

# Bureau of Fisheries Stream Habitat Surveys

## Umatilla, Tucannon, Asotin, and Grande Ronde River Basins

### Summary Report

1934 - 1942



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**Summary Report for  
Bureau of Fisheries Stream Habitat Surveys:  
Umatilla, Tucannon, Asotin, and Grande Ronde River Basins  
1934-1942**

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## INTRODUCTION

This document contains summary reports of stream habitat surveys, conducted in the Umatilla and Grande Ronde River basins, by the Bureau of Fisheries (BOF, now National Marine Fisheries Service) from 1938-1942. 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 contained 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-yd<sup>2</sup> and > 6 feet deep
  - S2: 25- to 50-yd<sup>2</sup> and 3-6 feet deep
  - S3: < 25-yd<sup>2</sup> and < 3 feet deep
  - S4: 25- to 50-yd<sup>2</sup> and > 6 feet deep
  - S5: 25- to 50-yd<sup>2</sup> 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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## Umatilla River

**River System:** Umatilla

**Stream Surveyed:** Umatilla River

**Date of Survey:** Sept 18-20, 1945, Parkhurst, Hanavan, Brewington, Silliman, Rucker, and Davids

**Source:** Formed by the confluence of the North and South Forks in s22, T3N, R37E, about 7 miles above Ryan Creek in the Blue Mountains of the Umatilla National Forest.

**Direction of Flow:** The stream flows in a general westerly direction until it reaches Pendleton, then in a northwesterly direction to its confluence with the Columbia River near Umatilla, Oregon.

**Total Length:** 119 miles, surveyed from the mouth to the confluence of Ryan Creek, a distance of approximately 87 miles.

**Station Location:**

St	Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
A	Hwy bridge above mouth	0	0.0	0	0.0	S17,T5N, R28E	60'	
B	Three mile dam and diversion	7400	4.2	7400	4.2	S33,T5N, R28E	200'	1'
C	Ordinance Rd bridge	8800	5.0	16200	9.0	S16,T4N, R28E	110'	
D	Hwy bridge near Hermiston	12600	7.0	28800	16.0	S28,T4N, R28E	60'	
E	Hermiston irrigation dam		15.0		31.0	S27,T3N, R29E	80'	4'
F	Hwy bridge west of main hwy		6.0		37.0	S5,T2N, R30E	40'	2'
G	Road Bridge		4.5		41.5	S2,T2N, R30E	120'	
H	Near Furnish Reservoir		0.75		42.25	S12,T2N, R30E	80'	1'
I	Railroad bridge below Rieth, OR		12.25		54.5	S13,T2N, R31E	70'	
J	Rieth, OR		0.5		55.0	S7,T2N,R32E		
K	Pendleton, OR		4.5		59.5	S2,T2N,R32E	145'	6"
L	Road bridge at grain elevator		5.75		65.25	S10,T2N, R33E	57'	15"

**Station Location (cont):**

St Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Depth
	Yds	Miles	Yds	Miles			
M		3.75		69.0	S7,T2N,R33E	69'	6"
N .66 mi below Cayuse, OR		2.0		71.0	S4,T2N, R33E	40'	4'
O 1 mi above Cayuse, OR2		2.66		73.66	S2,T2N, R34E	50'	1'
P R.R. Bridge, mi below Thorn Hollow, OR		2.67		76.33	2S6,T2N, 35E	50'	8"
Q Road Bridge Thorn Hollow		2.64		79.0	S4,T2N, R35E	66'	14"
R Tumia OR siding		2.0		81.0	S34,T3N, R35E	69'	14"
S Mouth of Meacham Creek		3.0		84.0	S30,T3N, R36E	36'	?
T Mouth of Ryan Creek		3.33		87.33	S21,T3N, R36E	45'	?

**EPA River Reach Codes:**

Station	HUC	SEG	Rmi
A	17070103	0515	0.00
B	17070103	0001	2.54
C	17070103	0001	7.31
D	17070103	0014	0.00
E*	17070103	0016	0.97
F	17070103	0018	0.00
G	17070103	0018	4.26
H	17070103	0018	4.94
I*	17070103	0021	0.00
J*	17070103	0032	0.31
K	17070103	0048	2.05
L	17070103	0049	2.41
M*	17070103	0049	8.25
N*	17070103	0049	9.51
O*	17070103	0049	12.54
P	17070103	0049	15.33
Q	17070103	0049	17.66
R*	17070103	0049	19.38
S	17070103	0057	0.00
T	17070103	0057	2.75

\* Station location is not definite and has been estimated

**Character of Bottom Between Stations:**

St	Area (yd <sup>2</sup> )	L.R.	%	M.R.	%	S.R.	%	M&S	%
A-B	436,300	372,800	85.4	3,600	0.8	1,350	0.3	58,550	13.5
B-C	362,000	126,950	35.5	34,450	9.1	22,000	6.1	178,600	49.3
C-D	410,000	183,850	44.7	42,700	10.3	24,350	6.0	159,100	39.0
D-E	705,500	39,450	5.6	108,100	15.3	171,300	24.3	386,650	54.8
E-F	338,500	12,700	3.7	88,100	26.0	150,350	44.4	87,350	25.9
F-G	280,000	24,300	8.6	116,000	41.4	108,800	38.7	30,900	11.3
G-H	36,000	4,700	13.2	14,500	40.5	13,550	38.1	3,250	8.2
H-I	658,500	111,050	16.8	185,750	28.2	231,500	35.2	130,200	19.8
I-J	22,000	8,800	40.0	8,200	37.3	5,000	22.7	---	---
J-K	192,000	69,150	36.3	82,050	42.9	37,050	19.6	3,750	1.2
K-L	193,500	35,650	18.4	83,850	43.3	54,300	28.1	19,700	10.2
L-M	105,500	22,550	21.5	40,300	38.3	31,500	30.1	11,150	10.1
M-N	86,000	19,500	22.4	33,150	38.2	21,000	25.3	12,350	14.1
N-O	81,500	43,100	52.9	27,325	33.5	11,075	13.6	---	---
O-P	85,000	51,950	61.1	23,950	28.2	9,100	10.7	---	---
P-Q	64,500	23,550	36.8	21,900	34.4	10,800	15.9	8,250	12.9
Q-R	67,500	18,100	26.7	23,550	34.9	16,350	24.3	9,500	14.1
R-S	114,500	22,900	20.0	39,300	34.4	37,850	33.0	14,450	12.6
S-T	93,500	44,250	47.3	32,750	35.0	16,150	17.3	350	0.4
	4,332,300	1,235,30	28.5	1,009,525	23.3	973,375	22.5	1,114,100	25.7

**Spawning Area Usable and Available:**

St	Distance		Area (yd <sup>2</sup> )	Available Spawning Area (yd <sup>2</sup> )		Usable Spawning Area (yd <sup>2</sup> )	Usable %
	vds	miles		(MR&SR)	% Avail		
A-B	7,400	4.2	436,300	4,950	1.1	---	
B-C	8,800	5.0	362,000	56,450	15.6	12,200	3.3
C-D	12,500	7.1	410,000	67,050	16.3	12,000	2.9
D-E	11,000	6.25	705,500	279,400	39.6	58,950	8.3
D-F	11,000	6.25	338,500	238,450	70.4	14,000	4.1
F-G	7,900	4.5	280,000	224,800	80.0	71,400	25.5
G-H	2,100	1.2	36,000	28,050	77.9	8,400	23.3
H-I	21,900	12.4	658,500	417,250	63.3	55,500	8.4
I-J	800	.5	22,000	13,200	60.0	2,800	12.7
J-K	8,300	4.7	192,000	119,100	62.0	16,900	8.8
K-L	10,300	5.9	193,500	138,150	71.4	69,575	36.0
L-M	6,400	3.6	105,500	71,800	68.0	49,650	47.0
M-N	4,100	2.3	286,000	54,150	62.7	34,175	39.7
N-O	4,900	2.8	481,500	38,400	47.1	11,675	14.3
O-P	4,600	2.6	485,000	33,050	38.8	16,450	19.3
P-Q	4,500	2.6	64,500	32,700	50.7	20,400	31.6
Q-R	3,700	2.1	67,500	39,900	59.1	26,650	39.5
R-S	6,000	3.4	114,500	77,150	65.6	51,900	45.3
S-T	5,700	3.2	293,500	48,900	52.3	36,475	39.0

**Character of Watershed (stations A-D):**

	A-B	B-C	C-D	D-E
Mountainous				
Hilly				
Rolling	x		x	x
Flat			x	
Swampy				
Wooded				
Open	x	x	x	x
%Cultivated	50	50	90	50
Character of Valley	wide	wide	4-5 mi wide	wide
Character of Banks	10' high steep	5-8' high clay/dirt	8' steep, clay	6' rock & gravel
Density of Marginal Vegetation	Sagebrush Wheat	Sagebrush Wheat, grass	Wheat grass	Grass
Erosion				
a) Banks	slight	slight	slight	none
b) Watershed	none	slight	slight	none

**Character of Watershed (stations E-H):**

	E-F	F-G	G-H	H-I
Mountainous				
Hilly				
Rolling	X	X	X	X
Flat				
Swampy				
Wooded				
Open	X	X	X	X
%Cultivated	50	50	50	70

**Character of Watershed (stations E-H cont):**

	E-F	F-G	G-H	H-I
Character of Valley	wide	1-mile	1-mi, wide, flat	.5 mi flat
Character of Banks	G', dirt rock	6', steep earth, grvl	5', steep dirt	7', gravel
<b>Density of Marginal Vegetation</b>	grass, trees		grass, wheat sagebrush	wheat, sagebrush
Erosion				
a) Banks	slight	none	slight	slight
b) Watershed	slight	none	slight	slight

**Character of Watershed (stations M-P):**

	M-N	N-O	O-P	P-Q
Mountainous				
Hilly	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
Rolling				
Flat				
Swampy				
Wooded				
Open	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
%Cultivated	75	75	10	50
Character of Valley	flat 1mi	flat .5 mi.	.25 mi wide	flat .5 mi.
Character of Banks	7' gravel	10' steep	6' rock	<b>4-12'</b> earth
Density of Marginal Vegetation	willow sumac, alder cottonwood	willow sumac, alder cottonwood	willow <b>wheat</b> cottonwood pasture	willow alder cottonwood sumac wheat fields
Erosion				
a) Banks	moderate	slight	moderate	moderate
b) Watershed	moderate	slight	moderate	moderate

**Character of Watershed (stations Q-S):**

	Q-R	R-S	S-T
Mountainous			X
Hilly	X	X	
Rolling			
Flat			
Swampy			
Wooded		X	X
Open	X		
%Cultivated	50	10	none
Character of Valley	flat .25 mi	flat .25 mi	v-shaped 300 yds
Character of Banks	6-8' earth,rock cottonwood	1-5' earth,gravel cottonwood	1-10' steep, gravel earth
Density of Marginal Vegetation	willow alder Wheat fields	willow Jack Pine pasture	willow,alder,pine, Sumac,Thornapple, cottonwood wild plum
Erosion			
a) Banks	moderate	moderate	slight
b) Watershed	moderate	moderate	moderate

**Diversions:**

1. Brownell Ditch 2.4 mi. Flow 30 c.f.s.
2. West Extension Canal 4.2 mi. 225 c.f.s.
3. Beitle Ditch 8.8 mi. 1 c.f.s.
4. Hermiston Power and Light Canal 10 Mi 30 c.f.s.
5. Maxwell Canal 15.6 mi. 95 c.f.s.
6. Dillon Canal 26.7 mi. 20 c.f.s.
7. Unnamed Diversion at Echo 27.7 mi. 1 c.f.s.
8. Western Lands and Irrigation Co. Canal 29.7 mi. 290 c.f.s.
9. Echo Feed Canal 30.9 285 c.f.s.
10. Wilson Ditch 31.4 mi. 17 c.f.s.
11. Ramos Ditch 31.4 mi. 12 c.f.s.
12. Taylor Ditch 32.2 mi. 25 c.f.s.
13. Furnish Canal 35.7 mi. 155 c.f.s
14. Slusher Ditch 39.3 mi. 10 c.f.s.
15. Unnamed diversion at Rieth 52.5 mi 1 c.f.s.

**Diversions (cont):**

16. State Hospital Diversion 58.5 mi. 8 c.f.s.
17. Walter Mill Power Canal 59.5 mi. 120 c.f.s.  
 \*Miles given are above mouth. Flows are maximum recorded for a given period, and are obtained from U.S.G.S. and State Watermaster Publications.  
 Seven small pump diversions are located at 56.4, 58.3, 58.8, 60, 60.8 61, 65.3 miles above mouth.

**Natural Obstructions:**

1. Two falls are located 1-1/2 - 1-2/4 miles above the mouth. These are 6 ft. and 3 ft. high. Both are impassable at low water.
2. Cascades are located just above the upper falls (obst.#1). The width is about 6 ft. and drop 10 ft. in 40 yards, with some jumps of 1-2 ft. high. These are probably passable at all times. The following are the major diversion dams:
3. Brownell ditch, 24 miles above mouth. Dam 2 ft. high.
4. West Extension Canal, 4.2 miles about mouth. Dam 2 ft. high.
5. Beitle Ditch, 8.8 miles above mouth, passable to fish.
6. Hermiston Power and Light Canal, 10 miles above mouth, dam 20 ft. high. Already has a fishway.
7. Maxwell Canal, 15.6 miles above mouth, dam is 4 ft. high. Needs fishway.
8. Dillon Canal, 26.7 miles above mouth, dam is 2 ft. high.
9. Unnamed diversion at Echo, Oregon. 27.7 miles above mouth. Dam is 1 ft. high.
10. Western Land and Irrigation Co. Canal, 29.7 miles above mouth. Dam is 4 ft. high. Needs fishway.
11. Echo Feed Canal, 30.9 miles above mouth. No barrier to fish.
12. Wilson Ditch, 31.4 miles above mouth. No barrier to fish.
13. Ramos Ditch, 31.4 miles above mouth. No barrier to fish.
14. Taylor Ditch, 32.2 miles above mouth. No barrier to fish.
15. Furnish Canal 35.7 miles above mouth. No barrier to fish.

16. Slusher Ditch 39.3 miles above mouth. Dam is 2 ft. high.
17. Unnamed diversion at Rieth, Oregon, 52.5 miles above mouth. No barrier to fish.
18. State Hospital Diversion 58.5 miles above mouth. Dam is 2 ft. high.
19. Walters Mill Power Canal 59.5 miles above mouth. Dam is 4 ft. high. Good fishway needed.

**Pollution:**

The only polluted area of any importance was found just below Pendleton, Oregon, where sewage, probably from the city, was draining into the river. This is probably not very bad except at extreme low water.

Other pollution in the stream is caused in a few places by erosion and irrigation making the water muddy, and by the gravel washer crusher, or dredge in Meacham Creek, which causes the river to be muddy for a few hundred yards below the mouth of the Creek. This is probably of little importance and is no worse than the same conditions in some streams where there are large salmon runs.

**Fish (salmon):**

A few salmonids were observed in the river above Pendleton. These may have been steelhead, since steelhead are reported to ascend the river in small numbers.

**Fish (other than salmon):**

Several species of rough fish are found in the lower section of the river. Bream, Carp, squawfish, and suckers are quite numerous, according to reports. A few trout are reported to remain in the lower river through the summer. Trout are expected to be more numerous in the river above Pendleton, and a few were observed during the survey.

**General Remarks:**

The Umatilla River can be divided into two portions on the basis of general characteristics. the lower river from the mouth to Pendleton extends for a distance of 59 river miles through dry, semi-arid land, with low rolling hills and a wide valley with very little vegetation except where it is under irrigation. There are numerous diversion dams and the river contains a large amount of slough area where the stream bed is composed largely of silt.

There is very little good spawning area in this portion of the stream. Some sections become completely dry in late summer.

Above Pendleton the watershed is more hilly and the stream maintains a good moderate gradient. Here the river flows through a comparatively narrow valley which becomes increasingly narrow upstream. Marginal vegetation increases and pine forests appear in the upper portion of the watershed. There are long sections of good spawning area and very few diversions. These diversions are mostly of the pump type, are screened, and take only a small amount of water. The chief detrimental factor to fish in this upper area is the lack of sufficient resting pools.

There are many problems connected with improving the Umatilla River to make it a good salmon stream. It would be necessary to screen large diversions and build or improve fishways over several dams. the flow would also have to be increased and maintained during the late summer and early fall. This might be aided by the proposed dam at Ryan Creek, which would impound water at flood stage and release it during the low water period. Since there are no salmon in the river at present, the former runs having been exterminated except for steelhead trout, some sort of restocking program would have to be devised. The Indians may also be a problem because they are allowed to fish on the reservation at all times, and the section of the river containing the best spawning area is located on the reservation. With all these problems solved (which is extremely unlikely if not impossible of accomplishment), the Umatilla could probably support large runs of salmon and steelhead.

This river has not been surveyed as yet. It was inspected by Parkhurst in 1942, who reports an impassable dam 3.7 miles above the mouth that blocks all of the upper river for salmon spawning. Most of the water is diverted for irrigation purposes, and the stream has no real value to salmon anymore. (Surveyed. 1945)

#### Temperature Data:

Sta	Miles above mouth	Date	Hour		Air Temp	Water Temp	Sky
A	---	9/18/45	12:00	P	63	63	clear
D	4.1	"	11:30	A	70	62	"
E	4.9	"	11:00	A	58	59	"
F	7.0	"	4:15	P	69	61	"
G	15.0	9/19/45	11:00	A	64	57	"
H	6.0	"	4:00	P	78	65	"
I	4.5	9/20/45	2:00	P	63	63	"
J	0.5	"	---		---	mm-	---
K	4.5	"	3:00	p	---	---	---
L	5.75	9/19/45	10:00	A	65	60	"
M	3.75	9/19/45	11:00	A	60	56	"
N	2.0	"	11:00	A	68	55	"
O	2.75	"	3:00	P	72	63	"
P	2.75	"	3:30	P	70	61	"

**Temperature Data (cont):**

Sta	Miles above mouth	Date	Hour	Air Temp	Water Temp	Sky
Q	2.75	"	3:30 P	76	63	"
R	2.0	9/20/45	10:30 A	58	56	cld,cool
S	3	"	10:45 A	58	52	rain
T	3.33	"	1:50 P	60	55	cldy

**Pool Grade:**

Sta	Dist (mi)	Resting Pools	Resting Pools/Mi	SlT1 %	SlT2 %	S2T1 %	S2T2 %	S6	Total
A-B	4.2	7	1.7	7				20	27
B-C	5.0	13	2.6	13				18	31
C-D	7.0	6	0.9	6				66	72
D-E	15.0	117	7.8	117				65	182
E-F	6.0	19	3.2	19				88	107
F-G	4.5	5	1.1	5				43	48
G-H	0.8	1	1.3	1				7	8
H-I	12.3	83	6.7	83				109	192
I-J	0.5	6	12.0	6					6
J-K	4.5	34	7.6	13		21		1	35
K-L	5.8	56	9.7	55		1		3	59
L-M	3.8	35	9.2	35					35
M-N	2.0	26	13.0	26				1	27
N-O	2.7	26	9.6	23		3		3	29
O-P	2.7	12	4.4	10		2		2	14
P-Q	2.7	17	6.3	17				1	18
Q-R	2.0	8	4.0	8					8
R-S	3.0	10	3.3	10					10
S-T	3.3	26	7.9	26				1	27
<b>TOTAL</b>	<b>87.8</b>	<b>507</b>	<b>5.8</b>	<b>480</b>		<b>27</b>		<b>428</b>	<b>935</b>

**Gradient:** (Source of Data: Station A - U.S.G.S. Topographic Station B - Umatilla Quadrangle, Station K - U.S.G.S. Water Supply proper, Station T - #964-1942/ No topographic map above St "H")

Sta	Elv	Distance (Miles)	Total Drop	Avg Drop Per Mile	Between Stations
A	296				
B	400	4.1	104	25'	A-B
C	500	4.9	100	20'	B-C
D	550	7.0	50	7'	C-D
E	670	15.0	120	8'	D-E
F	730	6.0	60	6'	E-F
G	800	4.5	70	15'	F-G
H	810	0.75	10	13'	G-H
K	1062	17.25	252	15'	H-K
T	1855	28.0	193	7"+	K-T

**Tributaries:**

Name	Side Entered On	Distance Above Mth	Width ft.	Flow c.f.s.	Value To Salmon
1. Butter Cr.	South		10	---	None
2. Birch Cr.	South		55	---	None
<b>3. McKay Cr.</b>	South		57	---	None
4. Wildhorse Cr.	North	62	--	---	Little
5. Squaw Cr.	South	83	--	dry	None
6. Meacham Cr.	South	84	--	---	Potential value
7. Ryan Cr.	South	87.3	--	---	Little

**Stream Flow Observations:**

St	Distance above mouth	Date	Flow c.f.s.	Stream Condition	Record By
A	---	9/18/45	---	low	Silliman
B	4.1	"	80	"	Hanavan
C	9.0	"	---	"	Rucker
D	16.0	"	---	"	Hanavan, Siliman
E	31.0	9/19/45	45	"	Rucker
<b>F</b>	37.0	"	100	"	Rucker
<b>G</b>	41.5	9/20/45	---	"	Silliman
<b>H</b>	42.25	"	80	"	Rucker
I	54.5	"	---	"	Hanavan
J	55.0	"	---	"	Davis
K	59.5	"	72	"	Parkhurst
L	65.25	9/19/45	80	"	Brewington
M	69.0	"	80	"	Parkhurst
<b>N</b>	71.0	"	80	"	Davis
<b>O</b>	73.67	"	80	"	Davis
P	76.33	"	80	"	Parkhurst
Q	<b>79.0</b>	"	75	"	Brewington
R	81.0	9/20/45	75	"	"
S	84.0	"	50	"	Parkhurst
T	87.33	"	50	"	"

All flows estimated

## Tucannon River

River System: Snake River  
**Name of Stream:** Tucannon River

**Date of Survey:** February 1-8, 1935

Source of Stream: North slope of Blue Mountains, Tucannon Game Preserve, Garfield County, Washington. Garfield and Columbia Counties, Washington; discharges into Snake River in the NW4 NW4, Sec 3, T12N, R37E.

**Approximate Length:** 70 miles, surveyed 60 miles

### Station Location:

St	Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
1	RR bridge at mouth		0.0	0.0		S3,T12N R37E	54'	13"
2	Bridge at Powers		2.7	2.7		S11,T12N R37E	58'	14"
3	Bridge at Starbuck, WA		2.6	5.3		S13,T12N R37E	36'	12"
4	Bridge known as Smith Hollow		3.9	9.2		S21,T12N R38E	72'	8"
5	Bridge approx 2.25 mi above St 4		3.4	12.6		S23,T12N R38E	40'	12"
6	Hwy bridge		4.4	17.0		S29,T12N,R38E	39'	11"
7	Bridge 3.6 mi by rd above St 6		5.1	22.1		S2,T11N R39E	40'	12"
8	Bridge 2.9 mi by rd above St 7		5.2	27.3		S9,T11N R40E	25'	11"
9	Bridge 4.3 mi by rd above St 8 (Marengo, WA)		5.0	32.3		S13,T11N R40E	47'	13"
10	Bridge 1.5 mi by rd above St 9		2.0	34.3		S19,T11N R41E	66'	5"
11	Bridge 2.5 mi by rd above St 10		2.8	37.1		S32,T11N R31E	35'	10"
12	Bridge 3.2 mi by rd above St 11		4.4	41.5		S12,T10N R41E	26'	14"
13	Bridge near Cummings Ck, 2.7 mi by rd above St 12		3.2	44.7		S21,T10N R41E	27'	18"
14	<b>Bridge 2.5 mi</b> by rd above St 13		2.6	47.3		S27,T10N R41E	24'	21"
15	Bridge 6 mi by rd above Umatilla Ntl Forest ranger st		6.2	53.5		S21,T9N R41E	22'	11"

**Station Location (cont):**

St	Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
16	Confl of Little Tucannon		3.1	56.6		SW1/4,S29 T9N,R41E	30'	18"
17	200' <b>above</b> confl of Panjab Ck		2.4	59.0		NE1/4,S5 T8N,R41E	35'	7"
18	Confl of Sheep Ck		5.9	64.9		NW1/4,S12 T8N,R41E	22'	8"
19	Columbia-Garfield county line		0.5	65.4		ELine,S12 T8N,R41E	24'	7"
20	Confl Bear Ck		3.2	68.6		NW1/4,S16 T8N,R42E	15'	8"

**EPA River Reach Codes:**

Station	HUC	SEG	Rmi
1*	17060107	0002	0.23
2	17060107	0002	2.14
3	17060107	0004	0.00
4	17060107	0004	2.73
5	17060107	0006	0.48
6	17060107	0007	2.33
7	17060107	0009	3.42
8	17060107	0009	7.57
9	17060107	0009	10.20
10	17060107	0009	12.92
11	17060107	0009	15.55
12	17060107	0010	0.63
13	17060107	0010	1.95
14	17060107	0011	0.97
15	17060107	0011	7.55
16	17060107	0011	9.00
17	17060107	0011	11.61
18	17060107	0011	15.71
19	17060107	0011	16.12
20	17060107	0011	19.67

\* station location is not definite and has been estimated

**Character of Bottom Between Stations:**

Station	Area (yd <sup>2</sup> )	L.R.		M.R.		S.R.		M&S	%
		%	%	%	%	%	%		
1-2			2.0		4.0		82.0		12.0
2-3			0.5		6.0		80.0		13.5

**Character of Bottom Between Stations (cont):**

Station	Area (yd <sup>2</sup> )	L.R.	%	M.R.	%	S.R.	%	M&S	%
3-4			3.0		12.0		70.0		15.0
4-5			0.0		5.0		78.0		17.0
5-6			0.5		5.5		84.0		10.0
6-7			2.0		9.0		79.0		10.0
7-8			0.5		18.0		74.0		7.5
8-9			2.0		31.0		59.0		8.0
9-10			9.0		33.0		54.0		4.0
10-11			4.0		38.0		53.0		5.0
11-12			5.0		39.0		47.0		9.0
12-13			12.0		47.0		41.0		0.0
13-14			19.0		35.0		46.0		0.0
14-15			28.0		31.0		41.0		0.0
15-16			28.0		46.0		24.0		2.0
16-17			29.0		47.0		24.0		0.0
17-18			16.0		49.0		33.0		2.0
18-19			8.0		55.0		37.0		0.0
19-20			22.0		49.0		28.0		1.0

**Spawning Area Usable and Available:**

Station	Distance (yds)	Area (yd <sup>2</sup> )	Available Spawning Area(yd <sup>2</sup> ) (MR&SR)	% Avail	When Avail	Usable Spawning Area(yd <sup>2</sup> )	% Usable
1-2			51,000				
2-3			49,000				
3-4			87,000				
4-5			84,000				
5-6			88,000				
6-7			86,000				
7-8			90,000				
8-9			79,000				
9-10			29,000				
10-11			19,000				
11-12			58,000				
12-13			47,000				
13-14			38,000				
14-15			83,000				
15-16	5,510		36,806	70.0			
16-17	4,196		33,170	71.0			
17-18	10,400		80,596	82.0			
18-19	6,047		917	91.0			
19-20	5,600		27,220	77.0			

**Spawning Area Unavailable and Unusable:** none

**Character of Watershed:**


---

Mountainous x

Hilly

Rolling

Flat

Swampy

Wooded x

Open

Cultivated (%) 10%

Character  
of Valley

Character  
of Banks

Density of  
Marginal  
Vegetation

Erosion  
a) of banks

b) of watershed

**Diversions:** Irrigation

D 1.	N.W.4	<b>sec.</b> 19,	T.12N.,	R.38E.	L.B.	Starbuck Power Dam
D 2.	s.w.4	<b>sec.</b> 20,	T.12N.,	R.38E.	R.B.	
D 3.	s.w.4	<b>sec.</b> 22,	T.12N.,	R.38E.	R.B.	Smith Hollow
D 4.	s.w.4	<b>sec.</b> 23,	T.12N.,	R.38E.	R.B.	No data
D 5.	S.W.4	<b>sec.</b> 19,	T.12N.,	R.39E.	R.B.	Delaney Ditch
D 6.	S.E.4	<b>sec.</b> 19,	T.12N.,	R.39E.	L.B.	
D 7.	N.E.4	<b>sec.</b> 32,	T.12N.,	R.39E.	L.B.	Lower De Ruwe
D 8.	s.w.4	<b>sec.</b> 34,	T.12N.,	R.39E.	L.B.	Jackson
D 9.	N.E.4	<b>sec.</b> 3,	T.11N.,	R.39E.	L.B.	De Ruwe
D 10.	N.E.4	<b>sec.</b> 2,	T.11N.,	R.39E.	L.B.	Brown
D 11.	S.W.4	<b>sec.</b> 1,	T.11N.,	R.39E.	L.B.	
D 12.	S.W.4	<b>sec.</b> 5,	T.11N.,	R.40E.	L.B.	Upper Jackson
D 13.	N.W.4	<b>sec.</b> 10,	T.11N.,	R.40E.	L.B.	
D 14.	s.w.4	<b>sec.</b> 11,	T.11N.,	R.40E.	L.B.	
D 15.	s.w.4	<b>sec.</b> 18,	T.11N.,	R.41E.	L.B.	
D 16.	N.E.4	<b>sec.</b> 19,	T.11N.,	R.41E.	L.B.	Coffins

**Diversions (cont): Irrigation**

D 17. N.W.4 sec. 19, T.11N., R.41E. R.B.  
 D 18. N.W.4 sec. 30, T.11N., R.41E. L.B.  
 D 19. N.W.4 sec. 32, T.11N., R.41E. L.B. Donahue  
 D 20. S.E.4 sec. 32, T.11N., R.41E. L.B.  
 D 21. N.W.4 sec. 9, T.10N., R.41E. R.B.  
 D 22. S.E.4 sec. 9, T.10N., R.41E. L.B. Rurrel grade  
 D 23. N.W.4 sec. 22, T.10N., R.41E. L.B.  
 D 24. S.E.4 sec. 27, T.10N., R.41E. L.B.  
 D 25. N.W.4 sec. 35, T.10N., R.41E. L.B.  
 D 26. N.W.4 sec. 2, T.9N., R.41E., R.B.  
 D 27. S.W.4 sec. 2, T.9N., R.41E., R.B.  
 D 28. S.E.4 sec. 3, T.9N., R.41E., R.B.  
 D 29. S.E.4 sec. 10, T.9N., R.41E., R.B.  
 D 30. N.E.4 sec. 21, T.9N., R.41E. R.B. Hopkin's Mill Dam  
 D 31. N.W.4 sec. 5, T.8N., R.41E.

