Bureau of Fisheries Stream Habitat Surveys

Willamette River Basin

Summary Report
1934 - 1942

DOE/BP-02246-3

January 1990

This report was funded by the Bonneville Power Administration (BPA), U.S. Department of Energy, as part of BPA's program to protect, mitigate, and enhance fish and wildlife affected by the development and operation of hydroelectric facilities on the Columbia River and its tributaries. The views of this report are the author's and do r necessarily represent the views of BPA.

This document should be cited as follows:

McIntosh,Bruce A., Sharon E. Clarke, James R. Sedell, Pacigc Northwest Research Station, USDA-Forest Service, Oregon State University, U. S. Department of Energy, Bonneville Power Administration, Division of Fish and Wildlife, Project No. 89-104, Contract No. DE-AI79-89BP02246, 492 electronic pages (BPA Report DOE/BP-02246-3)

This report and other BPA Fish and Wildlife Publications are available on the Internet at:

http://www.efw.bpa.gov/cgi-bin/efw/FW/publications.cgi

For other information on electronic documents or other printed media, contact or write to:

Bonneville Power Administration
Environment, Fish and Wildlife Division
P.O. Box 3621
905 N.E. 11th Avenue
Portland, OR 97208-3621

Please include title, author, and DOE/BP number in the request.

This report was funded by the Bonneville Power Administration (BPA), U.S. Department of Energy, as part of BPA's program to protect, mitigate, and enhance fish. and wildlife affected by the development and operation of hydroelectric facilities on the Columbia River and its tributaries. The views in this report are the author's and do not necessarily represent the views of BPA.

For additional copies of this report, write to:

Bonneville Power Administration
Public Information Center - CKPS-1
P.O. Box 3621
Portland, OR 97208

Please include'title, author, and DOE/BP number from the back cover in the request.

Summary Report for
Bureau of Fisheries Stream Habitat Surveys:

Willamette Ri ver Basin
1934-1942

Prepared by:

Bruce A. McIntosh
Sharon E. Clarke
and
James R. Sedell

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

Prepared for:

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

Project No. 89-104
Contract No. DE-AI79-89BP02246

Table of Contents

	Page
Introduction	i
Methods	iii
Literature Cited	viii
Summary Reports	1
A. Willamette River Basin	
Willamette River	1
Johnson Creek	8
Clackamas River	13
Deep Creek	21
Eagle Creek	22
Eagle Creek, North Fork	26
Delph Creek	29
Tualatin River	33
Dawson Creek	41
Beaverton Creek	42
Bronson Creek	43
Rock Creek	44
Dairy Creek	45
Emery's Mill Creek	48
McKay Creek	49
Jackson Creek	50
Gales Creek	51
Scoggins Creek	60
Molalla River	64
Pudding River	76
Beaver Creek	82
Rock Creek	83
Little Pudding River	84
Butte Creek	85
Abiqua Creek	90
Silver Creek	97
Brush Creek	105
Drift Creek	106
Milk Creek	111
Molalla River, North Fork	113
Champoeg Creek	116
Mission Creek	117
Yamhill River	118
Palmer Creek	120
North Yamhill River	121
Panther Creek	126
Baker Creek	130

Summary Reports **(cont):**

South Yamhill River 132
Cozine Creek 135
Salt Creek 136
Deer Creek 138
Muddy Creek 141
Mill Creek 142
Gooseneck Creek 145
Willamina Creek 147
Coast Creek 152
Rock Creek 153
Agency Creek 158
Santiam River 162
North Santiam River 169
Pamelia Creek 189
Downing Creek 190
Little North Santiam River 191
Blowout Creek 1 9 7
Breitenbush River 200
Breitenbush, North Fork 208
Breitenbush, South Fork 212
Marion Fork 215
Puzzle Creek 219
White Water Creek 220
South Santiam River 221
Thomas Creek 230
Crabtree Creek 238
Middle Santiam River 245
Quartzville Creek 252
Calapooia River I 258
Calapooia River II 266
Marys River 273
Long Tom River ..... 274'
Coyote Creek 278
Squaw Creek and Inman Brook 279
Noti Creek 280
Elk Creek 281
Poodle Creek 282
Jack Hayes Creek 282
McKenzie River 283
Mohawk Creek 290
Blue River 295
Lookout Creek 301
Quartz Creek 306
Deer Creek 307
McKenzie River, South Fork 310
McKenzie River, East Fork 316
French Pete Creek 318
Augusta Creek 321
Cougar Creek 325
Elk Creek 326
Walker Creek 329

Summary Reports **(cont):**

Horse Creek 330
Separation Creek 337
Lost Creek 339
Olallie Creek 341
Smith River 343
Anderson Creek 346
Middle Fork Willamette River 347
Simpson Creek 359
Tumblebug Creek 360
Big Fall Creek 363
Little Fall Creek 368
Winberry Creek 373
Portland Creek 377
Lost Creek 380
White Branch 385
Willamette River, North Fork ... 386
Christy Creek 392
Fischer Creek 398
Salmon Creek 401
Black Creek 409
Furnish Creek 413
Salt Creek 416
Eagle Creek 423
Hills Creek 424
Buck Creek 429
Coal Creek 432
Staley Creek.....; 435
Echo Creek 439
Swift Creek 440
Coast Fork Willamette River 442
Black Butte Creek 4 5 1
Row River 452
Mosby Creek 458
Sharps Creek 463
Laying Creek.....; 468
Frank Brice Creek 472

INTRODUCTION

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

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

Recently, the field notebooks from the BOF surveys were discovered. The data is now archived and stored in the Forest Science DataBank at Oregon State University (Stafford et al., 1984; 1988). These records are the earliest and most comprehensive documentation available of the condition and extent of anadromous fish habitat before hydropower development in the Columbia River Basin. They provide the baseline data for quantifying changes and setting a benchmark for future restoration of anadromous fish habitat throughout the Basin. The summaries 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 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 basis 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 to 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,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^2 and > 6 feet deep
s2: 25- to 50-yd^2 and 3-6 feet deep
s3: < 25-yd^2 and < 3 feet deep
S4: 25- to 50-yd^2 and > 6 feet deep
s5: 25- to 50-yd^2 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 informatidn 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.

LITERATURE CITED

Bryant, F.G. 1949. A survey of the Columbia River and its tributaries with special reference to its fishery resources, no. 2, Washington streams from the mouth of the Columbia River to and including the Klickitat River ,(Area I). U.S. Fish and Wildlife Service, Special Scientific Report No. 62. 110 pp.

Bryant, F.G. and Z.E. Parkhurst. 1950. Survey of the Columbia River and its tributaries. No. 4. Area III, Washington streams from the Klickitat and Snake Rivers to Grande Coulee Dam, with notes on the Columbia and its tributaries above Grande Coulee Dam. U.S. Fish and Wildlife Service. Special Scientific Reports on Fisheries No. 37. 108 pp.

Craig, J.A., and R.L. Hacker. 1940. The history and development of the fisheries of the Columbia River. Bulletin of the Bureau of Fisheries, Vol. XLIX(32).

Fulton, L.A. 1968. Spawning areas and abundance of chinook salmon (Oncorhvnchus tshawvtscha) in the Columbia River Basin-past and present. U.S. Fish and Wildlife Service Special Scientific Report: Fisheries, No. 571. 26 pp.

Fulton, L.A. 1970. Spawning areas and abundance of steelhead trout and coho, sockeye, and chum salmon in the Columbia River Basin--past and present. National Oceanic and Atmospheric Administration Special Scientific Report: Fisheries, No. 618. 37 pp.

Northwest Power Planning Council. 1986. Council staff compilation of information on salmon and steelhead losses in the Columbia River Basin. March 1986, Portland, OR. 252 pp.

Parkhurst, Z.E. 1950a. Survey of the Columbia River and its tributaries, Part 6, Area V. Snake River from the mouth through the Grande Ronde River. U.S. Fish and Wildlife Service. Special Scientific Report, Fisheries No. 39. 58 pp.

Parkhurst, Z.E. 1950b. Survey of the Columbia River and its tributaries, Part 7, Area VI. Snake River from above the Grande Ronde River through the Payette River. U.S. Fish and Wildlife Service. Special Scientific Report, Fisheries No. 40. 95 pp.

Parkhurst, Z.E. 1950c. Survey of the Columbia River and its tributaries, Part 8, Area VIII. Snake River above Payette River to upper Salmon Falls. U.S. Fish and Wildlife Service. Special Scientific Report, Fisheries No. 57. 19 pp.

Parkhurst, Z.E., F.G. Bryant, and R.S. Nelson. 1950. Survey of the Columbia River and its tributaries, Part 3. U.S. Fish and Wildlife Service. Special Scientific Report, Fisheries No. 36. 103 pp.

Rich, W.H. 1948. A survey of the Columbia River and its tributaries with special reference to the management of its fishery resources. U.S. Fish and Wildlife Service. Special Scientific Report No. 51. 25 pp.

Stafford, S.G., P.B. Alaback, G.J. Koerper, and M.W. Klopsch. 1984. Creation of a forest science data bank. Journal of Forestry 82(7):432-433.

Stafford, S.G., G. Spycher, and M.W. Klopsch. 1988. Evolution of the forest science data bank. Journal of Forestry 86(9):50-51.

Thompson, R.N., and J.B. Haas. 1960. Environmental survey pertaining to salmon and steelhead in certain rivers of eastern Oregon and the Willamette river and its tributaries. Part I. Survey reports of eastern Oregon streams. Fish Commission of Oregon, Research Division, Clackamas, Oregon. 432 pp.

Thompson, K. 1976. Columbia Basinfisheries; past, present, and future. Columbia River Fisheries Project Report. Pacific Northwest Regional Commission. 41 pp.

Willamette River

River System: Willamette River
Stream Surveyed: Main Willamette River

Date of Survey: 6/9-13/38 by Hanavan, Parkhurst, Morton, Langton & Wilding

Source: Willamette National Forest, Douglas County, Oregon, and Opal, Temanogas, and Indigo Lakes. R51/2E, T25S.

Direction of Flow: Flows northwest to Eugene then north to Portland where it joins the Columbia. The main Willamette River is formed by the confluence of the coast fork and the middle fork aproximately 2 miles above the city of Eugene, Oregon.

Total Length: 130 miles, 18 miles surveyed from a point 7 miles below the McKenzie River confluence to the confluence of the coast and middle forks.

Length: Approximately 130 miles. Upper 18 miles only surveyed, 6/9-13/38.

Station Location:

St	Location	Distance Above Prev. Station Yds	Distance Above Prev. Station Miles	Distance Above Mouth Yds	Distance Above Mouth Miles	Map Location	Width	Depth
A	Koon's grvl pit		--		0.3	S1/2,S24, T16S,R4W	330'	
B	Coburg bridge at Eugene		13.1		13.4	NW4,S30, T17S,R3W	240'	10.5-f
C	Conf. Coast and Middle Forks		3.9		17.3	NW4,S11, T18S,R3W	230'	

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090003	0062	0.00
B	17090003	0063	3.66
C	17090003	0063	10.63

Character of Bottom Between Stations:

S t	Area (yd^2)	L.R.	M.R.	S.R.	M&S
A-B	2,283,400	911,950	752,750	586,740	31,960
B-C	542,600	288,650	134,850	102,390	16,710
Tot	2,286,000	1,200,600	887,600	689,130	48,670

Classification of stream based on amount of usable spawning rubble and area present: N/A

Spawning Area Usable and Available:

Station	Distance vds	Distance miles	Area (yd^2)	Available Spawning Area (yd^2) (MR&SR)	% Avail	Usable Spawning Area (yd^2)	% Usable
A-B				1,339,490		152,630	
B-C				237,240		13,660	
Total				1,576,730		166,290	

Spawning Area Unavailable and Unusable: None

Character of Watershed:

	A-B	B-C
Mountainous		
Hilly		
Rolling		
Flat	X	X
Swampy		
Wooded		
Open	X	X
Cultivated	75%	75%
Character of Valley		

Character of Watershed **(cont):**

	A-B	B-C
Character of Banks		
Density of Marginal Vegetation		
Erosion a) Banks		
b) Watershed		

Diversions:

1. Power diversions at Oregon City Falls, mainly for paper mills. State fish wardens see that small downstream migrants are bypassed here. Not checked to obtain details by F. & W.L.S. yet.

2. Eugene, Oregon power diversion, 200-300 cfs at Eugene dam; all returned below the city. No screens on the diversion at time of survey. Effect on upstream migrants small or none; no downstream migrants known.

Artificial Obstructions:

1. Willamette or Oregon City Falls at Oregon City. This is protected by a fish ladder system that seems quite adequate.

2. Eugene Power dam, 8′ high and approx. 400′ long, located approximately 2 miles below head of river just above southside of Eugene, Oregon. Has a good fish ladder. No barrier to salmon.

Natural Obstructions: None

Fluctuation in Water Level: 6-8′

Cause of Variation: Spring runoff and seasonal rains.

Stream Volumes: At Eugene, Sta. B, 2,020 cfs, mean flow for June, 1928 (Water Resources of the State of Oregon, 1925-1930, bull. #8).

For water year 1937-38, Max. 47,500 cfs; min. 696 cfs; mean 6,610 cfs; mean for June 2,818 cfs. (U.S. Geolog. Survey Water Supply Paper #864).

Pollution:

The Willamette River is probably the most badly polluted stream of any size in the northwest.

1. Domestic sewage from Eugene, Salem, Cottage Grove, Portland, etc., in large volumes, untreated.

2. Pulp and paper and lumber mills; waste materials, sulphide liquors, etc., in large quantities dumped in all along river; particularly bad at Oregon City and below, and at various points above.

3. Fruit cannery and factory wastes, etc., at intervals all along river.

Pollution Effect: Not bad at high water when huge drainage area enables stream to be well flushed out and diluted. Therefore, probably does not seriously interfere with the large spring run of chinook and steelhead to its tributaries, as yet.

At low water it is extremely serious, and apparently getting worse each year during the warm summer months; i.e., killed crawfish, etc., in summer of 1941. Definitely known that below Oregon City and Portland on lower river the pollution is great enough to remove all oxygen, creating a zone that means death to all salmonids entering it, as shown by a test by state with young trout and salmon fingerlings all killed in less than a minute after introduction into the river water. The number of fish killed (young downstream migrants) by entering this zone is unknown, but it may be thousands, although it is believed that most of them pass this area during high water periods. More work should be done on this phase and the pollution remedied. Nothing is being done to date.

Status of Fish Runs:

A good run of spring chinook passes through the river to its various tributaries. Very few utilize the 18 miles of spawning area at the upper end of the river. Below the area surveyed, the water is too deep and good riffles lacking. A good run of steelhead is reported in some tributaries. The runs are on the decline in the tributaries at present, due to dams, pollution, logging off of headwaters, unscreened diversions, etc.

Most of the Willamette fish do not apparently enter into the commercial take, as they pass through the commercial fisheries before the season is opened. However, the take of the sportsmen, particularly in the vicinity of Oregon City, is huge. These spring runs, if maintained, will probably be the source of supply for planting and restocking of other tributaries of the Columbia River with the now greatly depleted spring run fish, and every effort should be made to protect and increase the runs.

Fish (salmon):

None seen at time of survey but a large run of spring chinooks ascends the main Willamette and enters principally the McKenzie River and the Middle Fork of the Willamette.

Fish (other than salmon):

Species	Date	Very Abundant	Abundant	Fair	No.	Scarce
Suckers	6/9-13/38		X	throughout		
Dace	"		"			
Squawfish	"		"			
Whitefish	"		"			

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
A	No data				
B	6/13/38	9:30 AM	58.0 F	56.0 F	Cloudy
C	No data				

Pool Grade:

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6 Total
A-B		223	15.9					
B-C		63	15.8					
Grand Total		286	15.8					

In most cases pools or resting areas were designated in votes as "+" marks. Each of these may have a total area of many S1 pools or the "+" mark may show a deep slow current with no definite pool area but a suitable resting area for migratory fish.

Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
A-B	14	55'	3.9'	U.S. Army Engrs.
B-C	4	40'	10.0'	Willamette R. & trib, Portland,OR 2/15/37

General Remarks:

The main Willamette River is generally regarded as beginning at the confluence of the coast and Middle Forks of the Willamette River at a point approximately 2 miles upstream from the city of Eugene, Oregon. The main river flows in a general northerly direction to its confluence with the Columbia River below Portland, Oregon. The stream is approximately 130 miles long, of which only 18 miles were actually surveyed. However, the portion surveyed, from a point 7 miles below the McKenzie River confluence up the confluence of the Coast and Middle Forks, contains the best spawning area in the main river.

A short distance below the point where the survey started the river becomes very slugg.ish, with a high percent of mud and silt covering the available spawning rubble. This condition, together with increasing amounts of pollution, lack of good riffle areas, and the high temperatures prevailing in the entire lower section of the Willamette, renders most of the main stream unsuitable for salmon spawning.

The main Willamette drains the wide, fertile, highly cultivated Willamette valley. For the most part, the stream gradient is very slight. In the area surveyed, the gradient is slight to moderate, with some extensive riffle areas. In the early days the stream was navigated by river packets as far up as Eugene, but the stream must have carried more water at that time than at present.

Although there is a large amount of available spawning area (1,576,730 sq. yds or 55.8%), in the area surveyed, actually a much lesser amount is utilized by spring chinooks, which prefer to enter the McKenzie and Middle Fork of the Willamette in an endeavor to proceed further upstream. A comparatively large run of spring chinooks pass through the main Willamette.

Two miles below the confluence of the Coast and Middle Forks of the Willamette on the south side of Eugene, the Eugene Power Dam is located. This is a concrete structure 400' long and 8' high. As there is an adequate ladder in the center of the dam, it offers no obstruction to the migration of fish. The large power diversion (200-300 cfs) is unscreened. The diversion flows through Eugene and is returned to the Willamette on the north side of Eugene.

Tributaries:

I. Willamette River System (direct tributaries only)
   1. Balch Canyon Creek (S. Portland)---no data
   * 2. Johnson Creek at Milwaukee, OR
   3. Kellog Creek " "
   * 4. Clackamas River and tribs.
   * 5. Tualatin River and tribs.
   6. Beaver Creek
   * 7. Molalla River
   8. Newland Creek

Tributaries **(cont):**

9. Boickman Creek
10. Corral Creek
I) 11. Champoig Creek
I) 12. Mission Creek
13. Hess Creek
14. Chehalem Creek
* 15. Yamhill River and tribs.
16. Spring Valley Creek (McMinville Quad.)
17. Gibson Gulch Creek
18. Mill Creek (at Salem)
19. Croisan Gulch Creek (See Salem Quad.)
20. Pettijohn Creek " " "
21. Rickreall Creek " " "
22. Ash Creek (intermittent)
* 23. Santiam River
24. Luckiamute River
25. Crooks Creek (intermittent)
26. Murder Creek
27. Second Periwinkle Creek
28. First Periwinkle Creek
Part* 29. Calapooya River
30. Bowers Slough
31. Dead River & Owl Creek
32. Dixon Creek
33. Marys River
34. Muddy Creek (east or left bank trib.)
35. Lake Creek (intermittent)
* 36. Long Tom River
37. Flat Creek (see Halsey Quad.)
38. Canterbury Creek
* 39. McKenzie River
* 40. Middle Fork of Willamette River
* 41. Coast Fork of Willamette River

I = Inspected * = Surveyed

Johnson Creek

River System: Willamette River
Stream Surveyed: Johnson Creek

Date of Survey: February 1935

Source: Northwestern Oregon (S.W. corner S26 township, R15).

Direction of Flow: West and joins the Willamette River just above Milwaukie, OR.

Total Length: 22 miles, 20 miles surveyed

Station Location:

St	Location	Distance Above Prev. Station Yds	Miles	Distance Above Mouth Yds	Miles	Map Location	Width	Depth
A	E. 82 St. bridge above mth of Johnson Cr	--			5.4	S21,T2E, R15	40'	5.5'
B	Regner rd bridge above lower station		8.9		14.3	S14,R3E, T15	13'	3.2'
C	Barnes Rd		5.6		19.9			

EPA. River Reach Codes:

Station	HUC	SEG	Rmi
M	17090012	0024	0.20
A'	17090012	0024	1.37
B	17090012	0024	12.69
c*	17090012	0024	17.81

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

Stat	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
Mth-A	76,441	7,186	9.4	10,478	13.7	30,350	39.7	28,427	37.2
A-B	115,184	1,705	1.5	8,347	7.3	30,464	26.5	74,668	64.8
B-end	18,018	5,779	32.1	3,472	19.3	4,993	27.8	3,774	20.8
Tot	209,643	14,670	7.0	22,297	10.6	65,807	31.4	106,869	51.0

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

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	% Usable
Mouth-A		40,828				
A-B		38,811				
C-end		8,465				
Total		88,104				

Spawning Area Unavailable and Unusable:

Cause of Unavailability: 2,750 paces from the mouth, there is an obstruction to migrating fish. At the time of survey (2/2/35), there were several obstructions to migrating fish. It is questionable whether these obstructions would prove serious during other periods.

Character of Watershed:

	A-B
Mountainous	
Hilly	
Rolling	
Flat	
Swampy	
Wooded	X
Open	
Cultivated	95%
Character of Valley	
Character of Banks	

Character of Watershed **(cont):**

	A-B
Density of Marginal Vegetation	
Erosion	
a) Banks	
b) Watershed	

Diversions: None (there is one 6" diameter pipe for flume returning to stream blow. Screened. 4,520 paces above Sta. A).

Artificial Obstructions:

1. 2,750 paces from mouth, makeshift dam, impassable at low water.
2. 3,219 paces from mouth, complete dam, 2' high, impassable at low water.
3. Last 3 miles of stream, concrete dam, 3' high sloping, impassable at low water.
4. Last 3 miles of stream, cement dam, 2' high, impassable at low water.
5. Last 3 miles of stream, wooden dam, 3' high, impassable at low water.
6. From above dam to forks, log jams.

Natural Obstructions: None

Fluctuation in Water Level: There is no available data.

Cause of Variation: The water level is dependent entirely on seepage and runoff. The presence of several dams would stabilize the flow.

Pollution:

Widespread over practically the entire course. It is polluted by domestic sewage, garbage and, doubtless, barnyard debris also. At 2,200 paces from Sta. A, a mill creek running under a sawmill adds to the general pollution.

Fish (salmon): None

Fish (other than salmon): None

General Remarks:

Johnson Creek is 22 miles long, about 20 miles were surveyed. The Barnes Road Bridge was near the end of survey. Crystal Springs Creek is the first tributary. There are also several, small tributaries.

Johnson Creek runs in a westerly direction through the suburbs south of Portland. Its main source of water is seepage and runoff. At the time of survey, the stream was undergoing improvement by P.W.A. workers. This work consisted of channel straightening and flood control. This activity will shorten the stream and shallow it considerably, and will also eliminate cover and pools. There are many log jams, brush jams and dams of various descriptions which were impassable at time of survey. Some, at least, were impassable at high water.

The stream is heavily polluted with domestic sewage and sawmill debris.

Sta. 1. E. 82nd St. Bridge. The air temperature was 51.0 F; water 46.0 F. These readings were taken at 2:00 pm on 2/2/34. Average depth was 5.5'; width, 40'; velocity, 2.0 fps; volume, 33 cfs. A velocity determination was made on Crystal Springs Creek. Average width 10'; average depth, 9". Flow was .9 fps or 6.5 cfs volume. A duplicate determination was made on Johnson Creek 300' below the confluence of Crystal Springs Creek with Johnson Creek. Average width was 28'; average depth, 10.3". The air and water temperatures were 55.0 F and 46.0 F, respectively. The hour was 10:30 am on 2/2/35. Volume of water 33.3 cfs; velocity 1.5 fps.

Sta. 2. Regner Road Bridge, The air and water temperatures at 2:00 am were 51.0 F and 46.0 F, respectively. The volume, 10.1' cfs; velocity 1.9 fps. At 10:30 am the air and water temperatures were 45.0 F and 44.0 F, respectively. Average width was 13'. Average depth 8.2". An estimate was made of volume flow at Barnes Road Bridge of 4 cfs. This was near the end of survey.

Fish population:

This stream is of very little consequence to salmon spawners. Although there are a few areas of spawning gravel, the high degree of pollution, the obstructions and flood control improvements and the heavily populated region in which it lies make this stream practically useless as a salmon producer.

Pool Grade

Sta	S1T1 %	S1T2 %	S2T2 %	S2T3 %	S3T1 %	S3T3 %
All	16.7	16.7	25.0	8.3	8.3	25.0

From mouth - 2,750 paces "small makeshift dam" no pool mentioned
3,219 paces 2' dam filled up on upper side

From Jenna Rd Bridge 5,370 paces "int rif and pool"
6,690 paces "rif and pool"
7,330 paces "rif and pool"

From 82nd St 1,820 paces 3' concrete dam "artificial lake"
2,000 paces 2' cement dam "artificial lake"
2,390 paces 3' wooden dam "lake and swimming pool"

Temperature Data: N/A

Gradient: N/A

Tributaries: N/A

Clackamas River

River System: Willamette River
Stream Surveyed: Clackamas River

Date of Survey: June 27-29, 1938

Source: Olallie Lake and others T9S, R8E.

Direction of Flow: Flows northwest to confluence with Willamette River near Oregon City (Mt. Hood Nat'l Forest Map).

Total Length: 95 miles, 21 miles surveyed.

Station Location:

St	Location	Distance Above Prev Station Yds	Distance Above Prev Station Miles	Distance Above Mouth Yds	Distance Above Mouth Miles	Map Location	Width	Depth
A	Park Place br.		--		1.0	S20,T2S,R2E	197'	5.0'
B	Carver br.		5.9		6.9	S18,T2S,R3E	225'	13.5'
C	Barton br.		4.9		11.8	S22,T2S,R3E	202'	7.1'
D	Eagle Creek		2.8		14.6	S36,T2S,R3E	-	-
E	River Mill dam		5.5		20.1	S20,T3S,R4E	dam	dam

EPA River Reach Codes:

Station	HUC	SEG	Rmi
M	17090012	0783	0.00
A	17090011	0001	0.00
B	17090011	0001	6.47
C	17090011	0004	0.00
D	17090011	0005	0.11
E	17090011	0005	6.19

Character of Bottom Between Stations:

Stat	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
A-B	841,100	410,680	48.8	247,520	29.4	159,520	19.0	23,380	2.8
B-C	632,900	346,800	54.8	180,150	28.7	101,370	16.0	4,580	0.7
C-D	356,300	209,640	58.8	83,940	23.5	54,520	15.3	8,200	2.3
D-E	677,400	436,610	64.4	164,570	24.3	71,400	10.6	4,820	0.7
Tot	2,507,700	1,403,730	56.0	676,180	27.0	386,810	15.4	40,980	1.6

Classification of stream based on amount of usable spawning rubble and area present: N/A

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	% Usable
A-B			407,040	'48.4		14.1
B-C			281,520	44.5		24.6
C-D			137,860	38.6		19.1
D-E			235,970	34.8		14.5
Total			1,062,390	42.5		17.7

Spawning Area Unavailable and Unusable: None

Character of Watershed:

Mountainous above Cazadero. Hilly above Barton. Flat near the mouth. Wooded occasionally to Sta. E. Forest above. Cultivated to Cazadero, 3%.

Diversions: None

Artificial Obstructions:

1. Sta. E, power dam, ladder poor.
2. Cazadero, above Sta. E, power dam, 70' high, no fish way. Salmon are taken here by U.S.B.F. Clackamas hatchery; ladder pools are small and entrance does not attract fish.

Natural Obstructions: None seen

Fluctuation in Water Level:

Floods occur from November to March. August and September are low water months.

Cause of Variation: Rain and snow runoff

Stream Volumes: Lowest flow recorded at Cazadero 750 cfs - highest flood stage, 24,000 cfs.

Pollution: None

Fish (salmon): Species - Chinook - Sta. E (tail race) over 100 seen on 6/27/38. At Cazadero dam (above E) 2 seen on 6/26/38 (pictures).

Fish (other than salmon):

Species	Date	Very Abundant	Abundant	Fair	No.	Scarce
Suckers	6/28/38		X			
Cyprinids (smallj	"		X			

General Remarks:

Topography:

From the mouth to Sta. E the drainage area contains rolling hills and flat farm lands. Above Sta. E, the river is bordered by the steep forest covered slopes of the cascade mountains.

Character of Stream:

The gradient is moderate through the entire stream section surveyed. Good spawning riffles are numerous. Adequate protection for the fish life is afforded by many long deep pools and areas of quiet water. In most places the marginal vegetation is dense, composed of alder, maple, conifer, berries, etc. Banks are moderate in some sections, steep in others. No obstructions are found below the power dam at Sta. E (temporary end of survey).

Fish Population:

The most important fish run is the spring chinook. These ascend the river in May and June and are taken by the U.S.B.F. Clackamas Hatchery at Sta. E. The eggs are hatched at Clackamas. It was impossible to estimate the time these fish were seen, the fish ladder over the dam was in operation. An attendant at the power house reported that very few fish were attracted to the ladder. About four miles above this obstruction another power dam, 70' high, forms a complete barrier, as no ladders are provided. A new very poor fish ladder has been installed over Cazadero dam since 1938 survey, but chinooks refuse to use it in fall, 1940. The Clackamas Hatchery ceased operation - no fish taken in 1940.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
A	6/28/38	5:15 PM	82.0 F	66.0 F	Clear
B	"	1:45 PM	73.0	62.0	"
C	"	12:00 PM	69.0	60.0	"
D	6/26/38	12:15 PM	68.0	62.0	"

Pool Grade:

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6 Total
A-B	7.0	90	13.0	all				
B-C	5.0	45	9.0	all				
C-D	3.0	38	12.6	all	(small pools not counted)			
D-E	6.0	52	8.7	a-11				
Total	21.0	225	10.7	all				

Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
A-B	7.0	65'	9.3'	U.S. Engineers Office Portland District
B-C	5.0	60'	12.0'	"
C-D	3.0	50'	16.7'	"
D-E	6.0	-98'	16.5'	"

Tributaries:

I. Clackamas River
  1. Rock Creek
  2. Clear Creek
    a. Swagger Creek
    b. Little Clear Creek
I. 3. Deep Creek
    a. Noyer Creek
    b. North Fork
    c. Tickle Creek
* 4. Eagle Creek
* a. North Fork
      (1) Bear Creek
      (2) Little Eagle Creek
      (3) Grabenheim Creek
* b. Delph Creek

Tributaries **(cont):**

```
I     RIVER MILL DAM------------------T-------
1     CAZADERO DAM-------------------------
      5.    North Fork Creek
            a.    Fall Creek
            b.    Bee Creek
            c.    Bedford Creek
            d.    Boyer Creek
                  (1) Winslow Creek
      6.    South Fork Creek
            a.    Memaloose Creek
      7.    Movie Creek
      8.    Fish Creek
            a.    Wash Creek
                  (1) Pick Creek
                  (2) Falls Creek
            b.    Calico Creek
      9.    Roaring River
            a.    South Fork
            b.    Splinterock Creek
            c.    Chatter Creek
      10.   Pup Creek
      11.   Dinner Creek
      12.   Three Lynx Creek
      13.   Cripple Creek
            a.    South Fork
      14.   Sandstone Creek
      15.   Bull Creek
      16.   Big 'Creek
      17.   Oak Grove Fork
            a.    Butte Creek
      ------DAM------
            b.    Kink Creek
            c.    Shellrock Creek
            d.    Peavine Creek
            e.    Stone Creek
            f.    Anvil Creek
            g.    Dinger Creek
            h.    Crater Creek
      18.   Tag Creek
      19.   Tar Creek
      20.   Trout Creek
            a.    Rod Creek
      21.   Collawash River
            a.    Spring Fork
                  (1) Sand Creek
                  (2) Pink Creek
                  (3) Thunder Creek
                  (4) Rock Creek
                  (5) Pansy Creek
                  (6) Blister Creek
```

Tributaries **(cont):**

(7) Hot Creek
(a) Whetstone Creek
(8) Nohom Creek
(a) Skin Creek
(b) Hugh Creek
(c) Paste Creek
(d) Farm Creek
(e) Peat Creek
(f) Buckeye Creek
(g) Dickey Creek
(h) Happy Creek
(i) Russ Creek
(1) Jazz Creek
(j) East Fork Collawash River
(1) Round Creek
(k) Elk Lake Creek
(1) Welcome Creek
(2) Battle Creek
(a) Mother Lode Creek
(b) Twin Lakes Creek

22. Switch Creek
23. Granite Creek
24. Pot Creek
a. Lost Creek
25. Pan Creek
26. Cabin Creek
27. Campbell Creek
28. Bonner Creek
29. Pinhead Creek
a. Last Creek'
(1) Camp Creek
b. Fall Creek
30. Wall Creek
31. Lowe Creek
32. Rhododendron Creek
a. Tumble Creek
33. Fawn Creek
34. Sisi Creek
35. Cub Creek
a. Hunter Creek
b. Berry Creek
36. Lemiti Creek
a. S. Fork
b. Slow Creek
37. Squirrel Creek
38. Olalli Creek

I = Inspected * = surveyed

(Copy enclosed with letter of transmittal from Wm. Hagen to Dr. Fish, 2/9/44)

A REPORT ON THE SPAWNING OF THE SALMON IN THE CLACKAMAS
By Ralph H. Olson, Junior Fish Culturist

During the months of September and October, 1941, limited observations were made on the spawning of the spring run of the chinook salmon in the Clackamas River, and in Eagle Creek. These observations were too limited to be able to tell just how many fish were in the runs, or to tell just how many fish spawned on each ripple. However, sufficient information was obtained to give a general picture of the conditions.

In order to make accurate observations, the use of a boat would have been necessary. It is not possible for one man to put a boat in the Clackamas River just below River Mill dam. So observations were limited to those places along the river that are accessible by foot.

The first observations were made on September 8th. At that time there were still an estimated 1,000 salmon just below River Mill Dam. There was another concentration of a like number just below the mouth of Eagle Creek. At that time, the mouth of Eagle Creek was blocked by a log jam. The State had a crew in there cutting a way through the jam.

Several days later a way was cut through the jam and soon after from a half to two thirds of the concentration moved up Eagle Creek. The remaining ones started moving up and down the river onto the ripples. At River Mill 75 salmon were counted on the first ripple spawning. One pair was found stranded and dead where the water had dropped and caught them in a shallow hole. They were only partly spawned.

By September 18th the fish had all moved out of the deep water onto the ripples. Employees at the River Mill Power Plant gave me the following figures. An estimated 25% of the River Mill run went up over the ladder. Most of the fish that went up over the ladder were the smaller ones as the large fish cannot get into the ladder. An estimated 75% of the remaining fish spawned in the first 1/4 mile below the dam. Of the fish that went up over the ladder, the majority spawned just below the Cazadero Power Plant. Reports have come in of salmon having been seen several mi. above Cazadero Dam.

Barton Bridge appears to be about as low down the Clackamas that the fish drop to spawn. Salmon were found on every ripple that was examined from Barton Bridge to River Mill. Just how far down the River Mill run dropped or just how far up the Eagle Creek run went, could not be told. The number of fish that spawned on these ripples during the season is likewise unknown. It appears that the heaviest spawning took place along near the mouth of Eagle Creek, and on that long ripple a couple of miles up the river.

Some five to seven hundred salmon, perhaps more, ascended Eagle Creek. A limited number spawned in the lower reaches of the creek. Spawning started at about Eagle Fern Park. One day, September 23:103 salmon were counted spawning from the bridge above

Report **(cont):**

Eagle Fern Park to the mouth of Delph Creek, 22 were counted on one ripple. Some 200 fish were seen later in a hole just above the falls that are a short ways above the mouth of Delph Creek. Just how far up Eagle Creek these fish went before they spawned is not known.

There is a well driller who has lived on Eagle Creek most of his life. He tells me that for many years salmon spawned in the lower end of Eagle Creek only. This year there was a large run up Eagle Creek and this is the first year for a long time that the fish have run up past the first small falls. These falls are about half a mile or more below Eagle Fern Park. This would indicate that this years run is a result from the plantings in Delph Creek four years ago.

100 dead salmon were examined. About half in the Clackamas River and the rest in Eagle Creek. 43 were females and 57 were males. Three were found that had not spawned and five males. These were found at the start of the spawning season. All of the rest of the fish examined had successfully spawned. An average of one out of every three dead fish were examined.

Three of the marked fish that were liberated at Delph Creek four years ago were found. They all were in Eagle Creek. One was found at Eagle Fern Park and the other two were found just below the mouth of Delph Creek. At this time of year when the water in Delph Creek is low, the salmon cannot enter. One day 30 salmon were seen at the point where Delph Creek flows into the creek.

From all indications the plant of chinook salmon at Delph Creek Hatchery four years ago was successful, and that there has been a good return.

(In pencil) Marks were made by clipping the adipose and right pectoral fins.

Submitted 11/17/41 by Ralph H. Olson

Deep Creek

River System: Willamette River
Stream Surveyed: Deep Creek, tributary to Clackamas River

Date: 6/28/38 by Wilding

Description:

Accessible at mouth and 1/2 mile above at Salvation Army Camp Bridge. Flow about 3 cfs – muddy – 12' dam at camp with 3' square box steps. A few steelhead are reported to enter the stream in March. Trout are present but not common.

Eagle Creek

River System: Willamette River
stream Surveyed: Eagle Creek, tributary to Clackamas River

'Date of Survey: 6/25/38 by Havavan, Wilding and Morton

Source: Mountain streams from Squaw Mt., Coffman Butte, Wildcat Mt., etc. Rises in S12, T4S, R6E.

Direction of Flow: Flows northwest and then west and northwest to the left bank of the Clackamas River about 17 miles above its confluence with the Willamette River.

Total Length: 22 miles, 9.2 miles surveyed.

Station Location:

St	Location	Map Location	Width	Depth
A	Mouth of Eagle Creek conf. w/Clackamas	S6,T2S R3E	90'	5"
B	R.R. trestle & hwy bridge	S5,T3S,R4E	60'	8"
C	Estacada br above forks	S24,T3S,R4E	40'	--
D	Falls, end survey 18'high	S30,31,T3S,R5E	30'	--

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090011	0041	0.06
B	17090011	0041	1.38
c*	17090011	0042	0.00
D	17090011	0042	2.61

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
A-B	89,800	36,620	40.8	21,340	23.7	19,580	21.7	12,260	13.8
B-C	129,500	79,470	61.6	22,000	16.9	17,740	13.6	10,290	7.9
C-D	30,100	11,890	37.9	6,860	23.3	5,810	19.6	5,540	19.2
Total	249,400	127,980	51.3	50,200	20.1	43,130	17.2	28,090	11.4

Classification of stream based on amount of usable spawning rubble and area present: N/A

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

Spawning Area Usable and Available:

Station	Distance yds· miles	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	% Usable
A-B			40,920	45.4	18,090	20.0
B-C			39,740	31.7	7,290	6.3
C-D			12,670	42.9	1,950	6.9
Total			93,330	37.3	27,330	10.9

Spawning Area Unavailable and Unusable:

Cause of Unavailability: Spawning areas above the 18, falls at Sta. D are unavailable at present. Water drops straight down. Impassable.

Character of Watershed:

	A-B	B-C	C-D
Mountainous			
Hilly			
Rolling	In upper portion		
Flat	To low hills		
Swampy			
Wooded.	Patches of timber along stream. Uplands in fields and groves.		
Open			
Cultivated	40%	40%	40%
Character of Valley			
Character of Banks			

Character of Watershed (cont):

	A-B	B-C	C-D
Density of Marginal Vegetation			
Erosion			
a) Banks			
b) Watershed			

Diversions: None

Artificial Obstructions: None

Natural Obstructions:

1. Sta. D, 9.2 mi above mth, 18' falls, impassable.
2. Fails, 36-40' wide and average of 6-8" deep at time of survey. Sheer drop over bedrock.
   Remarks: Passable log jams common in some areas.

Fluctuation in Water Level: 4-10' in flood stage

Pollution: None

Fish (salmon):

No adults were seen. 3 & 4" silvers and chinooks were plentiful.

Fish (other than salmon):

Species	Date	Very Abundant	Abundant	Fair	No.	Scarce
Trout			fairly common			
Suckers			fairly common			

General Remarks:

The lower portion has a considerable amount of sand and there is a deep canyon below the North Fork confluence. However, the little stream has a good deal of good spawning area and at the time of the survey, it was full of steelhead and salmon fry and fingerlings. Lampreys were seen spawning. -Cut banks are common and are composed of rubble except in the canyon where 80' clay

General remarks **(cont):**

cliffs are common.

Numerous fishermen were observed filling their creels with these **4-5"** salmon which they called silver trout. Although the stream itself is lined with timber, most of the surrounding territory is cut over and under cultivation.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
A	**6/25/38**	**12:15** PM	68.0 F	61.0 F	Clear
B	" "	**2:30** PM	69.0	65.0	Fair
C	"	**4:10** PM	66.0	60.0	Clear

Pool Grade:

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	**S1T1** %	**S1T2** %	**S2T1** %	**S2T2** %	S6	Total
A-B		47.	33.0	8	1	19	19	47	94
				8.0	1.0	19.0	19.0	54.0	
B-C		87	38.4	23	6	32	26	106	193
				12.0	3.0	16.0	13.0	56.0	
C-D		12	27.0	4	2	5	**1**	14	26
				14.0	9.0	20.0	7.0	50.0'	
Grnd		146.0		35	9	56	46	167	313
Tot				11.1	3.3	17.8	14.6	53.2	

Gradient: Moderate to steep

Eagle Creek, North Fork

River System: Willamette River
Stream Surveyed: North Fork Eagle Creek, tributary to Eagle Creek

Date of Survey: 6/26/38 by Morton

Source: Rises as mountain streams from McIntyre Ridge in S15,T3S,R6E.

Direction of Flow: West to the left bank of Eagle Creek 6 1/4 miles above its mouth at the State Park on Eagle Creek.

Total Length: 10 miles, 3.7 miles surveyed.

Station Location: None taken – all results summarized for whole 3.7 miles. Sta. A – at mouth; Sta. B – at end of survey.

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090011	0045	0.00
B*	17090011	0045	3.72

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
A-B	67,400	35,650	52.8	10,350	15.3	14,040	20.8	7,360	11.1

Classification of stream based on amount of usable spawning rubble and area present: N/A

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	% Usable
A-B			24,390	36.1	3,200	4.7

Spawning Area Unavailable and Unusable: None

Character of Watershed: High rolling hills cut over mostly in lower portion. 10% cultivated on uplands.

Diversions: None

Artificial Obstructions: None

Natural Obstructions:

1. Many log jams and much logging debris upstream about a mile. None impassable.

Fluctuation in Water Level: 4-10'

Pollution: Considerable silt and logging debris in lower portion - evidently not harmful.

Fish (salmon): Fry and fingerlings common. No adults seen.

Fish (dther than salmon): Trout were observed.

General Remarks:

The adjoining land of the first two miles of the stream has been recently logged off. From two miles up to the end of the survey, the creek is heavily timbered. Large rubble areas interspersed with series of 2' falls over solid reddish bedrock is typical of this section of river; log jams are common. The creek was full of 1" fingerlings - trout or salmon - and here again fishermen were observed taking 5-6" silver trout. The valley is narrow and steep and from 1/4 to 1/2 mile wide.

Temperature Data: None recorded

Pool Grade:

Sta	Resting Pools	Resting Pools/Mile	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S2T3 %	S3T1 %	S6	Total
A-B	18	4.9	34	5	21	1			51	112
			30.0	4.0	19.0	2.0			45.0	

Gradient: Moderate

Tributaries: None

Delph Creek

River System: Willamette River
Stream Surveyed: Delph Creek, tributary to Eagle Creek

Date of Survey: 6/26/38

Source: Mt. Hood National forest boundary - S31,T3S,R6E

Direction of Flow: Northwest into Eagle Creek

Total Length: 9 miles, 3 miles surveyed

Station Location:

St	Location	Distance Above Prev. Station Yds	Distance Above Prev. Station Miles	Distance Above Mouth Yds	Distance Above Mouth Miles	Map Location	Width	Depth
A	Conf. with Eagle Creek	--		--		S24,T3S, R4E	1 5	13'
B	Delph Creek Hat.		3.0		3.0	SE1/4,S36,T3S,R4E		

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090011	0618	0.00
B*	17090011	0635	0.00

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
A-B	36,500	28,250	77.4	1,220	3.3	2,980	8.2	4,050	11.1

Classification of stream based on amount of usable spawning rubble and area present: N/A

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd^2)	Available Spawning Area (yd^2) (MR&SR)	% Avail	Usable Spawning Area (yd^2)	% Usable
A-B			4,200	11.5	1,570	4.3

Spawning Area Unavailable and Unusable:

Cause of Unavailability: A few steelhead reported to reach dam but none seen above.

Character of Watershed:	A-B
Mountainous	
Hilly	X
Rolling	
Flat	
Swampy	
Wooded	Scattered woods and fields (dense woods near stream)
Open	
Cultivated	10% (estimated)
Character of Valley	
Character of Banks	
Density of Marginal Vegetation	
Erosion a) Banks	
b) Watershed	

Diversions:

Diversion 1: Hatchery diversion at Sta. B takes entire flow at low water season. Returns below ponds.

Artificial Obstructions:

1. Sta. B, diversion dam 4' high and apron. No steelhead reported above this dam.

Natural Obstructions:

1. Sta. A-B, bedrock, aprons, debris and falls 6-7' high, passable at high water.

Fluctuation in Water Level: 3-4' at flood stage.

Cause of Variation: Rain runoff

Stream Volumes: 7-8 cfs estimated

Pollution: None

Fish (salmon):

Chinook and silver salmon fry released from hatchery ponds. Date: 6/26/38 Number: Numerous

Fish (other than salmon):

Species	Date	Very Abundant	Abundant	Fair	No.	Scarce
Cutthroat	6/26/38		X (small)			
Some years a few steelhead trout are reported to reach the lower hatchery screens. None have been seen above the dam.						
Steelhead	6/26/38			X		

General Remarks:

Topography:

Stream flows through high rolling hills containing woodlands and, farms. The stream banks and adjacent steep valley slopes are densely covered with alder', cedar, fir and thick tangles of salmon berries and vines. The valley from Sta. A-B is narrow to canyonous. Above the valley is wider and the slopes moderate.

Character of Stream:

The section surveyed is very'steep. Smooth bedrock aprons and falls are numerous. Many of these were, at the time, impassable. Debris jams also create low water barriers. Pools are generally small and shallow, spawning areas poor. Steep rock banks border the stream in most sections. These indicate a flood stage 3-4' above the present stream level. There was little evidence of erosion.

Fish Population:

Fingerlings were numerous below the hatchery. They include chinook, steelhead, silvers and cutthroat. Only cutthroat were reported above the dam.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
A	6/26/38	Noon	68.0 F	58.0 F	Fair
B	"	4:00 PM	68.0	60.0	"
C			68.0	60.0	

Pool Grade:

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6	Ttl
A-B	3	24	8	7	1	13	4	282	306
				2.3	0.2	4.2	1.3	92.0	

Gradient: none noted

Tributaries:

1. Right fork, about 2 dfs at hatchery.

Tualatin River

River System: Willamette River
Stream Surveyed: Tualatin River

Date of Survey: 9/22-25/40

Source: Rises in the coastal range in Washington County. It is formed by a number of small tributaries, the exact point where it becomes the Tualatin River being uncertain.

Direction of Flow: Southeast

Total Length: 70 miles. In September 1940, an inspection was made from the mouth to Cherry Grove, Oregon and a detailed survey was made for a distance of 3.1 miles above Cherry Grove up to Lee Falls. In September 1945, a survey was made from Lee Falls upstream for a distance of approximately 1 2/3 miles. The Oswego Dam and diversion canal were also rechecked.

Station Location:.

St	Location	Map Location	Width	Depth
A	First bridqe above town of Wiilamette	S2,T3S R1E	50'	12.0"
B	Second hwy bridge above the mouth (covered bridge)	S21,T2S R1E	125'	12.0"
C	Bridge on hwy 99W	S15,T2S,R1W	198'	16.0'
D	Bridge on hwy 212 between Tualatin & Tigard	S19,T2S R1W	178'	6.8'
E	Shanberg bridge	T2S,R1W	172'	10.6'
F	Bridge on hwy 210 on way to Laurel	S10,T2S R2W	122'	9.6'
G	Harris bridge near Farmington	S21,T1S,R2W	71'	2.7'
H	Minter bridge near Hillsboro	T1S,R2W	58'	2.4'
I	Bridge near Cornelius	S9,T1S,R3W	46'	1.0'
J	Bridge near Dilley	S13,T1S,R3W	27'	1.5'
K	Bridge at Gaston	S35,T1S,R4W	34'	1.1'
L	Bridge near Cherry Grove	S36,T1S,R5W	51'	2.8'
M	Small wooden bridge 3,072 yds above Cherry Grove bridge	S26,T1S,R5W	20'	1.6'
N	12' bedrock falls approx. 3 miles above bridge near Cherry Grove	S22,T1S, R5W	25'	3.0'

Note: Stations A through K were checked by car. Sections from L to N were surveyed on foot.

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090010	0001	0.00
B	17090010	0001	4.44
C	17090010	0003	0.00
D*	17090010	0004	0.00
F	17090010	0004	4.06
G	17090010	0004	15.66
J*	17090010	0022	1.65
K	17090010	0027	0.21
L	17090010	0027	6.36
M	17090010	0028	0.00
N	17090010	0028	2.30

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
N-M	16,500	10,830	65.6.	3,175	19.2	1,195	7.2	1,300	8.0
M-L	24,820	8,902	35 9	7,790	31 4	6,306	25 4	1,822	7.3
Total	41,320	19,732	47.8	10,965	26.5	7,501	18.2	3,122	7.5

Note : Section of stream between L-N was worked downstream.

Classification of stream based on amount of usable spawning rubble and area present: N/A

Spawning Area Usable and Available:

Station	Distance yds miles	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	% Usable
N-M			4,370	26.4	452	2.7
M-L			14,096	56.8	2,000	8.1
Total			18,466	44.7	2,452	5.9

Note : Rubble is available only at high water.

Spawning Area Unavailable and Unusable:

Cause of Unavailability: The area of unvailable spawning substrate at time of survey is 18,466 yd^2. The entire river above the Oswego dam on the Tualatin approximately 3 miles above the mouth of the river is unavailable at low water, because of a poorly constructed fish ladder emptying onto a 7' wide wooden apron.

Character of Watershed:

	N-M	M-L
Mountainous	X	
Hilly		X
Rolling		
Flat		
Swampy		
Wooded	X	X
Open		X
Cultivated		40%
Character of Valley		
Character of Banks		
Density of Marginal Vegetation		
Erosion a) Banks		
b) Watershed		

Diversions: There were no irrigation diversions noted on the section of the stream that was surveyed on foot upstream from the town of Cherry Grove 3.1 miles.

Diversion 1: The most important diversion between Cherry Grove and the mouth of the stream is the Oswego Canal 6 miles above the mouth. The point of diversion is in NW 1/4, S20, T2S, R1E and the diversion dam is about 3 miles downstream, NE 1/4, S33, T2S, R1E. This canal is primarily for power and recreational purposes. The surface water supply paper no. 864 gives the following information about the canal:

Average discharge 10 years 61.4 cfs
Maximum discharge 1938, 4,000 cfs 12/30
Minimum discharge 5 cfs 1/24-29, and 2/11.

Water is not returned to power but goes from Oswego Lake into Willamette River below the mouth of the Tualatin.

Artificial Obstructions:

1. NE1/4, S33, T2S, R1E, 3 miles downstream from Oswego Canal and 3 miles above mouth, wooden dam 3′ high, a fish ladder or box is present (but inadequate, opens onto 7′ wooden apron and fish can't get in at high water). Salmon could get over any part of the dam during high water. Impassable at low water.

2. 1,268 yds below Sta. M, log jam 10-12′ high, nearly impassable during low water.

Natural Obstructions:

1. Sta. N, 3 miles above Cherry Grove, waterfalls vertical of bedrock 10-12′ high, impassable. Farmer living in vicinity has heard of steelhead trout getting up to the pool at the base of the falls.

Fluctuation in Water Level: 5-15′

Cause of Variation: Heavy precipitation in fall of the year. For the greater part of the way, the stream flows through the land with little forest vegetation to help retard the runoff.

Stream Volumes: From the Geological Survey Water Supply Paper No. 864, we have the following data:

River gauge station is 1 mile NW of Willamette
Area drained - 710 sq. miles
Records available - July 1928 - September 1938
Ave. discharge (river only) 10 years - 1,409 sec. ft.
Extremes (river only) Dec. 1938 - 22,300 sec. ft.
Minimum August 29-25 sec. ft.

Pollution: None observed

Fish (salmon):

None observed. A man living at Cherry Grove reported that he had seen quite a few salmon in the river in 1938 and 1939 in the spring of the year. Silverside salmon and steelheads are reported from the river system.

Fish (other than salmon):

Species	Date	Very Abundant	Abundant	Fair	No.	Scarce
Trout (St N-M)	9/15/40			X		

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

Species	Date	Very Abundant	Abundant	Fair	No.	Scarce
Trout, Chubs, Suckers & Steelhead (St M-L)	9/15/40		X Fingerlings			

General Remarks:

The Tualatin River rises in the coastal range of mountains and flows in a southeast direction to join with the Willamette River near the town of Willamette, Oregon. The principal tributaries of the Tualatin are listed as follows: Scoggin Creek, Gales Creek, Dairy Creek, Dawson Creek and a few small streams of no particular consequence.

Observations on the stream were taken at highway bridges between the confluence with the Willamette and upstream to the town of Cherry Grove. Above the town of Cherry Grove the stream was surveyed on foot for a distance of 3.1 miles.

The river drainage area is roughly about 710 sq. miles. Discharge in second feet, near Willamette Oregon was as follows: Maximum discharge in 1938 was 23,300 cfs December 30; minimum 25 cfs August 29. Average discharge river only 10 years - 1409 cfs.

The largest and most important diversion on the river is the Oswego Canal, which diverts water 4 1/2 miles above the river gauge station near Willamette for recreational use and for development of power at Oswego. Water is returned to Willamette River below the gauge station. The diversion dam for this canal is about 3 miles downstream from the canal in the NE 1/4, S33. Entrance of the canal is in NW 1/4, S20. Canal gauge is located 3/4 of a mile downstream from point of diversion on Tualatin River. Average discharge 10 years - 61.4 cfs. Readings for 1938 - maximum discharge 4000 cfs. December 30; minimum 5 cfs January 24-29, February 11.

From the impassable falls above Cherry Grove to Sta. L just below Cherry Grove, the stream flows through very hilly, densely wooded country. Large rubble and bedrock are very much in evidence, making up 47.8% of the stream bottom, medium and small rubble was 44.7%, and mud and silt was 7.5%. Useable spawning rubble was found to be 5.9% of the bottom. Stream banks averaged about 8', being largely of bedrock, gravel and dirt. Vegetation was very dense along the stream banks in a great many instances completely arching over the stream. Good resting pools, excluding S6 pools, averaged about 12.9 pools per mile. A man living at Cherry Grove reported that during the spring of 1938-39, he had seen quite a few large salmon in the Tualatin River. Some salmon were also seen in Roaring Creek. Trout were quite abundant in this section of the stream.

From Sta. L just below Cherry Grove downstream to the Oswego

General remarks **(cont):**

Canal diversion dam the observations that were taken at the highway bridge crossings revealed the following information:

(a) The water was quite muddy.
(b) The banks averaged about 5-10' largely of dirt.
(c) The bottom of the stream was very heavily silted.
(d) The Oswego Canal diversion dam backed up the water for about 10 to 12 miles.

Between the Oswego Canal diversion dam and the confluence with the Willamette, the stream bed had a lot of large rubble and bedrock visible. The water was quite turbid. Banks were quite high and of bedrock, gravel and dirt.

Temperature Data:

Sta	Date	Hour	Air Temw	Water Temp	Sky
A	9/14/40	lo:oo AM	71.0 F	68.0 F	Cloudy
B	"	10:15 AM	70.0	67.0	"
c	"	11:00 AM	70.0	67.0	"
D	"	12:45 PM	70.0	67.0	"
E					
F					
G	-	-	-	-	-
H	-	-	-	-	-
I					
J	9/14/40	4:30 PM	68.0	63.0	Cloudy
K	9/15/40	lo:oo AM	74.0	61.0	Clear
L					
M	9/15/40	12:15 PM	74.0	60.0	Cloudy
N	"	12:40 PM	74.0	60.0	"

Pool Grade:

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6	Total
N-M		9		3		5	1	45	54
				5.6		9.0	1.9	83.5	
M-L		9		2		6	1	39	48
				4.2		12.5	2.0	81.3	
Grand Total		18		5		11	2	84	102
				4.9		10.8	2.0	82.3	

Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
A-B	1.5	10'	6 . 7 '	OR City Quadrangle, U.S.G.S.
B-C	3.5	15'	4.2'	"
C-D	4.0	2'	.5'	Tualatin & OR City Quadrangle
D-E	3.0	6'	2.0'	"
E-F	12.0	12'	1.0'	"
F-G	5.0	5'	1.0'	"
G-L	No information available.			
L-M	Measured 1.8 miles – No information available.			
M-N	Measured 1.3 miles			

Tributaries:

* I. Tualatin River (Part surveyed 1940)
- 1. Wilson Creek
- 2. Athey Creek
- 3. Oswego Canal
- 4. Saum Creek
- 5. Fauno Creek
- 6. Rock Creek
- 7. Chicken Creek
  - a. Cedar Creek
- 8. McFee Creek
  - a. Baker Creek) uncertain which is
    - (1) Heaton Creek) trib. to which
  - b. Gulf Canyon Creek
- 9. Rock Creek
- I 10. Dawson Creek
  - I a. Rock Creek
  - I b. Beaverton Creek
    - I (1) Bronson Creek
    - (2) Cedar Mill Creek
- 11. Dairy Creek
  - I a. McKay Creek
    - I (1) Jackson Creek
    - (2) East Fork McKay Creek
  - b. Emery's Mill Creek
  - C. West Fork Dairy Creek
- 12. Gales Creek
  - a. Clear Creek
  - b. Iler Creek
  - c. Glenwood Creek
  - d. Beaver Creek
  - e. Coffee Creek
  - f. Finger Creek
  - g. south Fork Gales Creek

Tributaries **(cont):**

* 13. Scoggins Creek
a. Seine Creek

I = inspected
* - surveyed

Inspected tributaries of Tualatin River

(a) Bronson Creek - Tributary of Beaverton Creek
Observations at (1) Bridge between Orenco and Reedville. Average depth 2.5", width 4'6", date 9/22/40, time 9:30 am, sky clear, air 76.0 F, water 57.0 F.

(b) Rock Creek
Observations at (1) Highway bridge between Reedville and Orenco. Average depth 2', width 3', date 9/22/40, time 10:30 am, air 75.0 F, water 56.0 F.

(c) Dairy Creek
Observations at (1) Bridge on highway no. 47, between Banks and Manning. Average depth 5", width 14', date 9/17/40, air 62.0 F, water 52.0 F, sky clear.
(2) Bridge between Banks and Manning. Average depth 10", width 18', date 9/17/40, water 61.0 F.
(3) At Manning bridge, average depth 3'6", width 38', date 9/17/40.

(d) McKay Creek
Observations at (1) About 1 1/2 miles above Hillsboro, Oregon, average depth 17.6", width 23', date 9/22/40, 10:30 am, air 77.0 F, water 57.0 F, sky clear.
(2) Second highway bridge above Hillsboro, Oregon, average depth 12.8", width 32', 9/22/40, 10:40 am, air 78.0 F, water 57.0 F, sky clear.
(3) Bridge near North Plains, Oregon, average depth 6", width 10', 9/22/40, 11:00 am, air 77.0 F, water 59.0 F, sky clear.
(4) Br. above junction w/ Jackson Cr, no. Plains Road,

(e) Jackson Creek - tributary of McKay Creek
Observation at (1) No. Plains, Oregon, average depth 2", width 2', estimated flow 1/2 cfs.

(f) Emery's Mill Creek - tributary of Dairy Creek
Observations at (1) Bridge near Mountaindale, Oregon, average depth 10", width 30', 9/22/40, 11:00 am, air 78.0 F, water 60.0 F, sky clear.
(2) First bridge above Mountaindale on way to Bacona, average depth 9", width 21', 9/22/40.

Dawson Creek

River System: Willamette River
Name of Stream: Dawson Creek, tributary of Tualatin River

Date of Survey: 9/22/40

General Remarks:

Observations on Dawson Creek and its tributaries were made 9/22/40 at highway bridge crossing the stream.

Dawson Creek proper is roughly about 5 miles long. It winds sluggishly through pastures and cultivated fields. The bottom is of mud and the dirt banks range from 8-10' high. Dense vegetation of willow and ash line both banks. About 2 miles above Reedville, OR, the stream was found to be 22' wide, with an average depth of 15". The flow at this point was estimated to be about 4 cfs. At the highway bridge on route 8, the stream was 20' wide and around 6'6" deep. Temperatures were: air 74.0 F, water 57.0 F, 9/22/40. This stream would be of no value to salmon.

Inspected Tributaries of the Tualatin River

I. Dawson Creek

Observations at (1) about 2 miles above Reedville, Oregon. Average depth 15", width 22', 9/22/40.

(2) Highway bridge on route 8, average depth 6'6", width 20', 9/22/40, 10:00 am, air 57.0 F, water 74.0 F, clear sky.

Tributaries of Dawson Creek

Observations at (1) Highway bridge near Huber, OR. Average depth 12", width 17', 9/22/40, 9:10 am, air 65.0 F, water 55.0 F, sky clear.

(2) Bridge between Orenco and Reedville. Average depth 1.6', width 18', 9/22/40, 9:20 am, air 76.0 F, water 67.0 F, sky clear.

Beaverton Creek

River System: Willamette River
Name of Stream: Beaverton Creek, tributary to Dawson Creek

Date of Survey: 9/11/40

General Remarks:

The largest tributary of Dawson Creek and Tualatin River is about 10 miles long. Observations taken at the highway bridge near Huber, Oregon showed the stream to be 17′ wide, with an average depth of 12", water temperature was 55.0 F, 9/11/40. The bottom and banks of the stream are of mud. Water is very turbid and sluggish. The next observations were taken on the bridge between Orenco and Reedville, Oregon. Here the stream was 18′ wide, average depth 19.8", water temperature 67.0 F, 9/22/40. The water was sluggish and turbid. Cultivated land or pastures on both sides of the stream. Stream banks averaged about 6-8′ high.

Bronson Creek

River System: Willamette River
Name of Stream: Bronson Creek, tributary to Beaverton Creek

General Remarks:

A tributary of Beaverton Creek, is roughly about 8 miles long. Observations were taken at the highway bridge between Orenco and Reedville. Here the stream was found to be 4'6" wide and 2 1/2" deep. The bottom was of mud and the banks were dirt and about 4-8' high. Fairly dense vegetation of willow, alder and ash line the stream banks. Gradient: Sta. A-B, 3 miles long, total drop of 390', average drop per mile of 130'.

Rock Creek

River System: Willamette River
Name of Stream: Rock Creek, tributary to Dawson Creek

General Remarks:

A tributary of Dawson Creek and Tualatin River, is about 14 miles long. Observations were taken at the highway bridge between Reedville and Orenco. Here the stream was found to be 3′ wide and 2′ deep. Water temperature was 56.0 F. The stream had very little flow. The bottom is mud and the banks are dirt about 2–4′ high. The water is quite turbid.

The small tributaries of Dawson Creek would be of no value to salmon.

Dairy Creek

River System: Willamette River
Stream Surveyed: Dairy Creek, tributary of the Tualatin River

Date of Survey: September 1940

Source: Rises in T3N,R4W.

Direction of Flow: Flows southeast and joins with the Tualatin River in S12,T1S,R3W.

Total Length: 25 miles, surveyed by car.

Station Location:

St	Location	Maw Location	Width	Depth
A	Bridge on hwy 47 between Banks & Manning	S25, T2N, R4W	14'	5"
B	Side rd br. between Banks & Manning	S24, T2N, R4W	18'	10"
C	Manning bridge	S10, T2N, R4W	3 8 '	3'6"

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090010	0016	8.23
B	17090010	0016	11.49
C	17090010	0016	14.22

Character of Bottom Between Stations: Mud and sand covered stream bottom for Stations A, B, and C

Classification of stream based on amount of usable spawning rubble and area present: N/A

Spawning Area Usable and Available: No information available.

Spawning Area Unavailable and Unusable: No information available.

Character of Watershed:

	A	B	C
Mountainous			
Hilly			
Rolling		X	X
Flat	X		
Swampy			
Wooded			
Open			
Cultivated	90%	80%	60%
Character of Valley			
Character of Banks			
Density of Marginal Vegetation			
Erosion a) Banks			
b) Watershed			

Diversions: None observed.

Artificial Obstructions:

1. About 200 yds below highway bridge in Manning, log pond dam 38′ wide - planks and boards - 58′ high. A fish ladder is present made of 2"x12" planks, 6" baffles on bottom. Ladder is 30" wide, 4 baffles, sections of ladder look too small to be of much use to salmon.

Natural Obstructions: None observed.

Fluctuation in Water Level: 4-6′ estimated

Cause of Variation: Seasonal fluctuation of precipitation.
Stream Volumes: At Sta. A, flow was estimated at 8 cfs.

Pollution: None observed and no information available.

Fish (salmon): None observed and no information available.

Fish (other than salmon): None observed and no information available.

General Remarks:

Dairy Creek, a small mud bottom tributary of the Tualatin River, rises in T3N,R4W and flows southeast to join the main river in S13,T1S,R3W. Its principal tributaries are McKay Creek and Emery's Mill Creek. Observations on Dairy, Creek and its tributaries were taken at highway bridges only.

Observations on the main stream of Dairy Creek at Sta. A, revealed that the stream was 15′ wide with an average depth of 5". Estimated flow was 8 cfs and the water temperature was 52.0F. Water was quite clear at this point. Banks were of dirt and 5-6′ high with dense vegetation of ash, willow and alder along both sides.

At Sta. B the stream was 18′ wide and 10" deep. Dirt banks were 5-6′ high with moderately dense vegetation of willow, alder and ash along the banks. The water temperature was 61.0F.

Just below Sta. C there is a small wooden dam 38′ wide and 58" high, with a fish ladder that looks too small for salmon. A man working on the dam reported that he had never heard of any salmon in the stream.

At Sta. E the stream was 38′ wide and 3′6" deep.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temw	Sky
A	9/17/40	3:30 PM	62.0 F	52.0 F	Clear
B	"			61.0	"
C	"	Water too sluggish			"

Pool Grade: No information available.

Gradient: No information available.

Tributaries: none listed

Emery's Mill Creek

River System: Willamette River
Stream Surveyed: Emery's Mill Creek, tributary to Dairy Creek

General Remarks:

Was also found to be a mud bottom creek. Near Mountaindale it was 30' wide and 10" deep. Water temperature was 60.0 F. Estimated flow was 10-12 cfs. dirt banks were 6-10' high. Dense vegetation of alder, willow and ash lines the banks. At Sta. B, the first bridge above Mountaindale on the way to Bacona, the stream was 21' wide with an average depth of 9". Estimated flow was about 10 cfs. Mud bottom and dirt banks still persist. Emery's Mill Creek is approximately 2 miles long.

McKay Creek

River System: Willamette River
Stream Surveyed: McKay Creek, tributary to Dairy Creek

General Remarks:

The largest tributary to Dairy Creek, is approximately 23 miles long; It too is a mud bottom, Dirt bank creek, with dense vegetation of ash, willow and alder along the banks. The stream winds through cultivated fields and pastures. At Sta. 2, about 1 1/2 miles above Hillsboro, Oregon, the stream was 23' wide and 17.6" deep, with an estimated flow of l-2 cfs. The water was rather turbid and the banks were about 8' high.

At Sta. B, the second highway bridge above Hillsboro, the stream was 32' wide; average depth was 12.8". Banks were 8' high. Dense vegetation of ash, willow and dogwood lines the banks. Estimated flow was 2.5 cfs and water rather turbid.

At Sta. C, the bridge near North Plains, Oregon, the stream was 10' wide, with an average depth of 6". The water was very sluggish and turbid.

At Sta. D, above North Plains, Oregon, the creek was 16' wide, average depth of 5". Estimated flow of 3-5 cfs.

Jackson Creek

River System: Willamette River
Stream Surveyed: Jackson Creek, tributary to McKay Creek

General Remarks:

A tributary of McKay Creek, is just a small stream about 2' wide and 2" deep. The flow was estimated to be 1/2 cfs.

Dairy Creek and its tributaries would be of no value to salmon.

Gales Creek

River System: Willamette River
Stream Surveyed: Gales Creek, tributary of Tualatin River

Date of Survey: 9/16-21/40 by Frey and Zimmer and 9/12/46 by Parkhurst, Brewington and Davis.

Source: S10 and 3, T2N, R6W, in the coastal range in Washington County, Oregon.

Direction of Flow: East and southeast

Total Length: 30 miles. In September, 1940, about 13 mi were surveyed, beginning about 2 mi above the mouth above Forest Grove, OR and ending at confl. of the South Fork. In Sept 1945, the survey was extended from the confl of the south fork for a distance of 2 miles upstream.

Station Location:

St	Location	Distance Above Prev. Station Yds	Distance Above Prev. Station Miles	Distance Above Mouth Yds	Distance Above Mouth Miles	Map Location	Width	Depth
A	First bridge above mouth	--		--		S6,T1S R3W	26'	9.7"
B	First hwy br above Forest Grove on road to Dilley	0.3		0.3		S1,T1S R4W	83.5'	5.3"
C	2nd br above Crystal Water Swimming Pool	1.4		1.4		S2,T1S R4W	71.0'	1.1'
D	Hwy br near town of Gales Creek, hwy 8	1.5		3.2		S8,T1N R4W	27.0'	7.6"
E	Bridge on old road Manning, Oregon	1.2		4.4			35.0'	-
F	B.M. on rt side of hwy, elev. 351, 2243 1937	1.4		5.8			40.0'	-
G	Small wooden br, rd above town (Gales Creek)	1.3		7.1			37.0'	5.0"
H	R.R. br over str/hwy	1.0		8.1		T2N,R5W	30.0'	-
I	Glenwood br	1.1		9.2		S23,T2N,R5W	35'	-
J	New log br for new hwy over coast range	0.7		9.9		T2N,R5W	10.0'	-
K	Br to new hwy, just below the Consolidated Lumber Co. Mill	1.4		11.3			30.0'	-
L	Concrete marker & B.M., rt bank 1,100 yds abv St L	0.6		11.9			40.0'	1.0'
M	So. Fork Gales Cr	0.6		12.5		S21,T2N,R5W	12'	10.0"
N	End of survey	1.9		14.4		S19,T2N,R5W	15'	6.0"

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090010	0019	0.00
B	17090010	0019	0.00
c*	17090010	0019	8.05
D	17090010	0020	0.75
E*	17090010	0020	0.80
I	17090010	0020	6.96
J*	17090010	0020	6.96

* Station location is not definite but has been estimated
(Stations F, G, H, K, M, and N were unable to be estimated)

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
B-C	21,980	1,530	7.0	4,802	21.8	4,842	22.0	7,106	32.3
C-D	52,200	1,270	2.4	19,820	38.0	20,030	38.4	11,080	21.2
D-E	22,160	2,036	9.2	11,116	50.2	3,421	15.4	5,587	25.2
E-F	24,750	1,740	7.0	9,005	36.4	8,850	35.8	5,155	20.8
F-G	20,620	8,586	41.6	6,538	31.7	2,022	9.8	3,474	16.8
G-H	16,300	5,160	31.7	5,390	33.1	4,760	29.2	990	6.1
H-I	18,780	7,284	38.8	6,272	33.4	2,498	13.3	2,726	14.5
I-J	8,100	4,490	55.4	2,150	26.5	765	9.4	695	7.0
J-K	21,500	7,480	34.8	7,090	33.0	3,540	16.5	3,390	15.8
K-L	14,300	1,600	11.2	3,570	25.0	2,100	14.7	730	5.1
M-N	27,700	12,880	46 5	8,370	30 3	4,540	16.4	1,910	6.8
Tot	248,390	54,056	21.7	84,123	33.8	57,368	23.1	42,843	17.3

Between Stations	Water too dirty to Determine	%	Useable Spawning Rubble	% of Bottom
B-C	3,700	16.8	12,038	54.8
C-D			19,045	36.5
D-E			3,881	17.5
E-F			7,555	30.5
F-G			1,281	6.2
G - H			235	1.4
H-I			1,520	8.1
I-J			302	3.7
J-K			600	2.8
K-L	6,300	44.1	385	2.7
Totals	10,000	4.5	46,842	21.2

Classification of stream based on amount of usable spawning rubble and area present: N/A

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	% Usable
B-C		21,980	9,644	43.9	12,038	54.8
C-D		52,200	39,850	76.4	19,045	36.5
D-E		22,160	14,537	65.6	3,881	17.5
E-log jam at 750 yds impass at low water		5,950	2,930	[illegible]	865	14.5
Total		102,290	66,961	65.6	35,829	35.1

Note : At 750 yds above Sta. E, a large log jam acts as a complete barrier to salmon migration during low water. We must therefore consider all spawning rubble above this point as being unavailable during low water.

Spawning Area Unavailable and Unusable:

Station	Distance	Area (yd^2)	Area Unavail (yd^2)	% Unavail	When Avail	Usable Unavail (yd^2)	% Usable Unavail
Log jam at 750 yds above St. E							
E-F		18,800	14,925	79.4		6,690	35.6
F-G		20,620	8,560	41.5		1,281	6.2
G-H		16,300	10,150	62.3		235	1.4
H-I		18,780	8,770	46.7		1,520	8.1
I-J		8,100	2,915	36.0		302	3.7
J-K		21,500	10,630	49.4		600	2.8
K-L		14,300	5,670	39.7		385	2.7
Entire Stream		118,400	61,620	52.0		11,013	9.3

Cause of Unavailability: Actually the entire river is unavailable at low water because of the Oswego Dam on the Tualatin River.

Character of Watershed:

	B-C	C-D	D-E	E-F	F-G	G-H	H-I	I-J	J-K	K-L
Mountainous										
Hilly		X	X	X	X	X	X	X	X	X
Rolling										
Flat	X									

Character of Watershed **(cont):**

	B-C	C-D	D-E	E-F	F-G	G-H	H-I	I-J	J-K	K-L
Swampy										
Wooded			x	X	x	x	x	x	x	x
Open	X	X	x							
Cultivated	70%	80%	50%	25%	40%	25%	25%	25%	-	-
Character of Valley										
Character of Banks										
Density of Marginal Vegetation										
Erosion a) Banks										
b) Watershed										

Diversions:

1. 450 yds above Sta. B, small irrigation pump, 4" pipe, right bank.
2. 490 yds above Sta. C, left bank, ditch 2' wide, 6" deep, single log dam across stream, no water flowing in ditch at present.
3. 1,970 yds above Sta. C, left bank, small pump 8" pipe, small wing dam present.
4. 2,900 yds above Sta. C, right bank, small pump, 2" pipe, irrigation.
5. 1,180 yds above Sta. F, paddle wheel 4' in diameter operating a 2" irrigation pump.
6. 1,490 yds above Sta. F, left bank, small pump, 2" pipe, irrigation.
7. 1,860 yds above Sta. F, left bank, 1 1/4" utilities pump.
8. 510 yds above Sta. I, right bank, small pump, 2" pipe.

Artificial Obstructions:

1. 1,580 yds above Sta. B, remains of old earth dam washed out in center, no obstacle to fish movements.
2. 490 yds above Sta. C, single log dam, passable.
3. 2,700 yds above Sta. C, remains of old dam, no obstacle to salmon.

Artificial Obstructions **(cont):**

4. 1,920 yds above Sta. D, very low wooden dam to raise water level for swimming pools, no obstacle to salmon.
5. 750 yds above Sta. E, log jam, 10' high, impassable at low water 11 1/2 miles up.
6. 1,180 yds above Sta. F, paddle wheel, 4' diameter operates 2" irrigation pump, impassable at time of survey (low water).
7. 1,490 yds above Sta. F, old wooden dam, boards nearly horizontal, water spills over top, 7" head.
a. 1,910 yds above Sta. F, rock dam with log across top, passable with difficulty at time of survey.
9. 1,790 yds above Sta. H, low boulder dam, passable.
10. 860 yds above Sta. I, log jam, impassable at present.
11. 1,430 yds above Sta. J, logs, mill waste, boards, etc., log jam 50 yds along creek, impassable at time of survey.
12. 1,540 yds above Sta. J, log jam, impassable at time of survey.
13. 242 yds above Sta. K. wood dam, 150' wide, water drop 12', a ladder is present. 14 sections to ladder, openings in sections 1' deep, 3' wide. 23 1/2" water in sections. 11" drop to creek bed from last section. Sec. boxes 6' long, 8' wide, 6" water going over end of last section at foot of ladder. Very efficient, plenty of water going through ladder.

