PHYSICAL AND BIOLOGICAL DATA TO 1968 FROM THE RIVERS INLET SOCKEYE SPAWNING AREAS

MANUSCRIPT REPORT

1970 - 1

by F. E. A. WOOD, D. C. SCHUTZ,,
AND J. D. C. HOLLAND

CANADA DEPARTMENT OF FISHERIES AND FORESTRY
FISHERIES SERVICE
PACIFIC REGION
VANCOUVER, B. C.

ADDENDA

Page 69.

Foskett, D.R. 1958. The Rivers Inlet Sockeye Salmon. J. Fish. Res. Bd. Canada, 15(5): 867-889.

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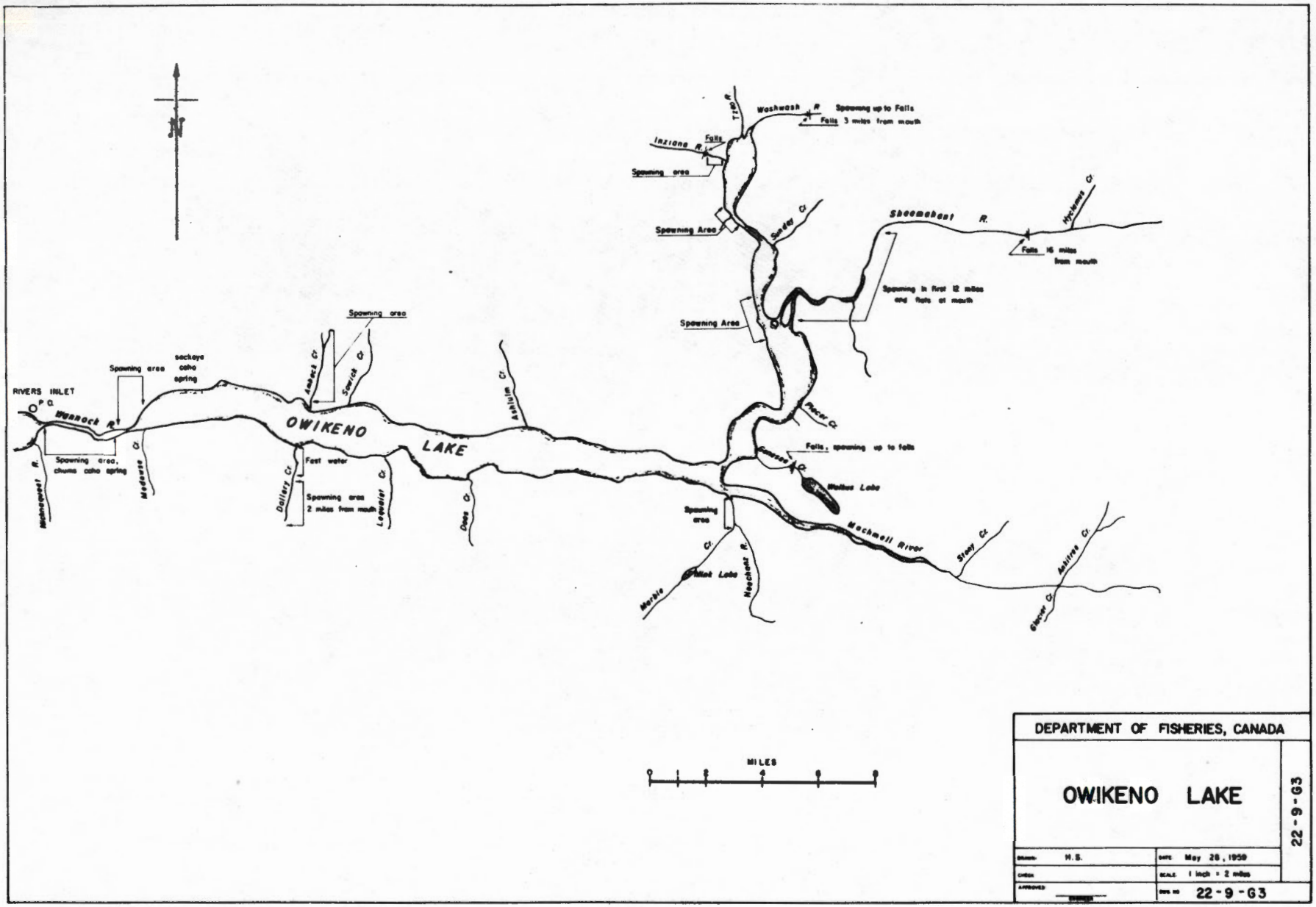
INTRODUCTION

