remarks:

Tributaries

Reservation Creek.

Topography

The South Fork is confined to a narrow valley never more than 1/2 mile in width. The valley walls are steep, about 1500 feet high, and sparsely covered with conifers and grasses. A few farms are found in the lower valley, these given over to raising of hops.

The creek is very well protected by willows, alders, cottonwood and miscellaneous small brush. The higher valley is mountainous, and is given over to sheep grazing.

Character of River

From Station A-C the stream is small, the discharge (Nov. 14, 1935) being about 8 cfs. The bottom is fairly well adapted to the spawning needs of salmonids, running approximately 40% small and medium rubble. The riffles are usually good.

The current was varied from 1-2 feet per second. The temperature fluctuated but little, being 34-35 degrees F on Nov. 14 1935; the air being 40 degrees F. Discharge about 6 cfs, Nov. 12, 1935.

There were 41 pools averaging 8 pools per mile in the 5.34 miles surveyed on the South Fork of the Ahtanum. 95% of the pools were small pools located in the center of the stream between cascades or fast water (S6). The remaining 5% were pools less than 25 sq yds in area, less than 3 feet deep, near the bank with adequate cover (S3T1).

Diversions and Obstructions

Six irrigation diversions occur on this fork, two possessing temporary diversion dams which are not barriers. No screens or protective devices are present.

No real obstructions are found, though frequent beaver dams, brush jams, etc. offer partial barriers.

Fish Population

No fish were observed, though limited numbers of rainbows and cutthroats are reported as present. Local residents state that not since about 1900 have salmon or steelhead entered this stream, though prior to that time a few salmon found their way about two miles up from the mouth. No steelhead run has ever been reported.

Remarks

Valueless as a salmon or steelhead producer, until main Ahtanum Creek made passable.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Skv
A	11/14/35	11:30 am	38 F	34 F	cloudy
B	11/14/35	2:10 pm	40 F	35 F	cloudy
C	11/14/35	2:00 pm	40 F	35 F	cloudy

Pool Grade:

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	SlT1 %	SlT2 %	S3T1 %	S6	Total
A-B	4.66	2	1/4			2	19	21
B-C	0.68	0	0/29				20	20
Total	5.34	2	1/7			2	39	41
						100.0		

Gradient:

Station	Distance (miles)	Total Drop,	Avg Drop Per Mile	Source of Data
A-C	5.34	420'	79'	Topographic Map

Reservation Creek

River System: Yakima River

Name of Stream: Reservation Creek, tributary to South Fork of
Ahtanum Creek

Description:

Flows NE 5 miles from source in small, mountainous lake in Sec 18, T11N R14E to confluence with South Fork of Ahtanum Creek. No tributaries. Steep gradient.

Remarks:

Not actually investigated but doubtless very small. South Fork of Ahtanum Creek carries but little water and has several partial barriers in the form of diversion and beaver dams.

Naches River

River System: **Yakima River**
 Stream Surveyed: **Naches River, tributary to Yakima River**

Date of Survey: **July 16-23, 1935**

Source: **Bumping River, Little Naches River**

Location: **Yakima and Kittitas Counties, Washington**

Total Length: **40 miles**

Naches River Note:

The Little Naches River (as listed on survey cards) is actually a continuation of the upper portion of the Naches River. The survey party used a Forest Service Fire Control map that showed the Naches River to begin at the confluence of Bumping River and the Little Naches River. The Little Naches River was that part of the river from the confluence of the North and South Forks of the Naches River (above Crow Creek) down to the mouth of Bumping River.

The Mount Rainier National Forest map of 1936 shows the Naches River proper to extend not only up past the mouth of Bumping River, but even past the South Fork, and thus considers even the North Fork to be part of the Main Naches River.

However the USGS Quadrangle maps consider the Naches River to originate at the confluence of its North and South Forks, instead of at the mouth of the Bumping River and shows no part under the name of the Little Naches River. Since the whole river from the confluence of the North and South Forks seems to be continuously the same stream, this appears to be the most common and logical arrangement, and will be the one used by the survey. Therefore the Little Naches River survey is placed in the files after the main Naches until the two can be combined in a single write-up.

Station Location:

Sta	Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
A	Yakima Ellens- burg Hwy Bridge	0	0.00	0	0.00	NE4,SW4,S12 T13N,R18E	79'	5.00'
B	Nelson Bridge		3.60		3.60	NW4,NW4,S9 T13N,R18E	234'	2.85'
C	Naches Bridge		8.34		11.94	SW4,NW4,S10 T14N,R17E	171'	0.76'

Station Location (cont):

Sta	Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
D	Tieton Bridge		4.71	16.65		SW4,NW4,S35 T15N,R16E	130'	1.34'
E	Krober Bridge		4.95	21.60		SW4,SW4,S17 T15N,R16E	118'	1.64'
F	Lower Rattle- snake Bridge		3.21	24.81		SW4,S2 T15N,R15E	161'	1.10'
G	Upper Rattle- snake Bridge		4.35	29.16		NW4,NE4,S28 T16N,R15E	156'	1.70'
H	Squaw Rock Bridge		3.36	32.52		SE4,S7 T16N,R15E	84'	2.40'
I	Chase Bridge		1.44	33.96		NW4,S1 T16N,R14E	76'	2.35'
J	Cliffdell Bridge		3.33	37.29		NW4,S26 T17N,R14E	86'	1.46'
K	Confl North & South Forks		3.93	41.22				

EPA River Reach Codes:

Station	'HUC	SEG	Rmi
A	17030002	0001	0.00
B	17030002	0002	0.61
C	17030002	1102	0.00
D	17030002	0003	0.00
E	17030002	0003	4.75
F	17030002	0003	8.48
G	17030002	0006	0.00
H	17030002	0008	0.07
I	17030002	0008	3.33
J	17030002	0008	7.93
K	17030002	0008	11.49

Character of Bottom Between Stations:

Station	Area (yd ²)	L.R.		M.R.		S.R.		M&S	
		%	%	%	%	%	%		
A-B		29		31		39		1	
B-C		23		31		46			
C-D		26		31		43			
D-E		34		32		34			
E-F		29		32		39			
F-G		28		32		40			
G-H		28		33		39			
H-I		36		32		32			
I-J		33		34		33			
J-K		37		34		29			

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd ²)	Available Spawning Area (yd ²) (MR&SR)	% Avail	Usable Spawning Area (yd ²)	% Usable
A-B	6,336	3.6	192,517	70		
B-C	14,784	8.3	554,273	77		
C-D	8,272	4.7	299,432	74		
D-E	8,800	5.0	186,050	66		
E-F	5,632	3.2	216,390	71		
F-G	7,568	4.4	215,539	72		
G-H	5,984	3.4	153,350	72		
H-I	2,534	1.4	50,832	64		
I-J	5,860	3.3	137,409	67		
J-K	6,916	4.0	173,148	63		

Spawning Area Unavailable and Unusable: **None**

Character of Watershed:

Mountainous	X
Hilly	
Rolling	
Flat	
Swampy	
Wooded	X
Open	
Cultivated	50%
Character of Valley	
Character of Banks	
Density of Marginal Vegetation	

Erosion

a) Banks

b) Watershed

Diversions:

Diversion 1: SE4,SE4,S10,T13N,R18E, L.B. 66.0 cfs. 3,267 paces above Station A. Screened. Union Irrigation Ditch, left channel, left bank. Width 20', depth 4,. Average water depth 2'. Maximum diversion 66.0 cfs. Headgate (concrete abutments) 150' from intake. Temporary rock diversion dam in stream. No protective devices.

Diversion 2: NW4,SW4,S10,T13N,R18E, L.B. 250.0 cfs. 4,433 paces above Station A. Pacific Power & Light Co. (diversion is Fruitvale Ditch) Screened. Left channel, crest 25' (dam divided into 4 concrete sections, slotted for planks to control flow in river channel. Width of sections 6', 6 1/2', 4,4", 4,).

Drop variable, 2 1/2-6 1/2', present total drop 6 1/2'. 4' vertical drop to downstream apron, width 10', drop of apron 2 1/2,. Water at spill 6". Abutments right and left bank. Height 7 1/2' earth.

Story has it that PP&L wanted the site for a power plant and guaranteed water delivery for irrigation forever to get it. Power plant not used now but power company is stuck with the agreement and must maintain a dam--gates and canal for irrigation.

Irrigation ditch, left bank, width 30', depth 6', average water depth 5', maximum diversion 250.0 sec ft.

Concrete abutments, wooden headgates located 300' from intake. No protective devices. No fish ladder.

Remarks: Dam diverts entire flow of channel in low water periods. Dam at present height complete barrier to up-stream migrants.

Diversion 3: SE4,NW4,S9,T13NfR18E, L.B. 40.0 cfs. 6,289 paces above Station A. Screened. Naches and Cowiche Irrigation Dam. Crest 225, total drop variable 4'-2', 3-2'. Flash boards 2' high, extending 67, along crest of dam from left sluiceway, create 2, vertical drop; flash boards 1' high extending 142' along crest of dam from right sluiceway, created 1' vertical drop down stream apron behind flash boards, width 15', drop of apron 2', water at spill, variable 9-18" (9" spill extends 67' from left sluice, 18" spill extends 142' from right sluice).

Sluiceways: Right bank and left bank each 8' wide, water

depth 2'9". (No drop to down stream apron.) Abutment left bank height 8', right bank height 5'. Irrigation ditch, left bank, width 10', depth undetermined. Maximum diversion 40.0 cfs. Two headgates at intake. Width (each) 4'.

Construction: Dam, apron, and ditch concrete. Flashboards: plank supported by iron frames set in concrete. Headgate, wood. No protective devices.

Remarks: Sluiceways of dam serve as adequate fish ladders.

Diversion 4: SE4,SW4,S31fT14N,R18E, L.B. 4.0 cfs. 3,433 paces above Station B. Screened. Lower Schuler and Rodenbeck Irrigation Ditch. Left channel, left bank, width 4', depth 4', average water depth 16". Maximum diversion 4.0 cfs.

Wooden headgate at intake. No diversion dam in stream. No protective devices.

Diversion 5: NE4,SW4,S31,T14N,R18E, R.B. 27.0 cfs. Above Station B (6 mi. above mouth). Screened. Chapman and Nelson Irrigation Ditch. Right channel, right bank, width 10 1/2', depth 3" average water depth 15". Maximum diversion 27.0 cfs. No headgate. No protective devices. Temporary rock diversion dam in right channel at its junction with main stream.

Diversion 6: SW4,NW4,S31,T14N,R18E, R.B. 4.0 cfs. Above Station B. Unscreened. McCormich and Long irrigation ditch. Right channel, right bank, width 7', depth 1 1/2', average water depth 6". Maximum diversion 4.0 cfs. No headgate.

No protective devices. Temporary rock dam in right channel. No obstacle.

Diversion 7: SE4,SE4,S25,T14N,R17Ef R.B. 6.0 cfs. Above Station B. Unscreened. White and Leach irrigation ditch. Side channel, right bank. Width 24", depth 34" average water depth 4". Maximum diversion 6.0 cfs. Headgate at intake. No protective devices. Entire side channel being diverted at present. Side channel takes off main stream 1/2 mile above ditch intake.

Diversion 8: SW4,NW4,S25,T14N,R17E, L.B. 68.0 cfs. 7,087 paces above Station B. Screened. Congdon Irrigation Ditch. Left channel, left bank. Width 8,, depth 4 1/2', average water depth 4'. Maximum diversion 68.0 cfs. Steel headgate located 116 paces below intake. Protective devices: rotary type, fish screen 1/4" mesh, located 120 paces below intake. Screen driven by water wheel behind it. Return to stream located ahead of screen. Temporary rock and board wing dam in main stream at divergence point of left channel, 1170 paces above ditch intake. Length of dam 60,.

Remarks: screen reported to be highly efficient. Left

channel dammed above ditch intake to form pleasure lake at Eshback Park.

Diversion 9: SE4,SW4,S24,T14N,R17E, R.B. 8.0 cfs. 7,493 paces above Station B. Unscreened. Morrisey Irrigation Ditch. Right bank, width 3'9", depth 3'6" average water depth 30". Maximum diversion 8.0' cfs. Headgate at intake. No protective devices. No diversion dam.

Diversion 10: SW4,NW4,S24,T14N,R17E, R.B. 70.0 cfs. 8,771 paces above Station B. Screened. Glead Irrigation Ditch. Right bank, width 9', depth 8', average water depth 5'. Maximum diversion 70.0 cfs. 2 headgates (cast iron) at intake, each 3 1/2, wide by 5, deep. No protective devices. Concrete abutment, length 12', height 8', extends into stream at right angles to stream flow.

Concrete diversion abutment, length 12', height 8, located in stream, 12, from abutment at intake. Both abutments slotted for planks to make solid wing dam extending 36' into stream if desired. At time of survey no planks in slots, abutments extended 3' above water level.

Diversion 11: SW4,NE4,S5,T14N,R17E, L.B. 77.0 cfs. 1,790 paces above Station C. Screened. Scott Channel Headgates. Left bank, 2 headgates (steel) each 5 1/2' wide by 10 1/2, deep. Concrete abutments supporting headgates. Maximum diversion 77.0 cfs. Temporary rip rap wing dam in stream. No protective devices.

Remarks: Headgates control water diverted into Scott Channel. This channel supplies water for four irrigation ditches: Upper Scott, LaFortune, Powell, and Basket Ford. (Basket Ford picks up water from Powell ditch and seepage from springs). Water supply at each ditch controlled by individual headgates.

Diversion 12: SW4,NE4,S5,T14N,R17E, R.B. 37.0 cfs. 1,790 paces Station C. Screened. Kelly and Lowry Irrigation Ditch. Right bank, width 8', depth 5', average water depth 21". Maximum diversion 37.0 cfs. Headgate at intake. No protective devices. No diversion dam in stream.

Diversion 13: NW4,NW4,S5,T14N,R17E, R.B. 6.0 cfs. 3,323 paces above Station C. Screened. Clark Irrigation Ditch. Right bank, width 4 1/2', depth 4', average water depth 2 1/2'. Maximum diversion 6.0 cfs. Headgate and concrete abutments 20' from intake. No protective devices. No diversion dam in stream.

Diversion 14: NE4,NE4,S6,T14N,R17E, L.B. 9.0 cfs. 3,694 paces above Station C. Unscreened. Foster Naches Irrigation Ditch. Left bank, width 46", depth 54", average water depth 24". Maximum diversion 9.0 cfs. Headgate 100' from intake. Temporary

sand bag diversion in stream. No protective devices.

Diversion 15: SE4,NW4,S36,T15N,R16E, R.B. 550.0 cfs. 6,458 paces above Station C. Screened. Wapatox Power and Irrigation Canal. Right bank, width 30', depth undetermined. Maximum diversion 550.0 cfs (500 cfs used for power and returned to stream, 11,760 paces below intake. 50 cfs diverted for irrigation).

Intake at right angles to stream, 4 cast iron headgates in concrete frame at intake, each headgate 5, wide, depth undetermined.

Second set of headgates, two, located 690, below intake. Drum type, each 13, wide, concrete abutments each bank 6, above water level of ditch. Return to stream 50, above second headgates. No protective devices. No diversion dam in stream.

Diversion 16: SW4,NW4,S35,T15N,R16E, R-B. 136.0 cfs. 1,046 paces above Station D. Screened. Selah Irrigation Canal. Right channel, right bank, width 20', depth 8,. Average water depth undetermined. Maximum diversion 136.0 cfs. Drum type headgate 12, wide by 8, deep at intake. Return to stream in front of headgate, 20, wide. Temporary timber wing dam, at 45 degree angle to stream, 60' long diverts water into ditch. No protective devices.

Remarks: During low water periods dirt and gravel dam thrown into main stream to divert water into right channel.

Diversion 17: NE4,NW4,S34,T15N,R16E, R-B. 16.0 cfs. 2,309 paces above Station D. Screened. City of Yakima Water Works. Right bank, intake width 15', depth 5'. Maximum diversion 16.0 cfs (1.0 cfs diverted by Fechter and Janick for irrigation). Headgates: one, located at intake, second one half mile below intake. Protective devices: 4" grizzly at intake.

Series of concrete abutments across stream slotted for planks to create temporary diversion dam during low water periods. Not in use at present. Dam at no time barrier to up-stream migrants.

Diversion 18: SW4,SW4,S27,T15N,R16E, L.B. 1.0 cfs. Above Station D. Unscreened. Fechter and Janick Irrigation Ditch. Left bank, dimensions of ditch not known. Maximum diversion 1.0 cfs.

Diversion 19: SW4,SW4,S17,T15N,R16E, R.B. 2.0 cfs. 44 paces above Station E. Screened. Krober Irrigation Ditch. Right bank, width 2', depth 2 1/2', average water depth 2'. Maximum diversion 2.0 cfs. Headgate 150 paces below intake. No protective devices. No diversion dam in stream.

Diversion 20: SE4,NW4,S18,T15N,R16E, L.B. 4.0 cfs. 897 paces above Station E. Screened. Meloy Irrigation Ditch. Left bank, width 4', depth 3 1/2', average water depth 8". Maximum

diversion 4.0 cfs. Headgate 200 paces below intake. No protective devices. Temporary log diversion dam in stream.

Diversion 21: NW4,SE4,S11,T15N,R15E, L.B. 0.5 cfs. Above Station E. Screened. Griffith Irrigation Ditch. Left bank, dimensions unknown. Maximum diversion 0.5 cfs.

Diversion 22: NW4,SE4,S11,T15N,R15E, R.B. 9.0 cfs. 4,035 paces above Station E. Screened. Stevens Irrigation Ditch. Right bank, width 4', depth 2', average water depth 9". Maximum diversion 9.0 cfs. No headgate. Ditch takes off small side channel of stream.

Diversion 23: NW4,SW4,S2,T15N,R15E, R.B. 3.5 cfs. 796 paces above Station F. Screened. Frederick and Hunting Irrigation Ditch. Right bank, intake width 5', depth 2', discharging into ditch, width 20'. Maximum diversion 3.5 cfs. Intake in face of wing dam. No headgate, cribbing may be removed from left side of ditch, allowing water to return to stream. Permanent timber and rock- wing dam in stream, length 60', height 15'. No protective devices. Dam no barrier to up stream migrants.

Diversion 24: NW4,SW4,S2,T15N,R15E, L.B. 3.0 cfs. 1,685 paces above Station F. Screened. Carmack and Parker Irrigation Ditch. Left bank, width 5', depth 2' average water depth 4". Maximum diversion 3.0 cfs. No headgate. No protective devices. No diversion dam in stream.

Diversion 25: NW4,NW4,S34,T16N,R15E, R.B. 2.5 cfs. 4,818 paces above Station F. Screened. Palmer Irrigation Ditch. Right channel, right bank, width 6', depth 2', average water depth 1,. Maximum diversion 2.5 cfs. No headgate. No diversion dam in stream.

Diversion 26: SW4,SE4,S21,T16N,R15E, L.B. 9.0 cfs. 7,601 paces above Station F. Screened. Markell Irrigation Ditch. Left bank, width 9', depth 4', average water depth 10". Maximum diversion 9.0 cfs. No headgate. No protective devices. Temporary log wing dam extends 180, into stream.

Diversion 27: SW4,SE4,S21,T16N,R15E, L.B. 0 cfs. 480 paces above Station G. Unscreened. Upper Markel Irrigation Ditch. Left bank, width 4 1/2', depth 18". No water being diverted. No headgate. No protective devices. Ditch used to divert water during flood stages of river.

Diversion 28: SW4,SE4,S21,T16N,R15E, R.B. 14.0 cfs. 797 paces above Station G. Screened. Lindsey Irrigation Ditch. Right channel, right bank, width 5', depth 3'. Not diverting at present. Maximum diversion 14.0 cfs. Headgate at intake. No protective devices. Temporary board diversion dam in channel.

Diversion 29: SE4,NW4,S21,T16N,R15E, R.B. 1.0 cfs. 2,102 paces above Station G. Screened. Valentine Irrigation Ditch. Right bank, width 4 1/2', depth 1', average water depth 3". Maximum diversion 1.0 cfs. No headgate. No protective devices. No diversion dam in stream.

Diversion 30: SE4,SE4,S17,T16N,R15E, R.B. 2.0 cfs. 2,210 paces above Station G. Screened. Benton Irrigation Ditch. Right channel, right bank, width 4', depth 3', average water depth 4". Maximum diversion 2.0 cfs. Headgate at intake. No protective devices. No diversion dam in stream.

Diversion 31: NW4,S1,T16N,R14E, R.B. 4.0 cfs. 2,351 paces above Station H. Screened. Emrich Irrigation Ditch. Right bank, width 6', depth 1 1/2', average water depth 6". Maximum diversion 4.0 cfs. No headgate. No protective devices. No diversion dam in stream.

Diversion 32: NW4,S36,T17N,R14E, R.B. 6.0 cfs. 3,230 paces above Station I. Screened. Anderson Irrigation Ditch. Right bank, width 5 1/2', depth 2 1/2', average water depth 4". Maximum diversion 6.0 cfs. Concrete abutments. Wooden headgates 75' from intake. Concrete retaining wall between ditch and river from intake to headgate. No protective devices. No diversion dam in stream. During high water periods, ditch diverts portion of flow of Gold Creek.

Diversion 33: SE4,S26,T17N,R14E, L.B. 2.0 cfs. 5,245 paces above Station H. Screened. Fontaine Irrigation Ditch. Left bank, width 4', depth 5', average water depth 7". Maximum diversion 2.0 cfs. Headgate at intake. No protective devices. No diversion dam in stream.

Note : Water diverted for water supply, 15 cfs
 Water diverted for irrigation 922.5 cfs
 Total diversion of water not returned to stream 937.5 cfs
 Total diversion of water for power and returned to stream 500.0 cfs
 Total diversion of water on the Naches River 1437.5 cfs.

Artificial Obstructions:

<u>Location</u>	<u>Character</u>	<u>Height</u>	<u>Protection Devices</u>	
			<u>Type</u>	<u>Efficiency</u>
D2(NW4,SW4,S10,T13N,R18E)	Irrigation	4-6,	none	see remarks
D3(SE4,NW4,Sg,T13N,R18E)	Irrigation	3-4'	2 spill-ways	see remarks

Remarks:

1. Dam on left channel of river. At low water periods dam would block all salmonoid migrations up this channel.

2. Dam no obstacle at high or low water. Two spillways, one at each end of dam, each eight feet wide provide easy passage for migrants, when there is not sufficient flow to allow fish to jump dam.

Natural Obstructions: None

Fluctuation in Water Level:

Feet Variation: 6'-10'

Cause of Variation:

Controlled discharge from Tieton and Bumping Dams; natural discharge due to heavy precipitation and melting snows in Cascades; and from other tributaries.

Stream Volumes:	At Station A	7/19/35	880 cfs
	At Station D	7/19/35	565 cfs

Pollution: None

Fish (salmon): None

Fish (other than salmon):

Few specimens collected : suckers, cottoids, whitefish fry, on 7/25/35

General Remarks:

Tributaries

Cowiche Creek, Rattlesnake Creek, Tieton River, Rock Creek, Gold Creek, Milk Creek, Little Naches River, Bumping River.

Topography

Below the confluence of the Tieton and Naches River, for approximately sixteen miles above the junction of the Naches and Yakima Rivers, the valley is wide, with the entire bottom land being devoted to orchards, alfalfa, and truck gardening. The banks of the streams are bordered by alders, cottonwood, willow, hawthorne, scrub oaks, and other miscellaneous brush. The upper hills are practically barren of trees.

Above the Tieton, the valley narrows. The bottom lands are devoted principally to the raising of hays with but few scattered orchards present. Conifers are very numerous throughout the bottom lands and side slopes of the valley.

Yellow pine is the principal species present, but larch, fir, hemlock, and a few scattered cedars also occur. Scrub oak, alder, willow and cottonwood still border the river banks, but tend to become less numerous in the upper reaches of the stream.

The irrigation diversions on this stream are not a serious menace to upstream migrants, throughout the entire area surveyed. In some cases one channel may be blocked, but another channel is always free of barriers.

Character of the River

Below the Tieton the Naches River tends to run in numerous channels, sometimes as many as seven being noted. Spawning gravels and good riffles are not extremely numerous, but are adequate enough to supply spawning beds for a large run of salmon. Pools in this area are few but boulders and deep channels provide good resting places and cover for upstream migrants.

Above the Tieton the river tends to remain in a single channel, with but few side branches. The current is fast and the resting pools are limited. However, here again, large boulders and scattered stretches of slow water through deep channels provide adequate shelter for upstream migrants.

There are 60 pools, averaging 1 pool per mile in the 41.22 miles surveyed on the Naches River. 40% of these are over 50 sq yds in area, over 6 ft deep, near the bank without adequate cover (SlT2); 18% are over 50 sq yds in area, over 6 ft deep, near the bank with adequate cover (SlT1). The remaining 42% represents 6 types of pool, none of which compose more than 10% of the total.

In certain areas in this upper section of stream the spawning areas are excellent, although it is reported that the bulk of the salmon spawning grounds are located in the American, Bumping, and Little Naches Rivers.

Fish Population

The lower river contains numerous small cyprinids in the back waters and side channels. Rainbow trout, varying in size from four inches to eighteen inches, are relatively abundant considering that this stream is being constantly fished by many anglers.

Chinooks were reported to have been seen in the deep holes of the upper river, and one was taken on hook and line during the period of the survey (July 16-23). No means were available for

checking the actual number of fish present, as the holes in which the fish lay were deep and well protected. But, as conditions were favorable for passage over the Sunnyside Dam on the Yakima River, this year, and chinooks were reported, by various residents, to be present in the stream, it was assumed that a small number would spawn in this area. The last good run to be reported was in 1929 although the run of former years far exceeded the more recent runs.

Steelhead and Silver Salmon are reported to spawn in this stream, although the size of these runs could not be determined. This stream at one time was an excellent salmon producer, and still is a good trout producer.

Fish foods are abundant through its course, but especially in the upper reaches. If salmon were allowed free access to the stream there is no doubt that the run would be greatly increased.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Skv
A	7-19-35	10:00 am	83 F	60 F	clear
B					
C					
D	7-19-35	12:45 pm	90 F	63.5F	clear
E					
F	7-19-35	10:00 am	83 F	57 F	clear
G					
H					
I					
J	7-23-35	3:00 pm	78 F	62.5F	cloudy

Pool Grade:

Sta	Resting Pools	Resting Pools/Mile	SLT1 %	SLT2 %	SLT3 %	S2T1 %	S2T2 %	S4T1 %	S5T1 %	S5T2 %	S6 %
A-B (3.60 mi)	5	1	3	1		1					
B-C (8.34 mi)	21	3	3	11		4	3				
C-D (4.71 mi)	4	1	1	1	1					1	
D-E (4.95 mi)	3	1	1	2							
E-F (3.21 mi)	3	1	1	1			1				
F-G (4.35 mi)	2	1						2			
G-H (3.36 mi)	7	2	1		2			3		1	

Pool Grade (cont):

Sta	Resting Pools	Resting Pools/Mile	SLT1 %	SLT2 %	SLT3 %	S2T1 %	S2T2 %	S4T1 %	S5T1 %	S5T2 %	S6 %
H-I (1.44 mi)	2	1		2							
I-J (3.33 mi)	5	1		2	1		2				
J-End 13.93 mi)	8	2	1	4	1	1		1			
Grand	60	1	11	24	5	6	6	6	1	1	
Total (41.22 mi)			18.0	40.0	8.0	10.0	10.0	10.0	2.0	2.0	

Gradient:

Station	Distance (miles)	Total Drop	Avg Drop Per Mile	Source of Data
A-B	3.60	150'	41.7'	Ellensburg Topog Map
B-C	8.34	330'	39.6'	'
C-D	4.71	120'	25.5'	'
D-E	5.50	183'	33.3'	Water Supply Paper #369
E-F	3.21	116'	36.1'	''
F-G	4.35	158'	36.3'	'
G-H	3.36	100'	29.8'	''
H-I	2.60	"	34.6'	'
I-J	3.33	118'	35.4'	'
J-Terminus	4.50	170'	37.8'	'
Totals	43.50	1535'	35.29'	

* Where surveyor's pacings conflicted with river distances as given in the water-supply paper, the latter were used in figuring these gradients.

Little Naches River

River System: **Yakima River**

Stream Surveyed: **Little Naches River, tributary to Naches River**

Date of Survey: **July 24, 1935 and August 29, 1936**

Source: **North Fork and South Fork of Naches River**

Location: **Boundary Kittitas and Yakima Counties, Washington**

Total Length: **10.07 miles surveyed**

Station Location:

Sta	Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
A	Naches Pass Bridge	0	0.00	0	0.00	SE1/4,S4 T17N,R14E	33'	8.4"
B	Crow Creek Trail Bridge		2.77		2.77	SE1/4,S30 T18N,R14E	39'	9.2"
C	Second Little Naches Rd Bridge		1.18		3.95	NE1/4,S25 T18N,R13E	30'	30.0"
D	South Fork Little Naches		6.12		10.07	SE1/4,S9 T18N,R13E	16'	3.4"

EPA River Reach Codes:

Station	HUC	SEG	Rmi
M	17030002	0009	0.02
A	17030002	0009	0.02
B	17030002	0010	0.00
C	17030002	0010	0.72
D	17030002	0010	6.25

Character of Bottom Between Stations:

Station	Area (yd ²)	L.R.		M.R.		S.R.		M&S	
			%		%		%		%
A-B			25		28		47		
B-C			40		26		34		
C-D			33		31		32		4

Spawning Area Usable and Available:

<u>Station</u>	<u>Distance vds miles</u>	<u>Area (yd²)</u>	<u>Available Spawning Area (yd²) (MR&SR)</u>	<u>% Avail</u>	<u>Usable Spawning Area (yd²)</u>	<u>% Usable</u>
A-B	4,870		44,985	75		
B-C	2,084		15,162	60		
C-D	10,770		62,330	63		

Spawning Area Unavailable and Unusable: **None**

Character of Watershed:

Mountainous

X

Hilly

Rolling

Flat

Swampy

Wooded .