**Irrigation Diversions (Descriptions of)**

(See accompanying tables for location of stations and diversions.)

**Between Stations**

1-2 None

2-3 None

3-4 Diversion 1 and 2

Diversion 1: Starbuck power and irrigation diversion, left bank, Sec.19, T.12N, R.38E, approximately 1 1/2 miles above station 3. NOTE; Dam 4-5 feet high, having a two stage board apron spillway with a by pass for fishway situated at the extreme right end of dam. Diversion intake at left bank, with an average width of approximately 10 feet to power house at Starbuck. It is estimated that the average depth of this ditch would be about 3-4 feet present diversion 66.6 sec ft (Feb. 3, 1935 flow 55.5 sec ft) assumed differences in flow 11. sec ft due to irrigation diversions operating on power ditch. No protective devices present in ditch to prevent fish passing down into it. Control gates are located at the intake and at a point 300 feet below the intake water from power plant returned to stream 1 mile below intake.

Diversion 2: Irrigation ditch, right bank, width 40" average water depth 5" present diversion 1.93 set ft.

4-5 Diversion 3

Diversion 3: Irrigation ditch, left bank, in Sec.21, T.12N, R.38E, about 3/4 of a mile above station 4. Width 23", average water depth 4" present diversion 1.8 sec ft. No protective devices

in the ditch.

5-6 Diversion 4, 5, and 6

Diversion 4: Irrigation Ditch, right bank, Sec.23, T.12N, R.38E, 600 yards above station 5. No water being diverted. No diversion in river or protective devices in ditch.

Diversion 5: Irrigation ditch, right bank, approximately 1/2 mile above the confluence of Pataha Creek and Tucannon River in Sec.19, T.12N, R.39E. NOTE; This diversion dam is 1 1/2 feet high at its highest point in crest. The dam forms no obstruction to ascending fish. Width of dam 48 feet. Ditch 2 feet wide by 1 foot deep average water depth 4" present diversion 2.87 sec ft. No screens in flume or ditch.

Diversion 6: Irrigation ditch, left bank, in Sec.19, T.12N, R.39E, width 5 1/2' average water depth 3 present diversion 3.31 sec ft. The intake is situated immediately under the bridge on the downstream side and abuts a deep channel of the river. A control gate is located here to regulate the flow of water passing into the ditch. Ditch about 2 feet wide. Approximately 3/4 of a mile downstream from intake an irrigation return ditch is located and it is believed to be a part of the ditch system described above.

6-7 Diversion 7,8,9

Diversion 7: Irrigation ditch, left bank, in Sec.32, T.12N, R.39E, 875 yards above station 6, width 6' average water depth 11" present diversion. Ten foot diversion wing projects into river. Flow controlled by head gates at dam 2 feet high.

Diversion 8: Irrigation ditch, left bank, n SW quarter of Sec.34, T.12N, R.39E, width 6' average, and water depth 7" present diversion 6.0 sec ft. During the summer months water is diverted from river into wide ditch, from thence carried to a small ditch partially fed by springs and distributed to neighboring land in sec. 33. A diversion wing dam is erected in the river during the summer.

Diversion 9: Irrigation ditch, left bank, in Sec.3, T.11N, R.39E, on property known as the De Ruwe Ranch, width 4' average water depth 7" present diversions 2.06 Sec ft. NOTE; Concrete diversion dam 5 feet high with about a 125 foot crest from bank to bank. The irrigation intake is situated at the extreme left end of dam. This intake is 3 feet wide and about 1 1/2 feet deep. A 10 foot opening for spillway is situated at the right end of the crest, with a 3 1/2 - 4 foot drop to river below. Approximately 12 inches of water was being discharged through the spill at the time of examination ( Feb. 5 1935). The old fish ladder at the extreme right end of dam now covered with mud and willows. Indications point to the fact that during irrigation most of the water passing

down this channel is diverted to the irrigation intake. This is accomplished by placing an obstruction at the spill. It was reported that this is the case during the summer months. Mud is accumulating in the forebay of the dam and is already crest high at the left wing. No screens in the ditch.

7-8 Diversion 10, 11, 12

Diversion 10: Irrigation ditch, right bank, in Sec.2, T.11N, R.39E, 920 yards above station 7, width 30" average water depth 5" present diversion .61 sec ft. Ditch 2 feet wide by 2 feet deep. No diversion wing dam and no protective device.

Diversion 11: Irrigation ditch, left bank, width 3' average water depth 2 1/2" present diversion 1.48 sec ft.

Diversion 12: Irrigation ditch, left bank, in Sec.5, T.11N, R.40E. Irrigation diversion wing dam of rock and brush extends 50 yards parallel to stream. Average height 2 feet but due to position of diversion in stream would not prohibit passage of fish upstream in low water period. Ditch 3 feet wide, 1 1/2 feet deep average water depth 7" present diversion 2.08 sec ft. No protective devices.

8-9 Diversion 13, 14, 15, 16

Diversion 13: Irrigation ditch, left bank, in Sec.10, T.11N, R.40E, 206 yards above station 8. Ditch 3 foot wide by 1 foot deep average water depth 6" present diversion 3.83 sec ft. No diversion wing dam and no protective devices.

Diversion 14: Irrigation ditch, left bank, in Sec.11, T.11N, R.40E, width 4' average water depth 8" present diversion 6.16 sec ft. A temporary diversion wing dam present in the river made of brush, logs and rocks. The intake at the diversion is about 7 feet wide and 2 feet deep. no protective devices.

Diversion 15: Irrigation ditch, left bank, width 50" average water depth 4", present diversion 0.20 sec ft.

Diversion 16: Irrigation ditch, left bank, width 4' average water depth 4 1/2 present diversion 0.21 sec ft.

10-11 Diversion 17, 18

Diversion 17: Irrigation ditch, right bank, Sec.19, T.11N., R.41E. about 150 yards above station 10. No diversion wing dam in river. Ditch is approximately 2 feet wide and 1 foot deep average water depth 4" present diversion 1.22 sec ft. No protective devices.

Diversion 18: Irrigation ditch, left bank, in sec. 30,

T.11N., R.41E. Diversion made of rocks and planks extending 15 feet diagonally upstream. Permanent pylon in stream indicates that a temporary diversion wing dam extends upstream an additional 40 feet. Irrigation ditch 4 feet wide and 2 feet deep average water depth 6" present diversion 2.02 sec ft. No protective devices.

**11-12** Diversion 19, 20, 21

Diversion 19: Right bank in Sec.32, T.11N, R.41E, about 60 yards **above** station 11. Ditch 2 feet wide by 2 feet deep no water being diverted. No diversion wing dam present and no screens in ditch.

Diversion 20: Irrigation ditch, left bank, width 22" average water depth 2 1/2" present diversion 0.49 sec ft.

Diversion 21: Irrigation ditch, right bank, width 5' average water depth 6" present diversion 6.17 sec ft.

**12-13** Diversion 22

Diversion 22: Irrigation ditch, left bank, in Sec.9, T.10N, R.41E, width 52" average water depth 4" present diversion 6.1 sec ft. Intake ditch 7 feet wide. 2 1/2 feet deep. No diversion wing dam in River. No protective devices in ditch.

**13-14** Diversion 23, 24

Diversion 23: Irrigation ditch, right bank, in NW quarter of Sec.22, T.10N, R.41E about 1900 feet above station 13, width 5', average water depth 3 1/2" present diversion 0.69 sec ft. Intake 6 feet wide and approximately 1 foot deep. Small dam about 1 foot high diverts water from right channel of the river. No protective devices in the ditch.

Diversion 24: Irrigation ditch, left bank, width 30", average water depth 3" present diversion 0.95 sec ft.

**14-15** Diversion 25, 26, 27, 28, 29

Diversion 25: Irrigation ditch, left bank, in Sec.35, T.10N, R.41E, about 2100 feet above station 14, width 3' average water depth 7 1/2" present diversion 3.73. Intake at river 7 feet wide and 6 inches deep. No protective devices, no diversion wing dam in stream.

Diversion 26: Irrigation ditch, right bank, n Sec.2, T.9N, R.41E, 2 feet wide by 2 feet deep average water depth 4 1/2", present diversion 0.78 sec ft. No protective devices. Temporary diversion wing dam in stream. Approximate length 40 feet.

Diversion 27: Irrigation ditch, right bank, 3 feet wide and

1 foot deep average water depth 4 1/2", present diversion 0.83 sec ft. No diversion wing dam in stream. No protective device in ditch.

Diversion 28: Irrigation ditch, right bank 2 foot wide by 1 foot deep, average water depth 1 1/2", present diversion 0.42 sec ft. No diversion wing dam in river. No protective device in ditch.

Diversion 29: Irrigation ditch, right bank, width 40" average water depth 3 1/2", present diversion 0.57 sec ft. No screens in ditch, no diversion wing dam in river.

**14-15** Diversion 30, 31

Diversion 30: Irrigation ditch, right bank a short distance above Hopkins Mill in Umatilla National Forest. Ditch 2 foot wide and 2 feet deep average water depth 3 1/2", present diversion 0.95 sec ft. No diversion wing dam in stream, no protective device in ditch.

Diversion 31: Irrigation ditch, left bank, width 17" average water depth 1 1/2", diversion not determined. No headgate. No protective devices. No diversion dam.

Total diversion of water for irrigation 72.1 sec ft

Total diversion of water for power and returned to stream 55.6

Total diversion for power and irrigation from Tucannon River at time of secondary survey (June 5 - 8, 1935) 127.70 sec ft.

**Artificial Obstructions:**

1) Concrete dam installed by County Game Commission to prevent migration of suckers up the creek. No fishway installed at dam. Dam does **not** prove menace to upstream migrants during high water but during periods of extreme low water during the summer months it is doubtful if fishes are able to pass this obstruction.

2) Efficiency of ladder is dependent on the amount of water allowed to pass from the forebay of the dam. Probably the majority of steelheads will pass over the dam at the spillway during high water. Practically all of water in creek diverted and utilized for water supply and irrigation from this point.

**Natural Obstructions:** None

**Fluctuations in Water Level:**

<u>Location</u>	<u>Sec. ft</u>	<u>Date</u>	<u>Feet variation</u>
at sta 1	180.47	2/2/35	5 - 8

Causes: Heavy precipitation and snow in Blue Mountains

**Pollution:** None

**General Remarks:**Survey:

Mouth of log bridge one mile above Ranger station. Umatilla National Forest.

Topography:

Below Marengo the Tucannon River flows thru a valley varying from one to two miles in width. The valley proper is devoted to the raising of alfalfa and utilized for winter pasturage of sheep. Wheat is raised on the high plateaus bordering the valley. The river is bounded by a fringe of cottonwood, alder, willow and miscellaneous brush.

Above Marengo the valley narrows and the side slopes become more precipitous. The entire bottom land is densely wooded principally with conifers. Numerous groves of cottonwood and alder are present in the lower stretches of this area. The ranches in the valley provide the winter range for small herds of cattle. There are some scattered alfalfa fields but these are not abundant.

Character of the river:

Below the Highway Bridge the river is broad and not extremely fast. There are numerous excellent spawning beds. The entire area has abundant spawning gravel and many good riffles. Above the Highway Bridge the river is extremely fast and the width is relatively narrow. From this point to the termination of the survey the stream contains numerous small cascades and rapids but good spawning areas are present thru out its course. Pools are not abundant in this area but they are usually spaced at convenient distances for migrating fish.

During the spring freshets the stream becomes extremely fast and high. A rise of seven feet above average has been reported. At such times it will flood practically the whole valley and may change the entire river channel for considerable distances.

### Irrigation and Obstructions:

See "Report of stream survey of lower portion of Tucannon River" for irrigation diversions and artificial obstructions. There are no natural obstacles in the area surveyed.

At station 15 the valley floor is 1/4 mile wide. This decreases gradually to station 19 where it enters a v shaped valley, continuing so to station 20. The valley walls are steep, the north slopes being forested by conifers, the south slopes sparsely so to station 17. From there up the forest is continuously heavy.

From stations 15 - 19 the banks are well lined with pines, cottonwoods and willows. Above this point deciduous trees give way to pines and fir. No cultivation occurs above station 15, though a few ranches are present.

Between stations 15 - 19 the current velocity is about 3' per second. Above this to station 20 the velocity increases to 4' - 5' per second.

Excellent spawning beds are continuous from station 15 to within one mile of station 20, small rubble averaging about 30%, medium 50%, and large 20%. Above this, however, large rubble predominates, running about 70%.

Besides the two obstructions mentioned above, the De Ruwe dam, located in the N.E.1/4 section 3, Township 11N., Range 39E., is worth of note. This dam has a height of approximately 5 feet and has an estimated crest of 125 feet. It was originally built and used to supply power for an electric generator plant. This plant has been torn down for several years, and the dam at present is used for an irrigation diversion dam.

The ditch intake is at the extreme left of the dam, and is 3 feet wide by 1.5 feet deep. A 10 foot opening is located at the right end of the dam. The old fish ladder, located to the right of the spillway, is filled with mud and a growth of willows, and is useless. Reports are that during irrigation months an obstruction is placed across the spillway to divert water into the irrigation ditch, which is totally unprotected by screens or other devices.

The forebay has become filled with mud and debris, crest high at the take end. Mr. Renowentz reports that he has observed chinooks making ineffectual attempts to surpass this dam, and that, at least in previous years, many fish were taken there by poachers, either by spearing or gaffing. This statement was corroborated by other individuals interviewed. Local sports fishermen seemed hearty in their condemnation of the obstruction. Certain it is that the intake offers a serious menace to seaward migrants, or do most of the intakes on the river. On June 6, 1935 two rainbows, 6 inches and 7 inches respectively, were seen taken from the Jackson Irrigation ditch near station 7. Many other salmonids were seen in this and other ditches. Large numbers of chubs and daCe were also seen in the ditches below station 15. No other species of fish were reported or observed in this area. In the stretches adjacent to the confluence of Sheep Creek many lampreys (Lampetra planeri) were observed in the process of nest building and spawning. This

entire area is extremely good for the propagation and maintenance of Salmon runs. Being in the National Forest preserve it offers few obstacles in the way of diversions, pollution, or decreased water run off.

According to Mr. Renowentz, mayor of Dayton, Washington who has been an ardent sport fisherman of that region for 35 years: the rainbow fishing in the Tucannon is continuously good, especially in the upper waters. He continues ' The entire Tucannon is an excellent Steelhead stream, including Bear Creek and the Panjab. Chinook fishing has always been excellent, especially from Shady Lane (just above station 14) to the confluence of Sheep Creek, and in the Panjab. He reports, however, an "unquestionable and alarming decrease" in both the steelhead and chinook runs, particularly the latter, and predicts a continual decrease unless salvage work is undertaken immediately.

For this depletion he blames, almost entirely, the Starbuck Power dam at Starbuck, Washington. This obstruction he brands as a veritable death trap to fishes attempting to ascend the stream. Many fish either die fighting the dam, or are taken by poachers in the attempt (true particularly in former years). He believes this dam to be destructive also to seaward migrants.

In addition he insists that the power plant which operates from this diversion is no longer necessary to Starbuck or the surrounding community, and he advocates its complete removal.

One important item in the chinook run, according to Mr. Renowentz, is the partial blocking of the Tucannon at the point of its convergence with the Snake River. This is a natural deposit of silt and rubble which he believes should be dredged or dynamited occasionally.

As a final item Mr. Renowentz admits the loss of innumerable seaward migrants in unscreened diversions, particularly **by** the Starbuck dam diversion which had a measured flow of 66.6 cfs. In general all of the persons interviewed concurred with the opinions of Mr. Renowentz as cited above.

### **Fish Population:**

A sample of fish taken from an irrigation ditch near station 15 on June 8, 1935, consisted of nine chinook fry (Onchorhynchus tshawytscha). Below station 15 many chubs and dace were seen, while suckers are reported to be numerous in the lower waters.

Steelhead appear in the river in January, February, March and April with a small fall run also reported. Mr. Wouton, county game protector, confirmed these runs and reported that steelhead will spawn in any desirable spot from station 15 to within a short distance of Bear Creek. Chinook also utilize this same region for spawning (usually about the 15th of August) as do rainbows, eastern brooks, and Dolly Vardens. Although the number of fish entering the river is not as great as former years a considerable run is still present. The first steelhead to appear in the Tucannon this

year was about the 20th of January. The last large run of chinook salmon was reported to be in 1915. At that time it was estimated that five hundred fish passed up the river per day during the spawning season. At the present time fifty fish are reported to migrate up the river each day. As the run lasts over a period of two months (May and June) this would bring the total of the present run to approximately three thousand fish. Section 9, Township 11 N., Range 10E. is reported to be the lower limits of the chinook spawning area.

In 1929 a run of silver salmon entered the river in October. According to Mr. Jackson, rancher. This is the last time that silvers have been observed.

Until two or three years ago dog salmon were reported migrating up the river to spawn in the fall months. It is doubtful if these were 0. keta but more than likely fall chinooks.

Trout are plentiful in the upper Tucannon. Rainbow, eastern brook, and Dolly Varden were reported to be present. The eastern brook were planted in this stream and are not native to the region.

Chubs and suckers spawn in the lower river. They are present in large numbers as both fry and adults.

This stream in former years supported an immense fish population and undoubtedly with a few stream improvements could be gradually returned to its former productivity.

#### Temperature Data:

Station	Date	Hour	Air	Water	Sky
2.	2/2/35	1:45 PM	43.5 F	43 F	overcast
3.	2/3/35	12:45 PM	41 F	43 F	overcast
4.	2/3/35	3:25 PM	38 F	43 F	overcast
7.	2/6/35	4:05 PM	42 F	43 F	overcast
10.	2/7/35	8:40 AM	36 F	40 F	overcast
11.	2/7/35	9:25 AM	35 F	40 F	overcast
13.	2/8/35	9:15 AM	32 F	36 F	clear
16.	6/18/35	4:05 PM	73 F	52 F	clear
17.	6/19/35	4:15 PM	63 F	53 F	cloudy
18.	6/19/35	11:20 AM	57 F	47 F	clear
19.	6/19/35	10:45 AM	57 F	47 F	partly cloudy
20.	6/19/35	8:15 AM	56 F	44 F	cloudy

The temperature varied from 52 F (6/18/35 - Air 73 F)  
At station 16 to 44 F at station 20 (6/19/35 - Air 56 F)

**Pool Grade:**

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	SlT1 %	SlT2 %	S2T1 %	S2T2 %	S6	Total
1-2	2.7	7	2.6			1	6		7
						14.3	85.7		
2-3	2.6	10	3.8				10		10
							100.0		
3-4	3.9	5	1.3		2	2	1		5
					40.0	40.0	20.0		
4-5	3.5	6	1.7			1	5		6
						16.7	83.3		
5-6	4.3	6	1.4	1	1		4		6
				16.7	16.7		66.7		
6-7	3.9	19	4.9			3	16		19
						15.8	84.2		
7-8	5.2	17	3.3	1	1	5	10		17
				5.9	5.9	29.4	58.8		
8-9	4.8	9	1.9			2	7		9
						22.2	77.8		
9-10	2.9	4	1.4			1	3		4
						25.0	75.0		
10-11	2.8	8	2.9	2		4	2		8
				25.0		50.0	25.0		
11-12	3.3	17	5.2	1		5	11		17
				5.9		29.4	64.7		
12-13	3.1	5	1.6	1		2	2		5
				20.0		40.0	40.0		
13-14	2.6	11	4.2	2		4	5		11
				18.2		36.4	45.5		
14-15	6.0	28	4.7	1		12	15		28
				3.6		42.9	53.6		
15-16	2.5	21	8.4	1		6	14		21
				4.8		28.6	66.7		
16-17	2.4	7	2.9				7		7
							100.0		
17-18	5.9	0	no resting pools						
18-19	0.5	0	no resting pools						
19-20	3.9	0	no resting pools						
<b>Tot</b>	<b>66.9</b>	<b>180</b>	<b>2.7</b>	<b>9</b>	<b>6</b>	<b>47</b>	<b>118</b>	<b>1004</b>	<b>180</b>
				<b>5.0</b>	<b>3.3</b>	<b>26.1</b>	<b>65.6</b>		

**Gradient:**

Station 1-18 Distance; 62.5 miles, Gradient; moderate

Station 18-20 Distance; 4.4 miles, Gradient; moderate to steep

No topographic map

**Supplementary Report:**

## Report of Stream Survey of Lower Portion of Tucannon River

The Tucannon River is subjected to a considerable increase in flow during the spring freshets. At the time of the survey, February 1-8, 1935, the river was estimated to be eight to ten inches above its normal height. Its maximum height is reached during early spring and a reputed rise of 6 to 7 feet above normal has occurred many times. During this period the river escapes its banks and often changes its course for distances of one half to one mile from its original channel. It is principally for this reason that permanent irrigation dams are not erected, instead, temporary diversion wing dams are installed during the summer months and then removed after the irrigating season has been concluded. There are a few permanent diversion dams but these are the exception rather than the rule.

The origin of the intakes to the irrigating ditches is extremely difficult to locate because of the conditions already mentioned. Too, it is the practice at times to divert water from the main river during the summer into side branches that are now dry and it is for this reason also that a factor of uncertainty arises in locating irrigation diversions. Very few of the permanent ditches in this region are found in the immediate vicinity of the river, these can only be definitely located a considerable distance inland, sometimes several hundred yards from the point of origin in the river.

Numerous spring branches are present along the course of the river. The waters from these are usually diverted for irrigation. Between stations 6 and 7 there is a spring branch typical of this condition. The springs arise in the bottom land near the river and the water is diverted to the irrigation ditch with an additional flow added from the diversion in the main river during the summer months. This particular spring branch is reported to contain a large population of trout and other fishes of fingerling size.

It was virtually impossible to locate the irrigation returns, due mainly to the fact that irrigation was not being carried on at the time of the examination. It is doubtful if by passes are used to divert water from the entrances of permanent ditches to the main river during the irrigating season. All waters diverted into the permanent ditch are needed for irrigation in this semi arid region. In the lower course of the river, especially below the town of Marengo, one ditch may irrigate lands of three or more ranches, usually not less than two ranches are thus served by this cooperative method. It is doubtful if the ground return from these ditches is very great.

The power and irrigation ditch at Starbuck is reported to be a destructive factor for fish life. Salmon and steelhead enter the

tail race of the power house. it was reported that when a "shut down" at the power plant occurs these adult fish are taken from the tail race by local inhabitants. The number of fish taken in this manner is unknown, but it was inferred that a goodly number are caught each season. It was estimated that the discharge in the tail race was 60 s.f. With a discharge of 60 s.f. a good attraction is created at the confluence of the tail race and the river for ascending fishes. During periods of low water the channel of the main river is reported to be very shallow and it is natural that fishes would have a tendency to enter the power house tail race. The section of the river between the power house intake and the outlet of the tail race is virtually dry during the summer season, proving a menace to any upstream migrants.

Throughout the entire area of the river surveyed there were no protective devices noted in the irrigation ditches to prevent migratory or other fishes from passing into the alfalfa fields to perish.

## Pataha Creek

**River System:** Tucannon River

**Name of Stream:** Pataha Creek

**Date of Survey:** April 28, 1937

**General Remarks:**

This is a creek about 35 miles long which discharges into the Tucannon near Delaney when seen on 4-28-37 the volume estimated was 4 c.f.s. According to the residents the creek nearly always dries up during the summer. Cover is good in scattered localities but is sparse, in general. The creek flows through a fairly broad valley utilized in wheat growing and also for sheep grazing. Several orchards are also present. In the lower portion the gradient is quite moderate and good spawning gravel is scarce due to mud deposits. Its upper portion becomes steeper and drains pine forests. No fish runs are present. A few trout are taken in the headwaters near the timber line. Practically useless to salmon. Trout (rainbows) in headwaters.

## Cummings Creek

**River System:** Tucannon River  
**Name of Stream:** Cummings Creek

**Date of Survey:** June 18, 1935

**Source:** Section 36, T.9N., R.41E. Tucannon Game Preserve.  
 Eastern Columbia County, Washington. Discharge; Tucannon  
 River, N.W.4 sec. 21, T.10N., R.41E.

**Total Length:** 12 miles, surveyed 7.0 miles

**Station Location:**

Sta	Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
A	Confluence with Tucannon		0.0		0.0	NE1/4, S1 T10N, R41E	11'	0.4'
B	First line above sta A		1.4		1.4	NE1/4, S22 T10N, R41E	10'	0.4'
C	End of road, 2 miles above Tucannon road		1.1		2.5	SW1/4, NE1/4 T10N, R41E	10'	0.4'
D	Umatilla Ntl Forest boundry		2.7		5.2	SE1/4, S35 T10N, R41E	9'	0.3'
E	3,165 yards above station "D"		1.8		7.0	DNW1/4, S12 T9N, R41E	6'	0.15'

**EPA River Reach Codes:**

Station	HUC	SEG	Rmi
A	17060107	0012	0.00
B*	17060107	0012	0.00
C	17060107	0012	1.48
D	17060107	0012	3.60
E	17060107	0012	3.60

\* Station location is not definite and has been estimated

**Character of Bottom Between Stations:**

Station	Area (yd <sup>2</sup> )	L.R.		M.R.		S.R.		M&S	
			%		%		%		%
A-B			39.0		41.0		20.0		0.0
B-C			15.0		50.0		35.0		0.0
C-D			22.0		53.0		25.0		0.0
D-E			27.0		46.0		27.0		0.0

**Spawning Area Usable and Available:**

Station	Distance (vds)	Area (yd <sup>2</sup> )	Available Spawning Area (yd <sup>2</sup> ) (MR&SR)	% Avail	When Avail	Usable Spawning Area (yd <sup>2</sup> )	% Useable
A-B	2,460		4,500	61.0			
B-C	1,883		4,785	84.7			
C-D	3,900		9,375	78.1			
D-E	2,637		4,093	72.9			

**Spawning Area Unavailable:** None

**Character of Watershed:**


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Mountainous	<b>X</b>
Hilly	
Rolling	
Flat	
Swampy	
Wooded	<b>X</b>
Open	
Cultivated %	0.2
Character of Valley	
Character of Banks	
Density of Marginal Vegetation	
Erosion a) of Banks	
b) of Watershed	

**Irrigation Diversions:**

D 1. N.W.4, N.W.4, sec. 22, T.10N., R.41E  
 D 2. N.W.4, N.E., sec. 22, T.10N., R.41E

**Irrigation Diversions (Descriptions of):**

Diversion 1: Above station A 812 paces. 0.00 sec. ft.  
 Irrigation ditch, right bank, width 16", depth 18"; no water being diverted. No headgate. No protective devices. Temporary rock diversion dam 27' long extends diagonally across stream.

Diversion 2: Above station A 1,675 paces. 1.79 sec. ft.  
 Irrigation ditch, left bank, width 16", average water depth 1 1/2", present diversion 1.79 sec. ft. No headgate. No protective devices. Temporary rock wing dam extends 2/3 distance across creek.

Total diversion of water for irrigation from Cummings Creek at time of survey 1.79 sec. ft.