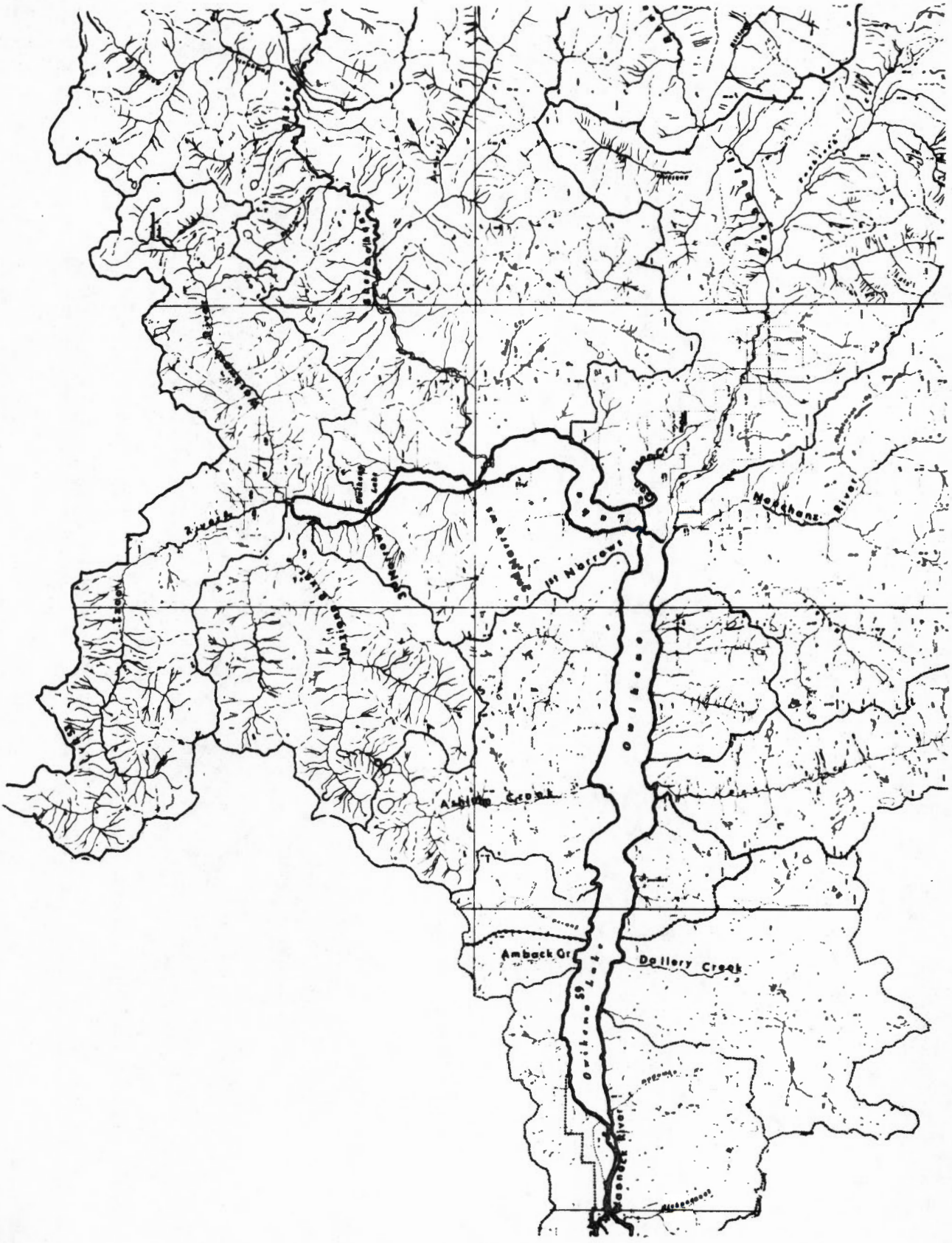
B. C. commercial fishermen have fished Rivers Inlet sockeye salmon since 1882; prior to that it is likely that coastal Indians fished these stocks for untold centuries.