Note: It was reported at the mill that several of the men working there had seen salmon going up the fish ladder (13).

Natural Obstructions: None

Fluctuation in Water **Level:**

Cause of Variation: Seasonal rainfall and drought. Heavily wooded watershed helps to prevent too rapid a runoff.

Feet Variation: Between Sta. D-E 5-6' (according. to a resident); Sta. J-K 6-8' estimated; Sta. K-L 6-8' estimated.

Stream Volumes: From Surface Water Supply Paper No. 864. Gauge 4 1/2 miles northwest of Gales Creek Post Office. Drainage area 33 sq. miles. 1935-38 maximum discharge 12/27/37 2,560 cfs; minimum discharge 9/24/36 6 cfs.

Pollution: None.

Fish (salmon): Chinooks - Sta. E-F had 2 live females (1 partly spawned) on 9/20/40. Sta. E-F also had 1 dead female spawned out on 9/20/40. Several redds seen, see card 14.

Fish (other than salmon):

Species	Date	Very Abundant	Abundant	Fair	No.	Scarce
Chubs, suckers, sculpin	9/19/40		X			
Trout	9/20/40			X		
Chubs, suckers	9/20/40			X		
Trout	9/21/40			X		
Chubs, suckers	9/21/40			X		

General Remarks:

Rising in a section of the coastal range of mountains that has been recently cut over and burned, Gales Creek flows rather rapidly in a southeast direction for about 30 miles to join with the Tualatin River. Approximately 12.87 miles of the stream was surveyed on foot during September, 1940. Observations were also taken at several of the highway bridges crossing the stream near its confluence with the Tualatin.

The stream, according to the U.S.G.S. Water Supply Paper No. 864, during the year 1938 had a maximum discharge, 12/27 of 3540 cfs and a minimum discharge 9/25 of 6 cfs.

Bedrock is very much in evidence both in the stream bed and in the banks between stations E and K. The greatest concentration of useable spawning rubble was found between Sta. B and C. Here it was found to be 54.8% of the bottom. Between stations K and L it was found to be only 2.7% of the bottom.

A large log dam at 750 yds above Sta. E completely blocks the stream during low water. Just below this log jam, a female chinook was found spawning and four or five redds with salmon eggs scattered in the rubble were observed.

Just above Sta. B is a gravel pit and washer with a dragline taking gravel from the stream bed, 2 1/2 miles figured.

Trout were very common in the upper section of the stream. People living in the vicinity reported that trout fishing is very good in Gales Creek. Quite a few chubs and suckers were observed in the stream and crawfish were very abundant.

Stream banks averaged about 6' high of dirt, gravel and bedrock. Fairly dense vegetation of willow, ash, fir and alder lines the stream banks.

Examination of the data indicates that Gales Creek could support a fair salmon run, certainly a larger run than is present.

In the 2 mile section above the confluence of the South Fork,

General remarks **(cont):**

there is some very good spawning area, which is not fully available because of obstructions in the lower part of the stream (see 1940 survey).

The South Fork is too small to be of more than slight potential value to salmon.

The forest in the entire upper portion of the watershed was burned in the early summer of 1945. This will cause more erosion and resultant silting of the stream bed for several years. Much information not given in this report will be found in the cards of the 1940 survey, especially the data on the stream from the mouth to the confluence of the South Fork.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
A	9/16/40	2:00 PM	74.0 F	60.0 F	Cloudy
B	9/16/40	2:30 PM	79.0	68.0	Clear
C	9/19/40	lo:oo AM	57.0	56.0	"
D	9/16/40	2:45 PM	79.0	69.0	"
E	9/19/40	1:15 PM	69.0	58.0	"
F	9/20/40	lo:oo AM	64.0	53.0	"
G	"	12:20 PM	73.0	58.0	"
950 yds above	"	2:30 PM	76.0	57.0	"
G	9/20/40	1:40 PM	72.0	55.0	"
H	"	3:45 PM	74.0	58.0	"
I	"	10:35 AM	72.0	54.5	"
I	9/21/40	11:45 AM	64.0	55.5	"
J	"	10:30 AM	70.0	55.0	"
Intermediate Sta. J R.R. bridge	"	12:35 PM	75.0	58.0	"
K	"	12:40 PM	75.0	55.0	"
L	"	1:40 PM	70.0	60.0	"

Pool Grade:

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6	Ttl
B-C		4		1 25.0	1 25.0		2 50.0	15	19
C-D		16				10 62.5	6 37.5	44	60
D-E		3		1 33.3	1 33.3		1 33.4	12	15
E-F								31	31
F-G		13		2 15.4	1 7.7	4 30.8	6 46.1	21	34

Pool Grade **(cont):**

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6	Ttl
G-H		13				6 46.1	7 53.9	a	21
H-I		14		8 57.1		4 28.6	2 14.3	14	28
I-J		6		2 33.3		3 50.0	1 16.7	14	20
J-K		13		2 15.4	1 7.7	9 69.2	1 7.7	32	45
K-L		2		1 50.0		1 50.0		11	13
Grand Total		84		17 20.2	4 4.8	37 44.1	26 30.9	202	286

Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
F-I	3.42	126'	36.8'	U.S.B.M. at Glenwood Br. U.S.B.M. at Sta. 5

Tributaries:

1. Clear Creek: 1,080 yds below Sta. D, left bank, 10' wide, 3-5" deep, estimated flow 2-3 cfs, water temperature 59.0 F, air 69.0 F, 2:00 pm. Note: The owner of the grocery store at Gales Creek stated that the State Fish and Game Commission used to operate a fish hatchery on Clear Creek, but it was abandoned some years ago.

2. Iler Creek: 10 yds below Sta. D, left bank, 6' wide, 3-5" deep, estimated flow 4 cfs, water temperature 58.0 F, air 69.0 F, 3:00 pm.

3. Small Stream: Name unknown, 220 yds above Sta. F, left bank, flow 1 cfs.

4. Small Stream: Name unknown, 2,260 yds above Sta. F, left bank, flow 1 cfs.

5. Small Stream: Name unknown, 946 yds above Sta. G, left bank, 3' wide, 2-6" deep, estimated flow l-2 cfs, water temperature 54.0 F, air 76.0 F, 2:30 pm.

6. Glenwood Creek: 1,920 yds above Sta. H, estimated flow 2-4 cfs, water temp. 55.0 F, air 74.0 F.

Tributaries **(cont):**

7. Small Stream: Name unknown, 506 yds above Sta. J, left bank, width 3', depth 2-3", estimated flow l-2 cfs, water temp. 51.0 F.

a. Small Stream: Name unknown, 1,230 yds above Sta. J, left bank, flow 1/2 cfs.

9. Small Stream: Name unknown, 104 yds above Sta. K, right bank, 3' wide, 4-6" deep, estimated flow 2-3 cfs, water temp. 56.0 F.

10. Beaver Creek

11. Coffee Creek

12. Finger Creek

13. South Fork Gales Creek

Scoggins Creek

River System: Willamette River
Stream Surveyed: Scoggins Creek, tributary of Tualatin River

Date of Survey: 9/17/40 by Frey and Zimmer and 9/11-12/45 by Hanavan, Rucker, and Silliman

Source: Coastal range, S9,T1N,R5W

Direction of Flow: Southeast

Total Length: 18 miles. The 1940 survey extended 3.9 miles. The 1945 resurvey extended 4.2 miles. Since the two surveys covered practically the same area, the total amount surveyed would not exceed 4 1/2 miles.

Station Location:

St	Location	Distance Above Prev. Station Yds	Miles	Distance Above Mouth Yds	Miles	Map Location	Width	Depth
A	Bridge 3.5 mi above Willamette Mill	0	0.0	0	0.0	S20,T1S R4W	23'	10"
B	Last road bridge	5600	3.1	11700	3.1	S12,T1S R5W	30'	4"
C	1 mile above last road bridge	1800	1.0	13500	4.1	S2,T1S R5W	30'	6"

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090010	0023	0.00
B	17090010	0023	0.00
c*	17090010	0023	2.07

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
A-B	70,100	9,410	13.7	8,510	12.4	23,790	33.9	28,390	40.0
B-C	19,700	9,710	49 3	4,250	21 6	2.790	14.1	2,950	15.0
Total	89,800	19,120	21.3	12,760	14.2	26,580	29.6	31,340	34.9

Classification of stream based on amount of usable spawning rubble and area present: N/A

Spawning Area Usable and Available:

Station	Distance vds	Distance miles	Area (yd^2)	Available Spawning Area (yd^2) (MR&SR)	% Avail	Usable Spawning Area (yd^2)	% Usable
A-Dam	3,600	2.0	43,500	21,630	49.7	5,810	13.3
Dam-B	2,000	1.1	26,600	10,670	40.1	2,100	7.9
B-C	1,800	1.0	19,700	7,040	35.7	2,630	13.3
Tot	7,400	4.1	89,800	39,340	43.8	10,540	11.7

All of Scoggins Creek is available only at high water because of the Oswego Dam on the Tualatin River.

Spawning Area Unavailable and Unusable:

Station	Distance	Area (yd^2)	Area Unavail (yd^2)	% Unavail	When Avail	Usable Unavail (yd^2)	% Usable Unavail
A-Dam			Unavailable at low water				
Dam-B	2,000	26,600	10,670	40.1		2,100	7.9
B-C	1,800	19,700	7,040	35.7		2,630	13.3
Tot	3,800	46,300	17,710	38.5		4,730	10.2

All of Scoggins Creek is unavailable at low water until the fishway is rebuilt at the Oswego Dam on the Tualatin River.

Character of Watershed:

	A-B	B-C
Mountainous		
Hilly	x	X
Rolling		
Flat		
Swampy		
Wooded	X	X
Open		
Cultivated	90%	30%
Character of Valley	Flat, 1 mile wide	Flat, 1/2 mile wide
Character of Banks	10' high, steep, composed of gravel	Steep, composed of earth & gravel

Character of Watershed (cont):

	A-B	B-C
Density of Marginal Vegetation	Alder, fir willows, blackberries	Alder, willows, fir, oak, wild blackberries
Erosion		
a) Banks	Slight	Slight
b) Watershed	Slight	Slight

Diversions:

Diversion 1: At 1,070 yds above Sta. A, a pump with a 3-4" intake is located. This pumps water into the pipeline that furnishes the water supply for Hillsboro, Oregon. The main water supply is in Sein Creek, a tributary to Scoggins Creek, but is supplemented by water from Scoggins Creek during low water stages.

Natural Obstructions:

1. A 4' dam is located 3,600 yds above Sta. A. It is of wood and log construction and is approximately 40' wide. There is no fishway. Owner and use not known. Impassable at low water.
2. Another dam of wood and log construction is located 390 yds above Sta. B. It is 60' wide, 5' high and is probably used to form a swimming pool. Owner not known. It has no fishway and is a low water barrier.

Fluctuation in Water Level:

Stream Flow: Sta. A, 9/11/45, 9.5 cfs, by Hanavan. Sta. B, 9/12/45, 8 cfs, by Hanavan. Sta. C, 9/12/45, 8 cfs, by Silliman.

U.S.G.S. Water Supply paper 964 gives the following data: Maximum 1,470 cfs 12/19/41; minimum 2 cfs 9/18/42; mean 103 cfs, water year 1941-42. Staff gauge is located 500 yds above highway bridge 1.7 miles northwest of Gaston, Oregon.

Pollution: None observed.

Fish (salmon): A small number of small fingerling and salmonids (probably silver salmon) were observed.

Fish. (other than salmon): None observed.

General Remarks:

Scoggins Creek is a small stream, but is one of the principal tributaries of the Tualatin River. Its low flow in late summer and early fall is due to the small amount of rainfall in that area during the summer. In the winter it has a comparatively high discharge.

There are only two low water barriers, both small wooden dams. Neither of these dams has any apparent use at the present time.

Due to the low summer flow, the stream can support only a small fall run of salmon or spring run of steelhead. The present small run of salmon might be increased if the obstructions were removed. In the 1940 survey it was found that a small run of silvers and some chinooks enter the stream in late fall.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
A	9/11/45	4:00 PM	71.0 F	58.0 F	Clear
B	9/12/45	11:00 AM	71.0	57.0	"
C	"	12:30 PM	62.0	56.0	"

Pools and Riffles:

Sta. A-B has 47 good pools, 17 poor pools = 64 pools total and 64 good riffles, 4 poor riffles = 68 pools total. Sta. B-C has 6 good pools, 3 poor pools = 9 pools total and 11 good riffles, 17 poor riffles = 28 riffles total.

Gradient: No topographic maps available. Moderate gradient in section surveyed.

Tributaries:

1. Sein Creek, left bank, 3 1/4 miles above mouth, 4' wide, 1/4 cfs, no value.
2. Right bank, 6 1/4 miles above mouth, 5' wide, 2 cfs, no value.
3. Right bank, 7 1/4 miles above mouth, 3' wide, 1/2 cfs, no value.

Molalla River

River System: Willamette River
Stream Surveyed: Molalla River

Date of Survey: September 5-11, 1940

Source: Cascade Mts., S8, T7S, R4E

Direction of Flow: Northwest

Total Length: 45 miles, of which 38 miles were surveyed by Frey and Zimmer.

Station Location:

St	Location	Distance Above Prev. Station Yds	Miles	Distance Above Mouth Yds	Miles	Map Location	Width	Depth
A	Confluence w/ Pudding River	0	0.0	0	1.0	S20,T3S R2E	40'	2.5'
B	Highway 99E bridge near Canby		2.6		3.6	S5,T4S R1E	40'	4.0'
C	First highway bridge above Canby		2.4		6.0	S9,T4S R1E	100'	8.0'
D	Harm's Farm,		2.4		8.4	S11,T4S,R1E	30'	2.0'
E	Macsburg road, Roy Chubb Farm		1.9		10.3	S13,T4S R1E	40'	2.0'
F	Wrights bridge		3.6		13.9	S29,T4S,R2E	100'	1.0'
G	Hutchinson Farm on Mills Rd		1.7		15.6	S28,T4S R2E	30'	3.0'
H	Next highway br above Wright's bridge		2.3		17.9	S2,T5S R2E	110'	1.5'
I	First covered br above St H		1.7		19.6	S14,T5S R2E	30'	3.0'
J	Lee Jones property, left bank of stream		1.8		21.4	S23,T5S R2E	90'	2.0'
K	First wooden bridge above Jones' property		1.1		22.5	S26,T5S R2E	60'	1.5'
L	1.5 miles by road above Sta. K.		1.6		24.1	S36,T5S R2E	60'	2.5'
M	Bridge at Trout Creek villa		1.6		25.7	S6,T6S R3E	40'	6.0'
N	Trail end from hwy		2.2		27.9	S18,T6S,R3E	30'	4.0'
0	Trail end leaving rd at last house before fire station		1.6		29.5	S30,T6S R3E	60'	8.0'
P	50 yds above a huge boulder in center of stream		2.6		32.1	S31,T6S R3E	40'	1.6'
Q	Trail crossing		1.3		33.4	S6&7,T7S,R3E	--	--

Station Location **(cont):**

St	Location	Distance Above Prev. Station Yds	Miles	Distance Above Mouth Yds	Miles	Map Location	Width	Depth
R	Br above Gawley Cr		2.1		35.5	S16,T7S,R3E	--	--
S	Confl Table Rock		2.2		37.7	S14,T7S,R3E	--	--

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090009	0021	0.00
B	17090009	0021	0.40
C	17090009	0021	4.00
D*	17090009	0022	0.00
E*	17090009	0022	0.00
F	17090009	0022	4.15
G*	17090009	0022	7.68
H	17090009	0593	0.00
I*	17090009	0022	12.01
J*	17090009	0022	12.98
K*	17090009	0022	13.63
L	17090009	0022	16.16
M	17090009	0023	0.69
N*	17090009	0023	0.69
o*	17090009	0023	3.07
P*	17090009	0023	5.56
Q	17090009	0023	7.46
R*	17090009	0023	10.58
S	17090009	0024	0.00

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

Sta	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
A-B	99,800	3,650	3.7	50,090	50.2	25,075	25.1	20,985	21.0
B-C	135,900	8,070	6.0	49,340	36.0	37,335	27.0	34,455	26.0
C-D	59,840	150	0.3	35,730	61.3	22,820	36.0	1,140	2.4
D-E	49,900	530	1.1	23,015	46.1	16,360	33.8	9,995	20.0
E-F	113,500	6,880	6.1	50,530	45.5	27,460	24.2	830	0.7
F-G	54,000	7,325	13.8	24,250	47.8	8,680	16.4	7'445	14.1
G-H	61,360	2,280	3.7	16,645	27.1	9,650	15.7	525	0.9
H-I	60,600	16,090	26.6	26,630	43.9	10,060	16.6	7,820	12.9
I-J	57,000	13,690	24.0	27,850	48.9	10,750	19.1	4,710	8.0
J-K	33,800	5,705	17.0	18,060	53.4	9,920	29.3	115	0.3

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

Sta	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
K-L	53,600	27,120	50.6	17,390	32.4	5,155	9.6	3'935	7.4
L-M	53,100	22,360	42.1	21,320	40.2	9,420	17.7		
M-N	52,000	29,080	55.9	16,090	30.9	5,045	9.7	1,785	3.4
N-O	53,000	14,180	26.8	24,980	47.1	13,840	26.1		
O-P	70,000	36,550	52.2	19,890	28.4	13,560	19.4		
Tot	1,006,400	193,660	19.2	421,810	41.9	225,130	22.4	93,740	9.3

Spawning Area Usable and Available:

Sta	Distance yds	mi	Area (yd^2)	Available Spawning Area (yd^2) (MR&SR)	% Avail	Usable Spawning Area (yd^2)	% Usable	When Avail
A-B	4,580		99,800	75,165	75.3	12,735	12.8	HW
B-C	4,300		135,900	86,675	63.8	19,885'	14.6	HW
C-D	4,300		59,840	58,550	97.8	20,620	34.5	HW
D-E	3,310		49,900	39,375	78.9	9,770	19.6	HW
E-F	6,276		113,500	77,990	68.7	18,815	16.6	HW
F-G	3,070		53,000	32,930	62.1	7,095	13.4	HW
G-H	4,080		61,360	26,295	42.7	10,485	17.0	HW
H-I	3,000		60,600	36,690	60.5	5,410	8.9	HW
I-J	3,200		57,000	38,600	67.7	11,760	20.6	HW
J-K	1,970		33,800	27,980	82.7	3,795	11.2	HW
K-L	2,820		53,600	22,545	42.1	3,048	5.7	HW
L-M	2,800		53,100	30,740	58.7	500	1.0	HW
M-N	3,850		52,000	21,135	40.6	2,745	5.3	HW
N-O	2,900		53,000	38,820	73.3	6,035	11.4	HW
O-P	4,600		70,000	33,450	47.8	3,540	5.1	HW
Tot	55,056		1,006,400	646,940	64.3	136,208	13.5	HW
A-Wooden dam 1,160 yds above H								
	31,076		592,200	410,300	70.7	101,375	17.1	AT

Spawning Area Unavailable and Unusable:

Sta	Distance yds	mi	Area (yd^2)	Area Unavail (yd^2)	% Unavail	When Unvail	Usable Unavail (yd^2)	% Usable Unavail
H-P	23,980		414,200	236,640	57.1	LW	34,833	8.4

Spawning Area Unavailable and Unusable **(cont):**

Cause of Unavailability: At 1160 yds above Sta. H there is a wooden irrigation dam which is impassable at low water; therefore, all spawning rubble above this barrier must be considered unavailable at low water, even though salmon were observed spawning above this barrier during the low water period.

Character of Watershed, St A-F:

	A-B	B-C	C-D	D - E	E-F
Mountainous					
Hilly				X	X
Rolling		X	X		X
Flat	X	X			
Swampy					
Wooded					
Open	X	X	X	X	X
Cultivated	90%	70%	60%	60%	70%

Character of Watershed, St F-K

	F-G	G-H	H-I	I-J	J-K
Mountainous					
Hilly	X		X	X	X
Rolling		X			X
Flat		X			
Swampy					
Wooded				X	
Open	X	X	X	X	X
Cultivated	60%	40%	40%	20%	50%

Character of Watershed, St K-P

	K-L	L-M	M-N	N-O	O-P
Mountainous			X	X	X

Character of Watershed, St K-P **(cont):**

	K-L	L-M	M-N	N-O	O-P
Hilly	X	X			
Rolling					
Flat					
Swampy					
Wooded	X	X	X	X	X
Open	X				
Cultivated	10%	1%	less than 5%	o	0

Diversions:

Diversion 1: 6" irrigation pump 1500 yds abv mth, left bank.

Diversion 2: 6" irrigation pump on left bank at 1600 yds above mouth.. Not operating at time of survey, but still in use.

Diversion 3: 3" irrigation pump on left bank at 2700 yds. above mouth.

Diversion 4: 10" irrigation pump on right bank at 1620 yds. above Sta. B.

Diversion 5: Diversion of stream to make swimming pool in new channel 810 yds above Sta E on left bank. 6' wide, l-2 1/2' deep, 4c.f.s. No protective devices.

Diversion 6: Diversion of stream to rock crusher and washer 200 yds above Sta. H. No protective devices.

Diversion 7: Irrigation diversion 1160 yds above Sta. H on left bank. 8' wide 16" deep. 17.4 c.f.s. No protective devices.

Diversion 8: Irrigation diversion 390 yds above Sta. I on right bank. 14' wide, 1.3' deep. 49.7 c.f.s. No protective devices.

Diversion 9: Irrigation diversion 1320 yds. above Sta. K on left bank. 10' wide, 14" deep. 7-8 c.f.s. No protective devices.

Artificial Obstructions:

1. 1500 yds above Sta. D. Gravel dam in front of pond at gravel pit. Low height. Passable with some difficulty at low water.

2. Stream branch-280 yds above Sta. E. Wooden dam with movable sections to increase height, 11' high, no obstacle as salmon can ascend through the main channel.

3. Diversion #5, 810 yds above Sta. E. Rough stone dam, 2' high, no obstacle to salmon.

4. 5780 yds above Sta. E. Rock dam, 5' high, salmon can get over or around.

5. Diversion #6, 200 yds above Sta. H. Loose stone and dirt dam, low height, passable.

6. Diversion #7, 1160 yds above Sta. H. Boards set on upstream face of wooden horses, 2' high, impassable at low water.

7. 2080 yds above Sta. H. Stone dam across right channel, low height, impassable, but salmon can ascend left channel.

8. 2400-2600 yds above Sta. H. 5 low rock dams with 6 baffles projecting into stream for erosion control, low height, passable with some difficulty at low water.

9. 2750 yds above Sta. H. Log and rock dam for swimming pool, low height, impassable at low water.

10. Diversion #8, 390 yds above Sta. I. Irrigation dam 60' wide, wooden horses with boards on upstream face, 2' high, no ladder. Impassable at low water.

11. Diversion #9, 1320 yds above Sta. K. Dam of wooden horses and boards leading to irrigation ditch, 2' high, impassable at low water.

12. 1330 yds above Sta. F. Log jam, passable.

13. 980 yds above Sta. H. Tree across stream, passable.

14. 4500 yds above Sta. 0. Log jam, 15' high, passable. Salmon can go around it.

Natural Obstructions: 900 yds above Sta. M. Falls, 6' high, passable but with some difficulty.

Fluctuation in Water Level:

Note: Data from U.S.G.S. water Supply Paper #864.

Run off in inches:

Maximum Nov., 1937 - 18.07" at gauge above Pine Creek.
Minimum Sept., 1938 - 0.31" at gauge above Pine Creek.
Maximum Nov., 1937 - 11.49" at gauge near Canby.
Minimum Sept., 1938 - 0.19" at gauge near Canby.

Feet Variation: 6 to 8 feet.

Stream Volumes: At gauge 1700' above Pine Creek: 1937 maximum discharge of 10,800 c.f.s. on Dec. 29; minimum discharge of 20 c.f.s. on Sept. 28, 1938. Records available from Oct., 1935 to Sept., 1938.
At gauge near Canby: 1937 maximum of 15,600 c.f.s. in Dec.; 1938 minimum of 86 c.f.s. in Aug. Records available from Aug., 1928 to Sept., 1938.

Pollution: .

Mud and silt from the rock crusher and washer above Sta. H. The water below here was so turbid that in many cases the composition of the bottom could not be determined.

Fish (salmon):
Species: Chinook
Estimated number (spawners) ca. 1000 in portion of river surveyed.

		Number of dead salmon				
				Female		
Stations	Alive	Male	Unknown	Spawned	Ripe	Date
F-G	few					9/6/40
G-H	2					9/7/40
I-J	16 +					9/8/40
J-K	91 +					9/8/40
K-L	24		1			9/8/40
L-M	312	5	1	2	5	9/8/40
M-N	94 +		7			9/9/40
N-O	202 +		1			9/9/40
O-P	116 +		2	1		9/11/40
Totals	857 +	5	12	3	5	

Fish (salmon) **(cont):**

Between Stations	Alive 1940	Alive 1941	Dead 1940	Dead 1941
E-F	0	0	0	0
F-H	2	19	0	1
H-I	0	13	0	0
Ditch #2		39		13
I-J	16	147	0	13
J-K	91	49	0	0
Ditch #3		44		7
K-L	24	49	1	3
L-M	312	39	13	7
M-N	94	91	7	31
N-O	202	166	1	45
O-P	116	66	3	10
P-Q		30		8
Q-R		57		12
R-S		19		15
Totals	857	828	25	165

No salmon were seen in the short section of Pine Creek that was looked at, but several people reported that they had seen salmon in the stream on a few occasions. It was also reported that salmon had been seen in the North Fork of the Molalla River. None were seen in the short section surveyed. There is also a run of silver salmon in the stream.

Fish (other than salmon):

Suckers, chubs, sculpins were abundant, 9/5-11/40. Trout sp. were fairly abundant between Sta. N and B, 9/9-11/40.

The section of the river above Trout Creek Villa is heavily fished for trout in the spring of the year. Several people have reported that trout fishing has not been very good for the past 2 or 3 years. Signs of fishermen as calk marks, papers, tin cans, etc. were quite numerous along the upper section of the stream.

Good run of steelheads.

General-Remarks:

The Molalla appears to be quite promising as a salmon stream. Four temporary dams above Sta. H form barriers at low water. These are of little real importance to the salmon runs, however, because of 857 live chinooks and 25 dead ones observed, all but 2 were above these barriers. Most of the salmon had migrated past the excellent spawning riffles in the lower half of the stream to the

General remarks **(cont):**

steeper upper half where bedrock cascades and large boulders interrupt the continuity of spawning areas.

Above Sta. M the country is mountainous and densely forested. The river flows through a narrow, steep-sided valley composed mostly of bedrock. Most of the spawning rubble is confined to small pockets between the large boulders. Between Sta. M and H the country is hilly rather than mountainous. In the river there are numerous excellent spawning riffles and resting pools utilized by the salmon. From Sta. H to the mouth of the river the country is quite flat and open and well-developed agriculturally. The banks of the stream are a dense tangle of willows, alders, cottonwoods, and brambles. The good spawning riffles in this part of the stream are not used by the chinooks.

None of the diversions on the stream are screened. Farmers say that in the fall spawned out chinooks drift down the irrigation ditches, and at the time of the survey chinooks were observed actually spawning in the uppermost irrigation ditch.

For one year racks were operated in the Molalla by the Oregon Fish Commission.

Examination of the data secured by the survey of 31 miles of the Molalla River during the month of September, 1940 brings to light certain information which may be summarized as follows:

1. The river at present supports a fair run of chinook salmon (857 live fish by actual count).
2. There are no artificial or natural obstructions of any consequence to the spring run of salmon which comes up the river during high water.
3. Above Sta. H are 4 dams acting as barriers to migration during low water. That these are not effective barriers, however, is evidenced by the fact that nearly all salmon seen in the river were above these dams.
4. There is no pollution of any consequence, except possibly the silt from the rock crusher above Sta. H.
5. The water temperatures are favorable for salmon.
6. Good holding pools are plentiful, ranging from 7.0 to 46.6 per mile.
7. There is a good supply of available spawning rubble.
8. There is sufficient water during the month of September to permit spawning in the upper half of the river.
9. An interview with Mrs. Otto W. Magill brought to light the information that in 1928 or 1929 (she could not remember which), her husband caught salmon at a rack just above the old covered highway bridge a short distance downstream from the North Fork confluence. Fry from the eggs obtained were released in the Molalla. The records of this salmon take are in the files of the Oregon Fish Commission.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
A	9/5/40	8:45 AM	67 F	65 F	Clear
B	9/5/40	9:10 AM	71	6 4	Clear
C	9/5/40	1:45 PM	78	71	Clear
D	9/5/40	3:45 PM	76	71.5	Clear
E	9/6/40	9:15 AM	69	63	Clear
G	9/6/40	12:00 AM	78	66	Partly cloudy
H	9/7/40	9:30 AM	60	62	Cloudy
H-I	9/7/40	9:30 AM	59 .	60	Cloudy
J	9/8/40	9:25 AM	63	60	Clear
K	9/8/40	9:45 AM	64	58	Clear
L	9/8/40	1:40 PM	78	65	Clear
N	9/9/40	10:20 AM	62	59	Raining
0	9/9/40	10:30 AM	67	60	Raining
P	9/11/40	4:00 PM	70	62	Clear

Pool Grade:

Sta	Dist (mi)	Resting Pools	Resting Pools/Mi	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S3T1 %	S6	Ttl
A-B	2.6	21	8.1	15.4	7.8	27.0	30.8		19.0	26
B-C	2.4	23	9.6	4.3	34.8	21.7	39.2			23
C-D	2.4	26	10.8	11.5	7.7	19.2	61.6			26
D-E	1.9	16	8.5	5.6	16.7	33.3	33.3		11.1	18
E-F	3.6	20	5.6	17.2		13.8	38.0		31.0	29
F-G	1.7	27	15.8	11.4	5.7	42.9	17.1		22.9	35
G-H	2.3	16	6.9	4.0	12.0	12.0	36.0		36.0	25
H-I	1.7	23	13.5	8.7		8.7	82.6			23
I-J	1.8	21	11.6	4.2	4.2	33.3	45.8		12.5	24
J-K	1.1	6	5.4	25.0		25.0	25.0		25.0	8
K-L	1.6	24	15.0	8.0		14.7	9.3		68.0	75
L-M	1.6	13	8.1	16.7	8.3	8.3	20.9		45.8	24
M-N	2.2	60	27.3	20.9		13.4	10.5	3.0	52.2	67
N-O	1.6	14	8.8	39.0	5.6	11.0	22.2		22.2	18
O-P	2.6	35	13.5	32.4	24.3	8.1	29.7		5.5	37

Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
A-B	2.6	30	11.5	Oregon City Quadrangle, U.S.G.S.
B-L	20.5	470	22.9	Oregon City and Estacada quadrangles. Data not available for intermediate points.

Gradient (cont):

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
L-M	1.6	75	46.8	Estacada Quadrangle U.S.G.S.
M-N	2.2	150	68.2	Estacada Quadrangle U.S.G.S.
N-O	1.7	100	58.8	Estacada Quadrangle U.S.G.S.
O-P	2.6	50	19.1	Estacada Quadrangle U.S.G.S.

Tributaries:

1. Pudding River
   a. Mill Creek
   b. Rock Creek
      (1) Bear Creek
   c. Butte Creek
      (1) Beaver Creek
      (2) Coal Creek
      (3) Fall Creek
      (4) Kirk Creek
   d. Zollner Creek
   e. Unnamed Creek, RB
   f. Little Pudding River
      (1) Lake Labish Ditch
      (2) Unnamed Creek or Fork (from Fruitland)
   g. Abiqua Creek
      (1) Little Abiqua Creek
      (2) Camp Creek
      (3) Bridge Creek
      (4) Sweet Spring Creek
   h. Silver Creek
      (1) Brush Creek
      (2) North Fork
      (3) South Fork
   i. Drift Creek
   j. Beaver Creek
   k. North Fork
   l. South Fork
2. Unnamed Creek, 788 yds above Station A, LB, 6' wide, 3-6" deep, l-2 cfs, water temp 67 F.
3. 310 yds above Station B, LB, approx 2 cfs.
4. 1,620 yds above Station B, LB, 10' wide, 3" deep, l-2 cfs.
5. 2,090 yds above Station B, LB, less than 1 cfs.
6. Gribble Creek, 2,670 yds above Station B, RB, 4' wide, 4" deep, less than 1 cfs.
7. 100 yds above Station C, RB, 4' wide, 3-6" deep, 1 cfs, water temp 58 F.

Tributaries (cont):

8. Milk Creek, 2,850 yds above Station C, 15' wide, 1' deep, 4 cfs, LB, a mud creek.
   a. Unnamed Creek, tributary near Mulino
   b. Mud Creek
   c. Hancock Creek
   d. Unnamed tributary, LB, 2 i below Callon, Oregon
   e. Canyon Creek
   f. Mill Creek
9. 850 yds above Station D, RB, <1 cfs.
10. 2,500 yds above Station D, LB, 8' wide, 2-8" deep, 2 cfs.
11. 2,324 yds above Station E, RB, 8' wide 3" deep, 0.5 cfs, water temp 67 F.
12. 1,100 yds above Station F, RB, 10' wide, 2-6" deep, 3-4 cfs, 67 F.
13. 2,630 yds above Station H, LB, 8' wide, 6-12" deep, 20-25 cfs (maybe part of main stream).
14. 200 yds above Station I, LB, 5' wide, 1-8" deep, 2-3 cfs.
15. 100 yds above Station J, LB, 4' wide, 3-5" deep, water temp 55 F.
16. North Fork of Molalla River (see Estacada Quad Map), 20' wide, approx 30 cfs.
   a. Dead Horse Canyon Creek
   b. Lukens Creek
   c. Cougar Creek
17. Trout Cree, 2,650 yds above Station L, LB, 6' wide, 1-2' deep, approx 6 cfs.
18. Pine Creek (see Mill City Quad Map), 4,160 yds above Station M, LB, air temp 71 F, water-temp 56 F, 7' wide, 6-12" deep, approx 10 cfs. Bedrock channel. Several people reported seeing salmon in Pine Creek; not surveyed in 1940.
19. Bear Creek
20. Gawley Creek
21. Table Rock Fork (sometimes called Middle Fork)
   a. Camp Creek
   b. Lost Creek
22. Copper Creek
23. Ogle Creek
24. Henry Creek
   a. Wilson Creek

Pudding River

River System: Willamette River
Stream Surveyed: Pudding River, tributary to Molalla River

Date of Survey: 9/6/1940

Source: Rises in T8S, R1W and flows north to join the Molalla River in section 20, T3S, R1E.

Direction of Flow: North

Total Length: 48 miles. Observations were taken at highway bridges only.

Station Location:

St	Location	Map Location	Width	Depth
A	Resort foot br 100 yd above hwy br. at Aurora, OR	S12, T4S R1W	91'	1.6'
B	Bridge opposite town of Hubbard	S36, T4S R1W	81'	2.6'
C	Hwy & R.R. bridge between Townsend & Woodburn	S21, T5S R1W	70'	2.7'
D	Bridge just west of Bethany	S32, T6S R1W	22'	10"
E	Bridge just east of Pratum	S13, T7S R2W	6'	6"

Character of Bottom Between Stations: Observations were taken only at highway bridges.

Between Stations	Character of Bottom
Mouth - A	Mud and silt
A-B	Mud and silt
B-C	Mud and silt
C-D	Mud and silt
D-E	Bedrock, boulders, silt

Spawning Area Usable and Available:

There was no spawning rubble observed anywhere in the stream.

Spawning Area Unavailable and Unusable: No data

Character of Watershed:

	Mouth-A	A-B	B-C	C-D	D-E
Mountainous					
Hilly					
Rolling					X
Flat	X	X	X	X	
Swampy					
Wooded					
Open					
Cultivated	75%	75%	75%	75%	75%
Character of Valley					
Character of Banks					
Density of Marginal Vegetation					
Erosion a) Banks					
b) Watershed					

Diversions: none observed

Artificial Obstructions:

1. 100 ft above Sta. E. Rock dam, 4' high, impassable at time of survey (low water barrier).

Natural Obstructions: None were observed.

Fluctuation in Water **Level:**

S t a	Ft. Variation	Stream Volume
Mouth-A	16-20'	
A-B	16-20'	
B-C	15-20'	
C - D	3-10'	
D-E	3-10'	2 cfs (at D)/5 cfs (at E)

Cause of Variation: The Pudding River flows for a greater part of its length through intensely cultivated land. Run-off is very rapid and during a very rainy season the stream rises to considerable heights. There is very little forest vegetation. on the watershed to help retard the run-off.

Pollution:

Location of source: (1) Woodburn Fruit Cannery, Woodburn, Oregon
(2) Near town of Hubbard, Oregon

Type of pollution: (1) emulsified cannery waste
(2) garbage

Fish (salmon): None were observed.

Fish (other than salmon):

Species	Date	Very Abundant	Abundant	Fair	No.	Scarce
Chubs	9/6/40		X			
Suckers	9/6/40		X			
Lampreys	9/6/40		X		X	
Catfish	9/6/40		X			

Note : All fish observed were dead or dying. Cause of death - cannery waste from Woodburn Fruit Cannery. A great many dead crawfish were also found.

General Remarks:

Pudding River rises in the Cascade Mountains in T8S, R1W -and flows for about 48 miles in a northerly direction to join the Willamette River in section 20, T3S, R1E.

General remarks (cont):

Observations taken during the month of September 1940, were made only at highway bridges. The river was not surveyed on foot.

From the confluence with the Willamette River upstream to Sta. D located just west of Bethany, the stream bottom was found to be composed entirely of mud. Above Sta. D the bottom is made up of bedrock, boulders and considerable silt.

Stream banks made up largely of earth average about 15' high and are lined with dense vegetation of willow, cottonwood and alder.

The estimated stream volume at Sta. D was 2 c.f.s. and at Sta. E, 5 c.f.s. At the time of the survey the entire river was very sluggish.

The waste from a fruit cannery enters the river at the rate of 1/2 c.f.s. near the highway bridge opposite the town of Woodburn. This pollution starts in the middle of August and is at its worst by September 1st. The material appears as a chocolate colored, foamy oil emulsion on the surface of the water. A great many dead chubs, lampreys, suckers and crawfish were found floating in this obnoxious material. Apparently the waste removes all oxygen from the water causing the fish and crawfish to be asphyxiated.

There-is pollution of another sort dumped into the river near the town of Hubbard. It is just plain, unadulterated garbage.

At 100 yds above Sta. E is a rock dam 4' high and impassable at the time of the survey.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
A	9/6/40	lo:oo AM	74.0 F	66.0 F	Clear
B	9/6/40	ll:oo AM	78.0	64.0	Clear
C	9/6/40	1:30 PM	80.0	64.0	Clear
D	9/6/40	3:00 PM	87.5	64.0	Clear

Pool Grade: No information available.

Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
Mth-A	approx 8 mi	approx 10'	1.25	Oregon City Quad,
A-B	" 8 mi	" 5'	0.62	Mt. Angel Quad
B-C	" 7 mi	" 25'	3.60	Mt. Angel Quad
C-D	" 19 mi	" 35'	1.80	Mt. Angel Quad
D-E	" 6 mi	" 25'	4.10	Stayton Quad
Mouth-E	" 48 mi	" 100'		

Tributaries:

1. Mill Creek, right bank; S12, T4S, R1W; muddy; flow est. less than 1 c.f.s.; no value to salmon.

2. Rock Creek, left bank; S30, T4S, R1E; muddy; no value to salmon.

   a) Bear Creek

3. Butte Creek, left bank; S2, T5S, R1W; muddy; no value to salmon.

   a) Beaver Creek
   b) Coal Creek
   c) Fall Creek
   d) Kirk Creek
   e) Zollner Creek
   f) Unnamed Creek, RB

4. Little-Pudding Creek, right bank; S7, T6S, R1W; muddy; no value to salmon.

   a) Lake Labish Creek
   b) Unnamed Creek at Fork (from Fruitland)

5. Abiqua Creek, left bank; S20, T6S, R1W. See survey sheets.

   a) Little Abiqua Creek
   b) Camp Creek
   c) Bridge Creek
   d) Sweet Spring Creek

6. Silver Creek, left bank; S32, T6S, R1W. See survey sheets.

   a) Brush Creek
   b) North Fork
   c) South Fork

Tributaries **(cont):**

7. Drift Creek, left bank; **S8, T7S, R1W;** mud and silt near the mouth. Bedrock large rubble in upper stretches; flow measured at 5 c.f.s.; very little value to salmon.

8. Beaver Creek, left bank; S18, **T7S, R1W;** muddy; flow estimated at less than 2 c.f.s.; no value to salmon.

a) North Fork
b) South Fork

Note : Examination of the data secured indicates that Pudding River itself is of very little value to- salmon.

Beaver Creek

River System: Willamette River
Stream Surveyed: Beaver Creek, tributary of the Pudding River

Date of Survey: 9/30/40

Source: Joins the river in S8, T7S, R1W, left bank

Direction of Flow: Northwest

Total Length: 4 miles long with an average width of 3'.

General Remarks:

Bottom is entirely of mud. Mud banks 3-8' high are lined with very dense brush. The stream has a very slight gradient and an estimated flow of less than 2 c.f.s. No fish were observed in the creek.

This stream would be of no value as a salmon stream.

Rock Creek

River System: Willamette River
Stream Surveyed: Rock Creek, tributary of the Pudding River.

Date of Survey: September 20, 1940.

Source: Joins the Pudding River in S30, T4S, R1E, left bank.

Direction of Flow: Northwest

General Remarks:

Observation taken on this stream revealed that at one mile above the mouth it was 36 feet wide with an average depth of 3.5 inches, and at two miles above the mouth it was 38 feet wide and 4.3 inches deep. At both points the bottom was of mud, and dense willows lined the banks. Water temperatures average 56.5 degrees.

This stream would be of no or little value to salmon.

Little Pudding River

River System: Willamette River
Stream Surveyed: Little Pudding River, tributary of the Pudding River.

Date of Survey: September 10, 1940

Source: Joins the main river in S7, T6S, R1W.

Direction of Flow: Northwest

Total Length: Approximately 16 miles long and enters the Pudding River on the right bank.

Stations:

Station	Width	Depth	Character of bottom	Ht. of banks	Water temp.	% of Cultivation
A	14'	2.0'	mud	15-20'	64.5 F	90%
B	21'	8.0'	mud	3-6'		90%
C	54'	3.2'	mud	3-6'	59.0	90%
D	15'	3.0'	mud	3-20'	59.0	90%

General Remarks:

Little-Pudding River is just a narrow, mud bottom, slow flowing creek. Dirt banks averaged about 8 feet high and dense vegetation of willow, alder and cottonwood lines these banks. The terrain is nearly flat. The river rises sometimes up to 6 feet high.

This stream would be of no value to salmon.

Lake Labish ditch goes into or out of this stream.

Butte Creek

River System: Willamette River
Stream Surveyed: Butte Creek, tributary of the Pudding River.

Date of Survey: December 1940

Source: Rises in the foothills of the Cascade Mts. in T8S, R3E and joins the Pudding River in S2, T5S, R1W.

Direction of Flow: Northwesterly direction

Total Length: 32 miles.

Station Location:

St	Location	Map Location	Width	Depth
A	1st highway bridge above the confluence	S11,T5S R1W	31'	2.7'
B	Just below highway bridge at Elliot Prairie	S15,T5S R1W	30'	10.7"
C	Bridge at Monitor, OR	S25,T5S,R1W	30'	5.5"
D	Hwy br. on rd on section line between S5 & S8	S5,8,T6S R1W	42'	1.3'
E	Bridge on highway #211, between Marquam & Silverton	S8,T6S R1E	57'	3.3'
F	Scott's Mills Br	S15,T6S,R1E	21'	2.3'
G	Cattle bridge 2.5 mi above St F	S24,T6S R1E	44'	8.9"
H	Above waterfalls 1.1 mi above St G	S30,T6S R1E	20'	2.0'
I	Br. 1 mile above St H, Falls (4')	S29,T6S R2E	15'	1.5'

Character of Bottom Between Stations:

Station	Character of Bottom
Mouth - Sta. C	Silt and sand
C-E	Silt
E-F	Bedrock and silt
F-G	Nearly all bedrock and boulders
G-I	Nearly all bedrock and boulders. Numerous small falls.

Spawning Area Available: No spawning area observed.

Spawning Area Unavailable and Unusable:

An impassable concrete dam one mile below Scott's mills makes any spawning rubble that might be present above it, unavailable at either high or low water. The dam is 10' high and is without a fish ladder.

Character of Watershed:

	Mth - C	C - E	E - F	F - G	G - I
Mountainous					
Hilly				X	X
Rolling			X		
Flat	X	X			
Swampy					
Wooded				X	X
Open					
Cultivated	90%	90%	75%		
Character of Valley					
Character of Banks					
Density of Marginal Vegetation					
Erosion a) Banks					
b) Watershed					

Diversions:

Diversion 1: Power diversion of Butte Creek Power Company above falls and dam at Scott's Mills, doesn't operate during summer low water period.

Artificial Obstructions:

1. Between Sta. C-E. Two small rock wing dams, passable at time of survey.

2. One miles below Scott's Mills. Concrete dam 85' wide, 10' high, all concrete, 2" crest. Backwater above dam 1/2 mile silted (dam has no diversion). No fish ladder present, dam is a barrier at low water and all but extreme high water.

3. 400 yards above Sta. F. Rock/dam 6' high at ends and 10' high in center. Dam is about 50' upstream from natural 20' height waterfalls. Water is diverted by the dam to the Butte Creek Power co. Diversion is on right bank. Power Co. operates only during high water. No fish ladder present. Dam is a barrier at all times.

Natural Obstructions:

Location	Character	Height	Desree of Obstruction
300 yds above St F	Waterfalls	20'	Impassable
Between Sta. G-I	Numerous small falls		Passable

Fluctuation in Water Level:

Cause of Variation: This stream fluctuates considerably due in part to the slight covering of the upper watershed, and also because of the fact that it flows for a considerable distance through intensely cultivated land. Run-off from the comparatively unprotected soil is rapid during heavy rains.

Feet Variation:

Between Stations	Variation
Mouth - Sta. C	12-15'
C-E	5-10'
E-F'	10-15'
F-G	10-20'
G-I	10-20'

Stream Volumes: Sta. C measured 17 c.f.s.

Pollution:

Considerable garbage was found in the stream near all of the bridges.

Fish (salmon):

None were observed and according to reports gathered from the natives no salmon had ever been seen in Butte Creek.

Fish (other than salmon):

Species	Date	Very Abundant	Abundant	Fair	No.	Scarce
Chubs	9/6/40			X		

General Remarks:

Butte Creek, a tributary of the Pudding River rises in the Cascade Mts. in T8S, R3E and flows about 45 miles in a northwest direction to join the main river in S2, T5S, R1W.

Observations on this stream were made during the month of September 1940 at highway bridges and at several other convenient points.

The character of the bottom changes considerably above Sta. E. From the mouth to Sta. E the bottom is entirely of silt and sand. While above Sta. E it is made up almost entirely of bedrock and large boulder with here and there a pocket of silt. At 300 yds. above Sta. F there is a 20' high impassable waterfall.

There are no figures available as to the quantity or quality of spawning rubble in the creek but examination of the data secured indicates that, if present at all, good spawning rubble is of such small amount as to be of no value.

The concrete dam located one mile below Scott's Mills make available, at low water, any spawning areas that might possibly be present above it. At 400 yds above Sta. F is an impassable dam. It too is without a fish ladder of any kind and is a barrier at all times.

The terrain through which butte Creek flows from the mouth to Sta. A is quite flat with the bordering areas under cultivation to the extent of about 90% while above Sta. E the land grades from rolling to very steep and rocky hills. Above Sta. F the area under cultivation is just about zero. Second growth oak and fir of moderate density cover this part of the watershed.

Stream banks of earth with considerable bedrock above Sta. E average about 10' high with dense marginal vegetation of willow, alder and cottonwood. There is considerable variation in the stream volume. High water marks indicated that during time of

General remarks (cont):

flood the water gets as high as 20'. At the time of the survey, the measured stream volume at Sta. C was found to be 17 c.f.s.

Between Sta. E and the mouth of the creek, considerable garbage was found thrown there, no doubt, by people living in that vicinity. This most certainly did not add to the appearance of the creek.

There were no salmon observed in the stream and people living in that area stated that they had never seen. any in Butte Creek. Quite a few chubs were seen at different places along the creek.

Water temperatures of the stream were quite favorable for fish, ranging from 58 degrees at Sta. E to 54.5 degrees at Sta. I.

Examination of the data secured indicates that Butte Creek is of no value to salmon.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
A	9/20/40	10:50 AM	62.5 F	58.0 F	Clear
B	9/20/40	11:15 AM	63.0	59.0	Clear
C	9/20/40	11:40 AM	63.0	59.0	Clear
D	9/20/40	2:30 PM	73.0	59.0	Clear
E	9/20/40	3:00 PM	76.0	59.0	Clear
F	9/20/40	4:00 PM	74.5	58.0	Clear
G	9/20/40	4:15 PM	74.0	57.0	Clear
H	9/20/40	4:30 PM	76.0	56.0	Clear
I	9/20/40	4:45 PM	62.0	54.5	Clear

Pool Grade: No information available.

Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
Mouth-A	1.5	10'	6.6'	Mt. Angel, OR Quadrangle
A-B	1.5	5'	3.3'	Mt. Angel, OR Quadrangle

Moderate gradient throughout portion surveyed. No other information available on this stream.

Abiqua Creek

River System: Willamette
Stream Surveyed: Abiqua Creek, tributary of the Pudding River.

Date of Survey: September 1940.

Source: Rises in the Cascade Mts. of Oregon in T8S, R3E and flows northwest to join the Pudding River in S20, T6S, R1W.

Direction of Flow: Northwest.

Total Length: Approximately 30 miles. 19.9 miles surveyed by Parkhurst and Bryant.

Station Location:

St	Location	Distance Above Prev. Station Yds	Miles	Distance Above Mouth Yds	Miles	Map Location	Width	Depth
A	Confluence with Pudding River		0.0		0.0	S20,T6S R1W	60'	2.0'
B	Hwy bridge 1.5 mi above confluence		1.5		1.5	S21,T6S R1W	54'	1.3'
C	Hwy bridge		4.5		6.0	S19,T6S,R1E	56'	11.0'
D	First covered bridge on Abiqua Ck Rd		6.5		12.5	S11,T7S R1E	64'	5.2'
E	Impassable falls		7.4		19.9	S34,T7S,R2E	20'	

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090009	0016	0.00
B	17090009	0016	0.84
C	17090009	0016	3.33
D*	17090009	0016	12.40
E	17090009	0018	2.01

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

Sta	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
A-B	28,200	9,760	34.6	4,320	15.3	14,120	50.1		
B-C	124,100	25,820	20.8	43,540	35.1	23,210	18.7	31,530	25.4

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

Sta	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
C-D	170,000	90,370	53.2	43,970	25.8	20,925	12.3	14,735	8.7
D-E	115,040	51,335	44.6	34,622	30.1	19,859	17.3	9,224	8.0
Tot	437,340	167,525	38.3	131,892	30.2	68,314	15.6	69,609	15.9

Spawning Area Usable and Available:

Station	Distance yds	miles	Area (yd^2)	Available Spawning Area (yd^2) (MR&SR)	% Avail	Usable Spawning Area (yd^2)	% Usable
A-B	1,800		28,200	14,080	49.9		
C-D	8,570		124,100	66,750	53.8	21,220	17.1
D-E	11,500		170,000	64,895	35.2	17,480	10.3
D-F	13,060		115,040	54,481	47.6	54,481	17.5
Total	34'930		437,340	200,206	45.8.	58,868	13.5

Spawning Area Unavailable and **Unusable:** None, if ladder over Abiqua dam is kept open.

Character of Watershed:

	A-B	B-C	C-D	D-E	E-F
Mountainous				X	
Hilly			X		
Rolling					
Flat	X				
Swampy					
Wooded			X	X	
Open					
Cultivated	90%	90%	30%	0%	
Character of Valley					

Character of watershed **(cont):**

	A-B	B-C	C-D	D-E	E-F
Character of Banks					
Density of Marginal Vegetation					
Erosion a) Banks					
b) Watershed					

Diversions:

Diversion 1: 4500 yds above Sta. B. Right bank, wood chute 18" wide 6" deep, 80 yds long to overshot wheel, about 5' diameter running by chain. Pumps water into farm. flow--2-3 c.f.s.

Diversion 2: 2870 yds below Sta. C. Left bank, 16" pipe, gravity flow for local irrigation. Screened inlet with gate.

Diversion 3: Abiqua Dam diversion to town of Silverton. Take-off is 100 feet above the dam on right bank. Head gate has grizzly 4' wide, 1" space. Iron bar grill with cement bulkhead. Reinforced woodpipe 200' long 2'3" outside diameter goes from grizzly to wooden settling tank which is 52'2" long by 12'2" wide. Water in tank is 4'4" deep and 1'3" from the top. Three screens in front of the settling tank. The center one which is 3'10" wide of 1/4" mesh is supposed to rotate but it doesn't. The two side screens each 3'8" wide a=of 1/4" mesh are vertical and are raised by pulleys. A debris chute 2'11" wide and with a 3 1/2" crest takes surface drift back to the stream.

Diversion 4: 4060 yds above Sta. D, right bank, sawmill 4" intake hose.

Artificial Obstructions:

1. 2400 yds above Sta. D, rock dam for swimming pool 2-3' high, passable.

2. 5800 yds below impassable falls, stream is full of debris from lumbering operation, temporary barrier at low water.

3. 19.9 miles above the confluence with the Pudding River, water falls 100' high, total barrier.

Articifical Obstructions **(cont):**

4. 3300 yds above Sta. B, remains of small plank dam probably for cattle pool, no obstacle to salmon movements although it was blocking salmon when observed.

5. Abiqua Dam 7100 yds above Sta. C, wood and timber construction 12" high flash boards on top of dam. 1" crest for 20' near of dam. Dam is approximately 75' wide and 15.5' high. Concrete fish ladder on left side. Ladder is very poor and the upper end was plugged with debris. Uppermost opening to ladder is subsurface with 10" crest. Headgate to ladder is 1'3" wide x 10" deep. Screens are present in take-off to Silverton, Or. Dam is not a barrier if ladder is kept open and functioning.

Natural Obstructions: N/A

Fluctuation in Water Level:

Sta	Ft. Variation
A-B	3-6'
B-C	3-10'
C-D	8-15'
D-E	8-15'

Cause of Variation: Seasonal variation of precipitation. Very heavily wooded upper watershed helps to retard the run-off. Present logging operations in the upper headwaters may have considerable effect on the water fluctuation in the future.

Stream Volumes: 3300 yds below impassable falls estimated 3 c.f.s. Sta. C, measured volume 19.2 c.f.s.

Pollution: None observed.

Fish (salmon):

	Station	Number	Date
Chinook	C-D	50	9/15/40
Chinook	D-E	200	9/10/40

General Remarks: It was reported that silverside salmon come up Abiqua Creek later in the fall.

Fish (other than salmon):

Species	Date	Very Abundant	Abundant	Fair	No.	Scarce
Chubs, Suckers	9/19/40			X		
Trout, Fingerling and	8'9"					X

General Remarks:

Abiqua creek rises in T8S, R3E of the Cascade Mts. and flows about 45 miles in a northwest direction to join the Pudding River in S20, T6S, R1W. Approximately 19.9 miles of this creek was surveyed on foot in September, 1940:

From Sta. A to Sta. C the terrain is very flat with the land under cultivation averaging about 90%. Above Sta. 3 it becomes quite hilly and as we progress upstream it even approaches the mountains. Percent of watershed under cultivation decreases until at Sta. E it is zero. Dense marginal vegetation of alder, fir and willow line the stream banks.

There is considerable change in the character of the bottom between Sta. A and B mud and silt averaged 50.1%, medium rubble was 34.6% and small rubble was 15.3%. Between Sta. D-E, large rubble and bedrock made up 44.6% of the bottom, medium rubble was 30.1%, small rubble 17.3% and mud and silt averaged only 8.0%. The greatest concentration of usable spawning rubble was found between Sta. B-C with the section between Sta. D-E a close second.

Good resting pools were fairly numerous and were scattered quite generally over the stream. Between Sta. C-D and D-E, the smaller S6 pools were very much in the majority; however, Abiqua Dam, located about 7100 yds above Sta. C is not a barrier if fish ladder is kept open and functioning. At the time of the survey the opening to the ladder was plugged with debris and there was insufficient water going through the ladder. A large school of salmon was observed in the pool directly below the dam.

The Abiqua Dam provides water for the town of Silverton, Oregon. The take-off ditch has screens in it (in front of the wooden settling tank). Before the water gets to the people of Silverton, it goes through a chlorination plant.

At approximately 19.9 miles above the confluence with the Pudding River there is a 100' high falls which is a complete barrier to any fish migration.

There were 250 chinook salmon observed between Sta. A and C and it was reported that silverside salmon go up the Abiqua Creek in the fall of the year.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
A	9/8/40	9:oo AM	58.0 F	64.0 F	cloudy
B	9/8/40	lo:oo AM	60.0	64.0	cloudy
C	9/15/40	ll:oo AM	64.0	61.0	fair
D	9/13/40	10:45 AM	68.0	60.0	cloudy
E	9/9/40	12:00 PM	65.0	57.0	
Abiqua Dam	9/8/40	12:45 PM	74.0	63.0	

Pool Grade:

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6	Ttl
A-B		61		6	4	36	15	5	66
				9.8	6.6	59.0	24.6		
B-C		202		42	12	72	76	37	239
				20.5	5.8	35.1	37.1		
'C-D		133		28	5	79	21	391	524
				21.1	3.8	59.4	15.7		
D-E		140		6	5	99	30	329	469
				4.3	3.6	70.7	21.0	329	469
Grand Total		536		82	26	286	142	762	1298

Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
A-B	1.02	15'	14.7'	Oregon, Mount Angel Quadrangle

Note : No further information available. May be classed as moderate through portion surveyed.

Tributaries:

1. No. 1 is a very small stream entering from the left bank at 180 yds below Sta.D; estimated volume was 2 c.f.s.; the stream was impassable at the time of the survey.

2. No. 2 is another small stream entering from the right bank at 700 yds below Sta. D; estimated volume was 1 c.f.s.; likewise impassable at the time of the survey.

Tributaries **(cont):**

3. Little Abiqua Creek enters from the right side at 3860 yds above Sta. D; estimated-volume was 5 c.f.s.; impassable at the time of the survey.

4. Small brook, right bank 2500 yds above Sta. a; 5 c.f.s.

5. Small brook, left bank 1243 yds below Abiqua Dam; 1 c.f.s.
6. Small brook, left bank 2200 yds above Sta. C; **1.c.f.s.**

Silver Creek

River System: Willamette River
Stream Surveyed: Silver Creek, tributary of the Pudding River.

Date of Survey: September, 1940.

Source: Both North and South branches of Silver Creek rise in T8S, R2E.

Direction of Flow: The branches join in section 10, T8S, R1W and flow northwest to join the Pudding River in section 32,T6S,R1W.

Total Length: 14 miles from mouth the junction of North and South branches. 5.4 miles of this part of the stream was surveyed on foot. Observations were made at several points on both the North and South branches. Including 9 1/2 miles north branch and 8 1/2 miles south branch = 32 miles.

Station Location:

St	Location	Distance Above Prev. Station Yds	Distance Above Prev. Station Miles	Distance Above Mouth Yds	Distance Above Mouth Miles	Map Location	Width	Depth
A	Confluence with Pudding River		0.0		0.0	S32,T6S R1W	40'	
B	Lower bridge in Silverton, OR		3.1		3.1	S34,T6S R1W	56'	18.1"
C	Izaak Walton Park		2.3		5.4	S12,T8S,R1W R1W	61'	10.4"
D	Falls on north branch					S7,T8S,R2E	50'	6.0"
E	100 yd abv falls on s. branch					S14,T8S,R1E	35'	3.8"

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090009	0013	3.16
B	17090009	0015	0.88
c*	17090009	0015	0.88

* Station location is not definite and has been estimated
(River reach codes for stations D and E were not determined due to lack of pool data at these two stations)

Character of Bottom Between Stations:

Sta	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
A-B	53,200	4,170	7.8	17,740	33.4	17,945	33.7	13,345	25.1
B-C	65,500	32,370	49.4	20,050	30.6	7,930	12.1	5,150	7.9
Tot	118,700	36,540	30.8	37,790	31.8	25,875	21.8	18,495	15.6

Spawning Area Usable and Available:

Station	Distance vds	Area (yd^2)	Available Spawning Area (yd^2) (MR&SR)	% Avail	Usable Spawning Area (yd^2)	% Usable
A-B	4,800	53,200	35,685	67.1	2,465	4.6
B-Silver'dam	900	13,400	6,670	49.8	1,890	14.1
Total	5,700	66,600	42,355	66.5	4,355	6.5

*Note : The Silverton Dam with its dry, very inadequate fish ladder, comstitutes a very effective barrier to fish migration at least during low water. All spawning rubble above this dam must threfore be considered unavailable during low water stages.

Spawning Area Unavailable and Unusable:

Station	Distance	Area (yd^2)	Area Unavail (yd^2)	% Unavail	When Unavail	Usab-le Unavail (yd^2)	% Usable Unavail
S. Dam-C	3,900	52,100	21,310	33.5	LW	6,305	12.1

Cause of Unavailability: Unavailable at low water.

Character of Watershed:

	A-B	B-C	S. Fork C-D	N. Fork C-E
Mountainous				X
Hilly		X	X	
Rolling				
Flat	X			
Swampy				

Character of Watershed **(cont):**

	A-B	B-C	S. Fork C-D	N. Fork C-E
Wooded			X	X
Open				
Cultivated	90%	50%		
Character of Valley				
Character of Banks				
Density of Marginal Vegetation				
Erosion a) Banks				
b) Watershed				

Diversions:

Diversion 1: Power diversion at Planing Mill in town of Silverton at dam 3 .1 miles above mouth. Takes considerable part of summer flow.

Artificial Obstructions:

1. 2100 yds above the confluence with the Pudding River; brush jam; at time of survey it appeared to be impassable to salmon (considered as passable.

2. 4300 yds below Sta. C; boulder dam; 6" high; passable.

3. 4232 yds below Sta. C; boulder dam; 1' high; passable.

4. From 4000 yds to 4200 yds below Sta. C; rubbish; passable.

Artificial Obstructions **(cont):**

5. 3900 yds below Sta. C; Silverton Dam. Dam is approximately 80' wide and supplies water power for planing mill; 12' high; a very inadequate wood fish ladder is present. At time of survey the ladder was dry and the upper end was full of garbage. Barrier at low water.

6. 3550 yds below Sta. C; concrete dam, 75 1/2' wide; 5' high; two fish ladders present. One on each side, passable.

7. 3450 yds below Sta. C; log dam for swimming pool; impassable at time of survey, barrier at low water.

8. 3325 yds below Sta. C; wood dam; 4' high; dam impassable at time of survey. Upstream side plugged with debris, opening around left end thoroughly plugged, barrier at low water.

9. 3115 yds below Sta. C; old dam and fish ladder no longer used. Dam is open; passable.

Natural Obstructions:

1. 3115 yds below Sta. C; waterfalls; 3' high; passable.

2. 226 yds below Sta. C; waterfalls over slanting sheet bedrock up 6' in 30'; 6' high; impassable at low water.

3. Silver Creek Falls Sta. D, north fork of creek; waterfalls; 146' high; impassable at all times.

4. Sta. E, south fork of creek; waterfalls; 184' high; impassable at all times.

Fluctuation in Water Level:

Sta	Ft. Variation
A-B	3-6'
B-C	3-6'
C-D	5-15'
C-E	5-10'

Fluctuation in Water Level **(cont):**

Stream Volumes:

Location	Measured flow	Estimated flow
50 yds above Sta. B	42.5 c.f.s.	
Sta. D N. falls		
abv S. falls	13.7 c.f.s.	25 c.f.s.

Cause: fairly moderate run-off of precipitation due to very dense vegetation of upper watershed.

Pollution:

Location of Pollution: No. 1 - 900 yds below Sta. B.
No. 2 - Fruit Cannery in Silverton, OR.

Type of Pollution: No. 1 - sewage treatment plant from town of Silverton. 2' pipe on left bank discharge from gravel filter bed above.
No. 2 - Cannery waste.

General Remarks: No. 1 - Pollution has no apparent affect on the stream fish population. Overflow is quite clear. Very slight odor present.
No. 2 - The cannery was not running at the time of the survey.

Fish (salmon): None observed.

Fish (other than salmon):

Species	Date	Very Abundant	Abundant	Fair	No.	Scarce
Chubs	9/29/40				X	
2-6" Trout	9/29/40					X

General Remarks:

Silver Creek rises in the Cascade Mts. in T8S, R2E and flows northwest to join the Pudding River in S32, T6S, R1W. Approximately 5.4 miles of this stream was surveyed on foot and several observations were made on both the north and south branches which unite in S10, T8S, R1E to make up the main stream. All

General remarks **(cont):**

observations were made during the month of September 1940.

The survey on foot was started at the Izaak Walton Park in S12, T7S, R1W and conducted downstream to the confluence with the Pudding River.

From the mouth' upstream to the town of Silverton, OR the terrain is very flat and about 90% of the area is under rather intensive cultivation. Banks of dirt and gravel average about 6' high with dense marginal vegetation of'willow, alder, oak, maple and cottonwood. Mud and silt average 25.1% of the bottom and large rubble 7.8%. About 2,465 sq. yds of useable spawning rubble was present, this averaged only 4.6% of the bottom.

A very large brush jam about 1/2 mile above the mouth makes the stream nearly impassable. The stream bed rises from the mouth to the town of Silverton, designated as Sta. B at the rate of 25.9' per mile. Good resting pools averaged 65.6 pools per mile. The people in the town of Silverton have acquired a very bad habit of throwing all of their junk and garbage into the stream.

Upstream from the town of Silverton to Sta. C, located at Izaak Walton Park, the terrain is quite hilly with only about 50% of the area under cultivation. Earth and bedrock banks average about 9' high with very dense marginal vegetation of fir, hemlock, oak, and maple. In this section of the stream, mud and silt averaged 7.9% and large rubble 49.9% of the bottom. Useable spawning rubble was found to be only 12.5% of the bottom. Good resting pools averaged 15.6 pools per mile. There are numerous obstructions in this section of the stream. At 226 yds below Sta. C is a 6' high impassable at low water waterfalls. About 2 miles below Sta. C is a 4' high impassable at low water wooden dam. Located at Silverton City Park, 550 yds above Silverton, OR is another impassable at low water dam. At 450 yds above Silverton, OR is a passable concrete dam with fish ladders on both sides and finally at 100 yds above Silverton, OR there is located a dam that is a very effective low water barrier to salmon migration. It is a wood dam with a very poor fish ladder. All spawning rubble above this dam was considered unavailable during low water.

A fruit cannery in the town of Silverton dumps its waste into the stream and the sewage treatment plant of Silverton also drains its overflow into the stream. The effects of this pollution on the fish population are not known, but it is safe to say that the stream is not benefited.

From the town of Silverton to Sta. C at Izaak Walton Park, the stream bed rises at the rate of 48.1' per mile.

Above Sta. C the stream forks and each branch flows through

General remarks **(cont):**

very precipitous box canyon-like terrain with the steep rocky watershed covered by dense stands of fir, hemlock, oak and maple. The amount of land under cultivation is negligible. Both branches of the stream have impassable waterfalls in them. The north branch waterfall' is about 2 1/4 miles above the fork and is 160' high, while the one on the south branch is only 1.0 mile above the fork and is 184' high.

There is very little spawning rubble above Sta. C. The bottom is made up almost entirely of bedrock with small falls quite numerous. The banks of bedrock average about 50' high and are very steep.

There were no salmon observed in the stream and trout were very scarce.

Under present conditions, Silver Creek has little value as a salmon stream.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
B	9/28/40	10:30 AM	59.0 F	55.0 F	cloudy
C	9/28/40	3:15 PM	59.0	55.0	cloudy
D	9/29/40	10:15 AM	56.0	53.0	cloudy
E	9/29/40	11:30 AM	55.0	54.0	cloudy

Pool Grade:

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6	Ttl
A-B		170		20		89	61	16	186
				11.3		50.3	34.5		
B-C		42		7		25	10	44	86
				16.7		59.5	23.8		
Grand Total		212		27		114	71	60	272
				12.7		53.8	33.5		

Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
A-B	2.7	approx 70'	25.9'	Oregon, Mt. Angel Quadrangle map

Gradient (cont):

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
B-C	2.7	approx 130'	48.1'	Oregon, Stayton Quadrangle map
C-D(N. fork)	2.5	Fairly steep grade		Field survey sheets
D-E(S. fork)	1.0	Fairly steep grade		Field survey sheets

Brush Creek

River System: Willamette River
Stream Surveyed: Brush Creek, tributary of Silver Creek

General Remarks:

Enters the main stream 1/2 mile above the mouth, on the right bank. Estimated flow was less than 2 c.f.s. This creek, since it is full of brush and mud, is of no value as a salmon stream.

Drift Creek

River System: Willamette River
Stream Surveyed: Drift Creek, tributary of the Pudding River

Date of Survey: September 1940

Source: Rises in the Cascade Mts in T8S, R1E.

Direction of Flow: Flows northwest for about 20 miles to join the Pudding River in S8, T7S, R1W.

Total Length: 20 miles. Stations A-B were surveyed by foot for approximately 0.8 of a mile. The remaining stations were surveyed by car.

Station Location:

St	Location	Distance Above Prev. Station Yds	Distance Above Prev. Station Miles	Distance Above Mouth Yds	Distance Above Mouth Miles	Map Location	Width	Depth
A	Confl. w/ Pudding River	--			0.3	S8,T7S R1W	12.0'	
B	Hwy bridge		0.5		0.8	S8,T7S,R1W	15.3'	4.0"
C	2 ft. diversion dam					T7S,R1W	30.0'	
D	Concrete bridge on hwy, Silverton to Salem					S9,T7S R1W	29.0'	8.1"
E	Bridge 4 miles above Sta. A					S36,T7S R1W	35.0'	3.8"
F	N.fork br. above Drift Creek Falls					S8,T8S R1E	15.5'	7.1"
G	Bridge 1 1/2 above N. fork confluence					S17,T8S R1E	9.0'	17.0"

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090009	0014	1.94
B	17090009	0014	1.94
C	17090009	0014	1.94

(Sta D,E,F, and G river reach codes were not determined due to absent pool data)

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
A-B	2,712	112	4.2	616	22.7	302	11.1	1,682	62.0

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

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
B-C	5,944	1,444	24.3	2,572	43.3	1,254	21.1	'674	11.3
Total	8,656	1,556	18.0	3,188	36.8	1,556	18.0	2,356	27.2

Spawning Area Usable and Available:

Station	Distance vds	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	% Usable
A-B	564	2,712	918	33.9	214	7.9
B-C	836	5,944	3,826	64.4	2,521	42.4
Total	1,400	8,656	4,744	54.8	2,735	31.6

Spawning Area Unavailable and Unusable:

Cause of Unavailability: At Sta C there is a 2′ dam that is impassable at low water, therefore we must consider all spawning rubble above this point as unavailable during low water.

Character of Watershed:

	A-B	B-D	D-E	E-F	E-G
Mountainous					
Hilly				X	X
Rolling	X	X	X		
Flat					
Swampy					
Wooded				X	
Open					
Cultivated	75%	75%	50%	10%	
Character of Valley					
Character of Banks					

Character of Watershed **(cont):**

	A-B	B-D	D-E	E-F	E-G
Density of Marginal Vegetation					
Erosion					
a) Banks					
b) Watershed					

Diversions:

Diversion 1: Diversion to dairy 0.8 miles above mouth is a wood flume and earth ditch above small diversion dam. Takes good share of water in summer.

Artificial Obstructions:

1. 1400 yds above the confluence with the Pudding River; wood diversion dam supplies water to large dairy; 2' high; impassable at time of survey.

Natural Obstructions:

1. 200 ft below Sta. F on north fork; waterfalls consisting of two parts. The first is a perpendicular drop of 20' then 30' on the horizontal and then another 15' perpendicular drop to the stream bed; 35' high; impassable.

Fluctuation in Water Level:

Causes: Seasonal precipitation is retarded to a great extent by the very dense second growth forest coverinng the upper watershed.

Sta	Ft. Variation
A-B	3-6'
B-D	2-4'
D-E	3-6'
E-F(N. fork)	3-6'
E-G(S. fork)	3-6'

Stream Volumes:

Station	Measured	Estimated
B	5.6 c.f.s.	
E		5 c.f.s.
F		2 1/2 c.f.s.
G (Drift Creek Falls)		2 1/2 c.f.s.

Pollution: None was observed

Fish (salmon): None observed. It was reported that chinook salmon had not been seen in the creek for the past 14 years.

Fish (other than salmon): None observed.

General Remarks:

Drift Creek, a very turbid stream at the time of the survey, rises in the Cascade Mts in T8S, R1E and flows northwest for about 20 miles to join the Pudding River at S8, T7S, R1W.

Approximately .8 of a mile was surveyed on foot during September 1940. Observations were also made at several other points along the stream and on both north and south forks that join in S7, T8S, R1E.

The terrain from the mouth to Sta. E is quite flat with a few comparatively low rolling hills. The land under cultivation is about 75% and scattered clumps of fir, oak and maple dot the landscape. Fairly steep stream banks of earch and gravel average about 6' high and marginal vegetation of willow, alder, fir and maple is very dense. Between the mouth and Sta. C the stream bed rises at the rate of 56.8 feet per mile.

From the mouth to Sta. B, mud and silt make up 62% of the bottom and bedrock is only 4.2%. Usable spawning rubble in this section was only 214 sq. yds or 7.9% of the bottom.

From Sta. B to Sta. C, which is the uppermost extremity of the area surveyed on foot, mud and silt averaged only 11.3% and bedrock 24.3% of the bottom. Usable spawning rubble was found to be 42.4% of the bottom.

At Sta. C is the small 2' high wood divers-ion dam which during low water is a barrier to fish migration. Because of this dam, all spawning rubble above this point was considered unavailable at times of low water. since the stream above this dam was not surveyed on foot, there are consequently no figures available relative to the quantity or quality of spawning rubble present. Observations taken at stations above the dam reveal that bedrock and large rubble are very much in evidence. Almost the entire stream bed above Sta. D is bedrock.

The terrain above Sta. D is very hilly with a dense stand of second growth fir, oak and maple. The area under cultivation is roughly about 10%. Stream banks of earth and bedrock average 12'

General remarks (cont):

high and marginal vegetation of fir, willow, alder and oak is quite dense.

At 200' below STa. F are impassable waterfalls. The upper fall is about 20' then the water flows over a 30' horizontal ledge and then drops perpendicularly for about 15'.

Measured stream volume at Sta. B was 5.6 c.f.s. and at Drift Creek Falls it was estimated to be about 2 1/2 c.f.s.

There were no fish observed in Drift Creek and according to reports no salmon had been seen for the past 14 years.

Examination of the data secured indicates that this stream is of little value to salmon.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
B	9/3/40	12:30 PM	66.5 F	62.0 F	cloudy
D	9/28/40	11:00 AM	60.5	56.5	cloudy
E	9/28/40	noon	60.0	55.5	cloudy
F	9/28/40	12:30 PM	60.0	54.5	cloudy
G	9/28/40	1:00 PM	60.0	56.5	cloudy

Pool Grade:

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6	Ttl
A-B		9		2		6	1	1	10
				20.0		60.0	10.0	10.0	
B-C		0						3	3
								100.0	
Grand Total		9		2		6	1	4	13
				22.2		66.6	11.2		

Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
A-B	0.48	15'	31.3'	Stayton Quad, Oregon
B-C	1.25	70'	56.0'	Stayton Quad, Oregon
C-D	6.0	355'	59.2'	Stayton Quad, Oregon
D-E,E-F	No information available			

Milk Creek

River System: Willamette River
Stream Surveyed: Milk Creek, tributary to Molalla River

Date of Survey: September 1940

Source: Foothills of the Cascade, Range. Milk Creek is formed by the water from Mud Creek, Hancock Creek, Canyon Creek, Mill Creek and several other small streams arising in the foothills. The approximate location is T4 and 5S, R3 and 4E.