**Artificial Obstructions:** None

**Natural Obstructions:** None

**Fluctuation in Water Levels:**

<u>Location</u>	<u>Str Flow</u> <u>c.f.s.</u>	<u>Date</u>	<u>Feet Variation</u>
above sta. C	7.78	6/18/35	3' - 4'

Causes: Rainfall, melting snow, etc.

**Pollution:** none

**General Remarks:**

The bottom, throughout, is compound of approximately 30% small rubble, 50% medium rubble, and 20% large rubble and boulders. Riffles are continuously good. The temperature, June 18, 1935 was 50 F at the mouth ( Air 72.0 F), 53.0 F at stations B and C (Air 73.0 F), and 50.0 F at station D (Air 68.0 F). In all 14,704 square yards of small rubble, 8,049 of medium rubble, and 7,887

square yards of large rubble and boulders were found on the part surveyed.

On June 18 the flow, as taken at station C, was 7.8 cfs.

#### Diversions and Obstructions:

Two irrigation diversions occur in the lower mile. Each of these ditches has a rock dam across the stream which offers no obstruction though neither ditch is screened or protected.

#### Fish Population:

A good migration of steelheads is reported for this stream, but the chinook run has been nil in recent years. In past years when the stream was open to sport fishing it yielded good catches of rainbow, and steelhead. Many rainbows were observed in the upper reaches. They ranged from fry to about eight inches in length.

A sample of fish was taken from one irrigation ditch. It consisted of eight steelhead fry and one bullhead (Cottus klamathensis). No other fish were reported or seen. The creek is closed to all fishing, and, though it is small, should be a good fish producer.

#### Topography:

The lower two miles of the valley is wide enough to support three small farms which resort to a little truck gardening small grains and some alfalfa. The valley floor here is approximately one quarter of a mile wide, and extremely rocky. The valley walls have a pitch of about 45 degrees, and are sparsely covered with stunted conifers and bunch grass. The plateaus above support some dry wheat farming.

From the end of the road to station E the valley becomes narrower and the gradient steeper, until at station E there is no level valley floor, and the stream is excessively turbulent and small.

Between stations A and C there is a heavy growth of willows, cottonwood and miscellaneous brush. This gives away slowly to pine (Pinus ponderosa) which prevail (with miscellaneous underbrush). Far up into the National Forest Preserve. Near station E these become replaced with Fir (Pseudotsuga toxifolo) and some spruce (Picea engelmoni).

#### Character of River:

In the lower two miles the stream is narrow and shallow, with good pools occurring at intervals of over one hundred yards. The

spawning beds between these pools are of excellent quality. From c upwards the stream is larger and progressively narrower and more turbulent, while the pools become smaller but more numerous. Between stations D and E the pools were estimated to occur each 30 feet. The spawning areas continue good to station E, though the stream is too small to be considered as very important above that point.

#### Temperature Data:

Sta	Date	Hour	Air	Water	Sky
A	6/18/35	8:15 AM	72.0 F	50.0 F	partly cloudy
B	6/18/35	10:05 AM	75.5 F	53.0 F	clear
C	6/18/35	12:35 PM	76.0 F	53.0 F	clear
D	6/18/35	11:10 AM	68.0 F	50.0 F	cloudy
E	6/18/35	10.10 AM	64.0 F	47.0 F	partly cloudy

#### Pool Grade:

St	Rst Pls	Rest Pls/Mi	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S3T1 %	S3T2 %	S3T3 %	S4T1 %	S4T2 %	S4T3 %	S6
A-B 11.4 mi)	22	15.7	4	1			6		6	4		1	22
			18.1	4.6			27.3		27.3	18.1		4.6	
B-C (1.1 mi)	16	14.5	1	1			5	1	6	1	1		16
			6.2	6.2			31.4	6.2	37.6	6.2	6.2		
C-D (2.7 mi)	7	2.6			1		2	2	2				341
					14.2		28.6	28.6	28.6				
D-E			(no resting pools, 1.8 mi)										320
<b>TOT</b>	<b>45</b>	10.9	5	2	1		13	3	14	5	1	1	699
			11.1	4.4	2.2		28.9	6.7	31.2	11.1	2.2	2.2	

#### Gradient:

Station A-D Distance is 5.2 miles, Gradient is moderate.

Station D-E Distance is 1.8 miles, Gradient is steep.

## Little Tucannon River

**River System:** Tucannon River  
**Name of Stream:** Little Tucannon River

**Date of Survey:** April 28, 1937

**General Remarks:** Mouth NE4,SE4, Sec 30, T9N, R41E. Stream flows through narrow canyon thickly timbered. Steep gradient results in many cascades. Bottom composed of more than 60% large rubble. A few small pools in section seen a short distance above mouth. Flowing 3-4 cfs snow runoff - maintains small flow through the summer. Unimportant as a steelhead stream because of its small size and few spawning areas. Probably a fair trout producer. 11 am - light snow, Air 42 Water 40. Little Tucannon River above confluence - air 42 , water 40 snowing, 3-4 sec ft (Cascades) LR 60%, steep gradient, heavily timbered, flows all year, no trout seen.

## Panjab Creek

**River System:** Tucannon River

**Name of Stream:** Panjab Creek

**Date of Survey:** June 19. 1935

**Source:** Oregon Buttes, Umatilla National Forest. Umatilla National Forest and Tucannon Game Reserve, Southeastern Columbia County, Washington.

**Total Length:** 10 miles, surveyed 4 miles

**Stations:**

Sta	Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
A	Confluence of Panjab and Tucannon	0.0		0.0		E1/4, S5 T8N, R41E	19'	0.6'
B	Confluence of Meadow Creek		2.6		2.6	NE1/4,S18	15'	0.5'
C	Confluence of Turkey Creek		1.4		4.0	NE1/4,S20 T8N, R41E	91	0.5'

**EPA River Reach Codes:**

Station	HUC	SEG	Rmi
A	17060107	2135	0.00
B	17060107	2147	0.00
C	17060107	2162	0.00

**Character of Bottom Between Stations:**

Station	Area (yd <sup>2</sup> )	L.R.		M.R.		S.R.		M&S	
			%		%		%		%
A-B			30.0		48.0		22.0		0.0
B-C			21.0		53.0		86.0		0.0

**Spawning Area Usable and Available:**

Station	Distance (vds)	Area (yd <sup>2</sup> )	Available Spawning Area		Usable Spawning Area	
			(MR&SR)	% Avail	When Avail	% Useable
A-B	4,600		16,624	69.0		
B-C	2,100		4,950	78.0		

**Spawning Area Unavailable:** 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) of banks

**b)** of watershed

**Irrigation Diversions:** None

**Artificial Obstructions:** None

**Natural Obstructions:** None

**Fluctuation in Water Level:**

Station	Stream Flow (estimated)	
	Sec ft	Date
Below sta B	55.0	6/19/35
At sta C	5.0	6/19/35

Feet Variation; 4' - 5'

Causes: Melting snows and rainfall

**Pollution:** None

**General Remarks:**

The Panjab proper, above the confluence of Turkey Creek, had an estimated flow of only 5 cfs. At the mouth the estimated flow was 60 cfs. A local Forest Service employee stated that in late summer the Panjab will decrease to 1/2 the flow observed above (measurements (?) made by the State Fisheries Dept. survey show the discharge on April 27, 1932, to be only 8.2 cfs).

Topography:

For the entire distance of the survey, Panjab Creek flows through a narrow valley approximately 1000 feet deep. The valley walls are heavily wooded with pine and fir, the latter predominating. The banks of the creek are well protected by cottonwoods and conifers, the former gradually giving way to firs as the higher reaches are attained.

The entire stream lies within the Umatilla National Forest, and neither habitations nor farming occur either in the valley or the surrounding country.

Character of Stream:

Throughout the stream is very swift, the velocity being 3'- 4' per second. Pools of good size are numerous and well spaced. The rubble is continuously good, being constituted of approximately 20% small rubble, 50% medium rubble and 30% large rubble.

The temperatures, June 19, 1935, were; Mouth 46.5 F (air 64 F), Station B 47.5 F (Air 63 F), Station C 45.5 F (Air 59 F).

Fish population:

Many rainbows between 3" - 12" in length were observed throughout the survey. Some Dolly Varden were also seen in the larger pools. Steelhead are reported to enter this stream to

spawn, though none were actually observed. The presence of salmon runs into the Panjab were consistently denied.

#### Temperature Data:

Sta.	Date	Hour	Air	Water	Sky
A	6/19/35	9:50 AM	64.0 F	46.5 F	partly cloudy
A	6/19/35	4:05 PM	63.0 F	49.5 F	clear
B	6/19/35	12:30 PM	63.0 F	47.5 F	clear
C	6/19/35	2:15 PM	59.0 F	45.5 F	clear

#### Pool Grade:

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6	Total
A-B	2.6	22	8.5	4	13	3	2		22
				18.2	59.1	13.6	9.1		
B-C	1.4	0	0.0	(no resting pools)					
TOT	4.0	22	5.5	4	13	3	2		22
				18.2	59.1	13.6	9.1		

#### Gradient:

Station A-C: Distance 4.0 miles, gradient moderate to steep, note; no topographic maps.

There are 56 pools, averaging 14 pools per mile, in the 4.04 miles surveyed on the Panjab. 31% of the pools are under 25 sq yds in area less than 3 ft deep near the center of the stream without adequate cover (S3T3). 21% are the same size and depth as the S3T3 type but are located near the bank with adequate cover (S3T1). 16% are from 25 - 50 sq yds in area, over 6 ft deep near the center of the stream without adequate cover (S4T3). The remaining 32% is divided among miscellaneous types none of which represent more than 9% of the total. (see card 16 "Panjab Creek Pool Grade")

#### Tributaries:

Meadow Creek, estimated flow, June 19, 1935, was 35 cfs. This is the chief tributary to the Panjab.

Turkey Creek, is next in size, on the same day the flow was estimated at 20 cfs.

## Minor Tributaries

**River System:** Tucannon River  
**Name of Stream:** Smith Hollow Creek

Description: Tributary to right bank of the Tucannon River, 3 1/2 miles above Starbuck.

Remarks: **Flows** thru arid land, and is dry wash most of the year.

**River System:** Tucannon River  
**Name of Stream:** Kellogg Creek

Description: Tributary to right bank of the Tucannon River, at Starbuck.

Remarks: Flows thru arid land, **and** is dry wash during the summer.

**River System:** Tucannon River  
**Name of Stream:** Watermelon Creek

Description: a very short, small brook running into the Tucannon River near its headwaters. Grub Canyon Creek, Sheep Creek and Bear Creek are similar brooks above Watermelon Creek. Hilly country with little precipitation.

Remarks: these four stream have too small a flow to be considered as spawning streams.

## Asotin Creek

**River System:** Snake River

**Name of Stream:** Asotin Creek

**Date of Survey:** 3/8/35 - 3/10/35, 6/29/36 - 6/30/36

**Source:** Blue Mountains, Asotin County, Washington, discharges into Snake River at Asotin, Washington.

**Total Length:** 28 miles, approximately 23 miles surveyed.

**Stations:**

Sta	Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
M	Confluence with Snake River			---		S14,T10N,R46E	-	--
A	Highway bridge at Asotin		0.3		0.3	S16;T10N.R46E	29'	5"
B	Brdg at Jerry 2.9 mi by rd above St A		2.9		3.2	S16,T10N R46E	28'	4"
C	W.W.P Dam 5.4 mi by rd above St B		5.4		8.6	S24,T10N R45E	45'	N/A
D	Bridge 6.1 mi by rd above St C		6.1		14.7	S30,T10N R45E	16'	6"
E	9.1 mi by river above St D		9.1		23.8	S4,T8N R43E	12'	4"
F	0.4 above St E		0.4		24.3	S4,T8N,R43E		

**EPA River Reach Codes:**

Station	HUC	SEG	Rmi
M	17060103	0003	0.00
A	17060103	0003	0.00
B	17060103	0004	0.00
c*	17060103	0004	5.71
D	17060103	0006	0.71
E	17060103	0010	0.00
F	17060103	0010	0.33

\* Station location is not definite and has been estimated

**Character of Bottom Between Stations:**

Station	Area (yd <sup>2</sup> )	L.R.		M.R.		S.R.		M&S	
			%		%		%		%
mouth to A			9.0		29.0		56.0		6.0
A-B			14.0		37.0		47.0		1.0
B-C			18.0		38.0		44.0		0.0

**character of Bottom Between Stations (cont):**

Station	Area (yd <sup>2</sup> )	L.R.	%	M.R.	%	S.R.	%	M&S	%
C-D			26.0		40.0		34.0		0.0
D-E			26.0		37.0		36.0		1.0
E-F			57.0		37.0		6.0		0.0

**Spawning Area Usable and Available:**

Station	Distance (vds)	Area (yd <sup>2</sup> )	Available Spawning Area (yd <sup>2</sup> ) (MR&SR)	% Avail	When Avail	Usable Spawning Area (yd <sup>2</sup> )	% Usable
mouth to A	575		4,930	85.0			
A-B	5,628		43,462	85.0			
B-C	10,740		57,359	82.0			
C-D	11,758		61,747	74.0			
D-E	16,355		91,945	73.0			
E-F	700		1,380	43.0			

**spawning Area Unavailable:** none

**Character of Watershed:**


---

Mountainous X

Hilly

Rolling

Flat

Swampy

Wooded X

Open

Cultivated %

Character  
of Valley

Character  
of Banks

**Character of Watershed (cont):**


---

Marginal Vegetation

Erosion

a) of banks

b) of watershed

**Diversions:**

Irrigation (Distance = miles by road)

D 1.	.6 miles	above	station	A
D 2.	1.0 miles	above	station	A
D 3.	2.0 miles	above	station	A
D 4.	.6 miles	above	station	B
D 5.	1.3 miles	above	station	B
D 6.	2.5 miles	above	station	B
D 7.	2.6 miles	above	station	B
D 8.	5.4 miles	above	station	B
D 9.	.7 miles	above	station	C
D 10.	.9 miles	above	station	C
D 11.	1.3 miles	above	station	C
D 12.	3.2 miles	above	station	C
D 13	S.W. 4 sec	3, T.9N.,	R.44E.	

**Irrigation Diversions (Description of);**

Diversion 1: Above station 1 0.6 mile. 0.00 sec ft.  
Irrigation flume, left bank, width 22", depth 12", no water being diverted. No headgate. Return located 50 yds below intake. No protective devices. Diversion wing dam will extend practically entire distance across stream.

Diversion 2: Above station A 1.0 mile. 0.00 sec ft.  
Rock and mortar irrigation dam, crest 40' (extends diagonally across stream drop 0 (dam 2' high but water level of stream of such height as to cover dam). Irrigation ditch, right bank, width 6', depth 6', no water being diverted. Headgate 3 1/2' wide by 3 1/2' deep set in concrete abutments at intake. No protective devices.

Diversion 3: Above station A 2.0 miles. 0.00 sec ft.  
Irrigation ditch, left bank, width 2', depth 2', no water being diverted. No headgate. No protective devices. No diversion dam in stream.

remarks: water carried across stream in flume.

Diversion 4: Above station B 0.6 mile. 0.00 sec ft. Irrigation ditch, left bank, width 24", depth 16", no water being diverted. No headgate. No protective devices. No diversion dam in stream.

Diversion 5: Above station B 1.3 miles. 0.00 sec ft. Irrigation ditch, right bank, width 1 1/2', depth 1', no water being diverted. No headgate. No protective devices. Diversion dam not installed in stream but timbers anchored in creek indicate temporary dam across stream during irrigating season.

Diversion 6: Above station B 2.5 miles. 0.00 sec ft. Irrigation ditch, right bank, no water being diverted. No headgate. No protective devices. No diversion dam in stream.

Diversion 7: Above station B 2.6 miles. 0.00 sec ft. Irrigation ditch, left bank, width 1', depth 1', no water being diverted. Intake thru 6" pipe. No headgate. No protective devices. Temporary plank and rock wing dam extends 30' diagonally into stream.

Diversion 8: At station C. 10.0 sec ft. Washington Water Power Dam, crest 90', drop 6' (flash boards may be added to raise drop additional 12") spill over dam undetermined. Fish ladder, 3' wide with 4 steps, located 15' from left bank. Construction; dam concrete; ladder, plank. 4' sluice at base of right end of dam used as discharge for flush water to clean screens at intake.

Irrigation and water supply intake, right bank, present diversion 10 sec ft. maximum diversion 40 sec ft. Headgates (4) each 7' wide by 8' deep located at intake. Gates used alternately 2 at a time. Two screens in series at each intake first screen 1/4' mesh, second 1/8" mesh.

Remarks: Water used for irrigation and municipal purposes in Asotin and Clarkston. During extremely dry years dam diverts entire stream flow leaving creek bed dry except for deep holes, for a distance of one to two miles below dam. During average years creek usually has sufficient flow to cause spill over dam. Efficiency of ladder dependent on amount of water discharged thru it. At present time ladder provides little attraction to upstream migrants. Power plant not in operation for some years. No water diverted for power.

Diversion 9: Above station C 0.7 mile. 0.00 sec ft. Irrigation ditch, right bank, width 2', depth 1'. No water being diverted. No headgate. No protective devices. No diversion dam in stream.

Diversion 10: Above station C 0.9 mile. 0.00 sec ft. Irrigation ditch, right bank, width 2', depth 9", no water being diverted. No headgate. No protective devices. Temporary wing dam will extend almost entire distance across stream during irrigating

season.

Diversion 11: Above station C 1.3 miles. 0.00 sec ft. Irrigation ditch, right bank, width 31", depth 18", no water being diverted. Intake 6' wide by 10" deep. No headgate. No protective devices. No diversion dam.

Diversion 12: Above station C 3.2 miles. 0.00 sec ft. Irrigation and water supply ditch, right bank, width 6", depth 6", no water being diverted. No headgate. No protective devices. **No** diversion dam.

Remarks: Ditch empties into small well. Probably some water diverted for garden during irrigating season.

Diversion 13: 0.00 sec ft. Irrigation ditch, left bank, width 3', depth 1', no water being diverted. No headgate. No protective devices. Temporary rock diversion extends 20' upstream parallel to bank.

Total diversion of water from Asotin Creek at time of survey; 10.0 sec. ft.

#### Artificial Obstructions:

<u>Location</u>	<u>Character</u>	<u>Height</u>	<u>Protective Type</u>	<u>Devices Efficiency</u>
.2 mi abv St A	sucker dam	2 ft	none	
at St C	irrigation-water supply	6 ft	gravity ladder	see remarks

**Natural Obstructions:** none

#### Fluctuation in Water Level:

Causes, melting **snow in** Blue Mountains  
**Feet** Variation; 3' to 6'

<u>Location</u>	<u>Stream flow Sec. Ft.</u>	<u>Date</u>
<b>At station A</b>	37.81	3/8/35
Above station C	61.97	3/10/35

**Pollution:** none

**Fish (Salmon):** could not find

**Fish (Other than Salmon):** could not find

**General Remarks:**

Survey:

Mouth to confluence of South Fork 3/8/35 - 3/10/35. 9 1/2 miles above South Fork 6/29/36 - 6/30/36 total distance surveyed (24), 26.0 miles, 16 miles accessible by road, 8 miles by trail and ridge road.

Topography:

The lower reaches of the stream flow thru a relatively wide valley. Alfalfa and hay are raised in the valley proper and wheat on the higher plateau. The stream course is marked by a growth of cottonwood, alder and willow but the surrounding hills are practically barren of trees. Three miles above the Asotin Memorial Bridge at the junction of the Asotin and George Creek, the valley becomes narrower and the side slopes become rugged and in some places very precipitous. Practically the entire region to the confluence of the South Fork is winter range for sheep. Above the South Fork the canyon narrows and becomes very rugged, the walls towering 1.500 - 2000 feet above the creek bottom. Cattle are pastured thru out this area. The creek bottom is well shaded by cottonwoods, alder and willow until it enters a narrow box canyon where there is little or no cover afforded by underbrush. The canyon is approximately one and one half miles long and is located five and one half miles above the Asotin Memorial Bridge. Above the canyon the valley widens to some extent, the bottom varies from one half to one quarter mile in width thru out the upper reaches of the stream. This upper area is well protected with heavy growths of alder, cottonwood, willow, conifers, and miscellaneous brush.

Character of the River:

Asotin Creek contains extensive spawning areas. There are no stretches of any length which are entirely devoid of some good spawning areas with the exception of the extreme upper limits of the survey above "station E". Excellent spawning areas occur in the box canyon previously described and in the stretches above the confluence of the South Fork (station D). Riffles throughout the entire stream are very good. The gradient is relatively steep (estimated at 90 ft per mile) but the slope is gradual with no natural barriers to migrating salmonids.

Irrigation and Obstructions:

There are fourteen irrigation diversions in the area surveyed. Three of which have permanent dams in the stream. The remainder have temporary dams which are installed during irrigating season

and are used for small tracts of orchard or alfalfa. With the exception of the Washington Water Power Dam, none of the intakes is screened. All are a menace to downstream migrants.

Two artificial obstructions are present on Asotin Creek. One, a sucker dam installed by the County Game Commission, is located two tenths of a mile above the Asotin Memorial Bridge. This dam is approximately two feet high and was installed to prohibit the migration of suckers from the Snake River into Asotin Creek.

The Washington Water Power Dam, located eight and four tenths miles above the Asotin Memorial Bridge is six feet high. A ladder has been installed at the dam under specifications of the Washington State Game Commission. During high water periods steelheads can easily jump the dam and rarely use the ladder. It is doubtful if chinooks can pass over the barrier because the majority of the water is diverted thru the pipe line at the time of their run in the stream (July and August).

The water diverted by this dam is used for irrigation and also as a source of water supply for the towns of Clarkston and Asotin the intakes to the pipe line are adequately screened with quarter and eight inch screens. This dam discharges a minimum of ten second feet and a maximum of fourth second feet through its flume. A measure of the stream below the dam at the Asotin Memorial Bridge. March 8, 1935, gave a reading of 37.81 second feet and above the dam of 61.97 second feet. It was estimated that 24 second feet was being diverted at that time.

In periods of extremely low water this dam diverts the entire stream flow leaving the creek bed dry with the exception of the deep pools along its course. Two such periods were reported (1930 and 1934). During August, 1934 the state of Washington performed commendable salvage work, three miles of ditch were dug in this dry area connecting the various pools present. The fish were seined from the upper pools and liberated above the dam. In this manner it is estimated that two hundred and fifty thousand steelhead fingerlings and twenty five adult chinook salmon were saved from certain destruction.

The steelhead run of 1936 was reported to be one of the largest to enter Asotin Creek. During the peak of the run fifty six steelhead were seen jumping the Water Power Dam in the elapsed time of but five minutes. Apparently the steelhead population is building back to the proportions known in early days. The main Asotin above the confluence of the South Fork to "station E" provides the principal spawning area for this species although some fish do migrate into the smaller tributaries and some may spawn below this area.

The chinook run is very small. The twenty five chinook that were transported above the dam in 1934 probably constituted the

entire run of that year, although in early times a good run is said to have been present in this stream.

Other game fish present in the Asotin are rainbows, Dolly Varden, whitefish and eastern brook. Suckers, cottus and squaw fish are present in the lower reaches but are not abundant enough to be detrimental. Forty thousand 5-10 inch rainbow trout were planted in June 1936 in Asotin Creek.

All types of aquatic insect larvae are well represented in the stream providing adequate forage for fish, both adult and fry.

The Asotin is an excellent fishing stream. If the hazards to the fish population were reduced by the screening of the ditches and regulation of the flow of water over the W.W.P. dam, the creek would no doubt be an excellent salmon and trout stream. It is probable that the chinook run could be reestablished or other species introduced.

#### Temperature Data:

Location	Date	Time	Air	Water	Weather
Sta A	3/8/35		45 F	44 F	
Sta B					
Sta C					
Sta D	6/29/36	3:00 PM	77 F	64 F	clear
Sta E	6/30/36	1:15 PM	77 F	54 F	fair
Sta F	6/30/36	1:35 PM	77 F	54 F	fair

#### Pool Grade:

Sta	Rst Pls	Rst Pl/Mi	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S2T3 %	S3T1 %	S3T2 %	S4T1 %	S4T2 %	S4T3 %	S6	Total
M-A (0.3 mi)	2	6.7							2					2
									100.0					
A-B (2.9 mi)	13	5.9	4	5	2	2								13
			30.8	38.6	15.3	15.3								
B-C (5.41 mi)	51	11.6	7	6	9	15	1	2	5	1	4	2		51
			11.8	17.7	29.5	1.9	3.9	9.8	1.9	5.9			3	9
C-D (6. mi)	60	10.0	1	1	17	20	1	6	12	1	1			60
			1.7	1.7	28.3	33.2	1.7	10.0	20.0	1.7	1.7			
D-E (9.1 mi)	80	8.8			35	1		44						80
					43.8	1.2		55.0						
E-F	0	0.0	(no	12 t	63 p	38		0.4 mi)						
TO (22.4 mi)	206	9.3	12	5.8	30.4	18.4	2	52	19	2	5	2		206
			5.8				0.9	25.2	9.3	0.9	2.4	0.9		

## Couse Creek

**River System:** Asotin Creek  
**stream surveyed:** Couse Creek

**General Remarks:** This is a short, rather steep, stream discharging into the right bank of the Snake River about 9 miles upstream from Asotin, Washington. When seen on 4-26-37, the volume was estimated at 3 cfs. It is reported dry later in the year. Cover is very poor, being limited to large cottonwoods, although some sections are quite brushy. Large and medium rubbles predominate but there are few, if any, good pools. The stream flows thru a precipitous V-shape valley with walls of bare rock or slopes covered with sagebrush. A very poor road parallels the creek. The surrounding country is utilized in sheep grazing. Temperatures at 9:15 a.m. on a clear day were air, 63 F and water, 52 F. No fish have been reported. No obstructions.

Remarks: virtually worthless except as possible trout feeder.

## Charles Creek

**River System:** Asotin Creek

**Stream Surveyed:** Charles Creek or Charlie Fork

**General Remarks:** This is an important tributary to Asotin Creek entering on the left bank about 15 miles from the mouth. 4 miles from the mouth a flow of about 10 cfs was calculated. At this time, the stream was high and flowing bank to bank. According to Game Protector Van Ardale the flow is about 5 cfs during the summer. The average width of the stream on 4/25/37 was about 8', the average depth was 6'. Air temperature was 74 F and the water temperature was 56 F at 3:00 p.m. during clear weather. Velocity was about 3.5' per second. The gradient is fairly steep and no definite pools were present at high water stage. Many small spawning areas and some good riffles are found in the lower 4 miles of stream. Rubble was estimated at 50% L.R., 40% M.R., and 10% S.R. The stream has good cover throughout. The entire course runs thru a narrow V-shape canyon with walls of bare rock or sagebrush hills. The stream bed is lined with cottonwood, scrub oak, willows, and alders. An occasional Ponderosa pine occurs in the lower section and they become more numerous further upstream. **No** barriers occur in the stream although cascades are present in some areas due to the steep gradient. A small irrigation ditch near the mouth diverts about 1/2 cfs. The valley and surrounding hills are used exclusively in the pasturage of sheep and cattle. A poor auto road follows the stream for about 7 miles. This stream was open to fishing in 1937 for the first time in 3 years. Anglers reported fair numbers of rainbow trout 6-10" in length and numerous fingerlings. It is a heavily fished stream. Steelhead ascend for about 11 miles upstream and 4 were observed by fishermen about 5 miles from the mouth. No chinooks enter the stream. The flow is maintained by springs in the headwaters and augmented by snow runoff and rains.

Remarks: a fairly good trout and steelhead stream. Salmonids may be introduced but spawning areas are not extensive.

## George Creek

**River System:** Asotin Creek  
**Stream Surveyed:** George Creek

**General Remarks:** This is one of the longest tributaries to Asotin Creek. It discharges into the left bank near Jerry, Washington. Its length is about 25 miles and it drains a portion of the Blue Mountains as well as high plateau land west of the Snake River. Many small tributaries discharge into the creek particularly in the mountainous section. When seen on 4-27-37, the volume was estimated at about 35 cfs which was practically flood conditions. Later in the season, the stream is very nearly dry in the lower part although it has never gone completely dry. At flood stage the stream is turbid. Although no pools are visible, good spawning riffles were present. The stream flows thru canyonous valleys throughout its course. In some sections the canyon is over 1000' high. The gradient, especially in the upper portion is steep. The surrounding watershed is utilized for grazing land, and on the plateau wheat is grown extensively. In the upper section, pine forests are present. There is little cover in the lower section, but protection becomes increasingly better upstream. A road parallels the stream but due to adverse conditions it was impossible to ford the stream. A few steelhead may utilize the stream but the chief value is as a trout stream and that value is small at present. No barriers were observed. At Jerry; air 53 F, water 46 F, 9:15 am and cloudy.