During this time the watersheds and spawning grounds of Owikeno Lake and adjacent rivers have remained in a near-natural state. Logging effort has been negligible and other industry nonexistent. This era is about to end. Within the next decade it is probable that all of the larger river valleys will be logged extensively.

The purpose of this report is to bring together all physical and biological information presently available on the sockeye spawning areas of Rivers Inlet. In the years to come additional information will be collected, and the effects of logging evaluated to the best of our abilities. The Genesee Creek watershed has been chosen by the Department for a detailed environmental study before and after logging. This investigation is currently underway and will continue for the next 5 to 10 years.



Major known sockeye spawning areas in the Owikeno Lake system.



Sockeye streams and their drainage areas in the Owikeno Lake system.

STANDARDS USED ON DESCRIPTION PAGE

The following standards are similar to those defined in the Department of Fisheries and Forestry 1970 Catalogue of Salmon Spawning Streams, Statistical Area 14, Pacific Region.

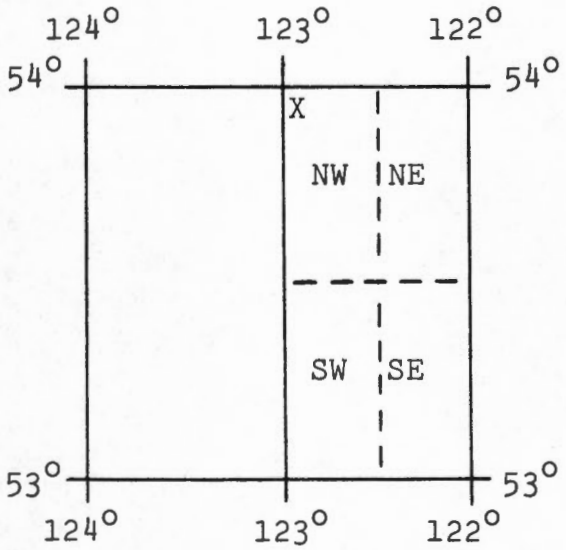
NAME OF STREAM: Name given in Gazetteer of Canada - British Columbia; other names are added in brackets.

PROTECTION DISTRICT: As defined by the Conservation and Protection Service (Apr. 1965).

STATISTICAL AREA: As defined by Department of Fisheries statistical map (Jun. 1957).

COMPUTOR CODE AREA: As defined by Department of Fisheries Computor Code of Salmon Investigation Locations in British Columbia, Jun. 1968.

LOCATION OF MOUTH AND POSITION: Position is defined by quadrant indexing. Each geographical quadrilateral of the earth's surface of 1 degree in extent in latitude and longitude is divided into the SE, SW, NE and NW quarters. The southeast corner of each quadrilateral gives the initial point for the figures of reference (Gazetteer of Canada - British Columbia).



EXAMPLE "X"

53° 122° NW

ACCESSIBLE LENGTH: Measured in miles and tenths of a mile from the mouth to a point beyond which 1% of the spawning population of any species fails to spawn profitably. Does not include tributary streams.

WIDTH: Average width, estimated to nearest foot, for the described length.

DRAINAGE: Area in square miles of the entire drainage basin feeding the stream.

COMPOSITION: Percentage occurrence of the listed categories for the wetted stream bed at average water levels within the described length.

Bedrock	bedrock
Boulder	256 mm (10")
Coarse	50.9 - 256 mm (2 - 10")
Fine	3.37 - 50.8 mm (1/8 - 2")
Sand & Silt	sand and silt
Unclassified	where bottom cannot be observed, e.g., log jams, pools, water colour, etc.

GRADIENT: Average vertical drop per thousand linear feet.

WETTED AREA: Number of square yards of stream bed under water at average flows within the described length.

SPAWNING AREA: Estimated number of square yards of stream bed suitable for salmon spawning within the described length.