Direction of Flow: Northwest

Total Length: 35 miles.

General Remarks:

Observations were made on the stream just above Colton, OR. Width 10', depth 2-10", estimated flow 7-10 c.f.s. The bottom in this upper portion of the stream was composed mostly of large and medium rubble.

Milk Creek most of the way up was observed to be sluggish with a heavily silted bottom and swampy shores, more in the nature of a slough than a river. There is little exposed stream bed indicating a rather small fluctuation in water level. Marginal vegetation is dense and in most cases comes down to the water's edge.

There are two dams on the river. The lower, or Mulino Dam being impassable at all times. The Mulino Dam is 10, high, 183, wide. Wooden slope with concrete abutments. No fish ladder was present.

The dam at Union Mills is 12'10" high, 83, wide and constructed of wood. During high water the 37" flash boards on top of the dam are removed. No fish ladder present, probably a total barrier.

Sufficient data were not obtained on this stream to give much detail, however from the sketches made it appears that:

Mulino Dam is used to create a head of water for irrigation purposes. An 8" irrigation pump pipe is shown on the sketch as taking off at one end of the dam. Nothing indicated as to protective devices.

Union Mills Dam shows a diversion canal taking off some distance above the dam to supply water power to a feed mill. Ditch

General remarks **(cont):**

returns water below mill and dam into Milk Creek. No data on protective devices except a trash screen shown in the ditch above the mill.

No data as to fish population. Lower portion of stream is slough-like. Upper portions have more gradient and might be of some value.

Stream is of no use in its present condition and fish ladders over dams would have to be installed before stream is stocked if spawning area above ever becomes needed.

Sketches present.

North Fork of the Molalla

River System: Willamette River
Stream Surveyed: North Fork of the Molalla, tributary of the Molalla River.

Date of Survey: 9/11/40

Source: Cascade Mts., R4E, T6S.

Direction of Flow: Northwest

Total Length: 25 miles of which 1.5 miles were surveyed by Frey.

Station Location: Average width at stations--35 feet.

EPA River Reach Code:

Station	HUC	SEG	Rmi
A	17090009	0030	0.00
B	17090009	0030	0.00

Character of Bottom Between Stations:

St	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%	Linear vds
All	28,200	16,420	58.0	8,430	30.0	1,770	'6.0	1,680	6.0	2.7

Spawning Area Usable and Available: Available at high water.

Station	Distance vds	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	% Usable
A-B	2,700	28,200	10,200	36.2	878	3.1

Spawning Area Unavailable and Unusable:

Cause of Unavailability: Unavailable at low water. The wooden irrigation dam at 1,160 yds above Sta. 8 on the Molalla River makes unavailable at low water all spawning areas in the North Fork since it enters the main stream above Sta. H. As with the main river, this is not an effective barrier as all of the salmon come up during the spring high water period.

Character of Watershed:

Topography: Mountainous, covered with timber and second growth. Less than 5% of the lower watershed is in cultivation.

Diversions: None.

Artificial Obstructions:

1. 740 yds above the mouth; log jam; passable at all times.

Natural Obstructions: None. Most of the stream channel is shallow with large boulders protruding from the surface of the water.

Fluctuation in Water Level: Reported to be 9-10 feet.

Pollution: None.

Fish (salmon):

No salmon were observed in the section of the river surveyed. Natives, however, reported salmon concentrated in a pool at the "narrows," ca. 3 1/2 miles above the mouth.

Fish (other than salmon):

Trout fingerlings 4" long were abundant. At the time of the survey, the stream was closed to fishing in an effort to restore the depleted trout populations.

General Remarks:

The stream is rather small and narrowly confined by steep banks of volcanic origin and, at times, 40-50' high. Vegetation crowds the water's edge and is very dense. Few good resting pools or spawning riffles were observed in the portion surveyed. Numbers of salmon enter the stream each year ascending to the upper part of the river to spawn.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
Mouth	9/11/40	10:10 AM	68.0 F	57.0 F	clear

Pool Grade:

Sta	Resting Pools	Resting Pools/Mi	S1T1 %	S2T1 %	S2T2 %	S3T1 %	S3T2 %	S4T1 %	S5	S6	Total Pools
A-B	23	15.3	4.4	17.4	4.4	13.0	2.0	4.4	4	50	46.0

Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
Lowest 2700 yds	1.5	50'	33'	Estacade Quadrangle, U.S.G.S.

Champoeg Creek

River System: Willamette River
Stream Surveyed: Champoeg Creek

Date of Survey: unknown

Source: Rises in S30, T5S, R2W and joins the Willamette River in S6, T4S, R1W.

Description of Stream:

Observations were made on this stream September 10, 1940 at a highway bridge west of Woodburn, OR. Here the stream was found to be 6′ wide and 6" deep with no perceptible gradient. The bottom was entirely of mud and the dirt banks 5-10′ high lined with dense willow and brush. The flow was estimated to be less than 2 c.f.s.

The watershed is of low rolling hills and large flat areas. The valley is saucer shaped with gently sloping sides and the area under cultivation is about 90%.

Champoeg Creek is subject to great fluctuation in water level. The intensive cultivation of the watershed and valley causes rapid run off and some erosion during high water.

This stream is of no value to salmon.

General Remarks:

Champoeg Creek enters the Willamette River at the first place up the Willamette where the banks slope back gently making a good landing place and hence was the site of the first U.S. Government on the pacific coast.

Mission Creek

River System: Willamette River
Stream Surveyed: Mission Creek

Source: Rises in S36, S1.

General Remarks:

Observations were made on Mission Creek, September 10, 1940. At this time the creek was found to be almost dry. It drains an area not over 4 miles wide of low rolling hills and small flat semi plateaus. The valley is not deep but slopes gently back as do the others in this vicinity. The earth banks average 4-8' high, typically forming a sort of small ravine with fairly steep 45 degree angle sides. The flow was found to be less than 1 c.f.s. The gradient is very slight for the most part to the moderate grade in places. The bottom is entirely of mud with dense marginal vegetation of willow, maple, alder and conifers. The valley is intensely cultivated (over 90%) with hops, hay, fruit and nuts the principal crops. Evidence points to extreme and rapid fluctuation in water level during flood season, with some erosion due to cultivation of the watershed.

The stream would be of no value to salmon.

Yamhill River

River System: Willamette River
Stream Surveyed: Yamhill River (main stream from confluence with Willamette River to junction of North and South Forks.

General Remarks:

Observations on this section of the river were taken at Dayton and Lafayette bridges. At Dayton the river was 169, wide, with an estimated depth of 3,. At the Lafayette bridge, it was 175' wide, with an average depth of 12'8".

At the time of the survey, September 26, 1940, the river was very turbid and sluggish with dirt banks averaging 18-20' high. Fairly dense vegetation of willow, ash, alder, maple and fir lines the river banks.

The only artificial obstruction observed in this part of the river was the U.S. Government locks one mile below Lafayette, OR, 47 miles from the mouth. The locks were found to be 276' long and 40' wide. A fish ladder is present. At the time of the survey, sufficient water was going through the ladder to permit upstream migration, providing the fish did not mind the debris clogging the opening at the top of the ladder, No doubt the fish could go right through the locks when they are open. The attendants at the locks stated that in the many years that they had been at the locks they had seen only one salmon in that vicinity.

Tributaries:

I. Yamhill River
    1. Palmer Creek (or Mill Creek on Siuslaw N.F. maps)
    2. Henry Brook
    3. North Yamhill River
        a. Panther Creek
            (1) Baker Creek
            (2) Fall Creek
        b. Hay Creek
        c. Cedar Creek

    4. South Yamhill River
        a. Cozine Creek
            (1) Mill Run (from Baker Creek of N. Yamhill River)
        b. Salt Creek
            (1) Swale Creek
                (a) Ash Creek
                (b) Athey Canyon Creek

Tributaries **(cont):**

c. Deer Creek
   (1) Muddy Creek
d. Rock Creek
e. Mill Creek
   (1) Gooseneck Creek
f. Willamina Creek
   (1) Coast Creek-
   (2) East Fork
g. Gold Creek (Cold Creek on N.F. maps)
h. Rowe11 Creek
i. Casper Creek (or Cosper Creek)
j. Rock Creek
k. Rogue River
1. Agency Creek
   (1) Joe Creek
   (2) Yoncalla Creek
m. Fad Creek
n. Pierce Creek
o. Kitten Creek

Palmer Creek

River System: Willamette River
Stream Surveyed: Palmer Creek, tributary to Yamhill River

General Remarks:

Palmer Creek, a tributary of the main Yamhill River,, enters from the left about 5 1/2 miles above the confluence. Observations on this stream were taken at a highway bridge about 3 miles south of Dayton, on the road to McMinnville. Here the stream was 15-18' wide and 2' deep. Water temperature 57 degrees, air 63 degrees, 9/26/40. Estimated flow was 4-5 c.f.s. The stream banks were of dirt and the bottom was mud. The water was very turbid. Moderately dense vegetation of maple, alder etc. lines the stream banks.

No data on salmon runs.' Probably no value.

North Yamhill River

River System: Willamette River
Stream Surveyed: North Yamhill River, tributary to Yamhill River

Date of Survey: Surveyed was started September 13 and 14, 1945 by Parkhurst, Rucker and Brewington. Finished on October 1, 1945 by Johanson, David & Brewington.

Source: S16, T2S, R6W, in the coastal range of Western, OR:

Direction of Flow: East for approximately 9 miles then turns and flows south for 17 miles before joining the So. Yamhill.

Total Length: 26 miles

Amount Surveyed: 35 miles, 3.6 miles were surveyed on foot.

Station Location:

St	Location	Map Location	Width	Depth
A	Bridge on hwy 99W near McMinnville	S15,T4S R4W	67'	5.6"
B	Bridge between Carlton & Yamhill	S6,T3S R4W	72,	2.4'
C	Covered bridge west of Yamhill on way to Fairdale	S6,T3S R4W	50'	24.0'
D	Third hwy bridge above Carlton	S26,T2S R5W	50'	
E	Intermediate St.	S27,T2S,R5W	30'	
F	Cedar Creek confluence	S28,T2S,R5W	50'	

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090008	0003	0.00
B*	17090008	0004	11.40
c*	17090008	0004	12.43
D*	17090008	0006	0.00
E*	17090008	0006	0.00
F	17090008	0006	4.03

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
D-E	53,278	20,459	38.4	20,375	38.2	10,726	20.2	1,710	3.2
E-F	24,700	11.880	48.1	7,410	30.0	2,110	8.5	3,300	13.4
Total	77,978	32,339	41.5	27,783	35.6	12,846	16.5	5,010'	6.4

Spawning Area Usable and Available: No data

Spawning Area Unavailable and Unusable:

Station	Distance	Area (yd^2)	Area Unavail (yd^2)	% Unavail	When Avail	Usable Unavail (yd^2)	% Usable Unavail
D-E			31,109	58.4		4,900	9.2
E-F			9,520	38.5		2,722	11.0
Total			40,629	52.1		7,622	9.8

Cause of Unavailability: The lumber mill dam near Carlton, OR is a very effective low water barrier to upstream fish migration. Therefore, we must consider all spawning rubble above the dam as being unavailable at all times.

Character of Watershed:

	A	B	C	D-E	E-F
Mountainous				x	X
Hilly			X		
Rolling	X	X			
Flat					
Swampy					
Wooded				X	X
Open					
Cultivated	80%	50%	20%	10%	less than 5%
Character of Valley					

Character of Watershed **(cont):**

	A	B	C	D-E	E-F
Character of Banks					
Density of Marginal Vegetation					
Erosion a) Banks					
b) Watershed					

Diversions:

Diversion 1: Lumber mill diversion at **Carlton,** no data.

Artificial Obstructions:

1. Lumber Mill Dam at **Carlton** Or; plank and board dam **196'** wide; **28'** high; a fish ladder is present. At the time of the survey, the ladder was dry (see sketch). Total barrier until ladder kept in operation.

Natural Obstructions: None

Fluctuation in Water Level:

Feet Variation: **4-8'** estimated

Cause of Variation: Slow run off due to extensively wooded watershed.

Stream Volumes: No information available.

Pollution: None observed.

Fish (salmon): None observed.

Fish (other than salmon):

Species	Date	Very Abundant	Abundant	Fair	No.	Scarce
Trout	10/1/40				X	

Fish (other than salmon) (cont):

Species	Date	Very Abundant	Abundant	Fair No.	Scarce
Sculpins	10/1/40		X		
Chubs	10/1/40		X		
Suckers	10/1/40		X		

General Remarks:

The North Fork of the Yamhill River rises in T2S, R6W and flows about 35 miles in a southeast direction to join the main Yamhill River in S14, T4S, R4W.

Observations were taken at three highway bridges and 3.6 miles were surveyed on foot. Information secured at the highway bridges showed that the stream bottom was heavily silted, the water turbid, banks of dirt and gravel averaged about 7' high and moderately dense vegetation of willow, ash and maple lines the stream banks. There is considerable cultivated land on both sides of the stream.

Concerning the section surveyed on foot, this part of the river flows through very hilly, densely wooded country. Character of the bottom was as follows: Large rubble 41.5%, medium rubble 35.6%, small rubble 16.5%, and mud and silt was 6.4%. Between Sta. D and E the stream banks averaged 8-10' high of bedrock gravel and dirt. Between Sta. E and F, the banks averaged 50-100' high of bedrock. Almost the entire section between Sta. E-F has a stream of bedrock.

Water temperatures in the river are favorable, ranging from 60 degrees F at Sta. B to 54 degrees at Sta. F.

The wooden dam at Carlton is a very effective barrier to upstream movements of fish. At the time of the survey, October 1, 1940, the fish ladder was dry.

As this stream has not been completely surveyed, it is impossible at this time to give an accurate opinion as to its potential value as a salmon stream.

The first 13 miles is all slough area with a mud and silt bottom. The section from the gravel crusher to Pike, OR has very little spawning area, but the rest of the stream from Pike to the CCC Camp above Fairdale has good spawning area and there is possibly some spawning area above that point.

About the time the survey was made, the stream should have been at its lowest, according to the U.S.G.S. water paper reports. At that time, there was water enough to support a large number of fish. any species of salmon could spawn in this stream.

General remarks **(cont):**

The removal of two log jams and a dam, and construction of a ladder over the Carlton Mill Dam would make the entire stream available.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
Logging Dam at Carlton	9/26/40	1:10 PM	65.0 F	64.0 F	cloudy
A					
B	9/26/40	2:30 PM	61.0	60.0	cloudy
D	10/1/40	2:30 PM	60.0	56.0	cloudy
E	10/1/40	10:40 AM	59.5	54.5	cloudy
F	10/1/40	10:30 AM	57.0	54.0	

Pool Grade:

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6	Ttl
D-E		13	23.5	3		10		44	57
				5.3		17.5		77.2	54
E-F		7		2		5		17	24
				8.3		20.8		70.8	
Grand				5		15		61	
Total		20	23.5	6.2		18.5		75.3	81

Gradient: No data

Tributaries:

1. Panther Creek
2. Baker Creek
3. Hay Creek

Panther Creek

River System: Willamette River
Stream Surveyed: Panther Creek, tributary of North Yamhill River

Date of Survey: September 1940.

Source: T35, R5W.

Direction of Flow: Southeast, joins North Yamhill in S9, T4S, R4W.

Total Length: Approximately 11 miles, observations made only at highway bridges.

Station Location:

St	Location	Map Location	Width	Depth
A	Hwy bridge above McMinnville	S5,R4S R4W	14'	10"
B	Hwy bridge near Panther Creek road	S31,T3S R4W	12'	10-12"
C	Logging bridge near hwy bridge on Panther Creek road		11'	6"
D	Last bridge over the stream near small sawmill		7'6"	7"

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090008	0012	0.00
B	17090008	0012	2.53
c*	17090008	0012	7.75
D*	17090008	0012	9.62

* Station location is not definite and has been estimated

Character of Bottom Between 'Stations:

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S'	%
A								mud	
B								mud	
C	Considerable bedrock & large rubble								
D			20.0		50.0		15.0		15.0
Total			2 0 . 0		50.0		15.0		15.0

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

Since observations of the stream were taken only at highway bridges, there are no figures available as to the quantity or quality of spawning rubble in the stream. Considerable spawning rubble was observed in the stream at Sta. C and D and at several places above Sta. D.

Spawning Area Unavailable and Unusable:

Cause of Unavailability: A small sawmill is located approximately 3 mi above mouth, between Sta. C and D. A small part of the main stream is diverted to the mill pond and the remainder flows through a small water wheel near the mill. At the time of the survey this water wheel was considered to be a very effective barrier to upstream movements of fish. Salmon, if there were any in the creek, would find it difficult to get by the waterwheel during low water stages.

Character of Watershed:

	A	B	C	D
Mountainous				
Hilly		X	X	X
Rolling	X			
Flat				
Swampy				
Wooded				
Open				
Cultivated	70%	60%	30%	20%

Diversions:

1. Sawmill diversion.

Artificial Obstructions:

'1. Between Sta. C and D; small water sheel in main stream; 5' high; there were no protective devices present. Water wheel is complete barrier during low water.

Natural Obstructions: None observed.

Fluctuation in Water Level:

Cause of Variation: Seasonal fluctuation of precipitation. Fairly dense vegetation of watershed retards too rapid run-off. Estimated variation, 4-6,.

Stream Volumes: Estimated flow at Sta. A - 15 cfs; at Sta. D - 4-8 cfs.

Pollution: No information available.

Fish (salmon): No information available.

Fish (other than salmon): No information available.

General Remarks:

The lower half of Panther Creek is characterized by having a mud bottom with very little visible rubble. Banks of dirt and gravel average 8-10' high. Quite dense marginal vegetation of willow, ash and alder line the stream banks. Stream volume was estimated to be 15 cfs.

There is considerable good spawning rubble in the upper half of the stream above Sta. D. At Sta. D, the rubble visible was classified as follows: Large rubble 20%, medium rubble 50%, small rubble 15%, mud and silt 15%. Banks of dirt and gravel were about 5' high. Very dense vegetation of alder, willow and maple line the banks.

A small water wheel located near Sta. D would be a complete barrier to salmon, if there were any in the stream, during low water. The wheel is a temporary affair and is probably removed during high water.

Examination of the data secured indicates that Panther Creek warrants being surveyed on foot to determine the exact value of the stream for salmon.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
B	9/28/40	11:20 AM	67.0 F	58.0 F	cloudy
C	9/28/40	12:10 PM	60.0	56.0	cloudy
D	9/28/40	1:15 PM		66.0	cloudy

Pool Grade: No information available

Gradient: No information available

Baker Creek

River System: Willamette River
Stream Surveyed: Baker Creek, tributary to Panther Creek

Date of Survey: September 28, 1940

Source: Rises in T3, 4S, R5W

Direction of Flow: Flows east to join Panther Creek in S4, T4S, R4W.

Total Length: Approximately 18 miles; observations made only at highway.

Station Location:

St	Location	Map Location	Width	Depth
A	First highway bridge going north out of McMinnville toward Yamhill	S9,T4S R4W	14'	3.5"

EPA River Reach Code:

Station	HUC	SEG	Rmi
A	17096008	0013	0.58

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
A								mud	

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

As this stream was not surveyed on foot there is no information as to the spawning rubble present.

Character of Watershed: At Station A, the watershed was open, flat and 80% cultivated

General Remarks:

Observations on the stream were taken at a highway bridge about 1.5 miles above the confluence with Panther Creek. At this station, the stream was found to be 14' wide and 3.5" average depth. Water temperature was 56.0 degrees F. Dirt banks were about 10' high. Fairly dense vegetation of willow, alder, ash and maple arches over the stream.

This stream is too small and shallow to be of any particular value to salmon.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
A	9/28/40	10:50 AM	68.0 F	56.0 F	cloudy

South Yamhill River

River System: Willamette River
Stream Surveyed: South Yamhill River, tributary of Yamhill River

Date of Survey: unknown

Source: Rises in the coastal range of mountains, T8S, R6W.

Direction of Flow: Northeast to join the North Fork of the Yamhill River in S14, T4S, R4W. Observations were made at highway bridges only.

Total Length: 52 miles

Station Location:

St	Location	Map Location	Width	Depth
A	Hwy bridge on 99W	S5,T5S,R4W	56'	3'5"
B	Hwy bridge between Bellevue & Amity	S26,T5S R5W	85'	1'9"
C	Hwy bridge between Ballston & Bellevue	S32,33,T5S R5W		
D	Hwy bridge at Sheridan	S35,T5S,R6W	92'	19.7"
E	1st hwy bridge above Willamina	S12,T6S R7W	94'	6.5"
F	Bridge on hwy 22	S13,T6S,R7W	72'	7.5"

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090008	0014	13.76
B	17090008	0017	0.00
C	17090008	0017	5.40
D	17090008	0017	10.36
E*	17090008	0020	0.58
F	17090008	0020	0.58

Character of Bottom Between Staations:

Station	(yd2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
A								mud	
B								heavilysilted	
C								mud	
D								heavily silted	
E	Bedrock			some		some			
F	Bedrock			some		some			

Character of Watershed:

Mountainous						
Hilly						X
Rolling				X	X	
Flat	X	X	X			
Swampy						
Wooded						
Open						
Cultivated	80%	80%	80%	70%	50%	20%

Fluctuation in Water Level:

Cause of Variation: Current fluctuation of seasonal precipitation. Comparatively fast run off from cultivated watershed.

Stream Volumes: From Geological Survey Water Supply Paper No. 864: Maximum discharge 1938, 14,000 cfs Dec. 27; minimum discharge, 3 cfs, Aug. 22.

Fish (salmon): No information available.

General Remarks:

Deep pools in the river were numerous but all were heavily silted. Observations revealed that there is considerable good spawning rubble in the river. Stream banks of gravel and dirt with varying amounts of bedrock, averaged about 8′ high. Quite dense vegetation of ash, alder, willow and fir lines both banks.

Further investigation of this river is necessary before an opinion can be given as to its value for salmon.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
A	9/28/40	10:25 AM	63.0 F	60.0	cloudy
B	9/28/40	4:10 PM	66.0	61.0	cloudy
C	9/29/40	10:15 AM	65.0	59.0	cloudy

Temperature Data **(cont):**

Sta	Date	Hour	Air Temp	Water Temp	Sky
E	9/30/40	2:10 PM	66.0	61.0	clear

Tributaries:

1. Salt Creek
2. Deer Creek
3. Mill Creek
4. Willamina Creek
5. Cold Creek
6. Casper Creek
7. Rock Creek
8. Rogue River
9. Agency Creek
10. Fad Creek
11. Pierce Creek
12. Kitten Creek

Cozine Creek

River System: Willamette River
Stream Surveyed: Cozine Creek, tributary of the South Yamhill River.

General Remarks:

Observations taken September 28, 1940 near McMinnville revealed that Cozine Creek was dry.

Salt Creek

River System: Willamette River
Stream Surveyed: Salt Creek, tributary of South Yamhill River

Date of Survey: September 28, 1940

Source: T7S, R6W

Direction of Flow: Northeast to join the South Yamhill River not far from the town of Whiteson

Total Length: 35 miles

Station Location:

St	Location	Map Location	Width	Depth
A	Hwy bridge between Perrydale & Broadmead	S14,T6S R5W	dry	
B	Hwy bridge in the town Amity	S20,T5S R4W .	3' little water	
C	Hwy bridge in the town of Whiteson	S8,T5S R4W	14'	12-10"

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090008	0027	0.00
B	17090008	0026	0.00
C	17090008	0026	0.00

Character of Bottom Between Stations:

Station	Area (yd 2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
A	Dry - Dirt								
B								mud	
C								mud	

Character of Watershed:

B

Mountainous

Hilly

Character of Watershed (cont):

	A	B	C
Rolling	X	X	X
Flat			
Swampy			
Wooded			
Open			
Cultivated	80%	80%	90%

Fish (salmon): No information available.

Fluctuation in Water Level:

Feet Variation: l-20'. Farmer living in vicinity reports that during high water, the South Yamhill River backs up into Salt Creek, producing a rise of 10-20'.

Cause of Variation: Seasonal fluctuations of rainfall. Fast run-off. Stream flows through cultivated lands for a considerable distance.

Stream Volumes: Estimated flow at Sta. C - l-2 cfs. At Sta. A, the stream was dry.

General Remarks:

Observations taken in September at the highway bridge between Perrydale and Broadmead, revealed that the stream was dry at this point. At the highway bridge in the town of Amity, there was a little water but no perceptible flow. The bottom was mud and the banks were dirt. Observations were also taken at Whiteson, OR. Here the stream was found to be 12-14' wide and 10" deep. The flow was estimated to be l-2 cfs. The bottom was mud and the dirt banks were lined with moderately dense vegetation of ash and willow.

During the early spring high water, the South Yamhill River backs up into the creek producing a rise of 10-20'.

This stream would be of little value to salmon.

Deer Creek

River System: Willamette River
Stream Surveyed: Deer Creek, tributary of South Yamhill River

Date of Survey: September 28, 1940

Source: Rises in T4S, R6W.

Direction of Flow: Deer Creek flows south to enter the river near the town of Sheridan, Oregon.

Total Length: 18 miles

Station Location:

St	Location	Map Location	Width	Depth
A	Hwy bridge on route 18 between Bellevue and Sheridan	S29,T5S,R5W	20'	2.7'
B	First bridge on Gopher Valley Rd	S30,T5S,R5W	23'	12.0"
C	First bridge on Rock Creek Rd	S36,T4S,R6W	16'	8.0"
D	Third bridge on Gopher Valley Road	S24,T4S,R6W	10'	6.0"

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090008	0016	5.19
B	17090008	0016	5.19
c*	17090008	0016	13.03
D	17090008	0016	13.03

* Station location is not definite and has been estimated

Character of Bottom:

Station	Area (yd2)	L.R. %	M.R. %	S.R. %	M&S %
A					mud
B					mud
C					mud
D	Bedrock				

Character of Watershed:

	A	B	C	D
Mountainous				
Hilly				X
Rolling	X	X	X	
Flat				
Swampy				
Wooded				
Open				
Cultivated	70%	60%	40%	5%

Pollution: None observed.

Fish (salmon): None observed.

Fish (other than salmon): None observed

General Remarks:

From the mouth upstream for about 10 miles the creek flows over a mud bottom. The banks are of dirt and average about 6' high. Marginal vegetation of ash, alder and maple is quite dense and in many cases arches over the stream. Small amounts of medium and small rubble were observed on several occasions. At the highway bridge on highway 18, between Bellevue and Sheridan, the stream was 20' wide with an average depth of 2.7'. Water temperature was 57 degrees. At the first highway bridge on Gopher Valley Road the width was 23', average depth was 12". Water temperature was 56 degrees. At the first bridge on Rock Creek Road, the stream was 16' wide and 8" deep.

Above the ten mile stretch of stream described above, the bottom was found to be largely of bedrock. Banks of bedrock and rubble averaged about 4' high. Stream flow was estimated to be 6-8 cfs. Marginal vegetation of alder and willow lines the banks. At this station, about 40% of the bottom was exposed. Of the exposed area, 20% was large rubble, 40% was-medium rubble, 30% was small rubble, and 10% was mud and silt. The stream at this point was 10' wide, with a depth of 4-8". Temperature of the water was 56 degrees.

General remarks (cont):

The above information was secured September 28, 1940, and all observations were made at highway bridges crossing the stream.

This stream would be of little value to salmon.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
A	9/28/40	2:45 PM	64.0 F	57.0 F	cloudy
B	9/28/40	2:50 PM	64.0	56.0	cloudy
D	9/28/40	3:30 PM	64.0	56.0	cloudy

Muddy Creek

River System: Willamette River
Stream Surveyed: Muddy Creek, tributary of Deer Creek

General Remarks:

Muddy Creek, a small tributary of Deer Creek rises in T4S, R5W and flows south to join with Deer Creek. The stream is approximately 15 miles long.

Observations taken at the highway bridge between McMinnville and Sheridan revealed that the stream was about 8' wide and very shallow with little flow. Banks were of dirt and about 2' high.

This stream would probably be of little value to salmon.

Mill Creek

River System: Willamette River
Stream Surveyed: Mill Creek, tributary of the South Yamhill River

Source: T7S, R7W

Direction of Flow: Flows north to koin South Yamhill River at S32, T5S, R6W, not far from the town of Willamina, Oregon.

Total Length: 25 miles

Station Location:

St	Location	Map Location	Width	Depth
A	1st bridge above the confluence	S5,T6S,R6W	33'	7.5"
B	2nd bridge above the confluence	S4,T6S,R6W	22'	3.5"
C	Hwy bridge between Buell & Sheridan	S9,T6S R6W	48'	1.1'
D	Hwy bridge at Buell on hwy 22	S21,T6S,R6W	46'	2'4"
E	Covered bridge on hwy 223		38'	2.4"
F	First log bridge abv covered bridge		44'	6.8"
G	3rd bridge above br. on hwy 223		27'	2.9'
H	4th bridge above br. on hwy 223		35'	2.2"
I	Logging bridge w/marker		36'	1.6'

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R.	%	M.R.	%	'S.R.	%	M&S	%
A		bedrock		small	amount	small	amount		
B	almost entirely bedrock								
C				X	50.0	x	3010	x	20.0
D	bedrock 30%	X	20.0	x	20.0	x	10.0	x	20.0
E	A little bedrock			X	70.0	x	30.0		
F		X	30.0	x	30.0	x	30.0	x	10.0
G		X	40.0	x	50.0	x	10.0		
H	bedrock 20%	X	50.0	x	20.0	x	10.0		
I	bedrock underneath rubble	X	30.0	x	60.0	X	10.0		

Character of Watershed:

	B	D	E	H
Mountainous				

Character of Watershed **(cont):**

	B			D	E	F	G	H	I
Hilly				X	X	X	X	X	X
Rolling			X						
Flat	X	X							
Swampy									
Wooded					X	X	X	X	X
Open	X	X	X	X					
Cultivated	70%	60%	30%	10%	5%				

Fluctuation in Water Level:

Cause of Variation: The stream did not appear to have a very great fluctuation in water level, possibly due to the heavily wooded watershed retarding the run-off.

Feet Variation: Estimated 4-7'

Stream Volumes: No measurements were taken but at Sta. E it was estimated to be 25 cfs.

Fish (other than salmon): .

Species	Date	Very Abundant	Abundant	Fair	No.	Scarce
Trout	9/30/40				X	
Suckers	9/30/40				X	

Remarks: Men working in the vicinity report that trout fishing is very good in the stream.

General Remarks:

At the time of the survey, a logging company was operating near the headwaters of the stream. Observations were taken at highway bridges only. The information secured revealed that there was considerable medium and small rubble in the stream. Bedrock and large rubble were very much in evidence, however. Banks of bedrock, gravel and dirt averaged about 8' high. Water temperatures ranged from 61.5 degrees at Sta. A to 56 degrees at Sta. I. Quite dense marginal vegetation of willow, ash, fir and maple lines the stream banks.

General remarks **(cont):**

Gooseneck Creek, a tributary of Mill Creek was found to be 7′ wide with an average depth of 5". Observations were taken at the highway bridge between Buell and Sheridan.

Further investigation of Mill Creek is necessary before an opinion can be given as to its value as a salmon stream.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
A	9/30/40	1:45 PM	64.5 F	61.5 F	cloudy
B	9/30/40	1:20 PM	64.0	61.0	clear
C	9/30/40	1:10 PM	60.0	64.0	cloudy
D	9/30/40	9:15 AM	63.0	59.0	cloudy
E	9/30/40	9:45 AM	64.0	58.0	cloudy
F	9/30/40	10:15 AM	67.0	58.0	cloudy
G	9/30/40	10:30 AM	65.0	56.0	cloudy
H	9/30/40	10:50 AM	63.0	56.0	cloudy
I	9/30/40	11:00 AM	65.0	56.0	cloudy

Gooseneck Creek

River System: Willamette River
Stream Surveyed: Gooseneck Creek, tributary of Mill Creek

Source: T6S, R7W.

Direction of Flow: Northeast to join Mill Creek in S21, T6S, R6W.

Total Length: 10 miles

Station Location:

St	Location	Map Location	Width	Depth
A	Hwy br. between Buell and Sheridan	S16 T6S,R6W	7'	5"

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090008	0038	0.00

Character of Bottom:

Station	Area (yd2)	L.R. %	M.R. %	S.R. %	M&S %
A		20.0	50.0	20.0	10.0

Character of Watershed: The watershed area was an open area of gently rolling hills. Sixty percent of watershed was cultivated.

General Remarks:

Observations were made at the highway bridge between Buell and Sheridan. The stream was found to be 7, wide and 5" deep. Water temperature was 65.0 degrees on 9/30/40 at 12:45 pm. The banks were 6-10′ high of gravel and dirt. Dense willow and alder completely covers the stream in many places. The bottom of the stream at this station was found to be: large rubble 20%, medium rubble 50%, small rubble 20%, mud and silt 10%.

General remarks **(cont):**

The creek, except for its small size, appears to be suitable for salmon.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
A	9/30/40	12:45 PM	61.0 F	65.0 F	cloudy

Willamina Creek

River System: Willamette
Stream Surveyed: Willamina Creek, tributary of South Yamhill River

Date of Survey: Surveyed from mouth to falls on October 2 and 4, 1945 by Johanson, Davis and Brewington. Previously inspected on September 29, 1940.

Source: Approximate location T3S, R6W. Coastal range, Yamhill County.

Direction of Flow: South and southeast

Total Length: 20+ miles. The stream was surveyed from the mouth to the falls, approximaely ten miles. Above the falls the bottom is practically 100% bedrock and the stream has avery small flow. The first falls is 10' high. Another falls, 18' high, was reported by a resident to be located a short distance farther upstream. Spawning area above would not justify building a ladder over the falls.

Station Location:

Sta	Location	Distance Above Prev. Station Yds	Miles	Distance Above Mouth Yds	Miles	Map Location	Width	Depth
A	Mouth of creek		0.0		0.0	S6,T6S, R6W	12'	6"
B	Road bridge at schoolhouse	4,300	2.5	4,300	2.5	S12,T5S, R7W	50'	4"
C	At falls	13,500	7.5	17,800	10.0	S18,T4S, R6W	75'	2"

References: Metzger's map of Yamhill County

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090008	0019	0.00
B*	17090008	0019	0.00
c*	17090008	0019	9.79

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

St	Area (yd^2)	L.R.	%	Suitable Spawning M.R.	%	S.R.	%	M&S	%
A-B	61,300	5,590	9.5	9,250	15.5	13,260	22.0	33,200	53.0
B-C	157,800	89,140	57.0	25,500	16.0	17,050	11.0	26,110	16.0
Tot	219,100	94,730	43.2	34,750	15.9	30,310	13.8	59,310	27.1

Pools and Riffles:

Between Stations	Distance (mi)	No. Pools Good	Fair	Poor	Total	No. Riffles Good	Fair	Poor.	Total
A-B	2.5	12	-	4	16	9	-	4	13
B-C	7.5	57	-	27	84	38	29	32	99

Spawning Area Usable and Available:

Station	Distance vds	miles	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	% Usable
A-B	4300	2.5	61,300	22,510	36.7	2,330	3.8
B-C	13,500	7.5	157,800	42,550	26.9	11,220	7.1
Total	17,800	10.0	219,100	65,060	29.7	13,550	6.2

Spawning Area Unavailable and Unusable: All the area above the falls is unavailable.

Character of Watershed:

	A-B	B-C
Mountainous		
Hilly		X
Rolling	X	
Flat		
Swampy		
Wooded	X	X
Open		

Character of Watershed (cont):

	A-B	B-C
Cultivated	1 0 %	30%
Character of Valley	Flat .5 miles wide	V-Shaped 300' wide
Character of Banks	20' high, steep, dirt comp.	10-20' high, steep, rock comp.
Density of Marginal Vegetation	willow, silex, oak, vines	fir, maple, willow, birch, hemlock, alder and wild blackberries
Erosion		
a) Banks	Great	Slight
b) Watershed	Slight	Slight

Diversions:

Diversion 1: An electric pump having a 5" intake is located 450 yds from the mouth. It is owned by a local lumber or logging company and is used to maintain a log pond. Intake is screened.

Diversion 2: Two pumps, one electric and one steam, are owned by the Garrabrant Lumber Co., and both have 1.5" intakes pumping approximately 1,200 gallons an hour and are used for applying water for steam boilers operating sawmill. Screened with large mesh wire, it should be smaller. Located one mile above mouth.

Diversion 3: Two electric pumps 6" and 4" intakes are located just above diversion #2. Both are screened and owned by Willamina Lumber Company.

Diversion 4: Electric pump located just above diversion #3. Owned by Willamina Clay Production. 2.5" intake, unscreened, pumps approximately 300 gallons/day.

Diversion 5: Ten other small electric pumps, 1-2" intakes, owned by farmers along stream 1.5 miles to 8 miles above mouth. Used for watering stock, irrigation, etc.

Artificial Obstructions:

1. A mill and power dam is located 1/4 to 3/4 mile above town of Willamina. It is 200' wide and 16' high of concrete and timber

Artificial Obstructions (cont):

construction. At high water the water spills over entire width of dam. A fishway is located on the right side aand is in need of repairs and better maintenance. It has 15 steps of about 5' x 5' with jumps varying from 6-18". Dam is owned by Portland General Electric Co.

2. A rock dam 30-39' wide and 1' high is located about 7.5 miles above town of Willamina. This is no barrier at any time, and apparently has no use at the present except to form a pool above it for watering stock on the farm bordering it.

Natural Obstructions:

1. 10' falls located approximately 10 miles above the mouth is a total barrier. Another falls, 18' high was reported a short distance farther upstream.

Fluctuation in Water Level:

Observations taken at Willamina on October 3, 1945 estimated the flow to be about 12 cfs, very low stream. USGS staff gauge reading on October 2, 1945 - 1.36 ft. From water supply paper 964 (1942) the correct flow at this height is 14.9 second feet. From the same water supply paper, the flow during water year 1941-42 was 2,690 second feet on December 19, 1941; minimum was 11 second feet on September 23, 24, 25, 1942; mean 180 second feet.

Stream Volumes: Observations at Willamina, 800 yds above mouth, 10/3/45, flow 12 cfs, stream condition very low, record by survey party.

Pollution:

Willamina Creek is heavily polluted from mouth to the last sawmill about 1.5 miles upstream. This is largely sewage from the town of Willamina and refuse from log ponds at sawmills.

A sewage disposal system could be installed to stop the sewage pollution. Log ponds built away from creek channel with water pumped to them, as is done is a few other places, could remedy the sawmill and log pond pollution.

Fish (salmon): No fish were observed.

Fish (other than salmon): None observed.

General Remarks:

Willamina Creek is a small stream with only fair spawning rubble from the slough area above the sawmills to the falls. There is practically no spawning area from the mouth to the last sawmill, approximately 2 miles above Willamina. For the next 8 miles to the falls, the rubble is only fair with large percentages of bedrock in the upper 2 miles. Above the falls, the stream bed is almost all bedrock.

In order to develop this potential spawning area, the pollution should be stopped. The fishway at the Portland General Electric Dam should be repaired and maintained. This would make the entire area from the mouth to the falls accessible at all times.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
A	10/2/45	lo:oo AM	63.0 F	54.0 F	clear, warm
B	10/2/45	lo:oo AM	64.0	52.0	clear
C	10/4/45	ll:oo AM	65.0	48.0	clear, warm

Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
A-B	2.5	moderate		No information available concerning gradient or elevation
B-C	7.5	moderate to steep		

Tributaries:

1. Coast Creek, left bank, 6.5 miles above mouth, 5' wide, flow 3 cfs, little value to salmon.

2. E. Fork, right bank, 7.25 miles above mouth, 5' wide, flow 4 cfs, no value to salmon.

Coast Creek

River System: Willamette River
Stream Surveyed: Coast Creek, tributary of Willamina Creek

Total Length: 12 miles, observations taken at highway bridge

General Remarks:

Sta. 1 - about 200' above confluence with Willamina Creek. Width 28', average depth 6". Banks were 2-3' high, of dirt and gravel. Exposed stream bed 50%, medium rubble 80%, small rubble 20%. Bottom of stream, bedrock and gravel. Estimated flow 8-10 cfs. Temperature - air 68.0, water 57.0, sky slear, time 1:15 p.m. c/o cultivation 60%. A narrow strip of rather dense willows, alder and maple borders both sides of the stream.

Rock Creek

River System: Willamette River
Stream Surveyed: Rock Creek, tributary of South Yamhill River

Date of Survey: October 4, 1945, from mouth to a point where stream divides into two branches, neither large enough to support salmon. Survyed by Johanson and Brewington.

Source: Approximate location S7, T7S, R8W, in coastal range of Polk County, OR.

Direction of Flow: East for the first 3 miles, then northeast to the confluence with the South Yamhill River near Grand Ronde, OR.

Total Length: 9 miles

Station Location:

St	Location	Distance Above Prev. Station Yds	Miles	Distance Above Mouth Yds	Miles	Map Location	Width	Depth
A	Mouth				.5	S12,T6S,R8W	10'	5"
B	Last road	9,000	5	9,000	5.5	S3,T7S,R8W	20'	3"

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090008	0042	0.09
B*	17090008	0042	4.79

*Station location is not definite and has been estimated

Character of Bottom Between Stations:

Sta	Area (yd^2)	L.R.	%	M.R.	%	Suitable Spawning S.R.	%	M&S	%
A-B	106,700	56,130	52.6	18,130	17.0	16,440	15.4	16,000	15.0

Pools and Riffles:

Between Stations	Distance (mi)	No. Pools Good	Fair	Poor	Total	No. Riffles Good	Fair	Poor	Total
A-B	5	44	-	24	68	27	32	23	82

Spawning Area Usable and Available:

Station	Distance vds	miles	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	% Usable
A-3800 yds		2.1	55,000	22,270	45.0	9,290	16.9

Spawning Area Unavailable and Unusable:

Station	Distance vds	mi	Area (yd^2)	Area Unavail (yd^2)	% Unavail	Usable Unavail (yd^2)	% Usable Unavail
3800-B	52,000	2.9	51,700	12,300	23.8	4,750	8.6

Cause of Unavailability: Impassable log jam.

Character of Watershed:

	A-B	Above B
Mountainous		X
Hilly	X	
Rolling		
Fiat		
Swampy		
Wooded	X	
Open		
Cultivated	40%	0%
Character of Valley	Level, 2 mi wide	
Character of Banks	10', earth & gravel	
Density of Marginal Vegetation	willow, alder, fir, oak, maple birch, and dogwood	

Character of Watershed (cont):

	A-B	Above B
Erosion		
a) Banks	moderate	
b) Watershed	slight	

Diversions:

Diversion 1: A 6" pipe is located on the right bank at railroad bridge near Grande Ronde. It is for the city water supply. It is well screened and takes only a small amount of water. Location, 1300 yds above mouth.

Diversion 2: An electric pump with a 10" intake is powered by a 30 h.p. electric motor. The pump is located about 500 yds above the railroad bridge and near the Long Bell Lumber Co. log pond. The intake pipe extends below the bottom of the stream: It pumps about 3 cfs and is used by the lumber company for supplying water for the log pond.

Artificial Obstructions:

1. A small log jam is located about 2 miles above the mouth. It is considered passable but might easily become impassable.

2. An impassable log jam is located about 200 yds upstream from the above jam. It is composed of large logs and appears to also be a beaver dam.

3. Another log jam is located about 700 yds above construction #2. It is also a total barrier.

4. A log jam at 6800 yds above the mouth is another barrier.

5. Falls about 6' high and 30' wide having 2 steps of about 3' each, is impassable at low water. It is located about 4 miles above the mouth and 1 mile below the end of the survey.

6. Another falls is located bout 500 yds above obstruction #5. It is 6' high and probably impassable except in high water.

7. Another natural falls is located bout 400 yds above obstruction #6. It is about 9' high and impassable at all times.

Fish (salmon): None Observed.

Fish (other than salmon): None observed.

Fluctuation in Water **Level:**

9/13/45 near Sta. A, .5 miles above mouth, flow 20 cfs, low stream condition, record by Hanavan.

10/4/45 at Sta. B, 5 miles above mouth,. flow 13 cfs, low stream condition, record by Brewington.

Notes and References: USGS publication – Water Resources of the State of OR, Bulletin No. 9, pub. 1937 gives miscellaneous reading of flow on Rock Creek as follows:

September 5, 1935 – near Grande Ronde – 2.9 cfs
September 11, 1936– near Grande Ronde – 1.5 cfs

Pollution:

Local residents dump small amounts of garbage in the stream from the mouth to the water supply intake. Above this point to the source there is no pollution, even wading and fishing being prohibited.

General Remarks:

The watershed of Rock Creek in the lower 5 miles has been all logged and now supports very dense second growth timber. In the mountainous upper section, logging operations in virgin timber are now in progress.

In the 5 miles surveyed, some good spawning area was observed but long stretches of bedrock and 3 falls ranging from 3' to 9' were found in the upper mile surveyed. It would not be practical to build ladders over these falls for the little spawning area above them. The removal of 3 or 4 log jams below would make the stream passable up to the first fall. This would provide approximately 4 miles of fair spawning area. As in other small streams forming the South Yamhill River, the summer flow is small and the stream could support only a late run of salmon and steelhead.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
A	10/4/45	1:00 PM	60.0 F	52.0 F	clear

Temperature Data **(cont):**

Sta	Date	Hour	Air Temp	Water Temp	Sky
near A	9/13/45	1:00 PM	68.0	58.0	clear
B	10/4/45	4:00 PM	56.0	49.0	clear

Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
A-B	5	moderate gradient		No information available concerning gradient in elevation

Agency Creek

River System: Willamette River
Stream Surveyed: Agency Creek, tributary of the South Yamhill River

Date of Survey: Surveyed from mouth to bedrock box canyon begins, on September 14, 1945 by Davis, Silliman, and Hanavan.

Source: Approximate location S28 and 29, T4S, R8W, coastal range in Yamhill County.

Direction of Flow: Southeast

Total Length: 14 miles

Amount Surveyed: This stream was surveyed from the mouth to the mouth of Joe Creek in 526, T5S, R8W. Above this point the bottom is largely bedrock. Total amount surveyed is about 4.5 miles.

Station Location:

Sta	Location	Distance Above Prev. Station Yds	Distance Above Prev. Station Miles	Distance Above Mouth Yds	Distance Above Mouth Miles	Map Location	Width	Depth
A	Hwy bridge at Grande Ronde Agency			1,000	0.5	S1,T6S, R8W	28'	10"
B	Covered road bridge	4,500	2.5	5,500	3.0	S36,T5S, R8W	24'	12"

References: Metskers Map of Yamhill County

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090008	0023	0.00
B	17090008	0023	1.80

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
Mth-A	10,000	1,620	16.2	1,760	17.6	1,880	18.8	4,740	47.4
A-B	47,900	18,740	39.1	10,600	22.1	9,090	18.7	9,470	20.1

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

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
B-end	34,400	15,270	44.3	3,960	11.5	3,210	9.4	11,960	34.8
Total	92,300	35,630	38.6	16,320	17.7	14,180	15.4	26,170	28.4

Spawning Area Usable and Available:

Station	Distance yds	Distance miles	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	% Usable
Mouth-A	1,000	.5	10,000	3,740	37.4	690	6.9
A-B	4,300	2.5	47,900	19,690	20.4	6,650	13.8
B-End	1,100	.5	14,400	2,840	19.9	580	3.0
Total	6,400	3.5	72,300	26,270	36.3	7,920	11.0

Spawning Area Unavailable and Unusable:

Sta	Distance	Area (yd^2)	Area Unavail (yd^2)	% Unavail	When Avail	Usable Unavail (yd^2)	% Usable Unavail
End	1500 yds	20,000	4,330	21.6		1,270	6.3

Cause of Unavailability: Low water barrier

Character of Watershed:

	Mouth-A	A-B	B-end of survey
Mountainous			X
Hilly	X	X	
Rolling			
Flat			
Swampy			
Wooded	X	X	X
Open			
Cultivated	40%	80%	0%

Character of Watershed (cont):

	-Mouth-A	A-B	B-end of survey
Character of Valley	2 miles wide,flat	.5 miles wide,flat	v-shaped,narrow
Character of Banks	20' high steep, bedrock & clay	15' high steep, gravel	high,steep,bedrock
Density of Marginal Vegetation	oak,brush, wild blackberry, willow,alder	same	willow,alder,fir,brush, wild blackberries
Erosion			
a) Banks	slight	slight	slight
b) Watershed	slight	slight	slight

Diversions: None found

Artificial Obstructions:

1. A beaver dam located 6,400 yds above the mouth is a low water barrier. It is 50' wide and 2.5' high. Another smaller dam is located 100 yds above this one.

2. A log jam located 7,000 yds above the mouth is another low barrier.

3. At the end of the survey, approximately 4.5 miles above the mouth, are a series of three falls ranging from 3 to 4' high. These are passable at high water. Just above these falls is a log jam which is also passable at high water.

Natural Obstructions: No information available

Pollution: None observed

Fluctuation in Water Level:

9/14/45, Sta. A, flow 7.1 cfs, low stream condition, record by Hanavan.
9/14/45, Sta. B, 10 cfs, low stream condition, record by Hanavan.

Fluctuation in Water Level **(cont):**

Notes and References: U.S.G.S. publication – water resources of the State of Oregon, Bulletin No. 9, 1937 gives miscellaneous readings of flow on agency creek as follows:
September 11, 1934 – near Grande Ronde at Hwy bridge – 1.2 cfs
September 4, 1935 – same – .9 cfs
September 1, 1936 – same – 3.2 cfs

Fish (salmon): None observed

Fish (other than salmon): None observed

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
A	9/14/45	2:00 PM	66.0 F	62.0.F	clear
B	9/14/45	4:00 PM	70.0	63.0	clear

Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
Mouth-A	.5	moderate		No information
A-B	2.5	moderate		available concerning
B-end	1.5	steep		gradient or elevation

General Remarks:

Agency Creek is a short stream having a small flow during the summer months. There is no record of the flow in late fall and winter, but it can be judged by Willamina Creek, which is a few miles away and flowing in the same direction. High water marks, drifts, etc., show that it has a much larger flow during rainy seasons.

The spawning area is only fair. There are a few obstructions and the cost of removing them would be small. The flow is large enough to support a run of fish only in the fall and winter.

Tributaries:

1. right bank, 3 8/10 mi above mouth, 1/4 cfs, no value to salmon.
2. Joe Creek, right bank, 3 9/10 miles above mouth, 1/4 cfs, no value to salmon.

, Santiam River

River System: Willamette River
Stream Surveyed: Santiam River

Date of Survey: August 2-3, 1940

Source: Formed by confluence of north and south forks of the Santiam in S24, T10S, R3W, approximately 3,800 yds above the main highway bridge in Jefferson, OR. Ultimate source of its tributaries is in the west slope drainage of the cascade mts in northwestern Oregon.

Direction of Flow: Northwest

Total Length: 11.1 miles, all surveyed by Parkhurst, Frey, Bryant and Zimmer, August 2-3, 1940.

Station Location:

St	Location	Distance Above Prev. Station Yds	Miles	Distance Above Mouth Yds	Miles	Map Location	Width	Depth
M	Confl w/Willamette	--		--		S35,T9S,R4W	120'	
A	2100 yds abv mouth where log br. crosses/rip rap wall rt bank	1.2		1.2		S25,T9S,R4W	150'	3'8"
B	Cement hwy bridge at Jefferson	7.8		9.0		S11,T10S R3W	260'	7'
C	Confl N and S Forks	2.1		11.1		S24,T10S,R3W	100'	

EPA River Reach Codes:

Station	HUC	SEG	Rmi
M	17090005	0001	0.00
A	17090005	0001	1.72
B	17090005	0001	7.15
C	17090006	0001	0.00

Character of Bottom Between Stations:

Sta	Area (yd^2)	L.R.	%	M.R.	%	'S.R.	%	M&S	%
Mth-A	97,600	400	4.1	45,280	46.4	33,780	34.6	18,140	18.6
A-B	1,059,800	85,645	8.1	407,755	38.5	377,605	35.6	188,795	17.8
B-C	227,800	2,630	1.1	118,620	52.1	70,990	31.2	35,560	15.6
Tot	1'385,200	88,675	6.4	571,655	41.3	482,365	34.8	242,495	17.5

Spawning Area Usable and Available:

Station	Distance vds	miles	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	% Usable
Mth-A	2,100		97,600	79,060	81.0	7,170	7.3
A-B	13,700		1,059,800	785,360	74.1	99,440	9.4
B-C!	3,800		227,800	189,610	83.2	13,900	6.1
Total	19,600		1'385,200	1,054,030	76.0	120,510	8.7

Spawning Area Unavailable and Unusable:

Cause of Unavailability: There were no dams or impassable barriers in this section of the river when surveyed..

Character of Watershed:

Mountainous	
Hilly	
Rolling	
Flat	To saucer shaped throughout
Swampy	In spots; several sloughs between mouth and Sta. B
Wooded	Scattered woodlots aside from fairly dense marginal vegetation
Open	Mostly open for agriculture and grazing
Cultivated	50% mouth-A; 70% A-B; 10% B-conf. N&S Forks

Diversions:

Diversion 1: Electric water pump on left bank 500 yds above Sta. A supplies 4" pipe line to field sprayers. Running August 3, with several 10' sprays seen, screened intake, no dam.

Diversion 2: Gas engine operated irrigation pump to field sprayers line left bank, 850 yds below Jefferson Bridge, Sta. B 4" pipe line had intake screened with 1/2" mesh screen, no dam.

Artificial Obstructions: None observed

Fluctuation in Water Level:

Cause of Variation: High water, often flooding areas along lower river, caused by spring run-off of heavy winter snows on high watershed aggravated in recent years by extensive cutting of timber on steeper slopes of upper watershed. Low water in summer months caused by removal of large volumes of water from tributaries for irrigation purposes and for drinking water supplies of several towns and cities, including Salem, OR.

Feet Variation: 5-15' throughout; reaches 20' in narrower portions.

Stream Flow: Sta. A 8/2/40, flow 418 cfs.
B - see water resources, State of Oregon, 1925-30, Bulletin #8, scattered records. 1926, Aug. maximum 2,340 cfs, minimum 240; U.S.G.S. establishing gauge Sta above bridge this summer and records should be available in the future.

% of Stream Bed Covered:

Mouth-A	40%
A-B	60%
B-conf.	90%
N&S Santiam River	

Pollution:

Discoloration noted just above Sta A, increasing with ascent up stream; quite noticeable and accompanied with silting from just below Jefferson Bridge, until at confluence of N&S Santiam, it is difficult to see bottom in over 4' of water.

Location of Source:
(1) Lebanon pulp and paper mills.
(2) Town of Lebanon.
(3) Town of Jefferson and farmers along rivers.

Type of Pollution:.
(1) Waste sulphite liquor from pulp and paper mill at Lebanon
(2) Untreated domestic sewage from Lebanon.
(3) Sewage from Jefferson and farm houses along banks.
(4) Garbage from residents of Jefferson and farmers living along banks.

The sulphites and waste from the Lebanon pulp and paper mills is in such quantity that although its source in Lebanon is 19 miles by river from the confluence of the North and South Santiam Rivers, the dark coloration of the water is noticeable on the main Santiam well below Jefferson. Many dead scrap fish were seen along the

Pollution (cont):

river. At the confluence of the North and South Santiam Rivers, the North Santiam is clear, while the South Santiam is so darkly colored that it is difficult to see the bottom, except on the riffles.

Garbage and refuse is dumped into the river and piled on river banks by farmers. The town marshal1 at Jefferson blames the Lebanon pulp mill for the heavy silting of the river and killing of the considerable numbers of fish observed; the silting and pollution forced the town of Jefferson to discontinue the pumping station, just below the Jefferson bridge, which formerly pumped water from wells under the river bed for drinking purposes. Untreated domestic sewage from Lebanon is dumped into the river with the waste sulfite liquor from the paper mill, helping to aggravate the serious condition caused by the latter pollutant. Although sewage at Lebanon is likewise untreated, the amount is so small that its effects on the river cannot be very great.

Fish (salmon):

No salmon were seen. However springrun chinooks pass through this river during the spring high water period, and several hundred were later seen in the deep holes of the various tributaries. It is doubtful if any number of spring run chinook remain in the main Santian during summer months.

Fish (other than salmon):

Species	Date	Very Abundant	Abundant	Fair	No.	Scarce
Steelhead*				X		
Rainbow						X
Chub			X			
Chisel-mouth chub		X				
Squawfish			X			
Suckers		X				
Catfish						X

*Spring run pass through, not seen but reported.

Note: No steelhead were seen but considerable numbers ascend to tributaries each spring. Rainbow trout are said by local residents to be taken occasionally. Chubs mostly 1-4" in length were very abundant from mouth to some distance above Sta. A. Adult suckers were abundant, more than 100 being observed in some stretches. Many skeletons of suckers, squawfish and catfish were seen along banks.

General Remarks:

The main Santian flows west north west from source to confluence with left bank of Willamette River in S35,T9S,R4W. The stream enters the Willamette through two separate channels, the larger north channel being the one surveyed. The south channel separates from the north channel approximately 2.75 miles from the confluence of the latter with the Willamette, and enters the Willamette one mile further upstream. Sometimes the north channel is designated "Little Santiam" on maps, but the natives know it only as "The Santiam". The actual channels vary from year to year in the lowest two miles; islands and side channels may appear and disappear during spring floods.

The main Santiam River flows through a nearly flat plain. No hills reach its banks except at its extreme upper end, this flat country is covered with hop yards, mint fields, tomato patches, pastures, etc. Between farms and along the fence rows and stream margins are strips of brush, scattered groups of trees, mostly second growth decidous with. scattered fir and other conifers. The banks of the streams, where not reached by cultivated fields, are practically jungles of young willows, poplar, blackberry brushes, nettle, vine and weeds and in spots almost impenetrable.

Below Sta. A the river is spread out on a flood plain and has several wide and long riffle areas suitable for spawning with occasional good resting pools, although there is little overhanging brush for protection. The rubble is quite consistent in being more than 50% of suitable spawning size. Above Sta. A however, the spawning area is spotty, the good riffle areas are separated for the most part by large stretches of wide, deep and more sluggish pools, and the suitable rubble often lies too deep or is covered silt or even algae in some shallow marginal areas. It has been noted that pollution makes it further unsuitable for salmon spawning.

Banks are generally steep, from 5-10' high, composed of earth, sand and gravel. There is evidence of much erosion during flood stages. New rip-rap walls protect the banks from further erosion at various points. During summer months water is low and large areas of sand and gravel are exposed between the high flood banks and the low water stream bed and islands of rubble and sand occur, particularly in the lower 5 miles of river. Gradient is slight. The stream is fairly clear for about a mile up from the mouth but takes on a brownish tinge below Sta. B, which becomes more noticeable the farther one ascends towards the head of the river. There was no mud or sand being carried at time of observation.

Spring run salmon pass through with high water, but do not utilize the main Santiam for spawning to any extent. Natives along the river say the numbers are steadily decreasing. No fall run chinook were reported. High water temperatures at present tend to

General remarks **(cont):**

prevent use of this area. The large numbers of suckers and scrap fish are a detriment to the successful spawning of any game fish. Rainbow or cutthroat trout, formerly reported as plentiful, seem to be so scarce that there was little evidence of fish or fishermen.

Lessening of the flow of water with accompanying increases in 'temperature, caused by excessive withdrawal of water from tributaries above for irrigation and water supply, and by excessive cutting off of timber on the higher watershed decreases the suitability of the main Santiam for fish. Passage up the tributaries is hindered by dams and pollution.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
Mouth-A	8/2/40	9:oo AM	F	69.5 F	clear
A	8/2/40	2:00 PM	84.0	74.5	clear
B	8/4/40	lo:oo AM	73.0	68.0	clear
C	8/3/40	2:15 PM	88.0	76.0	clear

Pool Grade:

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6 Ttl
Mth-A	i.2	20	16.8	10.0	55.0	5.0	30.0	20
A-B	7.8	200	25.7	4.0	35.5	7.0	53.5	2G0
B-C	2.2	32	14.8	21.9	56.2	3.2	18.8	32
Grnd Total	11.2	252	22.5	11.9	48.9	5.1	34.1	252

Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
Mth-A	1.19	10'	8.4	U.S.G.S. Topography map, Salem Quadrant
A-B	7.78	35'	4.5	U.S.G.S. Albany Quad.
B-C	2.16	15'	6.9	" "
Total	11.10	60'	5.4 (average)	

Note: Elevations as estimated from contour map studies: Mouth 160'; Sta. A 170'; Sta. B 205': confluence of N&S Santiam Rivers 220'.

Tributaries:

1. 530 yds from mouth, a stream about 30' wide enters on the right bank. Since this area is very flat and no tributaries are shown there on maps, it is presumably a side channel entering the main stream; a side channel leaves the main stream 2 miles above the mouth and the tributary seen may be at least part of the flow reentering the main stream.

This was the only tributary entering below the confluence'of the north and south Santiam Rivers. However, 2 or 3 sloughs were encountered in which there were very small amounts of water moving. One large slough, apparently an abandoned ox-bow of the main stream, enters a short distance above the Oregon Electric Company railroad bridge and extends clear back past Talbot, OR. Another, also on the left side, enters 4,000 yds below Jefferson Bridge.

2. Doty Creek, RB, approx 4.5 mi above mouth.

North Santiam River

River System: Willamette River
Stream Surveyed: North Santiam River, tributary to Santiam River

Date of Survey: August 5-12, 1940 by Parkhurst & Bryant, aided.by Frey and Zimmer on boat work, covering run below Detroit Dam site. Dam site to Whitewater Creek covered by Hanavan & Lobe11 and above Whitewater Creek by Baltzo & Kolloen, September 24-26, 1937.

Source: Formed by the uniting of several small unnamed streams originating near the top of the west slope of the cascade mountains in northeastern Oregon, in range SE, townships 11S and 12S, draining the western slope between Three Fingered Jack Mtn. and Mt. Jefferson. Other tributaries entering further down its course, including Breitenbush River which is the largest and the Little North Santiam River, drain the west cascade slopes north of Mt. Jefferson and south of the Clackamas River drainage. The full area drained includes the southeastern corner of Marion County, and the northeastern corner of Linn County.

Direction of Flow: North for first 18 miles then west for approximately 70 miles to confluence with the South Santiam River to form the Main Santiam River.

Total Length: 87 miles

Station Location:

St	Location	Distance Above Prev. Station Yds	Miles	Distance Above Mouth Yds	Miles	Map Location	Width	Depth
A	150' up from mouth of N.Santiam		0.0		0.1	S24,T10S R3W	145'	10.5'
B	Steel R.R. bridge in North Santiam, 4.5 mi below Stayton		9.0		9.0	S30,T9S R1W	112'	2.0'
C	Steel hwy br. near Stayton towards Kingston		5.0		14.0	S15,T9S R1W	70'	1.0'
D	Steel hwybr. Mehama		13.5		27.5	S18,T9S,T2E	112'	4.0'
E	Steel R.R. bridge Mill City		10.6		38.1	S29,T9S R3E	73'	39.5'
F	Steel hwy bridge south off rd. to Detroit in Gates		3.4		41.5	S26,T9S R3E	107'	12.5'
G	Log bridge on rt. just off road from Niagarato		6.7		48.2	S27,T9S R4E	90'	8.0'

Station Location **(cont):**

St	Location	Distance Above Prev. Station Yds	Miles	Distance Above Mouth Yds	Miles	Map Location	Width	Depth
H	New dam site 100 yds above Mayflower Creek		5.5		53.7	S7,T9S R5E	70'	8.0'
I	Logging rd bridge 2 mi above dam site		1.9		55.6	S7,T10S R5E	80'	6.0'
J	Foot bridge at Volcano Trail crossing		3.2		58.8	S15,T10S R5E	140'	2.0'
K	Foot br.,Detroit		1.6		60.4	S12,T10S,R5E	75'	20.0"
L	Trail crossing at Idanha		4.5		64.9	S16,T10S R6E	56,	8.0'
M	Logging bridge near McCoy Creek		1.8		66.7	S23,T10S R6E	68'	2.0'
N	Foot bridge at Bruno Meadows trail		3.2		69.9	S19,T10S R7E	72'	3.3'
0	Confl Marion Fk		6.4		76.3	S15,T11S,R7E	34'	15.0"
P	Confl Downing Ck		5.7		82.0	S32,T11S,R7E	31'	6.5"
Q	Big Meadows Rd bridge		5.5		87.5	S28,T12S R7E	12.5'	13.0"

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090005	0035	0.00
B	17090005	0035	7.76
C	17090005	0003	4.51
D	17090005	0003	12.72
E	17090005	0004	6.40
F	17090005	0004	10.02
G	17090005	0004	18.09
H	17090005	0005	0.00
L	17090005	0019	4.64
M	17090005	0021	0.39
N	17090005	0021	2.82
0	17090005	0021	10.89
P	17090005	0022	3.32
Q	17090005	0022	11.22

Character of Bottom Between Stations:

Sta	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
A-B	581,000	88,920	15.3	287,840	49.5	180,880	31.1	17,060	2.9

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

Sta	Area (yd^2)	L.R.	9	M.R.	%	S.R.	%	M&S	%
B-C	'424,800	172,610	400.6	155,480	36.6	44,440	10.5	52,270	12.3
C-D	978,900	487,480	49.8	349,850	35.7	94,720	9.7	46,850	4.8
D-E	902,600	555,480	61.5	283,640	31.4	61,540	6.8	1,940	0.2
E-F	339,500	183,890	54.2	84,020	24.7	16,130	4.8	55,460	16.3
F-G	386,300	190,750	49.4	115,960	30.0	58,870	15.2	20,720	5.4
G-H	130,600	111,570	85.4	15,910	12.2	900	0.7	2,220	1.7
H-I	106,100	73,490	69.3	16,200	15.3	12,200	11.5	4,210	4.0
I-J	255,800	141,940	55.5	67,210	26.3	29,720	11.6	16,930	6.6
J-K	87,300	56,890	65.2	16,510	18.9	11,930	13.7	1,970	2.3
K-L	234,640	157,952	67.3	43,604	18.6	23,274	9.9	9,810	4.2
L-M	75,520	52,336	69.3	12,812	17.0	8,052	10.7	2,320	3.1
M-N	167,020	109,634	65.6	29,664	17.8	16,522	9.9	11,200	6.7
N-O	278,200	141,260	50.8	80,580	29.0	49,440	17.8	6,920	2.5
O-P	107,100	42,880	40.0	40,120	37.5	23,410	21.9	690	0.6
P-Q	98,100	40,020	40.8	30,920	31.5	23,410	23.9	3,750	3.8
To	5,153,480	2,607,102 (50.6%)		1,630,320 (31.6%)		655,438 (12.7%)		254,320 (4.9%)	

Spawning Area Usable and Available:

Station	Distance yds	Distance miles	Area (yd^2)	Available Spawning Area (yd^2) (MR&SR)	% Avail	Usable Spawning Area (yd^2)	% Usable
A-B	16,500	9.4	581,000	468,720	80.7		
B-C	8,800	5.0	424,800	199,920	47.1		
C-D	23,700	13.5	978,900	444,570	45.4		
D-E	18,800	10.7	902,600	345,180	38.2		
D-F	6,000	3.4	339,500	100,150	29.5		
F-G	11,800	6.7	386,300	174,830	45.3		
G-H	5,600	3.2	130,600	16,810	12.9		
H-I	3,450	'2.0	106,100	28,400	26.8		
I-J	5,650	3.2	255,800	96,930	37.9		
J-K	3,000	1.7	87,300	28,440	32.6		
K-L	8,015	4.6	234,640	66,878	28.5		
L-M	3,180	1.8	75,520	20,864	27.6		
M-N	5,730	3.3	167,020	46,186	27.7		
N-O	11,200	6.4	278,200	130,020	46.7		
O-P	6,700	3.8	107,100	63,530	59.3		
P-Q	13,500	7.8	98,100	54,330	55.4		
Total	151,625	86.2	5,153,480	2,285,758	44.4		

Note : includes 6,300 sq yds bottom on which type not determined due to depth

Spawning Area Unavailable and -Unusable:

Cause of Unavailability:

None of the spawning area is actually unavailable, although the Stayton power ditch and the Salem ditch take most of the water available during low water periods. This section between the Stayton power ditch take-off above Stayton and the point of the diversion return below Stayton, of approximately 3,000 linear yds and including 73,900 sq. yds of bottom area, is unavailable during periods of exceptionally low water such as often occur during the late summer and fall months. Seepage water through diversion dam is the only water supply to this section during such low water periods.

As soon as the racks are put in at Detroit by the Oregon State Fish Comm. the river is blocked to passage of fish (salmon and steelhead) above that point, and remains totally blocked until the spawning season is over in the fall. Actually, very few fish ever ascend above the racks to spawn. Only once in several years are the racks washed out by floods, but even then they are generally replaced in time to catch the majority of the spring run.

Character of Watershed, St A-F:

	A-B	B-C	C-D	D-E	E-F
Mountainous					
Hilly				X	X
Rolling		X	X(particularly upper)		
Flat	X	X			
Swampy					
Wooded	scattered except margins	marginal	X	X	X
Open	part				
Cultivated	75%	75%	10%	5%	5 %

Character of Watershed, St F-Q

	F-G	G-H	H-Q inc
Mountainous		X	X
Hilly	X (very)		
Rolling	.		

Character of Watershed, St F-Q (cont):

	F-G	G-H	H-O inc
Flat			
Swampy			
Wooded	X	X	X
Open			
Cultivated	0	0	0

Diversions:

Diversion 1: Gardner ditch, left bank above lower Gardner dam on north channel of river in town of Stayton, OR.

Diversion 2: Stayton power canal actually a continuation of Gardner ditch through town of Stayton returning unused water into river .5 miles below Stayton.

Diversion 3: West Stayton irrigation ditch, taking off left side of Stayton power canal 1/4 miles below Stayton.

Diversion 4: Salem ditch take-off left bank of north channel, above small wing dam, 100 yds above Gardner ditch take-off, in town of Stayton.

Diversion 5: Ditch to Mehama fish hatchery, above temporary wing dam 300 yds below Mehama bridge.

Diversion 6: Mill City, power canal to saw mill take-off from left end of Mill City Dam.

Diversion 7: City of Stayton, water supply pumped from wells fed by seepage through river bed and banks.

Diversion 8: City of Salem water supply, pumped from wells fed by seepage from river bed, one mile above Stayton on island.

Diversion 9: Sidney ditch, S3, T10S, R2W. 8.0 cfs. irr near Marion.

Diversion 10: Jefferson Ditch (just above Green Bridge).

Artificial Obstructions:

1. Gardner dam town of Stayton, north channel; wood cribbing, rock-filled, 320' long; 7, high; passable only when water is allowed into fish ladder in Stayton power ditch.

Artificial Obstructions (cont):

2. Salem ditch wing dams (two parallel) 100 yds above Gardner Dam; rock wing dams extending nearly across north channel; 3' high; passable around ends.

3. Upper Stayton (or upper Gardner) dam, 3500 yds above lower Gardner Dam, Stayton; 400' long and triangular wooden rock-filled coffers; 4-8' high; passable only when water is allowed to fish ladder in Stayton power ditch.

4. Wooden rack wing dam 300 yds below Mehama bridge for fish hatchery; wooden wing extending over 1/3 distance across, channel bottom rock weighted; removable; 3-4' high; passable around outer end. No protective devices.

5. Mill City mill dam above town; wooden construction with wooden apron 21.5' long all the way across river, large logs across top in summer for flash boards; 8' high; open box fish ladder left end; very poor at low water.

6. Log jam approximately 4,200 yds above Sta. G; cut logs and drift caught in narrow rock-walled canyon; 15' high' passable with difficulty. No protective devices.

7. Confluence of Breitenbush River; hatchery racks of Oregon State Fish Commission; 4-7' high'; stop all fish after May of each year.

Note: preliminary surveys are being made for two huge dams, one at Mehama and another at Station H for irrigation and water storage purposes.

Natural Obstructions:

1. 2 miles above Sta. K; bedrock chute and falls; 9' high; passable with difficulty.

2. 6.1 miles above Sta. P; small log jam-silted above; 4' high; passable with difficulty.

3. 6.2 miles above Sta P; falls broken somewhat; 6' high; passable with some difficulty.

4. Between Sta. P and Q; 11 falls over logs; 1-2' high; frequence tiring.

Fluctuation in Water Level:

Sta	Ft. Variation	Cause	Stream Volume	% Stream Bed Covered
A-D	5-18'			A-B 54.1 Observed & figured
D-E	5-15'			B-C 60.0 Approximately
E-G'	10-15'			C-D 65.0 Approximately
G-H	10'			D-E 70.0 Approximately
H-J	8-15'			E-F 98.5 Observed& figured
J-L	3-5'			F-G 98.8 Observed & figured
L-N	2-4'			G-H 100.0 Approximately
N-O	1-3'			H-O 100.0 Approximately
O-P	2-4,			O-Q 90.0 Approximately
P-Q	.5-3'			

Note: On upper reaches (i.e., above dam site) the high banks and steep slopes result in very little additional wash during flood stages.

Cause of Variation:

1. High water due to spring run-off of melting snow from high mountains along upper reaches of river.
2. Heavy fall, winter and spring rains in mountain headwater areas.
3. More rapid run-off in spring, followed by low water in summer, aggravated more each year by extensive cutting of timber along upper drainage areas.
4. Excessive withdrawal of water for irrigation etc., by Salem and West Stayton ditches, causing abnormally low water in river below Stayton during summer months. A condition particularly aggravated by long periods of drought in some years.

Stream Volumes:

Sta. A 209.5 cfs on August 4, 1940, 1:00 pm; Sta. C less than 25 cfs; Sta. D 480 cfs measured August 6, 1940 2:00 pm.

Average discharge Sta. D, 21 years (1905-6, 1911-14, 1921-38) 3,275 sec. ft, maximum discharge 62,900 sec. ft., Nov. 20, 1921; minimum 400 sec. ft. on September 29, October 13, 1934.

Records at Detroit: Maximum discharge 15,000 cfs, March 31, 1931, minimum 2.95 cfs October 9-12, 14-16, 20-21, 1931; average discharge (Detroit) 12 years, 925 sec. ft (1907-8, 10-11, 28-38).

All average maximum and minimum records listed above are taken from U.S.G.S. 'Water Supply Paper #864 Pacific'slopes.

Sta. 0, 100 cfs, 9/27/37 (fair accuracy)
Sta. P, 32 cfs, 9/26/27 (fair accuracy)
Sta. Q, 7 cfs, 9/26/37 (good accuracy)

Pollution:

Location of Source: Town of Stayton (sewage); Paris woolen mill at Stayton, Mill City (sewage and saw mill waste). Detroit (sewage etc); White Water Creek and others (glacial silt).
Type of Pollution: Sewage (towns along river edge); dye stuff (from Paris woolen mill); saw mill waste (Mill City); garbage (towns and farms along river banks); glacial silt (from streams on slopes of Mt. Jefferson).

Large amounts of garbage and refuse in river at and just below Stayton. Paris woolen mill observed discharging dye stuffs into waste canal, one discharge of sufficient amount to dye approximately 100 yds of drainage canal (approximately 10' wide, 1-4' deep) a bright red, to such an extent that visibility possible only to 2" depth where ditch joins pools formed by Mountain States Power Co. plant discharge. Temperature of discharge more than our thermometers could record (well over 150 degrees F). Group of chinook salmon in pool behind power plant (unable to ascend due to dry fish ladder) observed to retreat back out of sight when dye stuff reached pool in which they lay.

At time of observation, no waste materials were being put into the canal by the batt factory or the flour mill in Stayton. Water was discolored for more than 1 mile below Mill City, apparently from a saw mill operated in that town. Swimming was reported banned at Mill City because of pollution from Detroit sewage. Glacial silt or rock flour was noticeable in the area between Mill City and Detroit. Large amounts of glacial silt in the stream are found following hot days. in summer and after heavy rains in the mountains. Most of the rock flour is said to come from the foot of Mt. Jefferson and is carried by Whitewater Creek. There is a large amount of garbage and refuse all along river, with heaviest concentrations below the towns of Stayton and Mill City.