X

Open

Cultivated

Character
of Valley

Character
of Banks

Density of
Marginal
Vegetation

Erosion

a) Banks

b) Watershed

Diversions: **None**

Artificial Obstructions: **None**

Natural Obstructions:

1. One mile above Station B. Cascade, 8'. Passable except during unusual low water conditions.

Fluctuation in Water Level:

Feet Variation: 4'-6'

Cause of Variation: heavy precipitation and melting snow in Cascade Range

Stream Volumes:	At Station A	7/24/35	114 cfs
	At Station B	7/24/35	58 cfs
	At Station D	8/29/36	115 cfs

Pollution: **None**

Fish (salmon): **None**

Fish (other than salmon): **None**

General Remarks:

Tributaries

Crow Creek.

Topography

The Little Naches River flows through a narrow, heavily wooded, mountain valley. In many places the side walls are canyon-like, rising sheer from the river bed on one side of the stream, or the other.

The forest on the side slopes and river bottom are composed principally of pine with fir, larch, hemlock and cedar also present. A few scattered cottonwood, willow and alder are found along the stream banks. None of the valley is under cultivation.

Character of River

This is a fast moving stream with excellent riffles and fine spawning gravels. There are 27 pools averaging 5 pools per mile in the 5.38 miles surveyed on the Little Naches. 19% of these are

over 6 feet deep, over 50 sq yds in area near the bank with adequate cover (S1T1). 15% are from 3' to 6' deep from 25-50 sq yds in area near the bank with adequate cover (S2T1), 15% are less than 3 feet deep, less than 25 sq yds in area near the banks with adequate cover (S3T1). The remaining 51% is divided among 6 types, none of which represent more than 11% of the total (see Card 16) "Little Naches River-Pool Grade").

Deep holes are scattered throughout its course providing excellent cover and resting pools for migrating salmonids. Numerous windfalls and small log jams also provide cover.

One mile above Sta B there is a small cascade with a total drop of approximately eight feet. This falls is no obstacle to upstream migrants, except in extremely low water, as it is not a direct drop, but tends to form about a 70 degree downstream apron.

Fish Population

Chinooks were reported to be present last year in considerable numbers in the Little Naches. It is probable that this species is also well represented this year, but due to the excellent cover afforded in this stream it is practically impossible to determine accurately the number present.

The same conditions are true in the Little Naches, as those found on the Naches proper. The salmon runs do not compare in present times to those of early years. In fact, these runs now reported do not exceed from fifty to one hundred fish at most. No other species of salmon is reported in this stream. Steelhead probably spawn in this area but local fishermen have little or no knowledge of the extent of this run.

The trout found in this stream are predominately cutthroats with a few scattered rainbow also present.

This stream should be an excellent salmon stream. If provision is made to allow the fish to reach the spawning grounds, there is no doubt that the fish will be able to maintain themselves and ultimately build up a large run.

Temperature Data:

<u>Sta</u>	<u>Date</u>	<u>Hour</u>	<u>Air Temp</u>	<u>Water Temp</u>	<u>Skv</u>
A	7-24-35	1:00 pm	78 F	64 F	clear
B					
C	7-24-35	4:30 pm	70 F	61 F	clear

Pool Grade:

Resting													
Sta	Pools /Mile	S1T1 %	S1T2 %	S1T3 %	S2T1 %	S2T2 %	S3T1 %	S3T2 %	S3T3 %	S4T1 %	S5T1 %	S5T2 %	S6 %
A-B	3	4		1	2						1		1
(2.77 mi)		45.0		11.0	22.0					11.0			11.0
B-C	5				1		2	1				1	1
(1.18 mi)					17.0		33.0	17.0			17.0	17.0	
C-D	5	1	4		7	6	9	3	1				1 13
(6.12		5	12.0		22.0	19.0	28.0	9.0	3.0				3.0
Tot 5 mi)	11.0	4	1	10	6	11	4	1	1	1	1	3	13
(10.07		9.0	2.0	21.0	13.0	23.0	9.0	2.0	2.0	2.0	2.0	6.0	

Total number of pools: 60 - 47 resting and 13 S6

Gradient:

Station	Distance (miles)	Total Drop	Avg drop per mile	Source of data
Mouth-A	3.2	155'	48'	Water Supply Paper 369
B-C	2.0	115'	58'	Water Supply Paper 369
C-D	4.5	270'	60'	Water Supply Paper 369
Totals	9.7	540'	56'	

Cowiche Creek

River System: Yakima River
 Stream Surveyed: Cowiche Creek, a tributary of Naches River

Date of Survey: August 1, 1936

Source: North and South Forks of Cowiche Creek

Location: Northwest portion of Yakima County, Washington

Total Length: 7 miles, all surveyed.

Station Location:

Sta	Location	Distance above prev. Station		Distance above Mouth		Map Location	Width	Depth
		vds	miles	vds	miles			
A	Mouth	0	0.00	0	0.00	SW4,NE4,S9 T13N,R18E	19'	5.7"
B	Confl North Fork		6.81		6.81	SE4,NE4,S10 T13N,R17E	7'	1.9"

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17030002	0057	0.00
B	17030002	0057	3.33

Character of Bottom Between Stations:

Station	Area (yd ²)	L.R.		M.R.		S.R.		M&S	9
		%		%		%			
A-B		24		21		29			26

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd ²)	Available Spawning Area(yd ²)		Usable Spawning Area(yd ²)	
			(MR&SR)	% Avail		% Usable
A-B	11,985		18,498	50		

Spawning Area Unavailable and Unusable: **None**

Character of Watershed:

Mountainous

Hilly	X
Rolling	
Flat	
Swampy	X
Wooded	
Open	X
Cultivated	15%

Character
of Valley

Character
of Banks

Density of
Marginal
Vegetation

Erosion

a) Banks

b) Watershed

Diversions:

Diversion 1: NW1/4,SE1/4,S9,T13N,R18E, L.B. 4.9 cfs. 1,175 paces above Station A. Yakima Valley Irrigation Co. ditch, width 5" depth 30", average water depth 18". No headgate, return or protective devices. Temporary earth fill dam 3' high entirely across stream. No ladder. No spill, except seepage. Dam is barrier to upstream migrants during low water season. Ditch is extreme hazard to down-stream migrants.

Diversion 2: NW1/4,NW1/4,S16,T13N,R18E, L.B. 0.8 cfs. 2,384 paces above Station A. Irrigation ditch, width 3', depth 2', average water depth 2". No headgate. No protective devices. Temporary board, straw and mud dam, crest 18', height 21".

Diversion 3: NE1/4,NE1/4,S17,T13N,R18E, L.B. 0.48 cfs.

2,740 paces above Station A. Irrigation ditch, width 1', depth 10", average water depth 6". No headgate. No protective devices. Temporary board dam, 18' long, 30" high. No spill.

Diversion 4: NE1/4,NE1/4,S17,T13N,R18E, L.B. 0 cfs. 2,740 paces above Station A. Irrigation ditch, width 15", depth 1', average water depth 3". No flow of water in ditch. No protective devices. No headgates. Temporary board dam, 18' long, 30" high. No spill.

Diversion 5: NE1/4,NW1/4,S17,T13N,R18E, L.B. 0.3 cfs, estimated. 3,440 paces above Station A. Irrigation ditch, width 3" depth 2', average water depth 1'. No headgate. No protective devices. Temporary board dam, 18' long, 3' high. No spill. Sandbag abutments.

Diversion 6: NW1/4,NW1/4,S17,T13N,R18E, L.B. 0.75 cfs. 3,878 paces above Station A. Irrigation ditch, width 10", depth 10", average water depth 8". Leads into 12" wooden flume. No headgate. No protective devices. Temporary rock and tar paper dam, 18' long, 1' high. No spill.

Diversion 7: NE1/4,NE1/4,S18,T13N,R18E, L.B. Undetermined flow. 4,474 paces above Station A. Irrigation ditch, width 3', depth 2', average water depth 10". No headgate. No protective devices. Temporary rock and sheet tin dam, 15' long, 18" high. No spill. Rock abutments.

Diversion 8: NW1/4,NE1/4,S18,T13N,R18E, R.B. 0 cfs. 5,043 paces above Station A. Irrigation ditch, width 2.5', depth 2', average water depth 6". No headgate. No protective devices. Temporary log and rock dam, 18' long, 2' high. No spill.

Diversion 9: NE1/4,NW1/4,S18,T13N,R18E, R.B. 1.2 cfs. 5,620 paces above Station A. Irrigation ditch, width 3" depth 2', average water depth 15". Leads into 18" wooden flume. Temporary earth and rock dam 15' long, 2' high. No spill but some seepage.

Artificial Obstructions:

1. NW4,SE4,Sg,T13N,R18E, Diversion #1, Irrigation dam, 3', No protective devices. This dam is only an obstruction during low water periods at which time nearly all the water in the stream is diverted into the ditch.

Natural Obstructions: None

Fluctuation in Water Level:

Fluctuation: Approximately 2'

Cause of Variation: Melting snow in spring.

Stream Volumes: No measurement available. Estimated 4 cfs at mouth on 8/1/36.

Pollution:

Garbage and refuse deposited in stream and along banks especially in lower reaches.

Fish (salmon): None

Fish (other than salmon): None

General Remarks:

Surveyed from mouth to confluence with North Fork on August 1, 1936 from auto road.

Topography

The Cowiche watershed is very narrow from the mouth to the confluence of the North Fork. From a point approximately three miles above the mouth to the town of Weikel, a distance of two miles, the valley sides become very steep forming a small box canyon which is rarely over 200' in width. Above the canyon the watershed becomes very broad and flat supporting numerous ranches on the bottom lands. The hillsides of the entire valley are barren except for a sparse growth of sage brush and grass; however, the dense thickets and underbrush along the banks of the creek offer good protection to fish in the stream.

Character of Stream

The stream is relatively sluggish in most areas, the gradient being slight. Wherever riffles occur the water is running over large rubble and often bedrock. This is particularly true of that portion of the stream which runs through the canyon mentioned above. A few spawning gravels are present, but usually in these areas the small rubble has a good percentage of mud deposit on it, rendering it unsuitable as first class spawning gravel. Pools are very few.

There are nine irrigation diversions on the Cowiche below the

confluence of the North Fork. During low water periods the stream bed is practically dry in various areas. The total diversion is 8.43 cfs, a relatively small amount of water, which at times during the summer is only available by the picking up of waste water from irrigation projects in the upper valley. In fact, the source of most of the supply of water in the main stream is the small seepage gain from swamps and waste water, and from ditches such as the Tieton and Congdon Canals diverting from the Naches River system.

Fish Population

No salmon or steelhead were observed in the stream during the time of the survey, however, one resident of this locality reported taking three "small" steelhead this spring (1936). Other reports, contradictory to this and apparently more accurate, indicate that steelhead seldom if ever ascend the Cowiche at present, although years ago before so much of the water was utilized for irrigation purposes steelhead were commonly seen in the creek. A few rainbow trout are the only game fish in the stream.

It is doubtful that this stream is of any value for salmon production for at least the following reasons: 1) no sustained flow of water, 2) pollution due to garbage in stream, 3) lack of spawning area without heavy deposits of mud, 4) irrigation dams and diversions, and 5) sluggish flow of water.

Although the South Fork of the Cowiche was too small to warrant a detailed survey, some information was secured in regard to it. There are five diversions on this fork which divert about 5.5 cfs. Even this small amount of water at times is not available in the stream, the flow becoming so reduced that all the water is conserved for stock water only.

The North Fork of the Cowiche is usually dry during the summer. from the confluence of main streams to a point about five miles upstream. Above here the stream bed is utilized as part of the Tieton canal and any water that might be in the creek becomes merely an addition to the canal's flow.

Temperature Data:

<u>Sta</u>	<u>Date</u>	<u>Hour</u>	<u>Air Temp</u>	<u>Water Temp</u>	<u>Skv</u>
A	8/1/36	10:00 am	60 F	78 F	Fair
B	8/1/36	4:00 pm	59 F	79 F	Fair

Pool Grade:

<u>Sta</u>	<u>Dist</u> <u>(mi)</u>	<u>Resting</u> <u>Pools</u>	<u>Resting</u> <u>Pools/Mile</u>	<u>S2T1</u> <u>%</u>	<u>S3T1</u> <u>%</u>	<u>S3T2</u> <u>%</u>	<u>S3T3</u> <u>%</u>	<u>S6</u>	<u>Total</u>
A-B	6.81	19	3	1	12	3	3		
				5.0	63.0	16.0	16.0		

Gradient:

<u>Station</u>	<u>Distance</u> <u>(miles)</u>	<u>Total</u> <u>Draw</u>	<u>Avg drop</u> <u>wer mile</u>	<u>Source of data</u>
A-B	6.81	389'	57'	Topographic Map

North Fork of Cowiche Creek

River System: Yakima River

Name of Stream: North Fork of Cowiche Creek

Description:

Flows easterly 18 miles from source in Mount Rainier National Forest to confluence with South Fork of the Cowiche, 1.5 miles above Wiekel. Tieton Irrigation Canal utilizes bed of the North Fork for 2.5 miles, beginning six miles above the confluence of the two forks.

Remarks:

The six mile stretch between the confluence of the South and North forks and the place where the North Fork and the Tieton Canal come together, is dry during the summer. Any water in the stream bed above this point is diverted into the canal.

South Fork of Cowiche Creek

River System: **Yakima River**

Name of Stream: **South Fork of Cowiche Creek**

Description:

Flows ENE 25 miles from the source in Rainier National Forest to confluence with North Fork of the Cowiche, 1.5 miles above Wiekel. No important tributaries. Five diversions divert 5.5 cfs, but even this amount of water is lacking during the drier seasons.

Remarks:

Normal flow too small and fluctuation during run-off too great for salmon spawning.

Tieton River

River System: **Yakima River**
 Stream Surveyed: **Tieton Riber, a tributary to Naches River**

Date of Survey: **July 11-13, 1935**

Source: **Rimrock Lake**

Location: **Yakima County and Snoqualmie National Forest**

Total Length: **22 miles, all surveyed.**

Station Location:

Sta	Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Dewth
		Yds	Miles	Yds	Miles			
-	Mouth	0	0.00	0	0.00			
A	Suspension Bridge		2.73		2.73	NW1/4,NW1/4 S10,T14N,R16E	61'	1.70'
B	Abandoned Road Bridge		1.86		4.59	sw1/4,NW1/4 S8,T14N,R16E	90'	3.18'
C	USRS Suspension Bridge		3.08		7.67	NW1/4,S23 T14N,R15E	85'	3.04'
D	Second Concrete Highway Bridge		0.92		8.59	SE1/4,S22 T14N,R15E	137'	1.60'
E	Tieton Irrigation Dam		4.41		13.00	SE1/4,S25 T14N,R14E	110'	2.21'
F	Rimrock Bridge		5.74		18.74	NE1/4,S36 T14N,R14E	70'	2.64'
-	Terminus		0.44		19.18			

EPA River Reach Codes:

Station	HUC	SEG	Rmi
M	17030002	0036	0.00
A*	17030002	0036	2.28
B*	17030002	0036	2.28
C	17030002	0036	8.43
D	17030002	0036	a.43
E	17030002	0036	14.65
F	17030002	0036	20.36

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

Station	Area (yd ²)	L.R.	%	M.R.	%	S.R.	%	M&S	%
Mouth-A			35		33		32		
A-B			33		34		33		
B-C			40		33		27		
C-D			39		31		30		
D-E			44		34		23		
E-F			50		29		21		
F-Terminus			48		31		21		

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd ²)	Available Spawning Area (yd ²) (MR&SR)	% Avail	Usable Spawning Area (yd ²)	% Usable
Mouth-A	4,806		109,369	65		
A-B	3,280		77,856	67		
B-C	5,430		121,949	60		
C-D	1,620		35,460	61		
D-E	7,568		140,887	57		
E-F	11,069		175,611	50		
F-Terminus	775		12,165	52		

Spawning Area Unavailable and Unusable: **None**

Character of Watershed:

Mountainous

X

Hilly

Rolling

Flat

Swampy

Wooded

X

Open

Cultivated

5%

Character of Watershed (cont):

Character
of Valley

Character
of Banks

Density of
Marginal
Vegetation

Erosion

a) Banks

b) Watershed

Diversions:

Diversion 1: NE4,SE4,S35,T15N,R16E, L.B. 12.5 cfs. 427 paces above mouth. Irrigation ditch, width 5', depth 4', average water depth 17". Screened. Abutments, concrete, height 5', and headgate, wooden, located 150 paces below intake. No protective devices. No diversion dam in stream.

Diversion 2: SE4,SE4,S35,T15N,R16E, R.B. 1.14 cfs. 642 paces above mouth. Irrigation ditch, width 2', depth 1', average water depth 4". No headgate. No protective devices. Rock wing dam in stream.

Diversion 3: NW4,SE4,S3,T14N,R16E, R.B. 1.68 cfs. 3,136 paces above mouth. Irrigation ditch, width 6', depth 16", average water depth 7". No headgate. No protective devices. Temporary rock and sandbag wing dam extends 40' into stream.

Diversion 4: NE4,NW4,S10,T14N,R16E, L.B. 0.95 cfs. 4,548 paces above mouth. Irrigation ditch, width 3.5', depth 1', average water depth 3.5". No headgate. No protective devices. No diversion dam in stream.

Diversion 5: NE4,NE4,Sg,T14N,R16E, R.B. 25.3 cfs. 269 paces above Station A. Irrigation pipe, diameter 30", discharges into ditch, width 7', depth 30". Screened. Headgate at pipe intake. No protective devices. No diversion dam in stream.

Diversion 6: SE4,NW4,Sg,T14N,R16E, R.B. 1.4 cfs. 1,367 paces above Station A. Irrigation ditch, width 6', depth 2', average water depth 11". No headgate. No protective devices. Temporary rock diversion dam in stream.

Diversion 7: NE4,SE4,S7,T14N,R16E, R.B. 3.0 cfs. 642 paces

above Station B. Irrigation ditch, width 20", depth 12", average water depth 7". Headgate at intake. No protective devices. No diversion dam in stream.

Diversion 8: SE4,S25,T14N,R14E, L.B. 311.0 cfs. At Station E. Tieton Irrigation Dam crest 110,, drop (4, right bank tapering to 2' on left bank), water at spill (7" right bank increasing to 32" on left bank). Abutments, left bank height 18', right bank height 5,. Irrigation ditch width 15', depth 16', maximum diversion 311.0 cfs. Three headgates at intake, widths: 53", 48", 46". Protective devices: US Bureau of Fisheries Project #39, four revolving fish screens, 7/16" mesh, located 200 paces below intake. Return at screens. Construction: dam concrete; abutments concrete, sides of ditch concrete. No fish ladder on dam. Dam no obstacle to upstream migrants unless there is unusually low water. Screens apparently block fish from ditch except those injured by passage over Rimrock Dam, these are so weak that they are carried over screens.

Note : Total diversion for irrigation on Tieton River at time of survey: 356.97 cfs. Some of the ditches were not diverting their capacity.

Artificial Obstructions:

1. SE4,S25,T14N,R14E. Diversion #8. US Bureau of Fisheries Project #39, four revolving screens located at ditch. No fish ladder on dam. Dam no obstacle except at low water, then it is complete barrier.

2. NE4,SW4,S31,T14N,R14E. Rimrock Dam, 222,. Complete barrier, no ladders. Land-locked sockeyes killed or badly bruised by passage over spillway or through tunnel (see folder attached).

Natural Obstructions: None

Fluctuation in Water Level:

Fluctuation: 6'-14'; Variation in discharge 4.0 cfs - 10,000 cfs

Cause of Variation: Controlled discharge from Rimrock Dam

Stream Volumes:	At Station A	700 cfs	7/13/35
	At Station F	1,140 cfs	7/13/35

Pollution: None

Fish (salmon): Small Chinook run reported in 1935.

Fish (other than salmon):

<u>Species</u>	<u>Date</u>	<u>Very</u> <u>Abundant</u>	<u>Abundant</u>	<u>Fair No.</u>	<u>Scarce</u>
Steelhead	reported				X
Rainbow	reported			X	
Whitefish					
Dolly Varden	reported			X	
Cutthroat					

General Remarks:

Topography

The Tieton River flows through a narrow, heavily forested canyon. The side walls are steep and in some places precipitous. Conifers are present in the bottom lands and side slopes of the valley consisting of 80% yellow pine and the remainder fir, larch and hemlock. Alder, willow, cottonwood, hawthorne and scrub oak border the stream. There are a few small ranches in the lower valley raising alfalfa and some garden stuffs on the irrigated lands.

Character of River

Fair spawning areas are found on this stream in the lower reaches but large rubble predominates throughout its course. The riffles are good and practically continuous.

There are 17 pools averaging one pool per mile in the 19.18 miles surveyed on the Tieton River. 41% of these pools are over 50 square yards in area, over six feet deep near the bank with adequate cover (S1T1). 35% are the same size, depth and location as the S1T2 type but are without adequate cover. 12% of the pools are from 25-50 square yards in area from 3-6 feet deep near the bank without adequate cover (S2T2). 12% of the pools from 25-50 square yards in area, less than three feet deep near the bank without adequate cover (S2T2).

Large boulders provide adequate resting places for migrating salmonids.

There are eight irrigation diversions on this stream, diverting at the time of the survey, 356.97 cfs. Of this amount the Tieton Irrigation Canal diverts 311 cfs. This is the only ditch that has a permanent dam in the stream.

The Rimrock Dam, located at the termination of the survey, is a complete barrier to all migrating fish and an added menace in

that it controls the stream flow in the river. During flood and irrigating season this dam will discharge as much as ten thousand cfs into the stream. Then during the winter months while the reservoir is filling a flow of but four cfs is allowed in the river. This dam bruises and kills numerous sockeye fry, planted in Rimrock Lake, as they pass over the spillway or through the outlet tunnel. It is doubtful if any of the fish so mutilated survive.

Fish Population

A few chinooks were reported to have been taken from the Tieton River this year (1935). Steelhead were also reported to have been present earlier in the season. This stream, before the construction of the Rimrock Dam on the Tieton and the Sunnyside Dam on the Yakima River, was said to have been an excellent producer of both these species. The landlocked sockeyes previously mentioned were present in the Tieton and could be easily seen at the time of the survey due to their mutilated condition and heavy infestation of saprolegnia.

Rainbow and Dolly Varden trout were reported to be numerous in this stream, but as the stream is heavily fished, there were no record catches reported. These two species of trout were the only ones seen or reported during the survey.

Under present conditions the Tieton River is extremely unfavorable to the production of salmon. Spawning nests located in the stream at normal water levels would be completely dry during the winter months. As this stream is extremely cold throughout the summer (49 F) the eggs would not develop fast enough for the fry to be free-swimming at the time of reduction in the stream flow. But if this were possible the fry would be concentrated in such a small area as to be easy prey for any trout in the stream. However, if a normal stream flow would be maintained throughout the year, it is entirely possible that this stream could become a fair producer of salmon, but it will never return to its former productivity, due to the unavailability of a large percentage of the spawning grounds.

Temperature Data:

<u>Sta</u>	<u>Date</u>	<u>Hour</u>	<u>Air Temp</u>	<u>Water Temp</u>	<u>Sky</u>
A					
B	7/11/35	4:00 pm	85 F	59 F	Clear
C					
D					
E	7/12/35	3:30 pm	89 F	54 F	Clear
F	7/13/35	4:15 pm	91 F	49 F	Clear

Pool Grade:

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	SlT1 %	SlT2 %	S2T2 %	S5T2 %	S6	Total
Mth-A	2.73	5	2	3	2				
				60.0	40.0				
A-B	1.86	1	1		1				
					100.0				
B-C	3.08	3	1	1	2				
				33.0	67.0				
C-D	0.92	1	1				1		
							100.0		
D-E	4.41	2	1		1	1			
					50.0	50.0			
E-F	5.74	5	1	3		1	1		
				60.0		20.0	20.0		
F-End	0.44	[no resting pools]							
Grand Total	19.18	17	1	7	6	2	2		
				41.0	35.0	12.0	12.0		

Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
Mouth-A	3.25	160'	49'	Water Supply Paper 369
A-B	2.10	100'	48'	Water Supply Paper 369
B-C	3.25	147'	45'	Water Supply Paper 369
C-D	0.92	45'	49'	Water Supply Paper 369
D-E	5.50	258'	47'	Water Supply Paper 369
E-F	6.60	390'	59'	Water Supply Paper 369
F-End	0.50	35'	70'	Water Supply Paper 369
Totals	22.12	1,135'	51'	

Oak Creek

River System: Yakima River

Stream Surveyed: Oak Creek, tributary to Tieton River

Date of Survey: July 11, 1936

Description:

Flows ten miles from source in T15N,R15E to confluence with Tieton River, 2.5 miles above its mouth on Naches River.

Remarks:

No water during dry season. At time of survey this creek was only 2' wide and 2" deep at its mouth.

Milk Creek

River System: **Yakima River**

Stream Surveyed: **Milk Creek, tributary to Tieton River**

Date of Survey: **April 30 and May 5, 1937**

Description:

Air 68 F, Water 47 F, at 12:30 pm. 5-6 cfs, very muddy on 4/30/37. Flows all summer but gets very low. Steep gradient. No fish reported. A number of beaver dams. One of them 15' high reported.

No migratory fish, or trout reported in the stream. Flowing 20+ cfs on 5/5/37, very muddy, cascades, few pools, very low after snow run-off. Of little value to migrating fish, probably trout in upper section. Watershed mountainous, well forested.

Soup Creek

River System: **Yakima River**

stream Surveyed: **Soup Creek, tributary of Tieton River**

Date of Survey: **April 30, 1937**

Description:

2 cfs, muddy, dry later in year. No fish reported.
Watershed mountainous, well wooded.

Wildcat Creek

River System: **Yakima River**
 Stream Surveyed: **Wildcat Creek, tributary of Tieton River**

Date of Survey: **April 30, 1937**

Description:

Average width 15'. Air 61 F, Water 42 F, at 11:00 am.
 Snow run-off 20-30 cfs. Stream closed to trout fishing. Good
 feeder stream series of cascades and S6 pools from mouth to 1.25
 miles. Water supply intake half mile up approximately 1.5 cfs. No
 dam. Some water returned 25' below intake.

Character of Bottom:

Station	Area (vd ²)	L.R.	%	M.R.	%	S.R.	%	M&S	%
--			80		5		10		15

Remarks:

Stream flows through narrow, V-shaped valley. Watershed is
 well covered with pine and fir forests. In lower 1.25 miles stream
 gradient steep, series of cascades and falls 4'-6'. Falls appear
 to be difficult but passable. Few resting pools--S6 pools
 numerous. Stream closed to fishing. Good feeder to Tieton River.
 No steelhead reported seen in the stream--few enter Tieton River.

South Fork of Tieton River

River System: **Yakima River**
Stream Surveyed: **South Fork of Tieton River**

Description:

Flows northeast from source at Tieton Peak to mouth at the Tieton Reservoir. Entire length of 18 miles in Rainier National Forest through mountainous territory. Tributaries are Short and Dirty Creek and Bear Creek, both small and with steep gradients.

Remarks:

The South Fork flows into the Tieton Reservoir, backed up by the Tieton Dam. This 220' dam is far too high for migrating fish to ascend, so the South Fork cannot be considered a possible spawning stream.

Bear Creek

River System: **Yakima River**

Name of Stream: **Bear Creek, tributary of Tieton Reservoir**

Remarks:

A small mountainous stream flowing into the south bank of the Tieton Reservoir. Above the 220' Tieton Dam, so impossible for salmonid migrants to reach it.

Indian Creek

River System: **Yakima River**

Name of Stream: **Indian Creek, tributary of Tieton Reservoir**

Description:

Flows nine miles southeast from source at Pear Lake to north bank of Tieton Reservoir. High, mountainous watershed in Rainier National Forest. No tributaries.

Remarks:

Above 220' Tieton Reservoir control dam, so worthless as a spawning stream.

North Fork of Tieton River

River system: Yakima River

Name of Stream: North Fork of Tieton River, tributary of Tieton
River

Description:

Flows 13 miles northeast from source at Tieton Peak to upper end of Tieton Reservoir. Entirely within high, mountainous area of Rainier National Forest. Tributaries are Clear Creek and Cold Creek.

Remarks:

Flows into the Tieton Reservoir above the 220' control dam. Inasmuch as there is no way the fish can get over this barrier, the North Fork cannot be considered a possible spawning stream.

Cold Creek

River System: Yakima River

Name of Stream: Cold Creek, tributary to North Fork of Tieton
River

Description:

A small mountainous tributary to the North Fork of the Tieton River, above the impassable Tieton Reservoir Control Dam.

Clear Creek

River System: **Yakima River**

Name of Stream: **Clear Creek, tributary to North Fork of Tieton River**

Description:

Flows seven miles southeast to confluence with North Fork of the Tieton River. Flows through high, mountainous country. Receives tributaries from Cramer, Dog and Leach Lakes.

Remarks:

Above 220' Tieton Reservoir Control Dam, so impassable for fish to reach it.