DISCHARGE: Mean annual discharge near the mouth of the stream. Maximum and minimum values are either daily means or instantaneous discharges. The latter are identified by (Inst.)

WATER TEMPERATURE: As described.

BARRIERS AND POINTS OF DIFFICULT ASCENT: Complete and partial barriers to salmon, and their distance from the stream mouth. Species likely to be affected may be listed.

SPAWNING DISTRIBUTION: Distribution is indicated by brief comments on opposite species.

GENERAL REMARKS: Emphasizes features of streams and of spawning populations. Also includes industrial activity, routes of accessibility, etc.

ESCAPEMENT RECORD: The escapement represents the mid-point of the coded range of escapement for each species. For example, 5,000 - 10,000 would be entered as 7,500. Where absolute numbers are provided by Department of Fisheries and Forestry personnel, these numbers are entered. N.O. means no fish observed; UNK means some fish were seen but no estimate made.

The timing is in reference to spawning.

Characteristics of the Major Rivers Inlet Sockeye Salmon Spawning Areas

River	Stream Type	Gradient in spawning area	Stability	Forest	Type of Gravel	Amount of Spawning Area	Obstructions	Good Escapement	Size	Flats
Amback	Clear	Low	Good	Heavy	Sand & Gravel	3½ miles	High Gradient	20-50,000	Small	Extensive
Ashlulm	Clear Water	High	Good	Heavy	Sand & large gravel			20-50,000	Small	
Dallery	Tea Water	Low	Good	Heavy	Excellent gravel	4 miles	Swamp & Impassable cascade	100,000+	Med.	None
Genesee	Clear Water	Low	Good	Heavy	Excellent gravel	1 mile	Impassable falls	10-20,000	Small	Wide
Inziana	Slightly silty	Low	O.K.	Heavy	Good gravel	3/4 mile	Impassable falls	50-100,000	Med.	3/4 mile
Machmell	Silty - Extreme	High	Poor	Heavy	Sand-gravel mud	2-12 miles	Steep Canyon	Unknown	Large	Extensive
Neechanz	Silty - clear	Med.	O.K.	Heavy	Good gravel	2 miles	Steep Canyon	10-20,000	Med.	None
Sheemahant	Extreme silty	Hi-med	Poor	Heavy	Sand & gravel	17 miles	Impassable falls	50-100,000	Large	Extensive
Second Narrows	Silty	Nil	Good	Heavy	Sand & mud & gravel	3 miles	None	20-50,000	-	Extensive
Tzeo	Silty	High	Poor near mouth	Heavy	Sand & gravel	4 miles	Impassable cascade	10-20,000	Med.	Wide & extensive
Washwash	Clear	Med-hi	Poor	Heavy	Excellent to average	2½ miles	Impassable falls	50-100,000	Med.	Extensive
Wannock	Silty	Low	Good	Heavy	Excellent to boulders	3 miles	None	50-100,000	Large	Extensive

1948 to 1968 Escapements to the major Rivers Inlet Sockeye Salmon Spawning Areas.