**Remarks:** May support a few steelhead. Upper reaches good for trout.

## South Fork Asotin Creek

**River System:** Asotin Creek

**Stream Surveyed:** South Fork Asotin Creek

**Date Surveyed:** 1935

**Source:** Blue Mountains, Asotin County, Washington. Tributary of Asotin Creek

**Total Length:** 12 miles, 4.0 miles surveyed

Stations:

Sta	Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
A	Confluence Sth Fork and Asotin Creek		0.0		0.0	S10,TSN R44E	8'	4"
B	1.4 miles by road above station A		1.8		1.8	S15,T9N <b>R44E</b>	10'	7"
C	2.2 miles		2.2		4.0	S22,T9N,R44	9'	5"

**EPA River Reach Codes:**

Station	HUC	SEG	Rmi
A	17060103	0012	0.00
B*	17060103	0012	0.00
C*	17060103	0012	0.00

\* Station location is not definite and has been estimated

Stream Flow:

At station B

Average depth; 3.5 ft

Average width; 9.0 ft

Average time flow; 50 ft; 24.25 sec

$$\frac{.35 \times 9. \times 56 \times .8}{24.25} = 5.20$$

Stream Flow 5.2 sec ft.

**Character of Bottom Between Stations:**

Station	Area (yd <sup>2</sup> )	L.R.	%	M.R.	%	S.R.	%	M&S	%
A-B			20.0		56.0		24.0		0.0
B-C			31.0		44.0		25.0		0.0

**Spawning Area Usable and Available:**Character of Bottom Station A to Station B

% of Rubble Sq yds of Spawning Area

Lineal yards	Width ards	L.R. %	M.R. %	S.R. %	Total yds bottom	L.R.	M.R.	S.R.	Total %
							Fair	Good	
300	3	30	70		900	270	630		630
300	3	40	50	10	900	360	450	90	540
300	3	20	70	10	900	180	630	90	720
300	3	10	40	50	900	90	360	450	810
300	4	15	50	35	1,200	180	600	420	1,020
300	4	10	50	40	1,200	120	600	480	1,080
300	4	10	40	50	1,200	120	480	600	1,080
400	3	20	60	20	1,200	240	720	240	960
400	4	15	70	15	1,600	240	1,120	240	1,360
285	4	30	60	10	1,140	342	684	114	798
3,185					11,140	2,142	6,274	2,724	8,998
Percent					100	19.23	56.32	24.45	80.77

Station B to Station C

% of Rubble Sq yds of Spawning Area

Lineal yards	Width yards	L.R. %	M.R. %	S.R. %	Total yds bottom	L.R.	M.R.	S.R.	Total %
							Fair	Good	
300	4	10	80	10	1,200	120	960	120	1,080
425	4	30	50	20	1,700	510	850	340	1,190
300	4	20	50	30	1,200	240	600	360	960
300	3	40	35	25	900	360	315	225	540
300	3	35	35	30	900	315	315	270	585
300	3	35	45	20	900	315	405	180	585
300	3	40	40	20	900	360	360	180	540
300	2	35	35	30	600	210	210	180	390
300	3	30	25	45	900	270	225	405	630
300	3	30	35	35	900	270	315	315	630
300	3	45	40	15	900	405	360	135	495
300	3	35	35	30	900	315	315	270	585
183	3	40	35	25	549	220	192	137	329
3,908					12,449	3,910	5,422	3,117	8,539
Percent					100	31.41	43.55	25.04	68.59

**spawning Area Usable and Available:**

Station	Distance (vds)	Area (yd <sup>2</sup> )	Available Spawning Area(yd <sup>2</sup> ) (MR&SR)	% Avail	When Avail	Usable Spawning Area(yd <sup>2</sup> )	% Usable
A-B	3,185		3,185	81.0			
B-C	9,908		8,500	69.0			

**Spawning Area Unavailable:** 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) of banks

b) of watershed

**Irrigation Diversions:**

distance miles by road

- D 1. 0.3 miles above station A
- D 2. 0.8 miles above station A
- D 3. 1.2 miles above station A
- D 4. N.W.4 sec. 27, T.9N., R.44E

**Irrigation diversions (Description of)**

Diversion 1 Above station A  
 0.00 sec. ft 0.3 mile  
 Irrigation ditch, left bank, width 3', depth 18", no water being diverted. No headgate. No protective devices. Single log diversion dam across stream.

Diversion 2 Above station A  
 0.00 sec. ft 0.8 mile  
 Irrigation ditch, right bank, width 28", depth 10', no water being diverted. Intake 5'. No protective devices. Rock wing dam in stream.

Diversion 3 Above station A  
 0.00 sec. ft 1.2 mile  
 Irrigation ditch, right bank, width 20", depth 10", no water being diverted, Intake 4' wide by 10" deep. No headgate. No protective devices. Rock wing dam in stream.

Diversion 4  
 0.00 sec. ft  
 Irrigation flume, left bank, width 6", depth 6". No water being diverted. No headgate. No protective devices. Log and rock dam across stream. 15' crest, 6" drop. No barrier. No water being diverted from South Fork Asotin Creek at time of survey.

**Artificial Obstructions:** None

**Natural Obstructions:**

<u>Location</u>	<u>Character</u>	<u>Height</u>	<u>Type</u>
1 mile above St A	log jam	4 feet	impassable

**Fluctuation in Water Level:**

<u>Location</u>	<u>Sec. Ft.</u>	<u>Date</u>
At sta. B	5.2	3/10/35

Causes; Melting snow in Blue Mountains  
 Feet Variation; 3' - 5'

**Pollution:** None

**General Remarks:**

Survey:

3.6 miles above mouth

Topography:

The **valley** of the south fork is narrow with sharply sloping sometimes precipitous sides. The floor of the valley is **covered by** a sparse growth of conifers, mostly pines. There are few ranches and very few cultivated fields. The crests of surrounding hills are barren of trees and the whole terrain is more rugged and rocky than the valley of the main Asotin. The entire valley is devoted to sheep ranching. Wheat is raised on portions of the high surrounding plateau.

Character of the River:

The spawning gravels are somewhat limited in this fork for the stream is small, discharging 5.2 second feet at the present time but during thru the spring freshets it is reported to rise four feet above its present water level. The creek contains numerous pools and small falls and cascades. Good spawning gravels were not found near the mouth.

About one half mile upstream gravels were located which were propitious for spawning. From this area to the point of conclusion of the survey there were small stretches of spawning gravels located on the riffles between the cascades and the pools. These would provide adequate spawning grounds for a considerable number of fish.

Irrigation and Obstructions:

There are four irrigation diversions on the South Fork. Each has a diversion dam in the stream but none are obstacles to the passage of adult fish. None of the ditches have any protective devices to guard against the passage of downstream migrants.

Approximately one mile above the confluence of the South Fork and Asotin Creek there is a log jam, four feet high, which at the present time is an impassable barrier to the passage of fish. Whether this will wash out in the spring freshets and allow free passage for fish or whether it will increase and become a permanent barrier is unknown.

Fish Population:

The rise in the creek during spring freshets probably would cause a considerable attraction for steelheads to migrate up South Fork from the main Asotin. In fact local inhabitants report that in former years a good run entered the South Fork but that in recent years steelhead are very scarce.

The chinook salmon were once reasonably abundant in this stream according to a report of one **local** inhabitant. However, in recent years none have been seen and it is probable that at this time there is little or no run of chinook in this fork.

The trout fishing in this stream is reported to be excellent, rainbow and Dolly Varden being the principal species caught.

This stream could probably be made into an active producer of chinook and steelhead fry with a small expenditure of money on stream improvement.

**Pool Grade:**

Sta	Dist (mi.)	Resting Pools	Resting Pools/Mile	S2T1 %	S3T1 %	S3T2 %	S3T3 %	S6	Total
A-B	1.8	36	20.0	1	9	22	4		36
				2.8	25.0	61.1	11.1		
B-C	2.2	24	10.9	5	11	5	3		24
				20.8	45.8	20.8	12.5		
<b>TOT</b>	<b>4.0</b>	60	15.0	6	20	27	7		60
				10.0	33.3	45.0	11.7		

**Gradient:**

south Fork Asotin Creek: Moderate gradient, actual drop per mile but stream is not difficult.

Note : No published maps show gradients in this vicinity.

## Minor Tributaries

**River System:** Asotin Creek  
**Stream Surveyed:** Lick Creek

**Description:** (from State Report) short and small tributary to Asotin Creek. 6 miles deep and 3 feet wide, May 5, 1932. Watershed of barren hills, stream nearly dry during summer.

Remarks: too small to be of importance.

**River System:** Asotin Creek  
**Stream Surveyed:** Dark Canyon Creek

**Description:** small stream discharging into the South Fork of the Asotin. Flows thru a deep and barren ravine with very steep gradient.

Remarks: no importance to fish life.

## Wenaha River

**River System:** Grande Ronde River

**Stream Surveyed:** Wenaha River

**Date of Survey:** October 15, 1940

**Location:** bridge at confluence with Grande Ronde at town of Troy.

Width: 41 feet

Depths: 0, 5", 6", 8", 14", 18", 14", 10", 8", 0"

Average depth: 9.2" or 0.8'

Times for 100 foot flows	Air Temp	Water Temp
14.6	61.0 F	59.0 F at 10 AM
17.2		
15.6		
20.4		
19.4		
27.0		
48.6		
Total	162.8 = 23.3 sec. average	

**Flow:**

$$\frac{100 \times 0.8 \times 40 \times .08}{23.3} = 110 \text{ sec ft}$$

**General Review:**

Rubble: 20-50-30-0, 75% usable

Banks: gradual, gravel, 2-4 feet high.

Fluctuation in water level: 1-2 feet.

Marginal vegetation: willow, cottonwood, alder - sparse.  
Many gC riffles.

Valley: V-shaped, 1/2-1 mile wide. Sparsely covered with pines and firs, few sumacs. Hills steep, 200-400 ft. high. Sheep and cattle grazing.

Remark: Looks to Zell like an excellent salmon stream.

## Wallowa River

**River System:** Grande Ronde River  
**stream Surveyed:** Wallowa River

**Date of Survey:** 10/14/40

**Location:** at highway bridge at Minam, 100 feet below Minam River confluence.

### General review:

Width: 146'

Depths: 0, 6, 4, 4, 6, 6, 6, 6, 6, 8, 10, 12, 13, 16, 18, 18,  
 20, 20, 24, 16, 14, 14, 24, 24, 26, 26, 25, 25, 27,  
 25, 24, 24, 24, 22, 22, 20, 28, 16, 14, 14, 14, 12,  
 10, 10, 6, 0      Average depth: 15.53" inches or 1.3'

Time in sec.: 95.6, 40.6, 49.4, 26.4, 50.2, 39.6, 39.0, 37.0,  
 40.0, 52.2      Average time: 47.0 sec.

Water temperature: 53.0 F at 12:50 PM

Air temperature: 64.0 F

Banks: 2 to 4' high, gravel, gradual slope

Valley: V shape 1/4 to 3/4 mile wide across top >100 yards in river bottom in many places. Hills 200 to 400' high, sparsely covered with pine, fir, spruce.

Marginal vegetation: sparse willow, alder, thornapple, cottonwood, fir, pine, spruce, larch.

Gradient: Moderate with all gC. riffles

Rubble: lg 20 - med 50 - sm 30 - sand 0  
 At least 75% usable spawning area.

Water fluctuation: 2', no erosion recently.

Flow:  $\frac{100 \times 146 \times 1.3 \times 0.8}{47.0} = 323 \text{ cfs}$

Wallowa River from Minam down 2 miles to end of road, right bank, is almost all gC. riffles. A good flat area 2 miles down, near end of road. Old hatchery site someplace in vicinity, but we could not locate exact former site. No tributaries.

## Indian Creek

**River system:** Grande Ronde River

**Stream Surveyed:** Indian Creek

**Date of Survey:** October 9, 1940

**General Remarks:**

Indian Creek, 8' wide, 4" deep, trib to Grande Ronde. Flow approximately 4 cfs. Air 46F, water 44F at 9:00 am, Water 55F at 5:00 pm. Moderate gradient. Small number of salmon come up in Spring--none in Fall, according to natives. Rubble 0-60-30-10. Marginal vegetation: very dense willow, alder, dogwood. Banks 1-3' high, mostly earth, some gravel. Watershed topography hilly, covering of grass, a few scattered bunches of pines, valley 1 mile wide below to 1/4 mile above. Covering wheat hay and pasture. Source of town of Elgin water supply. Creek almost completely dried up recently this summer- Elgin had to dig a well to get water. Recent rains have brought creek up again to 4 cfs. Logging operations now on watershed have injured flow in low water (September) period.

23.7 hiway Indian Creek

24.5 bridge near bench mark, el. 2832

26.3 bridge rubble 10-50-30-10

26.8 road crosses Mill Creek, now dry

28.3 bridge rubble 30-50-20 (lg, med, sm)

From here up valley is narrow and watershed covered with pine, fir, and hemlock of moderate density. This is City of Elgin watershed and no pollution is permitted. Watershed hilly, valley 1/4 mile to 100 yds wide.

29 0 dam, wood construction with rock rill, dam 89' wide, water 6' deep above dam. Elgin water supply pipe takeoff right side. Dam is 9' high. Very poor fish ladder--impassable. Spillway in center is 16' wide, 6' high, crest over spill is 3/4 to 1". Dam is 7' wide on top. Spill has wooden apron 8' long, 16' wide, and 8" drop. Sub-surface spill 4' wide, 2' high. Dam is 11' high on downstream side. Water pipe is 8" wood outside diam, covered with asphalt and wrapped with wire, so that inside diam is probably 5 1/2-6" diam. Water temperature at dam was 43.5F, air temperature at dam was 53F at 10:00 am. Fish ladder comes off center of dam--impassable at present low water--only pool in ladder. Rubble 50-30-20-o (lg, med, sm). About 6 miles of fairly good spawning area up to dam. Lots of C. riffles, pools are few and small.

29.6 Speed. Logging bridge, creek average 15' wide, 6-8: deep. Rubble 50-40-10 (lg, med, sm), moderate grade, all f Cl

riffle, banks 3-6', fairly steep, earth, fairly dense alder, willow, and conifers. Watershed hilly fairly dense covering of pine, fir, hemlock. Water temperature 44F air temperature 53F at 10:45 am.

**Phillips Creek**

**River System:** Grande Ronde River

**Stream Survey:** Phillips Creek

**Date of Survey:** October 9, 1940

**General Remarks:**

Phillips Creek, trib to Grande Ronde at Elgin, now completely dry.

Gordon Creek, trib to Grande Ronde 2 miles below Elgin now <1 cfs, of no value as a salmon stream.

## Willow Creek

**River System:** Grande Ronde River  
**Stream Survey:** Willow Creek

**Date of Survey:** October 9, 1940

**General remarks:**

Willow Creek, at highway bridge near Elgin is 15' wide, 2' deep, all mud and sand bottom, very slight gradient, banks 6' high and all earth, water temp 47F, air 53F at 8:40 am, Flow approximately 20 cfs. Banks marginal vegetation very dense bushes-willow, alder, dogwood. Topography here very flat, valley (at least) 7 miles wide. Fluctuation in water level 3'. Erosion of banks: some quite extensive sand cut banks. 75% of watershed in cultivation, mostly wheat, and a few apples, hay and pasture.

## Minor Tributaries- Lower Grande Ronde River

**River System:** Grande Ronde River

**Stream Surveyed:** Shumaker, Deer, Rattlesnake, Bear, Cottonwood, Grouse, Wenatchee, Medicine, Mud, and Wildcat Creeks

**Date of Survey:** 10/15/40

**General remarks:**

Shumaker Creek enters on right bank, flow approximate 1 cfs, of no value as salmon stream. Creek channel broken up by road fords. Steep gradient, mostly large rubble; in very narrow V shaped canyon (<1/4 mi wide valley). Stills barren except for grass and some sagebrush. Mostly cattle, some sheep grazing in this section. Marg. veg. sparse sumac, willow, alder.

Deer Creek enters on left bank--gradient not quite so steep as Shumaker Creek, and flow is a little greater, 1-2 cfs. Valley is wider--1/4-1/2 mile wide. Steelheads may go up it in Spring. Otherwise very - to Shumaker Creek.

Rattlesnake Creek enters on right bank, Washington Highway #3, Width 7', average depth 6", gradient fairly steep. Rubble 60-30-10-0, 10% spawning area available, flow approximately 2 1/2 cfs. Banks 3-6' high, large rock and earth. Narrow valley, V shaped, < 1/4 mile wide, sides often forming creek banks, hills completely barren except for scanty growth of grass--mostly bedrock. Marg. vegetation--sparse willow, sumac, cottonwood. Water temp 57.0, air 60.0 at 4:30 pm.

Bear Creek is a l.b. trib., <1 cfs, V shape valley 1/4-1/2 mile wide, moderate gradient, barren hills. Rubble 60-30-10-0. No value at present water level. Marginal vegetation, moderate willow, sumac, cottonwood, thornapple. Some erosion of banks--considerable water fluctuation.

Cottonwood Creek enters on right bank (facing upstream), steep gradient, very sparse marginal vegetation--willow, sumac. Cascades and boulders, passable with difficulty, water temp 56.0F, air 67.0F at 4:15 pm. Average width 8-10', average depth 5"± Banks 2-6' high, steep, boulders and earth. Narrow V shaped valley, < 1/4 mi wide, bordered by barren hills, cattle grazing. Rubble 60-30-10-0 no spawning area available. Flow approximately 5 cfs.

Grouse Creek enters on right bank, < 1 cfs, stream choked with logs and shrubs--willow, alder, cottonwood. Rubble 60-30-10-0. Moderate gradient. Valley < 1/4 mile wide (250 yds) V shaped, sides form banks. No value--impassable at present water level.

Wenatchee Creek enters on right bank. Width 15', averages 8" deep, fairly steep gradient, rubble 40-50-10-10. 30% available spawning area. Flow approximately 20 cfs. Water 53.0F, air 61.0F at 3:45 pm. Marginal vegetation--alder, willow, cottonwood, moderate density. Narrow valley 1/4 mile wide, very sparse growth of pine, spruce, no cultivation, cattle and sheep grazing.

Medicine Creek was dry.

Mud Creek enters on left bank 6.3 miles above Troy. 10/15/40. At Grande Ronde confluence, Mud Creek is 12' wide, 4" deep, flow approximately 5 cfs, water clear, moderate gradient, passable to fish, rubble 20-60-20-0, 50% spawning area available. Topography: very hilly, V shape, 1/2-1 mile wide, sides of valley form banks in most places. Water fluctuation 1-2 ft. Marginal vegetation moderate birch, alder, sumac, willow, cottonwood, yellow pine, thornapple. No cultivation. Hills very sparsely covered, 200-400' high, mostly barren, bedrock outcroppings and grass, scattered yellow pine and fir. Bridge across Grande Ronde at Speed 65.8  
1/4 mile below Wildcat Creek

Wildcat Creek enters on Grande Ronde, left bank, 7.8 mile above Troy. Wildcat Creek is an average of 15' wide, 6" deep, moderate gradient, flow approximately 7 cfs. Water temperature 53F, air temperature 64F at 2:10 pm. Water fluctuation 3'. Big run of steelhead spawn here in February and March. Banks 3-5' high, average 4', steep, mostly rock, some earth. Rubble 40-30-20-10. 30% spawning area available. Valley 1/4-1/2 mile wide, V shape, sides often forming banks, hills very sparsely covered with grass, scattered pine and fir. Marginal Vegetation moderate density, willow, alder, cottonwoods,

## Grande Ronde River

**River System:** Snake River River  
**Stream Surveyed:** Grande Ronde River

Date of **Survey:** August 10, 13-14, 16-18, 20, 1941

Source: Rises in T7S, R36E

**Direction of Flow:**

**Total Length:** 190 miles, of which 48.4 miles surveyed by Parkhurst and Zimmer

**Station Location:**

Sta	Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
A	Railroad trestle at Island City	0	0.0	0	0.0	S34,T2S <b>R38E</b>	28.0'	18.1"
R	First old road bridge 200 yd below Fruitdale ditch take-off		4.1		4.1	S31,T2S R36E	61.0'	21.0'
C	Road bridge 7 mi above Station B		8.0		12.1	S31,T2S R37E	39.0'	28.7'
D	Private road bridge 725 yds above Meadow Ck confluence		15.1		27.2	S36,T3S R35E	24.0'	16.0'
E	Road bridge at log loading station, opposite Starkey		2.2		<b>29.4</b>	S11,T4S R35E	32.0'	8.9'
F	First bridge on road to Indiana Mine		11.6		41.0	S24,T5S R35E	26.0'	12.1"
G	Entrance to Whitman National Forest (going upstream)		5.5		46.5	S32,T5S R35E:S5 T6S,R35E township line	18.0'	6.0'
H	Lower end of mine tailings		1.9		48.4		no measurements taken	
I	End of road 2 mi above lower end of mine tailings		2.2		50.6		10.0'	6.0'

**EPA River Reach Codes:**

Station	HUC	SEG	Rmi
A	17060104	0022	12.48
B	17060104	0022	19.10
C	17060104	0024	00.00
D	17060104	0030	00.00
E	17060104	0038	00.83
F	17060104	0040	06.78
G	17060104	0045	00.00
H	17060104	0045	00.54
I	17060104	0045	04.60

**Character of Bottom Between Stations:**

Station	Area (yd <sup>2</sup> )	L.R.	%	M.R.	%	S.R.	%	M&S	%
A-B	130,226	23,048	17.7	59,890	46.0	22,243	17.1	25,045	19.2
B-C	251,800	81,630	32.4	89,500	35.5	33,320	13.3	47,350	18.8
C-D	467,230	73,506	15.7	209,112	44.8	95,619	20.5	88,993	19.0
D-E	33,220	5,564	16.8	14,718	44.3	7,236	21.7	5,702	17.2
E-F	218,700	52,830	24.2	84,280	38.5	35,330	16.2	46,260	21.1
F-G	89,700	6,830	7.6	30,570	34.1	26,520	29.6	25,780	28.7
G-H	18,100	5,370	29.7	6,170	34.1	3,650	20.2	2,910	16.0
<b>TOT</b>	<b>1,208,976</b>	<b>248,778</b>	<b>20.6</b>	<b>494,240</b>	<b>40.9</b>	<b>223,918</b>	<b>18.5</b>	<b>242,040</b>	<b>20.0</b>

Station	Usable	%
A-B	8,170	6.3
B-C	37,970	15.1
C-D	104,248	22.3
D-E	18,827	56.7
E-F	52,210	23.9
F-G	32,470	36.2
G-H	4,950	27.4
<b>Total</b>	<b>258,845</b>	<b>21.4</b>

**Classification of stream based on amount of usable spawning rubble and area present:**

	Area (yd <sup>2</sup> )	Usable Spawning Area (yd <sup>2</sup> )	P e r c e n t Q u a l i t y (yd <sup>2</sup> )			
			Poor 0-10.5	Fair 10.6-30.5	Good 30.6-70.5	Excellent 70.6-100
Estimated usable rubble	1,208,976	258,845		21.4		
Spawn rubble (MR + SR)	1,208,976	718,158			59.4	

**Spawning Area Usable and Available:**

Station	Distance (yds)	Area (yd <sup>2</sup> )	Available Spawning Area(yd <sup>2</sup> ) (MR&SR)	% Avail	When Avail	Usable Spawning Area(yd <sup>2</sup> )	% Usable
A-1855 yd	1,855	39,526	20,333	51.4	LW	250	0.6

**Spawning Area Unavailable and Unusable:**

Station	Distance (mi)	Area (yd <sup>2</sup> )	Area Unavail (yd <sup>2</sup> )	% Unavail	When Avail	Usable Unavail (yd <sup>2</sup> )	% Usable Unavail
1,855 yds.							
above A-B	4.1	90,700	61,800	68.1	L.W.	7,920	8.7
B-C	8.0	251,800	122,820	48.8	L.W.	37,970	15.1
C-D	15.1	467,230	304,731	65.2	L.W.	104,248	22.3
D-E	2.2	33,220	21,954	66.1	L.W.	18,827	56.7
E-F	11.6	218,700	119,610	54.7	L.W.	52,210	23.9
F-G	5.5	89,700	57,090	63.7	L.W.	32,470	36.2
G-H	1.9	18,100	9,820	54.3	L.W.	4,950	27.4
<b>Total</b>	48.4	1,169,450	697,825	59.7	L.W.	258,595	22.1

cause of Unavailability: At 1,855 yards above Station A is located the Pioneer Flour Company dam and irrigation take-off. This dam is a barrier at low water, therefore all spawning area above this point must be considered as unavailable at low water.

**Character of Watershed:**

	A-B	B-C	C-D	D-E	E-F	F-G	G-H	H-I
Mountainous								
Hilly		X	X	X	X	X	X	X
Polling	X							
Flat								
Swampy								
Wooded					X	X	X	X
Open	X	X	X	X				
Cultivated	20%		10%			20%		

**Character of Watershed (cont):**

	A-B	B-C	C-D	D-E	E-F	F-G	G-H	H-I
Character of Valley	flat	V	V	U	V	pasture \_/\	\_/\	\_/\
Character of Banks	3-6' steep earth, rock	2-12' earth, rock	3' steep earth, rock	2-4' steep earth, gravel	3-6' steep rock	2-5' steep earth, rock	3-4' earth, rock	3-4' earth, rock
Density of Marginal Vegetation	dense	scatt	scatt	sparse	moder	moder	moder	heavy
Erosion								
a) Banks	slight	slight	scatt	sparse	moder	moder	moder	heavy
b) Watershed	none	none	none	none	none	none	none	none

**Diversions:**

Diversion 1: 1,855 yds above Station A, Pioneer Flour Company Power. L.B. 6 cfs. Return, headgates, passable at high water, impassable at low water, see sketch.

Diversion 2: 2,250 yds above Station A. R.B. 0 cfs. Irrigation, well and pump, 6" pipe, not running.

Diversion 3: 2,500 yds above Station A. R.B. 0 cfs. Irrigation, well and pump, 6" pipe, not running.

Diversion 4: 4,000 yds above Station A. L.B. 25 cfs. Caviness ditch, irrigation, return, headgate, passable at high water, impassable at low water, see sketch.

Diversion 5: 4,350 yds above Station A. L.B. 20 cfs. May Park ditch irrigation, return, headgate, no dam.

Diversion 6: 5,250 yds above Station A. R.B. 6 cfs. Nessley Ditch, return, headgate, no dam.

Diversion 7: 6,725 yds above Station A. R.B. 0 cfs. Remains of old irrigation ditch, dry, no obstacle at any time.

Diversion 8: 6,975 yds above Station A. L.B. 20 cfs. La Grande irrigation ditch, Slaughter house, Lumber Company return, headgates, passable at high water, impassable at low wdter, see sketch.

Diversion 9: 50 yds above Station B. R.B. 15 cfs. Orodell

irrigation ditch, return, headgate, passable at all times, see sketch.

Diversion 10: 100 yds above Station B. L.B. 12 cfs. Gekler irrigation ditch, no return, headgate, dam is on side channel, no obstacle.

Diversion 11: 2,550 yds above Station B. R.B. 0 cfs. Pump for swimming pool, 7" pipe, not running, return, no dam.

Diversion 12:" 2,700 yds above Station F. L.B. 0 cfs. Abandoned irrigation ditch, dry, no dam.

### **Artificial Obstructions:**

1. 270 yds above Station A. Debris dam, impassable at low water.

2. 1,855 yds above Station A. Dam made of gravel bags, 63' long, 28" high. Barrier at low water. Dam diverts water to Pioneer Flour Company mill.

3. 4,000 yds above Station A. Dam made of stones, 2' high, barrier at low water, diverts water to Caviness ditch.

4. 6,975 yds above Station A. Dam made of large rocks, blocks of concrete, etc., 150' long, 2.5' high, barrier at low water, diverts water to La Grande irrigation ditch, ditch passes underneath the city dump, through a slaughter house and part of it is by-passed to a lumber mill.

5. 50 yds above Station B. Dam made of stones, 75' long, 1.5 high, no barrier at any time.

6. 7,460 yds above Station C. Remains of old dam, 1.5' high, wood, passable on left side, 3' space underneath.

7. 8,715 yds above Station C. Low boulder dam, passable.

8. 1,650 yds below Station F. Remains of old dam, no barrier at any time.

9. 1,900 yds below Station H. Debris dam, impassable at low water.

10. 2,000 yds below Station H. Debris dam, nearly impassable at low water.

11. 2,100 yds below Station H. Debris dam, nearly impassable at low water.