Rattlesnake Creek

River System: **Yakima River**

Stream Surveyed: **Rattlesnake Creek, tributary to Naches River**

Dates of Survey: **July 30, 1935, and August 31-September 3, 1936**

Source: **Mount Aix, Rattlesnake Peak, Shellrock Peak**

Location: **Snoqualmie National Forest, . Yakima County, Washington**

Total Length: **20 miles, 18 miles surveyed.**

Station Location:

Sta	Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
	Mouth	0	0.00	0	0.00			
A	Rattlesnake Bridge		0.26	0.26	0.26	SW1/4,S3 T15N,R15E	42'	9.1"
B	Kennes Bridge		3.99	4.25	4.25	SE1/4,S1 T15N,R14E	33'	8.2"
C	Confl Three Creeks		1.10	5.35	5.35	SW1/4,SE1/4 S8,T15N,R14E	35'	6.4"
D	Confl Hindoo Creek		3.80	9.15	9.15	SE1/4,SE1/4 S13,T15N,R13E	30'	5.5"
E	Confl Elkhorn Creek		3.18	12.33	12.33	NE1/4,NE1/4 S33,T15N,R13E	20'	5.3"
F	Confl Little Wildcat Ck		2.33	14.66	14.66	NE1/4,SW1/4 S5,T14N,R13E	16'	3.2"

EPA River Reach Codes:

Station	HUC	SEG	Rmi
M	17030002	0029	0.00
A	17030002	0029	0.00
B	17030002	0030	6.62
C	17030002	0032	1.72
D	17030002	0034	0.00
E	17030002	0034	3.10
F	17030002	0034	5.34

Character of Bottom Between Stations:

Station	Area (yd ²)		L.R.		M.R.		S.R.		M&S	
			%	%	%	%	%	%	%	%
Mouth-A			30		35		35			

Character of Bottom Between Stations (cont):

Station	Area (yd ²)		L.R.		M.R.		S.R.		M&S	
				%		%		%		%
A-B			32		34		34			
B-C			58		20		22			
C-D			44		32		23			
D-E			44		29		23			
E-F			62		29		9			

Spawning Area Usable and Available:

Station	Distance		Area (yd ²)	Available Spawning Area (yd ²) (MR&SR)	% Avail	Usable Spawning Area (yd ²)	% Usable
	vds	miles					
Mouth-A	475	0.3	5,576		70		
A-B	7,030	4.0	56,848		67		
B-C	7,325	4.2	28,434		53		
C-D	6,682	3.8	29,830		55		
D-E	5,600	3.2	25,610		52		
E-F	4,100	2.3	9,980		38		

Spawning Area Unavailable and Unusable: **None**

Character of Watershed:

Mountainous	X
Hilly	
Rolling	
Flat	
Swampy	
Wooded	X
Open	
Cultivated	
Character of Valley	
Character of Banks	

Character of Watershed (cont):

Density of
Marginal
Vegetation

Erosion

a) Banks

b) Watershed

Diversions:

Diversion 1: SW4,S3,T15N,R15E, L.B. 4.0 cfs. 472 paces above mouth. Irrigation ditch, width 6', depth 2.5, average water depth 3". No headgate. Temporary rock diversion dam in stream. No protective devices.

Diversion 2: NE4,Sg,T15N,R15E, R.B. 3.6 cfs. 1,290 paces above Station A. Irrigation ditch, width 4,' depth 1,, average water depth 6". No headgate. Temporary log wing dam in stream. No protective devices.

Diversion 3: NE4,S9,T15N,R15E, R.B. 12.7 cfs. 1,650 paces above Station A. Irrigation ditch, width 7,, depth 3,, average water depth 1,. No headgate. Temporary log wing dam in stream. No protective devices.

Diversion 4: SW4,S1,T15N,R16E, L.B. 0 cfs. 119 paces above Station B. Irrigation ditch, width 1', depth 6". No water being diverted. No headgate. Temporary board wing dam in stream. No protective devices.

Note : Total diversion of water for irrigation from Rattlesnake Creek at time of survey 20.3 cfs.

Artificial Obstructions: None

Natural Obstructions:

1. E1/2,S23,T15N,R13E, 8, falls, passable with difficulty. Water running over bedrock, and is so shallow during low water periods it is doubtful whether chinooks could pass this obstruction. No barrier during high water. Barrier at low water.

Fluctuation in Water Level:

Fluctuation: 6'-8'

Cause of Variation: melting snow and relatively heavy precipitation in headwaters.

Stream Volumes:

At Station B	93.4 cfs	7/30/35
At Station E	10.4 cfs	9/ 3/36

Pollution: None

Fish (salmon): runs reported prior to 1935

Fish (other than salmon): Cutthroat, rainbow and Dolly Varden

General Remarks:

Survey conducted by auto road for nine miles (from mouth upstream); remainder by US Forest Service Trail.

Topography

Rattlesnake Creek drains an exceptionally rugged mountain valley. Practically all of the stream is contained in a continuous canyon, the walls rising precipitously to a height of 300-1000 feet in many places. Where the side slopes are not so steep conifers are abundant. Along the lower reaches of the stream near the mouth and along the extreme headwaters good protection is afforded by the dense growths of alders, willows, cottonwoods, and hawthorne; however, most of the stream between these areas has little protection because extreme high water during freshet periods has uprooted all the brush and trees that usually grow along the banks.

There are a few small ranches in the lower Rattlesnake Valley which produce hay and garden truck. Logging operations are being carried on along the creek up to the National Forest boundary.

Character of the River

There are twenty pools averaging four pools per mile in the 5.35 miles surveyed on the Rattlesnake. 40% of the pools are from 25-50 square yards in area, over six feet deep near the bank with adequate cover (S4T1). 25% of the pools are from 25-50 square yards in area, from 3-6 feet deep near the bank with adequate cover (S2T1). 15% are the same size, depth, and location as the S2T1

type but without adequate cover (S2T2). The remaining 20% is divided among four types, none of which compose more than 5% of the total.

This stream offers fairly good spawning gravels and riffles throughout the entire area surveyed, the best spawning beds being in the lower three miles of stream and in a half mile section just below the confluence of Elkhorn Creek, Station E. In the first area mentioned 70% of the bottom is suitable spawning gravel while in the other area the entire bottom is composed of small and medium rubbles. Pools are relatively numerous throughout the total length of the creek; however, most of them are inadequately protected with the exception of those found in the lower reaches of the stream. The extreme rise in water level (6'-8') in the spring has washed the banks barren of trees and shrubs and in general has scoured the stream bottom so that little protection is afforded to fish. The gradient of the river averages approximately 113 feet to the mile as computed from US Geological Survey Quadrangles.

The gradient from Station A-Station B is 112, per mile; from Station B-Station C is 132'; from C-D 79'; from D-E 157' and from E-F 88' per mile.

The temperature of the water in the lower Rattlesnake was 52 F when the air temperature was 59 F as compared with a water temperature of 42 F, air 52 F taken in the upper river.

There are four irrigation diversions in this stream, diverting a total of 20.3 cfs; however, none of the dams are of a permanent nature so as to be a barrier to upstream migrants. One natural barrier exists in the creek approximately a mile above Station D. This is a falls with an eight foot angular drop, the water running over a smooth bedrock crest being so shallow during low water periods that it is doubtful whether any fish could surmount it. This does not appear to be an obstruction during high water periods although no rainbow trout were found in the stream above this point which might suggest that steelhead do not go above the falls.

Fish Population

Rattlesnake Creek is closed to fishing at the present time, so that reports of the fish population were necessarily confined to conditions in previous years, supplemented by what fish could be observed in the stream at the time of the survey.

Local resident report that chinook salmon have run in this stream in previous years although none were seen in 1935 or this year, 1936. The runs have not been large, but when conditions were favorable for passage over the Sunnyside Dam on the Yakima River, fish were seen ascending the Rattlesnake. No other species of salmon was reported in the creek. Although no steelhead were reported they probably utilize this stream to some extent. The

game fish inhabitants are cutthroat, rainbow, and Dolly Varden trout. Many of the cutthroats observed were 14"-16" in length.

In general Rattlesnake Creek provides good spawning grounds for salmonids. If a stocking program were carried on and an easy passage assured through the Yakima River, it is probable that the salmon run in this stream could be rehabilitated.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Skv
A					
B	6/31/35	9:30 am	59 F	52 F	Cloudy
C	9/ 1/36	9:30 am	51 F	55 F	Cloudy
D	9/ 1/36	1:05 pm	61 F	53 F	Fair
E	9/ 1/36	3:20 pm	65 F	49 F	Partly Cloudy
F	9/ 2/36	11:00 am	52 F	42 F	Rain

Pool Grade:

Resting													
Sta	Rst Pls	Pools /Mile	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S2T3 %	S3T1 %	S3T2 %	S3T3 %	S4T1 %	S4T3 %	S6 %
Mth-A	1	4								1			
		(0.26 mi)								100.0			
A-B	16	4			5	1					1	8	1
		(3.99 mi)			31.0	6.0				6.0	50.0	6.0	
B-C	3	3	1			2							
		(1.10 mi)	33.0			67.0							
C-D	24	6/25	2	1	7	2	4	1	4	3			94
		(3.80 mi)	8.0	4.0	29.0	8.0	17.0	4.0	17.0	13.0			
D-E	12	4/81	1	3	3	3	1	1					250
		(3.18 mi)	8.0	25.0	25.0	25.0	8.0	8.0					
E-F	3	1/46			2	1							107
		(2.33 mi)			67.0	33.0							
Grnd	59	4/35	4	4	17	9	5	2	5	4	8	1	459
Tot		(14.67 mi)	7.0	7.0	29.0	15.0	9.0	3.0	9.0	7.0	13.0	2.0	

Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
Mouth-A	4.26	500'	117'	Topographic Map
B-C	4.20	520'	124'	Topographic Map
C-D	3.80	320'	84'	Topographic Map
D-E	3.18	310'	97'	Topographic Map
E-F	2.33	340'	146'	Topographic Map
Total	17.77	1,990'	112'	

Cold Creek

River System: Yakima River

Stream Surveyed: Cold Creek, a tributary to Rattlesnake Creek

Date of Survey: December, 1936.

Source: Yakima County

Direction of Flow:

Flows southwest from source in Yakima County to confluence with Rattlesnake Creek in Benton County. Flows five miles north of and parallel to upper part of Rattlesnake Creek.

Total Length: 22 miles long, none of which was investigated.

Remarks:

Cold Creek has not been investigated, but Rattlesnake Creek was found to be dry at its mouth in December, 1936. There are no important tributaries.

Nile Creek

River System: Yakima River

Name of Stream: Nile Creek, tributary to Naches River

Date of Survey: May 5, 1937

Description:

Flowing 20+ cfs. Spring run-off only; dry later in year. No fish runs. Permanent holes further up; fair trout stream in upper section. Watershed mountainous and well wooded. Farms near mouth; no irrigation as stream is too intermittent in character.

Rock Creek

River System: Yakima River

Name of Stream: Rock Creek, tributary to Naches River

Date of Survey: May 5, 1937

Description:

Flowing 10+ cfs. Spring run-off (practically fills road culvert). Steep gradient. 4" falls short distance above road. Mountainous, well wooded watershed.

Remarks:

Very low in summer. Of no value to migratory fish. Probably a good trout feeder stream.

Gold Creek

River System: Yakima River

Name of Stream: Gold Creek, tributary to Naches River

Date of Survey: May 5, 1937

Description:

Small stream. Succession of falls near mouth; doubtful if fish could enter. Mountainous; watershed well wooded. Like Rock Creek but steeper near mouth.

Lost Creek

River System: Yakima River

Name of Stream: Lost Creek, tributary to Naches River

Date of Survey: May 5, 1937

Description:

Flowing about 10 cfs. Steep gradient. Milky, snow run-off. Very low or dry later in year. Possibly trout in upper section. Watershed mountainous, well wooded.

Swamp Creek

River System: **Yakima River**

Name of Stream: **Swamp Creek, tributary to Naches River**

Date of Survey: **May 5, 1937**

Description:

Flowing 3-4 cfs. Snow run-off; dry later in summer. No fish reported. Watershed mountainous, forested.

Boulder Creek (Devil's Creek)

River System: Yakima River

Name of Stream: Boulder Creek (Devil's Creek), tributary to Naches River

Date of Survey: May 5, 1937

Description:

Flowing 3-4 cfs. Snow run-off; dry later in summer. No fish reported. Watershed mountainous, well forested. About the same as Swamp Creek (see Swamp Creek).

Milk Creek

River System: **Yakima River**

Name of Stream: **Milk Creek, tributary to Naches River**

Date of Survey: **May 5, 1937**

Description:

About 20 cfs. Very muddy; cascades; few pools; probably trout further up.

Bumping River

River System: Yakima River

Stream Surveyed: Bumping River, a tributary to Naches River

Date of Survey: July 25-27, 1935

Source: Bumping Lake

Location: Yakima County

Total Length: 24 miles

Station Location:

Sta	Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
	Mouth	0	0.00	0	0.00			
A	Halfway Flat Bridge		0.67		0.67	SW1/4,S4 T17N,R14E	50'	4.35'
B	Soda Springs Bridge		7.73		8.40	NW1/4,S34 T17N,R13E	65'	0.94'
C	Bumping Crossing Bridge		5.27		13.67	SW1/4,SE1/4 S10,T16N,R12E	71'	1.42'
	Terminus		1.03		14.70			

EPA River Reach Codes:

Station	HUC	SEG	Rmi
M	17030002	0014	0.00
A	17030002	0014	0.00
B	17030002	0016	5.31
C	17030002	0016	10.60
D	17030002	0016	12.02

Character of Bottom Between Stations:

Station	Area (yd ²)	L.R.		M.R.		S.R.		M&S	
			%		%		%		%
Mouth-A			36		34		30		
A-B			37		34		29		
B-C			37		34		29		
C-D(end)			36		35		29		

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd ²)	Available Spawning Area (yd ²) (MR&SR)	% Avail	Usable Spawning Area (yd ²)	% Usable
Mouth-A	1,173	23,604		63		
A-B	13,582	243,583		63		
B-C	9,270	126,666		63		
C-End	1,820	21,080		64		

Spawning Area Unavailable and Unusable: **None**

Character of Watershed:

Mountainous

X

Hilly

Rolling

Flat

Swampy

Wooded

X

Open

Cultivated

Character
of Valley

Character
of Banks

Density of
Marginal
Vegetation

Erosion

a) Banks

b) Watershed

Diversions: **None**

Artificial Obstructions:

1. 1 mile above Station C. Water storage dam, 46'. No protective devices. Dam complete barrier to upstream migrants. No fish ladder.

Natural Obstructions:

1. 0.5 mile below Station C. Log jam, 20'-40'. Passable during normal flow through side channel. Impassable at low water.

Fluctuation in Water Level:

Fluctuation: 6'-8'

Cause of Variation: controlled discharge from Bumping Reservoir

Stream Volumes: At Station C 146.0 cfs 7/27/35

Pollution: None

Fish (salmon): Chinook

Fish (other than salmon): Rainbow, Dolly Varden, Cutthroat, Whitefish

General Remarks:

Topography

The Bumping River flows through a mountain valley with steeply sloping sides. In some areas the cliffs rise sheer from the river's edge on one bank or the other and in others the valley widens and the stream will flow through grassy meadows and relatively open forests. The entire valley is heavily forested with conifers principally pine but with fir, larch, and cedar also present. Alder, cottonwood, and willow border the stream banks and in some areas form dense thickets. There is no cultivation of the land carried on in this valley, the whole of it lying in the Rainier National Forest.

Character of the River

Excellent spawning beds and good riffles are present throughout the entire area surveyed although large rubble is plentiful in the stream in its entire length. There are 31 pools averaging two pools per mile in the 14.7 miles surveyed on the

Bumping River. 48% of the pools are over 50 square yards in area, over six feet deep near the bank with adequate cover (S1T1). 13% are from 15-50 square yards in area from 3-6 feet deep near the bank with adequate cover (S2T1). The remaining 39% is divided among six types of pools none of which compose more than 10% of the total. Pools are not numerous but those present are large and well protected. These, and the presence of large boulders in the stream, provide adequate resting places and excellent cover for migrating salmonids.

A large log jam located one half mile below Station C probably is a complete barrier in low water if the present side channel goes dry. The Bumping Lake Dam, installed by the US Reclamation Service for water storage is a complete barrier to fish migrations due to the fact that there is no fish ladder at the dam. As the reservoir created by this dam has a variable water level (practically the entire area may be drained) it is doubtful if any serviceable fish ladder could be installed.

There are no irrigation ditches located on the Bumping River.

Fish Population

At the time of the survey chinook salmon were present in the stream lying in the deep holes. No count could be made of the number present owing to the splendid cover afforded in this stream. However, from the reports brought in by fishermen it is doubtful if there are a large number present. In former years large runs were said to enter this stream although the majority of the chinooks were said to have spawned in the American River which is a tributary of the Bumping.

No other species of salmon was reported in the river and no report of the steelhead run could be ascertained. In fact fishermen report that no steelhead enter this stream but it is probable that this statement is erroneous due to the fact that the steelhead migrate early in the spring in flood water periods and access to this stream is difficult at that time.

Landlocked sockeye have been planted in Bumping Lake and it is probable that a few of these fish migrate down the Bumping River although it would be impossible for the adults to again reach the lake.

Rainbow, Dolly Varden and cutthroat trout and whitefish are present in the stream. These fish are reputed to be of much smaller size than were taken from the stream in former years, but as this stream is heavily fished and stocking is required this condition is not surprising. The preponderance of the catch made in this stream by anglers is Rainbows running from six to eight inches in length.

This stream could be restored to its former productivity by the installation of an adequate fish ladder on the Bumping Lake Dam which would restore vast spawning areas now blocked out and by assuring a free passage for migrants up the Yakima and Naches Rivers.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Skv
A	7/27/35	1:00 pm	75.5 F	58.0 F	Cloudy
B					
C	7/27/35	3:30 pm	70.0 F	64.0 F	Cloudy

Pool Grade:

Sta	Resting Pools	Resting Pools/Mile	SLT1 %	SLT2 %	SLT3 %	S2T1 %	S2T2 %	S3T2 %	S4T1 %	S5T1 %
Mth-A (0.67 mi)	3	4	3							
A-B (7.73 mi)	9	2	9	2	2	2	2	1		1
B-C (5.27 mi)	6	1	2	1		2			1	
C-End (1.03 mi)	3	3	1		1			1		
Grand	3	12	15	3	3	4	2	2	1	1
Total (14.7 mi)			48.0	10.0	10.0	13.0	7.0	6.0	3.0	3.0

Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
Mouth-A	0.67	30'	45'	Water Supply Paper 369
A-B	8.33	410'	49'	Water Supply Paper 369
B-C	5.80	352'	61'	Water Supply Paper 369
C-End	1.50	68'	45'	Water Supply Paper 369
Totals	16.30	860'	53'	

American River

River System: **Yakima River**

Stream surveyed: **American River, tributary to Bumping River**

Date of Survey: **July 28-29, 1935**

Source: **Rainier Fork, Dewey Lake Fork**

Location: **Yakima County, Washington**

Total Length: **15 miles**

Station Location:

Sta	Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
	Mouth	0	0.00	0	0.00			
AA	Bumping Road Bridge		0.48		0.48	SW4, S12 T17N,R13E	47'	9.0"
BB	Thunder Bridge		4.26		4.74	NW4, S18 T17N,R13E	48'	9.4"
CC	Fourth Bridge		6.54		11.28	NE4, S35 T17N,R11E	33'	5.2"
DD	Lodge Pole Bridge		1.55		12.83	SE4, S35 T17N,R11E	38'	7.2"
EE	Morse Creek Foot Bridge		2.02		14.85	SW4, S3 T16N,R11E	23'	16.3"
	Terminus		0.35		15.20			

EPA River Reach Codes:

Station	HUC	SEG	Rmi
M	17030002	0115	0.00
AA	17030002	0015	0.00
BB	17030002	0015	5.29
cc	17030002	0015	11.89
DD	17030002	0015	13.26
EE	17030002	0015	16.22

Character of Bottom Between Stations:

Station	Area (yd ²)	L.R.		M.R.		S.R.		M&S	
			%		%		%		%
Mouth-AA			39		33		28		
AA-BB			41		33		26		

Character of Bottom Between Stations (cont):

Station	Area (yd ²)	L.R.	%	M.R.	%	S.R.	%	M&S	%
BB-CC		15		27		53		5	
CC-DD		42		31		27			
DD-EE		9		18		34		39	
EE-Terminus		0		7		20		73	

Spawning Area Usable and Available:

Station	Distance yds miles	Area (yd ²)	Available Spawning Area (yd ²) (MR&SR)	% Avail	Usable Spawning Area (yd ²)	% Usable
Mouth-AA	850	7,896		61		
AA-BB	7,500	69,534		59		
BB-CC	11,625	175,751		80		
CC-DD	2,725	18,287		58		
DD-EE	3,600	40,260		52		
EE-End	600	4,524		27		

Spawning Area Unavailable and Unusable: **None**

Character of Watershed:

Mountainous

X

Hilly

Rolling

Flat

Swampy

Wooded

X

Open

cultivated

Character
of ValleyCharacter
of Banks

Character of Watershed (cont):

Density of
Marginal
Vegetation

Erosion

a) Banks

b) Watershed

Diversions: None

Artificial Obstructions: None

Natural Obstructions:

1. 1 mile above Station CC. Cascades, total 100', max single 6'. Impassable in low water. Passable in high water, no jump over 6'.

Fluctuation in Water Level:

Fluctuation: 4,-6,

Cause of Variation: heavy precipitation, melting snows of Cascade Range

Stream Volumes: At Station AA 120.0 cfs 7/31/35

Pollution: None

Fish (salmon): Chinook salmon in fair numbers

Fish (other than salmon): Rainbow, Cutthroat, Dolly Varden

General Remarks:

Towosrawhy

The American River flows through a mountain valley which is very changeable in aspect. In some areas the river flows through a deep gorge, in others it widens and flows through grassy meadows or heavily forested flats. Cottonwood, alder, and willow thickets are numerous along the river banks in some areas. The entire valley is heavily forested with conifers, pines, larch, hemlock,

fir and cedar; all are represented.

Character of the River

The lower stretches of this stream contain a preponderance of large rubble but toward the upper reaches medium and small rubble become more numerous and many fine spawning beds are found. Pools also are few in the lower reaches but gradually become more numerous until in the middle stretches they are extremely plentiful and of good size, providing excellent cover and resting places for upstream migrants. There are 91 pools averaging six pools per mile in the 15.2 miles surveyed on American River. 76% of the pools are over six feet deep, over 50 square yards in area near the bank with adequate cover (S1T1). The remaining 24% is divided among eight types, none of which compose more than 7% of the total. The riffles in this river are excellent with the exception of two areas created by beaver ponds where the stream is slow and sluggish. One of these areas is found in Pleasant Valley five miles above Station BB, the other is found above Station EE. In these areas the river is broken into numerous small channels and ponds until it is virtually impossible to find a single main channel. In the area above Station EE, Rainier Fork and Dewey Lake Fork empty into a series of beaver ponds making it impossible to locate the exact junction of the two streams. The preponderance of mud in some of these stretches is due to the placer operations on Morse Creek and the work of beavers in diverting the stream into new channels.

One mile above Station CC the river enters a narrow gorge and rises one hundred feet in approximately 400 paces. However this rise is over a series of cascades, the highest of which is not over six feet. There are adequate resting pools between each jump so that these cascades are no obstacle except in low water when there is not sufficient flow over the rocks to insure an easy passage for upstream migrants.

Fish Populations

At the time of the survey chinook salmon were reported to be present in the American in fair numbers. In former years this stream was said to be an excellent salmon producer. As there is no sport fishing in this stream for these fish and as the salmon were lying in the deep holes at the time of the survey, no check could be made on the number of fish present. However, from the reports of trout fishermen who lost their tackle in this area it is believed that there are a fair number of chinook lying in the deep holes.

No steelheads or species of salmon other than chinooks are reported to be present in this stream although it is probable that steelhead do make a spawning migration into this area.

Rainbow, cutthroat and Dolly Varden trout are plentiful in

this stream in the order named.

This stream is reported to be one of the principal salmon streams in this area. Although the run is much depleted, it is highly probable that if fish were allowed free passage over the Sunnyside Dam on the Yakima River and the irrigation ditches were properly screened on the Yakima and Naches, this run could be restored to something of its former proportions.

Tributaries

Union Creek, Timber Creek, Mestache Creek, Dewey Fork Creek, Rainier Fork Creek.

Temperature Data:

Sta	Date	Hour	Air Temw	Water Temw	Skv
AA	7/29/35	3:00 pm	80.0 F	54.5 F	Clear
BB					
cc					
DD	7/29/35	4:00 pm	76.0 F	49.5 F	Clear
E					

Pool Grade:

Sta	Resting Pools	Resting Pools/Mile	SlT1 %	SlT2 %	SlT3 %	S2T1 %	S2T2 %	S2T3 %	S3T2 %	S4T1 %	S4T3 %
Mth-AA	(no resting woools, 0.48 mi)										
AA-BB	10	2	3		1	2			1	2	1
(4.26 mi)			30.0		10.0	20.0			10.0	20.0	10.0
BB-CC	68	10	61	1	2	2	1		1		
(6.54 mi)			90.0	1.0	3.0	3.0	1.0		1.0		
CC-DD	11	7	5	2	2			1		1	
(1.55 mi)			46.0	18.0	18.0			9.0		9.0	
DD-EE	2	1		1	1						
(2.02 mi)				50.0	50.0						
EE-End	(no resting woools, 0.35 mi)										
Grand Tot	91	6	69	4	6	4	1	1	2	3	1
(15.2 miles)			76.0	4.0	7.0	4.0	1.0	1.0	2.0	3.0	1.0

Gradient:

Station	Distance (Miles)*	Total Drow	Avg Drop Per Mile	Source of Data
Mouth-AA	0.48	55'	115'	Water Supply Paper 369
AA-BB	4.26	443'	104'	Water Supply Paper 369
BB-CopperCk	5.20	132'	25'	Water Supply Paper 369

Gradient (cont):

<u>Station</u>	<u>Distance (Miles)*</u>	<u>Total Drow</u>	<u>Avg Drop Per Mile</u>	<u>Source of Data</u>
CopperCk-CC	2.90	100'	34'	Topographic Map
CC-DD	1.55	60'	39'	Topographic Map
DC-EE	2.02	135'	67'	Topographic Map
EE-Terminus	1.40	50'	36'	Topographic Map
Totals	17.81	975'	55'	

* Where a surveyor's pacings differed appreciably from water-supply paper or topographic map river distances, the latter were used.

Tributaries:

1. Union Creek
2. Timber Creek
3. Mestache Creek
4. Dewey Fork Creek
5. Rainier Fork Creek

Union Creek

River System: **Yakima River**

Name of Stream: **Union Creek, tributary to American River**

Date of Survey: **May 5, 1937**

Description:

Flowing 35-40 cfs. Falls 12, and 60' at 700+ paces above mouth. Most of this section is large rubble and boulders, cascades, a few spawning areas. Snow run-off when observed; deep drifts along stream. Watershed mountainous, well forested.

Morse Creek

River System: Yakima River

Name of Stream: Morse Creek, tributary to American River

Date of Survey: May 5, 1937

Description:

Snow run-off. Succession of falls not available. Steep
gradient. Watershed mountainous, forested.

Deep Creek

River System: Yakima River

Name of Stream: Deep Creek, tributary to Bumping Reservoir

Description:

Flows nine miles northerly from source to south bank of Bumping Reservoir. Flows through high, mountainous country on west slope of Mt. Aix.

Remarks:

Above the 46' Bumping Reservoir control dam; a complete barrier to all upstream fish.

Crow Creek

River System: Yakima River

Name of Stream: Crow Creek, tributary to Naches River

Date of Survey: May 5, 1937

Description: 100 cfs. Turbid.

Quartz Creek

River System: **Yakima River**

Name of Stream: **Quartz Creek, tributary to Naches River**

Date of Survey: **May 5, 1937**

Description:

Approximately 40 cfs. Muddy water spread over large area by windfalls, beaver dams; should be looked at low water.

Wenas Creek

River System: Yakima River
Name of Stream: Wenas Creek, tributary to Yakima River

Date of Survey: May 6, 1937

Description:

Flowing 25-30 cfs. Turbid snow run-off, useless to migrating fish as it is broken up into several channels and diverted into many small ditches all through the valley. It was reported that no salmon or steelhead enter the stream, but there are native trout. Cutthroat and rainbow trout are caught in the ditches and above dam. All water used during summer.

Dam is twelve miles above mouth, earth fill, rock base, 60' high. Spill is straight drop of 10' to spill-way followed by a 40' straight drop to stream bed. Wood spillway and abutments, approximately 50', no ditches from dam. Stored water used to regulate the stream flow. Creek maintains a fair flow through the summer.

Cutthroat and rainbow reported in reservoir.

Concrete drain pipe through center of dam used when water is not flowing over spill.

Selah Creek

River System: Yakima River

Name of Stream: Selah Creek, tributary to Yakima River

Description:

Runs westerly for twenty miles along the north side of Yakima Ridge. Confluence with Yakima River, one mile upstream from Pomona.

Remarks:

Dry wash, except during rains and snow run-off, through arid land.

Roza Creek

River system: **Yakima River**

Name of Stream: **Roza Creek, tributary to Yakima River**

Description:

Flows eight miles southeast to confluence with Yakima River, near Roza Irrigation dam (projected). In southern end of Ellensburg-Yakima Canyon.

Remarks:

Dry, except during freshets. Flows through arid land.

Squaw Creek

River System: **Yakima River**

Name of Stream: **Squaw Creek, tributary to Yakima River**

Description:

Flows fifteen miles westerly to junction with Yakima River, at Canyon Ranch, in southern part of the Ellensburg-Yakima Canyon.

Remarks:

Dry wash during the dry season. Watershed arid.