Year	Amback River	Asklum River	Dallery River	Genesee River	Inziana River	Machmell River	Nee-chanz River	Shee-mahant River	Shee-mahant Flats	Tzeo River	Tzeo Flats	Wannock R & Flats	Wash-wash River	Annual Total
1948	G	G	F	F	L		E	K		H		L	G	105,250
1949	M	G	K	K	K		H	L		G		L	L	236,500
1950	M	H	M	H	L		K	M		K		M	M	445,000
1951	L	L	L	G	L		K	L		H		L	M	291,000
1952	M	L	N	K	M		L	M		H		M	N	529,500
1953	L	K	M	K	M		H	L		H		M	N	438,500
Mean	59,000	19,200	59,400	11,200	47,000		29,500	49,000		7,900		59,000	73,000	400,700
1954	H	C	M	F	L		F	L		G		K	D	155,300
1955	H	G	N	G	G		G	L		D		G	H	167,900
1956	K	K	M	G	K		H	L		K		L	H	223,500
1957	L	K	L	D	H		H	L		H		L	L	212,900
1958	L	L	K	G	H		H	L		H		E	M	221,750
Mean	20,000	13,760	58,000	2,480	11,700		5,600	35,000		6,780		17,850	25,100	196,270
1959	M	G	N	G	M		H	M	H	K	G	M	K	455,500
1960	K	D	L	G	G		H	L		D		L	G	138,800
1961	K	G	L	G	H		H	L	D	G	C	L	K	161,100
1962	M	G	L	L	L		K	L	H	G	F	N	M	421,000
1963	M	L	N	M	N		L	M	H	L	F	N	N	739,000
Mean	51,000	9,180	61,000	24,100	44,200		14,500	51,000	4,580	11,480	1,340	69,000	41,700	383,080
1964	M	G	N	K	M		K	M	L	K	K	M	M	573,500
1965	G	B	K	H	K		H	K	E	F	D	M	H	148,925
1966	K	F	K	K	H		K	L	K	H	G	L	L	190,250
1967	G	E	G	K	F		H	M	M	G	K	N	N	482,000
1968	G	L	K	L	N		L	M		K	L	M	N	555,000
Mean	23,700	8,165	29,700	17,100	39,800		16,000	52,000		8,500	11,070	77,000	685,000	389,935
O.A. Mean	38,425	12,576	52,025	12,970	37,425		16,400	46,750		8,665	6,205	55,712	206,000	342,496

A = 1-50
B = 50-100
C = 100-300
D = 300-500
E = 500-1000
F = 1000-2000
G = 2-5000
H = 5-10,000
K = 10-20,000
L = 20-50,000
M = 50-100,000
N = 100,000+

STREAM NAME AMBACK (Quap) CREEK
DISTRICT 6 STAT. AREA 9 COMPUTER CODE AREA 09-7-04
LOCATION OF MOUTH Flows south into Owikeno Lake.
Rge. 2 coast dist. POSITION 51° 127° NE
ACCESSIBLE LENGTH 3.5 mi.; WIDTH mi.;
DRAINAGE 16 sq. mi.
COMPOSITION:
BEDROCK BOULDER COARSE
FINE SILT AND SAND
UNCLASSIFIED

GRADIENT FALL IN FT./100	
0.0-2.5	
2.5-5.0	
5.0-7.5	
7.5-10.0	
> 10.0	

WETTED AREA sq. yd.; SPAWNING AREA sq. yd.
DISCHARGE cfs; MAX cfs;
MIN cfs
TEMPERATURE
BARRIER OR POINTS OF DIFFICULT ASCENT None

SPAWNING DISTRIBUTION

SPECIES	SECTION OF STREAM USED	TIMING
SOCKEYE	Total accessible	Late Oct.
CHINOOK		
COHO	Upper	Late Oct.-Nov.
PINK (ODD YR.)	Lower	Sept.
PINK (EVEN YR.)	Lower	Sept.
CHUM		

POTENTIAL OF INACCESSIBLE PORTION OF STREAM None

GENERAL REMARKS: The Amback Creek valley is heavily wooded for approximately 3 miles; thereafter elevation increases repidly, the valley narrows abruptly, and the creek subdivides into a number of channels. Most of the drainage area is high gradient, but the stream is slow-moving over sand and gravel bars in the lower reaches. It has a low silt load and tends to be clear with little or no colour. Over the years this stream, although small

in size, has been an excellent sockeye producer.

There are about 4 square miles of mature timber in the valley as well as a lesser amount of immature timber in the lower valley. A timber lease covering the lower Amback valley includes less than one half mature trees. There has been no logging along this creek to date.

The remains of a fish counting fence are located about one hundred yards upstream from the river mouth. The fence was used in the 1930's and earlier by hatchery crews to assist in egg takes. In the early 1960's it was used to count the escapement to this creek.