Fish (salmon):

Species: Spring chinooks in deep pools.
Estimated Number (Spawners): 1000-1200+ with 700-1000 additional being held in Detroit Racks.

Between Stations	Number	Date
A-B	none seen	Aug. 5-9 & 10, 1940
B-C	10-12 seen, others present	Aug. 8, 1940
C-D	20-30 seen, others present	August 7-8, 1940
D-E	30-40 seen, estimated over 500 in stretch	August '6, 1940

Fish (salmon, **cont):**

Between Stations	Number	Date
E-F	25-30 seen (mostly at dam) estimated 2-300 or more present	August 12, 1940
F-G	none seen; reported present	August 12, 1940
G-H	none seen; reported present	August 12-13, 1940
H-R	700 in racks at Detroit	August 12-13, 1940
R-N	1	September 27, 1937
N-O	13	September 26, 1937

Note : Because the chinooks were in deep resting pools it was impossible to make an accurate count. There were probably many more fish present than were actually seen.

Fish (other than salmon):

Species	Date	Very Abundant	Abundant	Fair	No.	Scarce
Steelhead	spring		X --spring--X			
summer						
Rainbow	Aug. 6-12			X		X
Eastern Brook trout	Aug. 7					X
Columbia R. chub	Aug. 6-12		X			
Oregon chub	Aug. 6-12	X		X		
Squawfish	Aug. 6-12	X				
Suckers		X below Mill City dam		X above Mill City dam		
Cottids	Aug. 6-10					
Minnows						
Whitefish		X below Mill City dam	X	X above Mill City dam		

General Remarks:

The river flows through a wide, almost flat valley for the first 25 miles above the mouth. The valley is bounded by low rolling hills which gradually become higher and encroach upon the valley as one proceeds upstream. Above Mehama, the hills are very high and steep and the river occasionally cuts into their bases to form steep or sheer cut banks. The valley bottom and lower hill sides are farmed from the mouth to the town of Mill city. Above Mill City the watershed is partly recent, logged-off area, partly

General remarks **(cont):**

young second growth conifer of forest and partly virgin National Forest conifer stands. The area from just below Mill City to a point above the town of Ages is a transition area in which the narrowing valley floor with earth and gravel stream gives way to the canyonous country above where the stream banks become exposed to bed rock ledges. Passage on foot along the river in the upper section becomes impossible in many places. Marginal vegetation is generally very dense below the canyon portion of the stream. Large resting pools are almost continuously in the canyonous portions of the river. Above Detroit, the North Santiam flows rapidly down the west slope of 'the cascade mountains. The gradient is moderate to fairly steep. Above Idanha the watershed is covered with a second growth forest of fir and hemlock, with considerable underbrush. Near the headwaters, the fir and hemlock is replaced by the more open growing pine and spruce.

Salmon and other fish can ascend the North Santiam as far as Stayton without much difficulty, but to get through the maze of canals, dams and by passes in that vicinity may be a problem. A large amount of water is diverted from the North Santiam just above Stayton, leaving a 2 mile section of the river opposite Stayton and between the diversion dams and the return practically dry at low water periods. A fish ladder was installed this year at the Mountain States Power Co. plant in Stayton in order to pass the fish upstream through the diversions to the river above. This ladder was late in being installed, and a great many of the early chinooks were forced to drop back downstream before the ladder was finally opened. Hundreds of unspawned chinooks, although in poor condition, were taken illegally by local residents.

Opposite Stayton the river is divided by a large island about 2 miles long and varying in width from 300-700 yds. The right or south channel of the river is blocked by the upper Gardner which extends from the upper end of the island to the right bank, and. during low water periods diverts the entire river into the north channel. The dam is 400' long and is made of wooden rock-filled, triangular shaped coffers 4-7, high. During high water this dam is completely covered and offers no barrier 'to ascending steelheads, which pass over it in April and May. After the spring run-off the dam allows only a few inches of seepage water in the south channel, and no fish can pass the dam until the fall rains raise the water sufficiently to flow over the spill way. Thus the chinook salmon, which in this river are spring run fish and ascend the river during the summer, must be passed around the dam through the Stayton diversions.

The water diverted down the north channel flows approximately 1.5 miles to the Salem ditch take-off on the left bank, where 2 low wing dams 3-5' high and constructed of rock and timbers extend some 50 yds diagonally upstream and across the channel to within a few feet of the right bank, diverting a large portion of the water from the north channel into the open Salem ditch. This carries the water to Salem, some 15 miles away, where it is used for power.

General remarks (cont):

The intake of this ditch of 80' wide, and the fast flowing water is 1.5' average depth. 300 yds below the intake there are 3 wooden hand-ratchet type headgates. The left gate (facing upstream) is 44" wide, the center gate is 73" wide and the right gate is 45" wide. At the headgates, the ditch is 24' wide and 4' deep on the upstream side. The ditch was running full when observed at frequent intervals from August to October, 1940. There are no screens nor protective devices of any kind on the ditch. Several hundred salmonid fingerlings were seen in the ditch, and it was reliably reported that they may be seen all the way to Salem. The effects on the downstream migrants of the several industrial uses of this water in Salem, are not reliably known. The mean average flow at a point on the ditch 125' below the headgates for the period from April to September (inclusive) in 1926 was 244 cfs (Bull. #8, p. 295, Water Resources, State of Oregon, 1925-30).

Immediately below the Salem ditch is the lower Gardner Dam. This structure is 320' long and about 7' high and is built of rock-filled wood cribbing. It completely bars the north channel except during high water periods. This dam diverts all the water that escapes going down the Salem ditch into the Gardner canal. 600 yds below the dam there are 8 wooden headgates. The 4 gates on the right, are 32" wide, and the 4 gates on the left side are 42" wide. The canal here is 34' wide, and the average depth just above the headgates was 4, at the time of observation. The aforementioned Water Resources Bulletin gives the mean average flow of the Gardner canal just below the headgates as 333 cfs for the period of April to September (inclusive), 1926. Just below the headgates there is a bypass to the north channel of the river. This bypass was dry when observed, and apparently is used only during periods of high water.

The Gardner canal continues some 500 yds parallel to the Salem ditch to the site of what is known as the "log pond," but which is now only a swamp through which the Gardner canal flows in a definite channel. A bypass leads out from the lower right edge of the swamp, 'emptying into the North Santiam just above the highway bridge in Stayton. This bypass collects only seepage water during periods of normal flow, and less than 2 cfs was observed in it in August.

From the swamp or "log pond" on the canal, is the Stayton Power Canal. It is 38.5' wide and 3.5' deep at the upper end.

About 100 yds below the swamp is the first industrial power take-off the power canal. This is the Paris Woolen Co. Mill. The water wheel is on the right side of the canal and was not in use when observed. It was learned on inquiry that the mill uses the wheel for power during the winter or high water periods. The intake to the wheel is protected by an iron grizzly with 1" spacing. The wheel is the low veloeity reaction type. When the wheel is in use, the water empties into the head of a ditch below the mill which joins the Stayton wasteway ditch at the pool below and in the rear of the Mt. States Power Co. plant. Hot waste

General remarks **(cont):**

dyestuffs (over 150 degrees F), are discharged from the woolen mill through a pipe into the head of the wasteway.

Immediately below the woolen mill, at the foot of Fourth Street in Stayton, is the Gardner Feed Mill. This uses water from the power canal. The intake to the power wheel is 7'2" wide, and is protected by a wooden grizzly with 1.75" spacing. The wheel has about a 9' head, and is of the low speed type. Discharge is into the wasteway belpw and at the rear of the mill.

A few yards below the feed mill and also on the right side of the power canal, is the Stayton Water Dept. pump house. This utilizes water from the canal to generate power to run pumps which pump the drinking water for Stayton from a series of wells near the river's edge above the highway bridge. The intake to the pump house is protected by a wooden grizzly 10.5' wide having 1" spacing. The water was 40" deep in front of the grizzly. Approximately 5 cfs is said to be diverted, discharging into the wasteway at the rear.

Adjoining and downstream from the pumping plant is the Mountain States Electric Co. power plant. The concrete intake from the power canal is 24'8" wide, protected by an iron grizzly having 3" spacing. The water depth in front of the grizzly was 6'9". About 50 chinook fingerlings were seen on August 9, 1940 directly in front of the intake. The Allis-Chalmers turbine has a rating of 164 rpm and operates under a 15' head. The newly constructed fish ladder leads around the power plant and opens at its upper end into the power canal about 20' below the power plant intake. The ladder is entirely of wood construction and is 51" wide at the headgate. The ladder has two turns, so that the lower jump is located directly beside the power plant discharge. There are 8 jumps in the ladder, the lowest one being over 26" high. The others are about 20' high, except the upper jump which is 11" high. Side baffles alternate on each jump making each pool entrance about 34" wide. The pools are 20" deep and are 8' long by 7.5' wide. The ladder was dry with the exception of one day on the several days it was visited from August 8-August 30, 1940. On one occasion there was about 1/2 cfs in the ladder, which was not enough to attract fish. More than a score of large chinooks were seen fighting the attractive discharge from the power plant on two consecutive days. The ladder does function when property regulated, for it was stated that when the ladder was first opened on June 14, 1940, more than 500 chinooks passed over from 4:00 pm to 7:00 am. It was reported' from a reliable source that more than 3,000. chinooks had been allowed to pass over the ladder prior to mid-August of this year (1940) . However, fish can ascend only when the Mt. States Power co. opens the ladder.

The water remaining in the power canal passes through a "woolen batt" factory located 200' below the Mt. States Co. power plant. This factory operates a low speed type turbine to generate power. The intake is provided with a grizzly having a 2" spacing.

The power canal wasteway, now containing all the water from

General remarks (cont):

the Gardner ditch, flows under the First Street bridge in Stayton and continues parallel to the river bed to a point approximately 1/4 mile below town. Just above the First Street bridge there is a new bypass leading to the river channel just below the Scio highway bridge. About 1/4 mile below town, another bypass takes off on the right side of the wasteway. About 100 yds below this bypass, the West Stayton irrigation ditch takes off from the left side of the wasteway. At the irrigation ditch headgates a bypass takes off on the right side. About 100 yds downstream this bypass is joined by the bypass originating 100 yds above the irrigation ditch headgates. The wasteway enters the North Santiam about 1/2 miles below the highway bridge.

The West Stayton irrigation ditch is operated by the Willamette Valley Water Co. C.H. Darley, the watermaster, said that earlier than June 1 the ditch diverts only 10-15 cfs for watering stock, but from June lo to September 15 approximately an 80 cfs flow is diverted for irrigation purposes. Apparently to stop fish from entering the ditch, there are two revolving screens based on wooden abutments in front of the headgates'at the takeoff. The screens consist of wooden drum-type frames covered with 3/4" mesh wire. The drums are 8'5" long and 4' in diameter, with paddles built inside. One screen was out of commission (August 7, 1940), and the other was revolving backwards (i.e., the top moving upstream), with a tendency to push fish and debris down under the screen and into the ditch. There were no seals under the screens, and nothing to prevent small fish from passing beneath. Small salmonids have been seen in large numbers in the ditch below the screens, where they are lost. The wooden headgates are operated by two hand windlasses. The water was 3' deep in front of the screens and the water level on the screen was 28" high, or 4" above.the center axis.

Mr. Ledgberwood, Superintendent of the Oregon State Hatchery at Mehama, states that he believes that the smaller of the downstream migrants can go through the Mountain States Power Co. wheel in Stayton without being harmed, but that the larger sized fingerlings are probably hurt. He tries to prevent this to some extent by releasing the young fish at a time when they are small enough to go through the wheel more easily, and also when the water temperatures are low enough to keep them working downstream.

The Mehama hatchery formerly used water from Stout Creek, but this year is getting most of its supply from the North Santiam. The small hatchery wing dam in the river at Mehama is a temporary structure of wooden tripods reinforced by loose rock. It is not a barrier to fish.

The Mill Dam above Mill City is a barrier at low water when logs are chained across the top of the dam to divert nearly all the water down the sawmill power canal. The dam is approximately 300' long and is of rock-weighted log and wood construction. It has a 21 1/2' wide wooden downstream apron across its entire length. There is a very poor wooden fish ladder with 4 jumps at the left

General remhrks **(cont):**

end of the dam. The amount of water flowing through the ladder at low water is not sufficient to attract fish. It is reported that at high water both steelheads and chinooks pass through the ladder without much trouble. There are no protective devices on the sawmill diversion.

There is a huge log jam located in the narrow bedrock box canyon about 1/2 mile below the proposed Mayflower Creek dam site. Fish somehow manage to get through this jam, although it may delay their migration.

The Oregon Fish Commission racks the North Santiam and Breitenbush rivers each year at their confluence near Detroit. A few early fish may get by while the water is too high to install the racks, but practically- all of the fish, both chinooks and steelheads, are trapped by the Mehama hatchery crew. There is an eyeing station at the racks. The eyed eggs are hatched at the Mehama hatchery, where the young are liberated. There are many miles of good natural spawning area above the racks in both the Breitenbush and North Santiam rivers. The racks prevent the downstream passage of the few spent and spawned-out steelheads which get to the headwaters.

Some chinooks spawn in the main North Santiam river below the Detroit hatchery racks. Six chinooks were seen spawning near the town of Gates in late September. High temperatures in the river below Stayton cause most of the chinooks to try to ascend farther to spawn.

From all reports, the run of salmon and steelhead into the North Santiam has fallen off considerably, and at present . constitutes only a small fraction of the runs reported by early settlers. Cause of the depletion is partly due to the cumulative effects of the various barriers and hindrances encountered by the fish on their spawning migration and the indiscriminate diversion of water and consequent destruction of large numbers of downstream migrants.

Two new dams are contemplated on the North Santiam in conjunction with the Willamette Basin Flood Control and Irrigation Project. The one proposed to to go in at Mayflower Creek (Sta. H), already has a crew working on preliminary borings. If finally approved, it will probably be an earth-fill dam 200-300' high and will be a total barrier to fish.

A survey was made in 1940 by the U.S. Army Engineers for a reservoir basin behind another proposed dam to be located just below Mehama. This dam, as planned, would be approximately 150' high and would be a total barrier to fish, cutting off even the Little North Santiam run. High temperatures would probably render most of the spawning area below this dam unsuitable for salmon and steelheads.

The following data on fish in the Santiam was obtained confidentially from Mr. Ledgerwood, Superintendent of the State Hatchery at Mehama. Egg take for the hatchery, now 3-4 million tops, has been over 7 million. Steelhead have reached Detroit in

General remarks **(cont):**

late April or May; there being but a light take in June. One and a half million steelhead eggs were taken in 1939, but he estimates 3-4 million eggs in river. Two and a quarter million take in 1940. Steelheads are about evenly distributed between Breitenbush and North Santiam racks, whereas most of the chinooks hit the North Santiam racks. The North Santiam averages 3-4 degrees F colder than the Breitenbush, giving the appearance of chinooks seeking the coldest waters available. Chinooks numbering around 700 were in the racks September 16, 1940. Egg take started on August 20, but few are ready until September. 67,800 eggs were taken in August this year (1940) and total take through September 14 was 1,079,000. Three and a half million eggs were taken in 1939. Average eggs per fish is about 5,200 in the North Santiam (at Detroit racks)', with 4,000 average for the middle fork and the South Santiam, and 5,000 per fish at the McKenzie River racks. Eggs were taken out one year on the Little North Santiam; 1/2-1 million chinook eggs being the estimated production there, through natural spawning.

Temperature Data:

Station	Date	Hour	Air Temw	Water Temw	Sky
A	8/04/40	1:00 PM	83.0 F	71.5 F	bright & clear
B	8/13/40	4:00 PM	. 78.0	72.0	bright & clear
C	8/13/40	3:15 PM	77.0	72.0	bright & clear
D	8/06/40	2:00 PM	89.5	70.0	bright & clear
E	8/06/40	10:30 AM	88.0	64.0	bright & clear
F	8/14/40	1:10 PM	74.0	62.0	bright & clear
G	8/13/40	11:45 AM	71.0	58.0	bright & clear
H	8/13/40	9:00 AM	60.0	55.0	bright & clear
I	9/26/37	12:20 PM	68.0	51.0	bright & clear
J	9/26/37	12:00 PM	66.0	51.0	bright & clear
K	9/26/37	11:45 AM	64.0	51.5	bright & clear,
L	9/26/37	11:20 AM	61.0	48.0	bright & clear
M	9/26/37	11:15 AM	58.0	47.0	bright & clear
N	9/26/37	10:00 AM	56.0	47.0	bright & clear
0	9/27/37	12:30 PM	66.0	46.0	bright & clear
P	9/27/37	4:30 PM	59.0	51.5	bright & clear
Q	9/27/37	2:00 PM	66.0	46.0	bright & clear

The following temperatures were taken on 9/16/40 in conjunction with the survey of the North Santiam River and give a picture of the temperature variation from the upper to lower end of the river on a single day during the chinook spawning season:

Sta/Stream	Hour	Air Temw	Water Temw
Bruno Meadow Trail, N.Santiam	12:55 PM	70.0 F	52.0 F
Idanha, N. Santiam	1:10 PM	70.0	54.0
At rack below Breitenbush confl	1:30 PM	68.0	57.0
Lakewood Bridge, N. Santiam	2:15 PM	72.5	58.0
Gates Bridge, N. Santiam	2:50 PM	67.0	58.5
Mill City Dam, fish ladder	3:00 PM	72.0	60.0
Mehama Bridge, N. Santiam	3:25 PM	76.0	66.0
Stayton Bridge, N. Santiam	3:50 PM	75.5	68.0
R.R. Bridge, town N. Santiam	4:25 PM	76.0	68.0
Greens Bridge, N. Santiam	4:45 PM	76.0	69.0
Jefferson Bridge, Santiam River	5:00 PM	77.0	70.0
Sta. A bridge, 1.5 mi above confl w/ Will. and Santiam Rivers	5:30 PM	71.5	70.5

Note : Above series taken by ZE Parkhurst and FG Bryant. Covers 85+ miles of stream.

Pool Grade:

Sta	Dist (mi)	Resting Pools	Resting Pools/Mil	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6	S6%
A-B	9.4	205	21.8	5.9	23.9	8.3	62.0		
B-C	5.0	53	10.6	20.8	26.4	11.3	41.5		
C-D	13.5	40	29.6	60.0	17.5	5.0	17.5	48	3.6
D-E	10.7	66	6.2	47.0	19.7	22.7	10.6	124	11.6
E-F	3.4	172	50.6	33.1	4.1	59.3	3.5	10	2.9
F-G	6.7	175	26.1	38.3	13.7	25.1	22.9	50	7.5
G-H	3.2	89	27.8	55.1		44.9		50	15.6
H-I	2.0	22	11.0	63.6	9.1		27.3	76	38.0
I-J	3.2	156	48.8	21.8		78.2		328	102.5
J-K	1.7	14	8.2	21.4	7.1	14.3	57.1	126	74.1
K-L	4.6	220	47.8	32.7	0.4	66.8		493	107.2
L-M	1.8	30	16.7	20.0		80.0		200	111.1
M-N	3.3	249	75.5	16.9		83.1		48	14.5
N-O	6.4	44	68.8	25.0	13.6	34.0	22.3	5	0.8
O-P	3.8	7	1.8	14.3	42.9	28.6	14.3		
P-Q	7.7	18	2.3		5.5	61.1	33.3		
Tot	86.4	1,560	18.1	27.8	8.2	48.5	16.6	1,558	18.0

Gradient:

Sta	Distance (Miles)	Total Drow	Avg Drop Per Mile	Elevation	Source of Data
A-B	9.4	130'	13.8'	220' (A)	U.S.G.S. Albany quadrangle map
B-C	5.0	85'	17.0'	350' (B)	U.S.G.S. Stayton quadrangle map

Gradient (cont):

Sta	Distance (Miles)	Total Drop	Avg Drop Per Mile	Elevation	Source of Data
C-D	-13.5	168'	12.4'	435' (C)	U.S.G.S. Water Supply Paper #349, profiles in Willamette River basin, Oregon plate 111A
D-E	10.7	187'	17.5'	603' (D)	" " "
E-F	3.4	95'	27.9'	790' (E)	" " "
F-G	6.7	205'	30.6'	885' (F)	" " "
G-H	3.2	100'	31.3'	1090' (G)	" " "
H-K	6.9	215'	31.0'	1190' (H)	Topographic map (1937 invest.)
K-M	6.4	375'	59.0'		" "
M-O	9.7	605'	62.0'		" "
O-P	3.8	235'	62.0'		" "
P-Q	7.7	moderate to steep			Estimated by 1937 investigators
Tot	78.7	2,400'	30.5' per mile		

Tributaries:

* = Surveyed
I = Inspected

I. North Santiam River
  1. Bear Branch
  2. Stout Creek
I 3. Little North Santiam River
    a. Canyon Creek
    b. Cougar Creek
    c. Big Creek
    d. Sinker Creek
    e. Little Sinker Creek
    f. Elkhorn Creek
I ---------Impassable Falls-------
    g. Evans Creek
    h. Henline Creek
    i. Dry creek
    j. Pearl Creek
    k. Cedar Creek
    1. Stock Creek
    m. Tin Cup creek
    n. Horn Creek
    o. Gold Creek
    p. Stony Creek
    q. Battle Axe Creek (L. Fork)
    r. Opal Creek (R. Fork)
  4. Rock Creek

Tributaries **(cont):**

5. Little Rock Creek
   a. Mad Creek
6. Sardine Creek
7. Lawhead Creek
8. Mayflower Creek
9. Whitman Creek
10. Cumley Creek
11. Kinney Creek
    a. Slide Creek
* 12. Blowout Creek
    a. Box Canyon Creek
    b. Cliff Creek
    C. Divide Creek
    d. Ivy Creek
    e. Hawkins Creek
    f. Lost Creek
* 13. Breitenbush River
    a. Tumble Creek
    b. French Creek
    c. Canyon Creek
    d. Wind Creek
    e. Byars Creek
    f. Deadhorse Creek
    g. Slide Creek
    h. Humbug Creek
    i. Cliffs Creek
    j. Cultus Creek
    k. Fox Creek
    1. Scorpion Creek
    m. Leone Creek
    n. Hill Creek
    0. Short Creek
    p. Mansfield Creek
    q. Devils Creek
        (1) Skunk Creek
* r. North Fork of Breitenbush River
        (1) Rapidan Creek
        (2) Mink Creek
        (3) Red Lake Creek
        (4) Indian Lakes Creek
* S. South Fork of Breitenbush river
    -------Impassable Falls-------
        '(1) Roaring Creek
        (2) Lake Creek .
14. Dry Creek
15. Tom Creek
16. Log Creek
17. Boulder Creek
18. Cabin Creek
19. Corset Creek (or Rainbow Cr. on N.F. maps)

Tributaries (cont):

20. McCoy Creek
21. Bear Lake Creek
22. Macy Creek (or Mary Cr. on N.F. maps)
23. Tunnel1 Creek
I 24. Whitewater Creek
    a. Cheat Creek
    b. Jeff Creek
25. Woodpecker Creek
I 26. Pamelia Creek
    a. Red Creek
    b.'Milk Creek
    C. Grizzly Creek
27. Minto Creek
28. Bruno Creek
* 29. Marion Fork
    a. Willis Creek
    b. Puzzle Creek
I -------Impassable Falls-------(Gooch or Gatch Falls)
    C. Moon Creek
    d. Turpentine Creek
30. Bugaboo Creek
31. Buck Creek
    a. Paskett Creek
32. Downing Creek
33. Straight Creek
34. Lynx Creek

General Remarks:

TRIBUTARIES:
(* - Surveyed)
Al - Small slough-like tributary, left bank, approximately 2 miles above Sta. A.
A2 - Small slough-like tributary, right bank, approximately 4 miles above Sta. A.
A3 - Small tributary less than 3 cfs, left bank, approximately 1 mile below Sta. B.
A4 - Small tributary less than 5 cfs, right bank, 1/4 mile below Sta. B.
A5 - Gardner (Stayton power canal), wasteway enters left bank, approximately 1/2 mile below Stayton Bridge. Approximately 400 cfs entering when observed, which was more than that coming down river channel.
A6 - Small tributary, less than 5 cfs, left bank, approximately 2 miles above Sta. C in Stayton.
A7 - Stout Creek, approximately 2 cfs, enters left bank approximately 3 miles above Sta. C. Mehama hatchery of State Fish Comm. located on this stream.

General remarks (cont):

A8* - Little North Santiam River, enters on left bank approximately 300 yds above Mehama bridge. Summer flow approximately 25 cfs when observed on August 16, spring chinooks ascend this stream and several hundred were seen in deep pools.

A9 - Small Creek, less than 5 cfs, right bank, approximately 3/4 miles above Gates, formed by uniting of Little Rock Creek and Mud Creek. Of little importance to Salmon.

A10 - Small Creek, less than 2 cfs, left bank, approximately 2 miles above Sta. F, gradient steep, impassable to salmon.

All - Small Creek, less than 2 cfs, right bank, approximately 1/4 mile below Niagara, steep gradient, impassable to salmon.

Al2 - Small Creek, less than 3 cfs, left bank, 1/2 mile above Niagara, steep gradient, impassable to salmon.

A13 - Small Creek, less than 1 cfs, 100 yds below Lakewood (Sta. G), steep gradient, impassable to salmon.

Al4 - Sardine Creek, less than 1 cfs, approximately 1 mile above Sta. G, left bank, steep gradient, impassable to salmon.

Al5 - Mayflower Creek-, less than 1 cfs, approximately 100 yds below Sta. H, left bank, steep gradient, impassable to salmon.

Al6 - Kinney Creek, less than 3 cfs, 2 miles above Mayflower Creek, right bank, steep, impassable to salmon.

A17* - Blowout Creek, 10 cfs, 1800 yds above Sta. A, right bank, 1938 survey.

A18* - Breitenbush River, 300 yds below Sta. J, left bank, 1938 survey.

A19 - Boulder Creek near Idanha, left bank, 15 cfs.

A20 - Corset Creek or Rainbow Creek, 2 1/4 miles above Boulder Creek, right bank, less than 5 cfs.

A21 - McCoy Creek, 2/3 miles above Corset Creek, left bank, 1 cfs.

A22 - Bear Lake Creek, 1/2 mile above McCoy Creek, right bank, less than 3 cfs.

A23 - Macy (or Mary) Creek, 1/2 mile above Bear Lake Creek, right bank, less than 5 cfs.

A24 - Tunnel Creek, 3/4 mile above Big Spring Forest S. Camp, right bank, less than 3 cfs.

A25* - Whitewater Creek, 1700 yds above Sta. N, left bank, 52 cfs, measured by 1937 survey.

A26 - Woodpecker Creek, 3500 yds above Sta. N, left bank, 1 cfs.

A27* - Pamelia Creek, 4100 yds above Sta. N, left bank, 130 cfs.

A28 - Minto Creek, 8500 yds above Sta. N, left bank, 10 cfs.

A29 - Bruno Creek, 8800 yds above Sta. N, right bank, 2 cfs.

A30* - Marion Fork, Sta. 0, left bank, surveyed.

A31 - Bugaboo Creek, 1900 yds above Sta. 0, right bank, 3 cfs.

A32 - Buck Creek, 5600 yds above Sta. 0, right bank, 8 cfs.

A33* - Downing Creek, Sta. P, left bank, 47 cfs, measured.

A34 - Straight Creek, 1400 yds above Sta. P, right bank, 3 cfs.

A35 - Lynx Creek, 2400 yds above Sta. P, right bank, 2 cfs.

Note: All tributaries with "*" have been surveyed orwritten up in separate reports. Others are of little value to salmon.

Pamelia Creek

River System: Willamette River
Stream Surveyed: Pamelia Creek, tributary to North Santiam

Description:

Arises in glaciers on the southwest side of Mt. Jefferson and flows westerly to its confluence with the left bank of the North Santiam. When observed at its mouth on September 27, 1937, the water was clear. The flow was estimated at 130 cfs, the air temperature was 67.0 F, and the water was 45.0 F. The stream drops very fast in a series of cascades and small falls over large boulders near its mouth, and is reported to be similar above. A 10′ high log jam 200 yds above the mouth, is passable with difficulty.

Fish Population:

A resident reported seeing one salmon below the log jam in 1937 and a half-dozen above it in 1936. He states that a good stretch of spawning area, where the salmon formerly congregated, exists one half mile above the mouth. Trout, though numerous, are small. The stream is closed to fishing.

Downing Creek

River System: Willamette River
Stream Surveyed: Downing Creek, tributary to North Santiam

Description:

A short stream, rising in springs and flowing westerly to its confluence with the left bank of the North Santiam, 3.8 miles above the Marion Fork. Its flow and temperature are reported to be quite constant throughout the year. Mountainous, wooded watershed on the southwest slope of Mt. Jefferson.

On September 26, 1937, the flow was measured at 47 cfs. The air temperature was 59.0 F and the water 41.5 F at 4:30 p.m., clear weather.

Remarks:

Drops 30' at its mouth in an impassable series of falls and chutes over bedrock. No available spawning area.

Little North Santiam River

River System: Willamette River
Stream Surveyed: Little North Santiam River, tributary to North Santiam River

Date of Survey: August 15 and 16, 1940 by Parkhurst and Bryant.

Source: Originates high on Battle Axe Mts., S2, T9S, R5E and French Creek Ridge (one branch comes from Opal Lake).

Direction of Flow: Flows west and southwest to confluence with the North Santiam River on left bank at a point 300 yds above the Mehama Bridge. Drains area northwest of Breitenbush River and southeast of headwaters of Molalla River and Butte Creek.

Total Length:' 30 miles of which the lower 15 miles below a 25' falls were surveyed.

Station Location:

St	Location	Distance Above Prev. Station Yds	Miles	Distance Above Mouth Yds	Miles	Map Location	Width	'Dewth
A	2 miles above mouth at bridge				2.0	NW/4,S16,T9S R2E	72.0'	3.3'
B	5.1 miles above Sta. A at bridge		5.1		7.1	N/2,S18,T9S R3E	28.5'	8.2'
C	5.2 miles above Sta. B at bridge		5.2		12.3	NW/4,S8,T9S R3E	52.0,	10.5'
D	3 miles above Sta. C at impassable falls		3.0		15.3	S/2,S31,T8S R4E	150.0'	>6.0'

Note: Flow at Sta. A approximately 20 cfs, August 16, 1940 according to U.S. Geological Survey Water Supply Paper #864, 1938, part 14, page 104, the maximum flow was 14,000 cfs in December; minimum 21 cfs in September with a'means of 852 cfs for the year. The yearly run-off was 105.13" or 617,100 acre feet.

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090005	0034	0.00
B	17090005	0034	5.31
C	17090005	0034	12.10
D	17090005	0034	15.35

Character of Bottom Between Stations:

Sta	Area (yd^2)	L.R.	%	M.R..	%	S.R.	%	M&S	%
Mth-A	42,240	25,344	60.0	8,448	20.0	4,224	10.0	4,224	10.0
A-B	77,980	40,630	52.1	19,290	24.7	10,262	13.2	7,798	10.0
B-C	102,608	53,979	52.6	30,131	29.4	15,066	14.7	3,432	3.3
C-D	75.504	38,104	50.5	22,651	30.0	14,749	19.5		
Tot	298,332	158,057	53.0	80,520	27.0	44,301	14.8	15,454	'5.2

Spawning Area Usable and Available:

Station	Distance vds	miles	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	% Usable
Mouth-A	3,520		42,240	12,672	30.0	4,224	10.0
A-B	7,798		77,980	29,552	37.9	7,798	10.0
B-C	9,152		102,608	45,197	44.1	3,089	3.0
C-D	4,928		75,504	37,400	49 5	7,550	10 0
Total	25,398		298,332	124,821	41.8	22,661	7 . 6

Spawning Area Unavailable and Unusable:

Cause of Unavailability: None in area surveyed, i.e., up to Sta. D, the location of an impassable 25' falls. The entire river above . Sta. D is unavailable at all times.

Character of Watershed:

	Mouth-A	A-B	B-C	C-D
Mountainous		X	X	X
Hilly	X very			
Rolling				
Flat				
Swampy				
Wooded	X	X	X	X
Open				
Cultivated	10%	0%	0%	0%

Diversions: None

Artificial Obstructions: None in the area surveyed

Natural Obstructions: Sta D, 15.4 miles by road up from mouth, rock ledge falls, 25' high, total obstruction for chinook. Few steelhe'ad may get over occasionally in spring high water.

Fluctuation in Water Level:

Cause of Variation: 3 - 15'. Very low in late summer with most tributaries dry or mere trickles.

Pollution: None, except occasional garbage and rubbish from farms along'the banks, usually dumped in at bridge.

Fish (salmon): Spring chinook and steelhead.
Estimated Number (Spawners): 500

Between Stations	Number	Date
Mouth-A	80	August 15,16, 1940
A-B	150	" " "
B-C	270	" " "
Total	500	

Note: No steelhead were seen, but they are said to ascend the stream during spring high water. Some probably get over the fall which block the salmon migrations.

Fish (other than salmon):

Species	Date	Very Abundant	Abundant	Fair	No.	Scarce
Steelhead					X	
Rainbow or Cutthroat	8/15-16/40		X	to	x	
Whitefish					X	
Suckers					X	

Note : Fewer scrap fish than in most streams and much less abundant than in the North Santiam below Mill City.

General **Remarks:**

The Little North Santiam River flows through a steep-sided canyon between Sta. A and B. Throughout its course, the stream

General remarks **(cont):**

flows through almost continuous ravines and box canyons having steep to vertical banks of earth, gravel, and solid rock. Above Sta. A there are several good resting pools from 8 to 30' deep in which chinook salmon were seen. Between Sta. C and D there is a narrow resting pool, 150 yds long and 10-30' deep which is known locally as "The Narrows." Approximately 200 chinook salmon were seen in this pool. Local residents are reported to frequently dynamite this pool, killing many more fish than are secured.

The chinooks in this stream had noticeably less fungus than those in the North Santiam.

At Sta. D, the termination of the survey, the stream falls over a rock ledge 25-30' high and forms a large resting pool below. More than 70 chinooks were counted in this pool. The falls is impassable, except possibly to a few steelheads at high water.

The stream is crystal clear in the summer months. There are no water diversions and very little pollution. Several sawmills have operated along the stream in the past, and two'or three are still in operation. A good second growth stand of fir and hemlock covers the watershed. Farms and clearings are small and scattered. Fair numbers of trout fingerlings, 2-4" in length, were seen throughout the stream.

It is difficult to reach much of the stream because of the steep to vertical banks which, in places, rise as much as 60' above the stream bed. However, some portions can be waded at low water once one arrives on the stream bed. The bottom is composed mainly of bedrock and boulders, with small scattered pockets of spawning gravel behind the boulders. Large, deep, well-protected resting pools are quite numerous. In fact, this stream is one in which the pool area far exceeds the population limit set by the meager spawning area.

Mr. Ledgerwood, the Superintendent of the Oregon State Fish Hatchery at Mehama, reports that only once were chinook eggs taken from the Little North Santiam because of difficulty in trapping and seining the fish. He estimates the number of eggs produced by natural spawning in the stream to be from 1/2 million to 1 million per season. This estimate'is compatible with the number of adult chinooks seen in the stream by the survey party.

All tributaries in the portion of the stream surveyed are small, not over 1 to 2.5 miles in length, and drain only the mills and ridges parallel to the stream. In the summer their flow is reduced to 1 to 2 cfs and many of them become intermittent. None of the tributaries above the area surveyed are small and have steep gradients.

Temperature Data:

Sta	Date	Hour	Air Temw	Water Temw	Sky
A	8/16/40	1:30 PM	79.0 F	68.0 F	Bright,clear
B	8/16/40	2:15 PM	80.0	67.0	" "
C	8/16/40	3:00 PM	81.5	67.0	" "
D	8/16/40	11:45 AM	73.0	61.5	" "

Pool Grade:

Sta	Dist (mi)	Resting Pools	Resting Pools/Mi	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6	Ttl
Mth-A	2.0	6	3.0	2 33.0		4 67.0		6	12
A-B	5.0	12	2.4	8 67.0	3 25.0	1 8.0		3	15
B-C	5.2	11	2.1	6 55.0		5 45.0		4	15
C-D	2.8	11	4.0	8 73.0		3 27.0		10	21
Total	15.0	40	2.7	24 60.0	3 7.5	13 32.5		23	63

Note : The S1 pools are excellent, deep, rock-protected resting pools.

Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
Mth-A	2.0	85'	42.5'	War Dept. map
A-B	5.0	150'	30.0'	U.S.G.S. Quad.
B-C	5.2	165'	31.7	" "
C-D	2.8	100'	35.7'	" "

Note : Altitudes, estimated from contour maps and water supply papers, are as follows: Mouth - 615'; Sta. A - 700'; Sta. B - 850'; Sta. C - 1,015'; Sta. D - 1,115'.

The elevation at the mouth is from U.S.G.S. Water Supply Paper #349.

The gradient continues 30-40' per mile for approximately 4 miles above Sta. D, and then increases quite rapidly in the narrow valley and canyons of the mountains above.

The highest tributary, Battle Axe Creek, rises on the slopes of Battle Axe Mountain at al elevation of 4,000-4,500', approximately 15 miles above Sta. D.

Tributaries:

All tributaries below the falls have a very small summer flow, or are even intermittent. None are over 2-3 miles long and have quite a steep gradient, with the exception of Elkhorn Creek which is 7-8 miles long but also has a small summer flow. Tributaries above the falls are all inaccessible.

1. Canyon Creek, left bank
2. Cougar 'Creek, left bank
3. Big creek, left bank
4. Sinker Creek, left bank
5. Little Sinker Creek, left bank
6. Elkhorn Creek, right bank

-------Impassable Falls-------

7. Evans Creek, left bank
8. Henline Creek, left bank
9. Dry Creek, left bank
10. Pearl Creek, right bank
11. Cedar Creek, right bank
12. Stack Creek, left bank
13. Tin Cup Creek, left bank
14. Horn Creek, left bank
15. Gold Creek, left bank
16. Stony Creek, right bank
17. Battle Axe Creek, left fork
18. Opal Creek, right fork

Blowout Creek

River System: Willamette River
stream Surveyed: Blowout Creek, tributary to North Santiam River

Date of Survey: July 18, 1938 by Parkhurst.

Source: Rises from mountain streams in Coffin and Scar Mt. area in. S33, T11S, R6E

Direction of Flow: Northeast to the left bank of the Santiam 4 miles above the Detroit Dam site.

Total Length: 12 miles, 4 miles surveyed.

Station Location:

St	Location	Map Location	Width	Depth
A	End of first mile	*T10S-T11S,R5-6E	36.0'	5"
B	End of second mile	*T10S-T11S,R5-6E	25.2'	3'

* Stations are presently inundated by Detroit Lake.

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
Mouth-A			54.8		25.6		10.0		9.6
A-B			71.3		18.4		6.3		4.0
Totals			61.5		22.6		8.3		7.6

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	% Usable
Mouth-A			7,270	35.6	1,600	7.8
A-B			3,440	24.7	300	2.0
Totals			10,710	30.9	1,900	5.5

Spawning Area Unavailable and Unusable: None

Character of Watershed:

	A-B
Mountainous	X

Character of Watershed (cont):

	A-B
Hilly	
Rolling	
Flat	
Swampy	
Wooded	X
Open	
Cultivated	0%

Diversions: None

Artificial Obstructions: None

Natural Obstructions:

1. Located at 3,100 paces, falls and cascades impassable to salmon.

Fluctuation in Water Level: 3-6 feet variation

Pollution: None

Fish (salmon): None seen nor reported, very few steelhead enter the stream.

Fish (other than salmon):

Species	Date	Very Abundant	Abundant	Fair	No.	Scarce
2-3" Rainbow fingerlings			X			

General Remarks:

Blowout Creek flows through narrow valley below to box canyon above. Banks 6-30 feet steep and composed of rock and some earth. This stream is closed to fishing. The Oregon State Hatchery at Detroit report no Chinook in Blowout Creek and only a few steelhead.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
A	7/18/38	1:30 PM	84 F	53 F	Bright
'B	7/18/38	3:30 PM	82	53	Bright

Pool Grade:

Station	Total Pools	S1T1 %	S1T3 %	S2T1 %	S2T3 %	S5T1 %	S5T3 %
Total	45	6.7	8.9	8.9	15.6	42.2	17.7

Gradient: steep, too steep for spawning

Breitenbush River

River System: Willamette River
Stream Surveyed: Breitenbush River, tributary to North Fork Santiam River

Date of Survey: September 27-29, 1937 by Lobell, Hanavan, Baltzo, Kolloen

Source: Confluence of North and South Forks of Breitenbush River (NW4,S21,T9S,R7E)

Direction of Flow: Flows southwest to confluence of North Santiam, two miles southwest of Detroit, Oregon

Total Length: 13.6 miles, all surveyed

Station Location:

St	Location	Distance Above Prev. Station Yds	Miles	Distance Above Mouth Yds	Miles	Map Location	Width	Depth
M	Confl N Fk Santiam	--			---	S10,R5E,T10S	--	--
A	Highway bridge 2 mi SW of Detroit		0.2		0.2	SW4,SE4, S10,R5E,T10S	100'	1.5'
B	French Cr br.		3.0		3.2	S2,T10S,R5E	55'	5.5'
C	Breitenbush rd crossing between Byars & Deadhorse Cr		3.3		6.5	NW4,SE4 S29,T9S,R6E	44'	2.0'
D	Eagle rock br.		3.1		9.6	S24,T9S,R6E	49'	14.0"
E	Breitenbush Forest Camp		2.4		12.0	SE4,NE4 S19,T9S,R7E	78'	10.0"
F	Confl N & S Fks		1.6		13.6	S20,T9S,R7E	45'	12.0"

EPA River Reach Codes:

Station	HUC	SEG	Rmi
E	17090005	0028	4.37
F	17090005	0028	6.00

Stations A-D are presently inundated by Detroit Lake

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
A-B			60		22		14		4

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

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
B-C			61		22		10		6
C-D			54		28		15		3
D-E			62		23		13		1
E-F			58		24		13		5
Total			59		24		13		4

Spawning Area Usable and Available:

Station	Distance vds	Distance miles	Area (yd^2)	Available Spawning Area (yd^2) (MR&SR)	% Avail	Usable Spawning Area (yd^2)	% Usable
A-B				42,954	36		
B-C				34,306	32		
C-D				31,720	42		
D-E				19,590	37		
D-F				18,740	43		
Total				147,310	37		

Spawning Area Unavailable and Unusable: Between stations E-F, 1,310 yds above Station E, 10,360 square yards.

Cause of Unavailability: Power dam, unsuitable at low water

Character of Watershed:

Mountainous	X
Hilly	
Rolling	
Flat	
Swampy	
Wooded	X Partly logged & burned off
Open	
Cultivated	0%

Diversions: Power diversions only

Diversion 1: 1,310 paces above Station E (SW4,NE4,S20,T9S, R7E) Dr. Skiff's Health Resort, Breitenbush Hot Springs, Oregon. Flow 85 cfs (varies) power flume, left bank, width 6', depth 4', water depth 18". Constructed of wood, wooden headgate, concrete abutments. Power wheel 70 yds below dam, slow speed wheel. Dam of log and rock construction. Drop 4.5', spill 3", crest 55,. Upstream wooden apron 10 degree angle, 4' long. No ladder but possibility of one being constructed on right side of dam. No screen in headgate, except trash rack. Passable with difficulty at high water, impassable at low stages, all returned to stream at power house. No bad trap to migrants but offers barrier at low water to spawners.

Diversion 2: 1,847 paces above Station E (500 yds upstream from above), Bruckman's Resort. 'Flow 60 cfs, power dam and flume right bank. Dam of log and rock construction with log abutments. 3' drop normally. Has flash boards adding 1, to the drop. Flashboards located 12, upstream from main dam with wooden apron between. 4, drop during low water, crest 60', spill about 2". Wooden headgate right bank with 1" wooden grizzly. Wooden flume 4, wide and 4, deep, 3.5, water depth, 500 feet long to power house. Total drop of 17, in the power house, wheel 280 rpm. Wooden headgate at power house, passable with great difficulty at low water, not bad trap for migrants, all water returned to stream at powerhouse.

Artificial Obstructions:

1. 1,310 paces above Station E, log and stone power dam, 4.5, high, no protective devices.

2. 1,847 paces above Station E, log and stone power dam, 4, high and low water, 3' high at high water, no protective devices.

3. Fish racks on Breitenbush River.

General Remarks: See "Diversions" for full description and possibility of fish ladders.

Natural Obstructions:

1. 2,000 paces above Station A, bedrock chute, 6, and 12, long and 6, wide. Passing difficult in low water.

Natural Obstructions (cont):

2. Mouth of French Creek, log jam 300 yds long, passing difficult at present.

3. 3,400 paces above Station B, bedrock falls, 45 degrees, drop 5', jump 7', passing difficult at present.

Fluctuation in Water Level:

Feet Variation: 6' at USGS gauging station, 1.5 miles above French Creek. 15' in the canyon.

Cause of Variation: spring runoff and rains

Stream Volumes:	Station D	9/29/37	160 cfs
	Station E	9/28/37	159 cfs

Pollution: None

Fish (salmon): Three chinook (Onchorynchus tschawytscha) spawners noted between stations D-E on 9/28/37.

Fish (other than salmon):

Species	Date	Very Abundant	Abundant	Fair	No.	Scarce
Trout fry	9/27/37		X			
Whitefish	9/27/37			X		

General Remarks:

Surveyed was the distance from the mouth of the Breitenbush River to the confluence of the north and south forks, approximately 13.6 miles. It was all surveyed on September 27-29, 1937 by investigators Lobell, Hanavan, Baltzo and Kolloen.

Topography

The watershed which the Breitenbush drains has an area of about 108 square miles. Although most of the region is rugged and mountainous, some parts can be classified as hilly. Most of the country is of volcanic origin. There are large areas of scab-rock

General remarks **(cont):**

formations and bedrock. The river flows through a narrow valley varying from 0.5 mile in width in the lower part to a steep sided canyon 100 feet in width in the upper section. The upper part again widens into a valley of about 200 yards. The valley is V-shaped in the lower part with a flat or moderate floor to a V-shaped valley with practically no floor further upstream.

In some stretches in the upper area box canyons occur. Mountains bounding the watershed rise to an elevation of about 4,100 feet, the elevation of the stream being around 1600-1800 feet. The watershed below Humbug Creek has been logged and burned over and supports only bushes of vine maple and scatterings of other brush and clumps of scattered conifers. Above Humbug Creek, the ridges are covered with virgin forests of fir, cedar, and hemlock. Pines are found on the higher levels. Numerous hot springs and mineral springs occur in the upper part of the watershed and there are two large resorts in that area.

Character of the Stream

Good spawning areas are generally lacking in the Breitenbush River. Such patches as do occur are small and spotty usually. There are, however, areas of from 25-40 sq yds at the downstream end of each S1 pool which can be utilized.- Although 32-43% of the bottom is MR and SR, the swiftness of the water and the scattered condition of the good gravel cuts the amount of available ground considerably. In spite of the fairly steep gradient, large pools are common and offer good resting places. Adequate cover is found practically throughout, provided by marginal thickets of maple, alder and willow. Numerous tributaries flow into the Breitenbush but few are large enough to support fish. Springs discharge a considerable amount of water into the river, particularly in the upper half of the stream. A volume of about 160 cfs was recorded on 9/29/37 near Station D. A crest of 8,100 cfs was recorded in December 1934.

Banks of rubble and earth are most general, but there are some bedrock banks also. The slope varies from 60 degrees to a sheer cut. Although there is a considerable fluctuation in water level, there is little erosion except for a few cut banks. The bank height varies from 15'-200'. Several fairly important potential natural obstructions may be listed. These consist of bedrock chutes and falls varying in height from 5-6' and a large log jam. The chutes were reported to be passable with difficulty at low water and, since fish were found above, this is possible. The log jam, at the mouth of French Creek was no barrier when seen but it was potentially very dangerous since at each high water it is augmented by fresh drift and logs. It is but a matter of time until it will be able to obstruct fish. The log jam occurs in a narrow bedrock gorge and is about 200-250 yards long and about 25'

General remarks **(cont):**

high. Two artificial obstructions are located in the upper end of the stream. These are both power dams used to provide a head of water for power for resorts in the vicinity. Although not serious barriers during high water, they are definitely barriers at low water because of the limited amount of water passing over the aprons of the dams. There are no fish protective devices in either one. Downstream migrants would not be harmed excessively since pressures are not great and the turbine wheels are slow speed. In spite of considerable water fluctuation, there is no flood plain because of the precipitous nature of the banks and stream. A USGS gaging station is located 1.5 miles above the confluence of French Creek. Water temperatures varied from 455.5 F to 51 F with air temperatures 47 to 56 on 9/29/37.

Fish Population

In the entire area surveyed, only Spring Chinook were observed. One nest was also seen. Trout ant salmon fry were found to be abundant in the lower part of the river but became scarcer upstream. up to 1934, steelhead in large numbers ascended the Breitenbush and were reported as far upstream as the Breitenbush Hot Springs. Since 1934, however, the run has dwindled to practically nil. Trout were also abundant at one time but over-fishing has reduced the populations and size of the individual fish. Undoubtedly, the construction of the two power dams on the stream has contributed to the decline of the fish populations. The Oregon State Fish Commission maintains racks and an egg taking station at the mouth of the Breitenbush. This was washed out in June 1937 and one dead steelhead was found near the racks. There were less than 500 fish observed between the racks during September. Since practically the entire area of good spawning gravel lies between the two dams, it is problematical whether or not spring chinook ascended the river very far above the survey. Primarily, the Breitenbush should be a good steelhead and trout stream. Because of it ready accessibility the river can be and is heavily fished. Great numbers of large pools offer'good protection to fish and other physical factors are also favorable. If devices were installed at the dams and the log jam at French Creek, cleaned out salmon would be able to ascend the river to the region above the springs where there is a large area or good gravel. However, under the present setup all fish (theoretically) are detained at the mouth by the racks. A few whitefish were observed below the French Creek log jam.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
A	9/29/37	2:05 PM	56 F	51 F	Cloudy
B	9/29/37	1:45 PM	56	49	Cloudy
C	9/29/37	1:30 PM		no data	
D	9/29/37	10:15 AM	47	45.5	Cloudy
E	9/28/37	3:30 PM	53	47.5	Clear
F	9/29/37	12:40 PM	49	46	Cloudy

Pool Grade:

Sta	Dist (mi)	Rest Pools	Rest Pl/Mi	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6	Total
M-A	0.2			no pool data was recorded					
A-B	3.0	35	11.7	10 28.6	2 5.7	10 28.6	13 37.1	274	309
B-C	3.3	189	57.3	61 32.3		128 67.7		399	588
C-D	3.1	19	6.1	3 15.8	8 42.1	2 10.5	6 31.6	10	29
D-E	2.4	19	7.9	4 21.1	3 15.8	3 15.8	9 47.3	2	21
E-F	1.6	57	35.6	11 19.3		46 80.7		180	237
Tot	13.6	319	23.4	89 27.9	13 4.1	189 59.2	28 8.8	865	1,184

Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
A-B	3.3	150'	45'	
B-C	3.3	300'	91'	
C-D	3.1	240'	77'	
D-E	2.4	160'	70'	
E-F	1.6	120'	76'	

Tributaries:

1. Tumble Creek, LB, 2 cfs, steep, will all be used for sawmill.
2. French Creek, LB, 6-7 cfs, impassable, 14' falls, 2.5 mi from mouth, immense log jam at mouth.
3. Canyon Creek, LB, very small, steep and impassable.

Tributaries **(cont):**

4. Wind Creek, RB, 2-3 cfs, very steep, impassable, ravine canyon.

5. Byars Creek, LB, 8-10 cfs, steep, short, probably spring fed.

6. Deadhorse Creek, LB, 1 cfs, steep, V-shaped ravine, torrential.

7. Slide Creek, RB, 2-3 cfs, steep and impassable.

8. Humbug Creek, LB, 12 cfs, solid bedrock bottom, steep earth banks, second growth timber, marginal vegetation, dense sparse spawning area.

9. Cliffs Creek, RB, l-2 cfs.

10. Cultus Creek, RB, very small.

11. Fox Creek, LB, 1 cfs, steep ravine torrential gradient.

12. Scorpion Creek, LB, 2 cfs, steep ravine, series of falls at mouth, impassable, second growth timber.

13. Leone Creek, RB, very small, steep, impassable, drains Leone Lake.

14. Hill Creek, RB, 2-3 cfs, steep.

15. Short Creek, LB, 1 cfs, same type as Scorpion Creek.

16. Mansfield Creek, LB, 3 cfs, similar to Scorpion Creek.

17. Devils Creek, RB, 4-5 cfs, to be further investigated.

18. North Fork Breitenbush, see survey write-up.

19. South Fork Breitenbush, see survey write-up.

North Fork Breitenbush River

River System: Willamette River
Stream Surveyed: North Fork Breitenbush River, tributary to North Breitenbush River

Date of Survey: September 28, 1937 and July 18, 1938

Source: Breitenbush Lake, Mt. Hood National Forest, Marion County, Oregon, 6 mi north of Mt. Jefferson, NW4,S25,T9S,R8E.

Direction of Flow: Flows west from source, flows through Mt. Hood and Willamette National Forests, Marion County, Oregon. Joins South Fork near Breitenbush Hot Springs.

Total Length: 10 miles, 6.3 miles surveyed.

Station Location:

St	Location	Distance Above Prev. Station Yds	Miles	Distance Above Mouth Yds	Miles	Map Location	Width	Depth
AA	Mouth, confl N & S-Forks	---		---		NW4,S20 T9S,R7E	36'	12.0"
BB	Gravel pit at end of road marked "N Breitenbush R"		3.9		3.9	N1/2,S14 T9S,R7E	36'	
CC	2.4 mi above BB		2.4		6.3	S1/2,S17 T9S,R7E	25'	10.9"

EPA River Reach codes:

Station	HUC	SEG	Rmi
AA	17090005	0030	0.00
BB*	17090005	0030	4.12
cc*	17090005	0030	6.76

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
AA-BB			35.0		28.0		23.0		14.0
BB-CC	35,000		35.2		46.2		17.2		1.4
Total	35,000	12,350		16,210		6,030		410	

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	% Usable
AA-BB			29,800	51.0		
BB-CC			22,240	63.5	7,570*	21.7*

*Estimated

Spawning Area Unavailable and Unusable: None

Character of Watershed:

Mountainous	X
Hilly	
Rolling	
Flat	
Swampy	X
Wooded	X
Open	
Cultivated	0%

Diversions: None

Artificial Obstructions: None

Natural Obstructions:

Log jams and debris located throughout survey area, 2-4' high, passable with difficulty.

Fluctuation in Water Level:

Feet variation: 3-6 feet

Cause of Variation: runoff and rains and height of Breitenbush Lake

Fluctuation in Water Level (cont):

Stream Volumes:	At BB	9/28/37	35.0 cfs
	At AA	7/17/38	72.6 cfs

Pollution: None

Fish (salmon): None

Fish (other than salmon):

Species	Date	Very Abundant	Abundant	Fair	No.	Scarce
Trout (very small)	9/28/37				X	

General Remarks:

The North Fork of the Breitenbush River was surveyed from the South Fork confluence to a gravel pit approximately 4 miles upstream on 9/28/37 and 2.3 miles above same on 7/18/38.

Topography

The watershed of the North Fork is mountainous and very heavily wooded. It is of volcanic origin. The upper ridges have extensive areas of scabrock and volcanic debris. Ridges as high as 4800 feet rise from the stream valley which is very'narrow, not exceeding 500 yards in the widest place and generally much narrower. The flats are densely covered with maple, alder, willow, and devil's club with occasional specimens of hemlock, cedar and fir. The highest benches support fir, red cedar, and pine. The upper levels have scatterings of yellow pine, white pine and an occasional sugar pine. Numerous springs are found throughout the region, both hot springs and cold springs. The entire area is located in National Forest land.

Character of Stream

51% of the bottom is good spawning gravel. Excellent riffles are common throughout and pools are also found to be in numbers. Although the gradient is steep in areas, numerous channels and backwaters offer quiet water for spawners. Considerable erosion and bank cutting takes place in high water. The entire valley is a mass of channels crisscrossed with downlogs and debris. None of these obstructions, however, are barriers. A flow of 35.2 cfs was measured at the terminus of the 1937 survey (Station BB). This volume, no doubt, is increased tremendously during spring snow

General remarks (cont):

runoff. The stream varies from 30 feet in width near the mouth to 18 feet in other places. The valley is mostly U-shaped but in places becomes a V-shaped ravine with steep dirt and rubble sides. Practically no bedrock is to be found on the stream.

Fish Population

No salmon were observed although this stream should be ideal to any salmon running up the Breitenbush. A fisherman's catch of small cutthroat was noticed. The stream, though comparatively difficult of access, is heavily fished by anglers. If a consistent stocking policy were initiated and carried through, coupled with sufficient regulation and improvement of barriers on the Breitenbush, this stream should be able to support a large population of salmon and trout.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
BB	7/17/38	2:00 PM	83 F	54 F	Clear

Pool Grade:

Sta	Resting Pools	Resting Pools/Mile	S2T1 %	S2T2 %	S2T3 %	S3T1 %	S3T2 %	S3T3 %	S6	Ttl
AA-BB	177	44.2	7	1	84	5	78	2	206	382
(4.0 mi)			1.8	0.3	22.0	1.3	20.3	0.5	53.8	
BB-CC	4	1.7	4						33	37
(2.3 mi)			11.0						89.0	
Total	181	30.2	11	1	84	5	78	2	239	419
(6.3 mi)			2.6	0.2	20.0	1.2	18.6	0.4	57.0	

-Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
AA-BB	4.0	300'	75'	

Tributaries:

1. Rapidam Creek, 1.3 mi above Forest Guard Station, 1 cfs, steep.

South Fork of Breitenbush River

River System: Willamette River
Stream Surveyed: South Fork of Breitenbush River, tributary to Breitenbush River

Date of Survey: July 14-15, 1938

Source: Mountain streams from glaciers on Mt. Jefferson

Direction of Flow: Rises in S10,T10S,R8E, flows NE to confluence with north fork

Total Length: 8 miles, 1.7 miles surveyed

Station Location:

St	Location	Distance Above Prev. Station Yds	Miles	Distance Above Mouth Yds	Miles	Width	Depth
M	Confl w/ Breitenbush R.			---		31.5'	*
A	End of survey		1.7		1.7	32.1'	*

* Average width 39', average depth 13.5", flow 106 cfs.

EPA River Reach Codes:

Station	HUC	SEG	Rmi
M	17090005	0029	0.00
A	17090005	0029	0.00

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
M-A			52.6		34.3		11.0		2.1

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	% Usable
Total			14,430	45.3	6,800	21.5

Spawning Area Unavailable and Unusable: None

Character of Watershed:

Mountainous	X
Hilly	
Rolling	
Flat	
Swampy	
Wooded	X Densely
Open	
Cultivated	0%

Diversions: None

Artificial Obstructions: None

Natural Obstructions: 1. 2,100 paces above mouth, falls, 12' high, impassable

Fluctuation in Water Level: Feet Variation: 4-6'

Pollution: None

Fish (salmon):

None were observed but were reported common before the State fish racks were put in.

Fish (other than salmon):

Species	Date	Very Abundant	Abundant	Fair	No.	Scarce
Rainbow	7/14/38				X	

General Remarks:

The canyon is narrow and steep with high heavily forested mountains on each side. Vegetation is dense consisting of typical fir forest growth.' The stream has a fast gradient such that cascades and small falls are common. The bottom was made up of 50% LR, 35% MR and 10% SR. The estimated spawning area was small in reference to the amount of medium and small rubble due to the fast current and percentage of boulders and bedrock. A 12' impassable falls was located 1.7 miles above the mouth. Fishing intensity is high due to the nearby resorts.

Temperature Data: None

Pool Grade:

Station	Distance (mi)	Resting Pools	Resting Pools/Mile
Total	1.7	77	45

Gradient: No data available, classified as steep.

Marion Fork

River System: Willamette River
Stream Surveyed: Marion Fork, tributary to North Santiam River

Date of Survey: September 24, 1937 by Baltzo & Kolloen

Source: Outlet of Marion Lake near summit of Cascade Mt., S2, T12S, R71/2E.

Direction of Flow: Flows northwest from source to confluence with North Santiam River in S15, T11S, R7E.

Total Length: 7 miles

Station Location:

St	Location	Distance Above Prev. Station Yds	Miles	Distance Above Mouth Yds	Miles	Map Location	Width	Depth
A	Confluence with North Santiam		---		---	S15,T11S R7E	50'	12'
B	Gooch(Gatch)Falls		3.4		3.4	S35,T11S,R7E	27'	falls

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090005	0023	0.00
B	17090005	0023	3.42

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
A-B			40.2		36.8		19.6		3.4

Spawning Area Usable and Available:

Station	Distance yds	miles	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	% Usable
A-B		3.4		50,180	56.4		

Note: About half the spawning area is unsuited on account of swift current.

Spawning Area Unavailable and Unusable:

Cause of Unavailability: River above impassable 40' Gooch Falls unsurveyed.

Character of Watershed:

	A-B
Mountainous	X
Hilly	
Rolling	
Flat	
Swampy	
Wooded	X
Open	
Cultivated	None

Diversions: None

Artificial Obstructions: None

Natural Obstructions:

1. Sta. B; Gooch Falls; 40' sheer drop;impassable at all times.

Fluctuation in Water Level:

Cause of Variation: Melting of snow in mountainous watershed.

Stream Volumes: Sta. A - September 27, 1937 - 120 cfs
Stream bed covered. No wash at all.

Feet Variation: Practically none; steep gradient and flat banks carry off excess water with very little rise. Large lake at source controls run off. Fluctuates only 12" to 18" in restricted gorge near falls.

Pollution: None

Fish (salmon):

Species: Spring Chinooks

Estimated Number (Spawners):

Station	Number	Date
A-B	6	9/37 (visibility very poor)

Fish (other than salmon): None observed.

General Remarks:

Length of survey - 3.4 miles from mouth to Gooch Falls.

Topography

The entire watershed of Marion Fork is near the top of the Cascade Range. It is heavily wooded with large second growth conifers. The underbrush is comparatively open. The river valley is from 1 to 2 miles wide and has a flat floor. The left hand side of the valley is bordered by rock cliffs, but the mountains on the right have a more moderate slope. In 1937, two logging outfits were engaged in taking out some of the large timber in the valley.

Character of Stream

Although the bottom of the stream contains much excellent spawning gravel, half of it is useless because the current is too swift. There are few large pools to break the rapid descent. The earth banks are flat and seldom much above the stream level. Many cross connecting channels wind about the flat valley floor and new channels are often cut through the underbrush. The marginal vegetation consists of large conifers and dense thickets providing plenty of shelter for fish along the edges. Where logging is being carried on, the stream is filled with debris. There is very little fluctuation, as the steep gradient and the flat banks permit the water to run off and spread out quickly.

Fish Population

Only six salmon were seen on the survey during the height of the run, but many more could have been present because of the poor visibility, dense vegetation and numerous channels. The run is probably small, however, as there is very little useable spawning -area. No information was obtained about the trout fishing, but here again the lack of pools and quiet areas would keep down the population. Little evidence of fish or fishermen was noted on the survey.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
A	9/27/37	12:30 PM	66.0 F	48.0 F	clear

Pool Grade:

Sta	Resting Pools	Resting Pools/Mile	S1T1 %	S1T2 %	S1T3 %	S2T1 %	S2T2 %	S2T3 %
A		17	5	2	12	29	3	17
			3.0	1.0	7.0	17.0	2.0	10.0

Sta	Resting Pools	Resting Pools/Mile	S3T1 %	S3T2 %	S3T3 %	S5T1 %	S5T2 %	Total
A		17	12	2	5	6	6	58
			7.0	1.0	3.0	4.0	4.0	

Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
A-B	3.4	550'	162,	Topographical map

Tributaries:

1. Willis Creek, 1,000 yds above Sta. A, left bank, 1* S'ec. ft.
2. Puzzle Creek, 4,700 yds above Sta. A, left bank, 45* Sec. ft.
3. Moon Creek, 5,100 yds above Sta. A, left bank, 2* Sec ft.

*Note: All flows estimated on 9/27/37.

Puzzle Creek

River System: Willamette River
Stream Surveyed: Puzzle Creek, tributary to Marion Fork

Description:

Puzzle Creek enters the left bank of the Marion Fork 2.6 miles above its confluence with the North Santiam River. Its source is near the summit of the Cascade Range on the south slope of Mt. Jefferson, and its direction of flow is west.

On September 27, 1937, the flow was estimated at 45 cfs. The lack of any wash indicated that the flow is quite uniform throughout the year. A short distance above its mouth, Puzzle Creek falls over a high, bedrock cliff, an impassable barrier to all migrating fish. The entire stream is torrential in character, being a long series of cascades and falls over large boulders.

Remarks: No available spawning area.

White Water Creek

River System: Willamette River
Stream Surveyed: White Water Creek, tributary to North Santiam River

Description:

Flows westerly from its glacial source on the west side of Mt. Jefferson to its confluence with the left bank of the North Santiam, about 11 miles above Detroit. The water is usually milky with glacial silt, so that it is only during cold weather that the bottom is visible. The bottom, too, is heavily covered with solidly packed silt. The gradient is steep and the bottom chiefly large rubble, so there is very little spawning area, if any.

On September 27, 1937, the flow was measured at 52 cfs. The air and water temperatures at 11:30 am (clear) were 53.0 F and 42.5 F respectively. The fluctuation amounts to as much as a 4, rise in stream level.

Fish Population:

No salmon run has ever been reported in White Water Creek. There do not seem to be any resident fish in the stream at all. Although trout fishing is fairly good in the Cheat Creek tributary.

Remarks:

Logging operations were being carried on in the valley of White Water Creek below Cheat Creek in 1937. Consequently, the stream was full of debris and its nature was constantly being altered in this section. Above Cheat Creek, it is reported that there is but little timber, so the logging will not extend that far.

South Santiam River

River System: Willamette River
Stream Surveyed: South Santiam River, tributary to Santiam River

Date of Survey: August 3-13, 1940 by Investigators Zimmer and Frey; September 15-16, 1937.

Source: Cascade Range, R4-5E,T13-14S

Direction of Flow: Flows NW to confluence with north fork

Total Length: Approximately 60 miles

Note: The data is combined from two surveys. The 1940 survey covered St A through St G. The 1937 survey 'continued upstream from St H through St N.

Station Location:

St	Location	Distance Above Prev. Station Yds	Miles	Distance Above Mouth Yds	Miles	Map Location	Width	Depth
A	Confl with north fork	---		---		S24,T10S R3W	100'	2.0'
B	Junction of Crabtree Creek		4.5		4.5	S27,T10S R2W	200'	5.0'
C	Highway bridge near town of Crabtree		4.6		9.1	T11S,R2W	140'	8.0'
D	Hwy br. Lebanon		10.1		19.2	T12S,R2W	220'	5.0'
E	Highway bridge at Waterloo		4.9		24.1	S33,T12S R1W	150'	5.0'
F	McDowell Cr. br		4.5		28.6	S11,T13S,R1W	120'	2.5'
G	Highway bridge at Sweet Home		6.4		35.0	S31,T13S R1E	120'	8.0'
H	Bridge at Foster		4.7		39.7	S26,T13S,R1E	150'	8.0'
I	Confl Middle Fk		1.8		41.5	S25,T13S,R1E	55'	9.0"
J	Bridge at Cascadia Ranger Station		7.7		49.2	S36,T13S R2E	56'	6.0'
K	Cascadia Bridge (Dobbin Creek)		1.6		50.8	S25,T13S R3E	46'	8.4"
L	Hwy Bridge, 5 mi above Cascadia		4.5		55.3	S36,T13S R3E	22'	9.4"
M	Fernview Frst camp		5.3		60.6	S27,T13S,R4E	34'	9.0"
N	Impassable falls, 1.5 miles above Soda Fork		2.3		62.9	S31,T13S R5E	10' falls	18.0' falls

EPA River Reach Codes:

Station	HUC	SEG	Rmi
B	17090006	0005	0.00
C	17090006	0005	2.37
D	17090006	0006	4.46
E	17090006	0007	0.42
F	17090006	0007	5.42
G	17090006	0008	4.17
J	17090006	0017	5.49
K	17090006	0017	7.43
L	17090006	0020	0.00
M	17090006	0020	7.73
N*	17090006	0021	1.46

* Station location is not definite and has been estimated

Character of Bottom **Between Stations:**

Sta	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
A-B	392,573	3,877	1.0	148,161	38.0	110,503	28.0	64,360	16.0
B-C	325; 998	2,800	1.0	97,237	30.0	63,309	19.0	91,819	28.0
C-D	636,332	13,615	2.0'	295,935	46.0	133,365	21.0	88,585	14.0
D-E	483,504	61,452	12.7	205,291	42.5	132,612	27.4	84,149	17.4
E-F	366,826	67,512	18.4	162,566	44.3	82,115	22.3	43,966	12.0
F-G	478,105	110,398	23.0	193,866	40.0	100,741	21.0	57,100	12.0
Tot	2,683,338	259,654	9.7	l/103,056	41.1	622,645	23.2	429,984	16.0

Sta	Percentages of L.R.	M.R.	S.R.	M&S	Sta	Percentages of L.R.	M.R.	S.R.	M&S
G-H	29.7	20.5	24.4	25.4	K-L	51.5	25.1	20.3	3.1
H-I	33.0	30.5	23.9	12.3	L-M	44.4	29.9	22.7	3.0
I-J	43.9	14.4	20.8	20.8	M-N	65.4	20.6	13.6	0.4
J-K	43.6	18.4	26.1	11.9	N-End	30.2	32.1	33.4	4.3

Station	Water too Dirty/Deep to Determine	%
A-B	65,666	17.0
B-C	70,834	22.0
C-D	104,832	17.0
E-F	10,667	3.0,
F-G	16,000	4.0
Total	267,999	10.0

Spawning Area Usable and Available:

Station	Distance yds	Distance miles	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	% Usable
A-B	8,090	4.6	392,573	258,664	65.9	9,448	2.4
B-C	8,100	4.6	325,998	160,546	49.2	9,611	3.0
C-dry area that is 500 yds long (1,600 yds below D)							
	15.650	9.8	576,999	379,835	65.8	42,927	7.4
Total	31,840*	18.1*	1'295,570	799,045	61.7	61,986	4.8

*Total distance is 32,340 yds or 18.4 mi after adding 500 yd dry area

Station	Available Spawning Area (yd^2) (MR&SR)	Percent Avail.
G-H	139,680	44.9
H-I	55,760	54.5
I-J	82,960.	35.2
J-K	22,940	44.5
K-L	44,110	45.4
L-M	65,640	52.6
M-N	16,180	34.2
Total	427,270	44.0

Spawning Area Unavailable and Unusable: No data available for either survey

Character of Watershed: No data available for Stations A-G. The following data correlates to Stations G-N.

	G-H	H-I	I-J	J-K	K-L	L-M	M-N	N-END
Mountainous				x				
Hilly					X	X	X	X
Rolling								
Flat	X	X						
Swampy								
Wooded	X	X	X	X	X		X	X
Open	X(partially)							
Cultivated	1%	1%						

Diversions: No data available

Artificial Obstructions: No data available

Natural Obstructions: None for stations A-G. Six obstructions between stations G-N.

1. 2,500 yds above Sta. I; 6′ high falls; impassable at low water.
2. 2,875 yds above Sta I; 5-6′ high falls; passable with difficulty.
3. 3,700 yds above Sta. I; series of falls 3-6′ high; difficult at low water.
4. 5,300 yds above Sta. K; 5′ high broken falls; difficult at low water.
5. At Sta. M; 18′ high falls over slanting bedrock; impassable at low water.
6. At Sta. N; 20′ high falls over slanting bedrock; difficult at low water.

Fluctuation in Water **Level:**

Feet Variation: At Waterloo - 13′ fluctuation 1938

Cause of Variation: very fast runoff; steep gradient above Sweet Home.

Stream Volumes:

At Waterloo:

Average discharge 16 yrs (1905-6, 1923-38)	2,764 cfs	
Maximum discharge 1938	37,600 cfs	6/22/38
Minimum discharge 1938	116 cfs	9/28/38

At Robertson's farm between Waterloo and McDowell Creek bridges:

Measured stream flow	176 cfs

At first bridge above mouth:

Measured flow	418 cfs
Width 150′, mean depth 3.39′	

No data available for Stations G-N.

Pollution:

(a) Waste water from the Lebanon Paper Mill and sewage from

Pollution (cont):

the town of Lebanon unite and enter the South Santiam River 3,300 yds below the Lebanon Bridge. Type of pollution: chemical waste from the paper mill and city's sewage from Lebanon.

(b) At St. G, town of Sweet Home; sewage disposal into stream. Pollution slight, probable very little effect on fish.

General Remarks:

(a) From the mouth of the South Santiam upstream to a point 3,300 yds below the Lebanon bridge the stream is very much discolored and very foul smelling. The rubble in the riffles is covered with a thick gelatinous layer of foreign material and in a great many instances the water in the pools is too dirty to permit estimation of the depth. A great many dead suckers and lampreys were found.

Fish (salmon):

Only one chinook salmon was sited between stations A-G at 3,750 yds above Lebanon Bridge.

Species: Spring Chinook

Between Stations	Number	Date
G-H	17	9/15/37
H-I (numerous nests)	1	9/16/37
I-J	104	9/16/37
J-K	17	9/15/37
K-L	66	9/15/37
L-M	32	9/16/37

Fish (other than salmon):

Species	Date	Very Abundant	Abundant	Fair No.	Scarce
Chubs	8/4-13/40		X		
Suckers	"		X		
Cyprinids	9/15/37		X		
Suckers	9/15/37		X		
Whitefish	9/15/37				X
Small Rainbow	9/15/37		X		
Cutthroat	9/15/37		X		
Silver Salmon	9/15/37			X	

General Remarks:

Topography

Above Sweet Home to the confluence of the Middle Santiam, the South Santiam flows through a flat valley from 2 to 3 miles wide. The watershed is low and rolling and covered with open fields or stands of young second growth. Much of the valley floor is under cultivation. The valley, above the confluence of the Middle Santiam, is usually only 1/4 to 1/2 mile wide. The floor, though narrow, is quite flat and the sides are steep. The watershed in this upper section consists of hills covered with a moderate to heavy growth of young timber, which prevents erosion to any extent. Near the very headquarters at the upper end of the survey and above, the stream enters a high, heavily forested, mountainous area.

Character of the Stream

The section of the South Santiam River from its confluence with the north fork to the place where the stream carrying the waste from the Lebanon Paper Mill and the sewage from the town of Lebanon enters, would be excellent for salmon under normal conditions. At present, the bottoms of the pools and the rubble on the riffles are very heavily coated with foreign material. A great many large suckers were found dead along the shore. The survey notes state the fact that a large school of suckers was observed trying to get into the clean water of a small stream emptying into the river. It is not known what the effects are of this pollution on salmon during the spring high water.

From the place on the South Santiam where the stream carrying the foreign material enters to the dam that is roughly 500 yds below the Lebanon highway bridge, the main stream is practically dry. This dry portion of the stream indicates that nearly all of the water, at least at this time of the year, comes through the papermill ditch. A great many chubs and suckers were stranded in the small shallow pools in the nearly dry section. The bottom of the stream was nearly 100% exposed. The high cut away dirt banks and the debris scattered around and the wide expanse of rubble in evidence would indicate that in time of high water this portion of the stream is not lacking in water.

From the Lebanon bridge upstream as far as Sweet Home bedrock and large rubble are much in evidence. In a great many cases bed rock makes up nearly 100% of the bottom.

Above Lebanon the topography becomes more hilly and bedrock in the banks is much in evidence. At present this stream supports an excellent run of salmon. Whether the run could be increased or not is a matter requiring further study.

General remarks **(cont):**

The South Santiam above the Middle Santiam flows through a bedrock canyon most of the way. Its depth is usually 15-25', but occasionally is less and in some places as much as 60'. Within the walls of the canyon, the stream margins are perfectly open, but above the edges the brush is moderate to dense.

Alder is the chief species of marginal vegetation, with considerable quantities of willow and small conifers. At the time of the survey, from 80-90% of the bottom was water covered. At high water, the river level raised 2-3' upstream and as much as 10-15' below. The gradient is moderate with numerous long, deep pools between the vertical canyon walls, as the run-off is not very rapid. Although the bbttom is principally open bedrock, there are localized areas of excellent spawning gravels. The stream could support a fair run of salmon, but it could never be rated as a first-class spawning stream as there is too much bedrock in most places.