12. At Station H. Debris dam, 3' high, 150' long, impassable at low water.

**Natural Obstructions:** none

**Fluctuation in Water Level:**

**Note:** Data from Surface Water Supply Paper No, 863, US Dept. of the Interior, 1938, Snake River Basin.

	<u>At La Grande, OR</u>	<u>At Rondowa, OR</u>
Location of Recorder	Sec 35, T2S, R37E 2.5 mi NW of La Grande	Sec 23, T3N, R40E, NW 1/4 500' downstream from Wallowa River at Rondowa
Drainage Area	678 sq miles	2,555 sq miles
Ave Discharge	24 years - 347 cfs (1905-9, 1910-11, 1912-15, 1918-20, 1920-22, 1925-38)	12 years - 1,853 cfs
Discharge for Water year Oct 1937-Sep 1938	Maximum - 2,410 cfs on 4/18/38 Minimum - 11 cfs on 8/31/38	Maximum - 9,840 cfs on 5/28/38 Minimum - 305 cfs on 10/01/38
Other years	1903-15, 1918-23, 1925-38: Maximum - 8,800 cfs on 3/18/32 Minimum - 4 cfs on g/14,16-20/22	1926-38: Maximum - 22,400 cfs on 3/18/32 Minimum - 225 cfs on 12/19/35

**Pollution:**

At present there is no pollution of any consequence. Until several years ago the Indiana Mine, near the headwaters of the river, was in operation and considerable silt has deposited over the rubble in the stream below. At the time of the survey the mine was not in operation and it was reported that all machinery had been removed.

There is a very small amount of refuse, from a slaughter house just outside the town of La Grande, that is emptied into the river.

The silt and mud returned to the river as a result of the two gravel pit operations might be called pollution.

**Fish (salmon):**

None observed. It was reported that an Indian had caught a salmon above the mouth of sheep creek. This report was not verified, however. It was also reported that one salmon had been taken near the Mt. Emily Lumber Co. camp on Meadows Creek, a tributary of the Grande Ronde River.

**Fish (other than Salmon):**

Chubs and suckers very abundant between Stations A-B, abundant between Stations B-C, sparse between Stations C-D. A few seen between Stations G-H. No fish seen in other areas.

**General Remarks:**

The Grande Ronde river rises in T7S, R36E and flows in a northeasterly direction to join the Snake River in S13,T7N,R46E. This river is approximately 190 miles long, of which 48.4 miles above Island City, Oregon, was surveyed on August 10, 13, 14, 16, 17, 18, 20, 1941.

From Station A, which is located at Island City, Oregon, upstream to Section B, a distance of approximately 4.0 miles, the river flows through a very wide, flat valley with fairly dense marginal vegetation of Cottonwood and Alder. The valley averages about 10 miles wide in most places and tapers off to practically nothing in the vicinity of Station B. There is considerable medium and small rubble in this section, averaging better than 50% of the total bottom, but only 6.3% of the total bottom was considered usable for spawning salmon because of the great amount of silt present. There are several obstructions in this section. The first is a debris jam located at 270 yards above Station A. This was considered impassable at low water. The second is the Pioneer Flour Company diversion dam located at 1,855 yards above Station A. This obstruction is of gravel-filled bags, 63' long and 28" high and likewise a barrier at low water. There were no screens in the ditch nor any protective devices at the mill. Employees at the mill reported having seen large numbers of dead suckers in the ditch, just below the dam. It is probable that these were killed by the action of the mill wheel. This ditch to the Pioneer Flour Company mill was taking about 6 cfs of water from the river at the time of the survey. Headgates were present with a return to the river not far below the take-off.

Two small irrigation pumps, each with a 6" intake pipe, were found at 2,250 yards and at 2,500 yards, respectively, above Station A. Neither of these was in operation at the time of the

survey.

The third obstruction is a dam made of loose stones at 4,000 yds above Station A. It is 2' high and extends completely across the river, diverting water to the Caviness ditch. This dam is also a barrier at low water. At the time of the survey, the Caviness ditch was flowing 20-25 cfs of water. There were no screens in the ditch. Headgates were present with a return to the river nearby.

The May Park irrigation ditch takes off the river at 4,350 yards above Station A. There is no dam for this diversion. Approximately 20-25 cfs was being diverted at the time of the survey. There were no screens in the ditch. Headgates were present with a return to the river.

The Nessley irrigation ditch takes off the river at 5,250 yards above Station A. There is no dam present nor are there any screens in the ditch. At the time of the survey this ditch was carrying about 6 cfs of water. Headgates were present with a return to the river.

The last obstruction in the river between Stations A and B is a dam of rocks and concrete blocks, 150' long and 2.5' high, located at 6,975 yards above Station A. This dam, a barrier at low water, diverts water through the La Grande irrigation ditch, which at the time of the survey, was flowing about 20 cfs. There were no screens in the ditch. Headgates were present with a return to the river.

There are two large gravel pit operations in the section of river between Stations A and B and both were in operation at the time of the survey. Long drag-lines operating from the banks were taking gravel from the center of the river. Considerable silt was being washed back into the river in each case.

From Station B upstream to about 1,650 yards below Station F, a distance of approximately 36.0 miles, the river flows for the greater part of the distance through a rather narrow valley. The hillsides are quite steep and rocky and covered lightly with bull and ponderosa pine. In some places sage brush predominates. The point at 1,650 yards below Station F was chosen because it is here that the very narrow valley ends and the wide, flat, heavily grassed valley begins. The entire watershed through this section is very hilly. There are several small flat farm areas bordering the river but they are quite far apart.

only two irrigation diversions leave the river above Station B, the first of these being the Orodell irrigation ditch at 50 yards above Station B. Estimated flow at the time of the survey was 15 cfs. There are no screens present but headgates are located a short distance from the mouth with a return to the river just in front of the gates. The second diversion is the Gekler irrigation

ditch which leaves the river at 100 yards above Station B. Estimated flow was 15 cfs at the time of the survey. There are no screens present, but headgates are located not far from the mouth.

At 2,250 yards above Station B is located a small pump with a 7" intake pipe which supplies water to a small concrete swimming pool nearby. The swimming pool was not in operation at the time of the survey. The owner of the pool stated that all of the water taken was returned to the river, each time the pool was drained.

In this section, between Station B and 1,650 yards below Station F, medium and small rubble make up about 50% of the total bottom with the other 50% about equally divided between large rubble and silt. Usable spawning rubble was estimated to be about 30% of the bottom.

There are three partial obstructions in the river above Station B. The first of these is the small rock dam, 75' long, and 1.5' high which diverts water to the Orodell ditch. Because sections of this dam were broken it was considered to be passable at all times.

The second is the remains of an old dam located at 7,460 yards above Station C. It is of wood and is 1.5' high and passable on the left side.

The third is a low rock dam at 8,715 yards above Station C. It is passable at all times.

From 1,650 yards below Station F, upstream to the boundary of the Whitman National Forest (Station G in the survey), a distance of about 6.4 miles, the river winds back and forth through a fairly flat meadow. Marginal vegetation is limited to succulent grasses. The valley floor averages about 0.75 mile wide and is bordered by a fairly dense stand of second growth bull and ponderosa pine. Of the total bottom, large rubble makes up a little less than 10% medium and small rubble about 60% and silt about 30%. It was estimated that about 30% of the total bottom was usable for spawning salmon. There were no obstructions or diversions in this section.

From Station G to Station H (the end of the survey), the river valley is quite narrow with a fairly dense second growth bull and ponderosa pine extending down to the very waters edge. Of the total bottom in this section 29.7% was large rubble, 54.3% medium and small rubble and 16.0% mud and silt. A total of 27.4% of the bottom was considered usable for salmon spawning.

There were four debris dams in this section between Station G and Station H. The first was at 2100 yards below station H. This was considered to be nearly impassable at low water. The second dam is at 2,000 yards below Station H. This also was considered to be nearly impassable at low water. The third dam is at 1,900 yards

below Station G and it is impassable at low water. The fourth is located at Station G and it, too, is impassable at low water. This fourth dam is a large one, extending completely across the river. It is about 3.5' high and pretty well silted in. Being at the lower end of mine tailings accounts for the great amount of silt being present.

The operations of the Indiana mine have certainly raised havoc with the upper portion of the river above Station H. In a great many instances the river is present in sound only. It was possible, at the time of the survey, to drive a car up the middle of the stream bed. What was left of the river was flowing, out of sight, underneath the rubble. Dredging and filling has put the rubble on top of the water. It was reported that the Indiana Mine Company had left the river because the gold recovered was no longer being found in sufficient quantities to pay the cost of operations. At any rate they have left a monument that will remain a dirty blot on the landscape for many years to come.

A partial summary of the data recorded regarding this portion of the Grande Ronde River above the town of La Grande, Oregon, is as follows:

1. Diversions of Importance:

Number	Total Est Flow	Protective Devices
7	104 cfs	none

2. Obstructions:

	Low Water Barrier	High Water Barrier	Fish Ladders
Dams	3	0	0
Debris Dams	3	0	

3. Spawning Area Available:

	MR&SR	% of Bottom	Total Bottom	Est Usable Sp Rubble	% of Bottom
Suitable at low water	20,333	51.4	39,525	250	0.6
Unavailable at low water	697,825	59.7	1,169,450	258,595	22.1

4. Salmon observed = none

5. Resting pools = 280: 5.8 pools per mile

**Temperature Data:**

Sta..	Date	Hour	Air Temp	Water Temp	Sky
A	8/29/41	9:45 am	64.0 F	59.0 F	Partly cloudy
B	8/29/41	10:45 am	67.0	59.0	Partly cloudy
C	8/19/41	11:15 am	70.0	62.0	Cloudy
D	8/29/41	12:00 noon	70.0	60.0	Cloudy
E	8/29/41	12:30 pm	65.0	58.0	Cloudy
F	8/11/41	10:40 am	62.5	59.5	Rain
G	8/10/41	12:45 pm	83.5	68.0	Bright & clear
H	---	---	--	--	----
I	8/10/41	11:45 am	84.0	53.0	Bright & clear

**Pool Grade:**

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	SlT1 9	SlT2 %	S2T1 %	S2T2 %	S6	Total
A-B	4.1	43	10.5	2	1	23	17	26	69
				4.7	2.3	53.5	39.5		
B-C	8.0	90	11.2	4	7	7	72	33	123
				4.4	7.8	7.8	80.0		
C-D	15.1	40	2.6	1		11	28	16	56
				2.5		27.5	70.0		
D-E	2.2	31	14.1			24	7	2	33
						77.4	22.6		
E-F	11.6	45	3.9			33	12	118+	163+
						73.3	26.7		
F-G	5.5	31	5.6			18	13	100+	131+
						58.1	41.9		
G - H	1.9	0	0.0	no resting pools				51	51
H - I	2.2	0	0.0	no resting pools				0	0
TOT	48.4	280	5.8	7	8	116	149	346+	626+
				2.5	2.9	41.4	53.2		

**Gradient:**

Station	Distance (Miles)	Gradient
A-B	4.1	slight
B-C	8.0	moderate
C-D	15.1	quite steep
D-E	2.2	moderate
E-F	11.6	quite steep
F-G	5.5	moderate
G-H	1.9	moderate
H-I	2.2	moderate

**Tributaries:**

1. Joseph Creek, left bank
2. Shumaker Creek, right bank
3. Deer Creek, left bank
4. Buford Creek, left bank
5. Rattlesnake Creek, right bank
6. Cottonwood Creek, right bank
7. Bear Creek, left bank
8. Medicine Creek, right bank
9. Wenatchee Creek, right bank
10. Grouse Creek, right bank
11. Bear Creek, right bank
12. Wenaha River, right bank
13. Courtney Creek, left bank
14. Mud Creek, left bank
15. Wildcat Creek, left bank
16. Cabin Creek, right bank
17. Sickfoot Creek, left bank
18. Grossman Creek, left bank
19. Elbow Creek, right bank
20. Bear Cree, right bank
21. Alder Creek, right bank
22. Meadow Creek, right bank
23. Clear Creek, left bank
24. Proctor Creek, right bank
25. Wallowa River, Left Bank
26. Looking Glass Creek, right bank
27. Moses Creek, right bank
28. Cabin Creek, right bank
29. Gordon Creek, right bank
30. Phillips Creek, right bank
31. Clark Creek, left bank
32. Indian Creek, left bank
33. Willow Creek,, right bank
- \*\* State Ditch enters - Sec 10, T2S, R39E
34. Warm Creek, left bank
35. Mill Creek, left bank
36. Catherine Creek, left bank (see survey notes)
- \*\* State ditch take-off - Sec 33, T2S, R39E
37. Five Point Creek, right bank (see survey notes)
38. Rock Creek, left bank (see survey notes)
39. Whiskey Creek, left bank, <0.5 cfs, no value
40. Spring Creek, right bank, <1.0 cfs, no value
41. Jordan Creek, left bank (see survey notes)
42. Beaver Creek, left bank (see survey notes)
43. Meadow Creek, right bank (see survey notes)
44. Fly Creek, right bank, 1.0 cfs, no value
45. White Horse Creek, left bank, <1.0 cfs, no value
46. Sheep Creek, right bank (see survey notes)
47. Limber Jim Creek, right bank, 2.0 cfs, passable, very little value

**Tributaries (cont):**

48. Clear Creek, right bank, not seen

NOTE: Since the main Grande Ronde River has not been surveyed **below** the town of La Grande there is consequently no information available concerning any of the tributaries (1-36 inc) entering below La Grande, with the exception of Catherine Creek (No. 36) which has been surveyed.

**Supplementary Report:**

**Date:** 10/15/40

**Location:** at Troy, just below confluence with Wenaha River Highway bridge

**General remarks:**

Width: 168 feet

Depths: 0, 8, 14, 25, 28, 30, 38, 50, 64, 68, 72, 69, 50, 36, 33, 28, 23, 26, 18, 6, 0, average is 34.3 inches.

Valley: about 2 to 4 miles wide, roughly \ / shaped with up to 1/2 mile of flat land at the bottom. Hills 200 to 600 feet high, rather sparsely covered with ponderosa pine, douglas fir, sumac, grass, and scattered small shrubs. Used for cattle and sheep grazing. Topography mountainous.

Marginal vegetation: cottonwoods, willows, few yellow pine, some sumac, rather sparse.

Rubble: 20 - 50 - 30 - 0, about 75% usable, good C, riffles.

Banks: 3 to 10 feet high of rubble and bedrock.

Water fluctuation: about 3 or 4 feet max. according to a native.

Erosion: slight.

Gradient: slight to moderate.

Fish populations: Silver salmon reported running at present. Two salmon hatcheries formerly located at this place

Air temperature: 63.0 F at 11:30 am

Water temperature: 56.0 F

Remark: Native reports 2 fair sized springs 1/2 mile from the confluence of the Wenaha with the Grande Ronde, and another about 1 mile away.

**Date:** Oct 9, 1940

**Tributary, Looking Glass Creek:** confluence of Grande Ronde  
 Water temperature: 47.5 F at 1:00 pm  
 Air temperature: 63.0 F  
 (Grande Ronde: 56.0 F just above confluence)

Lower

Width: 44 feet at lower Palmer Junction Bridge

Depths: (inches) 0, 6, 11, 12.5, 13, 16, 17, 15, 13, 14,  
 15, 13.5, 11, 11, 9.5, 9.5, 9, 9.5, 5, 0,  
 average is 11.0 inches

Upper

Width: 43 feet

Depths: (inches) 0, 13, 24, 22.5, 21.5, 20, 19.5, 20,  
 18, 16.5, 14, 13, 15, 12, 9.5, 6, 0, average is  
 15.28

Average depth of lower and upper = 1.1 feet

Times for sticks to flow measured 100' distance:  
 65.6  
 54.0  
 41.2  
 37.8  
 36.4  
 Average = 47.0 sec.

Flow: 
$$\frac{100 \times 43.5 \times 1.1 \times 0.8}{47.0} = 81 \text{ cfs}$$

**Date:** 10/10/40

**Location:** Grande Ronde River at road bridge near Palmer Junction.

**General remarks:**

Width: 165'

Depths: 0, 9, 16, 24, 12, 14, 13, 9, 4, 3, 0, average is 10.4 inches

Marginal vegetation: moderate density willow, alder, dwarf maple, fir, pine, spruce.

Water: fairly turbid, so that bottom visibility is zero except on very shallow riffles. Large amount of flat, broken pieces of bedrock in river bottom, which raises.

Rubble: % of large rubble, 30 - 40 - 20 - 10

Water temperature: 54.0 F at 12:30 pm

Air temperature: 62.0 F

Banks: form sides of very narrow V shape valley  
Topography very high hills (200 to 500 feet high)

Valley: 100 to 400 yards wide. No cultivation. Moderate density covering of watershed with pine, fir, larch, spruce, aspen, hemlock, all small scrubby stuff. No recent evidence of erosion, although hills are quite barren in many places, due to surface outcroppings of bedrock which has a very thin layer of soil which supports a sparse growth of grass and small bushes in many places.

## Catherine Creek

**River System:** Grande Ronde River  
**Stream Surveyed:** Catherine Creek, tributary to Grande Ronde

**Date of Survey:** August 9-12, 1941, by Frey and Bryant

**Source:** Formed by the confluence of the North and South Forks, which in turn arise high on the west slope of the Granite Mountains and the south slope of Cartwheel Ridge, in the Whitman National Forest, near the eastern edge of Union County, Oregon.

**Direction of Flow:** From its source at the forks, the stream flows in a general Northwest direction twenty miles to US 30 bridge, west of the town of Union. The stream then flows north six miles by map, east four miles, and north one mile to the confluence with the Grande Ronde meander.

**Total Length:** Approximately 30 miles, of which 21.8 miles were surveyed. It is difficult to estimate the total length of the stream because of the very extensive meandering below the US 30 bridge.

**Station Location:**

Sta	Location	Distance Above Prev. Station		Approx Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
A	Lower Benson Dam	0	0.0	0	0.0	NW1/4,S3, T4S,R39E ca	45'	--
B	US 30 bridge	1,300	0.7	1,300	0.7	SE1/4,S3 T4S,R39E	43'	30"
-	At Miller Farm	2,400					35'	10"
C	US 30 bridge in Union	10,460	5.9	11,760	6.7	SW1/4,S18 T4S,R40E ca	39'	--
D	Road bridge near Ranger Station	16,900	9.6	28,660	16.3	SW1/4,S8 T5S,R41E	29'	9"
E	Confluence N & S Forks	8,600	5.0	37,260	21.2	NE1/4,S2320'ea. T5S,R41E ca		10"

**EPA River Reach Codes:**

Station	HUC	SEG	Rmi
A	17060104	0060	0.00
B	17060104	0060	0.00

**EPA River Reach Codes (cont):**

Station	HUC	SEG	Rmi
C	17060104	0063	0.45
D	17060104	0063	11.64
E	17060104	0066	0.00

**Character of Bottom Between Stations:**

Station	Area (yd <sup>2</sup> )	L.R.	%	M.R.	%	S.R.	%	M&S	%
A-B	17,600	0	0.0	0	0.0	0	0.0	17,600	100.0
B-C	87,900	3,560	4.1	12,245	13.9	14,655	16.7	57,440	65.3
C-D	150,350	24,780	16.5	56,105	37.3	38,245	25.4	31,220	20.8
D-E	58,000	16,000	27.6	20,840	35.9	13,730	23.7	7,430	12.8
TOTAL	313,850	44,340	14.1	89,190	28.4	66,630	21.2	113,690	36.2

**Spawning Area Available:**

Station	Distance (miles)	Area (yd <sup>2</sup> )	Available Spawning Area (MR&SR) (yd <sup>2</sup> )	% Avail	Usable Spawning Area (yd <sup>2</sup> )	% Avail
A-B	0.7	17,600	0	0.0	0	0.0
B-C	4.0	54,800	8,270	15.1	1,177	2.1
<b>Total</b>	<b>4.7</b>	<b>72,400</b>	<b>8,270</b>	<b>11.5</b>	<b>1,177</b>	<b>1.6</b>

**Spawning Area Unavailable and Unusable:**

Sta	Distance	Area (yd <sup>2</sup> )	Area Unavail (yd <sup>2</sup> )	% Unavail	When unavail	Usable Unavail (yd <sup>2</sup> )	% Unavail
B-C	2.0 mi	33,100	18,630	56.3	L.W.	2,870	8.7
C-D	9.6 mi	150,350	94,350	62.7	L.W.	33,330	22.2
D-E	5.0 mi	58,000	34,570	59.6	L.W.	6,943	12.0
<b>Entire Stream</b>	<b>16.5 mi</b>	<b>241,450</b>	<b>147,550</b>	<b>61.1</b>	<b>L.W.</b>	<b>43,143</b>	<b>14.1</b>

Cause of Unavailability: 3,500 yards below Station C is a diversion dam impassable at low water. Actually the entire surveyed portion of the stream is inaccessible from below at low water because of the impassable nature of the Lower Benson Dam, even though it is equipped with a makeshift fish ladder.

**Character of Watershed:**

	A-B	B-C	C-D	D-E
Mountainous				low mountains
Hilly				X
Rolling		slightly in upper portion		
Flat	X	X		
Swampy				
Wooded				few ponderosa pines and douglas fir
Open	X	X	X	
Cultivated	90%	80%	15%	5%
Character of Valley	broad floodplain	flat valley	flat agri bordered by hills	0.1-0.5 mi cultural land
Character of Banks	Steep 6-20 feet, entirely of earth	Mostly steep, 3-6 ft, gravel and earth	Gradual to steep 1-6 feet earth and loose rock	Gradual to steep earth, gravel, loose rock, 1-6 feet
Density of Marginal Vegetation	willow, alder, rose; locally dense	willow, alder, thornapple, rose, thistle, bedstraw; locally	alder, willow, thornapple, cottonwood; very dense locally	mainly alder, cottonwood, grass, thornapple
Erosion				
a) Banks	very extensive	extensive	moderate	considerable
b) Watershed	slight- deposition instead	moderate	moderate	considerable

**Diversions:**

Diversion 1: At Station A. R.B. 8-10 feet wide near take-off, no headgates or fish screens.

Diversion 2: 700 yds above Station A. R.B. Old irrigation diversion, wooden headgates raised, ditch dry, appears to have been in disuse for some time, no screens.

Diversion 3: 3,360 yds above Station B. L.B. 0 cfs. Old ditch (?) take-off at dam, now entirely above water and dry.

Diversion 4: 5,250 yds above Station B. L.B. ca. 3 cfs. No screens or headgates, the ditch is used only for water stock and returns to the river 0.5 miles downstream, not detrimental to fish.

Diversion 5: 6,310 yds above Station B. R.B. 0 cfs. Old 6" irrigation pump, not operating.

Diversion 6: 6,870 yds above Station B. R.B. Approx 7 cfs. Wooden headgate 3.5' square, operated by hand wheel and screw, water by-passes back to river by seepage through log and earth walls of ditch, no protective devices.

Diversion 7: 8,260 yds above Station B. L.B. 3-5 cfs. 32" wide with 14" water in it, wooden headgate, no protective devices.

Diversion 8: 8,460 yds above Station B, L.B. 0 cfs. 2' wide, 1' deep, not used in 1941, no protective devices.

Diversion 9: 9,260 yds above Station B. R.B. 2' wide, 1' deep, wooden lift headgate in 8" concrete bulkheads, no protective devices.

Diversion 10: 9,360 yds above Station B. L.B. Wooden headgate 30" wide x 40" deep, good flow, 1' water in ditch, no protective devices.

Diversion 11: 10,160 yds above Station B. R.B. Small, no screens.

Diversion 12: 100 yds below Station C. R.B. 32" wide water 18" deep behind headgate which is operated by wheel and screw.

Diversion 13: 950 yds above Station C. R.B. Diversion to flour mill, 13.5' wide. 75' downstream from take-off are three wooden headgates, each 41" wide. 500 yds farther downstream the diversion enters a storage pond. From the pond a wooden flume conveys the water to the flour mill, where a Smith-Morgan turbine wheel, 22" in diameter, is located. The wheel generates 75 hp at 200 rpm with 43 cfs at a 21" head. Openings into the wheel are up to 2" x 8". At the head of the flume is another by-pass and a wooden grizzly with 1" spacing. Otherwise there is no protection for fish in the ditch. During a dry summer the ditch takes the entire flow of the stream, leaving the main channel dry for 0.5 mile. (see pictures)

14. 950 yds above Station C. R.B. Small 23" wide, metal headgate, no screens.

15. 1,000 yds above Station C. R.B. Small diversion taking off above upper dam, 30" wide 9" water, plank headgate, no protective devices.

16. 1,150 yds above Station C. L.B. Approx 15 cfs. 9' wide, two wooden headgates 4' wide by 3.5' high, operated by wheel and screw, concrete abutments, no protective devices.

17. 1,250 yds above Station C. R.B. 44" wide, 3' deep' 16" water in ditch, wooden headgate, no protective devices, supplies upper part of town of Union.

18. 1,800 yds above Station C. L.B. Enters pool about 10' x 5' from which ditch takes off, ditch is 48" wide, grooves for headgate boards in concrete abutments, but no boards in place at time of survey, wire screen with 0.5" mesh over intake and iron grizzly with 3" spacing in diversion, diversion to fish hatchery.

19. 3,760 yds above Station C. L.B. Concrete abutments, 2 wooden headgates, each 4' wide by 3'8" deep, scarcely any flow at time of survey, state ditch used for irrigation and flood control, water eventually discharges into Little Creek, no protective devices.

20. 4,310 yds above Station C. L.B. Diversion to Union water supply reservoir, 28" square, no headgates or protective devices. Two diversions arise from storage reservoir: 1) 10" pipe going to cooling house, screened with cloth at lower end, 2) 36" wide diversion, approx 8 cfs, no screens.

21. 4,450 yds above Station C. L.B. Two openings each 9" by 13" wooden conduits flow 20' into Union water supply reservoir, no screens or headgates.

22. 5,500 yds above Station C. L.B. 3' wide, approx 2 cfs, no screens or headgates.

23. 5,730 yds above Station B. L.B. 1 cfs. Wooden headgate 2' square closed to within 2" of bottom, only 1 cfs at time of survey, no protective devices.

24. 7,020 yds above Station C. L.B. 2' wide, 14" water in board ditch, approx 5-8 cfs, no screen or headgates, ditch returns to river 1,200 yds downstream.

25. 8,290 yds above Station C. R.B. 2' wide, no flow at present because of silt in front of headgate, headgate 2' by 2', no protective devices.

26. 9,900 yds above Station C. L.B. Wooden headgate 2' square, no water flowing because of low water level, no screens, many small fry up to 1" long in ditch.

27. 12,520 yds above Station C. L.B. Old diversion no longer in use.

28. 16,800 yds above Station C. L.B. Approx 1 cfs. 1' wide, water is 3" deep, wood headgate, screen of 0.25" mesh galvanized wire.

29. 2,100 yds above Station D. R.B. 15" corrugated, galvanized iron pipe under earth wall, headgate formed by several boards, 5" of water running in ditch, no protective devices.

#### **Artificial Obstructions:**

1. Lower Benson Dam at Station A. Concrete abutments with stringer log across top. Boards on upstream face to control water level, 6.5" high at present. Two spillway openings and another in center leading to fishway, consisting of three steps the lowest of which had no pool. Too little water flowing to attract fish or permit passage, dam in place only during irrigation season, low water barrier. (see picture)

2. Upper Benson Dam 700 **yds** above Station A. Concrete abutments within two logs across top. Planks resting against upstream log, in center is fishway consisting of two pools 8' x 4' with notches in baffles, dam 45' to 48' wide, approx 4' high, flooded by backwater from Lower Benson dam at time of survey.

3. 3,360 yds above Station B. Wooden apron 36' wide by 18' long, 8" x 8" timber near upstream edge, probably no barrier in present condition. Formerly picket boards rested against timber at bottom and stringer log at top, not used for some time.

4. 5,250 yards above Station B. Temporary diversion dam formed by two logs laid across stream at angle, 1' high, no barrier.

5. 6,870 yds above Station B. Diversion dam, apron 6' long with 14" to 20" jump over flashboards at upper end and 14" drop to pool at lower end, low water barrier.

6. 8,260 yds above Station B. Diversion dam, upstream apron and downstream apron, the latter being 8' long, slanting somewhat with a drop of 12" to 18" at the bottom. Flashboards 1' high between two aprons, little spill, small channel around right end obstructed by brush and debris, low water barrier. (see picture)

7. 9,260 yds above Station B. Wooden apron 30' wide by 3' to 4' long, 1" to 2" above water at lower end, upper end has a 1' plank flashboard, seepage channel around one end is blocked, low water barrier.

8. 9,360 yds above Station B. Turf, log and rock diversion dam across one of two channels of stream, no barrier.

9. 10,160 yds above Station B. Loose rock wing dam diagonally across stream, 1' high, no barrier.

10. 100 yds below Station C. Concrete dam consisting of an apron varying from 2.5' wide on the left to 4' wide on the right, a 6" drop at the lower edge of the apron, and a 1' raise at the upper end, in which on the right hand side there is a high-water spillway cut-out. Flashboard 1' high on top of dam. Only 2" crest, probably a low water barrier.