ESCAPEMENT RECORD FOR AMBACK* (QUAP) CREEK

Year	Pink	Sockeye	Coho	Chum	Spring
1934					
35					
36					
37					
38					
Mean					
1939					
40					
41					
42					
43					
Mean					
1944					
45					
46					
47					
48		2- 5,000			
Mean		2- 5,000			
1949		50-100,000			
50		50-100,000			
51		20- 50,000			
52		50-100,000	300-500		
53		20- 50,000			
Mean		40- 80,000	300-500		
1954		7,500			
55		5- 10,000			
56		10- 20,000			
57		20- 50,000			
58		20- 50,000			
Mean		10- 30,000			
1959		50-100,000			
60		10- 20,000			
61		10- 20,000			
62		50-100,000			
63	50-100	50-100,000	1-50		
Mean	50-100	30- 70,000	1-50		
1964		50-100,000			
65	1-50	2- 5,000			
66	50-100	10- 20,000	50-100		
67	1-50	2- 5,000			
68	1-50	20- 50,000			
Mean	10-60	20- 40,000	50-100		
G Mean	30-80	20- 50,000	100-200		

AMBACK CREEK

Amback River - 1961 Fry Catches

(1) 1800 - 14/4/61 to 1300 - 15/4/61

1' x 2' fyke net - about 100 ft. upstream from stream mouth.

TOTAL CATCH	135 sockeye fry = 21.7 qms. 7 coho fry = 16.1 qms. 11 sculpins

(2) 1500 - 19/4/61 to 0900 - 20/4/61

1' x 2' fyke net - (same site as above)

TOTAL CATCH	427 sockeye fry = 65.7 qms.

(3) 1900 - 30/4/61 to 0700 - 1/5/61

1' x 2' fyke net - about 25 yds. upstream from stream mouth.

TOTAL CATCH	220 sockeye fry = 36.3 qms 1 coho fry = 0.3 qms.

(4) 1800 - 5/5/61 to 1000 - 6/5/61

1' x 2' fyke net - about 200 ft. upstream from stream mouth.

TOTAL CATCH	about 3000 sockeye fry (247 sockeye fry = 38.6 qms)

(5) 1900 - 12/5/61 to 0800 - 13/5/61

1' x 2' fyke net (with live box) - (same site as above but lower current).

TOTAL CATCH	300 sockeye fry (91 sockeye fry = 14.2 qms.) 3 coho fry

(6) 1900 - 13/5/61 to 0100 - 14/5/61

1' x 2' fyke net (with live box) - (same site as above

but higher current).

TOTAL CATCH — 1000 sockeye fry
(203 sockeye fry = 32.0 qms.)
1 coho fry.

(7) 1930 - 21/5/61 to 0230 - 22/5/61

1' x 2' fyke net (with live box) - at fence site

TOTAL CATCH — 8 sockeye fry
16 coho fry

Age-sex composition of adult sockeye

	Year	3_2M	4_2M	4_2F	5_2M	5_2F
a	1952	14,700	10,580	9,000	15,530	25,280
	1960	3,060	4,140	2,620	2,280	7,900
	1961	7,800	1,260	1,840	3,600	5,500
	1962	2,100	21,300	24,500	22,900	27,000
b	1963	1,200	33,500	17,900	11,700	35,800
c	1964	4,280	14,380	7,710	25,040	48,590
d	1965	320	1,100	1,180	360	540
e	1966	590	2,160	800	4,470	8,320

a. Foskett, 1958
b. Bilton et al, 1963
c. Bilton et al, 1964
d. Bilton et al, 1965
e. Bilton et al, 1966.

STREAM NAME ASHLULM (Asklulm) CREEK
DISTRICT 6 **STAT. AREA** 9 **COMPUTER CODE AREA** 09-7-06
LOCATION OF MOUTH Flows south into Owikeno Lake
Rge. 2 coast dist. **POSITION** 51° 126° NW
ACCESSIBLE LENGTH _____ mi.; **WIDTH** _____ mi.;
DRAINAGE 38 sq. mi.
COMPOSITION:
BEDROCK _____ **BOULDER** _____ **COARSE** _____
FINE _____ **SILT AND SAND** _____
UNCLASSIFIED _____

GRADIENT FALL IN FT./100	
0.0-2.5	
2.5-5.0	
5.0-7.5	
7.5-10.0	
> 10.0	

WETTED AREA _____ sq. yd.; **SPAWNING AREA** _____ sq. yd.
DISCHARGE _____ cfs; **MAX** _____ cfs;
MIN _____ cfs
TEMPERATURE _____
BARRIER OR POINTS OF DIFFICULT ASCENT _____