Umptanum Creek

River System: **Yakima River**
 stream Surveyed: **Umptanum Creek, tributary to Yakima River**

Date of survey; **July 1, 1936**

Source: **Kittitas County, SE1/4,S19,T17N,R17E**

Location: **Kittitas County. Flows southeast to Yakima River, enters left bank at SW4,S20,T16N,R19E**

Total Length: **16 miles, 7.6 miles (13,470 yards) surveyed from mouth to falls.**

Station Location:

Sta	Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
A	Confl with Yakima	0	0.00	0	0.00	SW4,S20 T16N,R19E	7.0'	2.2"
B	Old Durr Wagon Road Crossing		4.90		4.90	NW4, S15 T16N,R18E	6.4'	3.0"
C	Falls		2.80		7.70	NW4, S76.0' T16N,R18E		NA

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17030001	0076	0.00
B	17030001	0076	2.90
c*	17030001	0076	7.60

• Station location is not definite and has been estimated

Character of Bottom Between Stations:

Station	Area (yd ²)		L.R.		M.R.		S.R.		M&S	
			%		%		%		%	
A-B			7		21		51		21	
B-C			23		36		26		15	

Spawning Area Usable and Available:

Station	Distance		Area (yd ²)	Available Spawning Area (yd ²)		Usable Spawning Area (yd ²)	
	vds	miles		(MR&SR)	% Avail	Area (yd ²)	% Usable
A-B	8,570		18,543		72		
B-C	4,900		5,610		62		

Spawning Area Unavailable and Unusable: **None - in high stages.**

Character of Watershed:

Mountainous

Hilly

X

Rolling

Flat

Swampy

Wooded

Open

X

Cultivated

two small farms in lower watershed

Character
of Valley

Character
of Banks

Density of
Marginal
Vegetation

Erosion

a) Banks

b) Watershed

Diversions:

Diversion 1: S1/2,S19,T16N,R19E, L.B. 0 cfs. 695 paces above Station A. An irrigation ditch formerly crossed the creek in a wooden flume. At time of survey, the flume was out. This condition created an inlet from the creek into the ditch. However, due to the height of the diversion, water would be intercepted only at extreme high water. The ditch is 18" wide and 12" deep and was dry when surveyed. There is no dam or other works present. It is doubtful whether the ditch would be a trap to downstream migrants except during very high water.

Diversion 2: SE4,S24,T16N,R18E, L.B. 1.0 cfs. 1,295 paces above Station A. A rock and earth wing dam diverts the entire flow during low water periods. At higher levels there is some spill.

When surveyed, the creek below the dam was dry. The crest of the dam is 8' and there is a 10" drop. The diversion ditch is 39" by 9". It had a water depth of 4" and discharged about 1 cfs. There are no headgates, abutments, or protective devices. The dam and ditch make a perfect trap for downstream migrants during low water levels.

Diversions 3: NW4,SE4,S24,T16N,R18E, R.B. 0 cfs. 1,970 paces above Station A. A rock and board dam 7' wide and 18" high. There was a 6" spill when the creek was surveyed. No water was being diverted, all the spill going into the creek bed. There are no protective devices or abutments. The ditch, on the right bank is 29" by 9". It was dry when surveyed. This system diverts water only during the spring at high stages. It is not a trap to downstream migrants.

Artificial Obstructions:

1. 1,295 paces above Station A. Diversion #2. Irrigation wing dam (rock and earth), 10", no protective devices. Possible obstacle at low water.

2. 1,970 paces above Station A. Diversion #3. Irrigation dam (rock and board), 18", no protective devices. Possible obstacle at low water.

3. 4,000-5,000 paces above Station A. Five beaver dams. Possible obstacle at low water.

Natural Obstructions:

1. At Station C. Falls, 35'. Impassable

Fluctuation in Water Level:

Fluctuation: Dry for part of the year; feet variation unknown.

Cause of Variation: Spring run-off. Irrigation diversions.

Stream Volumes: 0.58 cfs at Station A on 6/28/36.

Pollution: None

Fish (salmon): No run now; silvers before Pomona Dam built.

Fish (other than salmon):

<u>Species</u>	<u>Date</u>	<u>Very Abundant</u>	<u>Abundant</u>	<u>Fair No.</u>	<u>Scarce</u>
Trout	7/ 1/36		X (fry)		X (adults)

General Remarks:

Topography

The watershed is hilly, becoming rugged in the upstream parts. The hills are quite barren supporting very little vegetation. The lower mile of the stream flows through a narrow V canyon with little or no shade. Above this, the immediate margins are often swampy, with a section containing beaver dams, 4,000-5,000 paces above Station A. In this region, shade is abundant. Three small farms are located in the lower watershed.

Character of Stream

Umptanum Creek, like so many Eastern Washington streams is utilized to a considerable extent for irrigation purposes. There are three diversions in the lower portion of the stream between Station A and Station B. At the time of survey, only one was diverting water. This one, however, consumed the entire flow, so that the creek was dry for 150 paces. Numerous beaver dams 4,000-5,000 paces above Station A may be barriers at times. According to reports of residents, the stream becomes dry near the mouth for about two weeks (July 1-14, 1936). Good pools, well shaded, are numerous practically throughout. The riffles are plentiful and large (C3). Shade is good, with the possible exception of the first mile. Three stations were established: Station A, at the mouth; Station B, at the old Durr Road crossing; and Station C, at an impassable 35' falls. The average air temperature was 71 F and the average water temperature was 63.5 F. The temperatures were taken in the morning (9-10 am) with clear weather. Between Station A and Station B, there are 18,543 square yards of available spawning gravels (72%). From B-C 5,610 square yards (62%). On 6/28/36 the flow was taken at the mouth and found to be 0.58 cfs. The survey stopped at an impassable 35' falls.

Fish Population

Many trout fry were observed in pools in the stream especially from Station A to about 1,000 paces above Station B. Few, if any, were seen above this point. The fry were from 0.5" to 3.0" long. Two 6" trout were also seen in the area. A resident of the lower valley (Mr. Davis) reports numerous silver salmon in the stream before the erection of the Pomona Dam. After the dam was built, the run died out. Adult trout are few except in high water. In spite of low water periods, this stream could support salmon if the

diversions were screened. Fry can utilize pools during dry seasons and good cover is present.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
A	7/ 1/36	9:00 am	71.0 F	63.0 F	Clear
B	7/ 1/36	10:00 am	70.5 F	64.5 F	Clear
C	7/ 1/36	1:00 pm	---	---	Clear

Pool Grade:

Sta	Total Resting Pools	Resting Pools/Mile (rest/S6)	S2T1 %	S3T1 %	S3T2 %	S5T1 %	S5T2 %	S6 %	Total
A-B (4.9 mi)	87	17/0	2	9	12	46	18		87
B-C (2.8 mi)	9	3/9		7		2		26	35
Grand Total (7.7 mi)	96	12/3	2	16	12	48	18	26	122
			2.0	17.0	12.0	50.0	19.0		

Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
A-B	4.9	395'	81'	Topographic Map
B-C	2.8	490'	175'	Topographic Map
Total	7.7	885'	115'	

Wilson Creek

River System: Yakima River

Name of Stream: Wilson Creek, tributary to Yakima River

Description:

Wilson Creek drains the west slope of Colocham Pass and empties into the right bank of the Yakima River six miles below Ellensburg. At two places Wilson Creek and Naneum Creek flow together, the upper confluence being regarded as Naneum and the lower at the mouth as Wilson. These creeks derive their flow from their hilly, forested headwaters which are subjected to heavy winter snows. In their lower reaches all the streams in the Wilson Creek system are transformed into a complex irrigation system. Numerous channels and laterals flow over the entire surface of the broad, flat valley which is completely given over to cultivation. The stream beds are dry in many places below diversions in the summer, but considerable flow is maintained in the lowest reaches by seepage from lands irrigated from the Highline Canal.

There are 73 water rights totalling 25.22 cfs adjudicated for Wilson Creek. Attempts to transfer some of these early rights to lands above the Highline Canal have been blocked in court. The Tjossem Mill Ditch, which diverts from the Yakima River, empties into Wilson Creek a short distance above its mouth. Ellensburg's raw seepage is discharged into the creek on the southeast outskirts of the town (NE1/4,SE1/4,S2,T17N,R18E).

On April 20, 1936, Wilson and Naneum Creeks were carrying 80 cfs in their upper confluence, but this is broken up into much smaller volumes in the ditches below. The gradient is moderate in the upper reaches, but slight in the valley below. The creek margins are either brushy and swampy, or else exposed and deeply eroded. (See picture in files of Cherry Creek). The bottom is mostly mud and silt, with only occasional patches of gravel. The stream is clean in its upper portion, but the drainage from the irrigated lands keeps the lower part badly silted.

Fish Population:

There is no salmon or steelhead run into Wilson Creek of any significance. Its nature is not such that much of a salmonid population could be supported, although angling for Eastern Brooks, rainbows and cutthroats produces fair results in the headwaters.

Remarks:

This description of Wilson Creek is generally true for all the streams in the system, namely Naneum, Cherry, Caribou, Cook

and Coleman Creeks. For water rights on all streams in the Wilson-Naneum Creek area see Wilson Creek folder in work files.

Naneum Creek

River System: Yakima River

Name of Stream: Naneum Creek, tributary to Wilson Creek

Description:

Naneum Creek joins Wilson Creek near its headwaters, later divides and then rejoins just before reaching the Yakima. The stream is little more than an irrigation ditch, meandering about in several channels and numerous swampy areas. The lower reaches appear to be totally unfit for salmonids.

There are 54 adjudicated water rights that are allowed a total maximum of 5,800 Miners Inches (116 cfs). Ellensburg diverts 2.5 cfs for water supply just above upper confluence with Wilson Creek.

The flow is maintained throughout the summer by seepage water from the Highline Canal.

Fish Population:

Migrating salmonids are not known to frequent this stream. Rainbows, cutthroats and Eastern Brooks furnish good early fishing in the headwaters. A transition at the point where the Highline Canal crosses Naneum Creek makes it possible to divert water from one to the other as the need arises. Sportsmen object that the trout in the creek are in this way run into the canal.

Note : For list of water rights and diversions, see Area III Briefs folder file.

Caribou Creek

River System: Yakima River

Name of Stream: Caribou Creek, tributary to Naneum Creek

Description:

Caribou Creek joins Cook Creek to form Cherry Creek, a tributary to Naneum Creek. Caribou Creek is small (about 5 cfs on 4/20/37), with a largely mud bottom and flowing through farm lands. The course is meandering and frequently swampy. The flow is maintained in the lower part of the course by seepage water from the Highline Canal.

There are thirteen adjudicated water rights on Caribou Creek, having a total water allotment of 396.5 Miners Inches (7.93 cfs). Some of the diversions are on Cherry Creek. The watermaster's records seem confused in that all diversions from Cherry Creek are given as being either from Caribou or Cook Creeks.

Fish Population:

Migratory salmonids are not known to frequent this stream. Rainbows, cutthroats, and Eastern Brooks usually afford good early fishing in the headwaters.

See also Wilson Creek.

Cook Creek

River System: Yakima River

Name of Stream: Cook Creek, tributary to Wilson Creek

Description:

A small creek with a meandering course that breaks into numerous channels and swampy areas. Much of the bottom, as well as the banks, is of mud. On 4/20/37 the flow was approximately 4 cfs.

The watermaster's records show 43 adjudicated diversions with a total allotted diversions of 70.02 cfs. However, these figures include most of the diversions from Cherry Creek.

The flow in the lower part is maintained by seepage water from the Highline Canal.

Fish Population:

Migratory salmonids are not known to frequent this stream. Rainbows, cutthroats and Eastern Brooks furnish good, early fishing in the headwaters.

See also Wilson Creek.

Coleman Creek

River System: Yakima River

Name of Stream: Coleman Creek, tributary to Wilson Creek

Description:

Coleman Creek is one of the larger tributaries of the Wilson-Naneum System. It is small and meandering with many channels and swampy areas. The banks are mud and the bottom largely mud and silt.

There are 46 adjudicated water rights having a total allotted maximum of 2,645 Miners Inches (52.9 cfs).

The flow in the lower reaches is maintained by seepage water from Highline Canal.

Fish Population:

Migratory salmonids are not known to frequent this stream. Rainbows, cutthroats, and Eastern Brooks furnish good early fishing in the headwaters.

See also Wilson Creek.

Reeser Creek

River System: Yakima River

Name of Stream: Reeser Creek, tributary to Yakima River

Description:

Reeser is a small creek tributary to the right bank of the Yakima about two miles above Ellensburg.

There are six adjudicated water rights with a total maximum allotment of 216 Miners Inches (4.32 cfs). The lower part is completely dry most of the year, all water being diverted for irrigation. No fish are reported for this stream. The banks and bottom are mostly mud, the gradient of the lower reaches being flat.

Jones Creek

River System: **Yakima River**

Name of Stream: **Jones Creek, tributary to Yakima River**

Description:

Flows eight miles southerly to junction with Yakima River, two miles above Ellensburg.

Remarks: **Dry during part of the year. Arid watershed.**

Dry Creek

River System: Yakima River

Name of Stream: Dry Creek, tributary to Yakima River

Description:

Flows southeast seven miles to mouth on right bank of the Yakima River, four miles above Ellensburg.

Remarks: Dry most of the year. Arid watershed

Manastash Creek General Review

River System: Yakima River

Stream Surveyed: Manastash Creek, tributary to Yakima River

General Review:

(See Manastash Middle Fork, Manastash Channel IV, and Manastash Main Channel and South Fork. All locations in these write-ups are from county map of Kittitas County Engineer's office unless otherwise stated.)

The Manastash is a small creek in which the flow is used almost entirely for irrigation purposes. In the lower part of the stream, below Station C, there are 44 diversions. There are none above Station C. About 50% of the diversion ditches have dams of various types, of which only a few are barriers to fish. The real danger to fish in this stream is the presence of unscreened ditches and the small flow of water. There is a complete lack of fish protective devices throughout the irrigation systems. At Station B the main Manastash splits into two channels which are called III and IV. Channel III is the downstream branch and this in turn divides into two mouths both emptying into the Yakima. Stations on Channel III are labeled AIII for the downstream mouth and A'III for the upstream mouth. Stations on Channel IV are labeled AIV, etc. Two other channels have been noted, but were not bona fide and for this reason they were not surveyed. Channel I has a flow of about 0.5 cfs which seemed to be the maximum flow. This channel is in reality a return from Diversion #3 on the main channel above Station B. Channel II does not come from the Manastash but it is a return from the Highline ditch--a diversion from the Yakima River.

Although there is good cover, a good proportion of spawning gravels and easy gradients, the low volume of water, the presence of unscreened diversions and some barriers make the system practically useless to fish under the present conditions. None of the channels offer even an avenue to the upper waters. Any fish which get into the Manastash system would present an economic waste. In order to make the headwaters a fish producer, an avenue for fish only would have to be constructed, all ditches screened and beaver dams cleared out. Under the present conditions only the headwaters are of any use to fish and then to trout only.

Manastash Creek Main Channel and South Fork

River System: Yakima River

Stream Surveyed: Manastash Creek, Main Channel and South Fork,
tributary to Yakima River (splits into Channel
III and IV at SE1/4 of SW1/4,S12,T17N,R17E)

Date of Survey: June 24 and 28, 1936

Source: Rainier National Forest near Quartz Mountain at
NE1/4,S10,T18N,R14E (Rainier National Forest, Forest
Service Map, 1930 edition)

Direction of Flow: Flows east to confluence with Yakima River
(through several channels: Channel IV joins Yakima River
at NW1/4 of SW1/4,S33,T18N,R18E Channel III joins Yakima
River at SE1/4 of NE1/4,S4,T17N,R18E.)

Total Length: 24 miles from its source to split into channels at
SE4,SW4,S12,T17N,R17E. 31,910 yards or 18 miles surveyed.

Station Location:

Sta	Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
A	Split of main stream	0	0.00	0	0.00	SE1/4 of SW1/4 S12,T17N,R17E	NA	NA
B	Reclamation Road Bridge		0.50		0.50	NE1/4 of NE1/4 S14,T17N,R17E	13'0"	14"
C	Highway Bridge 5.8 mi above B		6.50		7.00	SW1/4 or NE1/4 S18,T17N,R17E	22'9"	12"
D	South Fork of Manastash Ck		3.00		10.00	NE1/4 of SE1/4 S14,T17N,R16E	15'0"	11"
E	Confl with Lake Creek		4.60		14.60	SW1/4 of NE1/4 S26,T18N,R15E	18'0"	3"
F	Confl of South Fork & Middle Fork		3.50		18.10	SE1/4 of NE1/4 S22,T18N,R15E	12'0"	6"

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17030001	0073	4.51
B	17030001	0073	5.16
c*	17030001	0075	2.33
D*	17030001	0075	2.33
E	17030001	0075	8.70
F*	17030001	0075	12.79

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

Station	Area (yd ²)	L.R.	%	M.R.	%	S.R.	%	M&S	%
A-B			19		40		34		7
B-C			15		33		39		12
C-D			14		35		46		5
D-E			18		36		39		7
E-F			11		29		49		10

Spawning Area Usable and Available:

Station	Distance yds miles	Area (yd ²)	Available Spawning Area (yd ²) (MR&SR)	% Avail	Usable Spawning Area (yd ²)	% Usable
A-B	340	1,040		27		

Spawning Area Unavailable and Unusable:

Station	Distance	Area (yd ²)	Area Unavail (yd ²)	% Unavail	When Avail	Usable Unavail (yd ²)	% Unavail
A-B	560 yd		1,780	47			
B-C	10,710 yd		51,216	73			
C-D	5,230 yd		24,035	81			
D-E	8,150 yd		38,315	75			
E-F	6,200 yd		22,325	79			

Character of Watershed:

Mountainous

Hilly X

Rolling

Flat

Swampy X

Wooded middle and upper part

Open

Cultivated a few small farms (hay & small grains)

Character of Watershed (cont):

Character
of Valley

Character
of Banks

Density of
Marginal
Vegetation

Erosion
a) Banks

b) Watershed

Diversions:

Diversion 1: NW1/4 of NE1/4,S14,T17N,R17E. L.B. 7 cfs. 220 paces above Station B. The irrigation ditch is 6' wide, 21" deep, and has an average water depth of 7". There is no headgate or protective devices present. A return is situated 30' below the intake. No dam is present in the system. The ditch, unscreened, is a trap to downstream migrants.

Diversion 2: NW1/4 of NE1/4,S14,T17N,R17E. L.B. 2.7 cfs. 225 paces above Station B. The irrigation ditch is 5'10" wide, 31" deep, and has an average water depth of 4". The headgate is of plank with 0.5" opening. The headgate abutments are constructed of concrete. No return is present, and the system also lacks protective devices. There is no dam. A plank acts as a partial dam for both Diversion 1 and 2. The system doubtless is a trap to downstream migrants.

Diversion 3: NE1/4 of NW1/4,S14,T17N,R17E. L.B. 2.2 cfs. 350 paces above Station B. The irrigation ditch is 61" wide, 50" deep, and has an average water depth of 8.5". A headgate of plank with a 12" opening is present. A return and protective devices are lacking. There is no dam. This system is not a complete downstream migrant trap but it is a serious one.

Diversion 4: SE1/4 of NW1/4,S15,T17N,R17E. L.B. 0 cfs. 3,966 paces above Station B. The ditch is 36" wide, 20" deep, and has an average water depth of 4". A wooden headgate, 36" by 30", with an opening of 3" is present. A return and also protective devices are lacking. There is no dam, but a miner's weir with a drop of 27.25" and a spill of 2.5" is found. This system does not offer a bad condition to downstream migrants.

Diversion 5: NW1/4 of NE1/4,S16,T17N,R17E. R.B. Est 0.5

cfs. 7,860 paces above Station B. The ditch is 24" wide, 15" deep, and has an average water depth of 3". There is no headgate or return and protective devices are lacking. There is no dam.

Diversion 6: SE1/4 of NE1/4,S16,T17N,R17E. R.B. Est 0.25 cfs. 8,110 paces above Station B. A flume, 9" wide and 6" deep, takes the water from a branch at the main stream. There was little water in the flume when surveyed and it was all returned at the intake. No headgate or protective devices are found in the system. There is no dam.

Diversion 7: SE1/4 of NE1/4,S16,T17N,R17E. R.B. Est 1 cfs. 8,130 paces above Station B. The ditch is 28" wide, 26" deep, and has an average water depth of 3". A wooden headgate, 28" by 26" with a 2" opening is present. There is no return, and protective devices are lacking. There is no dam.

Diversion 8: SE1/4 of NE1/4,S17,T17N,R17E. R.B. 0 cfs. 9,271 paces above Station B. The ditch is 20" wide, 30" deep, and has an average water depth of 2". There is no dam, return or headgate. Protective devices are totally lacking and are probably not needed since this system is not a trap to downstream migrants.

Diversion 9: SE1/4 of NE1/4,S17,T17N,R17E. R.B. 0.2 cfs. 9,500 paces above Station B. The ditch is 10' wide, 8" deep and has an average water depth of 2.5". There is no dam, return or headgate. Protective devices are lacking and are unnecessary since the system is no trap to downstream migrants.

Artificial Obstructions:

1. 340 yards above Station A. Beaver dam, 6'. Probably a barrier.
2. 300-850 yards above Station B. Beaver dams.
3. 1,785-2,000 yards above Station B. Beaver dams. Probably barriers.
4. To end of survey. Beaver dams. Some probable barriers.
5. 3,430 yards above Station C. Log jam. Possible barrier to salmon.

Natural Obstructions:

1. 525 yards above Station C. Falls, 3'. Passable.
2. 5,300 yards above Station D. Falls, 6'. Passable with difficulty.

3. 8,125 yards above Station D. Falls, 4'. Passable.

Fluctuation in Water Level:

Feet Variation: unknown

Cause of Variation: run-off and rains in Rainier National Forest. Reported to become dry in places in summer.

Stream Volumes: Station B on 6/26/36 25 cfs.

Pollution: None

Fish (salmon): None

Fish (other than salmon): None

General Remarks:

Manastash Creek, located in Kittitas County and Rainier National Forest, enters the left bank of the Yakima River, just west of Ellensburg. Before joining the Yakima, the creek breaks into two major channels. The upstream branch is designated as Channel IV. The downstream branch, Channel III, divides into two branches, both discharging into the Yakima River. Channel III carries the greatest flow and is regarded as the main stream. From the splitting of the main stream into Channels III and IV, the distance is 24 miles. Of this total, 31,910 yards or 18 miles were surveyed. The survey commenced at the banks mentioned above and continued upstream to the confluence of the South Fork with the Middle Fork.

Tributaries

Several large tributaries flow into the Manastash. The Middle Fork was surveyed. Three lakes are drained by the upper system. They are Lower Manastash, Lost Lake and Shoestring Lake. In the upper reaches, numerous small streams join the Manastash; while in the middle and lower reaches, there are practically no tributaries.

Topograhly

The lower part of the Manastash watershed is hilly, and for the most part bare, except in the immediate vicinity of the stream. Beaver ponds make certain portions of the stream marshy. The middle and upper portions become more rugged and more densely wooded. Most of the upper waters flow in a canyon of varying

width. There are a few small farms in the wider portions of the valley. Swampy areas caused by beaver dams occur throughout. The headwaters flow largely in a parklike country, quite high and oftentimes rugged. There are considerable stands of timber in this region which is the Rainier National Forest.

Character of Stream

From the split of the main Manastash into Channels III and IV, the creek enters a narrowing canyon with a few small farms (hay and grain). Within 300 yards above Station B three large diversion ditches are found. Any one of these would constitute a serious trap for downstream migrants. Six smaller diversions, some of which were dry when surveyed, are of less danger. Beaver dams are encountered all along the stream. Some of these doubtless are barriers at certain stages of water level. Pools are frequent (S2,S3,S5) and GC3 cascades are numerous. The stream is always well protected by cottonwoods, maples and willows along the banks. Spawning gravels are excellent and average about 73% of the total bottom. Between Station B and Station C, the stream splits into two channels. These were both surveyed. A few small falls are found in this region but are not barriers. A log jam of some size was also found but not regarded as dangerous to migrants. Six stations were established. The average width of the stream is 16' and the average depth is 9". At Station B, the flow was found to be about 25 cfs. The air temperature varied from 74 F - 51 F and the water temperature from 61 F - 41.5 F. The weather was clear throughout the survey. A box canyon extends from 4,850 yards above Station D to Station E.

Fish Population

Eastern Brook, cutthroat, and rainbow trout occur in steadily decreasing numbers. Salmon have been unobserved for over twenty-five years. This channel should be a good fish producer, but it would be a loss of fish to stock it with salmon. The lower valley should be traversed with an artificial channel for fish alone, or be screened off from the upper valley to preserve the trout there. The streams are open to fishing, and are worked intensively. With improvement, this stream should be a consistent and large trout producer.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Skv
A	6/24/36	1:45 pm	74.0 F	61.0 F	Clear
B	6/26/36	10:00 am	65.0	55.0	Clear
C	6/27/36	3:00 pm	58.5	55.0	Clear
D	6/29/36	9:30 am	61.0	47.0	Clear
E	6/28/36	12:00 n	63.0	45.0	Clear
F	6/28/36	8:00 am	51.0	41.5	Clear

Pool Grade:

St	Rest Pools	Rest Pls/Mile	S2T1 %	S2T2 %	S2T3 %	S3T1 %	S3T2 %	S3T3 %	S5T1 %	S5T2 %	S5T3 %	S6 %
A-B	8	16							8			
(0.5 mi)									100.0			
B-C	4	87	5			7	3		26	2	5	
(6.5 mi)			10.0			15.0	6.0		54.0	4.0	10.0	
C-D	36	12			3				30	2	1	
(3. mi)					8.0				83.0	6.0	3.0	
D-E	55	12/1	1	1		1	1		44	5	2	8
(4.6 mi)			2.0	2.0		2.0	2.0		80.0	9.0	4.0	
E-F	124	35/5	1		2	18		4	91		8	18
(3.5 mi)			1.0		2.0	15.0		3.0	73.0		6.0	
Grn	271/297	15/1	7	1	5	26	4	4	199	9	16	26
Total (18.0 mi)			3.0	0.4	2.0	10.0	1.0	1.0	73.0	3.0	6.0	

Gradient:

Station	Distance (Miles)	Total dROP	Avg Drop Per Mile	Source of Data
Mouth-A	(See Channels III and IV)			
A-C	4.3	485'	113'	Topographic Map
C-D	1.7	245'	144'	Topographic Map
D-E	8.5	1,300'	153'	Topographic Map
E-F	2.1	250'	119'	Topographic Map
Totals	16.6	2,280'	137'	

Manastash Creek Middle Fork

River system: **Yakima River**
 Stream Surveyed: **Manastash Creek Middle Fork, tributary to
 Manastash Creek South Fork**

Date of Survey: **June 28, 1936**

Source: **Kittitas County near Frost Mountain (SE1/4 of NW1/4,
 S7,T18N,R15E)**

Direction of Flow: **Flows southeast to confluence South Fork at
 SE1/4 of NW1/4,S22.,T18N,R15E**

Total Length: **Four miles. 1,820 yards (about 1 mile) surveyed
 from mouth to CCC Camp (SW1/4,S16,T18N,R15E).**

Station Location:

Sta	Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
A	Confl with South Fork	0	0.0	0	0.0	SE1/4 of NW1/4 S22,T18N,R15E	7'5"	3.5"
B	CCC Camp		1.0		1.0	SW1/4, S16 T18N,R15E	4'6"	2.0"

EPA River Reach Codes:

Station	HUC	SEG Rmi
A	EPA river reach codes were not	
B	determined due to insufficient historical data	

Character of Bottom Between Stations:

Station	Area (yd ²)	L.R.		M.R.		S.R.		M&S	
			%		%		%		%
A-B	3,420		5		9		56		31

Spawning Area Usable and Available:

Station	Distance vds miles.	Area (yd ²)	Available Spawning Area (yd ²)		%	Usable Spawning Area (yd ²)		%
			(MR&SR)	Avail		Area (yd ²)	Usable	
A-B	1,820		2,185	64				

Spawning Area Unavailable and Unusable: **None**

Character of Watershed:

Mountainous lower 0.25 mile in V-gorge

Hilly

Rolling

Flat

Swampy

Wooded

X

Open

Park-like in upper part

Cultivated

**Character
of Valley**

**Character
of Banks**

**Density of
Marginal
Vegetation**

**Erosion
a) Banks**

b) Watershed

Diversions: None

Artificial Obstructions: None

Natural Obstructions: None

Fluctuation in Water Level:

Feet Variation: unknown

Cause of Variation: spring run-off--quite constant due to springs.

Stream Volumes: Station A 6/28/36 Est 3.0 cfs Clear weather
Station B 6/28/36 Est 1.5 cfs Clear weather

Pollution: **None**

Fish (salmon): **None**

Fish (other than salmon):

<u>Species</u>	<u>Date</u>	<u>Very Abundant</u>	<u>Abundant</u>	<u>Fair No.</u>	<u>Scarce</u>
Eastern Brook	6/28/36		X (3"-5" long)		

General Remarks:

The Middle Fork of the Manastash joins the South Fork at Station F. It has a length of about four miles, of which slightly over a mile was surveyed. This branch is quite small in its entirety. There are no tributaries except discharge from springs.

Topography

In the lower 0.25 mile, the stream flows through a narrow V-gorge. The sides and surrounding ridges are covered with pine, fir, and cedar trees. The upper 0.5 mile surveyed was through a parklike area well shaded by cedars and firs. This area is more or less open and trees occur in clumps. Above the survey, the country becomes more rugged.