11. 950 yds above Station C. Wood diversion dam 58' wide, with concrete abutments, wooden apron 9' long with downstream end 1' above river channel, upstream end has a 6" high portion formed by boards laid edgewise, topped by a 1' plank on edge making a total upstream jump of 1.5'; there is another apron extending upstream below the surface, no spill, little water seeping through, low water barrier. (see pictures)

12. 1,000 yds above Station C. Wood diversion dam with concrete abutments, 8' long by 6' high, plank apron 4' to 5' long with a 6" slope, a 1' drop from lower end of apron into pool and 1' flashboard at upper end, making a total drop of 2.5', 1" to 2" of water spilling over top and some squirting through holes and cracks, low water barrier. (see pictures)

13. 1,250 yds above Station C. Logs diagonally across stream backed by gravel, 2' high, broken through in two places for 5' to 10' wide, passable in present condition.

14. 1,800 yds above Station C. Wood diversion dam, for State Fish Hatchery, 40' wide, with an apron 12' long, flashboards at head of apron 22" high at side and 16" high in center of dam, 3" spill over latter portion, apron slopes and has drop of 6" to water surface at lower end, making a total drop of approx. 3', low water barrier. (see picture)

15. 4,310 yds above Station C. Dam for city of Union water supply, consists of a sloping concrete apron 45' wide by 30' long, with a 5' drop at the lower end and 1' flashboard at the upper, concrete abutments. A fish ladder on the right side is a trough 70' long by 25" deep by 35" wide. There are 15 baffles in the fish ladder in addition to the one at the top and the jump at the bottom, the latter being 2'. Each baffle is 12" high, with a notch 6" deep and 18" wide in one side, the notches alternating from side

to side in successive baffles. According to reports, salmon and steelheads jump over the dam, rather than use the fishway, low water barrier. (see picture) Two additional dams occur in the water supply reservoir a short distance to the left, but both of them are likewise low water barriers hence, the dam in the main stream cannot be by-passed by fish swimming through the reservoir.

16. 5,730 yds above Station C. Diversion dam formed by a plank apron 42, wide by 12, long with 2' flashboards at the upper end and a 2, drop in the slope of the apron, making a total drop of 4,. Water spreads evenly 1.5" to 2" deep over apron, wooden abutments, low water barrier.

17. 7,020 yds above Station C. Wing dam consisting of sloping upstream and downstream apron each 6' long with a 1, flashboard at the junction, no drop at lower edge of downstream apron, dam does not extend completely across stream, two logs on right are passable.

18. 8,290 yds above Station C. Diversion dam consisting of wooden apron 30, wide by 8, long, sloping upstream, 2' jump from lower end of apron into gS2T1 pool, rock-filled plank abutments, no barriers.

19. 2,100 yds above Station D. Constructed of small rocks rip-rapped over the top with cattle fence wire, 14, long with a 4' drop, water flows between stones, low water barrier.

**Natural Obstructions:** None

**Fluctuation in Water Level:**

Sta	Ft. Variation	Cause	Stream Volume	% Stream Bed Covered
A-B	ca 6,			100
B-C	ca 6'			85
C-D	2'-4'			80
D-E	2'-4'			90

Cause of Variation: Fluctuation in water level caused by rapid run-off from open country. Occasionally flash floods result from cloudbursts in the mountainous tributaries. These are deleterious to large fish.

## Stream Volumes:

- A. Flows measured at time of survey:
1. 2,400 yds above Station B at road bridge near Miller Farm - 21 cfs on 8/13/41.
  2. 150 yds below Station **D** at artesian well pipe, 68 cfs on 8/13/41.
  3. At Station E, 55 cfs on 8/13/41. Obtained by adding separate flows on North Fork and South Fork measured at their mouths.
- B. Flow records from Water Supply Paper 863, p 211. Staff gauge in SW1/4,S2,T5S,R40E, 6 miles SW of Union.
1. Period from 10/1/37 to 9/30/38:
    - Maximum flow - 1,100 cfs on 4/30/38
    - Minimum flow - 20 cfs on 9/28-29/38
    - Mean flow - 148 cfs
  2. 15 years of records:
    - Maximum flow - 1,240 cfs on 5/12/12
    - Minimum flow - 4 cfs on 11/26-27/30
    - Mean flow - 117 cfs

**Pollution:**

There apparently is a small amount of pollution of unknown source, possibly from Union and barnyards. The water was quite turbid. Considerable silt has been carried down and deposited on some of the riffles.

**Fish (salmon):**

Twenty chinooks were counted, eleven below Station D and nine above. The first chinooks were observed a short distance below the Union water supply reservoir dam. A flash flood on August 19, 1941, is said to have killed nearly every chinook in the stream. A filling station operator reported 40 dead chinooks along 0.5 mile of stream near his place.

**Fish (other than salmon):**

Species	Date	Very Abundant	Abundant	Fair No.	Scarce
Steelhead				in spring	
Rainbow				fingerlings	
				above Sta c	
Carp			in muddy flats		
			below Station c		
Suckers				below Sta C	
Chubs				below Sta C	

**Fish (other than salmon) (cont):**

Species	Date	Very Abundant	Abundant	Fair No.	Scarce
Sunfish				below Sta B	

**General Remarks:**

For only four miles below the town of Union is there any rubble in the stream, but in the lowest three miles of this section scarcely any of the rubble is usable because of heavy silt on the riffles. From here to the mouth of the stream the bottom contains nothing but mud and an occasional large stone. There are many good pools below Union, but they are probably unsuitable for salmon because of the high water temperatures in summer, reputedly reaching the 80's. Carp appear as soon as mud comprises most of the bottom, and continue in abundance to the mouth of the stream. Mallards and blue-winged teal are common. This portion of the river meanders through a broad flood plain continuous with that of the Grande Ronde River. Gradient is very shallow, being only one to a few feet per mile.

Above the town of Union the gradient begins to get steeper. It is here that all spawning activities of salmon and steelheads occur. Between Union and Station D there are two agricultural valleys, the lower, larger one continuing almost to Union, separated by a narrow V-shaped valley. In these valleys, especially the lower one, there occur some good spawning riffles and some fair resting pools. The V-shaped valleys for the most part have a gradient too steep to permit good spawning areas.

Steelheads and chinooks run in Catherine Creek. According to Phillips at the People's Market in Union, an ardent sportsman who has followed the runs with great interest, the run of steelheads appears to have been increasing over the past four years, while that of the chinooks has been steadily decreasing. Phillips estimated that perhaps 200 chinooks entered Catherine Creek in 1941. The chinooks appear from May 10 to June 1 and spawn in late August or early September.

A number of factors contribute toward making conditions in Catherine Creek unfavorable for migratory fish.

1. The surrounding country is dry, necessitating irrigation of land for successful production of certain crops. Of 19 dams in the main river channel, 11 are barriers at low water. Some of these dams which are permanent structures hold the fish up even at high water. Most of the dams consist of a slanting wooden apron with flashboards at one end and a drop at the other.

2. 1,000 yds above the town of Union a diversion to a flour mill takes all the water in summer (see Figure 1). Two by-passes from the diversion are dry when the mill is operating. Normally in summer when the mill is operating, there is no water in the main channel for 900 yards, all of it being passed through the Smith-Morgan turbine which takes 43 cfs. When the mill closes down the water spills into the river channel from the two by-passes and at times even over the lower dam. The two dams hinder the migration of salmon at high water. Natives report that salmon are often observed fighting the mill tailrace. In 1940 the mill had to be shut down temporarily to remove two steelheads which had become caught in the power wheel. Below the headgates by-pass is a pool where town boys catch salmon trapped there by mill operations.

3. The dam at the city water intake (Figure 2) is a bad low water barrier in spite of its fishway which has a drop of 2' from the lowest pool to the river. The 5' jump at the lower end of a 30' concrete apron is especially formidable. The fish ladder appears to be a standing joke with the sportsmen around Union. According to reports, the salmon and steelheads jump over the dam rather than use the fishway. In years of low stream flow many fish can be kept from reaching the upper spawning grounds by this dam.

4. Of the 29 diversions arising from the main stream, only two are screened, one of them being one of the smallest ditches on the river. The diversion to the State Fish Hatchery is protected by a 0.5" mesh screen. The diversion to the flour mill is protected only by a grizzly with 1" spacing. According to Watermaster Barnard, three other ditches were once screened after a State official had threatened action, but when all the rest of the ditch operators did not install the necessary protective devices the operators of the three ditches let their screens go unrepaired. Many fish are said to go down the ditches in spring.

5. Snagging and gigging is still allowed in the stream, although the local sportsmen claim there was none in 1941 because of ridicule. It is said that the fishermen follow the fish up the river, fishing for them at each dam as they are successively temporarily blocked. Fishing is permitted from April 15 to June 10, after which date all the salmon in the stream are protected during the layover and spawning periods.

6. Possibly as a result of timber removal in the headwaters of the tributaries, the summer water temperatures reach the low 80's in August, according to the superintendent of the fish hatchery. The hatchery cannot hold any fish after June, and hence may be forced to move.

7. Flash floods caused by cloudbursts in tributaries may be very injurious to the chinook runs. On Tuesday, August 19, 1941, a cloudburst in the Middle Fork brought down a 5' head of mud and muddy water. The fellow who runs the filling station just below

the Catherine Creek Guard Station at Station D is willing to wager that not a chinook below the Middle Fork escaped death. He says there were forty dead salmon along 0.5 mile of the river near his place.

### Temperature Data:

Station	Date	Hour	Air Temp	Water Temp	Sky
A	8/13/41	4:10 pm	80	71	Clear
2,400 yds above B	8/12/41	5:30 pm	74	70	Overcast, stratocumulus
2,400 yds above B	8/13/41	3:50 pm	78	74	Clear
2,000 yds below C	8/12/41	1:30 pm	76	66	Overcast, cumulus
2,000 yds below C	8/13/41	2:45 pm	82	69	Clear, few cumulus forming
1,150 yds above C	8/13/41	1:00 pm	79	68	Clear
2,550 yds above C	8/10/41	5:15 pm	85	71	80% clear, cirrus & altocumulus
4,900 yds below D	8/10/41	10:45 am	83	64	Clear
D	8/10/41	10:30 am	81	64	Clear
D	8/13/41	12:45 pm	81	66	Clear
4,700 yds below E	8/13/41	12:30 pm	80	61	Clear
1,200 yds below E	8/13/41	12:10 pm	76	59	Clear

### Pool Grade:

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6	Total
A-B	0.7	4	5		1		3		4
					25.0		75.0		
B-C	5.9	160	27	2	1	37	120		160
				1.3	0.6	23.1	75.0		
C-D	9.6	188	20			64	124	61	249
						34.0	66.0		
D-E	5.0	56	11		1	16	39	34	90
					1.8	28.6	69.6		
<b>Total</b>	<b>21.2</b>	<b>408</b>	<b>19</b>	<b>2</b>	<b>3</b>	<b>117</b>	<b>286</b>	<b>94</b>	<b>502</b>
				0.5	0.7	28.7	70.1		

### Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Station Elevation
Mouth-A	11.0	10	1	Mouth - ca 2,690'
A-B	0.7	1	1	A - ca 2,700'

**Gradient (cont):**

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Station Elevation
B-C	5.9	88	15	B ca 2,700'
C-D	9.6	482	50	c - 2,700'
D-E	5.0	380	76	D ca 3,270'
				E ca 3,650'
Totals	32.2	960	30	
Source of Data: Telocaset, Oregon quadrangle map, USGS				

**Tributaries:**

1. Little Creek, 1,200 yds above Station B, R.B., 10' wide, 1' to 2' deep, little flow, sluggish, all mud bottom, many carp.
2. Pile Creek, 3,360 yds above Station B, R.B., 1 cfs, too small for salmon.
3. 5,440 yds above Station B, L.B., 1.5' wide, 1 cfs, may be ditch return.
4. Little Catherine Creek, 350 yds above Station D, left bank, approx 5 cfs, 6'-7' wide.
5. North Fork at Station E, L.B., flow 28 cfs, 21' wide, 7" deep, surveyed.
6. South Fork at Station E, R.B., flow 27 cfs, 19' wide, 8" deep, surveyed.

**Supplementary Report:**Catherine Creek

At bridge on Highway 30. Width 43'. Depths 0, 18", 36", 48", 54", 56", 48", 44", 24", 12", 0 (average = 34.0 inches). Water temperature 52F, air temperature 57F, 9:20 am. All mud bottom, almost no gradient, no spawning area, banks 3-5', average 4' high, mostly steep, all earth, slight erosion of banks. Water fluctuation 2-3 ft. Marginal vegetation sparse, mostly willow, a few alders and cottonwoods. Valley flat 12-14 miles wide, all of valley under cultivation, mostly in hay and pasture, some wheat. Valley bounded by sparsely covered hills to west of La Grande and east of Cove. Some scrub pine, fir, spruce, larch near tops of hills, and some sheep grazing on hills.

## Mill Creek

**River System:** Grande Ronde River

**Name of Stream:** Mill Creek, tributary of Catherine Creek

Arises in S27, T3S, R41E towards the SE corner of Union Co., Oregon; joins Catherine Creek in S18, T3S, R40E near Cove. Approximate total length 10 miles.

The creek is small and the water extensively used for irrigation. Beaver have taken over the lowermost portion of the river where it meanders through a broad floodplain continuous with that of Catherine Creek. The bottom of this lower portion is entirely mud, and it is not until 1/2 mile below the village of Cove that usable rubble begins to appear. At Cove is a low power dam which blocks runs of migratory fish. The owner of a garage in Cove said that each year a few steelhead manage to get upstream as far as the power dam, but that they have never been seen above the dam. Chinook are not reported from the stream.

Gradient of lowest 3 miles ca. 45 ft/mile, of next 4 miles ca. 290 ft/mile.

### Supplementary Report:

**Date of Survey:** 10/11/40

### General Remarks:

Mill Creek enters on left - 3-6 feet wide. 2-10 inches deep. All mud bottom and banks.

Flow of Mill Creek about 3 cfs. Temperatures: 4:50 p.m., Mill 57F, air temperature 62F. Fluctuation in water level 3 to 5 feet.

## Ladd Creek

**River System:** Grande Ronde River  
**Name of Stream:** Ladd Creek, tributary of Catherine Creek

Ladd Creek looks like a large stream on the map, being at least 20 miles long, but of this 20 miles  $\frac{2}{3}$  lies in a broad floodplain continuous with that of the Catherine Creek and the Grande Ronde, in which the bottom composition is almost entirely mud and sand. In the canyon above the floodplain suitable rubble occurs (30-40-10-20 for example at the bridge west of **Hot** Lake), but the stream is too small to support salmon, being 6' wide, ca. 3" deep, and having a flow of 2-3 c.f.s. on August 11, 1941.

Ladd Creek flows under Highway U.S. 30 through two 36" culvert pipes. Evidently the flow does not increase enough in spring to warrant the expense of a bridge.

In the lower flat portion the water is very turbid. The stream winds through farms separating into several shallow channels in places. Willows along the banks are dense in places, absent in many others.

Bridge in S2, T4S, R38E. 1:45 pm on August 11, 1941. Air temp 66F; water temperature 65F; sky--overcast, had been raining. The gradient is ca. 1 ft/mile in the lower portion.

### Supplementary Report:

**Date of Survey:** 10/11/40

### General Remarks:

Ladd Creek at road bridge closest to mouth. Width 41'. Depths 0, 16", 12", 10", 4", 0" (average = 9.0 inches). Gradient slight. All mud bottom. Banks are 3 to 10 feet high, all mud, average 8 feet. Steep. Erosion moderate. Vegetation of willow, thornapple, service berry. Dense. No spawning area. Watershed 10-15 miles wide. Valley is flat bordered by mountains. Region highly cultivated - 90% or more. Wheat, alfalfa, some apples. Upper parts of hills sparsely to moderately covered with yellow pine.

Flow of Ladd Creek about 40 cfs. Temperatures: 4:50 p.m., Ladd 57F, air temperature 62F. Fluctuation in water level 3 to 5 feet.

## Little Creek

**River System:** Grande Ronde River

**Name of Stream:** Little Creek, tributary of Catherine Creek

Arises in S14, T4S, R41E on the north side of Bold Mt.; enters Catherine Creek in S10, T4S, R39E west of Union. Approximate total length 14 miles.

The lower part of the creek courses through a broad flat valley in which the water is extensively used for irrigation. The creek **separates into** several channels, **and** on several occasions the surveyors could not readily tell whether they were looking at the creek itself or one of its diversions. Several dams block runs of migratory fish. Carp are abundant in the lower portion.

Several miles above Union the creek enters a rather narrow canyon with steeper gradient. Here, however, the creek is too small to be usable by salmon and the rubble averages quite large.

According to Watermaster Barnard, Little Creek is intermittent. Water is diverted from Catherine Creek by 2 diversions to maintain a flow in the agricultural valley during summer.

Gradient of lowest 5 miles ca. 30 **ft/mile**, of next 5 miles ca. 160 **ft/mile**.

## Pyle Creek

River System: Grande Ronde River

Name of Stream: Pyle Creek, tributary to Catherine Creek

Arises in S16, T5S, R40E; joins Catherine Creek in S15, T4S, R39E. Approximate total length 10 miles.

Pyle Creek is a small, intermittent creek of no value to salmon. At its present confluence with Catherine Creek at the Miller Dam it was only 2' wide and flowing 1 c.f.s. or less. U.S. Highway 30 following the river between Union and Telocaset has resulted in the relocation of the channel in several places, and the dumping of large rocks into the channel. Nearly all the water that gets to the flat valley near the mouth is used for irrigation.

Gradient of lowest 4 miles ca. 25 ft/mile, of next 5 miles ca. 100 ft/mile.

## Little Catherine Creek

River System: Grande Ronde River

**Stream Surveyed:** Little Catherine Creek, tributary to Catherine Creek

Arises in S25, T4S, R41E; joins Catherine Creek in S8, T5S, R41E. Total length ca. 7 miles. One-fourth mile above the mouth Little Catherine Creek enters a narrow canyon in which the gradient is fairly steep and there are numerous log and debris jams, resulting from the construction of a forestry road along the stream. Many of the riffles in the lowest 1/4 mile are so shallow salmon would have difficulty swimming through. The stream averages only 6-7' in width with a flow of ca. 5 c.f.s. In the lowest 1/4 mile there are a few usable riffles, but in the canyon there is little usable rubble. Just after the creek leaves the canyon there is a small diversion on the right bank for a livestock watering pool.

Surrounding hills are covered with a moderately dense stand of spruce, fir, and a few ponderosa pines. Dogwood, willow, and alder are rather sparse along the stream.

Station	Date	Hour	Air	Water	Sky
mouth	8-13-41	10:15 am	76°F	61°F	clear
1 1/2 mi		10:00 am	68°F	57°F	clear

Gradient averages 240 ft/mile for the first 2 miles, 400 ft/mile for the next 2 miles.

## South Fork of Catherine Creek

**River System:** Grande Ronde River  
**Stream Surveyed:** South Fork of Catherine Creek, tributary to Catherine Creek

**Date of Survey:** August 9, 1941 by D.G. Frey

**Source:** Arises in S18, T5S, R43E, in the Eagle Cap Primitive Area of the Whitman National Forest in the SE corner of Union co., Oregon. The course of the stream is saucer shaped open towards the mouth. The stream begins flowing south at its source, bends gradually until it is flowing NW at its confluence.

**Total Length:** 9 miles of which 2.1 were surveyed.

### Station Location:

Sta	Location	Distance above prev. Station		Distance above Mouth		Map Location	Width	Depth
		vds	miles	vds	miles			
A	at mouth	0	0.0	0	0.0	S23,T5S,R41E	19'	8"
B	2.1 miles from mouth		2.1		2.1		n/a	n/a

### EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17060104	0066	0.00
B	17060104	0065	0.00

### Character of Bottom Between Stations:

Station	Area (yd <sup>2</sup> )	L.R.		M.R.		S.R.		M&S	
			%		%		%		%
A-B	16,980	3,816	22.5	6,502	38.3	3,186	18.8	3,476	13.3

	Total sq yd bottom	Sq yds spawn usable rubble		Poor	Fair	Good	Excel
est usable rubble	16980	2242	592	1670			
spawning rubble (MR & SR)	16980	9688			9368	320	

**Fish (Salmon):**

None observed. South Fork formerly had the largest run of spring chinooks of any tributary of Catherine Creek. The run has been declining rapidly, undoubtedly a result of the numerous recent log jams in the stream as well as the conditions in Catherine Creek itself.

**Fish (other than Salmon):**

None observed. Steelheads are reported to use the stream in spring. Rainbow trout occur.

**General Remarks:**

South Fork is said by the natives to have been the best of the three upper branches for salmon. Certainly it has better spawning riffles than the North Fork or Middle Fork. A road constructed along the creek several years has decreased the value of the stream for salmon through the many log and brush jams formed by the slashings. Seventeen of these were observed in the lowest 2 miles, many of them passable with great difficulty at low water and some of the possibly impassable. Quite a number of excellent resting pools were formed in connection with these barriers, but no chinooks were seen in them. The main improvement needed in this stream is to keep the channel clear of log jams. Present logging operations result in the conditions becoming worse rather than better.

**Temperature Data:**

Station	Date	Hour	Air	Water	Sky
mouth	8-9-41	2:30 pm	83°F	64°F	80% clear: cirrus & alto-cumulus
mouth	8-13-41	12:00 noon	75°F	59°F	clear

**Pool Grade:**

Station	Resting Pools	Resting Pools/Mile	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6
A-B (24.6 miles)	37	18.0	0.0	0.0	12	25	61
					32.4	67.6	

**Gradient:**

Station	Dist. miles	Total drop ft	Av drop ft/mi	Source of data	Station elevation
mth- 3	3.0	730	240	Telocaset OR, quadrangle	
miles next 3	3.0	1020	340	U.S.G.S.	3650'
miles					5400'

**Tributaries:**

- a) Spring, l-b., 1200 yds above mouth, <1 c.f.s.

## North Fork Catherine Creek

**River System:** Grande Ronde

**Name of Stream:** North Fork Catherine Creek, tributary to Catherine Creek

**Date of Survey:** August 9, 1941, by Frey and Bryant

**Source:** Arises in S16, T4S, R42E in the Whitman National Forest near the eastern edge of Union County, OR. The stream resembles in shape the minor image of a question mark. It flows north for a mile, then bends gradually to the west and SW, finally flowing almost SE for 3 miles. The stream then makes another bend and flows SW for 4 miles to its confluence South Fork.

**Approximate Total Length:** 11 miles, of which 3.6 were surveyed.

**Location of Stations:** none taken. Confluence with South Fork in NW 1/4, S13, T5S, R41E.

<u>Location</u>	<u>Width in ft.</u>	<u>Width in in.</u>
200 yds above mouth	21	8
1170 yds above mouth	20	8
5290 yds above mouth	18	8

### Character of Bottom Between Stations:

Between Sta	Total yds bottom	LR	%	MR	%	SR	%	MS	%	Est. usable	%
mouth to 8.9 mi	26250	8050	30.7	9300	35.4	6275	23.9	2625	10.0	2342	8.9

	Total sq yds bottom	Sq yd spawn use rubble	Sq Yds of			
			Poor	Fair	Good	Ex.
est usable rubble	26250	2342	1172	530	640	
spawning rubble (MR&SR)	26250	15575			13975	1600

### Spawning Area Available:

Between stations	Dist betwn sta in yds	Total sq vds bottom	Sq yd avl spawn rub	% of bottom	Sq yd usable rubble	% of bottom
mouth to end of survey	4960	20750	12775	61.6	2130	10.3

**Spawning Area Unavailable:**

Between stations	mouth to end of survey
Distance between stations in yds	1300
Total sq yds bottom	5500
Sq yds unavailable spawn rubble	2800
% of bottom	50.9
Sq yds est. usable rubble	212
% of bottom	3.9
When unavailable	L.W.

4960 yds above the mouth of the stream is a log jam considered impassable at low water.

**Character of Watershed:** low mountains covered with a spruce-fir association and some ponderosa pines. Moderately dense with fairly good reproduction. No cultivation. Valley V to \-/-shaped, 1/8-1/2 mile across top and usually about 10 yds flat land at bottom. Banks average 2-4' high but sometimes are continuous with valley walls; rubble with some earth, and bedrock in a few cases. Marginal vegetation consists of willow, alder, dogwood, few cottonwoods; mostly rather sparse, but dense in patches. Erosion quite extensive.

**Diversions:** none

**Artificial Obstructions:**

a) log jam 4960 yds above mouth. Caused by recently felled trees. 2-3' high, with branches projecting 4-5' in all directions. Water falls onto a rock cascade; hence there is not pool from which fish can jump. Low water barrier.

b) log jam 6120 yds above mouth. 40' wide, 4' drop. Water does not spill over at any point but seeps through small channels. Filled in above with medium and small rubble. Low water barrier.

c) several other log and brush jams are passable with difficulty at low water.

**Natural Obstructions:** none

**Fluctuation in Water Level:** estimated at 2-4 ft; caused by seasonal variation in precipitation and rapid runoff. ca. 70% of the stream bed was covered with water at the time of survey. A flow of 28 c.f.s was measured 200 yds above the mouth on August 13, 1941.

**Pollution:** Water was somewhat turbid and tasted slimy, but cause not known.

**Fish (salmon):** 3 adult chinooks were observed in a small pool 1 mile above mouth. In previous years chinooks have been observed up to the mouth of the Middle Fork.

**Fish other than salmon:**

- a) some steelheads are reported to use the stream in spring
- b) several rainbow trout 6-8" long were observed.
- c) trout fry (sp) 1" long were abundant in backwaters and eddies.

**General Remarks:**

Formerly there was only a trail up the North Fork, but within the past 2 years a road has been constructed upstream to the Middle Fork, then up that stream a short distance. In many places the river channel has been relocated to make way for the road. Much of the timber cut down for the roadway is lying along the present channel or in it, forming a number of log jams and brush jams, 2 of which are low water barriers and several others are passable with difficulty. the gradient is fairly steep and there are few suitable resting pools. The rubble averages a bit too large to make good spawning riffles. A number of riffles have only 1-2" of water on them, making them all but impassable at low water.

A small run of spring chinooks and steelheads still occurs in the stream. Chinooks have been observed as far upstream as the confluence with the Middle Fork; steelheads are reported to ascend for some distance further upstream.

## Temperature Data:

Distance above mouth in vds	Date	Hour	Air	Water	Sky
mouth	8-09-41	2:30 PM	83F	66F	80% clear: cirrus alto-cumulus
200	8-13-41	11:40 AM	74F	58F	clear
630	"	11:25 AM	75F	57F	clear
1170	'	11:15 AM	74F	56F	clear
1960	a-9-41	1:30 PM	87F	62F	clear: few alto- cumulus & cirrus
5260	'	12:15 PM	80F	57F	clear: few cirrus
5260	8-13-4	11:00 AM	76F	53F	clear

## Pool Grade:

Between stations	mi	Total no. rest pools	No. rest pools/mi	No	S2T1 %	No	S2T2 %	S6
mouth to end of survey	3.6	32	9	10	31.2	22	68.8	78

## Gradient:

Sta	Dist. miles	Total drop	Av drop ft/mi	Source of data	Station elevation
mouth to Middle Fk	2.4	670'	280	Telocaset OR, USGS	3650'
Mid Fk to 4 mi	4.0	1180'	295	'	4320'

## Tributaries:

- a. Buck Creek, ca. 1 mile above mouth, r.b., not located.
- b. Middle Fork Catherine Creek, 5260 yds above mouth, r.b., ca. 6' wide, steep
- c. 5950 yds above mouth, l.b., ca. 1 cfs. No value to salmon.
- d. 6600 yds above mouth, l.b., 1-2 cfs. Steep. No value to salmon.

## Middle Fork of Catherine Creek

**River System:** Grande Ronde River  
**stream Surveyed:** Middle Fork of Catherine Creek, tributary to Catherine Creek

**Date of Survey:** August 9, 1941, by Bryant

**Source:** Arises between China Cap Mt. and Burger Butte in NW 1/4, S12, T5S, R42E, towards the SE corner of Union Co, Oregon. From its source the stream flows in a general westerly direction to its confluence with North Fork, making one bend to the NW about midway in its length.