Fish Population

For Stations A-G, chubs and suckers were very abundant all along the stream. Many large schools of large suckers were observed. Only one salmon was seen and trout were very scarce.

Conversations with farmers living near the stream brought out the fact that trout used to be quite abundant in the stream but of late years they have become very scarce. Several men have observed salmon in the spring of the year above Lebanon.

For Stations G-N, Rainbow and cutthroat trout are abundant in the upper reaches of the South Santiam above Cascadia where the water is colder, but they seldom exceed 6" in length. In the lower, warmer portion, cyprinids are numerous. Dace are abundant everywhere. Fishing intensity is moderate, but the lack of large fish keeps this stream from being very popular with anglers.

In 1937, salmon were permitted to ascend the South Santiam unhindered, and a fair run of spring chinooks for this region occurred. Whether or not this is the case in other years, is not known but the chinook fry were fairly numerous in the lower reaches.

Temperature Data:

Station	Date	Hour	Air Temp	Water Temp	Sky
A	8/03/40	2:15 PM	88F	76F	Clear
B	8/04/40	11:00 AM	79	74	Clear
Creek at paper mill	8/05/40	2:10 PM	94	76	Clear
G	9/17/37	10:30 AM	62F	66F	Clear

Temperature Data **(cont):**

Station	Date	Hour	Air Temp	Water Temp	Sky
H	9/17/37	9:50 AM	63	62	Clear
I	9/17/37	9:15 AM	60	63	Clear
J	9/17/37	8:55 AM	56	59	Clear
K	9/17/37	9:00 AM	57	58	Clear
L	9/17/37	11:30 AM	67	58	Clear
M	9/17/37	12:00 PM	74	55	Clear
N	9/17/37	12:30 PM	62	55	Clear

Pool Grade:

Stations A-G surveyed in 1940

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6	Ttl
A-B	4.5	43	9.6	1	21	1	20		43
B-C'	4.6	65	14.1	2.6 9	49.0 23	2.6 10	46.0 23		65
				14.0	35.0	16.0	35.0		
C-D	10.7	64	6.3	10	20	4	30	1	65
				15.0	31.0	6.0	46.0	2.0	
D-E	4.9	21	4.4	2	7	4	9	1	23
				9.0	30.0	18.0	40.0	3.0	
E-F	4.5	29	6.5	2	8	1	18	2	31
				6.4	25.9	3.2	58.0	6.5	
F-G	6.4	36	5.6	2	10	1	23	4	40
				5.0	25.0	2.5	57.5	10.0	
Tot	35.6	259	7.3	26	89	21	123	8	267
				9.7	33.3	7.9	46.1	3.0	

Stations G-N surveyed in 1937

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6	Ttl
G-H	4.7	59	12	17	2	6	16	44	85
				20.0	2.0	7.0	19.0	52.0	
H-I	1.7	63	34	14		24		30	68
				21.0		35.0		44.0	
I-J	7.7	248	32	70	2	55	22	231	380
				18.0	1.0	14.0	6.0	61.0	
J-K	1.5	26	16	8	5	2	11		26
				31.0	19.0	8.0	42.0		
K-L	4.5	72	16	5	45	3	14	5	72
				7.5	62.0	4.0	19.0	8.5	
L-M	5.3	47	95	18	3	11	10	47	89
				11.0	38.0	6.0	23.0	22.0	
M-N	2.3	39	17	3	8	2	7	19	39
				8.0	20.0	5.0	18.0	50.0	
N-END	1.0	17	17	1	11	3	3	2	20
				6.0	65.0		18.0	11.0	
Tot	28.7	571	19.9	136	76	106	83	378	779
				17.5	9.7	13.6	10.7	48.5	

Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
A-B	4.5	29'	6.5'	Oregon, Albany & Lebanon Quadrangles, USGS
B-C	4.6	19'	4.1'	Oregon, Lebanon Quad
C-D	10.1	78'	7.7'	"
D-E	4.9	54'	11.0'	Oregon, Lebanon and Brownsville Quad
E-F	4.4	58'	13.0'	Oregon, Brownsville Quad
F-G	6.4	not available - estimate moderately steep		
G-H		(moderate)		
H-I		(moderate)		
I-J		50' est. (moderate)		
J-K		40-50' est. (moderate)		
K-L		40-75' est. (moderately steep)		
L-M		75' est. (moderately steep)		

Tributaries for Stations G-N, 1937:

1. Wiley creek, right bank, 10 cfs, impassable mill dam near mouth.
2. Middle Santiam, see survey report.
3. Dobbin Creek, right bank, 1 cfs.
4. Wolf Creek, right bank, 1 cfs.
5. Canyon Creek, right bank, *18 cfs.
6. Moose Creek, left bank, 10 cfs.
7. Trout Creek, left bank, 2-3 cfs.
8. Boulder Creek, right bank, 1 cfs.
9. Keith Creek, left bank; 1 cfs.
10. Soda Fork, left bank, *15 cfs.
11. Stewart Creek, right bank, 1 cfs.
12. Elk Creek, right bank, 1 cfs.
13. Sheep Creek, left bank, 5 cfs.

* - flow measured; other estimated.

Thomas Creek

River System: Willamette River
Stream Surveyed: Thomas Creek, tributary of South Santiam River

Date of Survey: August 18-20, 1940 by Parkhurst and Bryant; September 26-27, 1945, Brewington, Davis, and Johanson.

Source: Rises in T10S, R4E, in the Cascades

Direction of Flow: West to join the South Santiam River in S29, T10S, R2W

Total Length: 45 miles. The first survey was'from the mouth to Jordam Dam, approximately 18 1/2 miles. The second survey was from Jordan Dam to a point 1 1/2 miles beyond the end of the road, approximately 8 1/2 miles. The total distance surveyed is 27 miles, and approximately 20 miles to the headwaters remains unsurveyed.

Station Location:

St	Location	Distance Above Prev. Station Yds	Miles	Distance Above Mouth Yds	Miles	Map Location	Width	Depth
A	Confluence w/South Santiam		0.0		0.0	S29,T10S R2W	50.0'	2.0'
B	Hwy bridge at Gilkey		5.0		5.0	S23,T10S,R2W	50.0'	3.6'
C	Covered bridge above Scio		5.5		10.5	S8,T10S R1W	70.0'	0.7'
D	Covered bridge on road to Burrnester Creek		6.5		17.0	S8,T10S R1E	53.0'	3.5'
E	Hwy bridge near Jordan dam		1.5		18.5	S4,T10S R1E	34.7'	5.6'
F	1 mile above Jordan Dam		1.0		19.5	S3,T10S R1E	51.0'	1.0'
G	Old Sawmill above dam		3.5		23.0	S12,T10S R1E	60.0'	8.0"
H	End of survey		4.0		27.0	S15,T10S,R2E	30.0'	5.0"

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090006	0047	0.05
B*	17090006	0047	4.55

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

Station	HUC	SEG	Rmi
c*	17090006	0049	0.00
D	17090006	0053	0.00
E	17090006	0053	0.00
F	17090006	0053	1.83
G	17090006	0053	6.02
H	17090006	0053	9.98

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

Sta	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
A-B	209,912	62,973	30.0	41,983	20.0	104,956	50.0		
B-ScioDam	112,112	11,211	10.0	44,845	40.0	11,211	10.0	44,845	40.0
ScioDam-C	105,248	40,480	38.5	31,574	30.0	10,525	10.0	22,669	21.5
C-D	152,592	66,422	43.5	39,494	25.9	27,826	18.2	18,850	12.4
D-E	57.024	39,072	68.5	7,181	12.6	7,181	12.6	3,590	6.3
Total	636,888	220,158	34.6	165,077	25.9	161,699	25.4	89,954	14.1

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	% Usable
A-B		209,912	104,956	50.0		
B-Scio Dam		112,912	56,056	50.0		
Total		322,024	161,012	50.0		

Note : Area above Scio Dam is unavailable at low water.

Spawning Area Unavailable and Unusable:

Station	Distance	Area (yd^2)	Area Unavail (yd^2)	% Unavail	When Avail	Usable Unavail (yd^2)	% Usable Unavail
Scio Dam-C		105,248	42,099	40.0			
C-D		152,592	67,320	44.1			
D-E		57,024	14,362	25.2			
Total		314,864	123,781	39.3			

Cause of Unavailability: Scio Dam. Although there is a fishway over the dam, during low water periods, as when surveyed, so much water is diverted for power production that the fish ladder is nearly dry, offering even less attraction for salmon than leakage

Spawning Area Unavailable and Unusable **(cont):**

through the dam. At such times, salmon cannot use the ladder to get past the dam. The area between Scio Dam and Jordan Dam at Sta. E, is available at high water. No spawning area above Jordan Dam.

Character of Watershed:

	A-B	B-C-	C-D	D-E	E-F
Mountainous					
Hilly					
Rolling			X	X	
Flat	X	X			
Swampy					
Wooded					
Open					
Cultivated	75%	75%	75%	20%	
Character of Valley					
Character of Banks					
Density of Marginal Vegetation					
Erosion a) Banks					
b) Watershed					

Diversions:

Diversion 1: Power diversion canal, takes off from left side of Scio Dam which is located about 2/5 miles above the highway bridge in Scio and supplies power for feed mill located 200' above the bridge in Scio on left bank. Diversion canal take-off at dam is 15' wide and 3' deep. There are no fish protective devices anywhere in the diversion. 200' below the diversion take-off there are three wooden headgates each 52" wide, in wooden abutments. At

Diversions **(cont):**

time of survey, two of these were open 3′ of 4.5′ possible. The diversion canal'leads to a storage pond just above the feed mill in Scio. This pond has a bypass to the creek wich is closed at the time of the survey. An iron headgate in front of intake to the mill is set in concrete abutments 8′8" wide and protected by an iron grizzly having 2 3/4" spacing. The total drop from the mill intake to the creek below is less than 12′. The mill is equipped with a low speed wheel.

Diversion 2: Wooden flume diversion from right side of Jordan Dam to the Mountain States Power Company plant located about one mile below the dam. At the dam the flume intake is 12′ wide with an iron grizzly having 2" spacing. 12.5′ below the grizzly there is an iron headgate 5′6" wide. The flume below the headgate is 4′ wide and 16" deep; water flowing 1′ deep at rate of 14.4 cfs. 11′ above the lower end of the flume' on the left side, and approximately 200′ above the power house there are two wooden headgates set in concrete abutments 8′ apart. The headgates are protected by two iron grizzlies set 51" apart. The upper grizzly has 2" spacing and the lower has 1/2" spacing. The water was 2′7" deep at the headgate in front of a wooden penstock leading to the power plant. A wooden bypass leads from the end of the flume around the power plant to the creek below. This bypass is 46" wide with a 44" headgate. No water was flowing through the bypass at the time of the survey. The power house is equipped with an S. Morgan Smith impulse wheel operating under a 56, head and turning 900 rpm.

Diversion 3: Diversion at Jordam Dam is described in previous survey cards. On September 25-26, 1945, there was no water being taken from the stream through the flume.

Diversion 4: A small pump driven by gasoline engine is located 3 miles above Jordan Dam. The diversion is carried in a 1" pipe. It is used for seasonal irrigation, and was not in use at the time of the last survey.

Artificial Obstructions:

1. Scio; concrete and plank dam 148′ long and 6′2 high kplus temporary flash boards; inefficient fish ladder with four pools.

2. Jordan Dam,; concrete and plank dam 163′ long and 15′ high; fish ladder present, but broken and not operating. Lowest step completely dry. Total barrier.

3. Jordan Dam, impassable, full descriptions in cards of previous survey.

Artificial Obstructions (cont):

4. A small dam is located 2 1/4 miles above Jordan Dam. It has a log base across the stream and planks running parallel with stream on a 45 degree angle from stream bed and other ends resting on top of log. It is about 30' wide and 3' high. Probably used as a drinking pool for cattle. Low water barrier.

5. Another dam of the same type as obstruction #2 is located about 3 1/2 miles above the Jordan Dam. It is 90' long and 3' high. Passable except at extreme low water.

Natural Obstructions: None observed.

Fluctuation in Water Level:

Sta	Ft. Variation	Cause
A-B	5-15' lower	
	3-10' middle	(lower portion completely flooded in winter and spring)
	5-6' upper	
B-C	3-8'	
C-D	3-6'	
D-E	3-10'	

Cause of Variation: Seasonal fluctuation of precipitation. Run-off is retarded considerably by the rather dense vegetation of the upper watershed.

Station	Distance	Date	Flow	Stream Condition.	Record By
F	19.5	9/26/45	15 cfs	low	Davis
G	23.0	9/26/45	15 cfs	low	Brewington
H	27.0	9/27/45	12 cfs	low	Brewington

Stream Volumes: Estimated 20 cfs at point 2 miles above mouth, 8/18/40. Estimated 15 cfs at highway bridge above Sta. C.

Pollution: Some garbage and sewage from the town of Scio. The effects of this pollution on the fish in the stream are not known.

Fish (salmon):

Species: Chinook
Estimated Number: Number of spawners actually observed

Stations	Number	Date
C-D	12 plus 6 jacks	8/19/40
D-E	18	8/20/40

Fish (other than salmon):

Species	Date	Very Abundant	Abundant	Fair	No.	Scarce
Chubs			X			
Squawfish			X			
Suckers			X			
Steelheads	15 observed, spring run of steeheads reported.					

General Remarks:

Observations were made only at highway bridges. Character of entire stream bottom figured from these observations.

The sluggish nature and mud bottom of the lower portion of the creek and the predominance of bedrock and absence of spawning gravels in the upper portion render this a poor salmon stream. Less than 10% of the bottom is useable spawning arrea. From the confluence with the South Santiam River upstream to Sta. D, the stream bottom is heavily silted with earth banks averaging 3-6" in height. From Sta. D to the Jordan Dam, bedrock and large rubble are very conspicuous, and the earth and rock banks are from 6-30' high.

Very dense vegetation composed of willow, alder and vine maple, lines the stream banks.

The terrain through which the lower part of Thomas Creek flows is very flat with a small hill here and there. Towards the source of the river the country becomes hilly and even mountainous in places.

Barriers are three in number. (1) The concrete and wood dam at Scio is a low water barrier because of its poor fish ladder. At the time of the survey, the ladder was nearly dry. (2) Below Jordan Dam for 1 mile, the stream bed'is nearly dry because so much water is taken at the dam during low water for power production. (3) The Jordan Dam is a total barrier. The fish ladder present is in a state of disrepair, and the two lower steps were entirely dry.

From the Jordan Dam to the end of the road, a distance of about 7 miles, the valley is 1/2 to 3/4 miles wide, with farms becoming farther apart upstream.

Above the end of the road the valley narrows rapidly to about 50 yd wide and the velocity of the stream increases, although the gradient is still classified as moderate. The watershed in this upper section is covered with dense second growth conifers and the hills change from the low, rolling type to steep, rugged ones. Good riffles are numerous, but there are fewer large resting pools.

General remarks **(cont):**

In the 8.5 miles of this survey, a few sections of bedrock bottom were found, but except for these sections the spawning area was very good. It was the general consensus that the spawning area observed would justify the building of a good ladder over Jordan Dam and the removal of the two small wooden dams above it. The 20 miles of unsurveyed stream in the uppermost section should be surveyed.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
B	8/18/40	10:45 AM	77.0 F	71.0 F	cloudy
C	8/19/40	9:30 AM	61.0	68.5	cloudy
D	8/20/40	11:00 AM	68.0	67.0	cloudy
E	8/19/40	3:10 PM	79.0	71.0	cloudy
F	9/26/45	2:00 PM	67.0	54.0	clear
G	9/26/45	1:30 PM	67.0	53.0	clear
H	9/27/45	11:30 AM	57.0	49.0	clear

Pool Grade: Resting pools are present-in sufficient numbers to take care of the present run of fish, which is very small.

Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
A-B	5.0	45'	9.0'	Lebanon Quadrangle, U.S.G.S.
B-C	4.5	25'	5.5'	" "
C-D	13.2	85'	6.4'	USGS-Lebanon Quadrangle
D-F	5.9	110'	18.6'	Willamette Nat. Forest Map

Slight to moderate in lower section, moderate above Jordan Dam

Tributaries:

1. Peters Ditch, apparently takes off Mill Creek and passes by flume and ditch to irrigate near Scio. The surplus, if any, being returned to Thomas Creek just below the town.
2. Mill Creek, no data.
3. Burrnester Creek, enters 200' below bridge at Sta. D. Flow ca. 10 cfs. All bedrock and boulder bottom. Gradient moderate to

Tributaries **(cont):**

fairly steep, with S6 pools and small riffles abundant. The creek averages 30' wide near the mouth, narrows and becomes steeper above. The banks are 20-30' high, and the creek flows in a sharp v-shaped valley. The only spawning areas are in small pockets being boulders. No very good chinook spawning areas were observed.

4. Bilyeu Creek enters Burrnester Creek 1/2 mile above the confluence with Thomas Creek. The flow is ca. 5 cfs. Bottom is all bedrock and boulders, with small patches of medium and small rubble behind the boulders. The gradient is moderate to fairly steep. Many S6 pools are present. The stream is passable to steelheads in the spring, but is not used by chinooks as far as could be determined.

4. Jordan Creek, enters above the impassable (at present) Jordam Dam, no data.

Crabtree Creek

River System: Willamette River
Stream Surveyed: Crabtree Creek, tributary to South Santiam River

Date of Survey: August 16-21, 1940 by Frey and Zimmer.

Source: Ridge between Crabtree and Yellowstone Mountains in T11S, R3E and Bold Peter Mountains in T12S, R2E.

Direction of Flow: Northwest

Total Length: 43.1 miles; 32.7 miles surveyed by Frey and Zimmer.

Station Location:

St	Location	Distance Above Prev. Station Yds	Miles	Distance Above Mouth Yds	Miles	Map Location	Width	Depth
M	Confluence with South Santiam River		0.0		0.0	S28,T10S R2W	--	--
A	1st hwy bridge near BM25		1.9		1 . 9	S27,T10S R2W	41.0'	34.4"
B	2nd hwy bridge on Hungary Hill road from Crabtree		4.0		5.9	S35,T10S R2W	--	--
C	3rd hwy bridge		4.1		10.0	S31,T10S,R1W	67.6'	76.2"
D	4th hwy bridge near BM236		2.9		12.9	S34,T10S R1W	27.7'	6.3"
E	Farm		4.2		17.1	SW/4,S36,T10N,R1W	-	-
F	Bridge near confluence with Roaring Creek		1.9		19.0	S7,T11S R1E	--	--
G	Farm		2.2		21.2	SW/4,S7,T11S,R1E	-	-
H	Wooden auto bridge to Snow Peak Summit Road		2.7		23.9	S21,T11S R11E	28.0'	
I	Bridge below check station of Snow Peak Logging Co.		1.1		25.0	S23,T11S R1E	6.4'	16.4"
J	Uppermost bridge of Snow Peak Logging Co.		8.9		33.9	S22,T11S R2E	--	--

EPA River Reach Codes:

Station	HUC	SEG	Rmi
M	17090006~	0040	0.04
A	17090006~	0040	0.64
B	17090006	0040	4.77
C	17090006	0042	1.43
D	17090006	0042	4.54

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

Station	HUC	SEG	Rmi
E	17090006	0042	7.52
F	17090006	0042	7.52
G*	17090006	0043	0.00
H	17090006	0043	4.92
I*	17090006	0043	4.92
J	17090006	0045	2.50

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

Sta	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%	Not Deter	%
M-A	56,900	1,000	1.8	14,030	24.7	19,540	34.3	20,630	36.3	1,700	3.0
A-B	77,900	24,210	31.1	16,210	20.8	37,480	48.1				
B-C	111,600	11,500	10.3	15,145	13.6	29,205	26.2	53,750	48.2	2,000	1.8
C-D	65,800	30,740	46.7	23,990	36.5	11,070	16.8				
D-E	122,900	16,880	13.7	45,130	36.7	20,935	17.0	39,955	32.5		
E-F	58,500	26,875	45.9	13,040	22.3	4,595	7.9	13,990	23.9		
F-G	32,300	16,990	52.6	13,080	40.5	860	2.7	1,370	4.2		
G-H	60,500	31,670	52.3	14,325	23.7	5,180	8.6	7,325	12.1	2,000	3.3
H-I	21,590	18,200	84.3	2,610	12.1	780	3.6				
I-J	142,750	87,050	61.0	37,755	26.4	10,685	7.5	7,260	5.1		
Tot	750,740	210,165	28.0	210,065	28.0	131,980	17.6	192,830	25.7	5,700	0.8

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	% Usable
M-A		56,900	33,570	59.0	3,698	6.5
A-B		77,900	40,420	51.9	7,680	9'.9
B-C		111,600	44,350	39.8	3,000	2.7
C-D		65,800	54,730	83.2	10,170	15.5
D-E		122,900	66,065	53.7	9,184	7.5
E-F		58,500	17,365	30.2	316	0.5
Total		493,600	256,770	52.0	34,048	6.9

Spawning Area Unavailable and Unusable:

Station	Distance	Area (yd^2)	Area Unavail (yd^2)	% Unavail	When Avail	Usable Unavail (yd^2)	% Usable Unavail
F-G		32,300	13,940	43.2			

Spawning Area Unavailable and Unusable **(cont):**

Station	Distance	Area (yd^2)	Area Unavail (yd^2)	% Unavail	When Avail	Usable Unavail (yd^2)	% Usable Unavail
G-H		60,500	19,505	32.3		1,479	2.4
H-I		21,590	3,390	15.7			
I-J		142,750	48,440	32.9		2,171	1.5
Total		257,140	85,275	33.2		3,650	1.4

Cause of Unavailability: At Sta. F almost the entire stream slows through an old mill with a large water wheel in it. This is a barrier to upstream navigation of salmon during low water. Therefore, we must consider all spawning rubble above this point as being unavailable at low water. The entire area surveyed is available at high **water.**

Character of Watershed:

Mountainous	Above Sta. I
Hilly	Between Sta. B and I
Rolling	
Flat	Between Sta. 0 and B
Swampy	
Wooded	Moderately wooded Sta. C-I Dense forests above Sta. I
Open	Brush and trees mostly along streams 'Sta. O-C
Cultivated	80% cultivation near mouth to 0 % above Sta. I

Diversions:

Diversion 1: 330 yds above Sta F.; right bank; ca. 4 sec. ft., 6' wide, 2' deep; no protective devices; iron plate headgate. Bypass at a low wooden dam some distance down the ditch.

Diversion 2: 1,500 yds above Sta. H; right bank; 6' wide; small board in creek diverts water into ditch. Water to be used to fill a shingle mill pond of the Snow Peak Logging Co.

Diversion 3: 3,894 yds above Sta. H; right bank; Lacomb

Diversions **(cont):**

irrigation ditch; 7.5' wide, 6' deep, water 19" deep; flow about 5 sec. ft.; wooden grill across mouth and 2 slonting screens, the lower one of window screening. (Well protected, a man inspects and cleans.)

Artificial Obstructions:

1. 4,230 yds above Sta. D; rock wing dam on left; 100' long, 3' wide; 8" irrigation pipe draws water from pool; 14" high; passable.

2. 7,290 yds above Sta. D; small rock wing dam on left, creating drinking pool for livestock; passable.

3. 7,330 yds above Sta. D; small rock wing dam on left for 2" irrigation pump; passable.

4. 20 yds below Sta. F; water wheel in old mill. Nearly all water'flowed through mill at time of examination. Passable lowest stream but not upstream; barrier at low water.

5. 330 yds above Sta. F; temporary log dam to divert water into irrigation ditch, passable.

6. At Sta. G; Low rock dam forming a swimming pool; passable.

7. 3,984 yds above Sta. H; few large rocks in river to divert water into Iacomb irrigation ditch.

8. 1,500 yds above Sta. H; small board diverts water into ditch leading to shingle mill pond of Snow Peak Logging Co; passable.

9. 1,410 yds above Sta. B; 2 big logs across stream; passable.

10. 3,200-3,250 yds above Sta. B; many brush snags; passable.

11. 320 yds above Sta. G; big log jam completely across channel; probably impassable at low water.

12. 380 yds above Sta. G; log jam in right channel; left channel clear and passable.

13. 190 yds above Sta. H; big log jam; passable with difficulty at low water.

Natural Obstructions: There were no natural obstructions in that part of the stream surveyed.

Fluctuation in Water Level:

Cause of Variation: Almost entirely dependent on seasonal cycle dry periods, rainfall, melting snows.

Feet Variation: 5-10'

Stream Volume:' Sta I - 8/21/40 - 12.9 sec. ft.
Sta D - 8/22/40 - 37.5 sec. ft.

Pollution:

No pollution was observed. There are no cities located directly on the river, and the Snow Peak Logging Co. has cesspool treatment of its wastes.

Results of Water Analysis:

Sta I bridge near checking station below Snow Peak Logging Co.
free CO_2, 1.5 ppm
Mo alkalinity - 21.2 ppm.
O_2 - 8.6 ppm.
Chlorides - 1.9 ppm
Temp. - 67.0 F at 4:15 pm

Sta. A, first highway bridge above mouth.
free CO_2, 3.8 ppm
Mo alkalinity - 24.1 ppm.
O_2 - 8.0 ppm.
Chlorides - 1.5 ppm
Temp. - water 70.0 F; sky, clear, 9:30 a.m.; air 79.0 F; water somewhat turbid.

Fish (salmon):

Species: Chinook
Estimated Number (Spawners): 155 counted

Between Station	Number	Date
E-F	33	8/19/40
F-G	13	"
G-H	92	"
H-I	1	"
I-J	16	8/20-21/40
Total	155	

Fish (other than salmon):

Species	Date	Very Abundant	Abundant	Fair	No.	Scarce
Suckers (mostly coarse scaled)						
	8/16/40			x		
	"		X			
	8/18/40			X		
	"		X			
	8/19/40			X		
	8/20/40					X
Shiners	8/16/40		X			
Chubs	8/18/40			X		
	8/19/40			X		
	8/20/40					X
Trout sp.	8/16/40					X
	8/19/40			X		
	8/20/40					X

Note : Suckers were often fairly abundant in the same pools salmon were in, and frequently were found in pools without salmon. Shiners and chubs occurred in fair numbers in the small pools, as did sculpins in the riffles. Trout were scarce. Stelhead trout go up Roaring Creek.

General Remarks:

Crabtree Creek is nearly always less than 50' wide, narrower in the upper portion than in the lower. The lower one-third has a very shallow gradient and meanders back and forth considerably. Here beaver and muskrats occur and dense vegetation, almost impassable, crowds the water's edge.

As one ascends the stream the channel becomes smaller and straighter, the gradient steeper, and the rubble larger. The upper half contains a large percentage of bedrock and boulders, many of the latter projecting from the water at the time of survey.' In this stretch there is very little useable rubble, only small patches between the boulders. Yet salmon'get way up into the upper portions of Crabtree, Bold Peter and South Fork Creeks and a few are even said to ascend Rock Creek.

Roaring Creek is blocked near the mouth by a dam with a fair fish ladder over it. Southwick, manager of Roaring Creek trout hatchery, says that steelheads come up once in a while, but that he has never seen or heard of a chinook above the dam. The stream bottom is mostly of bedrock with a few good pools and little suitable rubble.

Near the source of the Crabtree the Snow Peak Logging Co. is

General remarks **(cont):**

taking out a great deal of Douglas Fir in the usual manner of removing only the good timber and burning the rest. The company has constructed its own road up the mountain. Several large diesel trucks in operation can haul out as much as 40-50,000 board feet in one load.

Temperature Data:

Sta	Date	Hour	Air' Temp	Water Temp	Sky
Mouth	8/16/40	9:10 AM	68.0 F	67.0 F	clear
A	8/22/40	9:30 AM	79.0	70.0	clear
B	8/22/40	lo:oo AM	74.0'	67.0	clear
C	8/18/40	9:30 AM		66.0	
D	8/22/40	11:45 AM	75.0	69.0	clear
E	8/19/40	10:45 AM		61.0	
F	8/19/40	12:30 PM		67.5	
H	8/21/40	5:00 PM	83.0	69.0	
I	8/20/40	9:15 AM		60.0	
I	8/21/40	4:15 PM		67.0	
I-J	8/21/40	9:45 AM		58.5	
I-J	8/20/40	1:05 PM	74.0	64.0	
J	8/15/40	1:00 PM		62.0	

Middle Santiam River

River System: Willamette River
Stream Surveyed: Middle Santiam River, tributary to South Santiam River

Date of Survey: September 18,20,21, 1937 by Baltzo and Kolloen to 11.7 miles. July 10-13, 1938 by Parkhurst and Wilding starting around Sta. C.

Source: A number of small creeks in the vicinity of Iron Mountain. S36, T13S, R5E.

Direction of Flow: Flows north for six miles, northwest for nine miles to South Santiam. Left bank, S25, T13S, R1E.

Total Length: 30 miles, 19.1 surveyed

Station Location:

St	Location	Distance Above Prev. Station Yds	Miles	Distance Above Mouth Yds	Miles	Map Location	Width	Depth
A	Confl w/ S. Santiam				--	S25,T13S,R1E	140'	3.0'
B	OR State Hatchery 2.5 miles above mouth	2.5			2.5	S15,T13S R2E	110'	22.4"
C	Confl Quartzville	5.0			7.5	S31,T12S,R3E	66'	8.6"
D	Whipples barn (Brady on map)	2.4			9.9	S34,T12S R3E	30'	4.0'
E	End of survey	9.2			19.1	S15,T12S R4E	40'	2.0'

EPA River Reach Codes:

Stations A-D are presently inundated due Foster and Green Peter reservoirs. Station E* is not definite but has been estimated with an HUC=17090006, SEG=0032, Rmi=4.62.

Character of Bottom Between Stations:

Sta	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
A-B	124,700	66,500	53.3	29,090	23.3	20,000	16.0	9,100	7.3
B-C	222,500	104,480	47.0	63,890	28.7	47,400	21.3	6,730	3.0
C-D	128,000	64,800	50.5	36,160	28.4	20,450	16.0	6,610	5.1

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

Sta	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
D-E	265,400	147,390	55.7	69,960	26.4	35,530	13.4	12,520	4.5
Tot	740,600	383,150	51.7	199,100	26.9	123,380	16.7	34,970	4.7

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

Spawning Area Usable and Available:

Correction: Bryant, **3/7/41:** All of 'the available spawning area listed below is unavailable at low water because of a dam at Lebanon on the South Santiam.

Station	Distance vds miles	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable -Spawning Area(yd^2)	% Usable
A-B			49,090	39.4		
B-C			111,290	50.0		
C-D			56,610	44.2		
D-E			105,490	39.8		
Total			322,480	43.4		

Spawning Area Unavailable and Unusable: None

Cause of Unavailability: 273,390 yd2 of MR and SR are unavailable when the salmon racks at Sta. B are in operation.

Character of Watershed:

	A-B	B-C	C-D	D-E	E-F
Mountainous			X	X	
Hilly	X	X			
Rolling					
Flat					
Swampy					
Wooded	X	X	X	X	

Character of Watershed **(cont):**

	A-B	B-C	C-D	D-E	E-F
Open					
Cultivated	1% between A-B, none above				
Character of Valley					
Character of Banks					
Density of Marginal Vegetation					
Erosion a) Banks					
b) Watershed					

Diversions: None

Artificial Obstructions:

1. At Sta. B; fish racks of Oregon State Fish Comm. placed in the river in May. Removed in October.

Natural Obstructions: None

Fluctuation in Water Level:

Cause of Variation: Melting snow and rains. The low gradient of the lower part of the river prevents a rapid run-off.

Stream Volumes: At Green Peter Cr, 6/09/33 19,300 cfs
10/09/33 62 cfs, water resource paper #754
Sta. C 9/18/37 100 cfs
Sta. C 7/10/38 141 cfs
Sta. E 7/13/38 100 cfs approximate

Pollution: None

Fish (salmon):

Species: Spring Chinook
Estimated Number (spawners):

Between Stations	Number	Date
A-B (below racks)	24	9/18/37
A-B (between racks)	250	"
B-C (on riffles)	40	9/21/37

The presence of spawners above the state hatchery racks probably due to washing out of the racks during high water in early part of the spring. Also reported that a few in early part of run are allowed to pass. Apparently a good run of chinooks in the stream.

Fish (other than salmon):

Species	Date	Very Abundant	Abundant	Fair	No.	Scarce
Small trout	9/18/37			X		
Dace	9/21/37		X			
Whitefish	"			X		
Suckers	"			X		
Suckers	7/12/38		X			
Whitefish	"			X		
Chub	"		X			
Dace	"		X			
Rainbow & cutthroad	"		X			
Steelhead fry	"			X		

Remarks: Fishing intensity if low due to the inaccessability of the stream. As a result, it holds a good sized fish population.

General Remarks:

As the survey was made by two different parties the write-up will be in two sections, the first from the mouth to Quartzville Creek and the second from there to the end of the 1938 survey.

A. Confluence with South Santiam River upstream to Quartzville Creek.

Topography:

Between the mouth and Sta. B (fish racks), 'the stream occupies a u-shaped valley about 1/2 mile wide at the mouth and narrowing to less than 1/4 mile above, with moderately steep sides. The stream has cut a channel in the valley floor becoming canyonous during the upper two miles with vertical walls 5 to 40'

General remarks (cont):

high. Throughout the next 3 miles, the valley is steep and v-shaped with stream flowing in a deep bedrock canyon at the base. The valley widens in the last two miles and the stream flowing in a moderately deep channel on the valley floor. The watershed is covered with large second growth conifers, moderately dense. Timber was being logged near Sta. C on the date of the survey. There is no erosion of the watershed into the stream.

Character of Stream:

The stream flows for 5 of.the 7 miles surveyed through a box canyon with steep bedrock sides. Vegetation immediate to the water's edge is sparse although there is a moderate growth of conifers, alder, maple and brush. The banks range from 5 to 40' in height. Notwithstanding the spring run-off, there is only a slight erosion of the banks due to their composition of bedrock. There is a fair amount of good and fair spawning riffle with suitable bottom. Large resting pools are abundant affording shade and protection to fish.

Fish Population:

A large number of spring chinook run in the Middle Santiam but they can ascend only as far as the state hatchery racks 3 miles above the mouth. A few, however, usually pass before the racks are installed. The washing out of the racks in the spring of the present year accounts for the number of spawners above and in Quartzville Creek. Trout fingerlings were observed in fair numbers. The larger pools are intensely fished although large trout are scarce. Whitefish occur in the large pools in fair numbers.

B. Mouth of Quartzville Creek to 11.7 miles upstream:

Topography:

The entire valley is narrow with steep mountains on either side. The valley is not over 1/4 mile wide except at Bady's, the only farm in the valley. In many places the valley is a steep box canyon of solid bedrock. Vegetation is dense throughout, consisting of fir, alder, maple, cedar, cottonwood, oak, pine, berries, brush and ferns.

Character of Stream:

The stream is an excellent one for salmon and trout. The gradient is moderate with good spawning and food riffles and numerous resting pools. The heavy vegetation and steep banks provide ample protection. The bottom was composed of 50% mud and sand. The average width was about 60' and the flow 115 cfs.

General remarks (cant):

None of the tributaries were suitable for salmon spawning. Certain areas of the stream bottom and banks were composed of bedrock, amounting to 80-90% of the bottom for some stretches.

Fish Population:

The stream supports a large population of suckers, chubs and dace and a good number of whitefish, rainbow, cutthroat and steelhead fry and fingerlings. Salmon are barred by the Oregon State Hatchery racks 8 miles below Quartzville Creek, but steelhead run into the stream in early spring. The fishing intensity is low due to the inaccessability of the stream as there is no road.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
A	9/21/37	4:00 PM	61.0 F	62.0 F	clear
B	9/18/37	2:30 PM	58.0	61.0	raining
C	9/21/37	2:30 PM	65.0	58.0	clear
C	7/12/38	5:40 PM	78.0	67.0	bright

Pool Grade:

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6	Ttl
A-B	2.6	31	14	9	19		3	5	36
				25.0	53.0		8.5	13.5	
B-C	4.9	47	12	9	26	1	11	14	61
				15.0	42.5	2.0	18.0	24.0	
C-D	4.0	73	18	28	5		40	20	93
				30.1	5.4		43.0	21.5	
D-E	7.7	238	31	30	24		184	174	412
				7.3	5.8		44.7	42.2	
Tot	19.2	389	20	76	74	1	238	213	602
				12.6	12.3	0.2	39.5	35.4	

Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
A-B	2.6	25-50'	Estimate	
B-C	4.9	50'	Estimate	
C-D-E	11.7	100'	Estimate	

Note: Topographic data is not available.

Tributaries:

Mouth to Quartzville Creek

1. Green Peter Creek, left bank, 4 cfs.
2. Whitcomb Creek, left bank, 4 cfs.
3. Rumbaugh Creek, right bank, 5 cfs.
4. Quartzville Creek, left bank, see survey report.
5. Tally Creek, 1 mile below Sta. D, 3 cfs.
6. No name, 6 miles above Sta. C, small.
7. No name, left bank, 7 miles above Sta. C, small, impassable.
8. No name, left'bank, 10.2 miles above Sta. C, small, impassable.
9. No name, left bank, 10.3 miles above Sta. C, small, impassable.
10. No name, left bank, 1 mile below Sta. E, 2 cfs; impassable.

Quartzville Creek

River System: Willamette River
stream Surveyed: Quartzville Creek, tributary to Middle Santiam River

Date of Survey: 9/18-22 1937 and 7/13/38

Source: Gordan peak, Scar Mountain. R6E, T12S

Direction of Flow: Location S31, R3E, T12 S, stream flows southwest to confluence with the middle fork of the Santiam.

Total Length: 26 miles, 16 miles surveyed

Station Location:

St	Location	Distance Above Prev. Station Yds	Miles	Distance Above Mouth Yds	Miles	Map Location	Width	Depth
A	Confl w/ Middle Santiam			--		S31,T12S,R3E	30'	1'
B	Moose Creek		4.0		4.0	S21,T12S,R3E	66'	7"
C	Yellowston Creek		5.0		9.0	S35,T11S,R3E	20'	14"
D	Canal Creek		4.7		13.7	S29,T11S,R4E	8 '	15"
E	Sign post marked 8 mi to Chinney Peak		1.8		15.5	S27,T11S R4E	15'	8"

EPA River Reach Codes:

Station	HUC	SEG	Rmi
B	17090006	0036	2.96
C	17090006	0036	9.32
D	17090006	0036	14.46
E	17090006	0036	16.30

(Station A is inundated by Green Peter. and Foster reservoirs)

Character of Bottom Between Stations:

Sta	Area (yd^2)	L.R. %	M.R. %	S.R. %	M&S %
A-B		60.0	14.0	12.0	13.0
B-C		60.0	18.0	13.0	8.0

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

Sta	Area (yd^2)	L.R. %	M.R. %	S.R. %	M&S %
C-D		64.0	17.0	15.0	4.0
D-E		73.5	19.3	7.2	--
Total		64.4	68.3	47.2	25.0

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

Spawning Area Usable and Available:

Station	Distance vds	Distance miles	Area (yd^2)	Available Spawning Area (yd^2) (MR&SR)	% Avail	Usable Spawning Area (yd^2)	% Usable
A-B	7,675			33,500	27.0		
B-C	8,290			42,870	32.0		
C-D	8,335			39,628	32.0		
D-E	3,154			8,530	26.6		
Total	27,454			124,348	29.4		

Spawning Area Unavailable and Unusable:

Station	Distance	Area (yd^2)	Area Unavail (yd^2)	% Unavail	When Avail	Usable Unavail (yd^2)	% Usable Unavail
C-E		48,158		29.3			

Cause of Unavailability: At Sta. C, bedrock falls, 10' high, 25' long, 30 degree angle, passage difficult at low water.

Character of Watershed:

	A-B	B-C	C-D	D-E	E-F
Mountainous					X
Hilly					
Rolling					
Flat					
Swampy					
Wooded					X

Character of Watershed **(cont):**

	A-B	B-C	C-D	D-E	E-F
Open					
Cultivated	None				
Character of Valley					
Character of Banks					
Density of Marginal Vegetation					
Erosion a) Banks					
b) Watershed					

Diversions: None

Artificial Obstructions: None

Natural Obstructions:

1. 300 paces above Sta. A; bedrock falls; 3-4' high; passage difficult in low water.

2. 200 paces above Sta. C; bedrock falls, 10' high; impassible in low water.

3. 283 paces above Yellowbottom Creek; bedrock falls; 7.5' high; impassable at low water.

4. 1,200 paces above Yellowbottom Creek; bedrock falls; 6' high; impassable at low water.

5. 1,500 paces above Yellowbottom Creek; lava flow with small channels; impassable in low water.

6. 100 paces below Sta. D; falls; 4' high; impassable in low water.

7. 1.8 miles above Sta. D; falls; 20' high; impassable at all times.

Fluctuation in Water Level:

Sta	Date	Stream Volume
A	9/22/37	35.0 cfs (estimate)
B	9/22/37	----
C	9/22/37	23.3 cfs (estimate)
D	9/22/37	15.0 cfs (estimate)

Cause of Variation: Snow run-off and heavy rains.

Feet Variation: As the stream is confined between steep banks for the most part, it has a vertical rise of 10-20'. High waters occur from February to June.

Pollution: None

Fish (salmon):

Species: Spring Chinook (*Oncorhynchus tschawytscha*)
Estimated Number (Spawners):

Between Stations	Number	Date	
A-B	19	9/18/37	5 nests
B-C	43	9/21/37	2 nests
C-D	53	9/22/37	17 nests
D-E	fry numerous	7/13/38	

Fish (other than salmon):

Species	Date	Very Abundant	Abundant	Fair	No.	Scarce
Cutthroat	9/18/37			X		
Rainbow	9/18/37		x 6-8"			
Rainbow	7/13/37		X 6"			

General Remarks:

Topography:

The watershed is mountainous and heavily forested with Douglas Fir and other confiers. The cover is primarily virgin growth with some burnt-over area and smali logging operations. A road parallels the stream from the confluence with the middle, fork of the Santiam to Canal Fork.

General remarks (cont):

Character of Stream:

The stream is confined between canyonous walls for practically its entire surveyed length. There is very little flood wash and a large area of bedrock bottom. Auriferous gravel deposits occur in the stream bed and along the margin. These have been worked by small scale placer miners for many years. Large resting pools are common. Spawning areas are usually confined to the ends of these pools and to small patches of gravel in the bedrock. Marginal vegetation above bedrock and high water stages, consists of alder, maple, dogwood and vines - fairly thick throughout.

Fish Population:

Chinooks are able to ascend the stream at least as far as Yellowbottom Creek where a low water barrier apparently marks the end of this year's run. About the barrier and as far as surveyed, trout, 3-4" are numerous and larger trout are common. A 20' falls was located 1.8 miles above Sta. D (Canal Fork), making an impassable barrier. Salmon and trout fry were numerous in July, i938.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp
D	7/13/38	2:00 PM	92.0 F	67.0 F

Pool Grade:

Sta	Dist (mi)	Resting Pools	Resting Pools/Mi	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6	Ttl
A-B	4.0	135	34	67		56	3	100	226
				29.7		24.8	1.3	44.2	
B-C	5.0	163	33	52	2	77	2	183	316
				16.5	0.6	24.3	0.6	57.9	
C-D	4.7	200	43	67	1	61	10	111	250'
				26.8	0.4	24.4	4.0	44.4	
D-E	1.8	51	27	10			41	91	142
				7.0			28.9	64.1	
Tot	15.5	549	35.4	196	3	194	56	485	934
				20.1	0.3	20.8	6.0	51.9	

Minor Pools:
Sta. A-B S5T2 (3) 1% S5T3 (6) 3%
Sta. B-C S5T1 (18) 5% S5T3 (12) 4%
Sta. C-D S5T1 (19) 6% S5T2 (9) 11%

Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
A-B	4.0	gradient	moderate	
B-C	5.0	440'	88'	U.S.G.S.
C-D	4.7	400'	85'	U.S.G.S.
D-E	1.8	200'	110'	U.S.G.S.

Tributaries:

1. Moose Creek, 4+ cfs; no good for spawning.
2. Trout Creek, more than 1 cfs; torrential gradient.
3. Panther Creek, more than 2 cfs; precipitous gradient.
4. Fouur bit Creek, more than 1 cfs; torrential gradient.
5. Two Buck Creek, more than 1 cfs; precipitous gradient.
6. Yellowstone Creek, 6-8 cfs; steep grade, to be surveyed.
7. Boulder Creek; 6 cfs; to be surveyed.
8. Packer's Gulch, 2+ cfs; 8' drop at mouth, impassable..
9. Yellowbottom Creek, more than 1 cfs; impassable at low water, no fish in creek.
10. Canal Fork, 5-6 cfs; steep, large boulders, to be surveyed.
11. Galena Creek, not seen.
12. Gold Creek, not seen.
13. McQuade Creek, not seen.
14. Gregg Creek, not seen.
15. Little Meadows Creek, not seen.
16. Beabe Creek., Freezeout Creek, Bruler Creek, and Butte Creek also not seen.

Calapooia River

River System: Willamette River
Stream Surveyed: Calapooia River

Date of Survey: September l-2, 1945 by Parkhurst, Hanavan, Silliman, Rucker and Brewington

Source: Originates in S16, T15S, R4E in the foothills on the west side of the Cascades along the southern boundary of Linn County, OR.

Direction of Flow: The river flows southwest for 3 miles from its source, then in a general northwest direction to its confluence with the Willamette at Albany, OR.

Total Length: Approximately 65 miles

Station Location:

St	Location	Distance Above Prev. Station Yds	Distance Above Prev. Station Miles	Distance Above Mouth Yds	Distance Above Mouth Miles	Map Location	Width	Depth
A	Hwy bridge below Finley Mill			47,520	27.0	S12,T14S R2W	51'	1'
B	Hwy br. at Crawfordsville	2,300	1.3	49,826	28.3	S6,T14S R1W	93'	6"
C	Sweet Home hwy bridge	11,000	6.5	60,820	34.8	S18,T14S R1W	80'	9"
D	Covered side road bridge	4,900	2.7	65,720	37.5	S24,T14S R1W	60'	2'
E	Covered road bridge	2,900	1.6	68,620	39.1	S30,T14S R1E	33,	4'
F	Mitchell,OR	5,900	3.3	74,520	42.4	S33,T14S,R1E	60'	1'
G	Logging bridge below Dollar	5,500	3.1	80,020	45.5	S2,T15S R1E	66'	9"
*H	Dollar,OR	4,300	2.4	84,320	47.9	S6,T15S,R2E	40'	1'

* Sta. H of 1945 survey and Sta. A. of the 1941 survey are only a few yards apart.

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090003	0081	17.23
B	17090003	0081	18.37
C	17090003	-0081	22.70

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

Station	HUC	SEG	Rmi
D	17090003	0081	25.30
E	17090003	0081	26.33
F	17090003	0081	29.20
G*	17090003	0081	32.59
H*	17090003	0081	33.48

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
A	58,600	20,410	34.8	14,550	24.8	11,570	19.7	12,070	20.7
A-B	61,000	23,300	38.2	15,010	24.6	5,370	08.8	17,320	28.4
B-C	277,600	128,140	46.0	57,760	21.0	34,370	12.0	57,330	21.0
C-D	103,400	52,530	50.8	19,600	18.9	13,590	13.2	17,680	17.1
D-E	69,100	33,990	48.0	23,600	35.0	8,830	13.0	2,680	04.0
E-F	135,400	91,070	68.0	15,100	11.0	11,940	08.0	17,290	13.0
F-G	74,200	55,900	75.0	9,290	12.0	5,270	08.0	3,740	05.0
G-H	68,670	36,740	53.3	16,000	23.4	10,070	14.7	5,860	08.6
Total	847,970	442,080	52.1	170,910	20.2	101,010	11.9	133,970	15.8

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

Spawning Area Usable and Available:

Station	Distance yds	Distance miles	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	% Usable
Start A	1,800	1.00	58,600	26,120	44.0	6,050	10.0
A-Dam*	500	.33	15,000	6,410	43.0	4,390	29.0
Total	2,300	1.33	73,600	32,530	43.5.	10,440	14.2

*Finley Mill Dam 500 yds above Sta. A - impassable at low water.

Spawning Area Unavailable and Unusable:

Station	(yd) Distance	Area (yd^2)	Area Unavail (yd^2)	% Unavail	When Avail	Usable Unavail (yd^2)	% Usable Unavail
Dam-B	1,800	46,000	13,970	30.0		6,100	13.0
B-C	11,000	277,600	92,130	33.0		37,420	13.0
C-D	4,900	103,400	33,190	32.0		6,340	06.0
D-E	2,800	69,100	32,430	47.0		6,910	10.0
E-F	6,000	135,400	27,040	20.0		4,780	04.0
F-G	3,700	74,200	14,560	20.0		2,720	04.0
G-H	4,300	68,670	26,070	[illegible]	38 0	8,380	12 0
Total	34,500	774,370	239,390	30.9		72,650	09.4

Character of Watershed, Stations A-E:

	A-B	B-C	C-D	D-E
Mountainous				
Hilly	X	X	X	X
Rolling		X		
Flat				
Swampy				
Wooded	X	X	X	X
Open	X	X		
Cultivated	90%	25%	70%	None
Character of Valley	Flat, 2 miles wide	U-shaped, 1 mile wide'	1 mile wide	V-shaped, .25 miles wide
Character of Banks	Earth & gravel	Steep, earth & gravel	Bedrock,	Earth & rock
Density of Marginal Vegetation	Alder, maple, oak, scattered firs & shrubs	Same	Same	Same
Erosion				
a) Banks	None	None	Slight	None
b) Watershed	None	None	Slight	None

Character of Watershed, Stations E-H

	E-F	F-G	G-H
Mountainous	X	X	X
Hilly			
Rolling			
Flat			
Swampy			
Wooded	X	X	X
Open			
Cultivated	None	None	None
Character of Valley	1 mile wide saucer shaped	1/8 mile wide, v-shaped	1/8 mile wide, v-shaped
Character of Banks	Earth&rock	Gravel&rock	Gravel&rock
Density of Marginal Vegetation	Alder,maple, oak, fir	Same	Same
Erosion			
a) Banks	None	None	None
b) Watershed	None	None	None

Diversions:

Diversion 1: A diversion dam located 2.5 miles above Brownsville, OR is a low water barrier. The dam is 143' wide, between 3-4, high, and is of wood construction. A fishway channeled through the bedrock on the left side is not passable at low water. The fishway is about 5' wide and extends downstream 28' with a 3' gradual drop. See diversion #1, for purpose.

Diversion 2: The Finley Mill dam is located just below Crawfordsville, OR. This is an impassable barrier, has nothing but possible historical value to owner and serves no purpose. It is of log and plank construction, 145' wide and 10' high, and has no fishway. Between 12 and 20 chinook salmon adults were held in pool below dam unable to go over the dam.

Diversion 3: Cascades probably passable at all times are

Diversions **(cont):**

located about l-l.5 miles above Crawfordsville, OR. These' consist of a number of small falls and rapids, none having over a 1' drop.

Diversion 4: A log jam, probably passable at all times, is located about 1.5 miles below Sweet Home highway bridge. It is 25' wide and 6, high.

Diversion 5: Another log jam, also passable, is located 1,000 yds below Mitchell, OR. It diverts part of the river around an island for about 150 yds before it again enters main stream._.

Diversion 6: This diversion occurs about 21 miles above the mouth and supplies the woolen mill at Brownsville, OR. The take-off is just above the dam, on the left bank. The diversion was 18 cfs and the river flow below it was approximately 30 cfs on September 1, 1945. There are no protective devices. The headgate is 10' wide, 2, deep and of wood construction. .

Fluctuation in Water Level:

Sta	Distance Above Mouth(mi)	Date of Observation	Flow	Stream Condition	Record By
*A	27	9/2/45	50 cfs	Low	Parkhurst
*H	47.88	9/1/45	40	Low	Hanavan

* Flows estimated

Notes and References: U.S.G.S. water supply paper 904 – 1940. Calapooya River at Holley, OR.

Stream Volumes: Maximum 2,160 cfs in February. Minimum 13 cfs in September. Mean 289 cfs.

Pollution: None observed.

Fish (salmon): Salmon and steelhead
Species: Chinook salmon

Between Stations	Distance Between Stations	Date	Fish Counted Alive	Fish Counted Dead	Redds Counted Occupied	Redds Counted Not Occupied
Start-A	1,800yd	9/2/45	-	1	-	
A-B	2,300	9/2/45	12	-	-	

No fish'were observed above Sta. B, except small salmonoid fingerling. These were quite numerous. Good visibility.

Fish (other than salmon): No fish of any other species were observed.

General Remarks:

Description of Stream:

Observations on this river were made 8/21/40 at several highway bridges.

At 200' above the mouth near the Albany gravel pit the river was found to be 105' wide and 4.7' average depth with a water temperature of 73.0 F.

From the confluence with the Willamette upstream to the town of Tangent, the earth banks average about 25' high with marginal vegetation of willow, alder, cottonwood, ash and scattered conifers. The water is very sluggish and yellow colored and the bottomm is about 90% mud and silt.

The second set of observations were taken at a highway bridge 3 miles below Tangent. Here the river was 47' wide and 2.2' deep with a water temp. of 72.0. Earth banks averaged 25' high with dense marginal vegetation of willow, alder, maple and oak. At this poinnt the stream was full of rubbish, dumped there by people living in the vicinity.

The stream valley is about 20 miles wide with nearly 90% under cultivation. The Albany ditch, which comes from the South Santiam River just above Lebanon, joins the Calapooya River in albany. Before entering the river, however, the Albany ditch goes through the mountain states power plant located at the endge of Albany. The power p[lant uses 2S Morgan Smith turbines. A 36' head of water is maintained by a gate located to the right of the power plant in the main ditch. The turbines have reaction type wheels, 550 h.p.; 257 rpm. There are also two Westinghouse generators, 500 dva, 2300 volts, 125 amp, 60 cycles, 257 rpm. The channel to the power plant is 16'2" wide with a grizzly having 2 1/4" spaces. A trash bypass 17" wide carries debris around the plant and into the Calapooya River.

It was reported that some salmon had been taken in back of the power plant and that several arrests had been made.

From the water supply paper no. 864 we get the following information relative to stream volumes. Drainage area 99 miles, maximum discharge in 1938 - 5,950 cfs March 18th; minimum discharge in 1938 - 21 cfs September 22, 23, 28.

Just below Crawfordsville and east of Halsey is the old Finley Feed Mill Dam. It is 150' wide and 10' high. The absence of a fish ladder makes this dam impassable at all times. The

General remarks **(cont):**

diversion to the mill takes off the left bank. The flume is 6' wide and 3' deep and supplies water power to the mill. the later is returned immediately below. The dam is made of log and board construction and has a 3" crest.

This stream was inspected twice. On 8/21/40, the section from the mouth up to the mill dam (finley dam) near Crawfordsville was inspected at intervals. No -bottom data in detail waas secured, b ut general notes on this section were written up.

From 9/29 to 10/2/40, a detailed survey was made of the 15 miles beginning at the north fork and working down stream to Dollar. This was necessary because of the discoloration in the stream below at the time, which prevented detailed observations on the lower section.

Both reports have card write ups. This stream needs to be finished in detail by another survey when the stream is clear enough to observe the bottom below Dollar.

As mentioned in previous surveys, the lower 25 miles of the stream is a mud bottom slough of no'value as salmon spawning area. Above this section there is 1 mile of good spawning area available up to the Finley Mill Dam. The area above the dam is available only to steelhead and part of the chinook run at high water stages. The number of chinooks able to ascend depends upon water conditions when the run arrives at the dam. A large number of chinook salmon have been observed to be blocked below -the dam in the fall, and these fish are easily captured by poachers in the vicinity. A ladder at this dam is badly needed. The dam and fishway above Brownsville should also be improved and the diversion screened. The log jam above Dollar should be removed.

Temperature Data:

Sta	Miles Above Mth	Date	Hour	Air Temp	Water Temp	Sky
A	27	9/2/45	12:30 PM	69.0 F	62.0 F	dull
B	28.33	9/2/45	11:00 AM	64.0	63.0	dull
C	34.83	9/1/45	4:00 PM	78.0	66.0	part cloudy
D	37.61	9/1/45	6:30 PM	76.0	65.0	clear
E	39.22	9/1/45	6:40 PM	76.0	66.0	clear
F	42.55	9/1/45	1:45 PM	71.0	63.0	clear
G	45.66	9/1/45	1:30 PM	69.0	63.0	clear
H	47.88	9/1/45	10:00 AM	64.0	58.0	clear

Pools and Riffles:

Between Stations	Distance Miles	No. Pools Good	Fair	Poor	Total	No. Riffles Good	Fair	Poor	Total
Start A	1	3	6	2	11	16	-	-	16
A-B	1.33	9	10	1	20	15	-	-	15
B-C	6.5	42	-	23	65	44	-	23	67
C-D	2.77	35	-	14	49	30	-	9	39
D-E	1.61	19	-	4	23	20	-	6	26
E-F	3.33	18	-	41	59	65	1	1	66
F-G	3.11	15	-	16	31	30	-	-	30
G-H	2.44	22	-	44	66	24	-	25	49
Total		163	16	145	324	244	-	64	308

Gradient:

Station	Distance (Miles)	Total Drop	Source of Data
A-B	1.33	moderate	No information available
B-C	6.5	moderate	
C-D	2.77	moderate	
D-E	1.61	moderate	
E-F	3.33	moderate	
F-G	3.11	moderate to steep	
G-H	2.44	moderate to steep	

Tributaries:

1. No name, right bank, 31 miles above mouth, more than 1 cfs, no value to salmon.

2. Brush Creek, left bank, 33 miles above mouth, 10' wide, 6 cfs, little value for salmon.

3. No name, right bank, 39 miles above mouth, more than 2 cfs, no value to salmon.

4. No name, right bank, 42 miles above mouth, less than 1 cfs, no value to salmon.

5. No name, right bank, 45 miles above mouth, less than 1 cfs, no value to salmon.

6. No name, left bank, 46 miles above mouth, more than 1 cfs, no value to salmon.

Calapooia River

River System: Willamette River
Stream Surveyed: Calapooia Rjver

Date of Survey: September 29, 1941 to October 2, 1941 by Frey and Bryant

Source: Originates in S16, T15S, R4E, in the foothills on the west side of the Cascades along the southern boundary of Linn County, OR.

Direction of Flow: Southwest for 3 miles from its source then bends gradually and flows in a general northwest direction for most of the'distance to its confluence with the Willamette in S1, T11S, R4W, near Albany, OR. Near Powell Hills in T13S, R3W, the river begins to swing northward, meandering in a broad flood plain containing several ox-bow lakes. Continuing a gradual bend the river flows northeast for the last mile before reaching the Willamette.

Total Length: 65 miles of which 13 miles were surveyed from the mouth of the North Fork downstream.

Station Location:

St Location	Map Location
A Start of survey at lower end of log pond near Dollar	SW4,S12,T14S R4E
B End of survey at confluence with North fork	NE4,S26,T15S R3E

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A*	17090003	0081	33.48
B	17090003	0081	46.98

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
A-B	226,600	102,730	45.3	66,130	29.2	30,285	13.4	27,455	12.1

classification of stream based on amount of usable spawning rubble and area present: N/A

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	% Usable
A-B	10,240	118,200	44,455	37.6	2,663	2.3

Note : Sometimes, according to reports, the water is so low that the bypass around the Dollar log pond is dry or almost dry. In such cases the entire stream above Dollar would be inaccessible.

Spawning Area Unavailable and Unusable:

Station	Distance	Area (yd^2)	Area Unavail (yd^2)	% Unavail	When Unavail	Usable Unavail (yd^2)	% Usable Unavail
A-B	12,600	108,400	51,960	47.9	A.T.	9,709	9.0

Cause of Unavailability: At times of very low water the entire stream above Dollar log pond may be unavailable.

Character of Watershed:

General Remarks: Mountainous, covered with Douglas Fir, cedar and hemlock, cut over or burned over in several places. No cultivation. The valley is narrowly v-shaped with quite steep sides, and in several places the stream flows through a narrow gorge. -Three miles below the North Fork confluence the valley broadens somewhat and the gradient is shallower, allowing several good spawning riffles to occur. Banks vary from 1 to 250' often being continuous with the walls of the valley, composed of bedrock, rubble and some earth. Marginal vegetation consisting of alder, big leaf maple, vine maple, dogwood, cottonwood, few willows, and berry bushes is fairly dense. Erosion of banks and watershed is considerable.

Diversions:

Diversion 1: At Dollar most of the water is diverted into a log pond a few feet away from the main channel. A volume of water equal to that entering the pond flows through the spillway at the lower end of the pond back into the river channel . No hindrance to downstream migration.

Artificial Obstructions:

1. Across the main channel at Dollar is a dam of earth and rubble 130′ wide, 15′ long and 7′ high on the downstream side. Water is diverted by the dam into a log pond on the left, and returns to the river some distance below. Around the right end of the dam is a bypass or spillway consisting in part of a wooden sluice 9′ wide, with a 10" drop at the lower end. This and a short, steep cascade in the bypass would make the channel impassable during very low water. At the lower end of the log pond is a spillway consisting of a 15′ sloping apron with a 4′ drop at the bottom and flash boards 2′ high at the upper end. The spillway is impassable to upstream migrants. Unscreened.

2. 10,240 yds above Dollar is a large log jam 100 yds long. The lower end of the pile rests over a narrow bedrock channel in which there are several small falls obstructed by logs. No passable channel could be found. Barrier at all times.

3. Numerous other log jams occur in the stream, many of which appeared passable only with great difficulty.

Natural Obstructions:

1. None in portion surveyed. Downstream a few miles at Crawfordsville is a mill dam which greatly impedes upstream migration.

Fluctuation in Water Level:

Stream Volumes: Estimated at 2-7′ and produced mainly by seasonal precipitation and rapid runoff. Stream flow at the end of the bridge below North Fork was 37.8 cfs on September 29, 1941. 90-95% of the stream bed was covered with water at this time.

Pollution: The stream silts up rapidly with heavy rains but clears up fairly rapidly.

Fish (salmon):

None observed in the portion of the stream surveyed. A short distance below the dam at Crawfordsville one spring chinook was observed on a redd. In 1941 quite a number (ca 200) of salmon were reported in a large pool in the Narrows ca 2 miles below Dollar. The run is undoubtedly impeded considerably by the mill dam at Crawfordsville.

Fish (other than salmon):

Rainbow trout occur in fair numbers in the upper portion of the stream. No fishing is allowed above Dollar after July 1. Steelheads ascent to the log jam each spring.

Species	Date	Very Abundant	Abundant	Fair	No.	Scarce
Rainbow				X		

General- Remarks:

Of necessity because of high turbidity in the lower part of the river the survey of the Calapooya River was begun at the upper end. Most of the stream below Dollar where the survey was terminated should be surveyed at some time.

The lower most part of the Calapooya lies in a broad flood plain. Shallow gradient, mud bottom and high summer temperatures are the rule. Upstream river enters a rather narrow v shaped valley in which spawning areas occur. Numerous tributaries enter the river in this region, but all are small, steep and of little or no value to salmon.

Spring chinooks and steelheads ascend the river each year being impeded by the old mill dam at Crawfordsville. It is reported by the operator of the mill that a part of the dam washed out in the spring of 1941 permitting some of the chinooks to escape to the upper river. An employee of the logging company at Dollar reported ca 200 chinooks during June in a big pool in the "narrows" two miles below Dollar. Several were also seen there in August by a lady but we could find no fish on 10/2/41. Steelheads have been reported upstream as far as the log jam, but not above this point. No chinooks were observed by the stream

General remarks (cont):

surveyors above Crawfordsville, but one dead chinook was found immediately below the mill dam.

The most immediate management measures would be to improve conditions at the Crawfordsville mill dam, the log pond at Dollar and the log jam above Dollar. Considerable good spawning rubble above the log jam would, in the opinion of the surveyors, be readily used by salmon. As matters now stand, the log jam is an impassable barrier.

Fish above Dollar is prohibited after July 1.

Temperature Data:

Yds. above Dollar	Date	Hour	Air Temp	Water Temp	Sky
2,000	10/2/41	11:30 AM	56.0 F	51.5 F	80% cloudy
3,700	10/2/41	11:15 AM	55.0	51.0	-----
10,500	9/30/41	1:00 PM	58.0	51.0	overcast
12,160	9/30/41	11:30 AM	58.0	50.0	overcast
15,360	9/29/41	4:00 PM	56.0	'49.0	clear
19,840	9/29/41	11:45 AM	55.0	49.0	clear
19,840	9/30/41	ll:oo AM	55.0	49.0	-----
Confl w/ N. fork	9/29/41	11:30 AM	52.0	47.0	s-B--

Pool Grade:

Sta	Dist (mi)	Rest Pls	Rest Pls/Mi	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S3T1 %	S3T2 %	S5T2 %	S6	Ttl
A-B	13	298	23	21	16	38	193	1	17	12	11	309
				7.0	5.4	12.8	64.8	3.0	5.7	4.0		

Gradient:

Station	Total Drop	Avg Drop Per Mile	Source of Data
Mth to Powell Hills br.	29'	3'	Albany & Halsey quads
Powell Hills br. to Oak Grove school br.	110'	14'	Halsey & Brnsville quads

Note: Topographic maps not available for the stream above Crawfordsville. Above Dollar, however, the gradient is steep; yet it flattens out somewhat for the 3 miles below the N. Fork confluence. Source of stream lies at elevation of approx 3,000'.

Tributaries:

A. Calapooya River
   1. Oak Creek
   2. Lake Creek .
   3. Butte Creek (intermittent stream)
      a. Sodom Ditch " "
      b. Cochran Creek "
   4. Walton Slough
      a. Cortney Creek (intermittent)
      b. Spoon Creek "
   -----Brownsville Ditch-----
   5. Warren Creek
   6. Brush Creek
   7. Washout Canyon Creek
   8. Potts Creek
   9. King Creek
   10. North Fork
   11. United States Creek
   12. Tredwell Creek

Tributaries (in area surveyed 1942 upper portion):

1. Big Creek, 1590 yds above Dollar; left bank; 5-7 cfs; cascade and log jam at mouth. Inaccessible.
2. 1780 yds above Dollar; left bank (1 cfs steep, no value to salmon).
3. 1890 yds above Dollar; right bank; 4' wide; 3-4 cfs; cascade near mouth. Probably of little value.
4. 4200 yds above Dollar; right bank; 8' wide; ca 5 cfs; steep. Boulder channel. No value to salmon.
5. 4400 yds above Dollar; right bank; (1 cfs, no value).
6. 5960 yds above dollar; left bank; 8' wide; ca 3 cfs; too steep and rough for salmon.
7. 6480 yds above Dollar; left bank; 1 cfs; spring feeder. No good for salmon.
8. 7000 yds above Dollar; right bank; ca l-l.5 cfs; spring feeder. No good for salmon.
9. 7350 yds above Dollar; right bank; 2-3 cfs; steep, unaccessible.
10. 7400 yds above Dollar; right bank; 5' wide; 3-4 cfs; all tumbling cascades. Inaccessible and unuseable.
11. 7720 yds above Dollar; left bank; 1 cfs; steep, inaccessible.
12. 7810 yds above Dollar; left bank; 2-3 cfs; steep; no value to salmon.
13. 8680 yds above Dollar; right bank; 1 cfs; no value to salmon.
14. 9460 yds above Dollar; left bank; 1-2 cfs; steep, inaccessible; no value to salmon.
15. 9690 yds above Dollar; right bank; l-2 cfs; steep, inaccessible.
16. 9940 yds above Dollar; right bank; l-2 cfs; 45 degree slope; inaccessible.

Tributaries **(cont):**

17. 10050 yds above Dollar; right bank; 1 cfs; steep, inaccessible.
18. 10650 yds above Dollar; left bank; 1 cfs; steep, inaccessible.
19. 10790 yds above Dollar; right bank; ca 3 cfs; 8' falls at mouth; inaccessible.
20. 11550 yds above Dollar; right bank; 4' wide; 1-3 cfs; enters over 10' tumbling cascades; inaccessible.
21. 11910 yds above Dollar; left bank; 1 cfs; 100' drop into river; no value.
22. 12410 yds above Dollar; left bank; 10' wide; 3-5" deep; ca 608 cfs; boulder channel too steep and rough for salmon.
23. 12790 yds above Dollar; right bank; ca 3 cfs; in deep v canyon; steep, inaccessible.
24. 13360 yds above Dollar; left bank; ca 1 cfs; steep, no value.
25. 13960 yds above Dollar; right bank; 1 cfs; no value to salmon.
26. 14060 yds above Dollar; left bank; 6-9' wide; ca 5 cfs; tumbling in boulder channel; inaccessible.
27. 14760 yds above Dollar; right bank; ca 5 cfs; 10' sloping but near mouth; inacessible.
28. 15620 yds above Dollar; right bank; 1 cfs; steep, inaccessible.
29. 16310 yds above Dollar; right bank; ca 2 cfs; steep, inaccessible.
30. 16590 yds above Dollar; right bank; 1-2 cfs; steep; no value.
31. 17'280 yds above Dollar; left bank; 1-2 cfs; no value to salmon.
32. 17630 yds above Dollar; left bank; 1 cfs; no value to salmon.
33. 17830 yds above Dollar; right bank; ca 1 cfs; no value to salmon.
34. 18140 yds above Dollar; right bank; 1-2 cfs; no value.
35. 18910 yds above Dollar; left bank; 2-3 cfs; two channels; no value.
36. King Creek; 19160 yds above Dollar; left bank; 3' wide; 1-2 cfs; no value at low water.
37. 19560 yds above Dollar; right bank; 2-3 cfs; enters over a steep cascade falls; inaccessible.
38. 19810 yds above Dollar; right bank; ca 1 cfs; no value to salmon.
39. 21640 yds above Dollar; left bank; ca 2 cfs; 2' wide.
40. 21840 yds above Dollar; right bank; 4-5 cfs; comes in through a steep sided gulley; shallow; no good for salmon.
41. North Fork; 22840 yds above Dollar; left bank; 15-20' wide'; 2-6" deep; 2/3 size of main stream.

Marys River

River System: Willamette River
Stream Surveyed: Marys River

No data was recorded for Marys river. However, a list of tributaires to Marys river follows.

Tributaries:

I. Marys River
  1. Oak Creek
    a. Skunk Creek
      (1) Alder Creek
  2. Muddy Creek
    a. Bull Run Creek
    b. Beaver Creek
      (1) Starr Creek
      (2) Powell Creek
      (3) Gleason Creek
    c. Hammer Creek
    d. Reese Creek
    e. Oliver Creek
  3. Greasy Creek
    a. Wells Creek
    b. Rock Creek
  4. Tumtum Creek
    a. Mulkey Creek
    b. Bark Creek
    c. Shotpouch Creek

Long Tom River

River System: Willamette River
Stream Surveyed: Long Tom River

Date of Survey: Surveyed by observation station selection method on June 8 and 11-13, 1938 by Parkhurst and Wilding.

Source: Rises on the easstern slopes of the coast range of Oregon in S1, T16S, R7W.

Direction of Flow: It flows, south south east approximately 14 miles to the town of Noti where it is joined by Noti Creek and its tributaries, then swings east and north east through Elmira to run north for over 20 miles gradually approaching the Willamette right bank which it joins at present through three different channels each over 1.5 miles apart from the others.

Total Length: Approximately 48 miles selection method.

General Remarks:

The lower 15 miles of the river flows in the nearly flat bottom of the Willamette Valley. The stream has many abandoned, channels about its present mouths and shows evidence of a flood rise up to 20'. The bottom is practically all mud in this section, the banks being steep, of earth and 20' in height and covered with a thick tangle of marginal'vegetation of maple, willow, alder, blackberries, nettles etc. The land around there is mostly cultivated, or at least in pasturage. The river is turbid, even at time of low water.

The stream varies fro 65 to 250' wide in places, averaging 75'; and this lower stretch is practically a big slough being very sluggish, with fallen trees and brush in the channel at frequent intervals. It is 4-6' deep and as early as the June survey, the temperature was as high as 69 degrees F it being an unfavorable stream for salmon.

From the vicinity of Monroe. (approximately 6 miles up) to Elmira (approximately 25 miles up), the stream gradient increases slightly, and the right bank is approached by low rolling hills which are about 30% cultivated, with scattering patches of mixed second growth trees. This mid section of the stream has slightly lower banks, with an occasional bedrock outcrop in the usual earth composition. Marginal vegetation continues dense and the valley narrows gradually until about 5 miles above Elmira it is

General remarks (cont):

about 1/2 mile wide between low hills, which slope gradually to the creek banks. A small part of the hills is cultivated from here on upstream, although the thin second growth is often cut for fuel. The stream is now only about 30' wide, 4' deep, still muddy and the banks from 6'-12' high. Water temperature had comparatively dropped to 58 degrees F on June 12, 1938. This decrease is apparently due to the fact that Coyote Creek which carries quite warm water through the flat land to the east, enters about 6 miles below Elmira, and above Elmira. Long Tom River swings bank into the hills to the west and north above Noti where it is confined in deeper valleys in the coast range east slope and is largely spring fed.

Above Noti (5 miles above Elmira), Long Tom River is a much, smaller stream because Noti Creek and its tributary Poodle Creek, enter Long Tom approximately 1 mile below the town of Noti and carrying nearly as much as Long Tom itself at that point. Approximately 5 miles above Noti there is a mill dam that was considered impassable to salmon. Water in the creek here was but 12" deep, kstill slightly muddy and temperature 57 degrees F (June 12, 1938). The flow was estimted at only 8 cfs and the stream bed was still just mud and sand, but flood stage at this point was apparently not over 4-6'.

U.S.G.S. water supply paper #864 lists a 15 year average discharge at the Long Tom at Monroe, approximately 5 miles above its mouth, as being 725 cfs, and for the water year 1937-38 the maximum discharge was 11,500 ft on March 19. The minimum discharge was 14 cfs on August 17-19 and 31 and also September 4-6, and the mean for'the year was 1216 cfs.

There is an irrigation ditch taking off approximately 1.5 miles below the mouth of the Coyote Creek, its unused surplus being returned some 3.5 miles downstream, but there were no dams below Noti at the time of the survey.

The flow by the U.S.G.S. water paper at a point 1/2 mile below the mouth of Noti Creek (but several miles above the mouth of Coyote Creek), for the water year 1937-38 was maximum 3140 cfs on March 19; minimum 13 cfs September 2,3 and 18; mean 358 cfs.

Long Tom River is not a good salmon stream. Spawning rubble is almost entirely lacking, and silting is considerable. The water is continually muddy except in the upper 10 miles which are inaccessible. The temperature is much too high during the summer months and the gradient is too low. The flow was too small from July to October. Only one or two people ever claimed to have seen salmon in the Long Tom River and those people only saw one or two and the presence of salmon is doubtful and certainly of no great value.

The army engineers'are at present engaged in the construction of a dam and water storage reservoir on the Long Tom River to be known as the Fern Ridge Resevoir. It is being built from Fern Ridge on the east side of Coyote Creek approximately 2 miles above its confluence with the Long Tom River. It will

General remarks **(cont):**

extend across both Coyote Creek and the Long Tom River to Richmond Butte, an elevation of approximately 300-400' above the surrounding landscape on the west bank of the Long Tom River. The impounded water behind this dam will cover a present swamp between Long Tom and Coyote Creek and will extend up each stream at least 2 or 3 miles, and will effectively block any possible salmon runs in the Long Tom River system. The 15 miles of the stream below the dam site is too much of a muddy high temperature slough to be of any use to salmon.

Dist abv Mth	Location	Air Temp	Water Temp	Width	Bnks-Rubble-Grdnt
4 miles	Bridge	67.0 F	69.0 F		muddy, slight
7 miles	#99 hwy			255'	mud 20' high
8.5 miles	White br			60'	15' high
10.5 miles	#99 hwy			78'	mud, bedrock
15.6 miles	Bridge	67.0 F	66.0 F		

Tributaries:

A. Long Tom River
  1. Shafer Creek
  2. Ferguson Creek
    a. Eber Creek
  3. Bear Creek
    a. Owens Creek
    b. Jones Creek
      (1) Nails Creek
----------Fern Ridge Dam-------Impassable Fish Barrier-------
  4. Coyote Creek
    a. Spencer Creek
    b. Fox Hollow Creek
  5. Squaw Creek
  6. Inman Brook
  7. Noti Creek
    a. Elk Creek
      (1) Poodle Creek
        (a) Jack Hayes Creek.