Character of Stream

This Middle Fork of the Manastash is a very small stream discharging about 3 cfs at the mouth. At the end of the survey, about one mile upstream, the flow is about 1.5 cfs. The stream varies in width from 3'-6' and in depth from 1"-4". Pools are entirely lacking, but numerous GC3 riffles are found throughout. There are no obstructions, either natural or artificial and no irrigation devices. Of a total 3,420 square yards of bottom, 2,185 square yards or 64% is available spawning rubble. According to reports, this section is partially spring fed. With an air temperature of 50 F, the water temperature was 41.5 F. The temperatures were taken 6/28/36 at 7:10 am on a clear day. The stream is well shaded throughout its course.

Fish Population

Numerous 3"-5" Eastern Brook trout were noticed in the stream. This portion of the Manastash is hardly good for anything but trout, since access to the upper waters is almost impossible due to the many unscreened diversions and the small volume of water.

Temperature Data:

<u>Sta</u>	<u>Date</u>	<u>Hour</u>	<u>Air Temw</u>	<u>Water Temw</u>	<u>Sky</u>
A	6/28/36	8:00 am	---	---	Clear
B	6/28/36	7:10 am	50.0 F	41.5 F	Clear

Pool Grade:

Length of section: 1,820 yards (1.03 miles)
 Average pools/mile: 0

Gradient:

The stream drops 130 feet in its lowest mile. From topographic map.

Manastash Creek Channel III

River System: **Yakima River**

Stream Surveyed: **Manastash Creek Channel III, tributary to Yakima River**

Date of Survey: **June 25, 1936**

Source: **The source of this channel may be regarded as the Forks where the Manastash splits (SE4,SW4,S12,T17N,R17E).**

Location: **Kittitas County, about one mile west of Ellensburg; joins Yakima River at SE4,NE4,S4,T17N,R18E, left bank.**

Total Length: **9,148 yards, all surveyed.**

Station Location:

Sta	Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
M III	Main mouth, 0 est. 400 paces above actual confl with Yakima River	0	0.0	0	0.0	SE1/4,NE1/4 S4,T17N,R18E	18'	54"
A	Confl with Channel IV		5.2		5.2s	SE1/4,SW1/4 S12,T17N,R17E	--	NA

EPA River Reach Codes:

Station	HUC	SEG	Rmi
M III	17030001	0073	0.00
A III	17030001	2106	0.00

Character of Bottom Between Stations:

Station	Area (yd ²)		L.R.		M.R.		S.R.		M&S	
	Area	(yd ²)	%	%	%	%	%	%	%	%
AIII-B			14		26		26			34

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd ²)	Available Spawning Area (yd ²)		Usable Spawning Area (yd ²)	
			(MR&SR)	% Avail	Area (yd ²)	% Usable
A III-B	200		2400	.74		

Spawning Area Unavailable and Unusable:

<u>Station</u>	<u>Distance</u>	<u>Area</u> <u>(yd²)</u>	<u>Area</u> <u>Unavail</u> <u>(yd²)</u>	<u>%</u> <u>Unavail</u>	<u>When</u> <u>Avail</u>	<u>Usable</u> <u>Unavail</u> <u>(yd²)</u>	<u>%</u> <u>Usable</u> <u>Unavail</u>
A III-B	8,948		16,554	51.3			

Character of Watershed:

Mountainous

Hilly

Sagebrush growth

Rolling

Flat

Swampy

Wooded

Along banks

Open

Cultivated

Character
of Valley

Character
of Banks

Density of
Marginal
Vegetation

Erosion

a) Banks

b) Watershed

Diversions:

Diversion 1: SW1/4,SE1/4,S5,T17N,R18E, R.B. 0 cfs. 2,776 paces above Station A'III. The ditch is 2' wide and 14" deep. It was dry when surveyed. There is no headgate or return and protective devices are lacking. A dam, 9.5" wide, with a drop of 5" and a spill of 3" is present. The abutments are of concrete. No fish ladder is included or needed.

Diversion 2: NW1/4,NW1/4,S8,T17N,R18E, L.B. 0 cfs. 3,443 paces above Station A,III. The ditch is 6, wide, 30" deep and has an average water depth of 15". There is a wooden headgate, but no return or protective devices are present. The dam is constructed of concrete and wood and has concrete abutments. The crest is 11, wide; the drop is 14". There is no spill but there is considerable leakage to the side and underneath the dam. An apron is located downstream from the base of the structure.

Diversion 3: NW1/4,NW1/4,S8,T17N,R18E, L.B. 0 cfs. 3,500 paces above Station A,III. The ditch is 4, wide, 2' deep, and was reported dry at time of survey. There is no headgate or return to the main stream. Protective devices are lacking. The dam is constructed of logs. It is 5, wide and has no drop, spill, or abutments. The log is placed in the bottom, upstream from the ditch, and is possibly not used as a diversion dam.

Diversion 4: SE1/4,NE1/4,S7,T17N,R18E, L.B. 1.7 cfs. 3,575 paces above Station A'III. The ditch is 5, wide, 18" deep, and has an average water depth of 7". There is no headgate or return. Protective devices are present. The dam, constructed of rock and wood, is 7, wide, 4, deep and has a spill of 1". The dam is complete across the flow. There is no fish ladder. Abutments are not present. This system would be a trap to downstream migrants but would not hinder upstream spawners.

Diversion 5: NW1/4,SE1/4,S7,T17N,R18E, L.B. 0 cfs. 4,586 paces above Station A'III. The ditch is 3, wide and 2, deep. When surveyed, the ditch was dry. There is no headgate or return, and protective devices are lacking. No dam is present. The system would divert only during high water periods.

Diversion 6: NW1/4,SW1/4,S7,T17N,R18E, L.B. 1.7 cfs. 5,883 paces above Station AIII. The ditch is 6, wide and 20" deep, and has an average water depth of 8". There is no headgate or return and protective devices are lacking. The dam is 20, wide. The drop and spill are unknown. Escapage is through the rocks of which the dam is built. The system is a perfect trap for downstream migrants and the dam offers a barrier to upstream migrants.

Diversion 7: NE1/4,SE1/4,S12,T17N,R17E, L.B. 0 cfs. 6,463 paces above Station AIII. The ditch is 24" wide, 24" deep and has an average water depth of 6". A wooden headgate 24" by 6" has a 2" opening under the gate. All the water is returned 90 yards downstream. There are no protective devices. There is no dam. This ditch has no barrier and is not a serious trap to downstream migrants.

Diversion 8: NE1/4,SE1/4,S12,T17N,R17E, L.B. Est. 0.5 cfs. 6,503 paces above Station AIII. This diversion is composed of a ditch 3' wide and 2' deep. It carries an average depth of 4" of water. No headgate, return or dam are present. There are no

protective devices; and due to this condition, the ditch is a trap to downstream migrants.

Diversion 9: SW1/4,SE1/4,S12,T17N,R17E, L.B. Est. 0.25 cfs. 7,063 paces above Station AIII. It consists of a ditch 13" wide, 7" deep, with an average water level of 3". There is no headgate, return or dam. In spite of the lack of protective devices, the ditch is not a serious trap.

Diversion 10: SW1/4,SE1/4,S12,T17N,R17E, L.B. 1.08 cfs. 7,263 paces above Station AIII. The ditch is 5' wide, 2' deep and has an average water depth of 4". There is no headgate or return. Protective devices are lacking also. The dam is constructed of rock in the stream bed. There is no spill or drop. The system is reported to be a complete trap for migrants.

Diversion 11: NE1/4,NW1/4,S13,T17N,R17E, R.B. 0.6 cfs. 7,831 paces above Station AIII. The ditch is 20" wide, 12" deep and has an average water depth of 7". There is no headgate or return. Protective devices are lacking. There is no dam. This diversion is reported to be a trap to downstream migrants.

Diversion 12: NW1/4,NW1/4,S13,T17N,R17E, L.B. Est. 0.5 cfs. 8,036 paces above Station AIII. The ditch is 32" wide, 34" deep and has an average water depth of 4". The headgate is 34" by 32" and is up 0.5". The system was flowing near half capacity. There is no return or protective devices. There is no dam. This diversion is reported as not being a serious trap to downstream migrants.

Diversion 13: NE1/4,NE1/4,S14,T17N,R17E, L.B. 1.5 cfs. 333 paces above Station B on the main channel. The ditch is 30" wide, 12" deep and has an average water depth of 4". There is no headgate and no water is returned. The lack of protective devices makes this ditch a trap for downstream migrants. The dam is constructed of planks and rock. It has a drop of 8", and has no spill. There are no abutments. The ditch takes out from a small side channel. No fish ladder is present or required.

Artificial Obstructions:

1. 200 yards above Station AIII. Beaver dam. Impassable in low water.
2. 2,925 yards above Station AIII. Log jam. Impassable in low water.
3. 5,687 yards above Station AIII. Beaver dam. Impassable in low water.

Note : None of the irrigation dams are barriers. For further

information see "Irrigation Diversions".

Natural Obstructions: None

Fluctuation in Water Level:

Fluctuation: unknown.

Cause of Variation: run-off and rains in head waters.

Stream Volumes: Unknown. Dry in sections in summer.

Pollution: None

Fish (salmon): None

Fish (other than salmon):

Trout fry observed in fair numbers. A few salmonid fry were observed about two miles above mouth. The Eastern Brook trout were observed in a diversion intake.

General Remarks:

This branch (Channel III) of the Manastash is regarded as the original channel and is the largest at the present time. It empties into the Yakima in two mouths which are formed by a split of Channel III, about 500 paces from the main Yakima River. The channel was surveyed from the mouth of the right, or upstream branch, upstream to the confluence with Channel IV. The downstream, or left branch, was partly surveyed.

Towosrawhv

The watershed is the characteristic dry hills of the region. Vegetation is sparse except directly fringing the stream. The gradient is not steep.

Character of Stream

Although this channel has 16,794 square yards of spawning gravel, constituting 53% of the total bottom, most of it is inaccessible due to barriers and the small size of the stream. Several beaver dams and irrigation dams are barriers. One occurs 200 paces from the mouth. Thirteen unprotected diversions of a more or less serious character occurs in this stretch of stream.

They would render this channel hazardous going for fish. This channel varies from 9"-18' in width and is quite shallow. The total volume of water flowing is unknown, but about 8 cfs was being diverted at the time of survey. The water temperature varies from 56 F - 61 F, and the air temperature from 74 F - 76 F. Several drainage ditches enter the channel in the lower portion. The stream has numerous GC3 cascades and pools are infrequent. Most of the pools are well shaded.

Fish Population

Salmonid fry in small numbers were observed in the stream as was one 5" Eastern Brook trout. Cutthroats and rainbows are reported, but none were observed. Salmon have not frequented the stream in 25 years. Although this is the largest channel, the prevalence of unscreened diversions, the absence of pools and the lack of a constant water flow makes this channel unsuitable for fish. It is doubtful whether this channel, which is hardly more than an irrigation ditch, could act even as an avenue for fish to get to the upper stream.

Temperature Data:

Sta	Date	Hour	Air Temw	Water Temw	Skv
A'111	6/25/36	10:00 am	76 F	56 F	Clear
AI11	6/25/36	10:25 am	76 F	60 F	Clear
B	6/27/36	1:0 pm	74 F	61 F	Clear

Pool Grade:

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S5T1 %	S5T2 %	S5T3 %	S2T2 %
AIII-B	5.2	8	2	2	5	1	
				25.0	62.5	12.5	

Gradient:

Channel III drops 430 feet along its 5.2 mile length, an average gradient of 83 feet per mile. From Topographic map.

Manastash Creek Channel IV

River System: **Yakima River**

Stream Surveyed: **Manastash Creek Channel IV, tributary to Yakima River**

Date of Survey: **February 24, 1936**

Source: **At confluence with Channel III to form main channel.**

Location: **SE1/4,SW1/4,S12,T17N,R17E. Kittitas County, Washington.
Mouth SW1/4,NW1/4,S33,T18N,R18E, about two miles NW of
Ellensburg.**

Total Length: **5 miles, all surveyed.**

Station Location:

Sta	Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Dewth
		Yds	Miles	Yds	Miles			
MIV	Mouth of Channel IV	0	0.00	0	0.00	SW1/4,NW1/4 S33,T18N,R18E	9.5'	5"
AIV	Confl with Channel III		5.02		5.02	SE1/4,SW1/4 S12,T17N,R17E	9.5'	6"

EPA River Reach Codes:

Station	HUC	SEG	Rmi
AIV	17030001	1949	0.00
BIV	17030001	0073	3.99

Character of Bottom Between Stations:

Station	Area (yd ²)	L.R.		M.R.		S.R.		M&S	
			%		%		%		%
AIV-BIV			5		15		23		56

Spawning Area Usable and Available:

Station	Distance		Area (yd ²)	Available Spawning Area (yd ²)		Usable Spawning Area (yd ²)	
	yds	miles		(MR&SR)	% Avail	Area (yd ²)	% Usable
AIV-BIV	8,833			8,518	39		

Spawning Area Unavailable and Unusable: **None**

Character of Watershed:

Mountainous

Hilly

Rolling X

Flat

Swampy X

Wooded

Open

cultivated 100%

Character
of Valley

Character
of Banks

Density of
Marginal
Vegetation

Erosion

a) Banks

b) Watershed

Diversions:

Diversion 1: 700 paces above Station AIV. L.B. 0 cfs. The ditch is 4' wide, 8" deep, and has an average water depth of 5". There was practically no flow in the ditch. No headgate or return is found in the system which also lacks protective devices of any kind. The dam, constructed of rocks, has a crest of 12', a drop of 9", and a 2" spill. There are no abutments. The system would doubtless be a trap to downstream migrants, although at the time of survey there was no flow.

Diversion 2: 1,100 paces above Station AIV. R.B. 2.2 cfs. The ditch is 7' wide, 26" deep, and has an average water depth of 20". There is no headgate and no water is returned. Protective devices are lacking. A wing dam, constructed of earth and boards,

dams half the width of the creek. At higher water levels, this system would divert a considerable portion of the flow.

Diversion 3: 1,341 paces above Station AIV. L.B. 2.2 cfs. The ditch is 8' wide, 2' deep and has an average water depth of 8". There is no headgate and no water is returned. Protective devices are lacking. The dam is constructed of concrete and has a crest of 30' with a drop of 4'. There are 5" of stop logs at the bottom of the dam. The stop logs are 50" wide. The dam is open at the bottom. A ditch paralleling the creek takes off from the main diversion ditch. No data is given on this. There are no abutments and no fish ladder. This system would be a trap to downstream migrants, and a probable barrier to ascending fish when all of the stop logs were placed.

Diversion 4: 1,400 paces above Station AIV. L.B. The ditch is 3' wide, 18" deep, and has a water depth of 12". There is no headgate. All the water is returned at a point 60 paces downstream, just above diversion #3. A wing dam, constructed of boards, diverts the water into the ditch. There are no abutments. The system has no protective devices and none are required since the total diversion is returned.

Diversion 5: 1,698 paces above Station AIV. L.B. 0 cfs. The ditch is 14" wide, 20" deep, and has an average water depth of 13". There is no headgate or return and there are no protective devices. The irrigation dam is 49" wide, has a depth of 18", and a spill of 2.5". Abutments are present and constructed of concrete. The dam itself is built of concrete. There is no ladder. This system would be a trap to downstream migrants. No flow taken.

Diversion 6: 2,064 paces above Station AIV. L.B. 0 cfs. The diverted water is carried in a 6" pipe and in a 1.0' by 1.5' ditch. There is no headgate and no water is returned. Protective devices are lacking. The dam and abutments are constructed of concrete. Dimensions of the dam are: crest 4', depth 18", and spill 5". There is no fish ladder. This system is a trap for downstream migrants.

Diversion 7: 2,469 paces above Station AIV. R.B. The ditch is 3' wide, 2.5' deep, and has an average water depth of 4". There is no headgate. A return spills into the creek 50 paces below the ditch. The dam is constructed of concrete and has concrete abutments. The crest is 4', drop 18", and spill 3". In cross-section, the dam is V-shaped. There is no fish ladder or other protective devices. A canal carried in a flume crosses the stream just above the diversion. The system would not be a serious trap to fish under present conditions.

Diversion 8: 3,454 paces above Station AIV. L.B. 2.85 cfs. The ditch is 38" wide, 24" deep, and has an average water depth of

15". None of the diverted water is returned. There is no headgate nor are there any protective devices. The dam, constructed of boards, has concrete abutments. It has a crest of 9'8", a drop of 23", and a 3" spill. There is no fish ladder. The system is a trap to downstream migrants.

Diversion 9: 3,563 paces above Station AIV. R.B. The ditch is 2' wide, 18" deep, and has an average water depth of 4". There is no headgate or return. Protective devices are also lacking. A dam is present, but has broken out.

Diversion 10: 4,434 paces above Station AIV. L.B. 2.5 cfs. This ditch is 6' wide, 26" deep, and has an average water depth of 21". There is no headgate or return. Protective devices are lacking. A dam, constructed of wood and concrete, has concrete abutments. The total crest is 10', but the spill occurs only in a 6' section. In height, the dam is 44' and it has a spill of 3.5". There is no fish ladder. This system is a trap to migrants moving downstream and a probable barrier to upstream migrants.

Diversion 11: 4,522 paces above Station AIV. R.B. The ditch is 5' wide, 24" deep and was dry at the time of survey. There is no headgate or return and no protective devices were present. This dam, constructed of concrete, has concrete abutments. The total crest is 15', but no spill occurs except in a 6' section. 22" is the height of the dam and there is a spill of 7". There is no fish ladder present. The system would be a trap to downstream migrants during irrigation seasons. The height of the dam 'would not be sufficient to act as a barrier.

Diversion 12: 6,019 paces above Station AIV. L.B. 0 cfs. The ditch is 3' wide and 18" deep. Since an earth dam closed the ditch during the time of survey, no water was being diverted. No protective devices are present. The dam is of plank construction and has a 2' by 3' gate in it. The height of the dam is 18" and the crest is 8'. When surveyed, the gate was open, allowing total water escape. There are no abutments in the dam.

Diversion 13: 6,349 paces above Station AIV. L.B. 0 cfs. The ditch is 3' wide and 1' deep. No water was being diverted. There is no headgate or return, and no protective devices are present. The dam, constructed of plank, has a crest of 6', a drop of 1', and a spill of 6". No abutments are found. There is no fish ladder. This system is seldom, if ever, used.

Diversion 14: 6,533 paces above Station AIV. L.B. 0 cfs. The ditch is 14" wide, 8" deep, and had no water in it when surveyed. There is no headgate but an earth dam in the ditch keeps water out. There is no return and protective devices are lacking. The system has no dam in it.

Diversion 15: 6,388 paces above Station AIV. R.B. 0.5 cfs.

The ditch is 18" wide, 6" deep, with an average water depth of 2". There is no headgate or return. No dam is present. No protective devices were found.

Diversion 16: 6,668 paces above Station AIV. R.B. 0 cfs. The ditch is 12" wide and 8" deep. It was dry when surveyed. There is no headgate or return. No protective devices. The dam is constructed of rock. The crest is 5' wide, has a drop of 6", and a spill of 5". There is no fish ladder. No abutments are present.

Diversion 17: 6,833 paces above Station AIV. L.B. 0 cfs. The ditch is 2' wide and 10" deep. The ditch was dry when surveyed, due to an earth and plank dam at the head. There is no return or protective devices. No dam is present.

Diversion 1a: 6,926 paces above Station AIV. L.B. Est. 1.0 cfs. The ditch is 2' wide, 6" deep, and has an average water depth of 5". There is no headgate or return and protective devices are lacking. There is no irrigation dam. The ditch floods directly onto an alfalfa field. Would be a partial trap to migrants.

Diversion 19: 6,963 paces above Station AIV. L.B. 0 cfs. The ditch is 15" wide and 10" deep. Due to a dam in the head of the ditch, no water was being diverted. There is no return and protective devices are lacking. No dam is present.

Diversion 20: 6,968 paces above Station AIV. R.B. 0 cfs. The ditch is 18" wide and 10" deep. No water was being diverted. There is a wooden headgate 14" by 22". No return or protective devices are present. There is no dam.

Diversion 21: 7,133 paces above Station AIV. R.B. 0 cfs. The ditch is 28" wide, and 12" deep. Due to a plank dam at the head there is no water diversion. No return or protective devices. There is no dam.

Diversion 22: 7,183 paces above Station AIV. L.B. Est. 1.5 cfs. The ditch is 26" wide and 14" deep, with an average water depth of about 10". There is no headgate or return and protective devices are lacking. The dam, constructed of rock, has a crest of 10', a drop of 8" and a spill of 5". There are no abutments.

Artificial Obstructions:

1. 1,341 paces above Station AIV. Concrete dam, 4'. See Diversion #3.
2. 1,698 paces above Station AIV. Concrete dam and abutments, 18". See Diversion #5.
3. 2,064 paces above Station AIV. Concrete dam and

abutments, 18". See Diversion #6.

4. 2,469 paces above Station AIV. Concrete dam and abutments, 18". See Diversion #7.

5. 3,454 paces above Station AIV. Plank dam with concrete abutments, 23". See Diversion #8.

6. 4,434 paces above Station AIV. Concrete and wood dam, 44". See Diversion 810.

7. 4,522 paces above Station AIV. Concrete dam and abutments, 22". See Diversion #11.

Natural Obstructions: None

Fluctuation in Water Level:

Fluctuation: unknown

Cause of Variation: run-off in headwaters.

Stream Volumes: At Station AIV on 6/24/36 2.2 cfs.

Pollution:

Refuse from slaughter house, 127 paces above Station AIV. This condition makes stream below source of pollution very rank.

Fish (salmon): None

Fish (other than salmon): None

General Remarks:

Channel IV of the Manastash is the upper of two channels, formed by the split of the main Manastash Creek. Its mouth is about a mile upstream from that of Channel III. The total length of this branch is 8,833 yards and it was completely surveyed. The only water emptying into the creek is from drainage, since there are no tributaries.

Towosrawhy

The entire channel runs through cultivated lands and hay and grain fields all the way. The uncultivated portion above is the

usual dry, hill, sagebrush lands seen in this region.

Character of Stream

This channel is very small, discharging about 2.2 cfs at the mouth. The width varies from 9'6" to 6' and the depth from 4" to 9". Of a total of 22,032 square yards of bottom, 8,518 square yards or 39% are available spawning gravels. Portions of the upper stream are marshy, and several beaver dams are found in this region. Pools are exceedingly scarce and riffles only fair. The stream is covered with moss and brush near the mouth and is continuously well-shaded by willows and brush to the source. 22 diversions are taken from this channel, none very large and none are screened. At the time of the survey, many of these were not diverting water so that a total flow could not be obtained. possible that the lower end is entirely dry during periods of heavy irrigation. Some of the irrigation dams may be barriers at times. Diversion #3 is 4' high and Diversion #10 is 44" high. Just above the mouth is located a slaughter house which dumps refuse directly into the channel, causing rank pollution.

Fish Population

This branch is worthless as a fish producer--or as an avenue to the upper creek. The many ditches would constitute traps which could not be avoided, and the size is such as to make it unimportant anyway. No fish were seen and none were reported.

Temperature Data:

Sta	Date	Hour	Air Temw	Water Temw	Sky
AIV	6/24/36	12:15 pm	76 F	60 F	Clear
BIV	6/24/36	1:45 pm	74 F	61 F	Clear

Pool Grade:

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S3T2 %	S5T2 %
AIV-BIV	5.02	3	1	2	1
				66.0	34.0

Gradient:

This channel drops 410' in the five mile length, a gradient of 82' per mile. From Topographic map.

Taneum Creek

River System: **Yakima River**

Stream Surveyed: **Taneum Creek, tributary to Yakima River**

Date of Survey: **June 20, 1936**

Source: **Lookout Mt., Mole Mt., Naches-Yakima Divide**

Location: **NW1/4,SW1/4,S34,R17E,T19N (Kittitas County Map)**

Total Length: **12.1 miles (total length surveyed)**

Station Location:

Sta	Location	Distance above prev. Station		Distance above Mouth		Map Location	Width	Dewth
		vds	miles	vds	miles			
A		0	0.0	0	0.0	NW1/4,sw1/4 S34,R17E,T19N	24.0'	6.5"
B			1.5		1.5	SE1/4,NW1/4 S4,R17E,T18N	36.0'	10.3"
C			3.4		4.9	NW1/4,NE1/4 S2,R16E,T18N	34.0'	12.0"
D			2.8		7.7	NE1/4,NW1/4 S33,R16E,T19N	22.0'	12.0"
E			3.9		11.6	NE1/4,NW1/4 S26,R15E,T19N	24.5'	10.0"

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17030001	0070	0.00
B	17030001	0070	0.00
C	17030001	0070	2.44
D*	17030001	0070	7.08
E	17030001	0070	11.74

* Station location is not definite and has been estimated

Character of **Bottom** Between Stations:

Station	Area (yd ²)		L.R.		M.R.		S.R.		M&S	
		%		%		%		%		%
A-B			13.89		44.36		35.41		6.44	
B-C			9.29		40.07		34.95		15.70	
C-D			14.73		42.68		41.18		1.41	
D-E			15.43		36.41		43.68		4.47	

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd ²)	Available Spawning Area (yd ²) (MR&SR)	% Avail	Usable Spawning Area (yd ²)	% Usable
A-B	2,657	14,532		79.67		
B-C	6,010	26,953		75.02		
C-D	4,928	31,908		83.86		
D-E	6,891	43,728		80.10		

Note : At low water, area above Diversion #2 (800 paces above Station B) is not available.

Spawning Area Unavailable and Unusable: **None**

Character of Watershed:

Mountainous

X

Hilly

Rolling

Flat

Swampy

Wooded

X

Open

cultivated

Character
of Valley

Character
of Banks

Density of
Marginal
Vegetation

Erosion
a) Banks

Diversions:

Diversion 1: NE1/4,SE1/4,S5,R17E,T18N. L.B. 1.12 cfs. Approximately 110 paces above Station B. The ditch is 8' wide, 4'6" deep and had an average water depth of 12". The steel headgate was open 5" when observed. There are no protective devices and no water was returned to the stream. Water is deflected into the ditch by a brush wing dam.

Diversion 2: SE1/4,NW1/4,S5,R17E,T18N. L.B. 84.7 cfs. Approximately 800 paces above Station B. The ditch is 10'6" wide, 4'6" deep and had an average water depth of 9". There are two headgates of double plank construction each 65" by 48". No water returned. No protective devices. Concrete abutments appear well adapted to screen installation. Concrete dam with 24" splash boards, 36' crest, 36" drop. No spill when ditch is in use. Complete barrier to upstream and trap for downstream migrants at low water--sufficient to destroy fish run.

Diversion 3: SE1/4,NE1/4,S6,R17E,T18N. R.B. 0 cfs. 1,540 paces above Station B. No water diverted. Flume 12" wide and 12" deep; dry when observed. No headgate, no protective devices. (Lom Thompson ditch)

Diversion 4: NW1/4,NW1/4,S2,R16E,T18N. R.B. 0 cfs. 660 paces above Station C. No water diverted. Flume 9" wide and 9" deep, dry when observed. No headgate. No protective devices. Dam constructed of logs, crest 24', drop 18", no fish ladder, not a barrier.

Diversion 5: NW1/4,SW1/4,S34,R16E,T19N. R.B. 0 cfs. 4,067 paces above Station C. Ditch 3' wide, 18" deep, average water depth 5". No headgate. No return, no protective devices. Dam constructed of logs, no ladder, crest 27', drop 1', spill 6"-8". No barrier. Not likely to divert downstream migrants.

Artificial Obstructions:

1. Diversion dam (Taneum Ditch). Diversion #2. Concrete with splash boards, 3'. No protective devices. No fish ladder. Complete barrier to upstream and trap downstream migrants at low water--sufficient to destroy run. See photograph.

Natural Obstructions: None

Fluctuation in Water Level:

Cause of Variation: seasonal run-off

Stream Volumes: Station A 6/26/36 3.3 cfs
 Station E 6/22/36 64.1 cfs

Pollution: None

Fish (salmon): None

Fish (other than salmon): None seen

General Remarks:

Tributaries

Large tributaries, North and South Forks, also surveyed. The others were too small.

Topography

Lower four miles cultivated; stream well shaded by willows, cottonwoods, etc. Above the stream enters a narrowing canyon. The watershed becoming more mountainous.

Character of Bottom

Spawning areas are very good.