**Total Length:** 5 miles of which the lower 0.6 was surveyed.

### Station Location:

St	Location	Distance above prev. Station		Distance above Mouth		Map Location	Width	Depth
		yds	miles	yds	miles			
A	confluence w/ North Fork	0	0.0	0	0.0	S6,T5S R42E	6'	2'
B	0.6 miles above mouth		0.6		0.6		n/a	n/a

### EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17060104	0070	0.00
B	17060104	0069	0.00

### Character of Bottom Between Stations:

Station	Area (yd <sup>2</sup> )	L.R.		M.R.		S.R.		M&S	
			%		%		%		%
A-B	2,300	1,080	47.0	690	30.0	300	13.0	230	10.0
		Total sq yds bottom		yd <sup>2</sup> spawning/usable rubble		Poor	Fair	Good	Excellent
est usable rubble		2300		25		25			
spwn rubble		2300		990				990	

**Spawning Area Usable and Unavailable:**

Station	Distance vds miles	Area (yd <sup>2</sup> )	Available Spawning Area (yd <sup>2</sup> ) (MR&SR)	% Avail	Usable Spawning Area (yd <sup>2</sup> )	% Usable
A-B	1300	2,300	990	43.0	25	1.1

**Spawning Area Unavailable and Unusable:** none

**Charaoter of Watershed:**

Small, steep mountains covered with spruce, fir, and ponderosa pine in moderate density. No cultivation. Valley V-shaped, 1/8 mile wide at top, 5-50 yds. wide at bottom. Banks 5-400' high, steep, composed of earth and loose rock and sometimes of bedrock. Very dense marginal vegetation of alder, fir, pine, few cottonwoods and willow. Erosion considerable.

**Diversions:** none

**Artificial Obstructions:**

Numerous log and trash jams, possibly each passable with difficulty, but considered together they might form a barrier for fish.

**Natural Obstructions:**

Several small cascades and bedrock chutes which were considered passable individually.

**Fluctuation in Water Level:**

Estimated 2-4 ft. All of the stream channel was covered by water at time of survey. Flow estimated at 5-8 cfs.

**Pollution:** none noted.

**Fish (Salmon):**

None observed. Spring chinooks in small numbers have been reported to use the Middle Fork.

**Fish (other than Salmon):**

A few steelhead are said to use the stream each year. Small numbers of rainbow trout fingerlings 2-3" long were observed.

**General Remarks:**

Although the Middle Fork is said to support a small run of spring chinook and steelhead it has little value for these fish. The stream lies in a steep-sided, V-shaped canyon with a steep gradient accounting for numerous small cascades and several bedrock chutes. Recent road construction has pushed trees and trash into the stream, forming a number of bad log and trash jams.

Pools are small, usually shallow and not more than 2-4' long. There is very little usable spawning rubble in the stream. The flow of water is small in summer and the stream is only 1-6" deep, scarcely enough for large fish.

**Temperature Data:**

Sta	Date	Hour	Air	Water	Sky
mth	8-9-41	12:15 PM	80°F	56°F	clear, few cirrus

**Pool Grade:**

Station	Resting Pools	Resting Pools/Mile	S1T1 %	S1T2 %	S2T1 0	S2T2 2	S6
A-B (24.6 miles)	2	3.0	0	0	0.0	0.0	24
			0.0	0.0			

**Gradient:**

Between Sta	Dist. miles	Ttl drop in ft.	Av. drop ft/mile	Source of data	Station elevation
mth - 1 mile	1.0	330	330	Telocaset OR quad- range, USGS	4320'

**Gradient (cont):**

Between Sta	Dist. miles	Ttl drop in ft.	Av. drop ft/mile	Source of data	Station elevation
1 mi- Squaw Cr	1.7	640	360	" " "	5290'

**Tributaries:**

None in portion surveyed. Squaw Creek comes in from the east  
ca. 2.7 miles above the mouth.

## Five Points Creek

**River System:** Grande Ronde River  
**Stream Surveyed:** Five Points Creek

**Date of Survey:** 8-15-41

**Source:** Rises in T1S, R38E, flows south to join the Grande Ronde River in S30, T2S, R37E.

**Total Length:** 12 miles of which 2.0 miles was surveyed. Stream bed was practically dry at end of survey.

**Station Location:**

St	Location	Distance above prev. Station		Distance above Mouth		Map Location	Width	Depth
		yds	miles	yds	miles			
A	at mouth	0	0.0	0	0.0	S30, T2S, R37E	12'	2 1/4"
B	2.0 miles above mouth		2.0		2.0		10'	2"

**EPA River Reach Codes:**

Station	HUC	SEG	Rmi
A	17060104	0022	24.70
B	17060104	0023	1.66

**Character of Bottom Between Stations:**

Station	Area (yd <sup>2</sup> )	L.R.		M.R.		S.R.		M&S	
			%		%		%		%
A-B	15,900	5,800	36.5	6,930	43.0	3,210	20.2	60	0.3

**Classification of Stream Based on Amount of Usable Spawning Rubble Present:**

Total sq yds bottom	Sq yd usable sp rubble	Poor 0-10%	Fair 11-30%	Good 31-70%	Excellent 71-100%
15,900	2,080		13.1		

Classification of stream based on amount of spawning area (MR, **SR**) present:

Total sq yds bottom	Square yards sp rubble (MR&SR)	Poor	Fair	Good	Excellent
15,900	10,040			63.1	

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd <sup>2</sup> )	Available Spawning Area (yd <sup>2</sup> ) (MR&SR)	% Avail	Usable Spawning Area (yd <sup>2</sup> )	% Usable
A-B	2.0	15,900	10,040	63.1	2,080	13.1

Spawning Area Unavailable and Unusable:

Btwn St	Dist btwn stations	Total sq yds bottom	Sq yds sp area MR, SR	% of bottom	Avail when
A-B	2.0 mi	15,900	10,040	63.1	L.W.

NOTE: The Pioneer Flour Company dam, located on the Grande Ronde River below the town of La Grande, OR, is a low water barrier; hence all spawning rubble above is, both in the main river and its tributaries, must be considered as unavailable, at low water.

Character of Watershed:

	A-B
Mountainous	
Hilly	X
Rolling	
Flat	
Swampy	
Wooded	Partly
Open	Partly
% cultivated	10%

**Character of Watershed (cont):**

A-B

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Character of valley	V 200-400 yds wide
Character of banks	earth, rock, 1-3", gradual
Density of Marginal Vegetation	very sparse
Erosion:	
Banks	moderate
Watershed	slight

**Diversions:** none**Artificial Obstructions:** none**Natural Obstructions:** none**Fluctuation in Water Level:**

A-B, estimated to be 1-3'. Stream nearly dry at time of survey.

**Pollution:**

Junk and garbage from the town of Hilgard. Not very serious.

**Fish (Salmon):**

No salmon observed, but it was reported that in former years a small run of steelhead and chinooks used this stream.

**Fish (other than Salmon):**

A few small trout were found in the sheltered pools in the stream. Small chubs were abundant.

**General Remarks:**

Rising in T1S, R38E, Five Points Creek. flows in a southerly direction to join the Grande Ronde River in S30, T2S, R37E.

This stream reputed to formerly have a small run of steelhead and chinooks, as well as a good resident trout population. It was once a fairly good trout fishing stream. Of late years no one bothers to fish it because it no longer carries sufficient water. In late summer, as at the time of survey, the flow is so slight that it cannot cover the width of the old stream bed, and often trickles through riffle areas in such a manner as to form a barrier to migration of adult fish.

The high water temperature encountered, as a corollary to lack of water, are an adverse factor to survival of Salmonids. High temperatures have also promoted a heavy growth of warm water algae and other aquatic plants.

This stream can no longer be considered as being of any value to salmon or trout.

A few small trout still remain in a few sheltered pools, in the stream. These probably entered at high water from the Grande Ronde and were isolated as the stream flow decreased.

**Temperature Data:**

Sta	Date	Hour	Air	Water	Sky
A	8-15-41	1:30 PM	88°F	74°F	Sultry and overcast
B	"	10:30 AM	84°F	68°F	Sultry and overcast

**Pool Grade:**

Station	Resting Pools	Resting Pools/Mile	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6
A-B (24.6 miles)	8	5.0	0	0	1	7	0
			0.0	0.0	20.0	80.0	

**Gradient:**

Station A-B, estimated to be 1-3'.

**Tributaries:**

There were no tributaries observed in the section surveyed.

## Rock Creek

**River System:** Grande Ronde River  
**stream Surveyed:** Rock Creek

**Date of Survey:** August 15, 1941, by Zimmer

**Source:.** NE1/4,T5S,R37E

**Direction of Flow:** Flows in a northerly direction to join the Grande Ronde River in S31,T2S,R37E

**Total Length:** 15 miles, of which 1.2 miles **was** surveyed

**Station Location:**

Sta	Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
A	Confl with Grande Ronde	0	0.0	0	0.0	S31,T2S R37E	8'	4"
B	End of survey		1.2		1.2		6'	3"

**EPA River Reach Codes:**

Station	HUC	SEG	Rmi
A	17060104	0024	0.00
B	17060104	0052	0.00

**Character of Bottom Between Stations:**

Station	Area (yd <sup>2</sup> )		L.R.		M.R.		S.R.		M&S	
		%		%		%		%		%
A-B	9,800		3,480	35.5	4,590	46.8	1,730	17.7		

**Classification of stream based on amount of usable spawning rubble and area present:**

	Use sp Area(yd <sup>2</sup> )	Spawning Area(yd <sup>2</sup> )	Percent Quality (yd <sup>2</sup> )			
			Poor 0-10.5	Fair 10.6-30.5	Good 30.6-70.5	Excellent 70.6-100%
Est usable rubble	9,800	680	6.9			
Spwn area (MR + SR)	9,800	6,320			64.5	

**Spawning Area Usable and Available:**

Station	Distance vds miles	Area (yd <sup>2</sup> )	Available Spawning Area (yd <sup>2</sup> ) (MR&SR)	% unavail	Usable Spawning Area (yd <sup>2</sup> )	% Usable
A-B	1.2	9,800	6,320	64.5		

**Spawning Area Unavailable and Unusable:**

Station	Distance	Area (yd <sup>2</sup> )	Area Unavail (yd <sup>2</sup> )	% Unavail	When Avail	Usable Unavail (yd <sup>2</sup> )	% Usable
A-B	1.2		9,800		L.W.	6,320	64.5

Cause of Unavailability: The dam of the Pioneer Flour Company located just below the town of La Grande, Oregon, is a low water barrier, hence are spawning rubble above it, both in the main stream and its tributaries, must be considered as unavailable at low water.

**Character of Watershed:**


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Mountainous

Hilly X

Rolling

Flat

Swampy

Wooded partly

Open partly

Cultivated 0%

Character of Valley V-shaped, 100 yds wide

Character of Banks earth & stones  
3' - 5' deep

Density of Marginal fairly dense

**Character of Watershed (cont):**


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 Vegetation

Erosion

- |              |               |
|--------------|---------------|
| a) Banks     | very little   |
| b) Watershed | none observed |

**Diversions:** None**Artificial Obstructions:** None**Natural Obstructions:** None**Fluctuation in Water Level:**

Sta	Ft. Variation	Cause	Stream Volume	% Stream Bed Covered
A-B	est 3-4'			

**Pollution:** None**Fish (salmon):** None observed and none reported for the creek.Fish (other **than salmon**): Small suckers and chubs numerous.**General Remarks:**

Rock Creek, a tributary of the Grande Ronde River, rises in T5S,R37E and flows northwest to join the Grande Ronde River in Sec 31,T2S,R37E.

At the time of the survey, August 15, 1941, the water was very low, being not over 2" to 3" over the riffles. A farmer living in the vicinity stated that the water was actually higher than usual

for that time of year. He further stated that ordinarily the stream is practically dry during August.

The stream, at the time of the survey, was flowing at an estimated volume of 2 cfs through a rather narrow valley about 100 yds wide at the lower end to 200 yds wide at the end of the survey. Grasses predominate on the valley slopes and there is a clump of second growth bull and ponderosa pine.

The same farmer, who reported about the water level, also stated that for the past five years he has watched the stream hoping that he might see at least one salmon, but to no avail. As the stream flows through his front door yard it is possible for him to watch for fish each day.

#### Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
A	8/15/41	11:00 AM	86.0	72.0	Clear
B	8/15/41	12:00 noon	90.0	76.0	Clear

#### Pool Grade:

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S1T1 %	S1T2 %	S2T1 %	S2T2 %	s3	Total
A-B	1.2	0	0					24	24

#### Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
A-B	1.2		very slight grade	

**Tributaries:** No tributaries on section surveyed.

## Whiskey Creek

**River System:** Grande Ronde River

**Name of Stream:** Whiskey Creek

**Date of Survey:** 10/13/40

**General Remarks:**

Tributary to Grande Ronde, enters from left. Flow > 1 cfs. Rubble 0-70-30-0, 50% of bottom is exposed. Usable spawning rubble--none at present water level. Width 6 feet, Depth average 3 inches deep. Water temperature 52F **at 11:15** am, air temp 56F. Marginal vegetation willow, thornapple, cottonwood, rather sparse. Low hills bordering valley. Banks 2-4 feet high, gradual, of gravel and earth. Valley 1/4-1/2 mile wide, hill slopes covered with diverse conifers. Gradient slight to moderate. Erosion slight. Banks well covered with grass. Water clean, while that of Grande Ronde is still very turbid.

## Jordan Creek

**River System:** Grande Ronde River

**Stream surveyed:** Jordan Creek

**Date of Survey:** August 21, 1941

**Source:** Rises in S11, T5S, R37E and flows in a northwesterly direction to join the Grande Ronde River in S11, T3S, R36E.

**Direction of Flow:**

**Total Length:** 15 miles, of which 1.3 miles was surveyed, stream bed nearly dry at end of survey.

**Station Location:**

Sta	Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
A	Confl with Grande Ronde	0	0.0	0	0.0	S11, T3S R36E	5'	5.0"
B	End of survey		1.3		1.3		4'	2.5"

**EPA River Reach Codes:**

Station	HUC	SEG	Rmi
A	17060104	0028	0.25
B	17060104	0050	0.22

**Character of Bottom Between Stations:**

Station	Area (yd <sup>2</sup> )	L.R.		M.R.		S.R.		M&S	
			%		%		%		%
A-B	6,600	270	4.1	3,160	47.9	2,470	37.4	700	10.6

**Spawning Area Usable and Available: none**

**Spawning Area Unavailable and Unusable:**

Station	Distance	Area (yd <sup>2</sup> )	Area Unavail		When Avail	Usable	
			(yd <sup>2</sup> )	% Unavail		(yd <sup>2</sup> )	% Unavail
A-B	1.3	6,600			L.W.	5,630	85.3

Cause of Unavailability: Jordan Creek is unavailable at low water because of the Pioneer Flour Company dam on the Grande Ronde River below the town of La Grande, Oregon. This dam is a low water barrier, hence all spawning rubble above it, both in the main river and its tributaries is unavailable at low water.

**Character of Watershed:**

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Mountainous

Hilly slightly X

Rolling

Flat

Swampy

Wooded partly

Open partly

Cultivated 0%

Character of Valley saucer-shaped, 100-150 yds wide

Character of Banks earth & rock, 3 to 4' steep

Density of Marginal Vegetation scattered

Erosion a) Banks slight

b) Watershed none

**Diversions:** None

**Artificial Obstructions:** None

**Natural Obstructions:** None

**Fluctuation in Water Level:**

Sta	Ft. Variation	Cause	Stream Volume	% Stream Bed Covered
A-B	est 2-2.5'			

**Pollution: None**

**Fish (salmon):** It was reported by local resident that salmon formerly traveled up Jordan Creek. No salmon were observed at the time of the survey.

**Fish (other than salmon):** chubs were found in fair numbers.

**General Remarks:**

Jordan Creek, tributary of the Grande Ronde River, rises in T5S, R37E and flows northwest direction to join the Grande Ronde River in Sec 11, T3S, R36E.

At the time of the survey its stream was practically dry and a compilation of the survey notes reveals that only 6.8% of the rubble present **was** considered usable.

The lower portion of the stream meanders through rather flat meadow land with small S3 pools fairly common. The upper section of the stream flows through a rather narrow valley about 100 yards wide **average** width. There is considerable good rubble present but because of the lack of water very little of it was considered usable for spawning. There were no large resting pools anywhere in the portion of the stream surveyed.

Several farmers living in the vicinity reported that salmon had been in Jordan Creek a good many years ago. No salmon were observed by the survey party in Aug. 1941.

**Temperature Data:**

Sta	Date	Hour	Air Temp	Water Temp	Sky
A	8/21/41	9:45 am	78.0	68.0	Clear
B	8/21/41	12:00 pm	90.0	66.0	Cloudy

**Pool Grade:**

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S3	Total
A-B	1.2	0	0	<hr/>				55	55

**Gradient:** very moderate grade.

**Tributaries:** None in the section surveyed.

## Beaver Creek

**River System:** Grande Ronde River  
**Stream Surveyed:** Beaver Creek, tributary to Grande Ronde River

**Date of Survey:** August 21, 1941, by Parkhurst

**Source:** Rises in NW14,T6S,R37E

**Direction of Flow:** Flows in a northerly direction to join the Grande Ronde River in S30,T3S,R36E

**Total Length:** 22 miles, of which 1.9 miles was surveyed

**Station Location:**

Sta	Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
A	Confl with Grande Ronde R.	0	0.0	0	0.0	S30, T3S, R36E	15.0'	4.25"
B	End of Survey	3,500	1.9	3,500	1.9		8.0'	3.00"

**EPA River Reach Codes:**

Station	HUC	SEG	Rmi
A	17060104	0029	5.92
B	17060104	0047	0.00

**Character of Bottom Between Stations:**

Station	Area (yd <sup>2</sup> )	L.R.		M.R.		S.R.		M&S	
		Area (yd <sup>2</sup> )	%	Area (yd <sup>2</sup> )	%	Area (yd <sup>2</sup> )	%	Area (yd <sup>2</sup> )	%
A-B	22,900	6,710	29.3	10,580	46.2	5,390	23.5	220	1.0

**Classification of stream based on amount of usable spawning rubble and area present:**

	Area (yd <sup>2</sup> )	Usable Spawning Area (yd <sup>2</sup> )	Percent Quality (yd <sup>2</sup> )			
			Poor (0-10.5%)	Fair (10.6-30.5%)	Good (30.6-70.5%)	Excellent (70.6-100%)
Estimated usable rubble	22,900	14,580			63.7	

**classification of stream based on amount of usable spawning rubble and area present (cont):**

	Area (yd <sup>2</sup> )	Usable Spawning Area (yd <sup>2</sup> )	Percent Quality (yd <sup>2</sup> )			
			Poor (0- -10.5%)	Fair (10.6- -30.5%)	Good (30.6- -70.5%)	Excellent (70.6- -100%)
Spawning rubble (MR + SR)	22,900	15,970			69.7	

**Spawning Area Usable and Available:**

The entire Beaver Creek is unavailable at low water because of the Pioneer Flour Company dam, located on the Grande Ronde River at Island City. This dam is a low water barrier hence everything above it must be counted as being unavailable at low water.

**Spawning Area Unavailable and Unusable:**

Station	Distance	Area (yd <sup>2</sup> )	Area Unavail (yd <sup>2</sup> )	% Unavail	When Unavail	Usable Unavail (yd <sup>2</sup> )	% Usable Unavail
A-B	3,500	22,900	15,970	69.7	LW*		

\*barrier in main stream.

**Character of Watershed:**

	a-b
Mountainous	
Hilly	X
Rolling	
Flat	
Swampy	
Wooded	X
Open	partly
Cultivated	0%
Character of Valley	v to u, 100 yards to 1.0 mile wide

**Character of Watershed (cont):**

	a-b
Character of Banks	earth & rock, 1' to 4', steep
Density of Marginal Vegetation	moderate
Erosion	
a) Banks	slight
b) Watershed	none

**Diversions:** None

**Artificial Obstructions:** None

**Natural Obstructions:** None

**Fluctuation in Water Level:**

Sta	Ft. Variation	Cause	Stream Volume	% Stream Bed Covered
A-B	est. 1' to 2'			

**Pollution:** None

**Fish (salmon):** None observed and none reported.

**Fish (other than salmon):** Chubs and small trout in fair numbers.

**General Remarks:**

Rising in NW1/4, T6S, R37E, Beaver Creek flows in a northerly direction to join the Grande Ronde River in S30, T3S, R36E. The

stream is approximately 22 miles long of which 1.9 miles was surveyed August 21, 1941.

The valley through which Beaver Creek flows is very narrow, 100 to 400 yards, for about the first mile upstream from the mouth, but widens out to about one mile wide for the second mile. The terrain of the watershed is quite hilly with a rather sparse stand of pine and fir with grass and sage brush in the opened areas.

At the time of the survey, it was estimated that the flow at the mouth was 6 cfs, and at the end of the survey, 2 miles above, it was only 3 cfs.

There is considerable spawning rubble present and fairly large resting pools are quite numerous and well distributed. Roughly 60% of the stream bottom was considered as "usable" for spawning.

Chubs and small trout were found in fair numbers but no salmon were observed nor were any reported for this stream.

**Temperature Data:**

Sta	Date	Hour	Air Temp	Water Temp	Sky
A	8/21/41	9:30 AM	70.5	60.0	Clear, warm
B	8/21/41	12:30 PM	83.0	69.0	Clear, warm

**Pool Grade:**

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6	Total
A-B	1.9	34	17.9	0	0	25	9	16	50
				73.5		26.5			

**Gradient:** Very moderate grade from Station A-B.

**Tributaries:** None in section surveyed.

**Supplementary Report:**

**Date of Survey:** 10/13/40

Beaver Creek enters on left bank at 66.7 about 15 feet wide, 6" deep, flow ca. 5 cfs. Flows down a narrow valley, about 1/4 mile wide. Rubble 0-70-30-0, 75% usable, all gC. riffles. Water clear. Usual marginal vegetation, moderately dense.

## Meadow Creek

**River System:** Grande Ronde River  
**stream Surveyed:** Meadow Creek

**Date of Survey:** August 22-23, 1941, by Parkhurst and Zimmer

**Source:** Rises in T3S,R33E

**Direction of Flow:** Flows east to join the Grande Ronde River in S36,T3S,R35E.

**Total Length:** 24 miles, of which 11.5 miles surveyed

### Station Location:

Sta	Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
A	Bridge at mouth of stream	0	0.0	0	0.0	S36, T3S,R35E	45'	4.2"
B	Bridge 3.5 mi above Station A		3.5		3.5	s35, T3S,R35E	24'	5.0"
C	Bridge at Mt. Emily Lumber Co. Camp		3.6		7.1	S9, T4S,R35E	38'	4.0"
D	Bridge at Cow Camp		2.4		9.5	S36, T3S,R35E	15'	3.5"
E	End of survey, 2 mi above Cow Camp Bridge		2.0		11.5		9'	3.0"

### EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17060104	0031	0.00
B	17060104	0035	0.00
C	17060104	0035	1.37
D	17060104	0035	6.00
E	17060104	0035	8.50

### Character of Bottom Between Stations:

Station	Area (yd <sup>2</sup> )	L.R.		M.R.		S.R.		M&S	
			%		%		%		%
A-B	68,300	17,830	26.1	32,040	46.9	13,230	19.4	5,200	7.6
B-C	62,300	16,560	26.6	25,900	41.6	11,380	18.3	8,460	13.5

**Character of Bottom Between Stations (cont):**

Station	Area (yd <sup>2</sup> )	L.R.	%	M.R.	%	S.R.	%	M&S	%
C-D	53,000	11,220	21.2	25,190	47.5	13,310	25.1	3,280	6.2
D-E	16,100	2,330	14.5	7,810	48.5	4,470	27.8	1,490	9.2
<b>Total</b>	<b>199,700</b>	<b>47,940</b>	<b>24.0</b>	<b>90,940</b>	<b>45.5</b>	<b>42,390</b>	<b>21.2</b>	<b>18,430</b>	<b>9.3</b>

Station	Usable	%
A-B	13,270	19.4
B-C	19,790	31.8
C-D	7,760	14.6
D-E	6,135	38.1
<b>Total</b>	<b>46,955</b>	<b>23.5</b>

**classification of stream based on amount of usable spawning rubble and area present:**

	Usable Area (yd <sup>2</sup> )	Quality (yd <sup>2</sup> )			
		Spawning Area (yd <sup>2</sup> )	Poor (0- -10.5%)	Fair (10.6- -30.5%)	Good (30.6- -70.5%)
Estimated usable rubble	199,700	46,955		23.5	
Spawning rubble (MR + SR)	199,700	133,330		66.7	

**Spawning Area Usable and Available:**

Station	Distance vds miles	Area (yd <sup>2</sup> )	Available Spawning Area (yd <sup>2</sup> ) (MR&SR)	% Avail	Usable Spawning Area (yd <sup>2</sup> )	% Usable
A-B			45,270	66.3		
B-low water barrier			16,830	67.6		
<b>Total</b>			<b>62,100</b>	<b>66.6</b>		

**Spawning Area Unavailable and Unusable:**

Station	Distance	Area (yd <sup>2</sup> )	Area Unavail (yd <sup>2</sup> )	% Unavail	When Avail	Usable Unavail (yd <sup>2</sup> )	% Unavail
low water barrier - C			20,450	54.7	L.W.		
C-D			38,500	72.6	L.W.		
D-E			12,280	76.3	L.W.		
<b>Total</b>			<b>71,230</b>	<b>66.9</b>			

**Character of Watershed:**

	A-B	B-C	C-D	D-E
Mountainous				
Hilly	X	X	X	X
Rolling				
Flat				
Swampy				
Wooded	scattered	X	scattered	scattered
Open	partly	---	partly	partly
Cultivated	30%	---	---	
Character of Valley	Upper half U, lower half V	V, 50-100' wide	saucer shape 200-300 yds	saucer sh 100 yds - 0.25 mi
Character of Banks	earth and rock 3-6' steep	rock and earth 1-3' gradual	earth and stone 4-10' steep	gravel and earth 1-4' grad
Density of Marginal Vegetation	moderate	moderate	moderate	sparse
Erosion				
a) Banks	slight	slight	slight	slight
b) Watershed	none	none	none	no'ne

**Diversions:** None

**Artificial Obstructions:**

1. 4,250 yds above Station A. Beaver dam. Stream has cut new channel around it, no obstacles.
2. 4,400 yds above Station A. Beaver dam. Stream has cut new channel around it, no obstacle.
3. 4,550 yds below Station C. Beaver dam, passable.
4. 4,060 yds below Station C. Beaver dam, passable.

5. 4,004 yds below Station C. Beaver dam, passable.
6. 3,900 yds below Station C. Beaver dam, barrier at low water.
7. 3,748 yds below Station C. Beaver dam, passable.
8. 3,165 yds below Station C. Single log dam, no barrier.
9. 1,112 yds below Station C. Low rock dam, barrier at low water.

**Natural Obstructions:** None

**Fluctuation in Water Level:**

Sta	Ft. Variation	Cause	Stream Volume	% Stream Bed Covered
A-B	3-4'			
B-C	1-2'			
C-D	3'			
D-E	1-2'			

**Pollution:** None

**Fish (salmon):**

None observed, but it was reported that a large salmon had been taken, in the spring of the year, at the Mt. Emily Lumber Camp bridge.

**Fish (other than salmon):**

It was reported that there is a fair run of steelhead in the spring. A few small rainbow and cutthroat were observed. Chubs and suckers were very abundant.

**General Remarks:**

Rising in T3S,R33E, Meadow Creek flows in an easterly

direction to join the Grande Ronde River in S36,T3S,R35E.

From Station A, located at the confluence with the Grande Ronde River, upstream for about 1.7 miles, the creek flows through a very narrow, steep-sided canyon. The stream bed in most cases covers the entire valley floor with the exception of a narrow railroad bed. In this area large rubble and bedrock predominate with only here and there a small fairly good spawning riffle. Quite a few small trout were observed in the small pools. There were only two good resting pools present while the smaller S6 pools were quite numerous.

Above the narrow gorge area described above we find Meadow Creek as a rather slow flowing, meandering stream, winding back and forth through pasture and semi-swamp. This area of flat valley, approximately 1-2 miles wide, extends upstream for about 1.2 miles to Station B. Fresh beaver signs were quite plentiful in this section with here and there a quite large dam. The stream has cut new channels around the ends of the dams hence these were not considered as serious obstructions. There is considerable available spawning rubble present interspersed with good resting pools. It is believed that this area of the stream could support a good many spawning salmon.

From Station B, which is located 2.9 miles above the mouth, to the end of the survey, the creek flows quite rapidly through fairly hilly terrain. The watershed is lightly wooded with cutover bull and ponderosa pine. The valley is very narrow, and steep-sided, being in most cases not much wider than the stream bed. Good spawning rubble is quite abundant but the necessary deep resting pools are scarce. Exposed bedrock was observed in several instances. Beaver dams are quite numerous but all are passable. A low rock dam about one foot high, located 4.3 miles above the mouth, is a barrier to any fish migration at low water.