Note: Major portion of Long Tom system is covered by U.S.G.S. quadrangle maps (Monroe, Elmira and Halsey, OR quads). Upper portion not shown on these maps is on Suislaw National Forest Oregon map. For proposed dams by army engineers, see War Dept map of Willamette R. and tributaries Oregon, Proposed Plan for Coordinated Development place XVIII etc. Revised March, 1941, to include notes on new Fern Ridge Dam, U.S. Army Engineers Willamette Reclamation Project.

Tributaries **(cont):**

Shafer Creek: A small creek approximately 1.5 miles long, entering on right bank.

Ferguson Creek: A small creek approximately 6 miles long, entering the right bank of the Long Tom approximately 6 miles above Monroe, OR. I-t is about 6' wide at its mouth, has steep earth banks usually 3' high. When surveyed on June 8, 1938, it was nearly dry. No use to salmon.

Eber Creek: A tiny branch of Ferguson Creek only 1.5 miles long and of no value.

Coyote Creek

River System: Willamette River
Stream Surveyed: Coyote Creek, tributary to Long Tom River

Date of Survey: June 11, 1938 by investigators Parkhurst and Wilding. Because of slow, sluggish current and muddy turbidity of water, Coyote Creek was not surveyed, but was written up at intervals throughout its course.

Source: Rises from springs in the slightly elevated land between the Willamette River and the coast range in T19S, R4W. Low rolling foothills of coast range.

Direction of Flow: Flows north to join the left bank of the Long Tom River in S27 and 28, T16S, R5W.

Total Length: Approximately 25 miles

Stations:

Location	Width	Depth
At confluence	51'	3.0'
East of Elmira	44'	3.0'
East of Crow	33'	2.5'

Fish (salmon): No salmon reported in this stream.

Fish (other than salmon): Catfish and chubs seen.

General Remarks: .

Spawning area: None Bottom: all mud
Turbidity: muddy Banks: 6-8' high, all'earth and clay
Gradient: Very slight Velocity: Sluggish
Color: White

Coyote Creek is not a suitable habitat for salmonoid fishes. The water is warm and muddy. The watershed is but thinly covered with second growth conifers and deciduous trees, so that the runoff is not held back and the stream is subjected to floods. The flow is very sluggish and there are no riffle areas.

Squaw Creek and Inman Brook

River System: Willamette River
Stream Surveyed: Squaw Creek and Inman Brook, tributaries to Long Tom River

General Remarks:

Both are small tributaries approximately 1.5 miles long entering on the right bank of the Long Tom River between the mouth of Coyote Creek and the mouth of Noti Creek. They are both dry or nearly so in the summer and, therefore, are of no value to salmon.

Noti Creek

River System: Willamette River
Stream Surveyed: Noti Creek, tributary to Long Tom River

General Remarks:

In itself, it is a small creek rising on a ridge west of the settlement of Crow, OR and looping west and north to join the Long Tom River about 1/2 mile below the settlement of Noti, OR. It is about 8 miles long. The upper 2/3 rds. of this stream is fed by short springfed feeders 1/4 to 1 mile in length, some of which are intermittent. It is a slightly muddy stream similar to Coyote Creek on a smaller scale, had a flow of approximately 4 cfs on 6/13/38, was 3" deep, and approximately 20, wide near the mouth.

It has little or no value to salmon. Its feeders, Elk and Poodle Creek double its flow in the lower mile. Elk Creek and Poodle Creek join about 1 mile above their union with Noti Creek. It is a question as to which enters which, both being approximately the same size, so we will consider that Poodle Creek enters Elk Creek about 1 mile above the mouth of the latter, and that Elk Creek enters Noti Creek about 1 mile above its mouth.

Elk Creek

River System: Willamette River
Stream Surveyed: Elk Creek, tributary to Noti Creek

Date of Survey: June 13, 1938

Source: Rises on east slope of coast range in T17S, R7W

Direction of Flow: East

Total Length: 6 miles

General Remarks:

Banks 4' high, steep, earth, with moderately dense vegetation. Drainage hilly with mostly conifer covering. Width near mouth 15', depth 6", gradient slight, flow approximately 12 cfs. Bottom mud and sand; no spawning rubble. Water temperature 54.0 degrees F.

No natural obstructions. Mill dam with poor fish ladder 1.2 miles above mouth of Poodle Creek impassable to salmon. Slight pollution of sawdust and ashes below mill.

Flucutation in water level 2'. Flume from mill carries approximately.2 cfs,. No salmon reported, but trout said to be in stream.

Of no importance to spawning salmon due to lack of suitable rubble, small flow etc. Will be entirely blocked by Fern Ridge Dam of Army Engineers.

Poodle Creek and Jack Hayes Creek

River System: Willamette River
Stream Surveyed: Poodle Creek and its tributary Jack Hayes Creek, both creeks are tributaries Elk Creek

Date of Survey: June 12, 1938

Source: Source is on east slope of the coast range, north of the headwaters of Elk Creek.

Direction of Flow: Southeast and south to join the right bank of Elk Creek approximately 1 mile above the mouth of the latter.

Total Length: Approximately 6.5 miles

General Remarks:

Poodle Creek lies in a valley that is not over 1/4 mile wide. The valley is 75% cultivated, either under crops or as pasture. It is bordered by a few low rolling hills that are covered with a poor second growth of trees and brush, also used as pasturage.

Poodle Creek:

Marginal vegetation is deciduous and dense, on earth banks lo'-high. The stream is 15' wide, 6" deep, and has a flow of approximately 6 cfs and temperaature of 52.0 F. The bottom is of medium rubble, clay and sand but the rubble is packed so solidly in the clay that it is practically all unusable. The stream fluctuates in height quite rapidly and in the sping may flood suddently for short periods of 12 hours or so. Just below Jack Hayes Creek, Poodle Creek has dwindled to a width of 6' and an average depth of less than 6", the water is clear and the banks not over 2' high, the surrounding area cut off, but only about 10% cultivation. Poodle Creek has never been known to have salmon in i,t and is too small to be of importance, although it can be a fairly good trout stream.

Jack Haves Creek:

Comes in on the left bank of Poodle Creek 4 miles upstream. It is a small unimportant spring fed stream approximately 2 miles long.

McKenzie River

River System: Willamette River
Stream Surveyed: McKenzie River

Date of Survey: August, 1937 and June 1938, by Baltzo, Hanavan, Kolloen, Lobell, Wilding and Langton

Source: Clear Lake, S7, T14S, R6E

Direction of Flow: South and west to the Willamette River confluence in S6, T17S, R3W Willamette National Forest Map

Total Length: 81 miles 78.4 miles mouth to Tamolitsh Falls surveyed

Station Location:

St	Location	Distance Above Prev. Station Yds	Distance Above Prev. Station Miles	Distance Above Mouth Yds	Distance Above Mouth Miles	Map Location	Width	Depth
A	Coburg br.	---			0.3	S10,T17S,R3W	276'	7.0'
B	Hayden br.		9.1		9.4	S20,T17S,R2W	150'	24.5'
C	Hendricks br.		9.2		18.6	S32,T17S,R1W	315'	6.1'
D	Eugene Power Dam (Vida)		11.9		30.5	S31,T16S R2E	350'	dam
E	Rennie Ft br.		8.2		38.7	S4,T17S,R3E	270'	6.0'
F	'Belknap br.		16.1		54.8	S17,T16S,R5E	96'	4.0'
G	McKenzie br.		4.7		59.5	S14,T16S,R5E	87'	4.5'
H	Belknap Springs		8.9		68.4	S11,T16S,R6E	97'	5.5'
I	Smith R. br.		7.2		75.6	S11,T15S,R6E	81'	22.0"
J	Tamolitsch Falls		2.2		77.8	S31,T14S,R7E	falls	falls

EPA River Reach Codes:

Station	HUC	SEG	Rmi
B	17090004	0002	0.20
C	17090004	0003	2.29
D	17090004	0006	3.89
E*	17090094	0011	2.52
F	17090004	0044	3.84
G	17090004	0050	0.53
H	17090004	0052	0.97
I	17090004	0055	2.91
J	17090004	0056	1.36

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

Sta	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
Mth-A	577,500	196,530	34.6	210,310	36.4	170,660	29.9	----	
A-B	677,900	236,430	35.0	245,840	36.2	188,880	27.9	6,750	1.0
B-C	1,229,000	481,030	39.2	453,220	36.8	294,750	24.0	----	
C-D	1,624,500	801,880	49.3	475,710	29.3	343,950	21.2	2,960	0.2
D-E	809,800	517,100	63.8	175,310	21.6	117,390	14.6	----	
E-F	1,538,800	815,590	53.0	412,910	26.8	297,460	19.3	12,840	8.3
F-G	241,100	157,420	65.3	49,730	20.6	32,430	13.5	1,420	0.6
G-H	427,900	245,780	57.4	111,350	26.0	67,270	15.8	3,500	0.8
H-I	472,800	201,130	42.5	187,080	39.6	79,360	16.8	5,230	1.1
I-J	91,700	68,620	74.8	10,080	11.0	6,670	7.3	6,330	6.9
Tot	7,691,000	3,721,510	48.4	2,331,640	30.3	1,598,820	20.8	39,030	0.5

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	% Usable
Mth-A			380,970	65.9		
A-B			434,720	64.1		
B-C			747,970	60.9		
C-D			819,660	50.5		
D-E			292,700	36.2		
E-F			710,370	46.2		
F-G			82,160	34.1		
G-H			178,620	41.8		
H-I			266,440	56.4		
I-J			16,750	18.3		
Total			3,930,360	'51.1		

Spawning Area Unavailable and Unusable: None

Character of Watershed:

	Mouth-J
Mountainous	X
Hilly	
Rolling	
Flat	

Character of Watershed **(cont):**

	Mouth-J
Swampy	
Wooded	X
Open	
Cultivated	Less than 1%
Character of Valley	
Character of Banks	
Density of Marginal Vegetation	
Erosion a) Banks	
b) Watershed	

Diversions:

Diversion 1: 5 miles below Sta. D, canal to power house near Walterville. No protective devices at mouth of ditch. Grizzly at power house. Mean flow from 800-1000 cfs (Water Resources of Oregon 1925-30).

Diversion 2: At Sta. D, Leaberg power canal and Vida dam. Canal 54′ wide - grizzly at mouth behind which closely suspended chains are in constant motion, probably not very effective. Flow about 1000 cfs. At the end of the ditch it is 89′ through the power house to the tail race. There is a 4" grizzly in front of the power intake. A 6" backed by a 2" grizzly protects the spillway. Rainbow fingerlings were numerous in front of the intake.

Artificial Obstructions:

1. Sta. C Fish Comm. racks - usually stop the entire salmon run. Put in river in May, eggs taken in August for Oregon hatcheries. Occasionally racks are washed out by spring floods.

Artificial Obstructions **(cont):**

2. Sta. D Vida Dam (Eugene Power Supply),. Total drop 15', width 415', 3-100' drum gates, 1-30' drop gate, concrete and steel construction. Fish ladders on each side of dam, 11 steps, 10' square resting pools 30" jumps. Apppears to be very efficient.

Natural Obstructions:

1. Sta. J Tamolitsch falls, 35-40' high, impassable. Nearly dry at the crest late in the summer when most of the river flow comes from springs at the base of the falls.

Fluctuation in Water Level:

Cause of Variation: Rains and snow runoff. Large spring flow in summer.

Feet Variation: Fluctuation not as great as other tributaries of the Willamette. Less than 4' variation was estimated at McKenzie Bridge. Steep gradient and spring flow contributing factors.

Stream Flow: 1933 June maximum 6,750 cfs. October minimum 1,030 cfs at McKenzie Bridge.

Pollution: None

Fish (salmon): Species: Chinook are the only salmon that run in the McKenzie River.

Remarks: In 1937 the Oregon Fish Comm. racks (at Sta. C) were washed out by June floods and a fair number of Chinooks were able to escape to spawning grounds in the upper river. Several of these were observed in the main river, a few were reported in Lost Creek.. Seven were seen in Horse Creek and 30 to 40 were seen in South Fork. In 1938 the racks held, and the entire run was held.

Fish (other than salmon):

Species	Date	Very Abundant	Abundant	Fair No.	Scarce
Rainbow (Redsides)	1937-38			X	

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

Species	Date	Very Abundant	Abundant	Fair	No.	Scarce
Rainbow (sm)	1937-38				X	
Cutthroat	"				X	
Brook Trout	"					X
Dolly Varden	"					X
Whitefish	"				X	
Squawfish	"		X			
Suckers	"		X			
Cyprinids	"		X			

Remarks: This river is famous for Redside fishing and is fished intensively. Restrictions on boat fishing, stocking, and excellent natural protection have prevented serious depletion.

General Remarks:

Topography:

The entire watershed is mountainous. The high cascade divide area is largely bare lava flows with occastional stands of lodge pole and white pine. The lower slopes are densely forested with Douglas Fir and smaller stands of spruce, hemlock, yellow pine and a few sugar pines. Cedars grow on the river margin with alder, maple and willow forming a dense brush cover. The valley is about four miles wide near the mouth. It narrows at Sta. C and is canyonous above Sta. I. The banks are earth rubble, and lava from 4-30' high.

Character of Stream:

Above Sta. D the gradient is for the most part steep moderating in the lower stream section. At flood stage the velocity increases but vertical rise 'is not great. The most extensive spawning areas are below Sta. F. Above this point they are generally small and located near the banks. The rough stream bed and dense brush cover, together with a fairly steady stream flow, afford adequate fish protection at all times. The large spring flow maintains a moderate water temperature throughout the year.

Fish Population:

Chinook run to and enter Lost Creek, a rough glacial tributary. None were reported above this confluence. Horse Creek and the South Fork provide the most important spawning grounds. Some of the fish held at Sta. C spawn on the riffles below the racks. Excepting the years when the racks wash out the

General remarks **(cont):**

extensive spawning areas from Sta. E-F are not accessible. Natural protection and legal restrictions have prevented a more serious depletion of the trout population in spite of intensive fishing. The large **redside** are most sought after but good catches of smaller rainbow and cutthroat are also reported. Whitefish and a few dolly vardens are also taken. Scrap fish are not excessively numerous.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
A	6/13/38	10:15 AM	56.0 F	52.0 F	cloudy
B	"	11:15 AM	64.0	53.0	"
C	6/12/38	4:20 PM	-		p.cloudy
D	6/13/38	1:30 PM	66.0	52.0	"
E	6/12/38	3:45 PM	59.0	50.0	cloudy
Blue R. Confl	8/24/37	2:30 PM	-	54.0	fair
F	8/25/37	12:10 PM	72.0	48.0	"
G	"	11:55 AM	69.0	47.0	"
McKenzie br	"	11:30 AM	66.0	47.0	"
H	"	10:45 AM	65.0	47.0	"
I	8/21/37	3:45 PM	79.0	45.0	"
J	"	4:10 PM	78.0	44.0	"

Pool Grade: Small pools to numerous to count.

Sta	Dist (i)	Resting Pools	Resting Pools/Mile
Mth-A	4%	55	14.0
A-B	5.0	101	20.0
B-C	9.0	130	14.0
C-D	13.6	195	14.5
D-E	7.0	137	19.5
E-F	16.3	143	9.0
F-G	5.0	18	3.7
G-H	9.0	66	7.3
H-I	7.0	131	18.5
I-J	2.5	133	58.6
Total	78.4	1,109	14.1

Gradient:

Sta	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
Mth-A	5.0	45'	9'	U.S. Engineers-Portland

Gradient **(cont):**

Sta	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
A-B	6.0	35'	6,0'	
B-C	9.0	100'	11.0'	
C-D	15.5	170'	11.0'	
D-E	10.0	155'	15.0'	
E-F	16.5	345'	21.0'	
F-G	5.0	280'	56.0'	
G-H	9.0	3 7 0 '	41.0'	
H-I	7.0	535'	76.4'	
I-J	2.5	260'	100.4'	

Tributaries:

1. Mohawk Creek, left bank, surveyed'20 cfs est.
2. Camp Creek, left bank, surveyed 8 cfs est.
3. Johnson Creek, left bank, very small.
4. Ritchie Creek, right bank, small and steep.
5. Trout Creek, right bank, small and steep.
6. Hatchery.Creek, left bank, water to trout hatchery-small.
7. Indian Creek, left bank, less than 4 cfs.
8. Gate Creek, left bank, surveyed 25 cfs-water to hatchery.
9. Martin Creek, right bank, less than 3 cfs.
10. Bear Creek, left bank, less than 1 cfs.
11. Deer Creek, right bank, less than 4 cfs.
12. Quartz Creek, right bank, written up.
13. Elk Creek, left bank, less than 2 cfs.
14. Blue River, left bank, surveyed 53 cfs.
15. Tenas Creek, right bank, less than 2 cfs.
16. South Fork, right bank, surveyed 300 cfs.
17. Mill Creek, left bank, less than 3 cfs.
18. Horse Creek, right bank, surveyed 332 cfs.
19. Lost Creek, right bank, written up 231 cfs.
20. Scott Creek, right bank, 4 cfs.
21. Boulder Creek, right bank, 3 cfs.
22. Frissel Creek, left bank, 2 cfs.
23. Deer Creek, left bank, surveyed 32 cfs.
24. Ollalie Creek, right bank, surveyed 70-80 cfs.
25. Anderson Creek, right bank, written up 30-40 cfs(inaccessible).
26. Smith River, left bank, surveyed 25-30 cfs.
27. Kink Creek, right bank, less than 3 cfs.

Mohawk Creek

River System: Willamette River
Stream Surveyed: Mohawk Creek, tributary to McKenzie River

Date of Survey: June 19-21, 1938 by Hanavan, Parkhurst, Wilding, Langton & Morton.

Source: Numerous small streams that drain the southern slope of a branch range of cascades. T15S, R2E.

Direction of Flow: Southwest

Total Length: 25 miles

Station Location:, This area is located about 25 miles northeast of Eugene, OR. The branch range mentioned above forms the boundary line between Linn and Lane counties at this point.

St	Location	Distance Above Prev. Station Yds	Miles	Distance Above Mouth Yds	Miles	Map Location	Width	Depth
A	Confl w/ McKenzie R	--			--	S18,T17S,R2W	no records	
B	Silver Creek bridge		4.5		4.5	S3,T17S R2W	"	
C	Marcola bridge		4.0		8.5	S19,T16S,R1W	"	
D	Hwy bridge 1 mi below Mabel		2.5		11.0	S8,T16S R1W	"	
E	Wagon bridge 14.5 mi above confluence		3.5		14.5	S27,T15S R1W	"	

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090004	0083	0.17
B	17090004	-0083	4.77
C	17090004	0087	0.00
D	17090004	0089	0.00
E*	17090004	0090	3.23

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
A-B			1.3		19.7		21.8		57.0
B-C			9.9		29.0		23.0		38.0
C-D			30.2		26.4		12.3		31.0
D-E			40.0		22.8		20.4		16.0
Above E			60.8		20.8		ii.4		7.0
Total			23.8		23.5		18.5		34.0

Classification of stream based on amount of usable spawning rubble and area present: N/A

Spawning Area Usable and Available: No data available

Spawning Area Unavailable and Unusable:

Cause of Unavailability: Survey made from confluence up to impassable falls 20.3 miles from confluence. A 12' falls above 4-5' falls form a natural obstruction. Creek was not surveyed above falls.

Character of Watershed:

	A-B	B - C	C-D	D-E	E-F
Mountainous	Above Sta. E -- really high hills				
Hilly	Sta. C-E -- brushy				
Rolling	Between Sta. B-C				
Flat					
Swampy					
Wooded	Very dense brush all along stream				
Open					
Cultivated	Below Marcola well developed; above Marcola to St.E fairly well developed. Above St.E none cultivated.				
Character of Valley					

Character of Watershed (cont):

	A-B	B-C	C-D	D-E	E-F
Character of Banks					
Density of Marginal Vegetation					
Erosion a) Banks					
b) Watershed					

Diversions: None

Artificial Obstructions: None

Natural Obstructions:

1. 20.3 miles from confluence 12' high falls over a bedrock, above a succession of 4' to 5' falls. Impassable at any season.

Fluctuation in Water Level:

Cause of Variation: There are extreme variations in water level because there is nothing to hold back the runoff. A flood this spring registered a 15' rise on a water gauge. A few springs and the many small tributaries near its source that feed it in the dry season, come from denuded hills completely logged off and burned over.

Pollution: None

Fish (salmon): None observed although they could come in from the McKenzie River.

Fish (other than salmon): Small chubs, suckers, turtles, and small trout fry were abundant. Six inch cutthroat were scarce.

General Remarks:

Survey:

20.3 miles upstream from confluence of Mohawk Creek and the McKenzie River.

Topography:

Mohawk Creek flows through a flat bottom swamp for the first mile above its mouth. From this area upstream to Marcola, the valley is about 2 miles across and is well cultivated - mostly grain, corn and pasture. Above Marcola, the valley narrows gradually. The valley is bordered all along by moderately steep hills completely logged off and covered with bracken ferns.

Character of Stream:

Banks 4-5' high in lower portion are composed of earch and humus and covered by a dense undergrowth of blackberry and wild rose bushes and everything else that has thorns.

In the upper portions of the river, the banks get higher and are composed of bedrock (12-30' high in places). The low flat banks in the lower portion permit much of the lower valley to be flooded during high water stage. In one place 40, were cut off a farmer's field by erosion this spring, when a 15' rise was marked on the gauge. Naturally there are extreme variations in water level in this stream because there is nothing to hold back the runoff and the lower portion has a flat gradient while the upper portion is only fair to moderate in gradient.

The lower portion of the stream has many deep holes and not so many good riffles; whereas the upper portion has many rocky cascades and riffles and fewer resting pools. Up to Marcola, the creek bottom is over 50% mud and sand and what rubble there is, is heavily silt-covered. From Mabel on, the creek bottom is over 50% bedrock and large rubble and naturally the water is much clearer. We would not consider it a good salmon spawning stream.

Fish Population:

The lower portion of Mohawk Creek is fairly alive with 3" chub minnows and larger suckers. Many turtles were also observed in this part. Above Mabel, trout fingerlings were fairly common; while in the extreme upper portions, quite a few 6" cutthroat trout were seen.

Residents claim there used to be a salmon run in the Mohawk 25 or 30 years ago but no salmon nor steelhead have been seen in the river since that time. The stream used to be fished quite heavily but not any more, according to, residents. The brushy character of the stream should protect a good trout population.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
11.5 mi up	6/21/38	12:00 PM	82.0 F	64.0 F	clear
20.0 mi up	6/21/38	---	81.0	60.0	clear

Pool Grade:

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6	Ttl
A-B	5.0	95	19.0	46	3	40	6	3	98
				48.4	3.2.	42.1	6.3		
B-C	4.0	73	18.3	33	4	28	8	5	78
				45.2	5.5	38.3	11.0		
C-D	3.0	32	10.7	9	1	14	8	28	60
				28.1	3.1	43.8	25.0		
D-E	3.0	34	11.3	14	10	7	3	15	49
				41.2	29.4	20.6	8.8		
E-end	5.3	43	8.1	21	1	1	20	10	53
				48.8	2.3	2.3	46.5		
Total	20.3	277	13.6	123	19	90	45	61	338
				44.4	6.9	32.5	16.2		

Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
A-C	9.0	70'	7.7'	Condensed profiles of Willamette River and East Side Tributaries
C -end	9.0	250'	27.7'	U.S. Engineer Office, Portland, OR. No. V-2-7. 4/1 Plate IV Sheet I.

Tributaries:

MvGowan and Parsons enter on left bank. Then Mill Creek on right bank halfway between Mable and Marcola. Cash and Shotgun Creeks enter on left bank above Mable. Each of these tributaries were doing from 5-10 cfs. All other tributaries noted were carrying less than 3 cfs at the time of the survey.

Blue River

River System: Willamette River
Stream Surveyed: Blue River, tributary to McKenzie River

Date of Survey: September 16-17, 1937 by Baltzo and Koloen

Source: Willamette National Forest - McKenzie River Dist. T14S, R5E, Linn County, OR, 1/2 mile south of Squaw Mountain

Direction of Flow: Southwest from source

Total Length: 16 miles to end of longest tributary, Man Creek
9.2 miles (16,400 yds) surveyed

Station Location: So. Linn and No. Lane counties, Willamette National Forest, mouth on right bank McKenzie at Blue River, OR, at NW 1/4 S28, T16S, R4E.

St	Location	Distance Above Prev. Station Yds	Distance Above Prev. Station Miles	Distance Above Mouth Yds	Distance Above Mouth Miles	Map Location	Width	Depth
A	Confluence with McKenzie River		--		--	S28,T16S R4E	43'	9"
B	Confluence with Quartz Creek		1.0		1.0	S16,T16S R4E	71'	12"
C	Confluence with Lookout Creek		4.4		5.4	S6,T16S R5E	52'	9"
D	Confluence with Cook Creek		3.8		9.2	S21,T15S R5E	17'	5"

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090004	0059	0.05
C	17090004	0068	0.00
D	17090004	0069	1.04

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
A-B			53.7		26.8		16.6		3.0
B-C			48.5		31.6		17.1		2.8

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

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
C-D			61.1		29.1		15.3		2.5
Total			53.0		29.1		15.3		2.5

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

Spawning Area Usable and Available:

Station	Distance vds	miles	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	% Usable
A-B	13,750				43.4		
B-C	67,660				48.7		
C-D	28,290				37.1		
Total	109,700				44.5		

Note: Stream above end of survey is rather small, with a bottom composed chiefly of bedrock; very little additional spawning area to that noted on survey.

Spawning Area Unavailable and Unusable: No data available

Character of Watershed:

	A-B	B-C	C-D
Mountainous	X		
Hilly			X
Rolling			
Flat			
Swampy			
Wooded	X		
Open			

Character of Watershed **(cont):**

	A-B	B-C	C-D
Cultivated	None		
Character of Valley			
Character of Banks			
Density of Marginal Vegetation			
Erosion a) Banks			
b) Watershed			

Diversions: None

Artificial Obstructions: None

Natural Obstructions:

1. 2,700 yds above Sta. B; bedrock chute (70 degrees L); 9' high; impassable at low water.

2. Intervals between Sta. C-D; falls over bedrock ledges; 2-5' high; passable with difficulty.

Fluctuation in Water Level:

Sta	Date	Stream	Volume
A	8/15/37	53 cfs,	good
C	8/17/37	62 cfs,	rough
D	8/17/37	13 cfs,	good

% of stream bed covered: About 80%. Stream at summer low level when surveyed.

Fluctuation in Water Level (cont):

Cause of Variation: Melting of snow in mountains up upper watershed. Heavy rains in late spring and in fall.

Feet Variation: Above 4' to 8'. up to 10' in narrow gorges above Sta. C. Steep valley walls cause quick runoff into stream.

Pollution: None

Fish (salmon): Species: Spring chinooks
Estimated Number (Spawners):

Between	Number	Date
B-C	8*	8/17/37

*All in pool below 9' falls.

Fish (other than salmon):

Species	Date	Very Abundant	Abundant	Fair	No.	Scarce
Rainbow Trout	8/17/37		X			
Suckers	8/17/37					X
Dace	8/17/37			X		

Remarks: Rainbow trout in upper reaches; suckers near mouth and dace in lower reaches.

General Remarks:

Survey:

9.3 miles from mouth to Cook Creek stream above is difficult of access and small. Very little spawning area. Doubtful if better survey is warranted.

Topopgraphy:

The watershed of Blue Creek consists of high hills which increase to mountains upstream. They are heavily wooded with large'second growth conifer with rather open underbrush and a scattering of alder and maple. The dense covering of these trees

General remarks **(cont):**

prevents any noticeable erosion from the valley walls, which are very steep. In most cases, the stream and its canyon constitutes the entire floor of the narrow valley but between Sta. B and C the floor flattens out to 1/4 mile in width.

Character of Stream:

Blue River is characterized by the predominance of bedrock and large rubble on its bottom. This is so evenly scattered about that half the gravel noted as right for spawning is not suitable. Good riffles are scarce and almost the only good spawning areas are at the lower ends of the large pools.

Between Sta. B and C the river runs through cut banks from 4' to 10' high above which the valley- floor is flat. Elsewhere the stream is in a bedrock canyon fro 15' to 25' deep, and the steep valley walls come to the very edge of the canyon. A moderate growth of alder, conifers, maple, willow and grass lines the stream margins above the bedrock walls. Its gradient is moderate becoming steep at short distances.

Fish Population:

Old timers claim that large salmon ran once in the river, yet the spawning area appears too limited to support a fair run. In recent years, the State Hatchery Racks in the lower McKenzie have prevented salmon from ascending to the Blue River. The racks washed out in 1937 but even then very few fish entered the river. The Blue River's long suit is its trout population. They are scarce near the road but become increasingly numerous above the road end and very abundant in the upper reaches. These McKenzie rainbow trout grow to 15" with an average of 10". There are many large pools and an abundance of food. Fishing is reported poor in the late summer, but excellent always at other times for those who hike off the road.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
A	8/15/37	4:45 PM	71.0 F	62.5 F	Clear
B	8/15/37	2:45 PM	76.0	62.0	Clear
C	8/17/37	11:30 AM	69.0	58.0	Clear
D	8/17/37	4:15 PM	73.0	59.0	Clear

Pool Grade:

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S1T1 %	S1T2 %	S1T3 %	S2T1 %	Total
A-B	1.0	23	23	6 26.1	5 21.7	9 39.1	3 13.1	23
B-C	4.4	45	10	13 28.9	8 17.8	21 46.6	3 6.7	45
C-D	3.9	48	12	27 56.3	6 12.5	10 20.8	5 10.4	48
Tot	9.3	116	13	46 39.7	19 16.4	40 34.5	11 9.4	116

Sta	Rest Pools	Rest Pls/Mi	S2T2 %	S2T3 %	S3T1 %	S3T2 %	S3T3 %	S5T1 %	S5T3 %	Ttl
A-B	15	1		7 46.7	2 13.3	1 6.7	3 20.0	2 13.3		15
B-C	29	7	7 24.1	3 10.3	4 13.8	3 10.3	9 31.0	2 6.9	1 3.6	29
C-D*	49	13		6 12.2	14 28.6	6 12.2		5 10.3		49
Tot*	93	10	7 7.5	16 17.2	20 21.5	10 10.8	12 12.9	9 9.7	1 1.1	93

Between Stations C-D only (* more pool types)

S4T1	S4T2	S4T3	S5T1	S5T3
3 6.1	3 6.1	3 6.1	2 4.1	7 14.3

*In the grand total:

S4T1	S4T2	S4T3	S5T1	S5T3
3 3.2	3 3.2	3 3.2	2 2.2	7 7.5

Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
A-B	1.0	100'	Estimated	
B-C	4.4		75' decreasing to 50'	
C-D	3.9	80'		

Tributaries:

1. Simmons Creek; 650 yds above Sta. A;. left bank, 2 cfs.
2. Quartz Creek; Sta. B; left bank, surveyed.
3. Lookout Creek; Sta. C; right bank; surveyed.
4. Mona Creek; 400 yds above Sta. C; left bank; 2 cfs.
5. Tidbits Creek; 1 mile above Sta. C; left bank; 8 cfs.
6. Cook Creek; Sta. D; left bank; 3 cfs.

All flows estimated at summer low level

Lookout Creek

River System: Willamette River
Stream Surveyed: Lookout Creek, tributary to Blue River

Date of Survey: August 17-18, 1937

Source: Confluence McRae Creek and Mack Creek, S27, T15S, R5E.

Direction of Flow: Southwesterly to confluence with right bank of Blue River. S6,T16S,R5E.

Total Length: 3 1/4 miles

Station Location:

St	Location	Distance Above Prev. Station Yds	Miles	Distance Above Mouth Yds	Miles	Map Location	Width	Depth
A	Confluence with Bue River	---			---	S6,T16S R5E	14'	11.0'
B	End of survey		2.3		2.3	S28,T15S,R5E	30'	7.5'

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090004	0065	0.00
B*	17090004	0065	2.51

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R. %	M.R. %	S.R. %	M&S %
A-B		61.8	4.7	13.2	0.3

Classification of stream based on amount of usable spawning rubble and area present: N/A

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd^2)	Available Spawning Area (yd^2) (MR&SR)	% Avail	Usable Spawning Area (yd^2)	% Usable
A-B	14,380			37.9		

Spawning Area Unavailable and Unusable:

Cause of Unavailability: At termination of survey, the gradient is very steepl it is probably that impassable barriers may occur above with unavailable spawning ground above.

Character of Watershed:

	A-B	B-C	C-D	D-E	E-F
Mountainous	X				
Hilly					
Rolling					
Flat					
Swampy					
Wooded	X				
Open					
Cultivated	None				
Character of Valley					
Character of Banks					
Density of Marginal Vegetation					
Erosion a) Banks					
b) Watershed					

Diversions: None

Artificial Obstructions: None

Natural Obstructions:

1. 300 yds above Sta. A; 6' high falls; passable with difficulty.
2. 2,400 yds above Sta. A; 9' high falls; impassable at low -water.
3. 2,600 yds above Stal A; 6' high falls; passable with difficulty. (over bedrock)

Fluctuation in Water Level:

Sta	Stream Volume
A	24 cfs (good)
B	13 cfs (rough)

Cause of Variation: Melting snow and mountainous watershed.

Feet Variation: 3' to 4' - 80% of stream bed covered.

Pollution: None

Fish (salmon): None

Fish (other than salmon):

Species	Date	Very Abundant	Abundant	Fair	No.	Scarce
Trout	8/18/37		X			

Remarks: These trout, probably rainbow, all were 6" or less in size. Inspection of fishermen's catch showed the same. Stream is very difficult to approach accounting for the abundance of small trout.

General Remarks:

Survey:

2.3 miles from mouth to terminated at a passable log jam and falls located 200 yds above second tributary shown on map. this tributary is very small (1 cfs or less), and enters left bank over falls.

Topography:

Lookout Creek flows on the floor of a u-shaped valley 1 mile wide at the mouth but tapering to 1/2 mile at a distance of 2 miles above. The depth is approximately 1,500' throughout with steep sides bordering valley floor. The watershed is covered with large first growth conifers of moderate density.

Character of Stream:

Lookout Creek is earth, large rubble and bedrock. Marginal vegetation consisting of maple, willow, alder, conifers and brush is moderately dense, and affords good protection for fish. Fluctuation in water level ranges from 3-4' with only slight erosion of the banks. Large S1 pools are numerous especially in the lowest mile. The gradient is steep with frequent cascades between pools. Suitable spawning area is-very scarce and 50% of those riffles marked C.F. are unsuitable because of the even distribution of large rubble. These facts together with the 3 falls (passable only with difficulty), in the first two miles eliminates the stream as much value to salmon.

Fish Population:

No salmon or nests were observed in Lookout Creek and the character of the stream is such that it could not support fish in any number. Trout less than 6" are abundant, probably due to the lack of trails to this stream. Good catches of small rainbow trout are taken by fishermen near the mouth of the stream.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
A	8/17/37	11:30 AM	69.0 F	56.0 F	Clear
B	8/17/37	4:00 PM	77.0	58.0	Clear

Pool Grade:

Sta	Dist (i)	Rest Pls	Rest Pl/Mi	S1T1 %	S1T2 %	S1T3 %	S2T1 %	S2T2 %	S2T3 %	S3T1 %	S3T2 %	S3T3 %
A-B	2":	60	26.1	5	8	16	7	5	5	1	2	11
				8.3	13.4	26.7	11.7	8.3	8.3	1.7	3.3	18.3

Gradient:

Station	Distance (Miles)	Avg Drop Per Mile	Source of Data
A-B	23	125'	Estimated

Tributaries:

Formed by confluence of McRae and Mac Creeks at a distance of about 3 3/4 miles from the mouth. Survey terminated short of this distance and Mac and McRae Creeks not observed. From appearance of Lookout Creek, at end of survey it is very probable that these tributaries are of very steep gradient and have a preponderance of large rubble.

Quartz Creek

River System: Willamette River
Stream Surveyed: Quartz Creek, tributary to Blue River

General Remarks:

Empties into the left bank of the Blue River, 1 mile above its mouth. flows through a hilly to mountainous watershed, heavily wooded with large timber. Narrow and steep sided valley. Subjected to considerable rise in volume during spring rains and snow runoff. 450 yds above its mouth, Quartz Creek divides into two equal forks. In as much as the flow of Quartz Creek was measured at 3.6 cfs, each fork is very small in size. The bottom is 56% large rubble and bedrock, with only about 60% of the wash covered during the summer. The gradient is moderate, dropping about 75, per mile. The water temperature was 60.0 F on 8/15/37 while the air waas 76.0 F.

Although there is 1,450 sq. yds of medium and small rubble between the mouth and the forks of Quartz Creek, none of it is suitable for spawning because of the large proportion of large rubble scattered over the bottom and because of the shallowness of the water. Trout fishing is fair for small fish in the spring, but they all drop back into the river when the creek dwindles during the summer.

The stream was not surveyed due to its small size, steep gradient and inaccessibility. The stream flows through a narrow canyon bordered by rugged mountains covered with a dense fir forest. The estimated flow at the mouth was 3-4 cfs. The bottom composition was mainly large rubble and boulders and did not appear to have any spawning area. The character of the banks showed considerable high water during the spring runoff which is probably full of silt due to the rapid gradient. The stream is not suitable for salmon.

Location: 3 miles below Blue River, right bank, T17S, R4E.

Deer Creek

River System: Willamette River
Stream Surveyed: Deer Creek, tributary to McKenzie River

Date of Survey: July 21, 1938 by Morton.

Source: Small mountain streams on Wildcat and Squaw Mountains; S19, T14S, R6E.

Direction of Flow: Southeast to the left bank of McKenzie 4 miles below Smith River Bridge.

Total Length: 5 miles long; 2 miles were surveyed. The average flow at the mouth gave 32 cfs. Sta. A is at the mouth, B is 1 mile upstream, C is 2 miles upstream at end of survey.

Station Location:

St	Location	Distance Above Prev. Station Yds	Miles	Distance Above Mouth Yds	Miles	Map Location	Width	Depth
A	Confl w/ McKenzie	--			--	S9,T17S,R3E	no record	
B	1 mi upstream		1.0		1.0	S10,T17S,R3E	"	
C	1 mi upstream		1.0		2.0	S14,T17S,R3E	"	

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090004	0714	0.00
B*	17090004	0711	0.00
c*	17090004	0676	0.00

* Station location is not definite and has been estimated

Character of' Bottom Between Stations:

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
A-B			52.1		20.3		18.2		9.4
B-C			47.0		25.0		18.0		10.0
Total			49.7		22.5		18.2		9.6

classification of stream based on amount of usable spawning rubble and area present: N/A

Spawning Area Usable and Available:

Station'	Distance vds miles	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	% Usable
A-B	1.0		8,610	38.5	1,810	8.1
B-C	1.0		9,340	43.0	1,900	9.0
Total	2.0		17,950	40.7	3,710	8.4

General Remarks:

Fritz Creek is about 1 mile from mouth on right bank. Deer Creek seems to run through a high table land in lower portion. The rolling highlands are covered with timber which is small on the crowns and large in the valleys, perhaps due to fire at some time.

Deer Creek is a fairly smooth flowing stream over a fair distribution of rubble type. At the time of the survey it was very low, causing about 50% of the rubble to be uncovered, but the river is mostly covered with logs or log jams and debris. The fluctuation is from 6-10'; it has a wide wash channel; 40-50% of the bottom was uncovered.

This is a good trout stream at present, fry are plentiful and numerous. 6" trout were observed and a few 12" specimens seen. It is doubtful if salmon would use this stream because of the log jams and water fluctuations.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
A	7/21/38	11:45 AM	80.0 F	58.0 F	Clear
B	"	1:20 PM	102.0	59.0	"

Pool Grade:

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6	Ttl
A-B		8		4		4		41	49
				10.0		10.0		80.0	
B-C		12		7		5		17	29
				24.0		13.0		63.0	
Total		20		11		9		58	78
				14.1		11.5		74.4	

Gradient: The gradient was moderate, estimated at 75-100' per mile. There is also a smaller Deer Creek tributary to McKenzie between Blue River and Vida. Do not confuse.

South Fork McKenzie River

River System: Willamette River
Stream Surveyed: South Fork McKenzie River, tributary to McKenzie River

Date of Survey: August 15-19, 1937, July 20, 1938 by Hanavan, Lobell, Langton.

Source: s17, T19S, R7E Mink Lake

Direction of Flow: Northwest to McKenzie River

Total Length: 30 miles, 26.4 miles surveyed

Station Location:

St	Location	Distance Above Prev. Station Yds	Miles	Distance Above Mouth Yds	Miles	Map Location	Width	Depth
M	Confl w/McKenzie River				--		--	--
A	Cougar Creek		0.3		0.3	S31,T16S,R5E	120'	3.5'
B	Walker Creek		2.9		3.2	S8,T17S,R5E	96'	2.0'
C	French Pete Creek		5.6		8.8	S34,T17S,R5E	75'	5.0'
D	Dutch Oven Camp		4.7		13.5	S25,T18S,R5E	66'	?
E	Frissel Crossing		7.6		21.1	S1,T19S,R5E	36'	9.0"
F	End of survey		5 . 3		26.4	S3,T19S,R6E	21'	8.0"

EPA River Reach Codes:

Station	H U C	SEG	Rmi
M	17090004	0022	0.08
A	17090004	0022	0.08
C	17090004	0030	0.21
D	17090004	0032	4.66
E	17090004	0036	0.00

(Stations B and F were unable to be located)

Character of Bottom Between Stations:

Sta	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
Mth-A	125,150	64,170	51.3	34,625	27.7	20,405	16.3	5,950	4.8
A-B	13'5,800	70,300	51.8	34,640	25.5	18,950	14.0	11,910	8.8
B-C	217,865	130,344	59.8	54,301	24.9	29,054	13.3	4,176	1.9
C-D	193,650	99,050	51.1	55,275	28.5	33,345	17.2	5,980	3.1

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

Sta	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
D-E	173,225	78,918	45.6	47,430	27.4	33,645	19.4	13,232	7.6
E-F	101,900	46,190	45.3	23,310	22.9	19,580	19.2	12,820	12.6
Tot	947,590	488,962	51.62	35,361	24.8	158,709	16.8	54,068	5.4

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

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	% Usable
Mouth-A			55,030	44.0		
A-B			53,590	39.5		
B-C			83,355	38.3		
C-D			88,620	45.8		
D-E			81,075	46.8		
E-F			43,430	42.1		
Total			405,100	42.7		

Spawning Area Unavailable and Unusable: No data available

Character of Watershed:

	A-B	B-C	C-D	D-E	E-F
Mountainous	X				
Hilly					
Rolling					
Flat					
Swampy					
Wooded	X				
Open					

Character of Watershed **(cont):**

	A-B	S-C	C-D	D-E	E-F
Cultivated	None				
Character of Valley					
Character of Banks					
Density of Marginal Vegetation					
Erosion a) Banks					
b) Watershed					

Diversions: None

Artificial Obstructions: None

Natural Obstructions: None

Fluctuation in Water Level:

Station	Ft. Variation
Mouth-A	6-7'
A-B	2 - 3 '
B-C	3-4'
C-D	3-4'
D-E	2-3'
E-F	2-3'

Cause of Variation: Snow runoff and rains.

Stream Volumes: 8/15/37 At Mouth 200-250 cfs (est.)
8/19/37 Below Roaring River 165 cfs (flow)
8/19/37 Sta. E 110 cfs (flow)
7/20/38 Sta. F 35-45 cfs (est.)

Pollution: None

Fish (salmon):

Species: Chinook
Estimated Number (Spawners):.

Between Stations	Number	Number
Mouth-A	None seen	Fry and fingerlings in fair no.
A-B	None seen	None seen
B-C	30-40	Fry and fingerlings abundant
C-D	None seen,	Fry and fingerlings fair no.
D-E	None seen	None seen
E-F	None seen	A few fry-probably trout.

. Adult salmon were in a large hole - not spawning.

Fish (other than salmon):

Species	Date	Very Abundant	Abundant	Fair No.	Scarce
Rainbow	8/16/37			X	
Rainbow (small)	8/15/37			X	
Suckers .	8/15/37		X (lower stream section)		

Stream fished intensively - few good catches reported.

General Remarks:

Topography:

For the lover 2.5 miles the river flows through a flood plain covered.with thick forest, swamps and heavy undergrowth. It enters the McKenzie River in several channels. Above this section the river valley is narrow and steep, often canyonous. The watershed is all mountainous and is densely forested with fir and cedar on the lower slopes, firs, pines, spruce, and hemlock on the upper slopes.

Character of Stream:

Above Sta. D, the gradient is steep, **estimated** between 70-100' per mile. From the mouth to Sta. D it is more moderate. Double channels are common throughout the entire length of the river. There is a considerable degree of fluctuation. Floods occur from February to June. Little erosion was observed either

General remarks **(cont):**

of the banks or of the watershed. Banks are moderate as a rule. Where-they are low in the upper stream section the margins are swampy and thickly wooded.

Secondary channels from D-E appear to be the best spawning areas in the river as they are well protected and have stretches of uniformly small gravel.

Fish Population:

Chinooks were seen in only one deep hole. None were spawning. Trout fishing was reported to be only fair as the stream is easily accessible and is intensively fished. Trout and chinook fry were rarely abundant, usually present in fair numbers. The adult chinooks seen were those that escaped when the Oregon Fish 'Comm. racks in the McKenzie River were washed out by floods.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
A	8/16/37	10:45 AM	65.0 F	53.0 F	Fair
B	"	11:15 AM	70.0	53.0	"
C	"	11:40 AM	76.0	53.5	"
D	"	12:15 PM	68.0	50.0	"
E	"	1:45 PM	80.0	50.0	"
F	7/20/38	12:30 PM	88.0	46.0	"

Pool Grade:

Station	Dist (mi)	Resting Pools	Resting Pools/Mile
Mouth-A	3.0	45	15.0
A-B	2.2	170	77.3
B-C	5.1	246	48.0
C-D	4.9	188	38.4
D-E	5.6	199	35.4
E-F	5.3	45	8.5
Total	26.4	893	33.8

Gradient:

Station	Distance (Miles)	Total Drop	
Mouth-D	15	50-60'	estimated
D-F	11	70-100'	estimated

Tributaries:

1. Cougar Creek, about 2 cfs.
2. East Fork, 6-8 cfs surveyed
3. Walker Creek, about 2 cfs.
4. Boone Creek, about 2 cfs.
5. Rider Creek, about 2 cfs.
6. Slide Creek, less than 2 cfs.
7. Ridge Creek, less than 2 cfs.
8. Penny Creek, less than 2 cfs.
9. French Pete Creek, about 10 cfs surveyed.
10. Balm Creek, less than 1 cfs.
11. Hardy Creek, about 5 cfs.
12. Rebel Creek, about 3 cfs.
13. Blue Creek, less than 1 cfs.
14. Star Creek, about 2 cfs.
15. Augusta Creek, about 6 cfs surveyed.
16. Cascade Creek, less than 1 cfs.
17. Roaring River, 55 cfs written up.
18. Elk Creek, 25-30 cfs surveyed. Springs are numerous above Elk Creek.

East Fork McKenzie River

River System: Willamette River
Stream Surveyed: East Fork McKenzie River, tributary to South Fork McKenzie River

Date of Survey: July 21, 1938

Source: Drainage Horsepasture Mountain, Taylor Castle Mountain, English Mountain. T17S, R5E-6E, mouth 6 miles above mouth of South Fork McKenzie.

Direction of Flow: Northwest

Total Length: 9 miles, 2.2 miles surveyed.

Station Location: None taken.

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
All	21,100	14,930	70.8	4,230	20.0	1,700	8.0	240	2.2

Classification of stream based on amount of usable spawning rubble and area present: N/A

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd^2)	Available Spawning Area (yd^2) (MR&SR)	% Avail	Usable Spawning Area (yd^2)	% Usable
All		5,930		28.1		

Spawning Area Unavailable and Unusable: None

Character of Watershed: Watershed was mountainous and wooded.

Diversions: None

Artificial Obstructions: None

Natural Obstructions:

1. Numerous small falls and cascades are impassable in present low water. A log jam and 4-5' falls at end of survey considered impassable.

Fluctuation in Water Level: 4-5' usual, in floods up to 15,. Flowing 6-8 cfs on 8/16/37.

Pollution: None

Fish (salmon): None

Fish (other than salmon): Cutthroat numerous

General Remarks:

The stream averaged about 18' wide with a volume of approximately 10 cfs. It flows through a narrow, steep canyon, bordered by high hills and mountains. Vegetation is dense throughout, consisting of firs, hemlock, cedar, spruce, alder, willow, maple, cottonwood and ferns. Due to the numerous cascades and low falls with the large amount of bedrock and large rubble, the stream is not suitable for spawning. A number of small cutthroat trout were seen. A log jam and 5 falls 2.1 miles above the mouth was considered a barrier to migatory fish.

Temperature Data: On 6/21/38, air temp was 76.0 F and water temp was 61.0 F.

Pool Grade:

Dist (mi)	Resting Pools	Resting Pools/Mile	S1T1 %	S1T2 %	S2T2 %	S6	Total
2.2	3	14			6	25	31
					19.0	81.0	

Gradient: No topographic data available; estimated as 300-400' per mile.

French Pete Creek

River System: Willamette River
Stream Surveyed: French Pete Creek, tributary to South Fork McKenzie River.

Date of Survey: 7/21/38

Source: Olallie Mt. drainage, Pyramid Mt. drainage, Bear Flat drainge.

Direction of Flow: Northwest

Total Length: 11 miles, 1.2 miles surveyed.

Station Location: The mouth of French Pete Creek is 10 miles above mouth of South Fork McKenzie, T18S, R5-6E. The end of the survey was the only other station noted.

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	-17090004	0039	0.00
B*	17090004	0039	0.95

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
Total	14,900	11,620	78.1	1,660	11.1	1,450	9.2	170	1.6

classification of stream based on amount of usable spawning rubble and area present: N/A

Spawning Area Usable and Available:

Available spawning area (MR&SR yd^2) is 3,110, 20.8% available.
Usable spawning area (yd^2) is 150 and 1.2% is usable.

Spawning Area Unavailable and Unusable: None

Character of Watershed:

	Total
Mountainous	X
Hilly	
Rolling	
Flat	
Swampy	
Wooded	X
Open	
Cultivated	None
Character of Valley	
Character of Banks	
Density of Marginal Vegetation	
Erosion a) Banks	
b) Watershed	

Diversions: None

Artificial Obstructions: None

Natural Obstructions:

1. Falls at end of survey, 4-5' high, successive jumps, passable with difficulty.

Fluctuation in Water Level:

Stream Volumes: 2-3', flood stage higher. Flowing 6-8 cfs on 8/18/37.

Pollution: None

Fish (salmon): None

Fish (other than salmon): None observed, probably a few rainbow and cutthroat.

Species	Date	Very Abundant	Abundant	Fair	No.	Scarce
Rainbow					X	
Cutthroat					X	

General Remarks:

The stream flows through a narrow steep valley bordered by thickly covered mountains. Vegetation consists of typical fir forest growth. The stream is small and is a succession of cascades and low falls. The bottom is composed of 78% large rubble, accordingly it does not provide much spawning area. A series of 4-5' falls were located at the end of the survey. It is doubtful if fish could pass this obstruction.

Temperature Data: The end of the survey at 1:45 PM, the air temp was 87.0F, the water temp was 60.0F, and the sky was clear.

Pool Grade: There was 2 S1T1 (2.1%), 19 S2T2 (17.7%), and 86 S6 (80.2%).

Gradient: Topographic data not published. Estimated at 300-400; per mile.

Augusta Creek

River System: Willamette River
Stream Surveyed: Augusta Creek, tributary to South Fork McKenzie River.

Date of Survey: July 20, 1938 by Morton.

Source: Augusta Creek rises from small mountain streams and springs on east slope of Hiyu Ridge and Grasshopper Mountain in S23, T19S, R5E.

Direction of Flow: Northeast and then north to the right bank of the south fork of the McKenzie River about 6 miles below Frissel Crossing or Roaring River bridge.

Total Length: Approximately 8 miles of which 2 miles were surveyed.

Station Location:

St	Location	Distance Above Prev. Station Yds	Miles	Distance Above Mouth Yds	Miles	Map Location	Width	Depth
A	Confl w/S. Fk McKenzie			---			19.8'	--
B	End of first mile	1.0		1.0			18.0'	
C	End of survey	1.0		2.0			17.0'	

Average Depth: None taken but flow at mouth gave about 7 cfs.

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090004	0033	0.00
B*	17090004	0033	0.86
c*	17090004	0033	1.59

* Station location is not definte and has been estimated

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
A-B			71.2		9.5		12.6		6.7
B-C			46.8		19.2		19.8		14.2
Total			59.3		14.2		16.1		10.4

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

Spawning Area Usable and Available:

Station	Distance miles	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	% Usable
A-B	1.0		2,490	22.1	90	1.0
B-C	1.0		4,180	39.0	400	3.7
Total	2.0		6,670	30.3	490	1.8

Spawning Area Unavailable and Unusable: None

Character-of Watershed:

	A-B	B-C
Mountainous	X	X
Hilly		
Rolling		
Flat		
Swampy		
Wooded	X	X
Open		
Cultivated	None	None
Character of Valley		
Character of Banks		
Density of Marginal Vegetation		
Erosion a) Banks b) Watershed		

Diversions: None

Artificial Obstructions: None

Natural Obstructions:

1. Big log jams at 3 points, 10-15' high and 30' upstream. Looked impassable.

Fluctuation in Water Level:

Cause of Variation: Creek was very low at time of survey. Over 50% of bottom was uncovered. Marks on rock walls and log jams showed it had been up 6' sometime this spring.

Pollution: None

Fish (salmon): One 16" jack salmon that must have squeezed through the weir at Hendricks Bridge was seen in a fairly deep hole.

Fish (other than salmon): 3"-6" red-sided trout fingerlings were common; many trout fry in shallow pools. Twelve were locked in a side pool at this low water stage.

General Remarks:

Survey:

2 miles up from mouth.

Topography:

Low rolling mountain ranges or upland tables predominate here, and they are not densely covered with timber. Devil's clubs, willows, and vine maples line banks, but not so densely.

General remarks **(cont):**

Character of Stream:

At the time of survey, stream was very low, over 50% of the bottomm being exposed. The banks generally were of red jasper or green chalcopyrite types of bedrock; sometimes of gravel and ranged from 4-10' high, often very steep. The lower portion of the stream is mostly through bedrock and the water wasn't over 3 or 4" deep, except in a few pools. The upper mile had more rubble types and also more big log jams.

Fish Population:

Well stocked with red-side trout. Although no large specimens were seen, fry and fingerlings were numerous. Too shallow for salmon and yet there was a jack in there. ,

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
A	7/20/38	11:30 AM	88.0 F	60.0 F	Clear
B	"	12:30 PM	88.0	62.0	"

Pool Grade:

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6	Ttl
A-B	1.0	17	17	5		12		34	51
				8.0		24.0		68.0	
B-C	1.0	31	31	5		26		28	59
				8.0		42.0		50.0	
Tot	2.0	48	24	10		38		62	110
				9.1		34.5		56.4	

Gradient: Moderate, perhaps 75-100' per mile

Cougar Creek

River System: Willamette River
Stream Surveyed: Cougar Creek, tributary to South Fork Mckenzie River.

Date of Survey: August 16, 1937.

Description: Flow less than 2 cfs. Average width, 3'; large rubble predominates. Gradient steep; small podls; water temperature 52.0 F; of no use to salmon.

(See general remarks South Fork McKenzie).

Elk Creek

River System: Willamette River
Stream Surveyed: Elk Creek, tributary to South Fork McKenzie River.

Date of Survey: 7/20/38

Source: Drainage from Roaring River Ridge and Little Roundtop Mountain. Mouth 2.5 miles above Roaring River, T19S, R6E.

Direction of Flow: Northwest

Total Length: 7 miles, 0.6 miles surveyed.

Station Location: Station A was taken at the mouth, stream width is 25', map location is S1, NE4, T19S, R5E.

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090004	0037	0.00

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
Total	8,500	4,510	53.0	1,940	22.8	1,390	16.3	660	7.9

Classification of stream based on amount of usable spawning rubble and area present: N/A

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	9 Usable
Total			3,330	39.2		

None estimated due to log jams, cascades and poor riffle grade.

Spawning Area Unavailable and Unusable: None

Character of Watershed:

	A-B
Mountainous	X
Hilly	
Rolling	
Flat	
Swampy	
Wooded	X
Open	
Cultivated	None
Character of Valley	
Character of Banks	
Density of Marginal Vegetation	
Erosion. a) Banks	
b) Watershed	

Diversions: None

Artificial Obstructions: None

Natural Obstructions:

1. Several log jams, all passable with difficulty.

Fluctuation in Water **Level:** Stream **Volumes: 7-9'**

Pollution: None

Fish (salmon): None

Fish (other than salmon):

Species	Date	Very Abundant	Abundant	Fair	No.	Scarce
Cutthroat			X			

General Remarks:

Elk Creek flows through a narrow valley bordered by mountains. Vegetation is dense through the region consisting of typical fir forest. The banks are steep and composed in part of lava bedrock. Three log jams were located in the short stretch surveyed. None of these formed a permanent barrier. Medium and small rubble made up 39.2% of the bottom but none of the area was considered suitable for spawning due to the logs, large boulders, nature of riffles and bedrock. Cutthroat trout were abundant in pools.

Temperature Data: At the mouth, air temp is **70.0F** and water temp is **52.0F.**

Pool Grade:

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6	Ttl
Total	0.6	3	5	2			1	5	8
				25.0			12.5	62.5	

Gradient: No data available. Approximately **200'** per mile.

Walker Creek

River System: Willamette River
Stream Surveyed: Walker Creek, tributary to South Fork McKenzie River.

Description: Flow, 1 cfs on 8/16/37. Gradient steep; large rubble; small pools.

(See general remarks, South Fork McKenzie).

Horse Creek

River System: Willamette River
Stream Surveyed: Horse Creek, tributary to McKenzie River

Date of Survey: August 24-26, 1937 and July 22, 1938 by Baltzo, Kolloen and Parkhurst.

Source: Middle and lower Horse Lakes in cedar swamp near summit of Cascade Range, T18S,R7E.

Direction of Flow: Northwest down side of Cascades to confluence with the right bank of the McKenzie River, one mile below McKenzie Bridge, OR.

Total Length: 22 miles, 11.1 miles surveyed in 1937; 3.8 miles in 1938.

Station Location:

St	Location	Distance Above Prev. Station Yds	Miles	Distance Above Mouth Yds	Miles	Map Location	Width	Depth
Al	Confl w/McKenzie River (downstream channel)			---		S16,T16S R5E	39.5'	15"
A2	Confl w/McKenzie River (upstream channel)			---		S14,T16S R5E	50.0'	11"
B	Confl Avenue Cr	7.1		7.1		S20,T16S,R6E	70.0'	21"
C	Confl Separtion Cr	4.1		11.2		S5,T17S,R6E	90.0'	16"
D	At Mosquito Creek	3.7		14.9		S21,T17S,R6E	--	--

EPA River Reach Codes:

Station	HUC	SEG	Rmi
Al	17090004	0045	0.00
A2	17090004	0045	0.00
B	17090004	0045	4.07
C	17090004	0045	8.88
D	17090004	0046	2.82

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
A1&A2-B			18.9		39.2		34.2		7.6

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

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
B-C			41.3		32.0		20.2		6.6
C-D			61.9		30.3		7.4		.4
Total			28.6		36.0		28.1		7.2

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

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd^2)	Available Spawning **Area(yd^2)** (MR&SR)	% Avail	Usable Spawning **Area(yd^2)**
A1&A2-B			143,000	73.4	
B-C			77,532	52.1	
C-D			18,540	37.3	
Total			239,072		

Spawning Area Unavailable and Unusable:

Preliminary survey made only up to confluence of Separation Creek. Rangers and residents report that fish could probably ascend to the source. Beyond Mosquito Creek (14.9 miles above mouth) the stream has no spawning area, according to rangers.

Character of Watershed:

	Al&A2	B-C	C-D
Mountainous.		X	X
Hilly	X	X	
Rolling			
Flat			
Swampy			

Character of Watershed **(cont):**

	Al&A2	B-C-	C-D
Wooded			
Open			
Cultivated			None
Character of Valley			
Character of Banks			
Density of Marginal Vegetation			
Erosion a) Banks			
b) Watershed			

Diversions: None

Artificial Obstructions: None

Natural Obstructions: 1 mi above Separation Cr. log jam, impassable.

Fluctuation in Water Level:

Cause of Variation: Separation Creek, which carries over four times as much water as Horse Creek above their confluence, rises from glaciers on the southwest side of Three Sisters Mountains. Temperature changes, therefore, cause comparative diurnal and seasonal fluctuations in the stream flow. Horse Creek itself rises in a lake and swamp area so that the runoff is quite uniform.

Stream Volumes:

Al&A2 combined	8/24/37	317 cfs
B	8/25/37	332 cfs
Roney Cr.	8/18/37	39 cfs
Separation Cr.	7/21/38	60 cfs

% stream bed covered -- nearly all. Only scattered patches of wash.

Pollution:

Location of Source: Glaciers at source of Separation Creek.
Type of Pollution: Glacial silt only in comparatively quiet areas. Not in any quantity on spawning riffles. Water more or less milky during warm weather.

Fish (salmon):

Species: Spring Chinook
Estimated Number (Spawners):

Station	Number	Date
A1&A2-B	7	8/25/37

Remarks: Apparently a poor run of chinooks into Horse Creek in recent years. None seen in 1938.

Fish (other than salmon):

Species	Date	Very Abundant	Abundant	Fair	No.	Scarce
Small Cutthroat	8/25/37			X		
Rainbow above Sta. C	7/21/38			x		

Remarks: Trout fishing is fair in Horse Creek, but the fish are small. Fishing intensity is moderate, the dense brush rendering much of the stream difficult to fish.

General Remarks:

Survev:

Survey 11.1 miles from mouth to Separation Creek, including alternate channels where divided and 3.8 miles to Mosquite Creek in 1938.

Topography:

Horse Creek flows through a flat bottom from 2-3 miles wide at its mouth, but varying from only- 1/4 to 1/2 mile in width above the lowest 2.5 miles. The valley is bordered by moderately steep hills at its downstream end, but the topography becomes mountainous and the valley wails increasingly steep upstream. The watershed is heavily wooded with large conifers. The undergrowth is moderate on the hillsides, but the flat valley

General remarks **(cont):**

floor is filled with a damp jungle and huge cedars. Thus, there is practically no erosion of the surrounding country into the stream.

Character of Stream:

The banks of Horse Creek are covered with a dense jungle of swamp maple, alder, cedar and brush which overhang the water, affording food and shelter for fish. The banks are flat, composed of earth and humus, and are seldom cut over a foot deep. Throughout its lowest five miles, the stream flows through an intricate network of cross-connecting channels which are constantly shifting with each high water. The low, flat banks permit much of the valley to be flooded at high water stages, and the resultant erosion makes the water roily after heavy rains. The raise in stream level seldom exceeds two feet because of the absence of restraining banks and because of the rather steep gradient.

Above Separation Creek the country is rough and mountainous. The bottom is composed of 62% large rubble, and with the fast riffles and cascades provides little spawning area. The ranger reports that the next few miles are similar, then the valley widens and the stream becomes a large swampy area.

A very large percentage of the stream is either good or fair spawning riffles with excellent bottom composition. Large pools are scarce, but there are numerous small ones.

Fish Population:

Horse Creek appears capable of supporting a very large salmon run, and the local residents report that it was once utilized by great numbers of spring chinooks and steelhead (?). Some people now claim that steelhead do not occur in the McKenzie system, while others disagree. The salmon runs of recent years have been very small. Only 7 were observed in the survey of the lowest 11 miles of stream during the height of the run in 1937, an unusually favorable year. 100 salmon were seen in 1938; racks in lower McKenzie stop all migrants.

The stream receives a moderate play by anglers, fishing for small trout being fair. There do not seem to be large trout in any numbers, but the very brushy character of most portions of the river contributes towards maintaining a fair population of the smaller sizes.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
Al	8/23/37	12:00 PM	59.0 F	50.0 F	Cloudy
A2	8/18/37	5:00 PM	74.0	53.0	Clear
B	"	3:00 PM	76.0	51.0	"
Roney Cr	"	2:00 PM	78.0	58.0	"
C	7/21/38	4:00 PM	94.0	58.0	Bright
D	"	2:00 PM	96.0	50.0	"

Pool Grade:

Sta	Dist (mi)	Rest Pls	Rest Pl/Mi	S1T1 %	S1T2 %	S1T3 %	S2T1 %	S2T2 %
A1&A2-B	7.0	85	12.1	15	3	7	21	9
				17.7	3.5	8.2	24.7	10.6
B-C	4.1	107	26.1	37	15	3	1	23
				34.6	14.0	2.8	0.9	21.5
C-D	3.8	68	17.9					68
				(S6= 65 pools)				100.0

Sta	S2T3 %	S3T1 %	S3T2 %	S3T3 %
Al&AZ-B	10	4	6	4
	11.8	4.6	7.1	4.6
B-C	3	5	16	2
	2.8	4.7	14.9	1.9
C-D	no resting pools of this type			

Sta	S5T1 %	S5T2 %	S5T3 %
A1&A2-B	2	2	2
	2.4	2.4	2.4
B-C	2		
	1.9		
C-D	no resting pools of this type		

Grand Total: Distance = 14.9 miles, Total resting pools = 260, Total resting pools per mile (260/14.9) = 17.4 pools/mile. 52 S1T1 (20.0%), 18 S1T2 (6.9%), 10 S1T3 (3.8%), 22 S2T1 (8.5%), 100 S2T2 (38.5%), 13 S2T3 (5.0%), 9 S3T1 (3.4%), 22 S3T2 (8.5%), 6 S3T3 (2.3%), 4 S5T1 (1.5%), 2 S5T2 (0.8%), 2 S5T3 (0.8%)

Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
A1&A2-B	7.0	70-80'		estimated
B-C	4.1	100'		"
C-D	3 . 8	200'		"

Tributaries:

Owl, Kings, Taylor, Willeleda, Avenue, Spring and Pasture Creeks enter on right bank in upstream order. Each was carrying less than 3 cfs at the time of the survey, but their washes indicated much higher flood stages. Separation Creek, entering the left bank at Sta. C was measured at 175 cfs.

1. Pasture Creek, 1 cfs, impassable.
2. Castle Creek, 3 cfs, impassable.
3. Roney Creek, 5 cfs, passable, good spawning area.
4. Pothole Creek, 10 cfs, steep.
5. Mosquito Creek, 10 cfs.

Separation Creek

River System: Willamette River
stream Surveyed: Separation Creek, tributary to Horse Creek

Date of Survey: 7/21/38

Description: Separation Creek rises in the glaciers of the Five Sisters Range of -the Cascade Mountains. T17S, R7.5E, and flows southwest, then northwest to Horse Creek. It is about 13 miles long; 2.4 miles were surveyed. Beyond this point survey was difficult as there is no trail and the region is exceptionally rough. The stream is 40' wide at the mouth; Sta. A, T16S, R7E, S36, SE4, and 50' wide at Sta. B, where there is a log jam and falls, T17S, R6E, S3, NW4. The total square yards of bottom were 58,700, divided as follows: Large rubble 48,560 or 82.5%, medium rubble 9,870 or 16.8%, small rubble 270 or 0.7%. Between Sta. A-B there was 19% of 11,100 sq. yds. of spawning area available.

General Remarks:

Two tributaries are recorded, Rainbow Creek and Louise Creek, each on the left bank and having a flow of 5 and 40 cfs respectively, and each have impassable falls.

The country is rugged throughout the entire length. The valley is narrow, not over 1/4 mile at any place. The mountains are composed of lava in the vicinity of Louise Creek. The vegetation is dense throughout, consisting of the usual trees of a conifer forest, with a few willows and ferns along the banks. For the most part the banks are almost vertical.

The stream is remarkable for its consistancy, as it is a continuous cascade and small fall from the mouth to the log jam 2.4 miles upstream which appears to be impassable. The bottom averaged over 80% large rubble. Resting pools are very scarce although S6 pools are numerous among the small falls. None of the area was considered good spawning ground, although 19% was composed of medium rubble. The stream is a poor one for salmon due to its suspension of glacial silt, large rubble composition and steep gradient. The fluctuation was not over 2' and the stream flow was estimated at 300-500 cfs.

General remarks **(cont):**

A few rainbow trout were seen. No salmon have been reported in the stream. No temperatures were taken. 102 S6 pools, or 42.5 per mile were noted, but there were no large resting pools.

Topographic data is not published. The gradient is steep throughout the surveyed area.

Lost Creek

River System: Willamette River
Stream Surveyed: Lost Creek, tributrary to McKenzie River

General Remarks:

Flows 3 3/4 miles northwest from its spring source to its confluence with the right bank of the, McKenzie River, one mile below Belknap Springs. Lost Creek rises in large, clear springs at the base of an enormous lava flow on the west side of the Cascade Range. The watershed is hilly and heavily wooded. The valley floor is about a half mile wide, flat and densely filled with large timber and underbrush. The ground and, therefore, the stream bottom is composed of earth over rough lava and is very porous.

Lost Creek rises in one main spring nearly two acres in extent, and a large number of nearby smaller springs. These springs are scattered all over the valley floor for about a half mile, and are everywhere choked with dense growths of underbrush, ferns and grass. The water is clear, and was 44.5 F during the August hot weather.

Below the confluence of the White Branch, about 3/4 miles below the springs, the water is always milky with glacial silt. Only in cold weather is the bottom visible. This silt forms a rather heavy layer on the bottom in many places, and elsewhere there are large, broken lava blocks. There are, however, occasional patches of ideal spawning gravel, but they do not amount to over 5% of the bottom in any event. The current is uniformly deep and swift the entire distance, with pools occurring only in the form of small pockets along the edges. 45' is about the average width. Insomuch as the fluctuation is slight, the margins are lined with an extremely dense growth of brush which overhangs into the water. The flows, as measured on August 20, 1937 were as follows:

Mouth of Lost Creek - 251 cfs.
Mouth of White Branch - 79 cfs.
Difference (flow of springs) - 152 cfs.

Fish Population:

Oldtime residents report that the runs of spring chinooks in late August were formerly very heavy in Lost Creek. A few still spawn there every year. One dead, spawned out male was found 8/20/37, and one nest was found. Many more could have been

General remarks **(cont):**

present as no careful search was made under the unfavorable conditions. Small, native rainbow trout are numerous in the creek and springs.

Olallie Creek

River System: Willamette R i v e r
Stream Surveyed: Olallie Creek, tributary to McKenzie River

Date of Survey: July 19, 1938 by Langton.

Source: Rises in two big springs spouting out of a mountain wall which contribute over 3/4 of the total flow of the creek. These springs are located in S30, T15S, R7E.

Direction of Flow: Southwest to the right bank of the McKenzie 2 miles below Smith River Bridge. The flow was estimated at 70-80 cfs.

Total Length: The stream has a average width of 24.6' for its entire length. 1.8 miles surveyed.

Station Location: No stations were taken, but summaries are given approximately every mile.'

EPA River Reach Codes:

Station	HUC	SEG	Rmi
1st mile	17090004	0096	0.00
2nd mile	17090004	0695	0.00

Character of Bottom Between Stations:

Station	L.R. %	M.R. %	S.R. %	M&S %
1st mile	79.4	15.5	4.1	1.0
2nd mile	58.0	20.0	13.0	9.0
Total	72.0	17.0	7.0	4.0

Classification of stream based on amount of usable spawning rubble and area present: N / A

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	% Usable
1st mile	1.0		2,940	19.6	80	1.0
2nd mile	0.8		3,540	33.0	280	3.0
Total	1.8		5,480	24.0	360	2.0

General Remarks:

Two small tributaries of less than 1 cfs were considered of no importance. Olallie Creek flows down the steep side of a mountain ridge and enters the narrow valley of the McKenzie at this point. An uninhabited area, heavily forested with cedar, hemlock and fir, in the Willamette National Forest is the area drained by this creek. It is a typical torrential mountain stream in its lower portion, composed of large rubble and cascades, and somewhat quiet in its upper portion, with a larger amount of medium and small rubble present. The banks are covered with thick brush and the creek bed is full of debris.

Its temperature is so low it is doubtful if any trout grow to a large size. A few small trout were observed and 6" specimens have been reported caught.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
Near mouth	7/19/38	11:00 AM	84.0 F	41.0 F	Clear
Springs at source	"	3:00 PM	"	38.0	"

Pool Grade: For whole river 21 pools in 1.8 miles, only 3 of which are resting pools, or a frequency of about 10 small pools per mile.

Gradient: Estimated at 300' per mile -- more in lower portion less in upper.

Smith River

River System: Willamette River
Stream Surveyed: Smith River, tributary to McKenzie River

Date of Survey: July 19, 1938 by Hanavan.

Source: Smith River rises from small mountain streams draining Browder Ridge in S4, **T14S, R6E.**

Direction of Flow: Due south to the left bank of the McKenzie River about 3 miles below Tamolitsch Falls. This was the uppermost tributary surveyed.

Total Length: 10 miles long of which 2.6 miles were surveyed.

Station Location: Sta. A located at the mouth of the river, river width was 36.3'. Sta. B at the end of the first mile had a river width of 26.1'. Sta. C located at the end of the second mile with a river width of 24.6'. Sta. D at the end of the survey. Depth: An estimated flow at end of survey gave 18-20 cfs.

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A*	17090004	0057	0.00
B*	17090004	0057	0.20
C	17090004	0057	0.20
D*	17090004	0057	2.30

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

Station	L.R. %	M.R. %	S.R. %	M&S %
A-B	65.0	17.2	12.2	5.6
B-C	76.3	11.7	10.9	1.1
C-D	67.3	21.0	10 0	1.7
Total	69.4	16.1	11.3	3.2

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

Spawning Area Usable and Available:

Station	Distance vds miles	Available Spawnin Area(yd²) (MR&SR)	% Avail	Usable Spawning Area(yd²)	% Usable
A-B		6,070	29.4	970	4.7
B-C		3,580	22.6	-160	1.0
C-D		3,070	31.0	240	2.5
Total		12,720	27.4	1,370	2.9

General Remarks:

Poole Creek, left bank, 1 mile up, less than 2 cfs; Browder and Gates Creeks are large tributaries on left bank 6-7 miles upstream. The topography is typical Willamette Forest type densely forested with fir and cedar on the mountains.

The stream flows through a canyonous narrow valley, no flats, banks and gradient steep. Former composed of rubble and bedrock. Almost entire stream is composed of cascades and low falls formed by large boulders, bedrock and large rubble. Spawning areas are scattered and small, usually located behind log jams. Stream covers about 80% of stream bed; exposed areas have the same proportions of rubble as the bottom.

This is a good trout stream at present, fry and fingerlings were numerous. It is doubtful if salmon would use this stream because of cascades and large boulders throughout.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp
Mouth	7/19/38	10:45 AM	79.0 F	55.0 F

Pool Grade:

Sta	Dist (mi)	Rest Pools	Resting Pools/Mi	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6	Ttl
A-B	1.0	8	8.0			8		95	103
						100.0			
B-C	1.0	15	15.0	3		11	1	69	84
				20.0		73.3	6.4		

Pool Grade **(cont):**

Sta	Dist (mi)	Rest Pools	Resting Pools/Mi	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6	Ttl
C-D	0.7	4	5.7	[illegible]		3	1	38	42
						75.0	25.0		
Tot	2.7	27	10	3		22	2	202	229
				11.1		81.5	7.4		

Gradient: The gradient is very steep, about 200-250' per mile.

Anderson Creek

River System: Willamette River
Stream Surveyed: Anderson Creek, tributary to McKenzie River

Date of Survey: July 19, 1938 at road crossing approximately 1/2 mile above mouth.

Total Length: Approximately 6 miles. Upper 3.5 miles intermittent.

Description:

The first half mile or so below the road crossing is steep. It has a log jam or two, all considered passable. There is quite a bit of brush along the 3, banks in this sector, mainly of gooseberry, hemlock, cedar and a few vine maples. It is well shaded with mossy roots frequent.