Fish Population

Reported that up to about 1910 a large run of silvers (chinooks?) entered this stream, but upon the completion of the Taneum ditch they soon became extinct. This ditch is a complete trap for downstream migrants. Other diversions are small.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Skv
A	6/20/36	9:50 am	71.0 F	53.0 F	Clear
B	6/20/36	10:40 am	72.0	52.0	Clear
C	6/20/36	4:00 pm	71.0	57.0	Clouded
D	6/21/36	1:30 pm	79.0	54.0	Clear
E	6/22/36	12:15 pm	83.0	54.5	Clear

Pool Grade:

Sta	Resting Pools	Resting Pools/Mile	S2T1 %	S2T2 %	S3T1 %	S3T2 %	S5T1 %	S5T2 %	S5T3 %	Total
A-B (1.5 mi)	9	6	11.0	11.0		11.0	33.0		33.0	9
B-C (3.4 mi)	19	5	5.0	5.0		5.0	58.0	21.0	5.0	19
C-D (2.8 mi)	38	13	2.0		5.0	8.0	24.0	16.0	45.0	13
D-E (3.9 mi)	97	24	6.0	1.0	4.0		55.0	7.0	27.0	97
Total (11.6 mi)	163	14	5.0	2.0	4.0	3.0	46.0	10.0	29.0	163

Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
A-B	1.5	150'	100'	Topographic Map
B-C	3.4	235'	69'	Topographic Map
C-D	2.8	130'	46'	Topographic Map
D-E	4.5	500'	111'	Topographic Map
Totals	12.2	1,015'	83'	

North Fork Taneum Creek

River System: **Yakima River**
 Stream Surveyed: **North Fork Taneum Creek, tributary to Taneum Creek**

Date of Survey: **August 3, 1936**

source: **Lookout Mt., Greek Ridge, Naches-Yakima Divide**

Location: **SE1/4,NW1/4,S26,R15E,T19N (Kittitas County Map)**

Total Length: **11.3 miles; 5 miles surveyed.**

Station Location:

Sta	Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
A		0	0.0	0	0.0	SE1/4,NW1/4 S26,R15E,T19N	12'	5.4"
B			3.0		3.0	NW1/4,NW1/4 S28,R15E,T19N	9'	5.0"
C			2.0		5.0	SW1/4,NE1/4 S24,R14E,T19N	9'	6.6"

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17030001	0071	0.00
B	17030001	0071	0.68

Character of Bottom Between Stations:

Station	Area (yd ²)	L.R.		M.R.		S.R.		M&S	
		%		%		%		%	
A-B		20		30		39		11	
B-end		58		28		14		0	

Spawning Area Usable and Available:

Station	Distance		Area (yd ²)	Available Spawning Area (MR&SR)	% Avail	Usable Spawning	
	yds	miles				Area (yd ²)	% Usable
A-B	5,359		16,851		69.01		
B-C	3,500		5,035		41.96		

Spawning Area Unavailable and Unusable: **None**

Character of Watershed:

Mountainous	X
Hilly	
Rolling	
Flat	
Swampy	
Wooded	X
Open	
Cultivated	
Character of Valley	
Character of Banks	
Density of Marginal Vegetation	
Erosion	
a) Banks	
b) Watershed	

Diversions: **None**

Artificial Obstructions: **None**

Natural Obstructions:

1. 890 yards above Station B. Log Jam, 4'. Possible barrier at low water.

Fluctuation in Water Level:

Cause of Variation: **Seasonal run-off**

Stream Volumes: Station A 8/3/36 7.0 cfs

Pollution: None

Fish (salmon): None

Fish (other than salmon):

Many rainbows and cutthroats 3"-12" long observed. Stream closed to fishing.

General Remarks:

The North Fork flows through a narrow, mountainous valley well wooded with conifers. The gradient of the section surveyed is moderate and the spawning areas good. Above, the gradient is steeper, and the valley is canyon-like. Here the rubble is too large for spawning. It was reported that this has never been a salmon or steelhead spawning stream as it remains frozen until late in the spring, and the water is very low in the fall. Many rainbows and cutthroats 3"-12" long were seen. The stream has been closed to fishing for the past two years.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
A	8/3/36	8:30 am	70.0 F	53.0 F	Fair
B	8/3/36	11:00 am	70.0	53.5	Fair
C	8/3/36	1:30 pm	73.0	55.0	Fair

Pool Grade:

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S3T1 %	S3T2 %	S6 %	Total
A-B	3.0	15	5	13	2		15
B-C	2.0	8	4/7	86.0	14.0		
Grand Total	5.0	23	4/3	100.0	21	2	15
				91.0	9.0		38

Gradient:

The stream drops 850' in the five miles between Stations A and C, an average drop of 170' per mile. From topographic map.

South Fork Taneum Creek

River System: Yakima River

Stream Surveyed: South Fork Taneum Creek, tributary to Taneum Creek

Date of Survey: June 22, 1936

Source: Peaches Ridge, Mole Mt., Naches-Yakima Divide

Location: SE1/4,NW1/4,S26,T19N,R15E

Total Length: 9 miles; 2.8 miles surveyed

Station Location:

Sta	Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
A		0	0.0	0	0.0	SE1/4,NW1/4 S26,R15E,T19N	12'4"	6"
B			2.9		2.9	SE1/4,SE1/4 S28,R15E,T19N	9'7"	5"

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17030001	72	0.00
B*	17030001	72	2.45

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

Station	Area (yd ²)							
	L.R.	%	M.R.	%	S.R.	%	M&S	%
A-B	17.87		39.78		37.04		5.31	

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd ²)	Available Spawning Area (yd ²)		Usable Spawning Area (yd ²)	
			(MR&SR)	% Avail	(MR&SR)	% Usable
A-B	3,984	14,858		65.4		

Spawning Area Unavailable and Unusable:

Probably at high water.

Station	Distance	Area (yd ²)	Area Unavail (yd ²)	% Unavail	When Avail	Usable Unavail (yd ²)	% Usable Unavail
A-B	1,100		2,595	11.4			

Character of Watershed:

Mountainous	X
Hilly	
Rolling	
Flat	
Swampy	
Wooded	X
Open	
Cultivated	
Character of Valley	
Character of Banks	
Density of Marginal Vegetation	
Erosion	
a) Banks	
b) Watershed	

Diversions: **None**

Artificial Obstructions: **None**

Natural Obstructions:

1. 3,984 yards above Station A. Log jam. Probably impassable most of the year.

Fluctuation in Water Level:

Feet Variation:

Cause of Variation: seasonal run-off

Stream Volumes: At Station A 6/22/36 17.8 cfs

Pollution: None

Fish (salmon): None

Fish (other than salmon):

A few Eastern Brook trout and cutthroats are present in the lower part of the stream.

General Remarks:

The South Fork is reported to be completely dry in the late summer. Stream poorly shaded in the lower portion; flows through wooded canyon above. Three miles from mouth the stream rises rapidly and survey was discontinued. One-half mile above this point is a 25' falls--a complete barrier.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Skv
A	6/22/36	12:15 pm	84.0 F	54.0 F	Clear
B	6/22/36	3:30 pm	83.5	53.5	Clear

Pool Grade:

Sta	Resting Pools	Resting Pools/Mile	S2T1 %	S3T1 %	S3T2 %	S5T1 %	S5T2 %	S5T3 %	S6 %	Total
A-B (2.9 mi)	42	14/22	2	4	4	25	4	3	64	106
			5.0	10.0	10.0	59.0	10.0	7.0		

Gradient:

<u>Station</u>	<u>Distance (Miles)</u>	<u>Total Drop</u>	<u>Avg Drop Per Mile</u>	<u>Source of Data</u>
A-B	2.8	800'	286'	Topographic map and surveyors' observations

Gradient is steeper above Station B.

Swauk Creek

River System: **Yakima River**
 Stream Surveyed: **Swauk Creek, tributary to Yakima River**

Date of Survey: **July 17-18, 1936**

Source: **Many small branches, five miles southeast of Blewett Pass NW1/4,T21N,R18E (Forest Service-Wenatchee National Forest, 1932)**

Location: **Wenatchee National Forest and Kittitas County. Flows south from source to Yakima. Enters right bank at NW1/4,S20,T19N,R17E.**

Total Length: **20 miles; 29,179 yards (16.6 miles) surveyed from mouth to Forks near highway (Blewett Pass Creek)**

Station Location:

Sta	Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
A	Mouth	0	0.0	0	0.0	NW1/4,S20 T19N,R17E	21.0'	3.0"
B	Ellensburg-Blewett County Road Bridge		6.3		6.3	NW1/4,S27 T20N,R17E	13.5'	8.0"
C	Deer Gulch-Highway Bridge		3.3		9.6	SW1/4,SE1/4 S10,T20N,R17E	21.5'	6.0"
D	1st Highway Bridge above Williams Ck		1.7		11.3	NW1/4,NE1/4 S34,T21N,R17E	12.0'	2.5"
E	Upper Blewett Pass Road Bridge		2.8		14.1	NW1/4,NE1/4 S22,T21N,R17E	7.0'	6.0"
F	Confl with Iron Creek		1.4		15.5	NW1/4,NE1/4 S14,T21NfR17E	6.0'	8.0"
G	Confl with Blewett Pass Creek		1.1		16.6	NW1/4,SE1/4 S11,T21N,R17E	7.5'	2.5"

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17030001	0021	0.05
B	17030001	0021	2.83
C	17030001	0021	0.22
D	17030001	0023	1.43
E	17030001	0023	3.34
F	17030001	0023	5.51
G	17030001	0023	6.34

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

Station	Area (yd ²)	L.R.	%	M.R.	%	S.R.	%	M&S	%
A-B			18		27		32		22
B-C			14		25		31		30
C-D			19		33		33		14
D-E			14		25		34		26
E-F			18		33		33		16
F-G			5		16		32		47

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd ²)	Available Spawning Area (yd ²) (MR&SR)	% Avail	Usable Spawning Area (yd ²)	% Usable
A-B	11,030		32,207	60		
B-C	5,736		13,599	56		
C-D	2,970		7,061	67		
D-E	4,948		10,332	59		
E-F	2,580		4,988	66		
F-G	1,915		400	10		

Spawning Area Unavailable and Unusable:

Station	Distance	Area (yd ²)	Area Unavail (yd ²)	% Unavail	When Avail	Usable Unavail (yd ²)	% Unavail
F-G	2,515		1,456	48			

Character of Watershed:

Mountainous				X			
						no vegetation (lower part)	
Hilly							
Rolling							
Flat							
Swampy							X
						middle portion	
Wooded							X
						upper part	
Open							

Character of Watershed (cont):

 Cultivated

2%

Character
of ValleyCharacter
of BanksDensity of
Marginal
Vegetation

Erosion

a) Banks

b) Watershed

Diversions:

Diversion 1: SW1/4,NE1/4,S17,T19N,R17E. R.B. 1.8 cfs. 1,930 paces above Station A. The ditch is 3.5" wide, 2" deep and has an average water depth of 13". There is no headgate, return or protective devices. The dam is composed of two 6" logs across the stream. The crest is 18' with a drop of 18" and a spill of 2". No abutments are present. There is no fish ladder. The dam would be passable to upstream migrants at practically any stage. Downstream fry migrations would be intercepted at times of low water.

Diversion 2: SE1/4,S8,T19N,R17E. R.B. 2.5 cfs. 3,405 paces above Station A. The ditch is 5.5' wide, 1.5" deep and has an average water depth of 5". There is no headgate, return, or protective devices. The dam is composed of three 12" logs set diagonally in the stream. The crest is 27', with a drop of 2.5, and a spill of 3". No abutments were present. There is no fish ladder.

Diversion 3: NE1/4,NW1/4,S22,T20N,R17E. L.B. 1.9 cfs. 8,410 paces above Station A. The ditch is 38" wide, 2' deep, and has an average water depth of 10". There is no headgate, return, or protective devices. The dam is composed of logs, sand bags, brush and rocks. It is set diagonally across the stream. The crest is 32', with a drop of 28", and a spill of 1-1.5". No abutments are present. Most of the escape of water is through the dam, not over the crest. There is no fish ladder. This system presents a complete trap to downstream migrants and is a barrier at low water periods to upstream spawners.

Diversion 4: SW1/4,NE1/4,S15,T20N,R17E. R.B. Est 2 cfs.

9,300 paces above Station A. The ditch is 28" wide, 10" deep, and has an average water depth of 6". There is no headgate, return, or protective devices. There is no visible dam. The ditch emerges from under a dense, old log jam and a windfall. The jam is a complete low water barrier to fish and a bad trap for downstream migrants.

Diversion 5: NW1/4,NE1/4,S15,T20N,R17E. L.B. Est 2 cfs. 9,740 paces above Station A. The ditch is 4' wide and has a depth of 2'. Since the ditch was under repair at the time of survey, no water was being diverted. There is no headgate, return or protective devices. The dam is composed of logs, sand bags, brush, and rocks. The crest is 32', with a drop of 3', and no spill at the time of survey. No abutments are present. The escape of water is through the dam, not over the crest. There is no fish ladder. This diversion system is a complete barrier to upstream migrants and a complete trap to downstream migrants in low water. It is estimated that the probable flow is 2 cfs when ditch is open.

Diversion 6: NW1/4,NW1/4,S27,T20N,R17E. R.B. 1.2 cfs. 215 paces above Station B. The ditch is 3' wide, with a depth of 2', and has an average water depth of 8". There is no headgate, return, or protective devices. The dam is composed of logs and boulders set across the stream. The crest is 40', with a drop of 28", and a spill of 1"-4". There are no abutments. Most of the spill goes over the section of the dam built of boulders. There is no ladder. This diversion system is no barrier, but is a complete trap to downstream migrants.

Diversion 7: SW1/4,S22,T20N,R17E. L.B. Est 2 cfs. 450 paces above Station B. The ditch is 3' wide, 3' deep, and has an average water depth of 8". There is no headgate, return or protective devices. The dam is composed of logs, brush and straw, and is set diagonally across the stream. The crest is 41' with a drop of 30" and a spill in the center of 36" by 4". No abutments are present. There is no fish ladder. This diversion is a barrier in low water to upstream migrants and a complete trap to downstream migrants.

Diversion 8: SE1/4,NW1/4,S22,T20N,R17E. L.B. 0 cfs. 1,800 paces above Station B. The ditch is 12' wide and 4' deep and was dry at the time of survey. There is no headgate, return, or protective devices. There is no dam or wing dam present.

Diversion 9: NE1/4,NW1/4,S22,T20N,R17E. R.B. 0.17 cfs. 1,990 paces above Station B. The ditch is 3.5' wide and 2.5' deep, with an average water depth of 5". There is no headgate, return or protective devices. The dam is composed of logs with boards lengthwise on the bottom. It is set across the stream. The crest is 21' with a drop of 10". No spill was noted at the time of survey. No abutments were present. There is no fish ladder. This diversion system would be a trap to downstream migrants, and

possibly, at low water, a barrier to upstream spawners.

Diversion 10: SW1/4,S10,T20N,R17E. L.B. 1.4 cfs. 250 paces above Station C. The ditch is 4' wide, 3' deep, and has an average water depth of 12". There is no headgate, return or protective devices. The dam is composed of logs and planks set diagonally in the stream. The crest is 40" with a drop of 24" and no spill at the time of survey. There are no abutments. All the escape occurs under and through the dam. There is no fish ladder. This diversion is a complete low water trap to downstream migrants. At low water, upstream spawners may find the dam a possible barrier. Diversion 11: NE1/4,SE1/4,S15,T21N,R17E. L.B. 0.6 cfs. 1,410 paces above Station E. The ditch is 16" wide, 9" deep, and has a water depth of 6". There is no headgate, return or protective devices. The dam is composed of rocks set diagonally across the stream. The crest is 12' with a drop of 12" and no spill at the time of survey. There are no abutments. Water seeps through the rocks of the dam. There is no fish ladder. This diversion system is a complete trap to downstream migrants. At time of low water, upstream spawners may be blocked by the dam.

Diversion 12: NW1/4,NW1/4,S14,T21N,R17E. L.B. Est 2 cfs. 1,830 paces above Station C. The ditch is 3' wide, 3' deep, and has an average water depth of 6". There is no headgate. All the water diverted is returned at a point 600 paces downstream. There are no protective devices. The water is used in gold sluicing operations. The dam is composed of boulders and is of a wing type. The crest is 10' with the drop and spill unknown. There are no abutments. This system is no barrier to upstream migrants. Downstream migrants may pass through unhurt under certain conditions.

Artificial Obstructions:

					<u>Protection Devices</u>	
<u>Yds above Sta</u>	<u>Sta</u>	<u>Character</u>	<u>Height</u>	<u>Type</u>	<u>Efficiency</u>	
1,930	A	Log dam	18"	None		
2,440	A	Log dam	30"	None		
11,760	A	Log dam, sand bags, brush, rocks	28"	None	Barrier at low water	
12,650	A	Log jam, windfall	48"	None	Barrier at low water	
13,090	A	Logs, sandbags, brush, rock dam	36"	None		
215	B	Boulder dam				
		Diversion #6	28"	None		
460	B	Brush, straw chinking dam	30"	None		
1,990	B	Board dam				
		Diversion #9	10"	None		

Artificial Obstructions (cont):

Yds above	Sta	Character	Height	Protection Devices	
				Type	Efficiency
250	C	Plank dam			
		Diversion #10	24"	None	Barrier at low water
945	C	Beaver dam	---	None	Barrier at low water
1,830*	C	System for gold sluicing rock dam	---	None	
414	D	Beaver dam	---		Barrier at low water
1,410	E	Rock dam	12 "	None	
16	F	Beaver dam	---		Barrier at low water
255	F	Beaver dam	---		Barrier at low water
320	F	Log jam dam	---		Barrier at any stage
400	F	Beaver dam	---	?	
515	F	Beaver dam	---		Barrier
625	F	Beaver dam	---		Barrier
760	F	Beaver dam	---		Barrier
1,400	F	Beaver dam	1'		Barrier at low water

* This is a wing dam. All dams except this one complete, extending completely across stream.

Natural Obstructions:

1. 330 paces above Station D. Falls, 3', Impassable during low water.

Fluctuation in Water Level:

Feet Variation: unknown

Cause of Variation: run-off and rains in Wenatchee National Forest

Stream Volumes: Sta A 7/19/36 9 cfs
5/ 6/37 high & discolored with snow water

Pollution:

Gold sluicing operations 1,830 yards above Station C creates fine sediment from washings. This pollution makes the water very muddy. No fish were seen in the polluted portion.

Fish (salmon): None

Fish (other than salmon):

<u>Species</u>	<u>Date</u>	<u>Very Abundant</u>	<u>Abundant</u>	<u>Fair No.</u>	<u>Scarce</u>
Rainbow			X		
			3"-8" long		

Many small salmonids observed between Station E and F

General Remarks:

Swauk Creek, a tributary of the Yakima River, flows in a southerly direction from its source near Blewett Pass for a distance of about 20 miles before joining the main Yakima River. Of the total length, 29,179 yards or 16.6 miles were surveyed. The section worked was from the confluence with the Yakima to the confluence of Blewett Pass Creek with Swauk Creek.

Tributaries

Iron Creek, the main tributary, which enters at Station F, was surveyed. Some other smaller tributaries were noted but not surveyed.

Topography

The lower Swauk Creek watershed is mostly a region of bare hills, with little vegetation. In the lower portions, the creek flows through a narrow, rugged canyon, which later widens into a river valley supporting several farms. Further upstream, the course becomes more rugged and vegetation is more dense. The stream runs some distance through a swampy, lowland region in the central portion. The upper watershed is a forest region of pine, fir, tamarack and cedar. Part of this region is included in a Federal Recreational area.

Character of Stream

Swauk Creek enters a rugged, narrow, V-shaped canyon just after the confluence with the Yakima. At this point, the valley is about 1/8 mile across. The valley narrows abruptly into a canyon, formed on one side by bed rock and on the other by unforested hills. Most of this region is without sufficient cover, although there are some pines, cottonwoods, and some bushy trees near the stream course. About 1.5 miles upstream, the valley widens and farms are found. This valley continues until the stream is completely lost in a maze of swamps and beaver ponds. In the extreme upper portion, the stream is small and flows through a narrow valley. Due to goldsluicing operations, about two-thirds of the distance from the mouth to the terminus, the entire downstream

area is turbid. In the upper one-half of the stream, good cover is common. Beaver dams become extremely common here. The land is marshy and the crest sides are well shaded with brush. Most of the beaver dams are incomplete, although two were noted as forming complete barriers. Spawning rubble is good along the whole course of the stream. The upper part of the stream is best, with the exception of a section through marshlands where the mud and sand percentage is high. Good cascades (C3) and many large and small pools with good shade are common. Seven stations were established. The first was at the start of the survey and the last at the terminus. Irrigation diversions are quite numerous. Twelve were noted in the stream from Station A to 1,410 yards above Station E. Of this number, eleven were complete dams of varying height. None should be a barrier to spawners, except at extreme low water periods. None of the diversion ditches are screened. These are doubtless traps to downstream migrants. A total of 17.57 cfs was being diverted at the time of survey. At Station A, the mouth, the flow was computed as about 9 cfs. The stream varies in width from 21' at the mouth to about 6, at Station F. The depth varies from 2.5" to 8". The gradient of Swauk Creek is not steep. There are but two small falls; the larger is 3, high. This should not be a barrier except at extreme low water levels. Air temperature varied from 63.5 F to 81 F, and water temperature varied from 47 F to 65F.

Fish Population

Numerous rainbow trout up to 8" in length were observed between Station E and Station F. In this same region, other small salmonids were also noted. According to local farmers, Swauk Creek was a good trout stream before the advent of placer mining. This activity has silted the stream considerably. It would seem that the unscreened diversion ditches are certainly responsible for some of the depletion of trout. This stream is not reported to support salmon. With a reasonable amount of care and a small expenditure, Swauk Creek could be developed into a good fish producing stream. The screening of diversions, removal of beaver dams, and regulation of mining activities, could be easily accomplished and certainly should be a great help to fish utilizing the stream. With such an abundance of good gravels, fine cover, and a fairly steady water flow, with no actual obstructions, the fish population in Swauk Creek would respond rapidly if given a chance.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Skv
A	7/17/36	8:10 am	75.0 F	48.0 F	Clear
B	7/17/36	12:00 n	75.0	47.0	Clear
C	7/18/36	9:00 am	63.5	57.5	Clear
D	7/18/36	11:15 am	68.5	56.5	Clear
E	7/18/36	12:45 pm	77.0	64.0	Clear

Temperature Data (cont):

Sta	Date	Hour	Air Temp	Water Temp	Skv
F	7/18/36	2:10 pm	81.0	65.0	Clear
G	7/18/36	3:00 pm	79.5	64.5	Clear
Confl of					
Iron Creek	5/ 6/37	11:30 am	59.0	45.0	Clear

Pool Grade:

St	Rst Pls	Rst Pl/Mi	S1T1 %	S1T2 %	S1T3 %	S2T1 %	S2T2 %	S2T3 %	S3T1 %	S3T2 %	S3T3 %	S5T1 %	S5T2 %	S5T3 %
A-B	181	28			1	1	4		45	66	33	2	24	5
(6.3 mi)					0.6	0.6	2.0		25.0	36.0	18.0	1.0	13.0	3.0
B-C	85	25	8	3	1	15	4	1	11	26			8	8
(3.3 mi)			9.0	4.0	1.0	17.0	5.0	1.0	13.0	31.0			9.0	9.0
C-D	37	21							3	12	21			1
(1.7 mi)									8.0	32.0	57.0			3.0
D-E	78	28				9		2	32	6	11	12	4	2
(2.8 mi)						11.0		3.0	41.0	7.0	14.0	15.0	5.0	3.0
E-F	32	23								26	6			
(1.4 mi)										81.0	19.0			
F-G	23	21							15	2	5			1
(1.1 mi)									65.0	9.0	22.0			4.0
Tot	436	26	8	3	2	25	8	3	106	138	76	14	36	17
16.6 mi			2.0	0.7	0.4	6.0	2.0	0.7	24.0	32.0	17.0	3.0	8.0	4.0

Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
A-B	6.3	415'	66'	Topographic Map
B-C	3.3	220'	67'	Topographic Map
C-D	1.7	135'	79'	Topographic Map
D-E	3.5	320'	91'	Topographic Map
E-F	1.4	125'	89'	Topographic Map
F-G	1.1	115'	105'	Topographic Map
Total	17.3	1,330'	77'	

Tributaries:

All tributaries to Swauk Creek are listed here in upstream order:

1. First Creek
2. Williams Creek
 - a. Lion Gulch Creek
 - b. Boulder Creek
 - c. Cougar Gulch Creek
3. Mill Creek

Tributaries to Swauk Creek (cont):

4. Baker Creek
5. Medicine Creek
6. Blue Creek
7. Hovey Creek
8. Iron Creek

Only Williams Creek and Iron Creek have been surveyed.

Williams Creek

River System: Yakima River

Name of Stream: Williams Creek, tributary to Swauk Creek

Description:

Flows eight miles southwest to confluence with Swauk Creek in S10,T20N,R17E. Tributaries are Lion Gulch Creek, Boulder Creek and Cougar Gulch Creek.

Remarks:

Aside from Iron Creek, Williams Creek is the largest tributary to the Swauk River. Others in upstream order are: First Creek, Mill Creek, Baker Creek, Medicine Creek, Blue Creek, and Honey Creek. All these tributaries flow through arid country and are dry or very small through most of the year. Iron Creek has been surveyed.

Iron Creek

River System: Yakima River
 Stream Surveyed: Iron Creek, tributary to Swauk Creek

Date of survey: July 19, 1936

Source: Kittitas County. Wenatchee National Forest.
 NW1/4,S33,T22N,R17E (Forest Service Map).

Direction of Flow: Flows southeast from source to Swauk Creek,
 left
 bank, SW1/4 of SE1/4,S10,T21N,R17E

Total Length: 3 miles; 2,271 yards (1.3 miles) surveyed--mouth to
 point 2,271 yards above.

Station Location:

Sta	Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
A	Confl with Swauk Creek (Forest Svc Map)	0	0.0	0	0.0	SW1/4ofSE1/4 S10;T21N,R17E	10.0'	3.0"
B	2,271 yards above Sta A (Kittitas Cnty Map)	2,271	1.3	2,271	1.3	SW1/4ofNW1/4 S3,T21N,R17E	4.3'	2.5"

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17030001	0959	0.00
B	17030001	0934	0.00

Character of Bottom Between Stations:

Station	Area (yd ²)		L.R.		M.R.		S.R.		M&S	
			%		%		%		%	
A-B			11		10		37		42	

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd ²)	Available Spawning Area (yd ²)		Usable Spawning Area (yd ²)	
			(MR&SR)	% Avail		% Usable
A-B	701		1,180	80		

Spawning Area Unavailable and Unusable:

Station	Distance	Area (yd ²)	Area Unavail (yd ²)	% Unavail	When Avail	Usable Unavail (yd ²)	% Usable Unavail
A-B	1,570 yd		2,070	76			

Character of Watershed:

Mountainous	X
Hilly	
Rolling	
Flat	
Swampy	X
	Beaver dams & ponds
Wooded	X
Open	
Cultivated	
Character of Valley	
Character of Banks	
Density of Marginal Vegetation	
Erosion	
a) Banks	
b) Watershed	

Diversions: **None**

Artificial Obstructions:

1. 701 yards above A to end of survey. Numerous beaver dams.

2. 771 yards above A to end of survey. Log jam.

Natural Obstructions: None

Fluctuation in Water Level:

Feet Variation: unknown

Cause of Variation: run-off and rains in Wenatchee National Forest

Stream Volumes: Station A 7/19/36 8 cfs.
5/06/36 high but clear

Pollution: None

Fish (salmon): None

Fish (other than salmon):

<u>Species</u>	<u>Date</u>	<u>Very Abundant</u>	<u>Abundant</u>	<u>Fair No.</u>	<u>Scarce</u>
Rainbow	7/19/36	x*			

* numerous fry and fingerlings

General Remarks:

Iron Creek, a tributary to Swauk Creek, lies in the Wenatchee National Forest near Blewett Pass. It is a small stream with an estimated flow of 8 cfs (July 19, 1936). Of its total length, 3 miles, a section of 2,271 yards, or 1.3 miles, was surveyed. Starting at the confluence with Swauk Creek, the survey continued upstream to a point where the stream was too small to be passable for fish and where numerous snags and windfalls obstructed the flow.

Tributaries

Many small tributaries join Iron Creek, but none large enough to warrant survey.

Topography

Rugged hills, well-forested, constitute the watershed of Iron Creek. The stream flows through a narrow V-shaped valley throughout. The valley walls are forested with fir, pine, cedar, and tamarack.

Character of Stream

Iron Creek is a small stream flowing through a densely wooded and semi-mountainous region. Many beaver dams and ponds serve to stabilize the flow and may prove to be obstacles to spawning fish at certain low water levels. The stream has excellent spawning grounds throughout. There is excellent shade and the banks are well protected by cottonwoods, cedar, willows, and miscellaneous small brush. Good and fair C3 cascades are numerous. Of a total 4,142 square yards, 3,250 square yards or 78% are spawning gravels. Many beaver dams occur in the middle and upper portions of the stream. Some may be barriers. In the upper portion surveyed, the stream dwindles into an extremely small rill which is badly choked with logs and debris. The stream varies from 4'-10' in width and from 2"-3.5" in depth. Air temperature varied 84 F - 87.5 F; water temperature varied from 49.5 F - 56 F. Computed flow was 2 cfs at Station A.

Fish Population

Steelhead were reported in Iron Creek until about 1915. Nothing is known of the early salmon runs. When surveyed, numerous rainbow trout fry and fingerlings were observed. The entire stream is accessible by a good saddle trail. In the spring, the lower portions of the stream are heavily fished.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
A	7/19/36	1:30 pm	84.0 F	56.0 F	Clear
B	7/19/36	12:00 n	87.5	49.5	Clear
Confl with	5/6/37	11:30 am	59.0	44.0	Clear

Pool Grade:

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S3T1 %	S3T2 %	S3T3 %
A-B	1.3	1	8	60.0	30.0	10.0

Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
A-B	1.2	215'	179'	Topographic Map

Stream steep above surveyed portion.

Teanaway River

River system: **Yakima River**

Stream Surveyed: **Teanaway River, tributary to Yakima River**

Date of Survey: July 2-5, 1936

Source: **East slope Cascade Mountains, Kittitas County**

Location: **Northwestern Kittitas County, Washington. Discharges into Yakima River at SW1/4,NW1/4,S3,T19N,R16E**

Total Length: **11.5 miles (all surveyed)**

Station Location:

Sta	Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
A	Mouth of Teanaway	0	0.00	0	0.00	SW1/4,NW1/4 S3,T19N,R16E	40.0'	2.0'
B	Bridge at Blewett Pass Rd.		3.39		3.39	NW1/4,NE1/4 S31,T20N,R16E	51.3'	1.0'
C	Confl of North Fork		7.17		10.56	NE1/4,SE1/4 S6,T20N,R16E	65.0'	3.0'
D	Confl of Middle and West Fork		1.00		11.56	SE1/4,NW1/4 S28,T22N,R15E	36.0'	1.7'

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17030001	0025	0.00
B	17030001	0025	2.26
C	17030001	0025	10.25
D	17030001	0029	0.70

Character of Bottom Between Stations:

Station	Area (yd ²)	L.R.		M.R.		S.R.		M&S	
			%		%		%		%
A-B			23		35		35		7
B-C			23		29		39		8
C-D			27		31		33		9

spawning Area Usable and Available:

Station	Distance vds miles	Area (yd ²)	Available Spawning Area (yd ²) (MR&SR)	% Avail	Usable Spawning Area (yd ²)	% Usable
A-B	5,975		76,790	71		
B-C	12,625		131,619	68		
C-D	1,775		14,772	64		

spawning Area Unavailable and Unusable: **None**

Character of Watershed:

Mountainous

Hilly

X

Rolling

Flat

Swampy

Wooded

Open

X

Cultivated

25%

Character
of Valley

Character
of Banks

Density of
Marginal
Vegetation

Erosion

a) Banks

b) Watershed

Diversions:

Diversion 1: NW1/4,NE1/4,S34,T2ON,R16E. R.B. 4.95 cfs.