There were no salmon observed but it was reported that a large Chinook salmon had been taken, in the early spring, near the Mt. Emily Lumber Co. bridge (Station C on the survey). Trout were scarce but small chubs were very abundant. The keeper of the commissar at the Mt. Emily Lumber Camp stated that each spring large numbers of suckers ascend Meadow Creek. It is thought by residents living in the vicinity that the suckers exact quite a toll of salmon eggs each year. They seem to think that perhaps this has had considerably to do with the rapid decline in late years of numbers of salmon using the stream.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
A	8/29/41	11:50 am	70.0 F	60.0 F	Cloudy
B	8/29/41	12:15 pm	67.0	60.0	Cloudy

**Temperature Data (cont):**

Sta	Date	Hour	Air Temp	Water Temp	Sky
B	8/29/41	12:15 PM	67.0	60.0	Cloudy
C	8/23/41	10:30 AM	61.5	62.0	Cloudy
D	8/22/41	11:30 AM	90.0	73.5	Cloudy
E	8/22/41	1:45 PM	79.0	69.5	Rain

**Pool Grade:**

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6	Total
A-B	3.5	10	3.4			5	5	52	62
						50.0	50.0		
B-C	3.6	19	5.3			7	12	7	26
						36.9	63.1		
C-D	2.4	no resting pools						18	18
D-E	2.0	16	8.0			14	2	3	19
						87.5	12.5		
<b>Total</b>	<b>11.5</b>	<b>45</b>	<b>3.9</b>			<b>26</b>	<b>19</b>	<b>80</b>	<b>125</b>
						57.8	42.2		

**Gradient:**

Fairly steep in lower portion; moderate in middle portion; fairly steep in upper portion.

**Tributaries:**

1. Dark Canyon Creek, 1,275 yds above Station A, R.B., <0.5 cfs, no value.
2. McCoy Creek, 3,750 yds above Station A, R.B. (see survey notes).
3. Name unknown, 1,573 yds above Station B, L.B., dry.
4. Name unknown, 2,115 yds above Station B, R.B., dry.
5. Marley Creek, 789 yds below Station C, L.B., 1.0 cfs, no value.
6. Burnt Corral Creek, 950 yds above Station C, L.B., 1.0 cfs, no value.

**Tributaries (cont):**

7. Battle Creek, 2,250 yds above Station C, L.B., <0.5 cfs, no value.

8. Campbell Creek, L.B., not seen.

9. Bear Creek, 1,116 yds above Station D, L.B., 0.25 cfs, no value.

## Dark Canyon Creek

**River System:** Grande Ronde River  
**Name of Stream:** Dark Canyon Creek

**Date of Survey:** 10/13/40

**General Remarks:**

Dark Canyon Creek at 68.2 on right bank. A spur of RR goes up Dark Canyon Creek. Sta at road bridge 100 feet above Grande Ronde confluence is clear, and an excellent spawning stream. All gC riffles, at least 75% spawning area. Rubble 10-60-30-0. Width at sta 30'. Average depth 4", moderate grade. Banks 3-6' high, but in many places banks form steep sides of V shaped valley. No cultivated area. Marginal vegetation very sparse, a few pine, fir, alder. Width of valley 1/4 mile, valley bottom 50-100 yds wide. Topography low hills, sparsely covered with yellow pine, fir, spruce (took 2 pictures of confluence with Grande Ronde, showing mud in Grande Ronde). Water Temp 53F at 12:45 pm, Air temp 57F. Flow 10-15 cfs. No erosion. Grande Ronde very muddy at confluence.

## McCoy Creek

**River System:** Grande Ronde River  
**Stream Surveyed:** McCoy Creek

**Date of Survey:** August 27, 1941, by Parkhurst and Zimmer

**Source:** Rises in T3S,R33 1/2E

**Direction of Flow:**

**Total Length:** 15 miles, of which 2.9 miles surveyed

**Station Location:**

Sta	Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
A	Confl with Meadow Creek	0	0.0	0	0.0	s35, T3S,R35E	8'	4.0"
B	First road bridge above the mouth	1,960	1.1	1,960	1.1	s34, T3S,R35E	13'	2.5"
C	End of survey	3,100	1.8	3,100	2.9	S28, T3S,R35E	8'	3.0"

**EPA River Reach Codes:**

Station	HUC	SEG	Rmi
A	17060104	0031	1.69
B	17060104	0032	0.89
C	17060104	0032	1.24

**Character of Bottom Between Stations:**

Station	Area (yd <sup>2</sup> )	L.R.		M.R.		S.R.		M&S	
			%		%		%		%
A-B	8,000	340	4.2	2,070	25.9	1,130	14.1	4,460	55.8
B-C	15,900	1,510	9.5	8,160	51.3	5,130	33.4	1,920	5.8
<b>Total</b>	<b>23,900</b>	<b>1,850</b>	<b>7.7</b>	<b>10,230</b>	<b>42.8</b>	<b>6,440</b>	<b>26.9</b>	<b>5,380</b>	<b>22.5</b>

Station	Usable	%
A-B	570	7.1
B-C	1,890	11.9
<b>Total</b>	<b>2,460</b>	<b>10.3</b>

**classification of stream based on amount of usable spawning rubble and area present:**

	Area (\/*)	Usable Spawning Area (yd <sup>2</sup> )	Quality (yd <sup>2</sup> )			
			Poor (0- -10.5%)	Fair (10.6- -30.5%)	Good (30.6- -70.5%)	Excellent (70.6- -100%)
Estimated usable rubble	23,900	2,460	10.3			
Spawning rubble (MR + SR)	23,900	16,670			69.7	

**Spawning Area Usable and Available:**

Station	Distance yds	miles	Area (yd <sup>2</sup> )	Available Spawning Area (yd <sup>2</sup> ) (MR&SR)	% Avail	When Avail	Usable Spawning Area (yd <sup>2</sup> )	% Usable
A	937		3,300	1,300	39.4	L.W.		
B	1,215		4,700	1,720	36.0	H.W.		

Note: At 937 yards above Station A is located a beaver dam that is impassable at low water; all of the stream above this dam is unavailable at low water. At 1,215 yards above Station A is located a beaver dam that is impassable at all times; all of the stream above this dam is unavailable at all times.

**Spawning Area Unavailable and Unusable:**

Station	Distance	Area (yd <sup>2</sup> )	Area Unavail (yd <sup>2</sup> )	% Unavail	When Unavail
937 yds above Sta A to 1,215 yds above Station A	278 yds		420	30.00	H.W.
1,215 yds above Sta A to Sta C	3,845 yds		14,950	77.86	all times

Note: The entire stream is unavailable at low water because of the Pioneer Flour Company dam located on the main Grande Ronde River, just above Island City, Oregon.

**Character of Watershed:**

	A-B	B-C
Mountainous		
H i l l y		
Rolling	X	X
Flat		
Swampy		
Wooded		X
Open	X	
Cultivated	---	5
Character of Valley	flat	U
Character of Banks	4' earth	4-5' earth, gravel
Density of Marginal Vegetation	sparse	sparse
Erosion		
a) Banks	considerable	slight
b) Watershed	slight	none

**Diversions:** None

**Artificial Obstructions:**

1. 520 yds above Station A, beaver dam, passable.
2. 650 **yds** above Station A, beaver dam, passable.
3. 810 yds above Station A, beaver dam, passable.
4. 937 yds above Station A, beaver dam, impassable at low water.
5. 1,008 yds above Station A, beaver dam, impassable at low water.

6. 1,150 yds above Station A, beaver dam, passable.
7. 1,215 yds above Station A, beaver dam, impassable at all times.
8. 1,300 yds above Station B, beaver dam, passable.
9. 1,450 yds above Station B, beaver dam, passable.

**Natural Obstructions:** None

**Fluctuation in Water Level:** Estimated 1' to 2'

**Pollution:** None

**Fish (salmon):** None observed and none reported

**Fish (other than salmon):**

A few trout observed and suckers and chubs quite abundant.

**General Remarks:**

Rising in T3S,R33 1/2E, McCoy Creek flows in southeasterly direction to join Meadow Creek in S.25,T3S,R35E.

There is considerably good spawning rubble present in this streambed at the time of the survey, August 27, 1941, the volume of water was only 2 cfs., there were quite a few fairly deep resting pools present, however.

At 937 yards above Station A is located a beaver dam that is impassable at low water and at 1,215 yards above Station A there is a beaver dam that is impassable at all times.

Because of a low water barrier in the Grande Ronde River, located below the town of La Grande, all of McCoy Creek must be considered as unavailable at low water.

The lower portion of the stream flows rather slowly through

pasture lands. Low rolling hills characterize the terrain of the upper part. The surrounding watershed is covered with grass and sage brush with here and there a thin stand of pine.

There were no salmon observed nor were any reported for the stream. A few small trout were seen and chubs and suckers were quite abundant.

**Temperature Data:**

Sta	Date	Hour	Air Temp	Water Temp	Skv
A	8/27/41	10:15 AM	59.0 F	60.0 F	Partly cloudy
B	8/27/41	12:10 A M	65.5	66.0	Partly cloudy
C	8/27/41	11:30 AM	78.0	68.0	Partly cloudy

**Pool Grade:**

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6	Total
A-B	1.1	36	32.7			3	33	14	50
						8.3	91.7		
B-C	1.8	7	3.9			6	1	28	35
						85.7	14.3		
<b>Total</b>	<b>2.9</b>	<b>43</b>	<b>14.8</b>			<b>9</b>	<b>34</b>	<b>42</b>	<b>85</b>
						20.9	79.1		

**Gradient:** Very slight grade in lower part, moderate above.

## Sheep Creek

**River System:** Grande Ronde River

**Stream Surveyed:** Sheep Creek, tributary to Grande Ronde River

**Date of Survey:** August 28, 1941, by Parkhurst and Zimmer

**Source:** Rises in SW1/4, T6S, R35E

**Direction of Flow:** Flows east and north to join the Grande Ronde River in S25, T5S, R35E

**Total Length:** Approximately 10 miles long, 5.7 miles surveyed

**Station Location:**

Sta	Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
A	Confl with Grande Ronde R	0	0.0	0	0.0	S25, T5S, R35E	18'	3.75"
B	Highway Bridge	5,500	3.1	5,500	3.1		16'	2.50"
C	End of Survey	4,500	2.6	10,000	5.7		6'	3.00"

**EPA River Reach Codes:**

Station	HUC	SEG	Rmi
A	17060104	0040	7.90
B	17060104	0042	1.83
C	17060104	0042	3.03

**Character of Bottom Between Stations:**

Station	Area (yd <sup>2</sup> )	L.R.		M.R.		S.R.		M&S	
			%		%		%		%
A-B	22,100	140	0.6	8,760	39.6	8,310	37.6	4,890	22.2
B-C	15,000	0	0.0	5,550	37.0	6,110	40.7	3,340	22.3
<b>Total</b>	<b>37,100</b>	<b>140</b>	<b>0.4</b>	<b>14,310</b>	<b>38.6</b>	<b>14,420</b>	<b>38.8</b>	<b>8,230</b>	<b>22.2</b>

**classification of stream based on amount of usable spawning rubble and area present:**

	Area (yd <sup>2</sup> )	Usable Spawning Area (yd <sup>2</sup> )	Quality (yd <sup>2</sup> )			
			Poor (0- -10.5%)	Fair (10.6- -30.5%)	Good (30.6- -70.5%)	Excellent (70.6- -100%)
Estimated usable rubble	37,100	15,050			40.6	
Spawning rubble (MR + SR)	37,100	28,730				77.5

**spawning Area Usable and Available:**

Station	Distance yds miles	Area (yd <sup>2</sup> )	Available Spawning Area (yd <sup>2</sup> ) (MR&SR)	% Avail	When Avail	Usable Spawning Area (yd <sup>2</sup> )	% Usable
A-low water 5,500 yds			17,370	77.5	L.W.	22,400	

Note: Actually the entire Sheep Creek is unavailable at low water because of the Pioneer Flour Company diversion dam located just above Island City, on the main Grande Ronde River.

**Spawning Area Unavailable and Unusable:**

Station	Dist	Area (yd <sup>2</sup> )	Area Unavail. (yd <sup>2</sup> )	% Unavail	When Avail	Usable Unavail (yd <sup>2</sup> )	% Unavail
Low water Barrier-B	4,500 yds		11,360	77.3	L.W.	14,700	

Note: Low water barrier is a small wooden dam at 5,500 yards above Station A.

**Character of Watershed:**

	A-B	B-C
Mountainous		
Hilly	low hills	X
Rolling		
Flat		

**Character of Watershed (cont):**

	A-B	B-C
Swampy		
Wooded	scattered	X
Open	partly	partly
Cultivated	rangeland	rangeland
Character of Valley	flat	saucer-shape
Character of Banks	earth, 1-3' steep	earth, gravel, 3-4' steep
Density of Marginal Vegetation	grassland, meadow	grassland, meadow
Erosion		
a) Banks	considerable	very slight
b) Watershed	very slight	none

**Diversions:**

Diversion 1: Six inch pipe with small pump attached used to supply water to trucks. Not in operation on the day of the survey, August 28, 1941.

**Artificial Obstructions:**

1. Small wooden dam, 6' wide, 1' high. Top board notched in the center. Temporary dam to provide water for trucks. A low water barrier only. Dam is for diversion (see Diversions).

**Natural Obstructions:** None

**Fluctuation in Water Level:**

Sta	Ft. Variation	Cause	Stream Volume	% Stream Bed Covered
A-B	Est 1-2'			
B-C	Est 2-3'			

**Pollution:** None

**Fish (salmon):** None observed and none reported

**Fish (other than salmon):**

Station	Species	Date	Very			
			Abundant	Abundant	Fair	No. Scarce
A-B	Scrap fish	8/28/41		X		
	Trout fry	8/28/41				X
B-C	Chubs	8/28/41				X
	3" trout	8/28/41				X

**General Remarks:**

Rising in the SW1/4 of T6S,R35E, Sheep Creek flows in a northeasterly direction to join the Grande Ronde River in S25,T5S,R35E.

Sheep Creek is not a very large stream. It is only 18 feet wide and 3 3/4 inches deep at the mouth, and six feet wide and three inches deep at the end of the survey, 5.7 miles above the mouth.

From Station A, at the mouth of the river, to Station B, a distance of 3.1 miles, Sheep Creek flows through a very richly grassed valley. It is here that the range cattle are brought to "fatten up" before slaughter time. This valley is about 0.5 to 0.75 mile wide and all in pasture. With the exception of a few isolated areas of heavy silt concentration this section of stream was considered excellent for possible salmon spawning. Good riffle areas of medium and small rubble are very plentiful and the necessary "resting pools" are common, averaging about 41.3 pools per mile.

Above Station B, we still find the stream meandering through pastureland, with only grass for marginal vegetation. The valley floor averages about 0.25 mile wide with dense second growth bull and ponderosa pine crowding against the periphery of the valley. Good spawning riffles are quite plentiful in this section. Some silt is present but not in sufficient quantity to greatly hinder possible spawning. Good holding pools are less numerous than in the section below but this smaller S5 pools were plentiful and it was thought that even these could be used by salmon, if necessary.

The gradient of the entire area surveyed is very moderate and

the fluctuation of water level was estimated to be 1-2 feet.

There were no salmon observed nor were any reported, but small trout and scrap fish were quite plentiful.

All of Sheep Creek is unavailable at low water stages because of the Pioneer Flour Company dam located below the town of La Grande, Oregon. There is also a low water barrier in Sheep Creek itself. It is a small board dam located about 100 yards above Station B. This obstruction is of no consequence during high water.

**Temperature Data:**

Sta	Date	Hour	Air Temp	Water Temp	Sky
A	8/28/41	10:30 AM	63.0 F	60.0 F	Partly cloudy
B	8/28/41	1:00 PM	72.0	62.0	Partly cloudy
C	8/28/41	12:00 PM	78.0	68.0	Partly cloudy

**Pool Grade:**

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S1T1 %	S1T2 %	S2T1 %	S2T2 & S2T3 %	s3	Total
A-B	3.1	128	41.3			34 26.6	94 73.4	0	128
B-C	2.5	5	2.0			4 80.0	1 20.0	138	143
<b>Total</b>	<b>5.6</b>	<b>133</b>	<b>23.8</b>			<b>38</b>	<b>95</b>	<b>138</b>	<b>271</b>
						28.6	71.4		

**Gradient:** Very moderate throughout

**Tributaries:**

1. Chicken Creek, 3,400 yds above Station B, L.B., <0.5 cfs. Stream is of no value to salmon.

### South Fork of Burnt River

**River System:** Snake River

**Stream Surveyed:** South Fork Burnt River

**Date of Survey:** September 1941, Parkhurst and Zimmer

**Source:** Rises in T14S, R36E

**Direction of Flow:** Northeast

**Total Length:** Approximately 16 miles from confluence with Reclamation Service reservoir. 13.5 miles surveyed.

**Station Location:**

St	Location	Distance Above Prev. Station		Distance Above Mouth		Map Location	Width	Depth
		Yds	Miles	Yds	Miles			
A	Confl Recl resv.	---		---		S29, T12S, R37E	28'	12.5"
B	John Day hwy br		2.8		2.8	S6, T13S, R37E	15'	7.1"
C	Powell Gulch br		2.9		5.7	S12, T13S, R36E	29'	6.6"
D	Pole Creek br		2.1		7.8	S23, T13S, R36E	11'	15.1"
E	Barney Creek br		3.0		10.8	S28, T13S, R36E	29'	4.4"
F	Confl Spring Cr		2.7		13.5	S31, T13S, R36E	6'	3.6"

**EPA River Reach Codes:** N/A

**Character of Bottom Between Stations:**

Sta <sup>2</sup>	Area		L.R.		M.R.		S.R.		M&S	
				%		%		%		%
A-B	24,850	480	1.9		4,350	17.5	10,150	40.9	9,870	39.7
B-C	37,200	500	1.3		15,280	41.1	9,680	26.0	11,740	31.6
C-D	19,700	840	4.3		7,200	36.5	7,950	40.4	3,710	18.8
D-E	47,000	500	1.0		22,070	47.0	15,600	33.2	8,830	18.8
E-F	27,390	1,750	6.4		12,279	44.8	11,363	41.5	1,998	7.3
<b>Tot</b>	156,140	4,070	2.4		61,179	39.2	54,743	35.2	36,148	23.2

**Spawning Area Usable and Available:**

Station	Distance		Area (yd <sup>2</sup> )	Available Spawning Area (yd <sup>2</sup> )		Usable Spawning Area (yd <sup>2</sup> )	
	yds	miles		(MR&SR)	% Avail		% Usable
A-B	2.8		24,850	14,500		6,300	
B-C	2.9		37,200	24,960		8,990	
C-low barrier			3,650	2,920		2,315	
<b>Total</b>			65,700	42,380		17,605	

\*Note: The spawning area (available) at all times, disregarding impassable Reclamation Service dam. The Reclamation Service Dam on the main Burnt River makes unavailable at all times the entire South Fork.

**Spawning Area Unavailable and Unusable:**

Station	Distance	Area (yd <sup>2</sup> )	Area Unavail		When Avail	Usable Unavail	
			(yd <sup>2</sup> )	% Unavail		(yd <sup>2</sup> )	% Unavail
Low barrier-							
impassable dam		1,250	950		L.W.	475	
Dam-D		14,800	11,280		A.T.	8,140	
D-E		47,000	37,670		A.T.	19,100	
E-F		27,390	23,642		A.T.	18,328	
<b>Total</b>		89,190	72,592		A.T.	45,568	

\* Note: At 10,700 yds. above the confluence with the Reclamation Service reservoir is an earth and rock reservoir dam that is impassable at all times. All spawning rubble above this barrier must be considered as being unavailable at all times.

**Character of Watershed:**

	Mouth-A	A-B	B-C	C-D	D-E	E-F
Mountainous						
Hilly			X	X	X	X
Rolling		X				
Flat						
Swampy						
Wooded					X	X

**Character of Watershed (cont):**

	Mouth-A	A-B	B	-	C	C-D	D-E	E-F
Open		X		X		X		
% Cultivated		20		5		5	10	--
Character of Valley								
Character of Banks								
Density of Marginal Vegetation								

**Diversions:**

1. 1,900 yds above Station B, right bank, ditch 15' wide, average water depth 6", no protective devices. No dam in stream. Est. flow 10-12 c.f.s.
2. 5,050 yds above Station B, right bank, ditch 18' wide, average water depth 6", no protective devices. No dam in stream. Est flow 30 c.f.s.
3. 425 yds above Station C, right bank, flume is 6'4" wide, 13.5" deep, no protective devices, est. flow 10 c.f.s. Diagonal dam in stream 60' long, barrier at low water.
4. 600 yds above upper end of South Fork reservoir, right bank, 18" diameter wood pipe. No dam. No protective devices.
5. 2,000 yds above Station C. Right bank, no dam, 5 c.f.s.
6. 2,935 yds above Station C, right bank, single log wing dam in stream, passable. Estimated flow 15 c.f.s. No protective devices..
7. 3,725 yds above Station D, left bank, width 7' average, depth 14". Est. diversion 15 c.f.s. 1 c.f.s. going through gate, the remainder is by-passed to river in front of gate. No dam. No protective devices.

**Artificial Obstructions:**

1. 100 yds above St. B. Debris jam, 4' height, passable.
2. 1,000 yds above St. B. Debris jam, 2' height, passable.
3. 2,700 yds above St. B. Debris jam, 2' height, passable.
4. 3,500 yds above St. B. Debris jam, 3' height, passable.

**Artificial Obstructions (cont):**

5. 425 yds above St. C. Dam of rocks and boards, 18" height, barrier at low water; no protective devices.
6. 483 yds above St. C. Remains of plank wing dam, no obstacle.
7. 493 yds above St. C. Headgate across river, 24.5" height, passable.
8. 550 yds above St. C. Reservoir dam, earth and rock, 300' long, 40-50' height, absolutely impassable at all times.
9. 1,800 yds above St. C. Measuring box, 34.5" height, passable.
10. 2,935 yds above St. C. Single long wing dam, extends 15' from right bank. Anchored by bedrock in center of stream, 18" height, passable; no protective devices.
11. 1,300 yds above St. D. Beaver dam, passable.
12. 2,200 yds above St. D. Beaver dam, passable.
13. 4,600 yds above St. D. Beaver dam, passable.
14. 1,400 yds above St. E. Debris jam, passable with difficulty.
15. 3,000 yds above St. E. Debris jam, passable.

**Natural Obstructions:** none

**Fluctuation in Water Level:** Between all stations, the fluctuation is 1 to 2 feet.

**Pollution:** None

**Fish (salmon):** None observed,

**Fish (other than salmon):** 3 or 4 small trout were seen, and scrap fish were fairly abundant.

**General Remarks:**

Rising in T14S, R36E, the South Fork of Burnt River flows in a northeasterly direction to empty into the Reclamation Service reservoir in S29, T12S, R37E. This stream is approximately 16.0 miles long, of which 13.5 miles were surveyed in September, 1941.

**General Remarks (cont):**

From the mouth upstream for approximately 5.7 miles the creek flows through a very much pastured valley. The upper portion of this section is roughly 100-200 yds. wide, while near the mouth it is about 1/2-3/4 of a mile wide. The grassed banks are low, averaging not over 2' in height. Marginal vegetation is very sparse and predominantly of scattered clumps of alder and cottonwood. The valley is quite shallow, with gently sloping sides covered with grasses, sage brush, and a few isolated juniper. There is considerable good spawning rubble in this section but less than 1/4 of the bottom is usable because of the great amount of silt present. The gradient is very moderate and the fluctuation in water level was estimated at 1-2'. Good resting pools averaged about 40 to the mile.

Above Station C, which is at the end of the pastured valley described above, we find the stream flowing thorough a very narrow, steep sided gorge. Width of the valley is approximately 100 yds. Bare broken rock is very much evidence on the valley slopes. There is considerable good spawning rubble here, and because there is very little silt present, a large proportion of it is usable. AT 550 yds. above Sta. C., or about 6.0 miles above the Reclamation Service reservoir, is located a large earth and stone dam, roughly 40-50' high on the downstream side, about 300' long and 75' wide on the top. The outlet for this reservoir is underneath the dam and is controlled by a single headgate regulated barrier to any and all fish migration. The reservoir extends up the valley about a half mile and is about a half mile wide.

From the upper end of the reservoir upstream to the end of the survey, approximately 6.6 miles, there is a great deal of excellent spawning rubble with the percentage usable averaging around 40% of the bottom. Good resting pools were fewer in number than in the area below, but were still in sufficient numbers. The watershed through this section is quite hilly and fairly heavily wooded with bull and ponderosa pine. Just above the reservoir and extending for about 3.9 miles along the left side of the stream there is considerable good farm pasture land, but this ends near the confluence of Barney Creek. Above this point we find the cattle pasturing in the comparatively open forest area. Stream banks of earth and rock average about 3 feet. A great many old broken out beaver dams were observed above the reservoir.

The entire South Fork is unavailable at all times to migrating fish because of the impassable Reclamation Service Dam on the main Burnt River about a mile below the confluence of the South Fork.

**General Remarks (cont):**

It was estimated that the six irrigation diversions observed on the South Fork were diverting approximately 87 c.f.s. at the time of the survey. A large proportion of this was being by-passed from the ditches back to the river. None of the ditches observed had screens or other protective devices present.

Elk Creek, a tributary of the South Fork, was surveyed for a distance of 1,342 yards. It is only a small stream flowing about 8 c.f.s. September 30, 1941, but does contain some excellent spawning rubble. Of the entire bottom surveyed, 86.3% was considered usable for spawning purposes. Since Elk Creek enters the South Fork above the large, impassable, earth and rock reservoir dam, it is therefore unavailable at all times.

The Reclamation Service dam on the main Burnt River likewise makes unavailable, at all times, the North, the West and the Middle forks of the river. Observations made on these streams September 28, 1941, revealed that they have no particular value as potential salmon spawning streams. All three were practically dry when observed.

There is an earth and rock dam, 3' high and 131' long, diagonally across the North fork at 3.5 miles above the confluence with the reservoir. At the time of the observations this dam was diverting 5.9 c.f.s of the stream water and allowing less than 1 c.f.s to continue down the creek bed. There were no protective devices on this ditch. The dam is a barrier at all times as the stream never carries enough water to make it passable, and as is usually the case, there was no fish ladder present. Large rubble predominates in the North fork with here and there a small isolated riffle of medium and small rubble. Very little usable spawning rubble was observed and there were no good resting pools present.

The West and Middle forks were flowing at about 2 c.f.s when observed and were considered to be of no value.

There were no salmon observed either in the main Burnt River or in any of its tributaries, Scrap fish were plentiful and several small trout were seen in the South Fork.

**Temperature Data:**

Sta	Date	Hour	Air Temp	Water Temp	Skv
A	9/27/41	10:30 AM	55 F	49 F	Clear
B	9/30/41	3:50 PM	62	56	Cloudy
C	9/30/41	3:30 PM	65	54	Cloudy

**Temperature Data (cont):**

Sta	Date	Hour	Air Temw	Water Temw	Skv
D	9/30/41	2:30 PM	65	52	Cloudy
E	9/30/41	2:00 PM	61	52	Cloudy
F	9/30/41	1:00 PM	60	46	Cloudy

**Pool Grade:**

Sta	Dist (mi)	Rest Pls	Rest Pls/Mi	S1T2 %	S2T1 %	S2T2 %	S2T3 %	S3T1 %	S3T3 %	S5T1 %	S6
A-B	2.8	119	42.5		76	31	12				
					63.9	26.1	10.0				
B-C	2.9	102	35.2		98	4					120
					96.1	3.0					
C-D	2.1	15	7.1		15						13
					100.0						
D-E	3.0	33	11.0		30	3					153
					90.9	9.1					
E-F	2.7	4	1.5		4			9		1	16
					100.0						
<b>Tot</b>	<b>13.5</b>	<b>273</b>			<b>223</b>	<b>38</b>	<b>12</b>	<b>9</b>		<b>1</b>	<b>302</b>

\*Note: Only S2T1, S2T2, and S2T3 pools were considered resting pools

**Gradient:**

Sta	Miles dist.	In feet total drow	Av. drop wer mile	Source of data
A-B	2.8	90	32.1'	OR Sumper Quad
B-C	2.9	130	44.8'	Ironside Mt. Quad. US Geol Sur
C-D	2.1	190	90.4'	" " "
D-E	3.0	150'	50.0'	" " "
E-F	2.7	230'	85.0'	" " "

**Tributaries:**

1. Pole Creek. 4,250 yds. above Stat. B, right bank, nearly dry, no value 1/2 c.f.s.
2. Small trib. 1 c.f.s. enters left bank of reservoir, no value. Two small trib. each 1 c.f.s., no value, enter irrigation ditch running around right side of reservoir.
3. Amelia Creek. left bank, nearly dry, 1/2 c.f.s., no value.

**Tributaries (cont):**

4. Barney Creek. 5,050 yds. above Sta. D, left bank, 1 c.f.s.,  
no value.
5. Elk Creek. 2,830 yds. above Sta. E, right bank.
6. Spring Creek. 4,330 yds. above Sta. E, right bank, 1 c.f.s.,  
no value.