Above the road, the stream is quite flat with about an 80% sand bottom and occasional moss covered islets. There is therefore little spawning area. Banks are generally lacking in this section.

The water is clear, the flow being 35-40 cfs. Water temperature 44.0 F, air 86.0 F, weather fair. Water fluctuation slight; not over 1,. Bank erosion slight or none.

The stream flows in a high mountainous section, with no cultivation, and a fairly heavy covering of timber, mainly fir, hemlock and cedar. However, the upper stream drainage is in a nearly open almost "mountain meadow" type with no well defined valley boundaries.

The stream is supplied by springs for the most part in the middle section, but has little value to spawning salmon.

Middle Fork Willamette River

River System: Willamette River
Stream surveyed: Middle Fork Willamette River

Date of survey: 8/28, 8/31, 9/3, 9/2, 9/10, 9/11, 9/12-1937 by investigators Hanavan, Baltzo, Kolloen and Lobell, written by Lobell. 6/9-13/38 by Hanavan, Parkhurst, Morton, Langton and Wilding. The 1938 survey began 4 miles below McKenzie confluence and continued to Lookout Point. The 1937 survey began at Lookout Point and terminates survey just above Tumblebug Creek.

Source: Willamette National Forest, Douglas County, OR. Source is Opal and Timanogas and Indigo Lakes. R5 1/2E, T25S. Location Lane and Douglas Counties, OR.

Direction of Flow: Northwest to join Coast Fork near Springfield, OR. T18S, R3W. Lane and Douglas Counties.

Total Length: 77 miles. 85.8 miles surveyed.

Station Location:

St	Location	Distance Above Prev. Station Yds	Miles	Distance Above Mouth Yds	Miles	Map Location	Width	Depth
A	Koon's gravel pit	--			--	S24,T16S,R4W	- -	--
B	Coburg Bridge at Eugene		14.0		14.0	S30,T17S R3W	274'	10.6'
C	Jasper Road br		11.0		25.0	S14,T18S,R3W	276'	7.0'
D	Lowell Road br		11.0		36.0	S23,T19S,R1W	285'	4.8'
E	Lookout Point		14.5		50.5	S1/2,S27	207'	5.0'
F	Hwy br above confl of N. Fork Willlamette		3.4		53.9	S12,R21S R2E	150'	1.4'
G	Oakridge salmon traps		2.5		56.4	S18,T21S	180'	3.0'
H	Confl Salt Cr.		2.8		59.2	S22,T21S,R3E	105'	1.5'
I	Modoc Cr trail		4.1		63.3	S11,T22S,R3E	81'	3.0'
J	Cold Springs Forest Camp		3.9		67.2	S34,T22S R3E	120'	9.0"
K	Camp Croft		4.1		71.3	S21,T23S,R3E	42,	20.0"
L	Campers Flat br		6.2		77.5	S13,T24S,R3E	57'	4.0'
M	Echo Cr ridge		3.7		81.2	S16,T24S,R5E	10'	2.5'
	End of survey		4.6		85.8	S19,T24S,R5E		

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090001	0001	0.00
B	17090001	0001	7.17
C	17090001	0011	0.00
D	17090001	0017	2.92
E	17090001	0018	0.00
F*	17090001	0020	0.35
G	17090001	0022	0.10
H*	17090001	0034	0.00
I*	17090001	0038	0.47
J*	17090001	0043	3.10
K	17090001	0047	0.69
L*	17090001	0054	0.00
M*	17090001	0058	0.00

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R. %	M.R. %	S.R. %	M&S %
A-B		40.7	33.4	26.7	1.08
B-C		48.2	29.9	21.4	1.10
C-D		51.8	26.8	21.0	1.56
D-E		49.8	32.5	16.9	1.03
E-F		46.0	29.0	21.0	4.0
F-G		31.0	36.0	23.0	10.0
G-H		43.0	30.0	16.0	11.0
H-I		48.0	26.0	21.0	5.0
I-J		45.0	28.0	22.0	5.0
J-K		51.0	27.0	16.0	6.0
K-L		49.0	28.0	19.0	4.0
L-M		52.0	26.0	17.0	5.0
M-terminus		32 0	38.0	27.0	3.0
Total		45.2	30.0	20.6	4.2

Classification of stfeam based on amount of usable spawning rubble and area present: **N/A**

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd^2)	Available Spawning Area (yd^2) (MR&SR)	% Avail	Usable Spawning Area (yd^2)	% Usable
A-B			143,690	6.0		
B-C			190,590	14.3		
C-D			274,230	20.5		
D-E			417,430	22.6		
E-F			136,228		5,992	50.0
F-G			69,580		4,400	59.0
G-H			60,370		4,900	46.0
H-I			88,997		7,159	46.0
I-J			100,807		6,857	50.0
J-K			72,707		7,241	43.0
K-L			103,013		10,899	47.0
L-M			61,092		6,572	43.0
M-Terminus			81,120		8,100	65.0
Total			1,799,854			

Spawning Area Unavailable and Unusable: None

Character of Watershed, Stations A-E:

	A-B	B-C	C-D	D-E
Mountainous	In upper regions			
Hilly	In upper regions			
Rolling				
Flat	In lower section			
Swampy				
Wooded	xxx			
Open				
Cultivated	Partly, 5% in lower area, none in upper			
Character of Valley				
Character of Banks				

Character of Watershed, Stations A-E **(cont):**

	A-B	B-C	C-D	D-E
Density of Marginal Vegetation				
Erosion				
a) Banks				
b) Watershed				

Character of Watershed, Stations E-M

	E-F	F-G	G-H	H-I	I-M
Mountainous	X	X	X	X	X
Hilly					
Rolling					
Flat					
Swampy					
Wooded	X	X	X	X	X
Open					
Cultivated	Less than 1%				
Character of Valley					
Character of Banks					
Density of Marginal Vegetation					
'Erosion					
a) Banks					
b) Watershed					

Diversions: 1. At end of survey, 8' drop;boulders and log jam. Two chinooks below; none in good areas above.

Artificial Obstructions:

1. Eugene Canal dam, cement structure across entire stream, 400-500'; 8' high; adequate fish ladder at center. Approximately 200-300 cfs diverted. All water returned below Eugene.

2. Canal to Springfield power or mill pond. No data as to width, flow or structure. Located 2.5 miles above Coast Fork confluence.

3. At mouth of Salmon Creek; Oregon Fish Commission Racks across Middle Fork of Willamette River; Used to divert salmon into Salmon Creek. Rack washed out in 1937 spawning racks in from May to ? generally.

Natural Obstructions:

1. Sta. L-N; log jams; all passable.

Fluctuation in Water Level:

Sta	Ft. Variation	Cause
E-F	2-3'	spreads out at flood stage
F-G	10-15'	higher at extreme flood.
G-H	10-15'	higher at extreme flood
H-I	2-4'	spreads out at flood stage
I-J	10-12'	
K-L	3-6'	wide flood plain of L.R. in places. Est. flow 36
L-M	10-15'	
M-end	2-3'	cuts new channels at high water

Cause of Variation: Spring runoff, seasonal rain.
Stream Volumes: At Eugene, Sta. B, 2,020 cfs (mean flow for June 1928). At Eula, between Sta. D-E, 1,660 cfs (mean flow for June 1930).

Pollution:

Location of Source: Eugene
Type of Pollution: City sewage
General Remarks: Not detrimental to fish, possible serious effects'at low water stage.

Location of Source: Oakridge, OR and vicinity
Type of Pollution: Domestic
General Remarks: Very slight, not noticeable, some silting, not important.

Fish (salmon):

Species: ***Oncorhynchus tschawytscha*** (Spring chinook)
Estimated Number (Spawners): None seen from Sta. A-E.
State Fish Hatchery on Salmon Creek, 10 miles above Sta. E.

Between Stations	Number	Date
E-F	0	8/28/37
F-G	5	8/29/37
G-H	0	8/30/37
H-I	0	9/01/37
I-J	0	8/31/37
J-K	0	9/02/37
K-L	150	9/10/37
L-M	227	9/12/37
M-terminus	55	9/15/37

Fish (other than salmon): Most fish were recorded past Station E during the 1937 survey.

Species	Date	Very Abundant	Abundant	Fair	No.	Scarce
Suckers	6/10/38 & 8/28/37		X			
Dace	8/28/37		X			
Squawfish	8/28/37					
Whitefish	8/28/37		X			
Rainbow	9/01/37			X		
Cutthroat	9/15/37			X		
Dolly varden	9/15/37			X		

General Remarks:

The following notes refer to both surveys, 1938 and 1937, respectively.

The approximate length of the Middle Fork of the Willamette River from its confluence with the Coast Fork to its headwaters in Opal and Timanogas Lakes is 77 miles. Of this distance, 85.8 miles were surveyed. The survey was started from Koon's Gravel Pit in the 1938 survey and was terminated 600 yds. above the confluence of Tumblebug Creek in the 1937 survey. The survey is to be continued below the gravel pit at a future date.

Topography:

The surveyed region may conveniently be divided into two parts differing in topography. The lower region is a flat and wide valley surrounded by low hills. Extensive farming is done

General remarks (cont):

on both sides of the river. The uncleared areas support an abundant growth of brush, berries, alders and ferns. The valley extends to 10 miles in width.

The upper area through which the Middle Fork of the Willamette flows is mountainous being almost entirely of volcanic origin. The surrounding ridges are from 1500' to 5700' high and are heavily wooded. In some areas there is extensive regions of scab rock formations of volcanic origin. A river valley from 3/4 mile to less than 100 yds in width is bounded by banks composed of dirt and rubble. Some few sections have walls of bedrock. The height of the immediate banks varies from 2-250'. This stretch is heavily wooded with typical fir forest growth. Along the banks are willow, alder, maples and berries. The gradient is primarily moderate although there are sections of rapids and cascades and long quiet pools. The steepness of the walls of the valley render most of the tributaries impassable to fish. Many of the tributaries are very long and none very large.

Character of Stream:

The section of stream from Koon's Gravel Pit-to the Coast Fork is, in general, wide, slow and deep, containing little suitable spawning area. The banks are relatively low and are frequently flooded. The channel divides in many places to form as many as 5 channels. Sloughs are common and are reported to contain bass, although none were seen. The bottom was composed of approximately 45% large rubble, 30% medium, 23% small and 2% mud and sand. The temperature varied between 52.0 F and 56.0 F.

The section from the Station E to the terminus has a faster current and is shallower than the lower area. Long stretches of good spawning area are found with suitable current, bottom composition and depth. A considerable amount of the spawning areas are well shaded marginal vegetation. The majority of spawners seen were digging in small side channels well shaded and protected by marginal vegetation. Large pools up to 400 yds long frequently alternate with riffles and rapids, affording good protection. Many fish were seen, including numerous suckers and dace and a few rainbow, cutthroat and whitefish. The banks are generally high and vary from 15-200', composed of brushy hills to steep rocky cliffs in the upper parts. The upper 5 miles of stream has a rapid gradient consisting of a series of rapids and cascades. The bottom rubble is larger than the lower area and is made up of approximately 53% large, 27% medium, 19% small and 1% mud and sand. Although the current is rapid, resting pools are frequent among the large boulders. Nowhere, except at the termination of the survey, are there any outstanding barriers to migrating fish. The water temperature varied from 48 F to 59.5 F. The temperature of the two springs at the end of the survey was 41 F and 37 F, with the air temperature at 59 F.

Many large springs in the upper regions were found but the

General remarks (cont):

original source of the river is far in the mountains in two connecting lakes; Opal and Timanogas Lakes. It is doubtful if salmonids can ascend to the headwaters. By spring delivered from 25-30 cfs. Although numerous tributaries empty into the stream, a few only are available to fish. These are to be investigated at a later date.

The gradient for almost the total distance surveyed is moderate, becomes steep in the upper portion. Because this stream has considerable rise during flood season and also because of the character of banks, considerable erosion of the stream valley is found. Numerous trees are undercut and form large jams which in time deflect the flow into new channels. In the lower section of stream a wide flood plain is found. There is practically no pollution in the system, the only possibility being the town of Oakridge and Eugene, OR. This is so slight as to be negligible. An estimated flow of 360 cfs was taken at Camp Croft, Sta. K.

Fish Population:

Spring chinook (Oncorhynchus tschawytscha) run into this system. The river supports a large fish population, consisting chiefly of chubs, suckers, cottids, dace and whitefish. Rainbow and cutthroat are present in fair numbers and dolly varden were reported from the upper sections. Numerous crayfish are also present. At the time of the 1937 survey, enormous schools of cyprinid fry were seen in quiet backwaters of the river. This stream could doubtless support a large number of trout if feeder streams were protected and if a consistent planting policy carried on. Residents report that steelhead do not enter this stream. The only migratory salmonid run existing in the Middle Fork now is that of the spring chinook (0. tschawytscha). At one time this run was very large. For many years, the Oregon Fish Commission has maintained racks and a hatchery on the Middle fork. The hatchery is located near Oakridge, OR. Racks were formerly located below Oakridge. However, maintenance difficulties due to high water levels in the spring forced the removal of the racks to Salmon Creek above Oakridge. The fish are diverted into Salmon Creek by racks in the Middle Fork just above the confluence. In normal seasons, the racks are in place from about May to October. However, in 1937 the racks were washed out by floods several times, thus enabling fish to ascend the main Middle Fork. 337 spawners were counted in the river and a fair estimate would be from 750-1000 in the section surveyed. In the years when racks were installed at out Sta. G, 6,000,000 eggs was a normal take. Now, with the racks on Salmon Creek, 3,000,000 eggs is normal. Of course, with a loss of spawners, as was the case in 1937 only 750,000-1,000,000 could be taken. No fall run of fish enters the Willamette due to extreme pollution in the lower river. Potentially, this part of the Willamette

General remarks (cont):

could support large runs of salmon since excellent spawning areas are available and protection is good. The stream is very difficult of access in places and food conditions are good for fry. Chinook fry in fair numbers were seen in large pools between Sta. G-H. They were from 4" - 6" in length.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
B	6/13/38	9:30 AM	58.0 F	56.0 F	Cloudy
C	6/12/38	1:30 PM	63.0	56.0	"
D	"	12:00 PM	61.0	52.0	"
E	8/28/37	10:00 AM	59.0 F	56.0 F	Fair
F	"	2:00 PM	65.0	59.0	"
G	"	3:15 PM	66.5	59.5	"
H	"	4:00 PM	63.0	56.0	"
I	8/31/37	5:00 PM	62.0	57.0	"
J	8/28/37	4:40 PM	64.0	58.0	"
K	9/02/37	4:10 PM	68.5	56.0	"
L	9/03/37	2:30 PM	67.0	50.0	Partly cloudy
M	9/11/37	2:00 PM	66.0	48.0	Cloudy

Pool Grade:

Sta	Dist (mi)	Rest Pool	Rest Pl/Mi	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S5T1 %	S5T2 %	S5T3 %	S6
A-B	14.0	223	16	(no-specific pool data)							
B-C	11.0	182	17				"				
C-D	11.0	160	15				"				
D-E	14.5	214	20				"				
E-F	3.4	42	12	7 16.7	3 7.1	8 19.1	9 21.4		15 35.7		15
F-G	2.5	85	34		22 25.9	21 24.7	2 2.3	28 32.9	12 14.1		16
G-H	2.8	133	48	19 14.3		54 40.6	8 6.0	51 38.4	1 0.8		129
H-I	4.1	127	31	13 10.2	7 5.5	61 48.0	12 9.4	19 15.0	15 11.9		54
I-J	3.9	103	26	16 15.5	3 2.9	51 49.5	13 12.6	15 14.6	5 4.9		112
J-K	4.1	141	34	25 17.7	3 2.1	65 46.1	12 8.5	31 22.0	5 3.6		158
K-L	6.2	160	26	32 20.0	5 3.1	54 33.8	30 18.8	25 15.6	9 5.6	5 3.1	2 6 2

Pool Grade (cant):

Sta	Dist (mi)	Rest Pool	Rest Pl/Mi	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S5T1 %	S5T2 %	S5T3 %	S6
L-M	3.7	159	43	28	1	90	10	28	2		301
				17.6	0.6	56.6	6.3	17.6	1.3		
M-Ed	4.6	80	17	12	2	33	4	11	4		42
				15.0	2.5	41.3	5.0	13.8	5.0		

	S1T3 %	S2T3 %	S3T1 %	S3T2 %	S3T3 %	S4T1 %
M-End (cont)	4	2	2	2	3	1
	5.0	2.5	2.5	2.5	3.7	1.2

Grand Total:

Total no. resting pools: 1809
Total no. S6 pools: 1089
Distance: 85.8
Total no. pools: 2898
Average resting pools/mile: 21

In most cases pools or resting pools were designated in notes as "X" mark. Each of these may have a total area of many S1T1 pools, or the X mark may show a deep, slow current with no definite pool area but a suitable resting area for migratory fish.

Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
A-B	14.0	55'	3.9'	U.S. Army map, Will R.
B-C	11.0	185'	16.8'	Condensed profiles
C-D	11.0	160'	14.5'	Portland, OR, 2/15/37,
D-E	14.5	180'	16.3'	
E-G	5.9	50'		
G-H	2.8	100'	36.0'	
H-I	4.1	125'	31.0'	
I-J	3.9	140'	34.0'	
J-K	4.1	260'	63.0'	
K-L	6.2	300'	50.0'	
L-N	8.3	becoming	100'	

Tributaries:

1. Canterbury Creek, left bank, small, not surveyed.
2. McKenzie River, left bank, surveyed.
3. Coast Fork, Willamette River, right bank surveyed.
4. Hills Creek, left bank, not surveyed, small.

Tributaries (cont):

5. Fall Creek, left bank, surveyed.
6. Rattlesnake Creek, right bank, not surveyed, small.
7. Lost Creek, right bank, surveyed.
8. Riffle Creek, right banks, not surveyed, small.
9. Goodman Creek, right bank, small not surveyed.
10. Bannister Creek, left bank, small not surveyed.
11. School Creek, left bank, small, not surveyed.
12. Harper Creek, right bank, small, not surveyed.
13. Cain Creek, left bank, small, not surveyed.
14. Schwitzer Creek, right bank, small, not surveyed.
15. Duval Creek, right bank, small, not surveyed.
16. Carpet Hill Creek, left bank, small, not surveyed.
17. Hospital Creek, left bank, small, not surveyed.
18. Tire Creek, left bank, small, not surveyed.
19. Buckhead Creek, left bank, very small, steep.
20. Deception Creek, right bank, ± 3 cfs 8/28/37. Big Boulders.
21. North Fork, left bank, surveyed 1.3 miles to dam (see write up).
22. Chilly Creek, right bank, very small.
23. Spot Creek, right bank, very small.
24. Gray Creek, right bank, ± 10 cfs.
25. Salmon Creek, left bank, surveyed to Salmon Creek Falls (see write up).
26. Salt Creek, left bank, surveyed to Salt Creek Falls (see write up).
27. Hius Creek, left bank, surveyed to Kitson Springs Bridge (see write up).
28. Larison Creek, right bank, 2-3 cfs, 8/31/37.
29. Modoc Creek, left bank, small, steep.
30. Bull Creek, left bank, very small, steep. More than 1 cfs.
31. Packard Creek, right bank, not seen, ± 3 cfs.
32. Stony Creek, right bank, very small.
33. Little Willow Creek, left bank, more than 1 cfs, steep.
34. Big Willow Creek, left bank, more than 1 cfs.
35. Coffeepot Creek, left bank, ± 2 cfs.
36. Snow Creek, right bank, very small.
37. Windfall Creek, right bank, very small.
38. Gold Creek, right bank, very small.
39. Buck Creek, left bank, ± 2 cfs.
40. Cone Creek, left bank, very small, steep.
41. Bohemia Creek, right bank, very small, steep.
42. Estep Creek, left bank, more than 1 cfs, steep.
43. Pine Creek, left bank, very small, steep.
44. Snake Creek, right bank, very small.
45. Boulder Creek, left bank, l-2 cfs, steep falls.
46. Indian Creek, right bank, small.
47. Youngs Creek, left bank, very small.
48. Coal Creek, right bank, to be surveyed. Less than 10 cfs.
49. Deadhorse Creek, left bank, very small.

Tributaries **(cont):**

50. Simpson Creek, left bank, 6-8 cfs. Steep, little spawning. Air 70 F,; water 52 F; thick cover, few pools; many debris jams, probably impassable.
51. Maple Creek, right bank, very small.
52. Staley Creek, right bank, to be surveyed. 20-25 cfs.
53. Echo Creek, right bank, 12-15 cfs. Air 66 F; water 52 F; steep but good spawning areas in lower 100 yds; doubtful if salmon could ascend further because of debris falls - shallow - strong - shows little fluctuation in level - probably spring fed - no fish seen - dense cover.
54. Noisy Creek, left bank, 3 cfs, steep.
55. Swift Creek, left bank, 25 cfs, to be surveyed.
56. Found Creek, left bank; 3 cfs, steep.
57. Indigo Creek, left bank, 10 cfs, steep.
58. Tumblebug Creek, right bank, 15 cfs, to be surveyed, steep.
42. 3 large springs near terminus, left bank, 10 cfs each.

Simpson Creek

River System: Willamette River
Stream Surveyed: Simpson Creek, tributary to Middle Fork Willamette River

Date of Survey: 9/12/37 by Hanavan and Loball.

Description:

Flowing 6.8 cfs when seen. Very steep, flowing through narrow ravine. Thickly overgrown with brush. Stream obstructed with down logs and debris jams. Little, if any, spawning area - bottom practically 100% L.R. and cascades. Very few pools, practically all S6 type. Air temperature, 70.0 F, water temperature, 52.0 F. Topographic map shows drop of about 400'/mile. Probably impassable to salmon. Doubtful if any great use for trout. No fish seen or reported.

Tumblebug Creek

River System: Willamette River
Stream Surveyed: Tumblebug Creek, tributary to Middle Fork Willamette River

Date of Survey: 7/8/38 by Langton. Also surveyd 9/11/37 by Hanavan and Lobe11 of which there is only a short record of general remarks. All other data is from 1938 survey.

Source: Summit Cascade Range at Capt. Jack Pt. (6,005) - starts as a mountain stream there. S21,T25S,R5E.

Direction of Flow: North to the left bank of Middle Willamette in its extreme upper part. It is the uppermost creek surveyed.

Total Length: 7 miles of which 1 mile was surveyed.

Station Location: No stations were taken but data can be furnished for 1st mile of the 1938 survey. Approximate stream width was 18.9'. No depths taken. Average flow approximately 20 cfs.

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R. %	M.R. %	S.R. %	M&S %
1st mile		62.9	19.1	12.0	6.0

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	% Usable
1st mile			3,560	31.1	260	2.2

Spawning Area Unavailable and Unusable:

Cause of Unavailability: There might be some above the falls but it is very doubtful as gradient is steep and so much large rubble.

Character of Watershed: Mountainous, densely forested and wild, and no signs of cultivation

Diversions: None

Artificial Obstructions: None

Natural Obstructions:

1. A 10' slanting waterfalls'at 700 paces from mouth and a 6' falls through a log jam at 1600 paces – both impassable at time of survey (1938).

Fluctuation in Water Level: It had been about 3' higher at some time previous to the time of the survey (1938).

Pollution: None

Fish (salmon): None in 1938 – although on 9/11/37 two chinooks were spawning in the main river near the mouth of Tumblebug Creek (Hanavan and Lobell).

Fish (other than salmon): None

General Remarks:

1937 survey: Volume of 15 cfs. Steep gradient becoming steeper upstream. A few good "holes" and small patches of good spawning gravel near mouth. Stream flows through a densely wooded canyon and bed shows practically no fluctuation in water level. Springs probably contribute most of flow. Salmon ascent a short distance only, if at all, since gradient becomes steeper with practically 100% L.R., cascades, and falls. No fish were seen in the creek, although two chinooks were spawning in the main river near the mouth of the creek.

1938 survey: Tumblebug Cr flows through a densely wooded canyon in a high forest area near the headwaters of the middle fork of the Willamette R. with the only trail about a mile to the east of it. The stream is a series of cascades and waterfalls and log jams. The lower portion, however, has a few "holes" and small patches of spawning gravel. Probably impassable to salmon and of doubtful use for trout. No fish seen or reported.

Temperature Data: None taken

Pool Grade:

Sta	Rest Pools	Rest P1/Mi	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6	Ttl
1st mile	7	7	2	1	2	2	70	77
			28.6	14.2	28.6	28.6		

Big Fall Creek

River System: Willamette River
Stream Surveyed: Big Fall Creek, tributary to Middle Fork Willamette River

Date of Survey: May 18,19,20,21, 1938. June 3,4, 1938.

Source: Numerous small streams which drain a portion of the western slope of the cascade mountains between the McKenzie River watershed on the north and the Middle Fork of the Willamette River on the south. T18S, R4E.

Direction of Flow: flows in a westerly direction

Total Length: 30 miles, 25 miles surveyed

Location: Big Fall Creek empties into the Middle Fork of the Willamette River about 11 miles above the confluence of the Middle and Coast Forks of the Willamette, between the towns of Lowell and Fall Creek, OR. The mouth of Big Fall Creek is approximately 15 miles SE from Eugene, OR. The upper 2/3 or 20 miles of Big Fall Creek flows through part of the Cascade National Forest.

Station Location:

St	Location	Distance Above Prev. Station Yds	Distance Above Prev. Station Miles	Distance Above Mouth Yds	Distance Above Mouth Miles	Map Location	Width	Depth
M	Middle Fk Willam.	--			--	S25,T18S,R1W	--	--
A	Little Fall Cr		3.1		3.1	S33,T19S,R1W	158'	25"
B	Confl Winberry Cr		4.2		7.3	S6,T19S,R1W	--	--
C	Foot bridge		4.3		11.6	S27,T18S,R1E	--	--
D	Br at Dolly Varden U.S. Forest Camp		3.7		15.3	S31,T18S R2E	--	--
E	He-He Forest Camp		9.5		24.8	S21,T18S,R3E	--	--

EPA River Reach Codes:

Station	HUC	SEG	Rmi
M	17090001	0094	'0.05
A	17090001	0094	0.05
B*	17090001	0095	'3.67
c*	17090001	0100	0.00

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

Station	HUC	SEG	Rmi
D	17090001	0105	1.71
E	17090001	0107	4.61
F*	17090001	0107	5.94

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

Sta	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
Mth-A	213,535	104,190	48.8	51,340	24.0	38,220	17.0	19,785	9.3
A-B	208,435	100,714	48.3	54,244	26.0	30,903	14.8	22,574	10.8
B-C	151,183	60,676	40.1	50,236	33.2	33,258	22.0	7,013	4.6
C-D	116,297	61,980	53.3	'32,470	27.9	19,934	17.1	1,913	1.6
D-E	288,581	191,150	66.3	60,180	20.9	34,400	11.9	2,851	1.0
Tot	978,031	518,710	53.0	248,470	25.4	156,715	16.0	54,136	5.5

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

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd^2)	Available Spawning Area (yd^2) (MR&SR)	% Avail	Usable Spawning Area (yd^2)	% Usable
Mth-A			89,560	41.9	23,650	11.1
A-B			85,147	40.8	42,434	20.4
B-C			83,494	55.2	54,916	35.8
C-D			52,404	45.0	33,170	28.5
D-E			94,580	32.8	53,420	18.5
Total			405,185	41.4	207,590	21.2

Mouth-A: 32,546 sq. yds; 1,997 linear yds; 46.45% of total bottom.
A-end of survey: 35,976 sq. yds; 3,190 linear yds; 45.68% of total bottom.

Spawning Area Unavailable and Unusable:

Cause of Unavailability: **8'** high falls impassable at low water.

Character of Watershed:	A-F
Mountainous	
Hilly	
Rolling	
Flat	
Swampy	
Wooded	
Open	
Cultivated	100%
Character of Valley	
Character of Banks	
Density of Marginal Vegetation	
Erosion a) Banks	
b) Watershed	

Diversions: None

Artificial Obstructions: None

Natural Obstructions:

1. 1,100 yds below Andy Creek; 8' high falls; impassable at low water.

2. 2,200 yds above Alder Creek confluence (24 -miles); 8' high falls; impassable at low water.

Natural Obstructions (cont):

3. 200 yds below Sta. E (25 miles); 4' high falls; impassable at low water.

Note : There are numerous other small falls in the upper part of the stream which are passable at all times.

Fluctuation in Water Level:

Cause of Variation: Runoff from rains, melting snow.

Stream Volumes: 135 cfs to 270 cfs.

Pollution: None, may be some slight barnyard pollution from farms.-

Fish (salmon): None

Fish (other than salmon): None

General Remarks:

Survey:

Of an approximate total length of 26 miles, 5,782 paces or 3.3 miles were surveyed. The end of the survey was at the confluence of Little Falls Creek with Big Falls Creek. First survey, second went 25 miles up.

Topography:

The character of the country around the portion of the stream surveyed is mountainous and wooded.

Character of Stream:

At Sta. 1, on 2/8/35, the width was 158' and the average depth was 18". Water temperature was 43.0 F. The velocity was computed at 4 f.p.s.; volume was 758.4 cfs. From the mouth to Sta. 1 the composition of the bottom is L.R. 28,920 sq. yds. or 41%; M.R. 19,454 or 28%; S.R. 13,092 or 19%; M&S 9,595 sq. yds or 12%. Total sq. yds of spawning area 32,546 sq. yds or 46% of the total. From Sta. 1 to the terminus of survey, L.R. 14%. Total spawning area 35,976 sq. yds or 46%.

General remarks **(cont):**

Fish **Population:**

No fish of any kind were observed in Big Falls Creek. Doubtless, with such a large percentage of good spawning ground, this stream should be able to support some fish.

Temperature Data: No data available

Pool Grade: Types of pools and pool frequency were not broken down between stations.
Stream distance = 24.8 miles
Total resting pools = 521
Resting pool per mile = 21.0
S6 = 220
Total resting pools including S6 = 741
Number of pools: 66 S1T1 (12.7%), 21 S1T2 (4.0%), 51 S1T3 (9.8%), 86 S2T1 (16.5%), 62 S2T2 (11.9%), 156 S2T3 (29.9%), 6 S3T1 (1.1%), 13 S3T2 (2.5%), 44 S3T3 (8.5%), 16 S5T2 (3.1%)

Gradient: No data available

Little Fall Creek

River System: Willamette River
Stream Surveyed: Little Fall Creek, tributary to Big Fall Creek

Date of Survey: February 7-8, 1936

Source: Near northwest corner of Cascade National Park about 30 miles east of Eugene, OR

Direction of Flow: Sduthwest

Total Length: 18 miles; 8 miles surveyed

Station Location:

St	Location	Distance Above Prev. Station Yds	Miles	Distance Above Mouth Yds	Miles	Map Location	Width	Depth
M	Confl w/Big Fall Cr	--		--		S33,T18S,R1W	--	--
A	Little Fall Cr		0.5		0.5	S33,T18S,R1W	58'	16"
	hwy br, just above confl w/Big Falls Creek							
B	First cable bridge		2.1		2.6	S6,T18S,R1E	75'	16"
	above last farm house							

EPA River Reach Codes:

Station	HUC	SEG	Rmi
M	17090001	0110	0.00
A	17090001	0110	0.00
B	17090001	0110	0.00

Character of Bottom Between Stations:

Sta	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
Mth-A	15,800	8,320	52.7	3,170	20.1	2,410	15.3	1,900	12.0
A-B	60,720	17,118	28.2	18,606	30.6	15,784	26.0	9,212	15.2
B-C	173,900	113,190	65.1	30,030	17.3	19,290	11.1	11,390	6.5
Tot	250,420	138,628	55.4	51,806	20.7	37,484	15.0	22,502	9.0

Classification of stream based on amount of usable spawning rubble and area present: N/A

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	% Usable
Mth-A		5,953	5,580	35.4	5,120	32.4
A-B		34,960	34,390	56.6	2,010	3.3
B-C		6,578	49,320	28.4	9,250	5.3
Total		47,491	89,290	35.7	16,380	9.4

Spawning Area Unavailable and Unusable:

Several obstructions (natural and artificial) may render stream above 4,247 paces from mouth unavailable in low water.

Character of Watershed:

	A-B	B-C
Mountainous	X(90%)	
Hilly		
Rolling		
Flat		
Swampy		
Wooded		
Open		
Cultivated	5%	
Character of Valley		
Character of Banks		
Density of Marginal Vegetation		
Erosion a) Banks		
b) Watershed		

Diversions: None

Artificial Obstructions:

1. 1,250 yds above Sta. A; temporary rock dam for watering livestock. Water escapes on both sides. 2′ high, no barrier.

2. 6,073 paces above mouth; remains-log dam, 4′ high.

3. Terminus to end of survey, old log dam, 25′ high, impassable.

Natural Obstructions:

1. 4,272 paces above mouth; 6′ high falls; passable with difficulty at low water.

2. 6,073 paces above mouth; 4′ high falls; passable with . difficulty at low water.

3. 6,873 paces above mouth; 5′ high falls; impassable at low water; passable with difficulty at high water.

4. 684 paces above mouth; 5′ high falls (Sta. 2); impassable at low water; passable with difficulty at high water.

5. 1,747 paces above mouth; 12′ high falls; impassable at low water; passable with difficulty at high water.

Numerous cascades, low falls, and log jams are located throughout the portion of the river surveyed but none of these obstructions is a total barrier. It is reported that there is an impassable falls a short distance above where the survey was terminated.

Fluctuation in Water Level:

Cause of Variation: Rains and melting snow in headwaters.

Stream Volumes: 120 cfs to 240 cfs.

Pollution: None

Fish (salmon): None, formerly reported sp. chinook and silvers. Although no fish were observed or reported at the time of survey, a few coho (0. Kisutch) have been reported in earlier years. Due to the presence of obstructions and steep gradient it is questionable whether this stream will support a large population of migrating salmonids.

Fish (other than salmon): None

General Remarks:

Little Fall Creek has an approximate length of 18 miles. Of this distance 14,706 paces or 8.3 miles were surveyed. Start of the survey was at confluence with Big Falls Creek; terminus was at impassable dam.

Sturdy Creek, left bank, 1,515 paces from end of survey.. 490 yds was surveyed, it was composed of 100% L.R. Above the terminus of the survey, many small tributaries were observed on a detailed map of the area.

Topography:

In its lower reaches, the creek flows through several ranches. The rest of the country is forested and mountainous.

Character of Stream:

There are several swift riffles in this area. The air and water temperatures were 51.0 F and 43.0 F respectively. Velocity was computed at 3.7 f.p.s.; volume as 270 cfs. Between Sta. B and C, water temperature was 42.0 F. Velocity was 3.3 f.p.s.; volume was 206 cfs. The velocity of the water at the time of the survey was considerably high due to high water conditions and rather steep gradient of the stream.

Pool Grade: Pool types and pool frequency are for the entire survey and were not broken down into stations.
Total distance = 8 miles
Total resting pools = 118
Resting pools per mile = 14.8
S6 = 200
Total resting pools and S6 = 318
Pool type and percentage: 26 S1T1 (22.0%)'
6 S1T2 (5.1%), 41 S2T1 (34.7%), 45 S2T2 (38.1%)

Gradient: No data available

Tributaries:

1. Sturdy Creek, left bank, 1,515 paces from end of survey. 490 yds was surveyed, it was composed of 100% L.R. Above the terminus of the survey, many small tributaries were observed on a detailed map of the area.

Winberry Creek

River System: Willamette River
Stream Surveyed: Winberry Creek, a tributary of Big Fall Creek

Date of Survey: May 18-19, 1938 by Hanavan

Source: Mountain streams from Tire Mountain and Alpine Ridges of the Cascades. The South Fork of Winberry Creek has its source near tire Mt. in S8, T20S, R3E.

Direction of Flow: Northwest to union with North Fork of Winberry Creek in S19, T19S, R2E from whence it continues in a northwesterly direction to the right bank of Big Fall Creek 7 miles above its confluence with the Middle Fork of the Willamette.

Total Length: 18 miles, 8 miles surveyed

Station Location:

St	Location	'Distance Above Prev. Station Yds	Miles	Distance Above Mouth Yds	Miles	Map Location	Width	Depth
M	Confl w/Big Fall Cr	--			--	S1,T19S,R1W	---	--
A	First bridge crossing near mouth		0.2		0.2	S1,T19S R1W	39.6'	-50'
B	Falls		4.0		4.2	S16,T19S,R1E	39.0'	--
C	Falls, end survey		3.8		8.0	S19,T19S,R2E	30.0'	--

EPA River Reach Codes:

Station	HUC	SEG	Rmi
M*	17090001	0097	0.00
A*	17090001	0097	0.00
B*	17090001	0097	0.00
c*	17090001	0101	2.17

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

Stat	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
A-B	106,800	84,040	78.6	11,530	10.7	7,890	7.3	3,340	3.4

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

Stat	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
B-C	86,500	63,560	73.4	10,530	12.1	7,300	8.3	5,110	5.4
Total	193,300	147,600	76.3	22,060	11.4	15,190	7.8	8,450	4.5

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

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	% Usable
A-B			19,420	18.0		
B-C			17,830	20.4		
Total			37,250	19.2		

Spawning-Area Unavailable and Unusable: None

Character of Watershed:

	A-C
Mountainous	xxx
Hilly	
Rolling	
Flat	
Swampy	
Wooded	xxx
Open	
Cultivated	Less than 1%
Character of Valley	

Diversions: None

Artificial Obstructions: N o n e

Natural Obstructions:

1. Sta C, falls, impassable or at least a barrier in low water.

Fluctuation in Water Level:

Feet Variation: 6-7'. High in flood stage; low in late summer.

Pollution: None

Fish (salmon): None seen. Chinooks reported to enter mouth in September but don't reach upper falls. In the fall (silver sides) cutthroat run reported.

Fish (other than salmon): None. Trout fry scarce and very small.

General Remarks:

Topography:

Mountainous and covered with dense fir forests. Valley steep; v-shaped; 1/2 mile wide.

Character of Stream:

Extremely high percentage of large rubble throughout, coupled with the steep gradient cause a number of falls and cascades all along its course. The falls at Sta. B is 8' high with a 15' jump and no pool from which to jump-probably impassable as is the falls at Sta. C. The falls at Sta. C is just below the confluence of the North and South Forks. It consists of a bedrock apron 150'+ wide, 60'+ long, with an average grade of 30 degrees. Water at equal depth over entire surface.

General remarks **(cont):**

Fish Population:

Only a few small trout fry were observed. However, chinook are reported to enter mouth in September -- they don't reach upper falls. In the fall (silver sides) cutthroat run is reported.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
Near Mth	5/20/38	11:15 AM	75.0 F	55.0 F	Clear

Pool Grade:

Sta	Dist (mi)	Rest Pool	Rest Pl/Mi	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S5T1 %	S5T2 %	S6	Ttl
A-B	4.0	56	14.0	17		24	2	11	2	149	205
				30.4		42.8	3.6	19.6	3.6		
B-C	4.2	69	16.4	25	1	35	8			151	220
				36.2	1.4	50.7	11.6				
Tot	8.2	125	15.2	42	1	59	10	11	2	300	425
				33.6	0.8	47.2	8.0	8.8	1.6		

Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
A-B	4.0	200'	50'	Estimated
B-C	4.2	300'	71'	"

Tributaries:

1. Alder Creek, 1 cfs.
2. North Fork, 40 cfs.
3. South Fork, 60 cfs.

Portland Creek

River System: Willamette River
Stream Surveyed: Portland Creek, tributary of Big Fall Creek

Date of Survey: 5/27/38

Source: Mountain streams from Alpine Ridge near Sinker Mts. in Cascades. Portland Creek begins as a mountain stream down the slopes of Alpine Ridge in S21,T19S,R3E.

Direction of Flow: North then west to the right bank of Big Fall Creek 14 miles above Winberry Creek and 21 miles above Fall Creek's confluence with the Middle Willamette.

Total Length: 7 miles of which 1.5 were surveyed

Station Location:

St	Location	Distance Above Prev. Station Yds	Miles	Distance Above Mouth Yds	Miles	Map Location	Width	Depth
A	Confl w/Big Fall Cr	--			--	S25,T18S,R2E	*39.8'	*9.2"
B	End of survey		1.5		1.5	S36,T18S,R2E	"	"

* averages

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090001	0106	0.00
B*	17090001	0106	0.00

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
Total		13,830	60.0	4,010	16.0	2,950	12.0	2,110	12.0

Classification of stream based on amount of usable spawning rubble and area present: N/A

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	% Usable
Total	1.5		6,960	28.0	1,920	19.0

Spawning Area Unavailable and Unusable: None

Character of Watershed:

	A-B
Mountainous	X
Hilly	
Rolling	
Flat	
Swampy	
Wooded	X
Open	
Cultivated	Less than 1%
Character of Valley	
Character of Banks	
Density of Marginal Vegetation	
Erosion a) Banks	
b) Watershed	

Diversions: None

Artificial Obstructions: None

Natural Obstructions:

1. End of survey; falls - 8' jump then low falls and another 8' jump with no pools between; impassable.

Fluctuation in Water Level:

Feet Variation: 2-3'; flow 42.9 cfs (higher than mean flow).

Pollution: None

Fish (salmon): None recorded

Fish (other than salmon): None recorded

General Remarks:

Topography:

Drains high hills, partly wooded and partly burned over.

Character of Stream:

Steep and rough, cascades numerous. Large rubble and bedrock predominate. Spawning areas small and scattered. Steep rock banks. Contains many windfalls and debris jams. Willows, maple and fir form the marginal vegetation.

Temperature Data: Air 74.0 F; water 57.0 F.

Pool Grade:

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6	Ttl
Total	1.5	17	11.3	5		9	3	41	58
				29.4		52.9	17.7		

Gradient: No record

Lost Creek

River System: Willamette River
Stream Surveyed: Lost Creek, tributary to Middle Fork Willamette River

Date of Survey: June 9-10, 1938 by Hanavan, Morton, Parkhurst & Wilding

Source: Low rolling foothills of Cascade Range; T20S, R1W.

Direction of Flow: Flows northwesterly down side of Cascades to confluence with right bank of the Middle Willamette 3 miles above Jasper, OR.

Total Length: 17 miles; approx. 7 miles surveyed

Station Location:

St	Location	Distance Above Prev. Station Yds	Miles	Distance Above Mouth Yds	Miles	Map Location	Width	Depth
A	Confluence with Middle Willamette	--		--		S6,T19S R1W	--	--
B	Willamette hwy br	1.9		1.9		S8,T19S,R1W	25.0'	12.0"
C	Mill-Lewis Lumber Company dam	5.4		7.3		S33,T19S R1W	31.5'	7.2"

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090001	0006	0.00
B	17090001	0006	0.00
c*	17090001	0006	4.26

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R. %	M.R. %	S.R. %	M&S %
A-B		24.1	36.7	12.8	26.4
B-C		30.6	21.2	28.1	20.1
Total		27.3	28.9	20.4	23.4

classification of stream based on amount of usable spawning rubble and area present: N/A

Spawning Area Usable and Available:

Station	Distance vds	Distance miles	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)
A-B	3,400	1.9		7,450	20.5	
B-C	9.600	5.4		2,990	2.5	
Total	13,000	7.3		10,340	11.3	

Spawning Area Unavailable and Unusable: No data available

Character of Watershed:

	A-B	B-C
Mountainous		
Hilly	Upper portion, hills covered with second growth conifers	
Rolling		
Flat	X	X(lower portion)
Swampy		
Wooded		
Open	X(fields and pastures)	
Cultivated	90%	35%
Character of Valley		
Character of Banks		
Density of Marginal Vegetation		
Erosion		

Diversions: None although a lumber flume takes most of the water in late summer.

Artificial Obstructions:

1. Lumber mill 7.5 miles from mouth; impassable dam; no ladder and very little overflow and seepage. Water diverted into flume to carry lumber to main river.

Natural Obstructions: None

Fluctuation in Water Level:

Cause of Variation: Banks generally 6-12' high of earth and bedrock - steep and show a general seasonal fluctuation of about 4'. A resident reported that 3 flumes from lumber mills take practically all of the water of the stream in late summer.

Feet Variation: 4' gradient very gradual - slight

Stream Volumes: At Lewis Mill Dam at upper end of survey.

Depths	Averaae Width	Time 100' Section	R=W.D.L./T
Upper 7.2"	29'	109.6"	31.83x67x100=
		111.0	129.15
Middle 8.3"	33'8"	151.0	
Lower 8.6"	32'6"	145"	16.5x8=13.2 cfs
Ave. 8.03"	31'10"	129.15"	

% of Stream Bed Covered: About an average of 60% of the river 'bottom covered with water at this time of year.

Pollution:

Location of Source: Three sawmills

Type of Pollution: Sawdust, bark and slashing

General Remarks: The middle and upper portions of the river surveyed were lined with banks of sawdust in many places. The mill pond at the Lewis Lumber Co. is flushed out occasionally and that contributes a large amount of loose mud and silt at the time.

Fish (salmon)% Residents reported that salmon have not inhabited this stream for the past 20 years.

Fish (other than salmon):

Species	Date	Very Abundant	Abundant	Fair No.	Scarce
Whitefish			X		
Suckers			X		
Chub minnows			X		
Cutthroat (small) (reported in upper parts of stream)					X

General Remarks:

Survey:

7.5 miles from mouth to Lewis Lumber Co. Mill Dam.

Topography:

Lost Creek flows through a flat bottom land for 2 or 3 miles most of which is the Willamette Valley. The valley is bordered by gently rolling hills covered with fields in the lower portion; a scattered to moderate covering with second growth conifers and maples in middle portion and fair dense growth of fir and hemlock in its upper portions, where the hills become almost mountainous. There are a few cut banks in the middle and lower portions of the stream.

Character of Stream:

The banks of Lost Creek are covered with a dense jungle of swamp maple, alder, willow, a few conifers and blackberry. The banks are steep - 6-12' high and composed of earth (and bedrock in its upper parts). The gradient of the stream can be termed as slight to gradual. The water fluctuates considerably (4,) during seasonal rains, and late in the summer the lumber mills divert most of the stream water into their flumes.

Fish Population:

Lost Creek does not offer ideal conditions to support a salmon run. The diversion of water and the pollution of the stream by the sawmills are factors detrimental to migrating fish. The bottom generally is unsuitable for salmon spawning because of large quantities of silt and algae in lower portions and bedrock in upper portions. The amount of available spawning rubble in the area surveyed was comparatively small. Residents cannot recall it ever having a large run - although salmon and steelhead were seen and caught therein 20 to 30 years ago. There is no fishing in the lower portion of the stream and very little in the upper parts at any time of year.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
B	6/9/38	1:00 PM	62.0 F	66.0 F	Clear
C	6/10/38	1:00 PM	62.0	66.0	Clear

Pool Grade:

Sta	Dist (mi)	Rest Pool	Rest Pl/Mi	S1T1 %	S1T2 %	S1T3 %	S2T1 %	S2T2 %	S2T3 %	S6	Ttl
A-B	2.0	45	22.5	3			41		1	34	79
				6.7			91.1		2.2		
B-C	5.5	114	20.7	22	4	1	45	31	11	9	123
				19.3	3.5	0.8	39.5	27.2	9.7		
Tot	7.5	159	21.2	25	4	1	86	31	12	43	202
				15.7	2.5	0.6	54.1	19.5	7.6		

Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
A-B	2.0	30'		Estimated
B-C	5.5	50'		Estimated

Tributaries:

1. Dexter Creek, right bank, less than 3 cfs.
2. Castle Creek, right bank, less than 3 cfs.
3. Carr Creek, right bank, less than 3 cf.s
4. Gosage Creek, right bank, less than 3 cfs.

White Branch

River System: Willamette River
Stream Surveyed: White Branch, tributary to Lost Creek

Description:

Flows down the wide, mountain-bordered valley on the west slope of McKenzie Pass. Its source is at Collier Glacier on the Sisters Mountains, from where it drops rapidly to its confluence with the right bank of Lost Creek, 3 miles above the mouth of the latter. Its watershed is composed chiefly of porous lava, so that the stream sinks and reappears again at intervals. For example, the flow was measured at 79 cfs at the mouth on August 20, 1937, but 4 miles higher there was only 3 cfs. As there is very little fluctuation, the stream margins are extremely brushy. The gradient is steep.

The water is usually very milky and the bottom covered with glacial silt. The temperature on 8/20/37 was 46.0 F.

Obstructions:

An 8' falls at an angle of 80 degrees from the horizontal, occurs on the White Branch 1 mile above its mouth. It appears to be impassable to most fish, if not all. Three miles farther upstream a 60' series of falls forms another barrier. The sinks through the lava are additional barriers.

Fish Population:

No report of salmon ever occuring in the White Branch was heard. It is not a trout stream of any value.

North Fork Willamette River

River System: Willamette River
Stream Surveyed: North Fork Willamette, tributary to Middle Fork Willamette River

Date of Survey: 8/1/37 from mouth to Westfir Dam by Hanavan & Kolloen. 7/11/13-15/38 from Westfir Dam to Skookum Creek by Hanavan, Morton and Langton.

Source: Lower and Upper Eddeeleo Lakes and Erma Bell and Otter Lakes in and around Taylor burn in Cascades just a few miles north of Waldo Lake. The north fork rises from upper Eddeeleo Lake in S1,T21S, R5 1/2E.

Direction of Flow: North 10 miles to the neighborhood of Box Canyon Ranger Station and Creek where it turns and flows west to Christy Creek, then southwest to left bank of the middle fork of the Willamette 1.3 miles below village of Westfir, OR.

Total Length: 46 miles of which 37 miles have been surveyed.

Station Location: None taken in 1938 but the following have been located arbitrarily.

St	Location	Distance Above Prev. Station Yds	Distance Above Prev. Station Miles	Distance Above Mouth Yds	Distance Above Mouth Miles	Map Location
A	Conf w/M.Fk Will.	--		--		S12,T21S,R2E
B	Cain Cabin Trail		7.6		7.6	S23,T20S,R3E
C	Christy Creek		5.9		13.5	S30,T19S,R4E
D	Devil's Canyon Cr		6.3		19.8	S34,T19S,R4E
E	Brock Camp hwy br		4.8		24.6	S33,T19S,R5E
F	Fisher Creek		4.5		29.1	S36,T19S,R5E
G	Below Skookum Cr		7.0		36.1	S1,T20S,R5E

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090001	0083	0.00
B*	17090001	0083	6.99
C	17090001	0084	0.00
D	17090001	0085	5.15
E*	17090001	0085	8.69

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

Station	HUC	SEG	Rmi
F	17090001	0089	0.03
G*	17090001	0089	5.44

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R. %	M.R. %	S.R. %	M&S %
A-B		44.3	14.3	10.5	30.9
B-C		58.4	20.8	14.7	6.1
C-D		47.3	27.9	17.9	9.9
D-E		35.8	26.0	27.5	10.7
E-F		22.5	34.2	31.4	11.9
F-G		36.9	14.5	15.5	33.1
Total		42.6	21.4	17.6	18.4

Classification of stream based. on amount of usable spawning rubble and area present: **N/A**

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd^2)	Available Spawning Area (yd^2) (MR&SR)	% Avail	Usable Spawning Area (yd^2)	% Usable
A-B	8.3		89,636	24.8	30,548	8.4
B-C	6.0		77,690	35.5	23,510	10.7
C-D	6.5		114,790	45.8	74,000	29.5
D-E	4.6		89,940	53.5	55,560	33.1
E-F	4.7		92,890	65.6	28,710	20.3
F-G	7.2		64,830	30.0	15,940	7.3
Total	37.3		529,776	36.0	228,178	16.8

Spawning Area Unavailable and Unusable: The North Fork of the Willamette shows some of the finest spawning areas in its middle areas that are to be found in the whole river system. These areas at present are all unavailable to salmon because of the inefficient fish ladder over the Westfir Lumber Mill Dam. This impassable barrier has blocked the ascent of salmon formerly spawning in this fork of the Willamette.

Character of Watershed:

	Lower	Middle	Upper Portions
Mountainous	X	X	X
Hilly	X		
Rolling	X		
Flat			
Swampy			Large swamp in extreme upper portion
Wooded	X (1938) logging operations are just now eating back timber line here		
Open	Logged off	Logged off	
Cultivated	2%		
Character of Valley			
Character of Banks			
Density of Marginal Vegetation			
Erosion a) Banks			
b) Watershed			

Diversions: None

Artificial Obstructions:

1. Mill Dam at Westfir, OR, 1.3 miles above the mouth of the North Fork. It has a 35, drop and from 200-250' crest. The spill is by seepage over wide aprons and over fish ladder trough. Abutments - none, built on natural bedrock falls. Two aprons extend downstream each about 40' long. The dam is made of wooded beams and timbers. The fish ladder is made of wood and contains 18-20' steps of the baffle type. It empties on bedrock. ABsolutely impassable at low water and although reported passable at high water, we doubt it. At time of observations in 1938 some of the end boards were broken out and most of the water seeped out of large seams before it reached the bottom of the ladder.

Natural Obstructions:

1. Outside of numerous log jams and low falls in the upper and middle portions, which are all passable, there are no natural obstructions until we go above Skookum Creek where several large falls are reported.

Fluctuation in Water Level:

Cause of Variation: Spring runoff and seasonal rains.

Feet Variation: 3-7,

Stream Volumes: An estimated flow on 8/31/37 was from 120-150 cfs. at the mouth, Sta. A. On 7/13/38, an estimated flow at Brock Camp Bridge was 168 cfs., Sta. E.

Pollution:

Location of Source: Westfir Mill and town empty debris into river. Logging operations from Christy Creek and above fill stream with old logs, etc.

Type of Pollution: Mill debris and domestic sewage. Old logs, bark and branches.

General Remarks: Above might have some effect on fish life, rather doubtful that it is harmful.

Fish (salmon): None observed either in 1937 or 1938. Two dark sharp-nosed fish about 24" long were seen trying to jump the falls from the aprons at the dam in July 1938 - whether they were small salmon or large steelhead was not determined. Men at the mill report having seen some salmon trying to get up the ladder in recent years but very few instances could be definitely established.

Fish (other than salmon):

Species	Date	Very Abundant	Abundant	Fair	No.	Scarce
Cyprinids	8/31/37			X		
Suckers	"			X		
Trout	"					X
Trout (fry)	"			X		
Rainbow	"		X			
Cutthroat	"		X			

General Remarks:

Topography:

The terrain generally is mountainous and densely wooded. The lower region is devoted exclusively to logging which has laid the high hills bald and barren as far upstream as Christy Creek. For a few miles up Christy Creek and for a few miles up the North Fork above Christy Creek logging operations are prosecuted intensively. From this area of logging activity to the headwaters above Skookum Creek the North Fork flows between sharply rising mountain ridges that are densely covered with virgin pine, fir, hemlock and cedar. In the extreme portions of the North Fork the hills have been laid bare of timber as the result of a huge forest fire in the "Taylor Burn" area.

Character of Stream:

About the most ideal large spawning area of the whole Willamette River system is found in the middle portion of the North Fork from Christy Creek to the Brock Camp highway bridge (Sta. C to E). This area shows from 30-50% of the river as suitable - ideally suitable - spawning area. From the mouth (Sta. A) to to Christy Creek (Sta. C) the river valley is narrow and steep, and the hills almost completely denuded of all timber, although the lower portions will show a well developing second growth. There are no flat areas in the valley which is from 1/4 to 1/2 mile wide at the widest point. The banks are steep and 10' to 30' high, largely of earth and rubble with a few areas of bedrock. Marginal vegetation consists largely of willows, alders, cottonwoods, maples and vines. The brush is very thick and overhangs the stream throughout its course. No erosion of banks was noticed in the lower portion - banks covered with logging debris, branches, etc., up around Sta. C where the sides of these steep hills form the banks.

Although there are many resting pools and some very good spawning areas, this area as a whole has too much (over 50%) of bedrock and boulders and is generally cluttered up with bark and such. A U.S.G.s. gaging station is located in this area.

As stated before, the area from Christy Creek (Sta. C) to Brock Camp Bridge (Sta. E) contains an ideal type and percentage of small and medium rubble and riffle areas needed to produce a large available suitable salmon spawning area. This area is just above the area of present greatest logging activities. Where the area below Christy Creek contains many small falls and cascades and a deep bedrock canyon near Ninth Creek, making it difficult as a spawning area, this area contains wide, smooth, clear riffles over clean medium and small rubble. There are numerous channels to the river especially from Sta. D to E or from Devil's canyon Creek to the bridge. A few log jams provide large resting

General remarks (cont):

pools. There is no erosion here, although the valley is steep and narrow up to 1/4 mile wide with a few small flat areas appearing now and then and the hillsides slope right into the stream showing 8-10' rubble banks in some places and 40-200' cliffs of bedrock in others. Large trout, 12-15" long, were commonly observed in this area.

From Brock Bridge (Sta. E) to Fisher Creek (Sta. F) the river in many places is almost entirely obscured from view by large trees that have fallen clear across it and there are many channels in this area. Trout were difficult to observe with so much cover. The valley remains steep and narrow from 1/8 to 3/4 mile wide with banks 8-20' high, steep, of large gravel or rubble. Two 40-50' perpendicular banks of small gravel and dirt were observed with the river washing them constantly away. This area contains much suitable spawning area if the fish can get at it through all the log jams and shallow channels.

The upper two miles of the river surveyed showed 100% sand bottom and the river flowing through many channels in a broad, flat swamp. It is almost impossible to penetrate this area very far on foot. The swamp is about 3 miles long with a big falls at the upper end as reported to us by a ranger.

Fish Population:

No salmon were seen anywhere in the river either in 1937 or 1938 with the exception of some unidentified fish about 2' long at the dam in 1938. Although a few salmon are reported, it is doubtful if any of them could ascend the fish ladder at the mill dam at any time.

In the lower portion, that is from Sta. A to C (to Christy Creek), quite a few cyprinids and suckers were seen, also a few trout, although trout fry were common. In the area from Sta. C to E, adult rainbow and cutthroat trout were observed to be numerous and generally of good size, and trout fry abundant. Above Sta. E it was difficult to see any trout because of the extensive cover over the stream, but trout were observed throughout the rest of the stream and fry were common all along.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
A	8/31/37	11:00 AM	65.0 F	54.0 F	Partly cloudy
B	7/11/38	2:00 PM	68.0	64.0	"

Temperature Data (cont):

Sta	Date	Hour	Air Temp	Water Temp	Sky
C	7/13/38	11:00 AM	78.0	56.0	Clear and hot
E	"	1:00 PM	74.0	56.0	"
G	7/15/38	?	78.0	58.0	"

Pool Grade:

Sta	Dist (mi)	Rest Pool	Rest Pl/Mi	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6	Total
A-B	8.3	99	11.9	33	8	27	31	266	365
				33.3	8.1	27.3	31.3		
B-C	6.0	70	11.7	32	9	29		134	204
				45.7	12.9	41.4			
C-D	6.5	71	10.9	27	14	25	5	164	235
				38.0	19.7	35.2	7.1		
D-E	4.6	76	16.5	47	1	27	1	80	156
				61.8	1.3	35.6	1.3		
E-F	4.7	55	11.7	29		26		155	210
				52.7		47.3			
F-G	7.2	49	6.8	12	22	14	1	87	136
				24.5	44.8	28.7	2.0		
Tot	37.3	420	11.3	180	54	148	38	886	1,306
				42.9	12.8	35.2	9.1		

Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
A-B	8.3	250'	30.1'	Topographical map
B-C	6.0	500'	83.3'	Condensed profiles of
C-D	6.5	400'	61.8'	Willamette River and
D-E	4.6	250'	54.4'	east side tributaries
E-F	4.7	400'	85.1'	U.S. engineer office
F-G	7.2	1,350'	187.5	office at Portland, OR 2/15/37

Tributaries:

1. Short Creek, 4.3 miles from mouth, left bank, more than 3 cfs.
2. Dartmouth Creek, 5.7 miles from mouth, left bank, more than 2 cfs.
3. First Creek, 6.5 miles from mouth, right bank, more than 1 cfs.

Tributaries **(cont):**

4. Unnamed Creek, 7.3 miles from mouth, left bank, 7.5 cfs.
5. Huckleberry Creek, 8 miles from mouth, right bank, 5 cfs.
6. Eighth Creek, 9.5 miles from mouth, right bank.
7. High Creek, 10.3 miles from mouth, left bank 2 cfs.
8. Ninth Creek, 11.2 miles from mouth, right bank, more than 1 cfs.
9. Hamner Creek, 11.8 miles from mouth, left bank, 6 cfs.
10. McKinley Creek, 12.3 miles from mouth, left bank, 1 cfs.
11. Chalk Creek, 13 miles from mouth, left bank.
12. Christy Creek, 14.3 miles from mouth, left bank, see survey of 1938.
13. Tumble Creek, right bank.
14. Coffee Creek, right bank.
15. Sidewalk Creek, right bank.
16. Plateau Creek, right bank.
17. Cedar Creek, right bank.
18. Evergreen Creek, 20 miles from mouth, right bank, 2 cfs.
19. Devil's Canyon Creek, 20.6 miles from mouth, right bank, 2 cfs.
20. Roosevelt Creek, 21.8 miles from mouth, right bank.
21. Maple Creek, right bank.
22. Major Creek, 24 miles from mouth, right bank, 2 cfs.
23. Parker Creek, right bank.
24. Captain Creek, 25.7 miles from mouth, right bank, 6 cfs.
25. **Brock** Creek, 25.9 miles from mouth, left bank, 4 cfs.
26. Glade Creek, 27 miles from mouth, left bank, 2 cfs.
27. **Cayuse** Creek, 28.3 miles from mouth, right bank, 3 cfs.
28. Fischer Creek, 30 miles from mouth, right bank, see 1938 survey.
29. Tiny Creek, 30.8 miles from mouth, left bank, **1/2** cfs.
30. **Moolack** Creek, 32.3 miles from mouth, left bank, 4 cfs.
31. Small Creek, 33.3 miles from mouth, left bank, 3 cfs.
32. Box Canyon Creek, 33.9 miles from mouth, left bank, 6 cfs.
33. Skookum Creek, 38 miles from mouth, left bank.

Note : Numbers 13 through 23: All short steep, cold streams, draining a steep mountain side, densely covered, with large timber.

Christy Creek

River System: Willamette River
Stream Surveyed: Christy Creek, tributary to North Fork Willamette River

Date of Survey: July 11, 1938 by Morton

Source: Mountain streams on the slopes of Sardine Butte, Grasshopper Ridge and Hiyu Ridge of the Cascade Range.

Direction of *Flow:* Sardine Creek flows south from Sardine Butte, S26,T18S,R4E. Lowell Creek flows west from Hiyu Ridge, S15,T19S,R5E. Grassy Creek flows northwest from Grasshopper Mt. (5627), S21,T19S,R5E. All join in S11,T19S,R4E to form Christy Creek which flows west and then south to join the left bank of the North Fork of the Willamette, S30,T19S,R4E.

Total Length: 13 miies, of which 2 miles were surveyed.

Station Location: As no stations were taken, all information is summarized for each mile. Stream width at the first and second mile 34.5' and 40.5' respectively. No depths taken. An estimated flow gave 58.5 cfs.

EPA River Reach Codes:

Station	HUC	SEG	Rmi
1st mile	17090001	0090	0.00
2nd mile	17090001	0,090	1.00

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
1st mile		6,240	31.6	4,950	25.1	5,440	27.6	3,070	150.7
2nd mile		20,110	82 4	2,260	9.2	1,800	7.3	230	1.1
Total		26,350	59.7	7,210	16.3	7,240	16.4	3,300	7.6

Classification of stream based on amount of usable spawning rubble and area present: N/A

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	% Usable
1st mile			10,390	52.7	1,110	5.6
2nd mile			4,060	16.5	430	2.0
Total			14,450	32.7	1,540	3.4

Spawning Area Unavailable and Unusable:

If there are any spawning areas above the two miles, it is doubtful if salmon would negotiate the series of 6' falls and wide shallow aprons in this area.

Character of Watershed:

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

Diversions: None

Artificial Obstructions: None

Natural Obstructions:

1. 1.5 miles up from mouth; 2 wide dome-shaped bedrock aprons, series of 3′ and 4′ falls and a 12′ falls in 3′ and 8′ sections.

Fluctuation in Water Level: 3 or 4′ above level at time of survey.

Pollution: Lower 1/2 clogged with log slashings and branches. Of no effect now.

Fish (salmon): None seen nor reported.

Fish (other than salmon):

Best trout stream seen all summer. Two large suckers were observed in deep pools and red-sided rainbow trout were plentiful throughout the area surveyed. Almost every hole up in the rocky section had from 3-5 foot long trout in it.

General Remarks:

The river flows between two steep and high mountains in its lower portion. Logging operations are being carried on in the first 1/2 mile of stream. The river from here down is choked up with branches, bark, etc., clear to its mouth. Pine, fir and hemlock are the trees being cut and maple and alders grow fairly dense along the shores.

This is a typical mountain trout stream, with series of cascades and falls with small deep holes of crystal clear water flowing over small rubble. Evidently the water level does not fluctuate much as all the boulders and bedrock are covered with an inch of soft green moss. The river is well stocked with rainbows probably in part due to its being closed to fishing because of logging activities.

Temperature Data:

Sta	Date	Hour	Air Temw	Water Temw	Sky
1st mile	7/11/38	2:20 PM	70.0 F	60.0 F	Clear

Pool Grade:

Sta	Resting Pools	Resting Pools/Mile	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6	Ttl
1st mile	14	14.0	2	2	10		6	20
(14 aood & 27 woor riffles)			14.3	14.3	71.4			
2nd mile	13	13.0	2	8	3		20	33
(3 sood and 41 woor riffles)			15.4	61.5	23.1			
Total	27	13.5	4	10	13		26	53
			14.8	37.0	48.2			

Gradient:

Station	Total Drow	Source of Data
1st mile	300' fall	Estimated
2nd mile	700' fall	Estimated

Fischer Creek

River System: Willamette River
Stream Surveyed: Fischer Creek, tributary to North Fork Willamette River

Date of Survey: July 15, 1938 by Morton

Source: Mountain streams in Taylor Burn area and from Winchester Lake. Fischer Creek rises in the scattered lakes area just north of Waldo Lake in the Cascades. S24,T20S,R5 1/2E.

Direction of Flow: North and west to the right bank of the North Fork of the Willamette at Saddle Camp.

Total Length: 7 miles of which 2 miles were surveyed.

Station Location: As no stations were taken, all data is summarized for each mile. Stream width at first mile and second mile was 21.3' and 20.4', respectively.

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R. %	M.R. %	S.R. %	M&S %
1st mile		27.4	31.2	27.7	13.7
2nd mile		36.6	30.6	23.3	9.5
Total		32.1	30.9	25.4	11.6

Classification of stream based on amount of usable spawning rubble and area present: N/A

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	% Usable
1st mile			7,190	58.9	940	7.7
2nd mile			6,690	53.9	270	2.1
Total			13,880	56.3	1,210	4.9

Spawning Area Unavailable and Unusable: None

Character of Watershed:

	Total
Mountainous	xxx
Hilly	
Rolling	
Flat	
Swampy	
Wooded	xxx
Open	
Cultivated	None
Character of Valley	
Character of Banks	
Density of Marginal Vegetation	
Erosion a) Banks	
b) Watershed	

Diversions: None

Artificial Obstructions: None

Natural Obstructions:

1. Numerous log jams form impassable barriers to salmon.'

Fluctuation in Water Level: No data available

Pollution: None

Fish (salmon): None seen or reported.

Fish (other than salmon):

A few rainbow trout, 6" size were observed, but not many could be seen because of brushiness and steep gradient of creek.

General Remarks:

A small fast mountain stream – many log jams. The upper portions are entirely overhung (to within 1 or 2' of entire surface), by willow and maple brush making survey difficult. Only a few trout were observed in the stream.

Temperature Data:

Sta	Date	Hour	Air Temw	Water Temw	Skv
At mouth	7/15/38	1:15 PM	74.0 F	54.0 F	Clear & warm
1st mile	7/15/38	2:30 PM	74.0	53.0	"
2nd mile	7/15/38	3:50 PM	75.0	52.0	"

Pool Grade: 1st mile: 10 good and 21 poor riffles
2nd mile: 7 fair and 32 poor riffles

Gradient: No data available

Tributaries: No data available

Salmon Creek

River System: Willamette River
stream Surveyed: Salmon Creek, tributary to Middle Fork Willamette River

Date of Survey: September 1, 1937 by Baltzo and Kolloen from mouth to falls, July 12 and 17, 1938 by Hanavan, Morton and Langton from falls to within 1/2 mile of Ranger Creek.

Source: A series of unnamed small lakes and mountain stream flowing from Waldo Mt. and Cupit Mary Mtn. in the Cascades, located about two miles west of the upper part of Waldo Lake, T21S,R6E,Secs. 14 and 22.

Direction of Flow: Flows west and southwesterly to the left bank of the middle fork of the Willamette (going upstream) about 1 mile below the village of Oakridge, OR. S16,T21S,R3E.

Total Length:. 24 miles of which 18.2 miles have been surveyed.

Station Location: None taken in 1938 but several have been located at the time of this writeup.

St	Location	Distance Above Prev. Station Yds	Miles	Distance Above Mouth Yds	Miles	Map Location	Width	Depth
A	Confl with Middle Fk Willamette	---		---		S16,T21S R3E	55'	10.5"
B	Salmon Cr Hatchery Racks; bridge at ranger station	1.6		1.6		S15,T21S R4E	49'	12.5"
C	Salmon Creek Falls	3.8		5.4		S8,T21S,R4E	80,	falls
D	Mth of Wall Cr	4.6		10.0		S34,T20S,R4E	68'	
E	Mth of Black Cr	3.5		13.5		S32,T20S,R5E	58'	
F	Furnish Cr	4.2		17.7		S34,T20S,R5E	43'	

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090001	0077	0.00
B*	17090001	0077	0.29
C	17090001	0077	4.51
D	17090001	0077	8.90
E*	17090001	0078	3.35

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

Station	HUC	SEG	Rmi
F	17090001	0081	3.06
End of Survey*	17090001	0081	3.20

* station location is not definite and has been estimated

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R. %	M.R. %	S.R. %	M&S %
A-B		17.7	41.1	37.6	3.7
B-C		28.6	38.8	27.8	4.8
C-D		43.7	26.6	22.1	7.6
D-E		67.6	19.6	11.3	1.5
E-F		57.3	19.9	17.4	5.4
Above Sta. F		62.6	18.0	13.2	6.2
Total		48.4	26.8	20.1	4.7

classification of stream based on amount of usable spawning rubble and area present: N/A

Spawning Area Usable and Available:

Station	Distance vds	Distance miles	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	% Usable
A-B	2,800	1.6		24,550	78.7		
B-C	6,600	3.8		81,200	66.6		
C-D	8,100	4.6		72,710	48.7		
D-E	6,100	3.5		47,700	30.9		
E-F	7,300	4.2		28,750	37.3		
Above F	900	0.5		9,200	31.2		
Total		18.2		264,180	46.9		

Spawning Area Unavailable and Unusable: Although there is good spawning area above the falls at Salmon Cr Falls Park, 4 mi east of Oakridge, OR, there is some questions whether or not the fish can or will "jump" these falls. Natives claim the fish used to ascend the falls in the spring when water was high, but it is obvious that they cannot pass the falls when the water is low.

Character of Watershed:

	Lower	Middle	Uwwer portions
Mountainous	X	X	X steep
Hilly		X	
Rolling	X		
Flat			
Swampy			
Wooded	X	X densely	X heavily
Open			
Cultivated	1%		
Character of Valley			
Character of Banks			
Density of Marginal Vegetation			
Erosion a) Banks			
b) Watershed			

Diversions: None

Artificial **Obstructions:**

In 1937 Salmon Creek Hatchery racks were installed less than a mile above the mouth of the stream, practically the entire run was stopped at this point. In 1938, the racks were placed across the middle fork of the Willamette, a few feet above the mouth of Salmon Creek Hatchery. The river is full of log jams above the falls a number of which are at present impassable barriers to salmon.

Natural Obstructions:

1. At Sta. C; S.C.falls; 10′ high; impassable at all times.

Falls are in two channels - downstream channel runs in thin sheet over bedrock at a 30 degree angle with horizontal lower end of which is 3′ sheer drop. Greatest volume of water and consequently main attraction for fish, falls in 10′ sheer drop over upstream falls. Water shallow but very swift at brink. Lower falls have a 50′ crest and upstream 30′. Both falls have large pools below with a riffle in between. It has been reported that a few fish got over the falls during the spring but this is doubtful - the fish observed in August were able to jump less than half the necessary height. It probably would be possible to construct a bypass for fish over the downstream falls.

Fluctuation in Water Level:

Sta	Ft. Variation	Cause
A-C	2-3′ lower	Melting snow from high cascades in spring
C-E	3-4' middle	and heavy rainfall in spring and fall for
E-End	4-5′ upper	entire stream survey

Stream Volumes: Sta. B 9/1/37 125 cfs.
Sta. D 7/12/38 150 cfs.

Remarks: 50% of stream bed covered between Sta. A-B; 80-100% between B-C; 90-100% between C-D and practically 100% above D.

Pollution: Practically none. Erosion of high dirt banks in lower portion have left a layer of silt on bottom in quiet areas. Riffle clean however, and water very clear -- so no detriment to spawning.

Fish (salmon): Spring Chinooks

Between Sta.			
A-B	300-400	9/1/37
B-C	6	9/1/37
C-F	none	7/12/38 & 7/17/38

Fish (other than salmon):

Species	Location	Abundant	Fair No.	Scarce
Whitefish	lower portion		X	

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

Species		Abundant	Fair No.	Scarce
Suckers	lower portion		X	
Salmon Fingerlings	upper portion			X
Cutthroat Trout	upper portion	X		
Rainbow Trout	upper portion	X		
Trout fry/fingerlings	upper portion	X		

General Remarks:

Survey:

18.2 miles from mouth (5.4 miles from mouth to falls in 1937; 12.8 miles from falls to Ranger Creek in 1938).

Towoaraphv:

The lower mile or two of Salmon Creek flows through the wide, flat valley of the middle fork of the willamette River. Above this the valley barrows from 1 mile in width until it becomes a steep sided canyon at the falls. Likewise the flat character of the lower watershed gradually changes to rolling or hilly topography as one goes upstream. The hills in this section are covered with a moderate growth of conifers while the flat valley below has all been logged off and a fair portion is being cultivated. The hills are not steep enough to suffer from erosion.

From the falls to the mouth of Wall Creek, the valley widens out again for a couple of miles and then abruptly cuts through a steep and narrow rock walled canyon (walls 80-100') for about a mile after which the valley is never again over 1/2 mile wide. This area is fairly well covered with cut over and second growth timber stands. The low rolling hills begin to assume high hills and mountainous proportions. None of the valley here has been cultivated.

From Wall Creek the valley gets narrower and the slopes steeper and higher and the timber taller and more primeval until at about Furnish Creek it is very steep and mountainous and covered with a dense growth of large timber. About this area and above the valley does not exceed 100 yards in width anywhere. There is no sign of human habitation after one leaves Wall Creek.

Character of Stream:

Salmon Creek flows through a wide wash in its lowest two miles, but is more confined above. The loose nature of the soil of the banks results in their being continually cut away by the stream. They vary from level with the water to 10 feet in

General remarks **(cont):**

height. The first 1/2 mile below the falls flows through a bedrock canyon about 15 feet deep. The alder, maple, cottonwood and brush that line the creek are sparse below where the flood water thins them out, but are moderately dense where banks are higher. Stream is ideal for salmon spawning below the falls. Excellent riffles with ideal gravel are numerous. Gradient is moderate - pools large and well spaced. Only 1/4 of the bottom is composed of rubble too large for spawning, and this is mostly situated where it will not be detrimental to spawning beds.

In the first two miles above the falls are located, some of the finest appearing spawning areas we saw anywhere. The rubble is mostly suitable - mostly medium and small with many fine, wide riffles. The third mile above the falls runs through a deep and narrow canyon and is composed chiefly of 3 to 6' falls over bedrock and cascades over very large rubble. However, in the 2 miles above the canyon we found excellent appearing spawning rubble and riffle beds, although more large rubble is found than below. One interesting phenomenon easily observed was a "waterline" of moss on trees and large boulders in the water -- above which there was a rich growth of moss and below which it was practically barren and dry. This "line" was just about 3' above the level of the water at the time of the 1938 survey. In this area, the banks (outside the canyon) were very steep and from 10 to 30' high although sometimes there were areas where the river was only a few inches lower than the flat and narrow valley through which it flowed - so that a wide assortment of slopes and heights were observed in the banks composed usually of rubble and bedrock or gravel. From Black Creek confluence on upstream, the Salmon Creek is composed largely of large rubble and very fast water due to the steep gradient. From Wall Creek on, the available spawning area is very limited in extent.