2,345 yards above Station A. Irrigation ditch, width 7', depth 30", average water depth 8". No headgate, returns or protective devices. Diversion dam, crest 60', drop 20", no spill or abutments, constructed of logs, planks and boulders. All water completely diverted.

Diversion 2: SE1/4,SW1/4,S26,T20N,R16E. L.B. 0.54 cfs. 3,040 yards above Station A. Irrigation ditch, width 22" depth 10.5", average water depth 5.5". No headgate, return, or protective devices. Log wing dam extends 30', across 1/6 width of river.

Diversion 3: SW1/4,SE1/4,S26,T20N,R16E. L.B. 3.7 cfs. 5,020 yards above Station A. Irrigation ditch, width 9', depth 3', average water depth 8". No headgate, return or protective devices. Log diversion dam completely across small left channel of the river.

Diversion 4: NW1/4,NE1/4,S25,T20N,R16E. L.B. 15.3 cfs. 800 yards above Station B. Irrigation ditch, width 7.5', depth 4', average water depth 2'. Plank headgate, 5' by 4', located 100', below intake, open 2" at present. Return just above headgate. No protective devices. Irrigation dam, crest 45', drop 8", no spill or abutments, construction of planks, no fish ladder. Dam extends completely across river, water leaking under and through dam.

Diversion 5: NW1/4,SE1/4,S24,T20N,R16E. L.B. 5.4 cfs. 1,785 yards above Station B. Irrigation ditch, width 14', depth 5.5', average water depth 8". Headgate of plank stop-logs, open 5" from bottom at present. No return or protective devices. Irrigation dam of boards and logs extends completely across river, crest 70', drop 3', no spill or abutments. No fish ladder. Only water escaping past dam is seepage through logs.

Diversion 6: NW1/4,SE1/4,S14,T20N,R16E. R.B. 14.5 cfs. 4,458 yards above Station B. Irrigation ditch, width 12', depth 27", average water depth 7". No headgate, return or protective devices. Irrigation dam, crest 60', drop 12", spill 1", no abutments nor fish ladder. Constructed of rocks and logs. Extends half way across river as wing dam.

Diversion 7: SE1/4,NW1/4,S14,T20N,R16E. R.B. 9.7 cfs. 6,493 yards above Station B. Irrigation ditch, width 8', depth 4', average water depth 11". No headgate, return or protective devices. Irrigation dam of logs extends completely across river, crest 65', drop 12', spill 2.5" and no fish ladders nor abutments.

Diversion 8: NE1/4,SE1/4,S9,T20N,R16E. R.B. Est 4 cfs. 9,926 yards above Station B. Irrigation ditch, width 9', depth 2', average water depth 7". No headgate, return or protective devices. No irrigation dam, ditch takes off at slight angle to river.

Diversion 9: NE1/4,SE1/4,S9,T20N,R16E. R.B. 8.7 cfs.
10,660 yards above Station B. Irrigation ditch, width 10" depth
3', average water depth 8". No headgate, return or protective
devices. Irrigation wing dam of rock construction blocks about
half width of stream, crest 35'.

Adjudicated water rights on Teanaway River prior to 1918:

Name	Year	Cfs
James McDonald	1882	1.50
H.C. Masterson	1883	9.70
Olaf Hansen	1884	1.30
(on Jack Creek & Teanaway)		
Dan Farmer & Bugni	1884	3.60
Hugh Fish	1884	0.32
J. Contratto	1885	1.90
Three M Ditch	1885	10.62
Max Bardesono	1885	1.20
Peterson & Danko	1885	6.40
J. Contratto	1886	1.30
J. Contratto (on North Fork)	1887	1.70
Ballard Ditch	1888	7.90
Ballard Ditch	1888	1.74
Thomas Cadwell (abandoned)	1889	0.60
J. Contratto (on Middle Fork)	1890	1.10
L. Crossetti (on West Fork)	1890	0.70
J.B. Ross	1890	2.20
Charles Gubesich	1890	0.72
Antone Vittone	1891	1.40
Gaveno-Sanduetta (on Middle Fork)	1894	0.80
P. Favro	1894	0.90
Paul Limon (on West Fork)	1894	0.80
P. Banchi (on Middle Fork)	1897	0.60
Cascade Lumber Co. (Middle Fork)	1897	0.56
John Rue	1899	1.50
David Thomas	1900	5.80
T.N. Jones (on Bear Canyon)	1902	0.20
F. Amano (on North Fork)	1902	1.24
Joe Dematteis (on West Fork)	1902	0.90
Guistetti	1902	1.40
J. Pretti (on West Fork)	1903	0.60
Cascade Lumber Co.	1905	1.20
A. Gassnan	1905	0.60
W. Saschsi	1910	0.50
Cascade Lumber Co.	1911	0.40
State of Washington	1917	2.06

Note : The survey crew was unable to make this list check with the
diversions as they found them July 2-5, 1936.

Artificial Obstructions:

1. Diversion dam #1 Entire stream diverted, 20". No protective device.

2. Diversion dam #4. Only seepage water below dam, 8". No protective device.

3. Diversion dam #5. Only seepage water below dam, 36". No protective device. Barrier at low water.

Remarks: Practically the entire flow of the river is diverted at these dams, constituting almost inescapable traps to downstream migrants at low water. See "Diversions" for locations and descriptions.

Natural Obstructions: None

Fluctuation in Water Level:

Feet Variation:

Cause of Variation: melting snow, and glaciers, rainfalls.

Stream Volumes:

Below Station C 7/3/36 80 cfs
5/6/37 high and discolored by snow water

Pollution: None

Fish (salmon):

No salmon were seen, but some were reported in the Yakima River up as far as the Easton dam.

Fish (other than salmon):

Species	Date	Very Abundant	Abundant	Fair No.	Scarce
Rainbow	7/36				X
Dolly Varden	7/36				X
Cutthroat	7/36				X
Squawfish	7/36		X		
Chubs	7/36			X	

General Remarks:

Survey

Mouth at Yakima River to confluence of the West and Middle Forks--11.5 miles.

Tributaries

The three forks (North, Middle and West) of the Teanaway River have been surveyed. Stafford Creek, Bear Creek and De Roux Creek, all on the North Fork have also been surveyed. Other tributaries to the North Fork are Mason, Middle, Indian, Jack, Standup, Miller, Beverly and Bean Creeks.

Toooaranhy

The Teanaway below the forks flows through a shallow valley from 0.5 to 1.0 mile wide. The entire valley is irrigated and under cultivation; dry-land farming is extensively carried on in the surrounding hills.

Character of Stream

This river has a large range of fluctuation due to the snow run-off in the spring and the dry season during the summer. So much water is diverted for irrigation during late August that the river bed is practically dry for a ways below three of the diversion dams.

The Teanaway is a good spawning stream by nature. Below Station B, the river bed is wide and shallow with little shade; above this point, the river is narrower and the heavy marginal growth provides continuously good shade. The pools are large, many and well spaced along the entire river; the gradient moderate and uniform. Spawning areas are fairly good, although large rubble and frequently bed-rock predominate.

There are nine diversions, all unscreened. Three of them are complete traps for all downstream migrants and the remaining six are serious menaces.

Fish Pooulation

Large salmon runs occurred prior to 1904. From 1905-1916 logging companies drove logs down the river and blasted the stream bed. Since that time, there have been no salmon observed. Rainbow, 'cutthroat and Dolly Varden trout are present but scarce. Rough fish are fairly abundant.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Skv
A	7/2/36	11:40 am	66.5 F	60.5 F	Cloudy
B	7/3/36	4:30 pm	62.5	60.0	Cloudy
C	7/3/36	12:15 pm	64.0	60.5	Cloudy
D	7/5/36	10:11 am	57.5	59.5	Clear
Bridge on Cle-Elum- Wenatchee Hwy					
	5/6/37	12:00 n	60.0	46.0	Clear

Pool Grade:

Rest St	Pl/Mi	S1T1 %	S1T2 %	S1T3 %	S2T1 %	S2T2 %	S2T3 %	S3T1 %	S3T2 %	S3T3 %	S4T1 %	S4T2 %	S5T1 %	S5T2 %	S5T3 %
A-B	7 (3.39 mi)		1 4.0	5 21.0		2 8.0	5 21.0	1 4.0		3 13.0			1 4.0	1 4.0	5 21.0
B-C	12 (7.17 mi)		8 9.0	10 11.0	4 4.0	10 11.0	14 16.0			1 1.0	1 1.0	8 9.0	6 7.0	24 28.0	3 3.0
C-D	23 (1.0 mi)	1 4.0	1 4.0	2 9.0			3 13.0	1 4.0	2 9.0					5 22.0	8 35.0
Tot	12	1	10	17	4	12	22	2	2	4	1	8	7	30	16
		1.0	7.0	13.0	3.0	9.0	16.0	2.0	2.0	3.0	1.0	6.0	5.0	22.0	12.0

Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
A-B	3.39	155'	46'	Topographic Map
B-C	7.17	235'	33'	Topographic Map
C-D	1.00	40'	40'	Topographic Map
Totals	11.56	430'	37'	

North Fork Teanaway River

River System: **Yakima River**

Stream Surveyed: **North Fork Teanaway River, tributary to Teanaway River**

Date of Survey: **July 3 and 12-14, 1936**

Source: **Near Ingalls Peak in T23N,R15E**

Location: **East slope Cascades, Yakima drainage.
NE1/4,SW1/4,S6,T20N,R16E (Kittitas County Map)**

Total Length: **17.5 miles (13.9 miles surveyed)**

Station Location:

Sta	Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
A	Mouth	0	0.00	0	0.00	NE1/4,SW1/4,S6 R16E,T20N	65'	4'
B			6.59		6.59	NE1/4,NE1/4,S5 R16E,T21N	39'6"	1'
C			2.11		8.70	NE1/4,NE1/4,S30 R16E,T22N	25'	10"
D			4.59		13.29	NE1/4,SW1/4,S11 R15E,T22N	9'8"	4"
E			0.57		13.86	NE1/4,NW1/4,S11 R15E,T22N	8'6"	14"

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17030001	0026	0.00
B	17030001	0028	1.14
C	17030001	0028	4.56
D	17030001	0028	9.08
E*	17030001	0028	9.63

• Station location is not definite and has been estimated

Character of Bottom Between Stations:

Station	Area (yd ²)	L.R.		M.R.		S.R.		M&S	
			%		%		%		%
A-B			31.91		32.64		28.46		7.0
B-C			39.03		31.58		21.80		7.59
C-D			28.73		28.30		33.34		9.63
D-E			49.14		29.14		13.86		7.86

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd ²)	Available Spawning Area (yd ²) (MR&SR)	% Avail	Usable Spawning Area (yd ²)	% Usable
A-B	12,278		100,001	61		
B-C	3,710		25,858	53		
C-D	5,700		22,736	51		
D-E			0	0		

Spawning Area Unavailable and Unusable:

Station	Distance	Area (yd ²)	Area Unavail (yd ²)	% Unavail	When Avail	Usable Unavail (yd ²)	% Usable Unavail
A-B			--	--			
B-C			--	--			
C-D	2,410 yd		10,697	71			
D-E	1,000 yd		1,505	43			

Character of Watershed:

Mountainous	X
Hilly	
Rolling	
Flat	
Swampy	
Wooded	X
Open	
Cultivated	1%
Character of Valley	
Character of Banks	
Density of Marginal Vegetation	

Character of Watershed (cont):

Erosion

a) Banks

b) Watershed

Diversions:

Diversion 1: NE1/4,SW1/4,S6,R16E,T20E, R.B. 12 cfs. 415 yds above Station A. Irrigation ditch, width 6', depth 4', average water depth 14". Plank headgate 5, x 5,; open 20" at present. No return or protective devices. Irrigation dam; crest 42', drop 8", no spill, abutments nor fish ladders. Dam extends completely across stream and permits escape of seepage water only; complete trap to downstream migrants.

Diversion 2: NW1/4,SE1/4,S31,R16E,T21N, L.B. 0 cfs. 1,675 yards above Station A. Irrigation ditch, width 6', depth 5', average water depth 2". Headgate of logs and planks, 4.5, wide and 5, deep. No return or protective devices. Irrigation dam consists of 14" logs placed across stream. Boards along the top of part of the logs form a spill of from 2" to 6" at one end.

Diversion 3: NE1/4,NE1/4,S31,R16E,T21N, L.B. 0.8 cfs. 4,880 yards above Station A. Irrigation ditch, width 3', depth 5, average water depth 8.5". No headgate, return or protective devices. Diversion dam consists of log thrown across channel as wing dam.

Diversion 4: SW1/4,NE1/4,S20,R16E,T21N, R.B. 0 cfs. 9,675 yards above Station A. Irrigation ditch, width 4', depth 3,. No headgate, returns or protective devices. Irrigation dam completely diverts water in one channel of the river. Crest 40', drop 12" and constructed of logs, planks and brush.

Artificial Obstructions:

1. 3.2 miles above Station C. Log jam, 8'. Probable barrier.

2. 3.5 miles above Station C. Log jam and beaver dams. Probable barrier.

Note : All four diversions present serious menaces to downstream migrants. Diversion #1 is a complete trap, and also a probable barrier to upstream fish at times of low water.

Natural Obstructions:

1. 0.3 miles above Station D. Falls, 5'. Probable barrier.

Fluctuation in Water Level:

Stream Volumes: At Station C 7/13/36 26 cfs
 At Station E 7/14/36 10 cfs, est

Causes: seasonal run-off of snow in mountains

Pollution: None

Fish (salmon): None

Fish (other than salmon):

Species	Date	Very Abundant	Abundant	Fair No.	Scarce
Rainbow	7/36				X
Dolly Varden	7/36				X
Cutthroat	7/36				X
Eastern Brook	7/36				X

Note : heavily fished.

General Remarks:

Tributaries

De Roux Creek and Stafford Creek surveyed.

Topography

For the lowest two miles, the stream flows through a shallow, cultivated valley 0.5 mile wide. Above this, the valley becomes narrower and the gradient steeper. The surrounding mountains are covered with fir, pine, cedar, and tamarack. The stream drainage above the confluence with Stafford Creek lies in the Wenatchee National Forest.

Character of Bottom

Spawning areas usually good, though much bedrock occurs. Riffles are good in the lower section of the North Fork although shade is not too plentiful. Plenty of shade lines the upper reaches of the stream, where the valley is narrower. Pools are

frequent and deep. By nature, this is an excellent spawning stream for salmonids.

Fish Population

Reported that there was a good run of steelhead and salmon until the Prosser power dam was built, and logging on the main Teanaway was conducted (1905-1906). Now few, if any, reach the North Fork. The stream supports a sparse population of Eastern brooks, rainbows, Dolly Vardens and cutthroats. It is heavily fished.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Skv
A	7/ 3/36	12:15 pm	65.0 F	60.5 F	Cloudy
B	7/13/36	9:20 am	61.0	49.0	Clear
C	7/13/36	1:00 pm	69.5	55.5	Clear
D	7/14/36	10:15 am	57.0	47.0	Clear
E	7/14/36	11:15 am	59.5	46.5	Clear

Pool Grade:

Rest St	Pl/Mi	S1T1 %	S1T2 %	S1T3 %	S2T1 %	S2T2 %	S2T3 %	S3T1 %	S3T2 %	S3T3 %	S4T1 %	S4T2 %	S5T1 %	S5T2 %	S5T3 %
A-B	17 (6.59 mi)	7	7	6	15	16	16	9	6	3	3		6	7	8
B-C	32 (2.11 mi)			2	2	3	6				5	2	14	10	24
C-D	21 (4.59 mi)	1	1		9	1	1	15	17	26		5	2	5	14
D-E	4 (0.57 mi)				9.0	1.0	1.0	15.0	18.0	27.0		5.0	2.0	5.0	14.0
Tot	20	8	8	8	26	20	23	24	23	29	8	7	22	23	47
		3.0	3.0	3.0	9.0	7.0	8.0	9.0	8.0	11.0	3.0	3.0	8.0	8.0	17.0

Pool Grade for S6 only:

Sta	S6
B-C	10
C-D	10
D-E	47

Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
A-B	6.59	485'	74'	Topographic Map
B-C	2.11	335'	159'	Topographic Map
C-E	5.16	1,680'	209'	Topographic Map
E-Source	2.80	1,540'	550'	Topographic Map
Totals	16.66	3,440'	206'	

Jack Creek

River System: Yakima River

Name of Stream: Jack Creek, tributary to North Fork Teanaway River

Date of Survey: July 1, 1937

Description:

A small stream having a predominance of small and medium rubble. The gradient is moderate and much brush grows along the banks.

On July 1, 1937, during a period of relatively high water, the flow was measured at 6.4 cfs. The temperatures at 2:15 pm were: air 71 F, water 58 F. Weather was clear.

The evident small volume during the dry summer and fall seasons lends credence to reports that salmon or steelhead never ascend the stream.

Of the unsurveyed tributaries of the North Fork of the Teanaway River, Jack Creek is the largest, all of the others being at least one third smaller.

Cutthroat, Eastern brook and rainbow trout occur in fair numbers. The foregoing description can, in general, be applied to Middle, Indian and Jungle Creeks.

Stafford Creek

River System: **Yakima River**
 Stream Surveyed: **Stafford Creek, tributary of North Fork of Teanaway River**

Date of Survey: **July 15, 1936**

Source: **Navahoe Peak**

Location: **Kittitas County, Washington (Wenatchee National Forest)**

Total Length: **7 miles, 2.69 miles surveyed**

Station Location:

Sta Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Depth
	Yds	Miles	Yds	Miles			
AA	0	0.00	0	0.00	SW1/4,SW1/4,S33 R16E,T22N	19.5'	9.0"
BB	4,730	2.69	4,730	2.69	SW1/4,SW1/4,S2 R16E,T22N	98.5'	2.5"

EPA River Reach Codes:

Station	HUC	SEG	Rmi
AA	17030001	0873	0.00
BB	17030001	0855	0.00

Character of Bottom Between Stations:

Station	Area (yd ²)		L.R.		M.R.		S.R.		M&S	
	Area	(yd ²)	%	%	%	%	%	%	%	%
AA-BB			27		31		34		8	

Spawning Area Usable and Available:

Station	Distance		Area (yd ²)	Available Spawning Area (yd ²)		Usable Spawning Area (yd ²)	
	vds	miles		(MR&SR)	% Avail	Area (yd ²)	% Usable
AA-BB	4,730			16,185	65		

Spawning Area Unavailable **and** Unusable: **None**

Character of Watershed:

Mountainous X

Hilly

Rolling

Flat

Swampy

Wooded X

Open

Cultivated

Character
of Valley

Character
of Banks

Density of
Marginal
Vegetation

Erosion
a) Banks

b) Watershed

Diversions: **None**

Artificial Obstructions: **None**

Natural Obstructions: **None**

Fluctuation in Water **Level:**

Feet Variation:

Cause of Variation: seasonal run-off

Fluctuation in Water Level (cont):

Stream Volumes: At Station AA 7/15/36 21 cfs

Pollution: None

Fish (salmon): None

Fish (other than salmon):

<u>Species</u>	<u>Date</u>	<u>Very Abundant</u>	<u>Abundant</u>	<u>Fair No.</u>	<u>Scarce</u>
Rainbow	7/15/36			X	
Montana black spots	7/15/36			X	

General Remarks:

Survey

Mouth to Bear Creek (2.69 miles) surveyed.

Tributaries

Standup Creek (not surveyed) and Bear Creek (surveyed)

Topography

Stafford Creek flows through a narrow valley, the surrounding mountains being moderately well covered with conifers. There is no cultivation in the valley. No water is diverted.

Character of Stream

Spawning areas are fair to good, 65% of the total bottom being medium and small rubbles. There are no obstructions to migratory fish within the distance surveyed.

Fish Population

In spite of the fact that the stream is heavily fished, rainbow and Montana black spot trout are present in fair numbers. Up to about 1916 salmon runs ascended Stafford Creek as far as Station BB (confluence of Bear Creek). Since that time the run has disappeared.

Temperature Data:

<u>Sta</u>	<u>Date</u>	<u>Hour</u>	<u>Air Temp</u>	<u>Water Temp</u>	<u>Sky</u>
AA	7/15/36	10:30 am	68 F	50.5 F	Clear
BB	7/15/36	12:00 n	68	51.0	Clear

Pool Grade:

<u>St</u>	<u>Rest Pl/Mi</u>	<u>S1T1 1</u>	<u>S1T2 %</u>	<u>S2T1 %</u>	<u>S2T2 %</u>	<u>S3T1 %</u>	<u>S3T2 %</u>	<u>S3T3 %</u>	<u>S5T1 %</u>	<u>S5T2 %</u>	<u>S5T3 %</u>
AA-BB	36	1.0	1	23	2	31	10	19	6	1	3
(2.69 mi)			1.0	24.0	2.0	32.0	10.0	20.0	6.0	1.0	3.0

Gradient:

<u>Station</u>	<u>Distance (Miles)</u>	<u>Total Drop</u>	<u>Avg Drop Per Mile</u>	<u>Source of Data</u>
AA-BB	2.69	90'	33'	Topographic Map
Source- Bear Ck	4.6	3,125'	680'	

Standup Creek

River system: Yakima River

Name of Stream: Standup Creek, tributary to Stafford Creek

Description:

A very small tributary to Stafford Creek. Steep gradient with bottom mostly large rubble. Very brushy banks. Great fluctuation in water level. Rainbow trout are taken occasionally.

Miller Creek is of the same size and description as Standup Creek.

Miller Creek

River System: **Yakima River**

Name of Stream: **Miller Creek, tributary to Stafford Creek**

See Standup Creek

Beverly Creek

River System: **Yakima River**

Name of Stream: **Beverly Creek, tributary to North Fork Teanaway River**

Description:

Beverly Creek is a very small stream that cascades for its entire length. Cutthroat, Rainbow and Dolly Varden trout occur in fair numbers. Eastern brooks have been planted, but they do not seem to have survived.

Bean Creek is the small fork of Beverly Creek. No road. A native says, "It stands on end". Steep gradient with enormous fluctuation. Fish for a short distance; the same as Beverly Creek.

Bean Creek

River System: **Yakima River**

Name of stream: **Bean Creek, tributary to Beverly Creek**

See Beverly Creek

Bear Creek

River System: **Yakima River**
 Stream Surveyed: **Bear Creek, tributary to Stafford Creek-North
 Fork Teanaway River**

Date of Survey: **July 15, 1936**

Source: **Near Miller Peak**

Location: **Kittitas County, Washington. Wenatchee National Forest
 (T22N,R16E)**

Total Length: **3.4 miles, 0.8 miles surveyed**

Station Location:

Sta	Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
AAA	Confl with Stafford Creek	0	0.00	0	0.00		8.67'	8.0"
BBB	Confl with Miller Creek		0.89		0.89		6.33'	6.5"

EPA River Reach Codes:

Station	HUC	SEG	Rmi
AAA	17030001	0841	0.00
BBB	17030001	0841	0.00

Character of Bottom Between Stations:

Station	Area (yd ²)	L.R.		M.R.		S.R.		M&S	
			%		%		%		%
AAA-BBB		47		26		16		10	

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd ²)	Available Spawning Area (yd ²)		Usable Spawning Area (yd ²)	% Avail	% Usable
			(MR&SR)				
AAA-BBB	410		383			37	

Spawning Area Unavailable and Unusable:

Station	Distance	Area (yd ²)	Area Unavail (yd ²)	% Unavail	When Avail	Usable Unavail (yd ²)	% Usable Unavail
AAA-BBB	1,165 yd		1,426	48			

Character of Watershed:

Mountainous

X

Hilly

Rolling

Flat

Swampy

Wooded

X

Open

Cultivated

Character
of Valley

Character
of Banks

Density of
Marginal
Vegetation

Erosion

a) Banks

b) Watershed

Diversions: **None**

Artificial Obstructions:

1. 410 paces above Station AAA. Log jam.
2. 920 paces above Station AAA. Log jam.

3. 1,000 paces above Station AAA. Log jam.

Natural Obstructions: None

Fluctuation in Water Level:

Feet Variation:

Cause of Variation: spring run-off

Stream Volumes: estimated 8.0 cfs

Pollution: None

Fish (salmon): None

Fish (other than salmon): None

General Remarks:

Tributaries

Miller Creek

Topography

Bear Creek flows through a narrow, uninhabited, mountainous valley that is moderately covered with conifers.

Character of Stream

Log jams are frequent in this small stream. 20 paces above the terminus of the survey is an 8' falls and log jam barrier.

Fish Population

None recorded in notes.

Temperature Data:

<u>Sta</u>	<u>Date</u>	<u>Hour</u>	<u>Air Temp</u>	<u>Water Temp</u>	<u>Skv</u>
AAA	7/15/36	12:00 n	68.0 F	51.5 F	Clear
BBB	7/15/36	12:30 pm	67.5	50	Clear

Pool Grade:

<u>Sta</u>	<u>Dist</u> <u>(mi)</u>	<u>Resting</u> <u>Pools</u>	<u>Resting</u> <u>Pools/Mile</u>	<u>S3T1</u> <u>%</u>	<u>S3T2</u> <u>%</u>	<u>S3T3</u> <u>%</u>	<u>S5T1</u> <u>%</u>	<u>S6</u> <u>%</u>
AAA-BBB	0.89	13	15/47	7	3	2	1	42
				54.0	23.0	15.0	8.0	

Gradient:

<u>Station</u>	<u>Distance</u> <u>(Miles)</u>	<u>Total</u> <u>Drop</u>	<u>Avg Drop</u> <u>Per Mile</u>	<u>Source of Data</u>
AAA-BBB	1.5	190'	127'	Topographic Map
BBB-	3.0	-----	593'	Topographic Map
3 mi above				

De Roux Creek

River System: Yakima River

Stream Surveyed: De Roux Creek, tributary to North Fork Teanaway River

Date of Survey: July 14, 1936

Source: Hawkins Mountains

Location: Kittitas County, Washington (Wenatchee National Forest)

Total Length: 4.5 miles, 1.33 miles surveyed

Station Location:

Sta	Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
AA		0	0.00	0	0.00	NE1/4,SW1/4,S1 R15E,T22N	16'	1.5'
BB			1.33		1.33	NE1/4,SW1/4,S10 R15E,T22N	--	--

EPA River Reach Codes:

Station	HUC	SEG	Rmi
AA	17030001	0717	0.00
BB	17030001	0717	0.00

Character of Bottom Between Stations:

Station	Area (yd ²)	L.R.		M.R.		S.R.		M&S	
		%		%		%		%	
AA-BB			13		18		62		8

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd ²)	Available Spawning Area (yd ²)		Usable Spawning Area (yd ²)	% Usable
			(MR&SR)	% Avail		
AA-BB	2,100		4,610	79		

Spawning Area Unavailable and Unusable: None

Character of Watershed:

Mountainous X
Hilly
Rolling
Flat
Swampy
Wooded X
Open
Cultivated
Character of Valley
Character of Banks
Density of Marginal Vegetation
Erosion
 a) Banks
 b) Watershed

Diversions: **None**

Artificial Obstructions: **None**

Natural Obstructions:

1. At Station BB. Falls, 6'. Probably impassable.

Fluctuation in Water Level:

Feet Variation:

Cause of Variation: spring run-off

Stream Volumes: At Station AA 7/14/36 est. 6.0 cfs

Pollution: **None**

Fish (salmon): **None**

Fish (other than salmon):

A few trout were seen--species undetermined.

General Remarks:

Topography

De Roux Creek flows through a deep mountainous valley, the slopes of which are covered with fir, cedar, pine and tamarack. There is no cultivation within the valley, nor is any water diverted from this stream.

Character of Stream

The bottom of this small stream contains a large amount of good spawning area. Numerous cascades and difficult log jams separate the spawning areas into intermittent stretches. With the exception of the falls at Station BB, the cascades and log jams probably do not constitute barriers at high water.

Fish Population

Residents of the locality state that neither salmon nor steelhead ascend this creek. Trout (species undetermined) are present but scarce.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Skv
AA	7/14/36	10:20 am	57 F	48 F	Clear
BB	7/14/36	11:45 am	58	47	Clear

Pool Grade:

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S3T1 %	S4T1 %	S6 %
AA-BB	1.19	69	58/3	65	4	3
				94.0	6.0	

Gradient:

<u>Station</u>	<u>Distance (Miles)</u>	<u>Total Drop</u>	<u>Avg Drop Per Mile</u>	<u>Source of Data</u>
AA-BB	1.33	550'	414'	Topographic Map

Above the surveyed portion the gradient was determined to be 1,000' per mile, from topographic map.