Fish Population:

All salmon that ascend to the upper portion of the middle fork of the Willamette, are diverted into Salmon Creek by a weir. These fish are then trapped a mile farther up the creek 'and artificially spawned by hatchery methods. Only the earliest fish and a few of the smallest escape the racks. However, a number of salmon do spawn naturally in the mile of excellent stream below. Due to the diversion weirs washing out on the middle fork, during the height of the run in 1937, a great number of fish escaped up the main stream. Trout fishing is poor below Salmon Falls, due to its accessibility and open wash. It is fished extensively and only a few small trout remain in the lower reaches.

The hatchery racks at the mouth of Salmon Creek prevents any salmon from getting upstream. The natural barrier of Salmon Creek falls at low or average water level will prevent any salmon migration above the falls. In the upper parts, i.e., above Black Creek confluence, 6" cutthroat and rainbow trout were common as

General remarks **(cont):**

were small fry and fingerlings. Although no large ones were seen, those numerous log jams and holes should provide fine trout fishing from all appearances.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temw	Sky
A	9/01/37	5:15 PM	73.0	56.0	Partly cloudy
B	"	5:00 PM	71.0	55.0	"
C	"	4:00 PM	68.0	52.0	"
D	7/12/38	1:45 PM	78.0	56.0	Clr,no wind
E	"	?	?	56.0	?
F	7/17/38	4:30 PM	?	49.0	Clear

Pool Grade:

For Stations A-B and B-C, a list of pools and the percentages of each follow.

Sta A-B, distance = 1.6 mi
total resting pools = 15
resting pools per mile = 9.4
Pools by number and percent: 2 S1T1 (13.3%)' 2 S1T2 (13.3%)' 1 S2T2 (6.7%), 2 S2T3 (13.3%), 1 S3T2 (6.7%), 1 S3T3 (6.7%), 1 S5T1 (6.7%), 5 S5T2 (33.3%)

Sta B-C, distance = 3.8 mi
total resting pools = 46
resting pools per mile = 12.1
Pools by number and percent: 4 S1T1 (8.7%), 2 S1T2 (4.4%)' 10 S1T3 (21.6%)' 2 S2T1 (4.4%), 5 S2T2 (10.9%)' 3 S2T3 (6.5%), 6 S3T1 (13.0%)' 3 S3T2 (6.5%), 1 S3T3 (2.2%), 2 S4T1 (4.4%), 1 S4T3 (2.2%), 3 S5T2 (6.5%), 4 S5T3 (8.7%)

Resting pools for Stations C-terminus will be displayed in table format. However, the grand total will include Stations A-C.

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6
C-D	4.6	66	14.3	47		19		18
				71.2		28.8		
D-E	3.5	62	17.7	20		42		363
				32.3		67.7		

Pool Grade **(cont):**

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6
E-F	4.2	32	7.6	15 46.9		17 53.1		42
F-End	0.5	10	20.0			10 100.0		37

Grand Total: Total distance = 18.2 miles
Total resting pools = 231
Resting pools per mile = 12.7
Total S6 = 460
Total resting pools and S6 = 691

Totals and percents of pools for entire stream: 88 S1T1 (38.2%), 4 S1T2 (1.7%), 10 S3T1 (4.3%), 91 S2T1 (39.4%), 5 S2T2 (2.2%), 5 S2T3 (2.2%), 6 S3T1 (2.6%), 4 S3T2 (1.7%), 2 S3T3 (0.8%), 2 S4T1 (0.8%), 1 S4T3 (0.4%), 1 S5T1 (0.4%), 8 S5T2 (3.6%), 4 S5T3 (1.7%).

Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
A-B	1.6	60'	67'	Topographical map
B-C	3.8	270'	71'	"
C-D	4.6	350'	75'	"
D-E	3.5	300'	75'	"
E-F	4.2	290'	97'	"
Above F	0.5	240'	160'	"

Tributaries:

1. Flat Creek, left bank, 2 miles above mouth, 2 cfs. .
2. Shitepoke Creek, 6 miles above mouth, more than 3 cfs.
3. Wall Creek, left bank, 10 miles above mouth, 5 cfs (end of road.
4. Moss Creek, left bank, 11 miles above mouth, 5 cfs.
5. Trapper Creek, left bank, 12 miles above mouth, 3 cfs.
6. Crevice Creek, left bank, 12.5 miles up, more than 1 cfs.
7. Black Creek, right bank, 13 miles above mouth, see cards for 1938 survey by Hanavan (of Salmon Creek).
8. Mule Creek, left bank, 14 miles up, 5 cfs.
9. Curley Creek, left bank, 14.5 miles up, 1 cfs.
10. Furnish Creek (of Salmon Creek), left bank, 17 miles above mouth and was surveyed in 1938. Ranger Creek was not quite reached in 1938.

Black Creek

River System: Willamette River
Stream Surveyed: Black Creek, tributary to Salmon Creek

Date of Survey: July 17, 1938

Source: Bingo Lake located 1/2 mile west of lower end of Waldo Lake at the summit of the cascade range, S12,T22S,R5 1/2E.

Direction of Flow: West and then northwest from its source in Bingo Lake to the right bank of Salmon Creek 13.7 miles above its confluence with the middle fork of the Willamette.

Total Length: 12 miles of which 7 were surveyed.

Station Location: None taken but any necessary data can be given for each mile surveyed.

Station Location	Width
1st mile	29.4'
2nd mile	27.9'
3rd mile	22.5'
4th mile	27.0'
5th mile	25.2'
6th mile	21.0'

EPA River Reach Codes:

Station	HUC	SEG	Rmi
Mouth	17090001	0079	0.00
End of Survey*,	17090001	0079	5.61

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
1st mi	16,700	11,360	68.0	2,720	16.3	1,760	10.5	860	5.2
2nd mi	16,900	9,730	57.6	3,760	22.2	2,130	12.6	1,280	7.6
3rd mi	12,800	8,790	68.7	2,160	16.9	'1,600	12.5	250	2.0
4th mi	16,300	11,970	73.4	2,000	12.3	1,930	11.8	400	2.5

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

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
5th mi	14,300	10,040	70.2	1,450	10.1	1,360	9.5	1,450	10.1
6th mi	12,600	8,820	70.0	1,260	10.0	1,260	10.0	1,260	10.0
7th mi	14,500	3,200	22.1	1,450	10.0	2,090	14.4	7,760	53.5
Tot	104,100	63,910	61.4	14,800	14.2	12,130	11.6	13,260	12.7

Classification of stream based on amount of usable spawning rubble and area present: N/A

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	% Usable
1st mile			4,480	26.8	490	2.9
2nd mile			5,890	34.8	940	5.6
3rd mile			3,760	29.4	310	2.4
4th mile			3,930	24.1	630	3.9
5th mile			2,810	19.6	300	2.1
6th mile			2,520	20.0		
7th mile			3,540	24.4	640	4.4
Total			26,930	25.8	3,310	3.2

Spawning Area Unavailable and Unusable: No data available

Character of Watershed:

	Total
Mountainous	X steeply so
Hilly	
Rolling	
F l a t	
Swampy	X in upper part
Wooded	X heavily

Character of Watershed **(cont):**

	Total
Open	
Cultivated	None, only a trail along creek
Character of Valley	
Character of Banks	
Density of Marginal Vegetation	
Erosion a) Banks	
b) Watershed	

Diversions: None

Artificial Obstructions: None

Natural Obstructions.:

The creek is full of log jams and little falls 3 to 6′ high. It is just one series of cascades and white water. About 10 miles from its mouth is an impassable falls.

Fluctuation in Water Level: No data available

Pollution: None

Fish (salmon): None

Fish (other than salmon): None

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
End of 4th mile	7/17/38	2:00 PM	70.0 F	50.0 F	Clear

Pool Grade: The following pool data covers the entire stream and has not been broken down into single mile stations.
Distance = 7 Total resting pools = 75
Resting pools per mile = 10.7
S6 = 297
Total resting pools including S6 = 372
Pools by number and percent: '19 S1T1 (35.3%)
56 S2T1 (74.7%)

Gradient: Very steep

Furnish Creek

River System: Willamette River
Stream Surveyed: Furnish Creek, tributary to Salmon Creek

Date of Survey: July 17, 1938 by Langton

Source: Gander Lake located 3 miles northwest of Waldo Lake at the summit of the Cascades Range, S3,T21S,R5 1/2E

Direction of Flow: Flows almost straight west from its source in Gander Lake to the left bank of Salmon Creek 16.7 miles above its confluence with the Middle Willamette River.

Total Length: 6 miles, 3 miles were surveyed.

Station Location: None taken but available data will be given for each mile surveyed.

Station Location	Width
1st mile	30.9'
2nd mile	25.8'
3rd mile	24.6'

EPA River Reach Codes:

Station	HUC	SEG	Rmi
Mouth	17090001	0123	0.00
End of Survey*	17090001	0123	2.81

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
1st mile			62.8		24.2		11.1		1.9
2nd mile			66.2		20.0		13.0		.8
3rd mile			59.2		20.6		17.0		3.2
Total			62.9		21.7		13.5		1.9

Classification of stream based on amount of usable spawning rubble and area present: N/A

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	% Usable
1st mile			6,240	34.3	210	1.1
2nd mile			5,120	33.0	none	none
3rd mile			5.310	37.6	350	2.4
Total			16,670	35.2	560	1.2

Spawning Area Unavailable and Unusable: None

Character of Watershed:

	Total
Mountainous	X steeply so
Hilly	
Rolling	
Flat	
Swampy	
Wooded	X heavily
Open	
Cultivated	None, only a trail along this creek
Character of Valley	
Character of Banks	
Density of Marginal Vegetation	
Erosion a) Banks	
b) Watershed	

Diversions: None

Artificial Obstructions: None

Natural Obstructions:

The creek is choked by log jams at regular intervals some of which cause 5 to 6′ falls are are impassable to salmon. Also as the gradient is very steep there are many cascades and small falls.

Fluctuation in Water Level: No data available

Pollution: None

Fish (salmon): None

Fish (other than salmon):

A few small trout and fingerlings observed in upper part. Hard to see as water is so fast and there is so much cover.

General Remarks:

The description of the upper Salmon Creek and Black Creek coincide identically with conditions found in Furnish Creek.

Temperature Data: None taken

Pool Grade:

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6	Ttl
Tot	3.0	9	3.0			9		45	53

Gradient: Very Steep

Salt Creek

River System: Willamette River
Stream Surveyed: Salt Creek, tributary to Middle Fork Willamette River

Date of Survey: August 28; September 2nd and 10th 1937

Source: Riggs meadow near summit of Cascades - approximately one mile from west end of Ode11 Lake. S1,T23S,R5 1/2E

Direction of Flow: Northwesterly down slopes of cascades to confluence with middle fork of Willamette. S22,T21S,R3E.

Total Length: 24 miles

Station Location:

St	Location	Distance Above Prev. Station Yds	Miles	Distance Above Mouth Yds	Miles	Map Location	Width	Depth
A	Confluence with Middle Fork Willamette	--		--		S22,T21S R3E	52'	12.9'
B	Second br above mouth on Salt Creek hwy	5.7		5.7		S23,T21S R3E	77'	8.5'
C	Confl Eagle Creek	5.5		11.2		S8,T22S,R5E R5E	33'	9.5'
D	Confluence Sth Fk	1.8		13.0		S21,T22S,R5E	29'	8.1'
E	1.5 miles above S.P.R.R. trestle	1.9		14.9		S22,T22S R5E	35'	6.9'
F	Salt Creek Falls, 1 mile from Abernathy on S.P.R.R.	4.0		18.9		S4,T23S R5 1/2E	30'	285' falls

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090001	0070	0.00
B	17090001	0070	0.00
C	17090001	0070	11.39
D	17090001	0071	1.53
E*	17090001	0071	3.69
F	17090001	0071	7.86

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R. %	M.R. %	S.R. %	M&S %
A-B		41.10	37.39	18.92	2.59
B-C		28.95	39.20	27.41	4.44
C-D		37.97	38.02	21.15	2.86
D-E		39.04	41.09	19.11	0.76
E-F		50.22	33.71	15.77	0.30
Total		39.45	37.88	20.48	2.19

Classification of stream based on amount of usable spawning rubble and area present: N/A

Spawning Area Usable and Available:

Station	Distance vds	miles	Available Spawning Area (yd^2) (MR&SR)	% Avail	Usable Spawning Area (yd^2)
A-B	10,000		77,240	56.30	
B-C	9,800		87,120	66.61	
C-D	3,200		21,540	59.17	
D-E	3,400		18,240	60.20	
E-F	7,600		36,570	49.49	
Total	34,000		240,710	58.35	

Spawning Area Unavailable and Unusable:

Survey terminated at Salt Creek Falls, which has a drop of 285'. There is approximately 3 miles of stream above the falls which is permanently inaccessible to fish.

Character of Watershed:

	A-B	B-C	C-D	D-E	E-F
Mountainous					X
Hilly	x	X	X	X	
Rolling					
Flat					

Character of Watershed **(cont):**

	A-B	B-C	C-D	D-E	E-F
Swampy					
Wooded	X	X	X	X	X
Open					
Cultivated	None				
Character of Valley					
Character of Banks'					
Density of Marginal Vegetation					
Erosion a) Banks					
b) Watershed					

Diversions: None

Artificial Obstructions: None

Natural Obstructions:

1. 4,500 yds above Sta. A; old log jam; small; passable with difficulty.
2. 2,900 yds above Sta. C; old log jam; small; passable with difficulty.
3. At Sta. F; 285' high falls over bedrock; impassable.

Fluctuation in Water Level:

The runoff in this stream is relatively uniform as is indicated by the presence of a small wash. Stream source is in a meadow area near summit of the cascades and the fluctuation which occurs is the result of melting snow and from rains. The heavy forestation insures a gradual runoff. Slight fluctuations occur as a result of heavy rains.

Stream Volumes: Sta. A 8/31/37 133 cfs (good)
Sta. D " 81 cfs (good)

% of Stream Bed Covered: Nearly all covered.

Pollution:

Location of Source: Construction of new highway (U.S. Bureau of Public Roads) has in many places changed the location of the stream bed. This between Sta. A to C.

Type of Pollution: Silt from recent road construction; throughout most of the distance from the mouth to Sta. C, the stream has been placed in a straight channel along the side of the road, the bank of which also serves as the bank of the stream. Consequently, there is considerable erosion of loose earth resulting in a silt at the bottom in quiet areas.

Remarks: Silt not sufficient to spoil spawning areas. Future growth of vegetation will protect the erosion of the banks.

Fish (salmon):

Spring Chinook

Station	Number	Date
A-B	30	8/29/37
B-C	22	9/2/37
C-D	23	"
D-E	6	"
E-F	6	9/10/37

Remarks: The number os spawning salmon observed in the course of the survey shows that there was a good run of spring chinooks in the season of 1937. The fact that the fish racks of the Oregon State Fish Commission on the middle fork. of the Willamette were washed out during the high spring water, probably accounts for the good run this year.

Fish (other than salmon):

Trout fingerlings occur in fair numbers in upper reaches but only rarely in lower. Stream is intensely fished below confluence of south fork because being near road.

General Remarks:

Topography:

Except the last 1.5 miles below Salt Creek Falls the valley is u-shaped with moderately steep sides and a flat floor from 1/4 to 3/4 mile. The 1.5 mile below the falls is a canyon with high rock cliffs. The watershed is heavily wooded with second growth

General remarks **(cont):**

conifers and no erosion in stream.

Character of Stream:

Salt Creek flows in a channel on the valley floor. The cut banks vary from 0-15' higher at bends and where stream flows against valley walls. The last 1 1/2 mile is a deep canyon with vertical bedrock walls 300' high. Banks are composed generally of earth and hard rubble with nearly all bedrock on the last mile. Where road forms one bank it is cut rock and earth mostly. Banks are well protected in the lower part by dense growth of maple, alder, conifers and brush becoming moderate in the upper reaches. The exception are the areas banked by the highway where no vegetation has as yet grown. (see card 11 on pollution) Fluctuation in stream level does not exceed 3'. Heavily wooded watershed insures a uniform runoff. This stream has a large amount of good spawning gravel computed at 58.9%. Good spawning riffle is abundant with numerous resting pools of all sizes.

Fish Population:

Salt Creek is capable of supporting a very large salmon run, but because of the State Fish Rack in middle fork of Willamette, relatively few are able to ascend. A fair number succeeded this year because of the rack washing out in the spring high water; 87 spawners were counted during the survey. Trout fishing is good above the south fork - the lower reaches being too easily reached by road. Trout fingerlings were observed in fair numbers in upper section of stream.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
A	8/31/37	10:00 AM	63.0 F	51.5 F	Partly cloudy
B	"	11:00 AM	58.0	50.0	Cloudy
C	"	12:30 PM	54.0	50.5	"
D	"	2:45 PM	56.0	49.0	Raining
E	9/02/37	4:30 PM	67.0	51.0	Clear
F	9/10/37	3:00 PM	61.0	54.0	"

Pool Grade: Pool data will be broken down into stations.

Station A-B: distance = 5.7 miles, total resting pools = 87 resting pools per mile = 15.3, 8 S1T1 (9.2%), 3 S1T3 (3.5%)' 13 S2T1 (14.9%)' 3 S2T2 (3.5%), 5 S2T3 (5.7%)' 11 S3T1 (12.6%), 13 S3T2 (14.9%)' 20 S3T3 (23.0%), 2 S4T2 (2.3%), 8 S5T2 (9.2%), 1 S5T3 (1.2%)

Station B-C: distance = 5.5 miles, total resting pools = 67 resting pools per mile = 12.2, S6 = 8, 2 S1T1 (3.0%)' 4 S1T2 (5.9%)' 5 S1T3 (7.5%)' 14 S2T1 (20.9%)' 4 S2T2 (5.9%)' 4 S2T3 (5.9%)' 9 S3T1 (13.5), 8 S3T2 (11.9%)' 8 S3T3 (11.9%)' 3 S4T2 (4.5%), 1 S4T3 (1.6%), 3 S5T1 (4.5%)' 2 S5T2 (3.0%)

Station C-D: distance = 1.8 miles, total resting pools = 37 resting pools per mile = 20.6, 2 S1T1 (5.4%), 2 S1T3 (5.4%)' 5 S2T1 (13.5%)' 6 S3T1 (16.2%)' 9 S3T2 (24.4%)' 5 S3T3 (13.5%)' 2 S4T2 (5.4%)' 4 S5T1 (10.8%)' 2 S5T3 (5.4%)

Station D-E: distance = 1.9 miles, total resting pools = 14 resting pools per mile = 7.4, S6 = 5, 2 S2T1 (14.3%), 3 S2T3 (21.5%), 2 S3T1 (14.3%), 5 S3T2 (35.7%), 1 S3T3 (7.1%), 1 S5T2 (7.1%)

Station E-F: distance = 4.0 miles, total resting pools = 80 resting pools per mile = 20.0, S6 = 13, 2 S1T1 (2.5%)' 5 S1T3 (6.3%), 5 S2T1 (6.3%)' 5 S2T2 (6.3%)' 16 S2T3 (20.0%)' 7 S3T1 (8.7%)' 8 S3T2 (10.0%)' 16 S3T3 (20.0%)' 1 S4T3 (1.3%), 3 S5T1 (3.6%), 12 S5T2 (15.0%)

Grand Total: distance = 18.9, total resting pools = 285 resting pools per mile = 15.1, total S6 = 26

Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
A-B	5.7	590'	103'	Topographical map
B-C	5.6	435'	78'	"
C-D	1.8	235'	130'	"
D-E	1.9	1,310'	211'	"
E-F	4.3	"	"	"

Tributaries:

1. Basin and Warner Creeks enter on the left bank in the order named, each carrying less than 2 cfs. on date of survey.

2. Eagle Creek enters left bank at Sta. C and measured as 26 cfs.

3. South Fork enters from right bank at Sta. D and estimated between 15 and 20 cfs.

Eagle Creek

River System: Willamette River
Stream Surveyed: Eagle Creek, tributary to Salt Creek

Direction of Flow: Northwest, rises in **S13,T22,R5E**

Station Location: Station A is at confluence with Salt Creek and station B is the end of the survey, approximately 1500 yards or 0.9 miles,

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090001	0076	0.00
B	17090001	0076	0.00

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
Total	9,000	2,920	32.4	1,870	20.8	2,140	23.8	2,070	23.0

1,500 yards of the river surveyed to an impassable series of low falls and cascades.

Spawning Area Usable and Available:

Station	Distance vds miles	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	% Usable
1st 500 yds		4,010	44.6	630	7.0

Hills Creek

River System: Willamette River
Stream Surveyed: Hills Creek, tributary to Middle Fork Willamette River

Date of Survey: 9/11/37 by Baltzo and Kolloen

Source: High on western side of Cascade Mts., near Hemlock Butte in T23S,R5E.

Direction of Flow: Northwest to confluence with middle fork of Willamette in S35,T21S,R3E.

Total Length: 15 miles

Station Location: The section of stream surveyed in 1937 is now inundated by Hills Creek Lake.

St	Location	Distance Above Prev. Station Yds	Miles	Distance Above Mouth Yds	Miles	Map Location	Width	Depth
A	Mdl Fk Willamette	--		--		S35,T21S,R3E	31'	9.5"
B	Impassable dam		1.4		1.4	S36,T21S,R3E	71'	1.0"
C	End of survey		1.4		2.8	S6,T22S,R4E	--	--

EPA River Reach Codes:

Station	HUC	SEG-	Rmi
A*	17090001	0031	0.00
B*	17090001	0031	0.00
C	17090001	0031	0.00

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
A-B			57.3		27.4		12.5		2.8
B-C			49.0		30.0		20.0		1.0
Total			53.2		28.7		16.3		1.8

Classification of stream based on amount of usable spawning rubble and area present: N/A

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd^2)	Available Spawning Area (yd^2) (MR&SR)	% Avail	Usable Spawning Area (yd^2)
A-B	2,400		9,290	39.9	

Spawning Area Unavailable and Unusable:

For the next 3 miles above Kitson Springs, Hills Creek flows through a small box canyon and has but little spawning area. Above this point, above the end of the road, however, the stream levels out and is ideal for spawning, probably as high as 80% of the bottom being available.

Character of Watershed:

	A-B	B-C
Mountainous		
Hilly	X	
Rolling		
Flat		
Swampy		
Wooded	X	
Open		
Cultivated	1 small farm	
Character of Valley		
Character of Banks		
Density of Marginal Vegetation		
Erosion a) Banks b) Watershed		

Diversions: None

Artificial Obstructions:

1. Abandoned mill site, 2,400 yds above mouth; 10' high dam; no ladder - impassable at all times.

Remarks: Constructed of rock-filled log cribbing, completely filled with gravel on upstream side. Formerly to divert into flume leading to sawmill, but both now abandoned and dilapidated. Horizontal apron on top of dam 12' long; 5' apron drops off from this at 45 degrees L, lower end and terminated 7' above pool below. Flash boards 1' high at upstream end of top apron (sketch in original data and pictures in file).

Natural Obstructions: None

Fluctuation in Water Level:

Cause of Variation: Melting snow in spring and heavy rainfall.

Stream Volumes: Sta. A 9/1/37 - 20.5 cfs.

% of Stream Bed Covered: About 90%, wash nearly all bedrock in small canyon.

Feet Variation: Seldom over 1'. Straight course and considerable gradient results in quick and rapid runoff.

Pollution: Light silting in quiet areas - no effect.

Fish (salmon): Spring Chinooks: 23 counted between Sta. A-B on 9/1/37. This is probably about as many as Hills Creek can support below the dam. Spawning area very limited. Old time residents report a heavy run existed before the dam was built.

Fish (other than salmon):

Species	Date	Very Abundant	Abundant	Fair No.	Scarce
Small Trout	9/11/37			X	
Suckers	"				X
Whitefish	"				X

Remarks: Usually stocked with trout fingerlings each year which are numerous above dam; continued fishing keeps trout scarce in lower 6 miles which is paralleled by road. More and larger trout above road.

General Remarks:

Survey:

2,400 yds from mouth to impassable dam; also 2,400 yds more above dam to Kitson Springs Bridge.

Tributaries:

None in surveyed stream. Shady Creek less than 1 cfs. Others above not observed.

Topography:

Hilly watershed near the lower reaches, becoming mountainous upstream. The valley floor is about 1/4 mile wide, the lower three miles, and the sides moderately steep, but the next three miles, valley much narrower and steeper. Hills have a moderate covering of medium sized conifers, underbrush and vine maple is dense. Very little erosion into the stream. In the upper reaches the valley flattens and widens considerably and filled with virgin growth of timber.

Character of Stream:

Through its lower six miles it flows through a bedrock canyon from 15-25, deep. Its course is very straight the entire distance. In the lowest half of this stretch the valley floor is flat above the canyon walls; but the canyon fills the entire valley floor in the upper half. Although the canyon walls and bottom are bare, a few conifers, alder and maple line the edges. Spawning area is very limited as the bottom is large rubble and bedrock.

The gradient is moderate to steep. About 90% of the floor of the canyon is covered with water, the wash being principally bedrock with a fair number of large pools.

General remarks **(cont):**

Above the lower six miles, accessibly only by trail, Hills Creek flattens out considerably and becomes excellent spawning ground. The gradient is moderate, pools numerous, banks flat, marginal vegetation dense and the bottom mostly spawning gravel.

Fish Population:

The 23 salmon counted in September 1937 were about all the creek could accommodate. Residents claim great numbers used to ascend to the headwaters before the dam was built. Due to racks washing out in middle fork this year with freshets this year's run into Hills Creek was exceptionally heavy. A good system of planting maintains a good population of 3" and 4" trout but nothing large is caught where the road parallels the lower six miles. Good fishing is reported in the headwaters.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
A	9/11/37	2:30 PM	70.0 F	57.0 F	Clear
B	"	2:00 PM	76.0	57.0	Overcast

Pool Grade:

Station A-B: distance = 1.4 miles, total resting pools = 17 resting pools per mile = 12.1, 3 S1T1 (17.7%), 4 S1T3 (23.5%), 4 S2T3 (23.5%), 3 S3T2 (17.7%), 2 S4T3 (11.8%), 1 S5T3 (5.8%)

Station B-C: distance = 1.4 miles, total resting pools = 29 resting pools per mile = 20.7, 3 S1T1 (10.3%), 11 S1T3 (38.0%), 2 S2T1 (6.9%), 3 S2T2 (10.3%), 2 S2T3 (6.9%), 1 S3T1 (3.5%), 2 S3T3 (6.9%), 5 S5T2 (17.2%)

Grand total: distance = 2.8 miles, total resting pools = 46 resting pools per mile = 16.4

Gradient: Between A-B, a distance of 2.8 miles, the total drop is 115 feet.

Buck Creek

River System: Willamette River
Stream Surveyed: Buck Creek, tributary to Middle Fork Willamette River

Date of Survey: July 10, 1938 by Hanavan

Source: As a mountain stream from Logger Butte (5.501) its North Fork. The source of the North Fork of Buck Creek on Logger Butte lies in S21,T23S,R4E.

Direction of Flow: Northwesterly and then west to enter the Middle Fork of the Willamette on the left bank 8 miles below Coal Creek.

. Total Length: 6 miles of which 1/2 mile was surveyed

Station Location: Station A begins the survey at the confluence with the Middle Fork Willamette and station B ends the survey one-half mile upstream.
Width: Average for first 1/2 mile was 18.3'.
No depths taken but a flow (est.) showed 12 cfs at time of survey

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090001	0063	0.00
B*	17090001	0063	0.00

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
.5 mile		2,780	50.5	730	12.3	1,010	18.6	1,010	18.6

Spawning Area Usable and Available:

Station	Area (yd^2)	Available Spawning Area (yd^2) (MR&SR)	% Avail	Usable Spawning Area (yd^2)	% Usable
.5 mile		1,740	30.9	230	4.1

Spawning Area Unavailable and Unusable:

There is apparently good, but limited, spawning areas above the falls located 1/2 mile from the mouth of Buck Creek.

Character of Watershed:

	A-B
Mountainous	X
Hilly	
Rolling	
Flat	
Swampy	
Wooded	X densely
Open	
Cultivated	None
Character of Valley	
Character of Banks	
Density of Marginal Vegetation	
Erosion a) Banks b) Watershed	

Diversions: none

Artificial Obstrudtions: none

Natural Obstructions: 1. A log jam and 8' high halls 1/2 mile above the mouth of the stream constitutes a barrier to salmon at all times.

Pollution: None

Fish (salmon and other): none seen

Temperature Data: At station A on 7/10/38, air temp was 70.0 F and water temp was 54.0 F.

Pool Grade:

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6	Ttl
A-B	0.5	5	10			5		45	50

Gradient: Very steep; in neighborhood of 400' per mile.

Coal Creek

River System: Willamette River
Stream Surveyed: Coal Creek, tributary to Middle Fork Willamette River

Date of Survey: July 9, 1938 by Langton

Source: Lolette Lakes and mountain streams on summit of southern range of Cascades. Deadwood Creek S8,T25S,R3E and Coal Creek S23,T25S,R3E rises in the northern sides of the summit of the Calapooya Mountains of the Cascade Range.

Direction of Flow: North joining near the Lane and Douglas County line to form Coal Creek proper which flows on north to join the right bank of the middle fork of the Willamette two miles below Staley Creek.

Total Length: 9 miles; 2.6 surveyed

Station Location:

St	Location	Distance Above Prev. Station Yds	Miles	Distance Above Mouth Yds	Miles	Map Location	Width
A	Mdl Fk Willamette	--			--	S11,T24S,R3E	22.2'
B	End of Survey		2.6		2.6	S22,T24S,R3E	21.9'

No depths taken. An estimated flow of 30 cfs. At the time of the survey, no true stations were designated; therefore, all information is summarized for each mile.

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090001	0046	0.00
B*	17090001	0046	2.04

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
1st mile		5,640	44.4	3,530	27.7	2,260	17.7	1,270	10.2

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

Station	Area (yd²)	L.R.	%	M.R.	%	S.R.	%	M&S	%	
2nd mile		5,800	43.9	3,270	24.7	2,810	21.2	1,320	10.2	
Total 6 mile		3.380	45.7 52.0	1,430	22.0 25.4	1,100	16.9 19.0	590	**9.1**	9.9
		14,820		8,230		6,710		3,180		

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

Spawning Area Usable and Available:

Station	Distance vds miles	Available Spawning Area(yd²) (MR&SR)	% Avail	Usable Spawning Area(yd²)	% Usable
1st mile		5,790	45.4	1,460	11.4
2nd mile		6,080	45.9	1,540	11.6
. 6 mile		2,530	38.9	730	11.2
Total		14,400	44.4	3,730	11.5

Spawning Area Unavailable and Unusable: None

Character of Watershed:

	A-B
Mountainous	X
Hilly	
Rolling	
Flat	
Swampy	
Wooded	X
'Open	
Cultivated	None
Character of Valley	

Character of Watershed **(cont):**

	A-B
Character of Banks	
Density of Marginal Vegetation	
Erosion a) Banks	
b) Watershed	

Diversions: None

Artificial Obstructions: None

Natural Obstructions: 1. A 20' high falls, 2.6 mi up from mouth.

Fluctuation **in Water** Level: 5-6'

Pollution: None

Fish (salmon): None seen or reported

Fish (other than salmon): Scarce - few small cutthroats seen.

Temperature Data: None taken

Pool Grade:

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6	Ttl
1st mi		4	4			2	2	11	15
2nd mi		5	5	2		3			5
0.6 mi		5	8	2	1	1	1		5
Total	2.6	14	5.4	4	1	6	3	11	25

Staley Creek

River System: Willamette River
Stream Surveyed: Staley Creek, tributary to Middle Fork Willamette River

Date of Survey: 7/9/38 by Morton

Source: Mountain streams from Staley Ridge and Potter Mountain and Capt. Jack Point at summit of Cascade range (6,000 ft up). South Fork of Staley Creek rises from mountain stream on Capt. Jack Point in S29,T25S,R5E.

Direction of Flow: East and northeast and then north from its source to the right bank of the middle fork of the Willamette about 7 miles below the confluence of the Middle Fork and Tumblebug Creek.

Total Length: 14 miles; 3.5 surveyed.

Station Location: No exact stations were taken and the information is summarized for each mile. However, stations A and B are designated as the start and finish of the survey.

St	Location	Distance Above Prev. Station Yds	Miles	Distance Above Mouth Yds	Miles	Map Location	Width
A	Mdl Fk Willamette	--			--	S18,T24S,R4E	29.1'
	1st mi above confl	1.0			1.0	S19,T24S,R4E	31.2'
B	End of survey	2.5			3.5	S32,T24S,R4E	31.5'

No depths taken - a flow at 2 miles showed 57 cfs.

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090001	0049	0.00
B*	17090001	0049	0.00

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
1st mile		4,050	24.3	4,910	29.5	4,930	29.6	2,710	16.6
2nd mile		6,210	33.2	5,090	27.2	3,570	19.0	3,830	20.6
3rd mile		10,380	58.3	3,350	18.8	2,590	14.5	1,480	8.4
Total	3 mile	23,790	3,150	70.0	41.3	14,010	660	24.3	14.6
		11,670	580	20.2	12.8	8,110	2.6	14.2	

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

Spawning Area Usable and Available:

Station	Area (yd^2)	Available Spawning Area (yd^2) (MR&SR)	% Avail	Usable Spawning Area (yd^2)	% Usable
1st mile		9,840	59.1	1,310	7.8
2nd mile		8,660	46.2	970	5.1
3rd mile		5,940	33.3	1,630	9.1
. 3 mile		1,240	27.4	300	6.6
Total		25,680	44.5	4,210	7.3

Spawning Area Unavailable and Unusable:

Cause of Unavailability: Above the first mile from its mouth, the river is full of log jams and falls and cascades - two of which flow over wide aprons of bedrock so that water is only an inch or two deep. Any areas above falls at 3.3 miles are also unavailable.

Character of Watershed:

	A-B
Mountainous	X
Hilly	
Rolling	

Character of Watershed **(cont):**

	A-B
Flat	
Swampy	
Wooded	x (densely, all wild)
Open	
Cultivated	None
Character of Valley	
Character of Banks	
Density of Marginal Vegetation	
Erosion a) Banks	
b) Watershed	

Diversions: None

Artificial Obstructions: None

Natural Obstructions:

1. One log jam at end of first mile a barrier. Two wide areas of bedrock with only 1 or 2 inches of water are barriers, and a 20′ fall at end of 3.3 miles is a final barrier to any salmon migrations in this creek.

Pollution: None

Fish (salmon): None seen but a good salmon run in previous years was reported.

Fish (other than salmon): In the first 2 miles only 3 small (6") trout were observed. However, in the upper gorge just below the falls they were more common and in a deep hole a few hundred paces below the falls, four 10" cutthroat trout were clearly seen. There should be excellent trout fishing above the falls.

General Remarks:

Staley Creek flows through a narrow valley with alternate flat bottoms and deep steep gorges through solid rock walls up to 40' high. Although the percentage of medium and small rubble is high (almost 50%), the water in most places is so fast or so shallow that much of it must be discounted as spawning area. There are some excellent patches of rubble all along the lower portion of the creek. The banks (where not solid rock), are composed of an assortment of coarse gravel and all types of rubble and in some places the creek is eating into these banks. It is a typical trout stream also with its many small falls and deep clear pools. The wide aprons of bedrock are impassable barriers in low water only.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
2 miles from mouth	7/9/38	3:00 PM	72.0 F	54.0 F	Clear

Pool Grade:

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6	Ttl
1st mi		16	16	4 25.0	3 18.8	6 37.4	3 18.8		16
2nd mi		12	12	3 25.0		6 50.0	3 25.0	10	22
3rd mi		15	15	2 13.3	1 6.7.	4 26.7	8 53.3		15
Total	3.5	43	12	9 20.9	4 9.3	16 37.2	14 32.6	10	53

Gradient: Very steep mostly.

Echo Creek

River System: Willamette River
Stream Surveyed: Echo Creek, tributary to Middle -Fork Willamette River

Date of Survey: 9/11/37, by Hanavan and Lobell.

Description:

Volume of 12-15 cfs. Good spawning area limited to lower 100 yds. Steep gradient with large rubble and cascades in upper section of stream. Stream shows very little fluctuation - probably spring origin. Doubtful if upper portion is accessible to salmon because of debris jams. Dense cover throughout, many fallen trees across stream. Air temperature, 66.0 F, water 52.0 F. Pools all small and shallow. Salmon seen in main river near mouth but not in creek.

Swift Creek

River System: Willamette River
Stream Surveyed: Swift Creek, tributary to Middle Fork Willamette River

Date of Survey: July 9, 1938 by Hanavan

Source: Lakes and mountain streams from Cascade Range Summit near Mt. Yoran and Diamond Peak. (8,750). Bear Creek (trib) rises in S36 and Swift Creek in S24.

Direction of Flow: West and then southwest from its source to the left bank of the middle fork of the Willamette about 2 1/2 miles below the confluence of the middle fork and Tumblebug Creek.

Total Length: 9 miles of which 3.3 were surveyed.

Station Location: There were no exact stations located. Stations A and B designate the start and finish, respectively. Stream data is summarized for each mile.

St	Location	Distance Above Prev. Station Yds	Distance Above Prev. Station Miles	Distance Above Mouth Yds	Distance Above Mouth Miles	Map Location	Width
A	Mdl Fk Willamette	--			--	S11,T24S,R4E	33.9'
	1st mi above confl		1.0		1.0	S1,T24S,R4E	37.5'
B	End of survey		2.3		3.3	S36,T23S,R4E	33.9'

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090001	0060	0.00
B*	17090001	0060	1.89

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
1st mile		12,320	63.8	3,870	20.0	2,090	10.8	1,020	5.4

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

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
2nd mile		12,770	56.5	4,120	18.2	3,010	13.3	2,700	12.0
3rd mile		13,300	68.9	3,140	16.2	1,640	8.4	1,220	6.5
. 3 mile		3,490	70.0	740	15.0	500	10.0	270	5.0
Total		41,880	63.2	11,870	17.9	7,240	10.9	5,210	8.0

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

Spawning Area Usable and Available:

Station	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	% Usable
1st mile		5,960	30.8	1,220	6.3
2nd mile		7,130	31.5	1,950	8.6
3rd mile		4,780	24.6	490	2.5
. 3 mile		1,240	25.0	130	2.5
Total		19,110	28.8	3,790	5.7

Spawning Area Unavailable and Unusable: None

Character of Watershed:

	A-B
Mountainous	X
Hilly	
Rolling	
Flat	
Swampy	
Wooded	X densely
Open	
Cultivated	None

Character of Watershed **(cont):**

	A-B
Character of Valley	
Character of Banks	
Density of Marginal Vegetation	
Erosion a) Banks	
b) Watershed	

Diversions: None

Artificial Obstructions: None

Natural Obstructions: Much debris, many log jams w/ low falls.

Fluctuation in Water Level: 3-7' shown on banks. A flow taken at mouth showed 43.2 cfs.

Pollution: Some glacial silt and sand - not serious.

Fish (salmon): None seen. No salmon reported at any time.

Fish (other than salmon): None reported or seen.

General Remarks:

Near its confluence with the middle Willamette, the creek flows through a wide, swampy valley and in its lower 1.5 mile course numerous flood channels are present. Above this point, Swift Creek flows through deep canyons in a series of cascades. Recent floods have washed out much of the bordering timber from the banks of the creek leaving many of the trees in the stream bed. These trees have formed numerous log jams in the portion of the stream examined.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
3/4 mile from mouth	7/9/38	12:OO PM	73.0 F	40.0 F'	Clear

Pool Grade:

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6	Ttl
1st mi		5	5	2 40.0		3 60.0		69	74
2nd mi		16	16	3 18.8		13 81.2		96	112
3rd mi		13	13			13 100.0		70	83
Total	3.3	34	10	5 14.7		29 85.3		235	269

Gradient: Very steep.

Coast Fork Willamette River

River System: Willamette River
Stream Surveyed: Coast Fork Willamette River

Date of Survey: 'May 25 to June 20, 1938

Source: Lane County OR, Black Butte to five miles south of Eugene. T22S-T23S, R3W-R2W.

Direction of Flow: North, northeast

Total Length: 55 miles, 46 miles surveyed.

Station Location:

St	Location	Distance Above Prev. Station Yds	Miles	Distance Above Mouth Yds	Miles	Map Location	Width	Depth
A	Boat House		--		--	S11,T18S,R3W	- -	- -
B	County rd br.		4.9		4.9	S13,T18S,R3W	125'	--
C	Hwy br near Goshen		2.6		7.5	S25,T18S,R2W	210'	--
D	Cresswell bridge		7.2		14.7	S19,T19S,R3W	176'	--
E	Sanginaw rd br.		6 . 6		21.3	S15,T20S,R3W	152'	12'
F	Dam at Cotton Grove		3.7		25.0	S32,T20S R4W	85'	--
G	Br. at damsite		6.0		31.0	S27,T21S,R3W	55'	1.3'
H	Thorn hwy bridge		6.0		37.0	S11,T22S,R3W	27'	2.0'
I	Bridge at Black Butte Fork		4.6		41.6	S2,T23S R3W	27'	0.8'
J	Old log dam		4.0		45.6	S8,T23S,R3W	- -	- - -

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090002	0001	0.11
B	17090002	0001	0.56
C	17090002	0002	0.00
D	17090002	0005	1.86
E	17090002	0006	0.00
F*	17090002	0007	2.36
G	17090002	0009	3.27
H*	17090002	0013	2.03
I*	17090002	0013	6.73
J*	17090002	0769	0.00

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

Sta	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
A-B	320,948	54,400	17.0	97,710	30.2	99,250	31.0	69,588	21.6
B-C	270,300	58,050	21.2	72,320	26.6	76,400	28.3	63,650	23.6
C-D	573,370	139,885	24.2	246,675	43.2	114,802	20.0	71,615	12.5
D-E	521,450	193,774	37.2	165,491	31.8	110,246	21.2	51,694	10.0
E-F	159,230	75,380	47.2	25,663	16.1	22,383	14.0	35,094	22.0
F-G	208,120	70,040	33.7	39,300	18.9	42,730	20.6	55,063	26.4
G-H	180,830	48,609	27.0	39,933	22.1	36,403	20.2	54,144	29.9
H-I	125,700	64,740	51.6	25,490	20.3	17,060	13.9	18,710	14.9
I-J	71,100	31,010	43.6	14,260	20.1	15,250	21.4	10,610	14.9
Tot	2,431,048	735,888		726,842		534,524		430,168	

Classification of stream based on amount of usable spawning rubble and area present: N/A

Spawning Area Usable and Available:

Station	Distance vds miles	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	% Usable
A-B	4.9	196,960	61.4	52,230	16.4
B-C	2.6	148,720	54.8	28,240	10.4
C-D	7.2	361,477	63.0	170,717	29.0
D-E	6.6	275,755	52.7	86,650	16.6
E-F	3.7	48,046	30.2	5,740	3.6
F-G	6.0	82,030	39.4	11,440	5.5
G-H	6.0	76,336	42.2	14,040	7.8
H-I	4.6	42,550	33.6	6,760	5.4
I-J	4.0	29,510	41.6	8,860	12.5
Total	45.6	1,261,384	46.5	384,677	11.9

Note : Extensive pools and slow deep riffles in the lower section and cascades and fast riffles in the upper section make much of the medium and small rubble bottom unsuitable for spawning.

Spawning Area Unavailable and Unusable:

Cause of Unavailability: Two miles below Sta. H is a millpond which is impassable. A poorly made fish ladder has been constructed but is seldom in operation.

The mill pond with its poor fish ladder is considered a barrier.

Character of Watershed:

Mountainous	Upper 10 miles only
Hilly	Lower 35 miles
Rolling	Lower 35 miles
Flat	Lower valley
Swampy	
Wooded	Upper 10 miles
Open	
Cultivated	80% lower, 10% upper sections
Character of Valley	
Character of Banks	
Density of Marginal Vegetation	
Erosion a) Banks	
b) Watershed	

Diversions:

Diversion 1: Cottage Grove flour mill, 15 cfs headgate 4' deep, 5' wide.

Diversion 2: 1.1 miles above Sta. F, pumping station. 5 cfs used to cool generators, 1/2" grizzly protects the pipe opening, return 200 paces below.

Artificial Obstructions:

1. Sta. F; mill dam; 7,; ladder; poor.

2. 1 mi above Sta. F; mill pond; 5,. No protection device.

Artificial Obstructions **(cont):**

3. 4 miles above Sta. G; old mill pond; 6,; spill. No protection device.

4. 3.5 miles above Sta. G; mill pond; ladder; poor, impassable.

5. 1.4 miles above Sta. H; wooden dam; 2'. No protection device.

6. 2.8 miles above Sta. H; old mill dam; passable around ends. No protection device.

7. Sta. J; old log dam; 7 1/2'; impassable. No protection device.

Natural Obstructions: None

Fluctuation in Water Level: Normal 4-8', flood stage 15,.

Cause of Variation: Seasonal rains and spring runoff.

Stream Flow: Sta. E at Saginaw. May 1930, 909 cfs average. June 1930 602 cfs average (from Water Resources of the State of Oregon).

Pollution: Slaughter house effluent near Cottage Grove. Sawmill wastes above Cottage Grove. Cottage Grove sewage. Mercury mine near Sta. G. Sewage and slaughter house wastes, sawdust, sulphide liquor.

Fish (salmon): None. Natives report that no salmon have been in this river for many years.

Fish (other than salmon):

Species	Date	Very Abundant	Abundant	Fair	No.	Scarce
Brook Trout	6/15/38			X		
Chub	"	X				
Cutthroat	6/20/38			X		
Sucker	"		X			

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

Species	Date	Very Abundant	Abundant	Fair	No.	Scarce
Whitefish	5/25/38			X		
Cottus	"			X		

General Remarks:

Above London the stream is small, not exceeding 35' in width. The gradient is moderate to steep with several small falls and series of cascades. The rubble was mainly large, thus cutting down the area suitable for spawning which was estimated to be about 7-8% of the total bottom.

Fish Population:

Cyprinids make up the bulk of the fish population. Suckers and cottids are also abundant. Trout fishing was reported good. in the spring and poor in summer. Cutthroat, rainbow and brook trout were observed in few numbers. Old residents of the region reported a salmon run some 20-30 years ago. The extent of this run could not be determined. In general, the stream seems suitable for a large salmon population, however pollution and obstructions would have to be removed before a stocking policy could be carried out.

Topography:

The river flows through a wide valley bordered by low rolling hills to the vicinity of London. The country is quite heavily farmed with some 80% in farms and pastureland. Logging activities have removed most of the former conifer growth. Marginal vegetation is generally dense consisting of willow, alder, berries, cottonwood and maple. Above London, the region is mountainous, heavily timbered with a narrow valley. Little of the area is farmed.

Character of Stream:

The lower area has a moderate to slow gradient. The bottom is composed of almost equal parts of large, medium and small rubble. The estimated spawning area, based upon bottom, current and depth, averaged approximately 15% of the total area with occasional stretches of 35% and zero. Above the Row River the river is considerably smaller, however the character of the stream is similar to the lower part. Six old mill ponds obstruct the stream above Cottage Grove, in some cases forming impassable barriers. The dam at Sta. J (end of survey), is also a barrier. The sawdust from mills and the sewage effluent of Cottage Grove are distinct sources of pollution.

Temperature Data:

Sta	Date'	Hbur	Air Temp	Water Temp	Sky
C	5/28/38	2:40 PM	82.0 F	62.0 F	Fair
D	5/24/38	10:15 AM	70.0	61.0	Fair
E	5/23/38	12:00 PM	81.0	60.0	Clear
F	6/20/38	4:30 PM	81.0	64.0	"
G	"	"	77.0	65.0	Fair
H	"	3:30 PM			Fair
I	6/17/38	4:15 PM	55.0	52.0	Rain

Pool Grade:

Sta	Dist (mi)	Rest Pools	Rest Pl/Mi	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6	Ttl
A-B	4.9	76	15.5	69		7		4	80
				90.8		9.2			
B-C	2.6	49	18.8	44	2	3			49
				89.8	4.1	6.1			
C-D	7.2	119	16.5	77	7	35		15	134
				64.7	5.9	29.4			
D-E	6.6	64	9.7	20	22	22		53	117
				31.2	34.4	34.4			
E-F	3.7	61	16.5	20	18	23		2	63
				32.8	29.5	37.7			
F-G	6.0	104	17.3	59	8	37		13	117
				56.7	7.7	35.6			
G-H	6.0	108	18.0	49	7	52		23	131
				45.4	6.5	48.i			
H-I	4.6	62	13.5	12	7	43		81	143
				19.4	11.3	69.3			
I-J	4.0	59	14.8	15	6	38		64	123
				25.4	10.2	64.4			
Tot	45.6	702	15.4	365	77	260		255	957
				52.0	11.0	37.0			

Gradient:

Station	Distance (Miles)	Total Drop	Avg Drop Per Mile	Source of Data
D-E	7	69'	9.8	USGS Cottage Grove Quadrangle

No other data available.

Tributaries:

1. Bear Creek, 4 cfs, 2.5 miles above Sta. C.
2. Lynx Hollow Creek, 4 cfs, 2.0 miles above Sta. D.
3. Gettings Creek, 15+ cfs, 3.0 miles above Sta. D.
4. Row River, see report, 5 miles above Sta. E.
5. Silk Creek, 5 cfs, at Cottage Grove.
6. No name, 10 cfs, 2.5 miles above Sta. G, right bank.
7. No name, 1 cfs, 4.5 miles above Sta. G, right bank.
8. No name, 3 cfs, 1 1/3 mile above Sta. H, right bank.
9. No name, 5 cfs, 1.5 miles above Sta. H, right bank.
10. No name, 1+ cfs, 4.2 miles above Sta. H, leftr bank.
11. Black Butte, 15-20 cfs, Sta. I.
12. No name, 3 cfs, 1.5 miles above Sta. I, left bank.
13. No name, 1 cfs, 2 miles above Sta. I, left bank.
14. No name, 200 yds below Sta. J.

Black Butte Creek

River System: Willamette River
'Stream Surveyed: Black Butte Creek, tributary to upper Coast Fork Willamette River

Date of Survey: 6/17/38

Description:

Only 400 yds of this small trib. to the upper Coast Fork is accessible. At this point an old dam is located that has a fall of over 8' and was considered impassable at all times.

At the time of the survey, the stream flow was 15-20 cfs but it was raining at the time, and the summer flow is believed to be much less.

The gradient in this section was moderately steep with small cascades in all stretches. A small falls about 6, high, located 85 yds above the mouth was passable with difficulty.

The stream is shallow and from 18-27' wide below the dam. This area was silted from road building, and had additional pollution from a mercury mine.

The stream has no value to spawning salmon. Now blocked by War Department Cottage Grove dam for all time.

Note : Data from stream sheet compiled by F.G.B. December 7, 1942.

Row River

River System: Willamette River
Stream Surveyed: Row River, tributary to Coast Fork Willamette River

Date of Survey: 5/23-31/38

Source: Springs and runoff from mountains. Umpqua National Forest, Lane County, OR.

Direction of Flow: Northwest from Willamette divide to Cottage Grove where it joins the Coast Fork of the Willamette.

Total Length: 21.7 miles, all surveyed (see Laying Creek report for continuation of the Row River).

Station Location:

St	Location	Distance Above Prev. Station Yds	Distance Above Prev. Station Miles	Distance Above Mouth Yds	Distance Above Mouth Miles	Map Location	Width	Depth
A	Coast Fk Will	--		--		S21,T20S,R3W		4.0,
B	Bridge		1.5		1.5	S32,T20S,R3W	150'	1.8'
C	Br near Dorena		7.3		8.8	S4,T21S,R2W	81'	9.5'
D	2nd white bridge above Sta. C		3.6		12.4	S14,T21S R2W	69'	2.0'
E	Sharps Cr br.		5.2		17.6	S35,T21S,R1W	72'	20'
F	Wildwood Falls		1.1		18.7	S34,T21S,R1W	60,	falls
G	Laying Cr br.		2.4		21.1	S32,T21S,R1W	--	--
H	End of survey		0.6		21.7	---	--	--

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090002	0016	0.00
B	17090002	0016	0.00
C*	17090002	0035	0.49
D*	17090002	0035	4.38
E	17090002	0024	3.06
F*	17090002	0028	0.00
G*	17090002	0028	2.87
End of survey	17090002	0028	3.51

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
A-B	60,720	27,737	45.6	18,107	29.8	10,434	17.2	4,442	7.4
B-C	511,840	262,281	51.2	127,390	24.8	76,277	14.9	45,892	9.1
C-D	295,040	234,675	79.7	27,134	9.18	20,712	7.02	12,519	4.1
D-E	240,900	162,465	66.3	41,521	16.9	26,200	10.3	10,714	5.8
E-F	41,200	28,670	69.5	6,200	15.0	4,300	10.4	2,030	5.1
F-G	87,000	63,000	72.4	11,160	12.8	9,670	11.1	3,170	3.7
Tot	1,236,700	778,828		231,512		147,593		78,767	

Classification of stream based'on amount of usable spawning rubble and area present: N/A

Spawning Area Usable and Available:

Station	Distance vds miles.	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	% Usable
A-B			28,541	42.0	13,401	22.1
B-C			203,667	39.7	75,639	14.8
C-D			47,846	16.2	14,269	4.8
D-E			67,721	27.6	10,920	4.4
E-F			10,500	25.6	840	2.0
F-G			20,830	23.9	5,040	5.8
Total			379,105	29.2	120,109	9.0

Spawning Area Unavailable and Unusable:

Station	Distance	Area (yd^2)	Area Unavail (yd^2)	% Unavail	When Avail	Usable Unavail (yd^2)	% Usable Unavail
F-G			20,830			5,040	

Cause of Unavailability: Wildwood Falls makes a 25' jump necessary. This also obstructs Laying and Frank Brice Creeks to migratory fish.

Character of Watershed:

Mountainous	In upper regions

Character of Watershed **(cont):**

Hilly	In upper regions
Rolling	
Flat	In lower part
Swampy	
Wooded	In lower part
Open	
Cultivated	10% in lower part
Character of Valley	
Character of Banks	
Density of Marginal Vegetation	
Erosion a) Banks	
b) Watershed	

Diversions: None

Artificial Obstructions:

1. 3 miles above Sta. C on Harms Creek, not on Row River; mill pond with an 18′ drop, no protection device.

Natural Obstructions:

1. Sta. F; 25′ high falls; impassable. By pass has falls of 8′-5′-4′ with no pools; followed by impassable chute.

2. 1/2 mile above Sta. D; 6′ high falls; passable with difficulty.

Fluctuation in Water Level:

Cause of Variation: Seasonal rains and spring runoff.

Stream Volumes: Lower: 2-3', upper 15' in narrow areas.

Stream Flow: 3.1 miles above Sta. B Aug. 11, 1926, 71 cfs (data from Water resources of the State of Oregon).

Pollution: None

Fish (salmon): None

Fish (other than salmon):

Species	Date	Very Abundant	Abundant	Fair	No.	Scarce
Sucker	5/28/38	X				
Dace	5/30/38		X			
Cottus	5/25/38			X		
Rainbow	"			X		

General Remarks:

Topography:

The lower section of the stream, up to Mosby Creek, flows through a wide open valley. Much of the region is cultivated and in pasture. Marginal vegetation is generally dense, consisting of willow, alder, berries, maple and cottonwood. The valley of the upper area is narrow, bounded by low hills, and covered with a dense second growth fir forest. A little of the area is cultivated.

Character of Stream:

The lower section of the stream was large and slow enough to permit a boat survey. Pools and type C3 riffles alternated. The bottom was composed of approximately 50% large rubble and equal percentage of medium and small rubble and about 10% of sand and mud. The section above Sta. C has a faster gradient, in some cases being a series of cascades. The bottom consisted of nearly 70% large rubble, made up mostly of bedrock. Spawning areas estimated were few amounting to less than 10%.

General remarks (cont):

Fish Population:

The stream does not support a large fish population which might be correlated with the large amount of bedrock bottom. Suckers were abundant in some areas and were seen spawning below Sta. C. A few chubs and numerous minnows were seen in occasional pools. A few rainbow were seen. No salmon were observed or reported.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
B	5/23/38	11:15 AM	81.0 F	58.0 F	Clear
C	5/31/38	2:00 PM	71.0	62.0	Fair
E	"	12:30 PM	70.0	54.0	"
F	"	11:45 AM	"	"	"

Pool Grade:

Sta	Dist (mi)	Rest Pools	Rest Pl/Mi	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6	Ttl
A-B	1.5	20	13.3	3	6		11	5	25
				15.0	30.0		55.0		
B-C	7.3	141	19.3	61	15		65	73	214
				43.3	10.6		46.1		
C-D	3.6	104	28.9	24	12		68	48	152
				2'3.1	11.5		65.4		
D-E	5.2	84	16.2	64	3		17	93	177
				76.2	3.6		20.2		
E-F	1.1	18	16.4	12			6	23	41
				66.7			33.3		
F-G	2.4	53	22.1	28			25	94	147
				52.8			47.2		
Tot	21.1	420	19.9	192	36		192	336	756

Gradient:

No data available, however the gradient may be classified as slow in the lower 6 miles to moderate for the upper section.

Tributaries:

1. Mosby Creek, 4.2 miles above mouth, see survey report.
2. Harms Creek, 9.2 miles above mouth, 3+ cfs, impassable.
3. McCauley Creek, 11 miles above mouth, 10 cfs, bedrock apron, impassable.
4. No name, 15.1 miles above mouth, left bank, 3+ cfs.
5. Sharps Creek, 17.8 miles above mouth, see survey report.
6. Frank Brice Creek, 18.1 miles above mouth, see survey report.
7. No name, 2Q.2 miles above mouth, 1+ cfs.

Mosby Creek

River System: Willamette River
Stream Surveyed: Mosby Creek, tributary to the Row River

Date of Survey: 6/13-16/38

Source: Springs and runoff from mountains. Lane County, Oregon, mouth four miles southeast of Cottage Grove.

Direction of Flow: Northwest from Bohemia mountains to Row River.

Total Length: 16 miles, 14 surveyed.

Station Location:

St	Location	Distance Above Prev. Station Yds	Miles	Distance Above Mouth Yds	Miles	Map Location	Width	Depth
A	Mouth		--		--	S32,T20S,R3W	60'	6"
B	Stewart Bridge		2.0		2.0	S1,T21S,R3W	48'	2.5'
C	Taylors private br		4.4		6.4	S36,T21S,R2W	43'	1'
D	Farm house		4.3		10.7	S16,T22S,R2W	35'	4"
E	End of road		3.1		13.8	S16,T22S,R2W	30'	6"

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090002	0017	0.07
B*	17090002	0017	0.07
c*	17090002	0017	6.50
D*	17090002	0017	11.28
E*	17090002	0017	13.62

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
A-B	53,210	16,305	30.6	20,826	39.1	11,183	21.0	4,896	9.3
B-C	134,000	52,970	39.2	44,390	33.1	27,480	20.4	9,160	7.3
C-D	77,800	40,070	52.5	22,580	29.0	12,760	16.3	2,390	2.2
D-E	63,600	30,810	48.4	17,470	27.5	13,540	21.3	1,780	2.8
Total	328,610	140,155		105,266		64,963		18,226	

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

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	% Usable
A-B			32,009	60.0	24,520	48.0
B-C			71,870	53.5	32,530	24.3
C-D			35,340	45.5	14,800	19.0
D-E			31,010	48.7	14,040	22.1
Total			170,229	51.9	85,890	28.4

Spawning Area Unavailable and Unusable: None

Character of Watershed:

	A-F
Mountainous	X
Hilly	X
Rolling	
Flat	
Swampy	
Wooded	X
Open	
Cultivated	30% lower to none in upper part
Character of Valley	
Character of Banks	
Density of Marginal Vegetation	
Erosion	

Diversions:

Diversion 1: 3.5 miles above mouth, 1 cfs log dam, 50' crest, 2' high. 2" spill.

Artificial Obstructions:

1. 1,100 paces above mouth; mill dam; 3' high; passable.

2. 3.5 miles above mouth; log dam for irrigation; 2' high; passable.

Natural Obstructions:

1. Several small falls, none over 4' high and all passable.

Fluctuation in Water Level: 3-5' during the year.

Cause of Variation: Spring runoff and seasonal rains.

Stream Volumes:

Stream Flow: Sta. C 6/16/38 41 cfs.
Sta. A 6/11/26 17 cfs
(data from Water resources of the State of Oregon)

Pollution: None

Fish (salmon): None

Fish (other than salmon):

Species	Date	Very Abundant	Abundant'	Fair	No.	Scarce
Sucker	6/15/38		X			
Cutthroat	"			X		
Chub	"		X			
Whitefish	"		X			
Silverside	"		X			
Lamprey	"			X		

General Remarks:

Topography: -

The lower half of the stream area is in a flat valley some three miles wide, bordered by low hills. The hills are covered with second growth conifers. Marginal vegetation is dense consisting of willow, alder, cottonwood, berries and a few oak. The low hills merge into low mountains in the upper section where the valley is narrow and v shaped. About 40% of the first section is cultivated and none in the upper part. Logging is being carried on through the first section. A mill is located near the mouth.

Character of Stream:

The stream averaged approximately 45-50' wide at the mouth and narrowed to 25-30' at the upper section. The bottom is composed of 30-52% large, 27-39% medium, 16-21% small rubble and 3-9% mud and sand. The gradient is moderate to steep with many good riffle areas and resting pools. The estimated spawning area was from 19-48% of the total bottom. There is considerable bedrock in many areas. Several small falls up to 4' high were observed. However, none were considered a barrier.

Fish Population:

The stream produces a large fish population consisting mostly of suckers, minnows and chubs. Whitefish, cottus and cutthroat are present in fair numbers. Two fish'ermen were seen with a fair catch of the latter.. No salmon were seen or reported by natives of the region.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
A	6/16/38	3:45 PM	62.0 F	60.0 F	Cloudy
B	"	3:30 PM	"	"	"
C	- - -	2:30 PM	59.0	59.0	"
D	6/16/38	2:00 PM	61.0	54.0	Rain
E	"	1:30 PM	"	"	"

Pool Grade:

Sta	Dist (mi)	Rest Pools	Rest Pl/Mi	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6	Ttl
A-B	2.0	37	18.5	5		32			37
				13.5		**86.5**			
B-C	4.4	**101**	**22.9**	**19**	2	80		29	130
				18.8	**2.0**	**79.2**			
C-D	4.3	129	30.0	20	2	107		35	164
				15.5	1.5	83.0			
D-E	3.1	61	19.7	**11**	**1**	**49**		**10**	**71**
				18.0	1.6	80.4			
Tot	13.8	328	23.8	55	5	268		74	402
				16.8	1.5	81.7			

Gradient: No data available

Tributaries:

1. No name, 2,600 paces, right bank, small.
2. No name, 3.5 miles, right bank, 1+ cfs.
3. No name, 5 miles, left bank, small.
4. No name, 8.5 miles, right bank, small.
5. No name, 10.1 miles, right bank, 3 cfs.
6. No name, 10.7 miles, right bank, 2 cfs.
7. No name, 13.4 miles, right bank, 2 cfs, impassable.

Sharps Creek

River System: Willamette River
Stream Surveyed: Sharps Creek, tributary to Row River

Date of Survey: 5/30/38

Source: Drainage from Bohemia and Elephant mountains of the Calapooya Range in the Umpqua 'National Forest. T21-23S, R1W, R1E, Lane County, OR.

Direction of Flow: Northwest to Row River

Total Length: 16 miles, 13.5 surveyed.

Station Location:

St	Location	Distance Above Prev. Station Yds	Miles	Distance Above Mouth Yds	Miles	Map Location	Width	Depth
A	Mouth	---		---		S5,T22S,R1W	49.3'	9"
B	Covered bridge	7.7		7.7		S22,T22S,R1W	30.8'	13"
C	Fairview Cr Confl	5.8		13.5		S8,T23S,R1E	17.8'	5"

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090002	0025	0.00
B	17090002	0025	4.47
C	17090002	0025	10.30

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
A-B	224,000	117,960	52.6	57,210	25.5	37,660	16.8	11,170	5.1
B-C	107,900	69,640	64 0	23,420	21 8	12,480	11 6	2.360	2.6
Tot	331,900	187,600	58.3	80,630	23.7	50,140	14.2	13,530	3.9

Classification of stream based on amount of usable spawning rubble and area present: N/A

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	% Usable
A-B			94,870	42.0	53,570	23.9
B-C			35,900	33.0	15,890	14.7
Total			130,770	40.3	69,460	20.9

Spawning Area Unavailable and Unusable:

Station	Distance	Area (yd^2)	Area Unavail (yd^2)	% Unavail	When Avail	Usable Unavail (yd^2)	% Usable Unavail
B-C			17,530			5,045	

Cause of Unavailability: A 10' falls is located 10.5 miles above the mouth, impassable at low water.

Character of Watershed:

	A-C
Mountainous	X
Hilly	
Rolling	
Flat	
Swampy	
Wooded	X
Open	
Cultivated	None
Character of Valley	
Character of Banks	

Character of watershed **(cont):**

	A-C
Density of Marginal Vegetation	
Erosion	
a) Banks	
b) Watershed	

Diversions: None

Artificial Obstructions: None

Natural Obstructions:

1. 6.2 miles above mouth; log jam; partial obstruction.
2. 10.5 miles above mouth; 10' high falls, cascade type; impassable at low water at present.

Fluctuation in Water Level:

Cause of Variation: Seasonal rains and spring runoff.
Stream Volumes: 6-10'
Stream Flow: Sta. A 6/1/38 77 cfs
Sta. B 6/1/38 46.4 cfs
Sta. C 9/20/26 8.0 cfs
Data from Water resources of the State of Oregon.

Pollution: None

Fish (salmon): None

Fish (other than salmon):

Species	Date	Very Abundant	Abundant	Fair	No.	Scarce
Chub	6/1/38			X		
Sucker	"		X			
Cottus	"			X		
Cutthroat	"			X		

General Remarks:

Topography:

The region up to the vicinity of Sta. B is hilly and heavily wooded. The valley is narrow with little cultivation. A few -farms are scattered along the road. Marginal vegetation is dense, consisting of fir, alder, maple and willow. The region above B is mountainous forming a narrow v shaped valley.

Character of Stream:

The stream was approximately 45-50' wide at the mouth and 25-30' at-Sta. C. The gradient is rather steep throughout, having many series of cascades and low falls. The bottom composition was 50-60% large, 21-25% medium, 11-16% small rubble and 2-5% mud and sand. There are many areas of almost bedrock and nearly the entire bottom contains some 10-30% of this material. General absence of pools and the good riffle areas provided good spawning ground estimated to be about 20% of the entire bottom. Two barriers are present, log jam at -6.2 miles above mouth and a falls at 10 miles above the mouth. In low water they are impassable.

Fish Population:

The stream supports a fair sized fish population, consisting chiefly of suckers and chubs with a fair number of cottus and cutthroat. No salmon were seen or reported.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
A	6/1/38	11:00 AM	71.0 F	59.0 F	Clear
B	"	4:00 PM	72.0	56.0	"
C	"	3:00 PM	76.0	52.0	"

Pool Grade: no data available

Gradient: No topographic data available. In general the gradient is rather steep.

Tributaries:

1. Table Creek, 100 paces above Sta. B, 2 cfs.

2. White Creek, 3.2 miles above Sta. B, impassable falls.

3. Marten Creek, 3.6 miles above Sta. B, 3 cfs, impassable dam 1/4 mile up.

4. Walton Creek, 1/2 mile below Sta. C, 2 cfs, impassable falls.

5. Fairview Creek, Sta. C, 6.2 cfs, passable.

Laying Creek

River System: Willamette River
Stream Surveyed: Laying Creek, tributary to Row River

Date of Survey: 6/1/ - 6/3/38

Source: Springs and runoff from Calapooya Mt., Umpqua National Forest, Lane County, OR.

Direction of Flow: westerly

Total Length: 12 miles, 5 miles surveyed

Station Location:

St	Location	Distance Above Prev. Station Yds	Miles	Distance Above Mouth Yds	Miles	Map Location	Width	Depth
A	Mouth		---		---	S36,T21S,R1W	39.5'	6"
B	Rujada Forest Camp		1.5		1.5	S31,T21S,R1E	36.0'	20"
C	City water dam		3.5		5.0	S21,T21S,R1E	dam	dam

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090002	0030	0.00
B	17090002	0030	1.51
c*	17090002	0032	0.00

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
A-B	51,200,	31,410	61.4	9,680	18.9	6,070	11.8	4,040	7.9
B-C	78,100	42,200	54 1	18,570	23.8	12,650	16 2	4.680	5.9
Total	129,300	73,610	57.8	28,250	42.7	18,720	14.0	8,720	6.9

Classification of stream based on amount of usable spawning rubble and area present: N/A

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	% Usable
A-B			15,750	31.0	1,660	3.2
B-C			31,220	40.0	6,000	7.7
Total			46,970	35.5	7,660	10.9

Spawning Area Unavailable and Unusable:

Cause of Unavailability: None surveyed, the dam at Junetta Creek is a barrier. All area above is blocked to migratory fish.

Character of Watershed:

	A-C
Mountainous	X
Hilly	
Rolling	
Flat	
Swampy	
Wooded	X
Open	
Cultivated	None
Character of Valley	
Character of Banks	
Density of Marginal Vegetation	
Erosion a) Banks	
b) Watershed	

Diversions: None below Junetta Creek.

Artificial Obstructions:

1. Sta. C; water supply dam; 12' high; no protection device.

Natural Obstructions:

1. Several small falls. None a complete barrier.

Fluctuation in Water Level: 4' in wide sections, 8' in canyons.

Cause of Variation: Seasonal rains and spring runoff.

Stream Flow: Sta. A 6/3/38 38.1 cfs.

Pollution: None

Fish (salmon): None

Fish (other than salmon):

Species	Date	Very Abundant	Abundant	Fair	No.	Scarce
Rainbow				X		
Cutthroat				X		
Cottus				X		

General Remarks:

Topography:

The country is rugged and steep between heavily wooded mountains. The valley is narrow. Marginal vegetation is dense consisting of fir, willow, alder and miscellaneous brush. Most of the area has been logged.

Character of Stream:

The gradient is rather steep, making numerous cascades and low falls. The bottom is composed of 50-60% large rubble, about 20% medium, 15% small'and 5% mud and sand. Little of the area

General remarks **(cont):**

was considered suitable as spawning grounds. The average width was approximately 30'. An impassable barrier is located at Junetta Creek.

Fish Population:

No salmon were seen or reported. A few trout were seen and a'number of fry.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
A	6/3/38	4:30 PM	80.0 F	63.0 F	Clear
B	6/1/38	2:30 PM	72.0	59.0	Fair

Pool Grade:

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6	Ttl
A-B	1.5	39	26.0	26	3	10		7	46
				66.7	7.7	25.6			
B-C	3.5	65	18.6	40	1	24		133	198
				61.5	1.6	36.9			
Tot	5.0	104	20.8	66	4	34		140	244
				63.5	3.9	32.6			

Gradient: No data available. The gradient can be classified as steep, as there are many series of cascades and low falls.

Tributaries:

1. Prather Creek, 1/2 mile above Laying Creek Camp, 3 cfs.
2. Dinner Creek, 1 1/2 mile above Rujada, 2 cfs.
3. Junetta Creek at Sta. C.

Frank Brice Creek

River System: Willamette River
Stream Surveyed: Frank Brice Creek, tributary to Laying Creek

Date of Survey: 6/2-3/38

Source: Springs and runoff from Calapooya Mt., Lane County, OR. T22-23S,R1W, R2E

Direction of Flow: Northwest

Total Length: 16 miles, 8.3 surveyed.

Station Location:

St	Location	Distance Above Prev. Station Yds	Miles	Distance Above Mouth Yds	Miles	Map Location	Width	Depth
A	Mouth	---		---		S35,T21S,R1W	31'	18"
B	County rd br.	4.2		4.2		S12,T22S,R1W	30'	20"
C	Falls, end survey	4.1		8.3		S22,T22S,R1E	51'	--

EPA River Reach Codes:

Station	HUC	SEG	Rmi
A	17090002	0029	0.00
B*	17090002	0029	3.30
C*	17090002	0029	7.10

* Station location is not definite and has been estimated

Character of Bottom Between Stations:

Station	Area (yd^2)	L.R.	%	M.R.	%	S.R.	%	M&S	%
A-B	98,300	57,450	58.4	20,690	21.0	13,420	13.7	6,740	6.9
B-C	145,400	86,880	59.7	30,090	21.2	19,330	13.3	9,100	6.3
Total	243,700	144,330		50,780		32,750		15,840	

Classification of stream based on amount of usable spawning rubble and area present: N/A

Spawning Area Usable and Available:

Station	Distance vds miles	Area (yd^2)	Available Spawning Area(yd^2) (MR&SR)	% Avail	Usable Spawning Area(yd^2)	% Usable
A-B			34,110	34.8	6,880	7.0
B-C			49,420	33.9	7,980	5.5
Total			83,530	34.4	14,860	6.1

Spawning Area Unavailable and Unusable:

Cause of Unavailability: All areas above Sta. B in present low water due to 10' falls. Above Sta. B – total sq. yds 7,980 (estimated). Medium and small rubble – 49,420 sq. yds.

Character of Watershed:

	A-C
Mountainous	X
Hilly	X
Rolling	
Flat	
Swampy	
Wooded	X
Open	
Cultivated	None
Character of Valley	
Character of Banks	
Density of Marginal Vegetation	
Erosion a) Banks b) Watershed	

Diversions: None

Artificial Obstructions: None

Natural Obstructions:

1. 2.8 miles above mouth; 10' high falls; impassable in low water.
2. Sta. C; 25, high falls; total obstruction.

Fluctuation in Water Level: 10-15' rise in spring.

Cause of Variation: Seasonal rains and spring runoff.

Stream Flow: Sta. A 6/12/38 20 cfs
Sta. B 6/2/38 131.7 cfs
Data from Water resources of the State of Oregon.

Pollution: Slight pollution from sawmill waste.

Fish (salmon): None

Fish (other than salmon):

Species	Date	Very Abundant	Abundant	Fair	No.	Scarce
Cutthroat	6/2/38			X		

General Remarks:

Topography:

The stream flows through a narrow steep canyon bordered by thickly forested mountains. Logging is being carried on a small scale. None of the region is farmed. Marginal vegetation is dense, consisting of alder, maple, cedar, willow, ferns and berries.

General remarks (cont):

Character of Stream:

The stream averaged approximately 65, wide at the mouth and 50' at Sta. C, the end of the survey. The stream flow is fast, such that cascades and small falls are numerous. Thus the high percentage (34) of medium and small rubble is not available for spawning. The estimated spawning area, as judged by riffle, depth and bottom, was only 6.1%. Two falls were located. The first is 4,200 paces above the mouth. The height is 10' and it is considered as a barrier in low water. The second falls is 8.3 miles above the mouth, the height is 25', thus it is a permanent barrier. None of the six tributaries were large enough to merit investigation.

Fish Population:

The only fish observed were several 6-8" cutthroat. Salmon were not reported in the stream.

Temperature Data:

Sta	Date	Hour	Air Temp	Water Temp	Sky
A	6/2/38	11:30 AM	68.0 F	52.0 F	Fair
B	6/3/38	10:30 AM	"	50.0	"

Pool Grade:

Sta	Dist (mi)	Resting Pools	Resting Pools/Mile	S1T1 %	S1T2 %	S2T1 %	S2T2 %	S6	Ttl
A-B	4.2	58	13.8	20	6	32		73	131
				34.5	10.3	55.2			
B-C	4.1	101	24.6	46	5	50		237	338
				45.5	5.0	49.5			
Tot	8.3	159	19.2	66	11	82		310	469
				41.5	6.9	51.6			

Gradient: Topographic maps not available. The gradient is considered steep.

Tributaries:

1. Alder Creek, 2 miles from mouth, 2 cfs.
2. Adams Creek, 3 **1/3** miles from mouth.
3. Maiden Creek, 4 **1/2** miles from mouth.
4. Crawfish Creek, 6 miles from mouth, 1 cfs.
5. Dog Creek, 7 miles from mouth.
6. Marten Creek, 8 miles from mouth.