Middle Fork Teanaway River

River System: **Yakima River**
 Stream Surveyed: **Middle Fork Teanaway River, tributary to
 Teanaway River**

Date of Survey: **July 5-7, 1936**

Source: **Center of T22N,R15E, Jolly Mountain.**

Location: **Northwestern Kittitas County, Washington
 SW1/4,NW1/4,S6,T20N,R16E (Kittitas County Map)**

Total Length: **15 miles, 11.5 miles surveyed**

Station Location:

Sta	Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
A		0	0.00	0	0.00	NW1/4,NW1/4,S6 R16E,T20N	34'	3.7"
B			4.69		4.69	SW1/4,NW1/4,S21 R15E,T21N	25'	17.2"
C			1.24		5.93	NE1/4,NW1/4,S15 R15E,T21N	21'	8.0"
D			5.55		11.48	SW1/4,NW1/4,S28 R15E,T22N	14'	6.0"

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17030001	0030	0.70
B*	17030001	0030	4.34
c*	17030001	0030	5.45
D	17030001	0030	11.05

*Station location is not definite and has been estimated

Character of Bottom Between Stations:

Station	Area (yd ²)	L.R.		M.R.		S.R.		M&S	
			%		%		%		%
A-B			29		25		40		6
B-C			35		29		32		4
C-D			36		27		32		5

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd ²)	Available Spawning Area (yd ²) (MR&SR)	% Avail	Usable Spawning Area (yd ²)	% Usable
A-B	8,260		38,987	65		
B-C	2,190		9,394	61		
C-D	9,765		38,834	59		

Spawning Area Unavailable and Unusable: **None**

Character of Watershed:

Mountainous	X
Hilly	
Rolling	
Flat	
Swampy	
Wooded	X
Open	
Cultivated	3%
Character of Valley	
Character of Banks	
Density of Marginal Vegetation	
Erosion	
a) Banks	
b) Watershed	

Diversions:

Diversion 1: NE1/4,NW1/4,S36,R15E,T21N, R.B. Est 0.5 cfs.

2,962 yards above Station A. Irrigation ditch, width 2', depth 12" average water depth 3". No headgate, return or protective devices. Wing dam of rocks and logs extends to middle of stream, crest 18'.

Diversion 2: SE1/4,SE1/4,S26,R15E,T21N, R.B. 5.5 cfs. 3,690 yards above Station A. Irrigation ditch, width 6.5', depth 16", average water depth 8". No headgate, return or protective devices. Irrigation dam, crest 40', drop 12", spill 3" (in midstream only). No abutments or fish ladder. Constructed of rocks, logs and straw. Extends entirely across stream at angle to banks.

Diversion 3: NE1/4,SW1/4,S26,R15E,T21N, R.B. 2.2 cfs. 4,820 yards above Station A. Irrigation ditch, width 8', depth 6', average water depth 9". No headgate, return or protective devices. Wing dam of logs with 32' crest.

Diversion 4: NE1/4,SE1/4,S27,R15E,T21N, R.B. 7.5 cfs. 6,460 yards above Station A. Irrigation ditch, width 5', depth 18", average water depth 10". No headgate, return or protective devices. Irrigation dam, crest 44', drop 12", no spill. No fishladder or abutments. Constructed of logs, brush and rocks. Extends completely across stream; barrier at low water and complete trap. Only water below dam is seepage through and around dam.

Artificial Obstructions:

Low rock dams and wing dams at diversions act as traps to downstream migrants. Only the dam at diversion #4 might be a barrier to upstream fish at low water. No protective devices.

Natural Obstructions: none

Fluctuation in Water Level:

Feet Variation:

Cause of Variation: seasonal run-off

Stream Volumes: At Station A 7/16/36 13 cfs

Pollution: None

Fish (salmon): None. Run existed prior to 1916.

Fish (other than salmon):

Species	Date	Very			Fair No.	Scarce
		Abundant	Abundant	Abundant		
Rainbow						X

Fish (other than salmon) (cont):

Species	Date	Very			Fair No.	Scarce
		Abundant	Abundant	Abundant		
Dolly Varden						X
Cutthroat						X

General Remarks:

From Station A-B the Middle Fork runs through a farming valley 0.5-1.0 mile wide. The stream is well shaded, and contains good spawning riffles. From Station B-C the bottom contains more bedrock and is canyonous. Above this canyon to Station D the stream flows through a valley thickly wooded with conifers. Spawning areas are good to 0.5 mile above Station C.

Jolly Creek discharges an estimated 5 cfs into the West Fork. The main stream above this point flows an estimated 10 cfs over almost 100% large rubble.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
A	7/ 5/36	1:50 pm	66.0 F	65.0 F	Clear
B	7/ 5/36	4:30 pm	62.0	59.0	Clear
C	7/ 8/36	---	58.0	53.0	Cloudy
D	7/ 7/36	12:05 pm	62.0	50.5	Clear

Pool Grade:

Rest	S2T1	S2T2	S2T3	S3T1	S3T2	S3T3	S4T1	S4T2	S4T3	S5T1	S5T2	S5T3	
St Pl/Mi	%	%	%	%	%	%	%	%	%	%	%	%	
A-B	15	6	4	5	2	5	4				19	12	12
(4.69 mi)	9.0	6.0	7.0	3.0	7.0	6.0				28.0	17.0	17.0	
B-C	24	4	1	1	2	2	5	1	1	2	4	5	2
(1.2 mi)	13.0	3.0	3.0	7.0	7.0	17.0	3.0	3.0	7.0	13.0	17.0	7.0	
C-D	11	10	6	4	2	4	1		1		18	9	6
(5.5 mi)	16.0	10.0	7.0	3.0	11	10		2.0		30.0	15.0	10.0	
Tot	14	20	11	10	4.60	7.0	6.0	1	2	2	41	26	20
(11.5mi)	12.0	7.0	6.0					1.0	1.0	1.0	26.0	16.0	12.0

(160 resting pools, 39 S6 pools between Sta C-D)

Gradient:

<u>Station</u>	<u>Distance (Miles)</u>	<u>Total Drop</u>	<u>Avg Drop Per Mile</u>	<u>Source of Data</u>
A-B	4.69	310'	66'	Topographic Map
B-C	1.24	70'	56'	Topographic Map
C-D	5.55	745'	134'	Topographic Map
D-Source	4.00	1,615'	404'	Topographic Map
Total A-D	11.48	1,125'	98'	

Jolly Creek

River System: Yakima River

Name of Stream: Jolly Creek, tributary to Middle Fork Teanaway
River

Description:

Flows southeast two miles from source on Jolly Mt. to confluence with Middle Fork of the Teanaway River. Flowing 5 cfs on July 8, 1936. Not surveyed.

Very swift stream over nearly 100% large rubble.

West Fork Teanaway River

River System: **Yakima River**
 Stream Surveyed: **West Fork Teanaway River, tributary to Teanaway River**

Date of Survey: **July 5, 1936**

Source: **East slope Cascade Mountains, Kittitas County**

Location: **Northwestern Kittitas County, Washington.**
Discharges Teanaway River SW1/4,NW1/4,S6,T10N,R16E.

Total Length: **13.6 miles, 8.7 miles surveyed**

Station Location:

Sta	Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
A	Confl of West & Middle Forks	0	0.00	0	0.00	NW4,NW4,S6 T20N,R16E	32'	6"
B	Ford-Forest Boundary		6.26		6.26	NW4,NE4,S30 T20N,R15E	38'	2"
C	West Fork Teanaway Box Canyon - 4,300 paces above Sta B		2.44		8.70	SW4,NE4,S1 T21N,R14E	38'	6"

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17030001	0031	0.00
B*	17030001	0031	6.92
c*	17030001	0031	9.94

• Station location is not definite and has been estimated

Character of Bottom Between Stations:

Station	Area (yd ²)	L.R.		M.R.		S.R.		M&S	
			%		%		%		%
A-B	74,470	18,927	25.42	16,976	22.8	31,416	42.0	7,151	10.0
B-C	21,400	6,900	32.24	6,200	29.0	7,345	34.0	955	4.5

Spawning Area Usable and Available:

Station	Distance		Area (yd ²)	Available	%	Usable	%
	vds	miles		Spawning Area (yd ²) (MR&SR)		Avail	
A-B	11,010			48,392	65		
B-C	2,100			7,880	59		

Spawning Area Unavailable and Unusable:

Station	Distance	Area (yd ²)	Area	%	When	Usable	%
			Unavail (yd ²)			Unavail	
B-C	2,200 yd		5,665	41.82			

Note : Spawning area constitutes 63.29% of total stream bottom between Stations B-C.

Character of Watershed:

Mountainous	X
Hilly	
Rolling	
Flat	
Swampy	
Wooded	X
Open Cultivated	0%
Character of Valley	
Character of Banks	
Density of Marginal Vegetation	

Character of Watershed (cont):

Erosion

a) Banks

b) Watershed

Diversions:

Diversion 1: SW4,NW4,S6,R16E,T20N, R.B. 9.8 cfs. 3,630 yards above Station A. Irrigation ditch, width 12', depth 2', average water depth 20". No headgate, return or protective devices. Irrigation dam 65, long and 12" high, extends diagonally across entire stream. Constructed of logs. Complete trap and barrier at low water, as only escapement of water is leakage through dam.

Diversion 2: SW4,SW4,S36,R15E,T21N, R.B. 2 cfs. 4,480 yards above Station A. Irrigation ditch, width 2', depth 2', average water depth 10". No headgate, return or protective devices. Rock wing dam 6, long. Trap but no barrier.

Diversion 3: SW4,SW4,S35,R15E,T21N, R.B. 0 cfs. 5,450 yards above Station A. Irrigation ditch, width 3' at bottom and 4.5, at top, depth 2.5,. Dry at present. No headgate, return or protective devices. Irrigation dam of logs and boards laid diagonally across stream.

Artificial Obstructions:

1. At Diversion 1. Dam, 1,. No protective device. Barrier at low water.

Natural Obstructions:

1. 1 mile above Station B. Falls, 15,. Impassable.
2. At Station C. Rock slide falls. Impassable.

Fluctuation in Water Level:

Feet Variation:

Cause of Variation: seasonal run-off

Stream Volumes: At Station C Est 8 cfs

Pollution: None

Fish (salmon): None

Fish (other than salmon):

Closed stream - trout abundant in sizes ranging from fingerlings to six inches. Species not determined.

General Remarks:

Tributaries

None of the tributaries were large enough to survey.

Topography

Stream flows through a valley 0.25 mile wide and with a few farms in the first mile. Most of the watershed lies in the Wenatchee National Forest. Moderate shade is provided by conifers and cottonwoods.

Character of Stream

Above Station C the gradient becomes much steeper and the watershed more mountainous. From Station B to Station C it flows through a box canyon. The lower section from Station A to Station B provides the best spawning area.

Fish Population

Small trout were numerous as the stream is closed to fishing.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
A	7/ 5/36	10:00 am	57.5 F	59.5 F	Clear
B	7/16/36	9:10 am	68.0	49.0	Clear
C	7/13/36	1:30 pm	73.0	45.0	Clear

Pool Grade:

Rest St	Pl	SlT1	SlT2	SlT3	S2T1	S2T2	S2T3	S3T1	S3T2	S3T3	S4T1	S4T3	S5T1	S5T2	S5T3
		2	%	%	%	%	%	%	%	%	%	%	%	%	%
A-B 27 mi)	1.0	6	2	19	15	12	34	17	6	1			17	17	20
(6.26		4.0	1.0	11.0	9.0	7.0	20.0	10.0	4.0	1.0			10.0	10.0	12.0

Pool Grade (Cont):

St	Rest Pl/Mi	S1T1 %	S1T2 %	S1T3 %	S2T1 %	S2T2 %	S2T3 %	S3T1 %	S3T2 %	S3T3 %	S4T1 %	S4T3 %	S5T1 %	S5T2 %	S5T3 %
B-C	39	1				4	5	3	7	45		3	1	14	12
	(2.44 mill)	1.0				4.0	5.0	3.0	7.0	47.0		3.0	1.0	15.0	13.0
Tot	30	3	6	2	19	19	17	37	24	51	1	3	18	31	32
		1.0	2.0	1.0	7.0	7.0	6.0	14.0	9.0	19.0	1.0	1.0	7.0	12.0	12.0

Gradient:

Station	Distance (Miles)	Total Drov	Avg Drop Per Mile	Source of Data
A-B	6.26	500'	80'	Topographic Map
B-C	2.44	350'	143'	Topographic Map
C-Source	6.60	2,690'	408'	Topographic Map
Total	8.70	850'	98'	

Dingbat Creek

River System: Yakima River

Name of Stream: Dingbat Creek, tributary to West Fork of
Teaway River

Description:

First and largest tributary to West Fork of the Teaway River. The other tributaries in upstream order are: Sandstone Creek, Corral Creek and Hex Creek. All are on the left bank.

These streams are too short and have too small a flow to warrant a survey.

Thornton Creek

River System: Yakima River

Name of Stream: Thornton Creek, tributary to Yakima River

Description:

Thornton, Cle Elum, Spexarth, Peterson and Nelson Creeks are small, short creeks draining into the south bank of the Yakima River in the vicinity of Cle Elum.

The streams have too little spawning area to warrant survey.

Cle Elum River

River System: **Yakima River**
 Stream Surveyed: **Cle Elum River, tributary to Yakima River**

Date of Survey: **February 19, 1935**

Source: **Hyas Lake**

Location: **Kittitas County**

Total Length: **33 miles long, 8 miles surveyed to Cle Elum Lake**

Station Location:

Sta	Location	Distance Above Prev Station		Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
A	Mouth to Yakima River		0.0	0.0		SE1/4,SW1/4,S32 T20N,R15E	109'	11"
B	Concrete Bridge; gravel hwy to Roslyn		1.5	1.5		SE1/4,NE1/4,S31 T20N,R15E	112'	22"
C	Wooden bridge, road from Ronald		5.2	6.7		NE1/4,SW1/4,S11 T20N,R14E	81'	18"
D	Dam, Cle Elum Lake	1.1		7.8		SW1/4,SE1/4,S3 T20N,R14E	200'	12"

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17030001	0033	0.00
B	17030001	0033	1.16
c*	17030001	0033	6.83
D	17030001	0033	6.83

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

Station	Area (yd ²)	L.R.		M.R.		S.R.		M&S	
			%		%		%		%
A-B			25		41		34		
B-C			29		39		32		
C-D			19		33		49		

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd ²)	Available Spawning Area (yd ²) (MR&SR)	% Avail	Usable Spawning Area (yd ²)	% Usable
A-B	2,717		71,406	75		
B-C	9,397		181,604	72		
C-D	1,675		63,607	83		

Spawning Area Unavailable and Unusable:

None below Cle Elum Dam and Lake

Character of Watershed:

Mountainous	X
Hilly	
Rolling	
Flat	
Swampy	
Wooded	X
Open	
Cultivated	
Character of Valley	
Character of Banks	
Density of Marginal Vegetation	
Erosion	
a) Banks	
b) Watershed	

Diversions:

None. Cle Elum Water SUPPLY takes off at low dam approximately three miles up. Diversion variable. Records can undoubtedly be obtained from Water Company. Intake screened.

Artificial Obstructions:

1. At Station D, Cle Elum Lake. Water storage, 135'. No protective device.

2. 3 miles above Station B. 2.5', passable.

3. 3.5 miles above Station B. Cle Elum Water Supply, 1.5,, passable. See Webbers notes, 1941. Dam being worked on by bulldozers.

Natural Obstructions: None

Fluctuation in Water Level:

Feet Variation: 0, - 10'

Cause of Variation: water release from Cle Elum Dam

Stream Volumes:

Pollution: None

Fish (salmon): None

Fish (other than salmon): None

General Remarks:

Tovosravhv

The Cle Elum River runs through a valley from one half to one mile wide with sharply sloping sides, which are rarely precipitous. The valley is heavily forested with conifers and an occasional grove of alders or cottonwoods. None of the valley is under cultivation and at the time of the survey there was but one inhabitant living below Cle Elum Lake.

Character of River

This stream is fast with but few resting pools. Two good spawning areas were located, one three miles from the mouth of the river, the other, four miles. Near Cle Elum Lake the river drops steeply, large rubble and boulders are plentiful and the riffles are poor.

Irrigation and Obstructions

There are no small irrigation diversions in this area. The Lake Cle Elum Dam, a storage basin for the Yakima River forms an impassable barrier for migrating fish. It is 135 feet high and has no fish way of any type. There are two small log dams on the river. Neither are a menace to migrating fish. The purpose of these dams is unknown, but it is assumed that they were installed to aid in flood control. One diverts for Cle Elum Water Supply Company.

Fish Population

At the present time, nothing is known of the fish population or salmon runs.

Upper Cle Elum System

The river above the reservoir, with its two main tributaries the Wapatus and Cooper Rivers, drains a large watershed and several lakes. Although there is probably much good spawning area in the many streams in this system, none have been surveyed because of the impassable 135 foot control dam at the outlet of the Cle Elum Reservoir.

Cle Elum Reservoir

The Cle Elum reservoir furnishes stored water for the Yakima Project. The main dam consists of a sprinkled and rolled earth embankment, approximately 750 feet long on the crest, with a maximum height of 135 feet. The spillway, 201 feet wide, is an open concrete lined channel adjacent to the dam in the south abutment, discharging into an excavated channel leading to the river. The channel extends approximately 4,700 feet below the outlet end of the spillway.

Temperature Data:

<u>Sta</u>	<u>Date</u>	<u>Hour</u>	<u>Air Temp</u>	<u>Water Temp</u>	<u>Skv</u>
A	3/19/35	8:40 am	40.0 F	38.0 F	---
B	3/19/35	9:45 am	42.5	36.0	---

Pool Grade:

Sta	Resting Pools	Resting Pools/Mile	SlT1 %	SlT2 %	SlT3 %	S2T1 %	S2T2 %	S2T3 %	S4T1 %
A-B (1.5 mi)	3	1	1	1		1			
B-C (5.2 mi)	29	5	34.0	33.0		33.0			
C-D (no resting pools, 1.1 mi)					4.0	3.0	62.0	28.0	3.0
Total (7.8 mi)	32	4	3.0	3.0	3.0	6.0	56.0	25.0	3.0

Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
A-B	1.9	50'	26'	Water supply paper #369
B-C	5.2	118'	23'	Water supply paper #369
C-D	1.4	17'	12'	Water supply paper #369
Totals	8.5	185'	22'	

Note : distances from Water supply paper.

Tributaries:

List of Tributaries to Cle Elum River and Reservoir
in Upstream Order

(all inaccessible due to impassable reservoir dam)

I. Tributaries to Cle Elum Lake:

1. Spring Creek
2. Bear Creek
3. Davis Creek
4. Newport Creek
5. Morgan Creek
6. Dry Creek
7. French Cabin Creek

II. Tributaries to Cle Elum River above the Lake:

8. Howson Creek
9. Thorp Creek
10. Little Salmon Lasac Creek

II. Tributaries to Cle Elum River above the Lake (cont)

11. Salmon Lasac Creek
12. Big Salmon Lasac Creek
13. Cooper River

- a) Stave Creek
- b) Tired Creek
- c) Delate Creek
- d) Pete Lake Creek

14. Paris Creek
15. Waptus River

- a) Terence Lake Creek
- b) Diamond Lake Creek
- c) Hour Creek
- d) Goat Creek
- e) Trail Creek
- f) Spinola Creek

16. Boulder Creek
17. Camp Creek
18. Fortune Creek
19. Silver Creek
20. Scatter Creek
21. Skeeter Creek

Reference: Wenatchee National Forest Map

Spring Creek

River System: **Yakima River**

Name of Stream: **Spring Creek, tributary to Cle Elum River**

Description:

This and the following streams are short, small and steep-gradient creeks in the Cle Elum River system above the reservoir control dam. In upstream order other creeks are Davis, Newport, Dry, French Cabin, Howson, Thorp, Lasac, Steve, Pete, Big Salmon Lasac, Salmon Lasac, Paris, Diamond Lake, Terence Lake, Goat, Trail, Boulder, Camp and Fortune Creeks. Several lakes of greater or lesser size are drained by some of these tributaries.

The 140' Cle Elum Reservoir Control Dam forms an impassable barrier to all migrating fish. For this reason the above streams are inaccessible to spawning salmonids and have been unsurveyed.

Domerie Creek

River System: Yakima River

Name of Stream: Domerie Creek, tributary to Cle Elum River

Description:

Flows into left bank of the Cle Elum River 1.25 miles below the Cle Elum Lake control dam. Water supply for town of Roslyn is located on this stream, two miles above its mouth. During dry seasons, this utilizes the entire flow. Mouth becomes lost in swampy, beaver meadows; doubtful if fish could enter creek.

Information from Cle Elum Dam keeper.

Cooper River

River System: **Yakima River**

Name of Stream: **Cooper River, tributary to Cle Elum River**

Description:

Flows southeast 12 miles from source in Spectacle Lake to confluence with upper Cle Elum River, 10 miles above Cle Elum Reservoir. Pete Lake outlet runs into Cooper River, and 1.5 miles of Cooper Lake is on the river. The most important tributary is Stave Creek.

The Cooper River is above the 140' Cle Elum control dam, an impossible barrier to fish.

Waptus River

River System: Yakima River
Name of Stream: Waptus River

Description:

Flows nine miles southeast from Waptus Lake to confluence with upper Cle Elum River, 12 miles above Lake Cle Elum. High, mountainous watershed. Tributaries are: Diamond Lake, Lake Terence, Goat Creek and Trail Creek.

Not surveyed, because it is above the 140' Cle Elum control dam.

Little Creek

River System: Yakima River

Name of Stream: Little Creek, tributary to Yakima River

Description:

Flows northeast ten miles to confluence with Yakima River, between Cle Elum and Easton. Drains wooded and mountainous watershed.

The entire flow of this stream is diverted for irrigation during the summer, leaving the creek bed dry where it runs through the flat Yakima valley. Not surveyed.

Big Creek

River System: Yakima River

Name of Stream: Big Creek, tributary to Yakima River

Description:

Flowing 12 miles northeast to confluence with the Yakima River, this is one of the larger tributaries to the upper Yakima. The mouth is on the left bank of the Yakima 5 miles below Easton. Wooded, mountainous watershed with a rather steep gradient. Numerous, small tributaries.

There are eleven adjudicated water rights having a total maximum allotment of 26.4 cfs. This causes the entire flow of Big Creek to be diverted for irrigation several miles above its mouth during the summer. It is a good spawning stream in the hilly portion of its length, but its bed in the flat valley of the Yakima River is dry. Not surveyed.

The greater length of Big Creek in its upper reaches drains a forested, mountainous watershed that is covered by heavy winter snows. The lower reaches flow through the flat, fertile Yakima River valley. During run-off May 6, 1937, this stream was discharging an estimated 40 cfs. On July 3, 1937, discharge was about 10 cfs.

A small Steelhead run is reported by the Cle Elum dam keeper (a native of Big Creek Valley). He also reports some fishing for "native mountain trout" in the headwaters. No other reports for fish were obtainable.

Tucker Creek

River System: **Yakima River**

Name of Stream: **Tucker Creek, tributary to Yakima River**

Description:

A small, short stream flowing into the left bank of the Yakima River, a couple of miles below Easton.

Too small for spawning purposes. Not surveyed.

Silver Creek

River System: **Yakima River**

Name of Stream: **Silver Creek, tributary to Yakima River**

Description:

Flowing 3 cfs on April 19, 1937, and 10 cfs on May 6, 1937. Enters the right bank of Yakima River at Easton Highway Bridge. In its upper reaches, this creek has a constant flow through a swampy bottom; below, it has a steep gradient. Mountainous, wooded watershed. Heavy winter snows.

During the greater part of the year, this creek sinks into its bed in the lower portion, rendering the entire stream inaccessible to migrants. Trout have been planted in the upper part.

Kachess River

River System: **Yakima River**

Stream Surveyed: **Kachess River, tributary to Yakima**

Date of Survey: **March 20, 1935**

Source: **Kachess Lake**

Location: **Kittitas County, Washington**

Total Length: **1.5 miles; all surveyed.**

Station Location:

Sta	Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
A	Mouth at Yakima R	0	0.00	0	0.00		21'	4"
B	Concrete Hwy Bridge		0.57		0.57		35'	3"
C	Kachess Lake Dam		1.00		1.57		12'	10"

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17030001	1024	0.00
B	17030001	1024	0.00
C	17030001	0050	1.63

Character of Bottom Between Stations:

Station	Area (yd ²)		L.R.		M.R.		S.R.		M&S	
	Area	(yd ²)	%	%	%	%	%	%	%	%
A-B			7		37		55		1	
B-C			14		40		46		0	

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd ²)	Available Spawning Area (yd ²)		Usable Spawning Area (yd ²)	
			(MR&SR)	% Avail	Area (yd ²)	% Usable
A-B	1,000		7,050	92		
B-C	1,945		14,098	86		

Spawning Area Unavailable and Unusable: **None**

Character of Watershed:

Mountainous **X**

Hilly

Rolling

Flat

Swampy

Wooded **X**

Open

Cultivated

**Character
of Valley**

**Character
of Banks**

**Density of
Marginal
Vegetation**

**Erosion
a) Banks**

b) Watershed

Diversions: **None**

Artificial Obstructions:

1. **Station C. Lake Kachess, water storage, 63'. No protective device.**

Natural Obstructions: **None**

Fluctuation in Water Level:

Feet Variation: 0-10'

Fluctuation in Water Level (cont):

Cause of Variation: water released from Kachess Dam

Pollution: None

Fish (salmon):

None. Dr. Rich says that Blueback formerly used Kachess, Cle Elum and Keechelum Lakes before the dams were put in.

Fish (other than salmon): None

General Remarks:

Topography

The Kachess River flows through a wide valley with gently sloping sides. The area is heavily forested with conifers. There are no habitations along the river and none of the area is under cultivation.

Character of River

The stream is small and slow at the present time. The flow is regulated by the headgates at the Kachess Lake dam. Spawning areas are limited due to the presence of large pools and there are but a few scattered riffles.

Irrigation and Obstructions

There are no small irrigation diversions. The Kachess Lake Dam is an impassable barrier to migrating fish. It is seventy feet high and has no fish ladder of any kind. The dam acts as a storage reservoir for the Yakima River Irrigation Project. There are no natural barriers in the stream.

Fish Population

At the present time nothing is known of the fish population or salmon runs of the stream.

Temperature Data:

<u>Sta</u>	<u>Date</u>	<u>Hour</u>	<u>Air Temp</u>	<u>Water Temp</u>	<u>Skv</u>
A	3/20/35	8:55 am	34.5 F	38.0 F	---

Pool Grade:

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S1T2 %	S1T3 %	S2T1 %	S2T2 %	S3T2 %
A-B	0.57	2	3	1		1		
				50.0		50.0		
B-C	1.00	15	15		5	1	7	2
					33.0	7.0	47.0	13.0
Total	1.57	17	10	1	5	2	7	2
				6.0	29.0	12.0	41.0	12.0

Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
A-B	1.67	70'	42'	Water Supply Paper #369

Elevation at Kachess Lake is 2,230'; elevation at confluence Kachess Lake and Yakima River is 2,160'.

Tributaries:

Due to the impassable 63' water supply dam at the foot of Lake Kachess, none of the tributaries of the river (or lake) are accessible to salmon. Kachess Lake is connected by a short stream with Little Kachess Lake above it. They are, in upstream order:

1. Lodge Creek
2. Thetis Creek
3. Gale Creek
4. Box Canyon Creek
5. Mineral Creek

Tributaries enter Little Kachess Lake.

Box Canyon Creek

River System: Yakima River

Name of Stream: Box Canyon Creek, tributary to Lake Kachess

Description:

Flows eight miles southeast from Alta Lakes into Little Kachess Lake. Flows through wooded, mountainous watershed and has steep gradient. Several small tributaries.

Remarks:

This stream is above the 63' Kachess Reservoir control dam, an impassable barrier to migrating fish. Other streams draining into Lake Kachess and not surveyed because of inaccessibility to salmonids are: Lodge Creek, Thetis Creek, Gale Creek and Mineral Creek. The first two are very small and short.

Hudson Creek

River System: **Yakima River**
Name of Stream: **Hudson Creek**

Description:

One of several small, short, steep-gradient creeks flowing into the Yakima River between Easton and Lake Keechelus. Others are: Stampede Creek, Telephone Creek, Swamp Creek and Mosquito Creek.

Remarks:

Not surveyed.

Cabin Creek

River System: Yakima River
Name of Stream: Cabin Creek

Description:

Flows into left bank of the Yakima River, two miles above the Easton dam. Flowing est 50 cfs on 4/19/37 during heavy snow runoff. Reported to be very small during summer and fall. 14 miles long, through wooded mountainous watershed. Accessible by trail, and road to mouth.

Water-supply for town of Easton is diverted from Cabin Creek through a 6" pipe. Five miles above the mouth the stream rises rapidly in a series of cascades, but flattens out in upper reaches. The lower portion of the stream has been dredged out and cleared with a bulldozer.

Fish Population:

Fair fishing in swampy headwaters for Rainbows and Eastern brooks. No salmon known to run stream--probably too low in the fall.

List of Tributaries to Keechelus Lake

All inaccessible due to high level control dam

1. Meadow Creek
2. Roaring Creek
3. Resort Creek
4. Wolfe Creek
5. Cold Creek
6. Rocky Run
7. Gold Creek
- A. Coal Creek
 - 1) Hyak Creek
 - 2) Tunnel Creek

Meadow Creek

River System: Yakima River

Name of Stream: Meadow Creek, tributary to Lake Keechelus

Description:

One of the steep-gradient streams flowing into Lake Keechelus, above the high control dam. High, wooded and mountainous watershed. Numerous small lakes and tributaries in the system. Other tributaries to Lake Keechelus are: Roaring Resort, Wolfe, Cold and Coal Creeks. The last has four tributaries: Rocky Run, Gold, Hyak and Tunnel Creeks.

Remarks:

None surveyed, as the high Keechelus Reservoir control dam makes these streams inaccessible to migrating salmonids.