SPAWNING DISTRIBUTION

SPECIES	SECTION OF STREAM USED	TIMING
SOCKEYE	Lower 3 miles	Sept.-Oct.
CHINOOK		
COHO	Lower 3 miles	Oct.-Nov.
PINK (ODD YR.)		
PINK (EVEN YR.)		
CHUM		

POTENTIAL OF INACCESSIBLE PORTION OF STREAM _____

GENERAL REMARKS: The Ashlulm Creek valley is narrow and heavily forested. The stream is relatively small and fast flowing in the upper portions but slows considerably at the mouth where large amounts of sand are often deposited. The creek is relatively clear, with little or no color. Spawning populations in the Ashlulm fluctuate widely from year to year.

There are approximately 4 square miles of mature timber in the Ashlulm valley interspersed with pockets of "non-

commercial timber". The narrowness of the valley and steepness of its sides suggest this valley would be difficult to log. There is a pulp licence (was a timber licence) on the lower two miles of this creek. Limited logging has occurred along the lakeshore near the mouth of this creek but it appears to be of no consequence to the spawning areas of the creek.

ESCAPEMENT RECORD FOR ASHLULM* (ASKLUM) CREEK

Year	Pink	Sockeye	Coho	Chum	Spring
1934					
35					
36					
37					
38					
Mean					
1939					
40					
41					
42					
43					
Mean					
1944					
45					
46					
47					
48		2-5,000			
Mean		2-5,000			
1949					
50	500-1,000	5-10,000			
51	50-100	20-50,000			
52		20-50,000			
53		10-20,000			
Mean	300-600	10-30,000			
1954		300			
55		2- 5,000			
56		10-20,000			
57		10-20,000			
58		20-50,000			
Mean		8-20,000			
1959	50-100	2- 5,000			
60		300-500			
61		2- 5,000			
62		2- 5,000			
63		20-50,000			
Mean	50-100	5-10,000			
1964		2000-5,000			
65		50-100			
66		1-2,000			
67		500-1,000			
68		20-50,000	Pres.		
Mean		5-10,000			
G Mean	200-400	6-10,000			

ASHLULM CREEK

Age-sex composition of adult sockeye:

	Year	3_2M	4_2M	4_2F	5_2M	5_2F	6_3M	6_3F
a	1952	1,710	4,270	6,820	10,260	11,940		
	1961	50	-	50	1,850	3,000		50
	1962	280	1,290	960	1,040	1,240		200
b	1963	3,850	13,450	5,800	13,450	13,450		
c	1964	130	130	130	1,120	1,200		
d	1966	94	-	-	470	840	94	

a. Foskett, 1958

b. Bilton et al, 1963

c. Bilton et al, 1964

d. Bilton et al, 1966.

STREAM NAME DALLERY (Dallac) CREEK
DISTRICT 6 STAT. AREA 9 COMPUTER CODE AREA 09-7-05
LOCATION OF MOUTH Flows north into Owikeno L.
Rge. 2 coast dist. POSITION 51° 127° NE
ACCESSIBLE LENGTH 4 mi.; WIDTH _____ mi.;
DRAINAGE 69 sq. mi.
COMPOSITION:
BEDROCK _____ BOULDER _____ COARSE _____
FINE _____ SILT AND SAND _____
UNCLASSIFIED _____

GRADIENT FALL IN FT./100	
0.0-2.5	
2.5-5.0	
5.0-7.5	
7.5-10.0	
> 10.0	

WETTED AREA _____ sq. yd.; SPAWNING AREA _____ sq. yd.
DISCHARGE _____ cfs; MAX _____ cfs;
MIN _____ cfs
TEMPERATURE _____
BARRIER OR POINTS OF DIFFICULT ASCENT
Impassable cascades

SPAWNING DISTRIBUTION

SPECIES	SECTION OF STREAM USED	TIMING
SOCKEYE	From falls down 3 miles	Mid Oct.-Nov.
CHINOOK	Slide area and up	Aug.
COHO	Throughout (above falls also)	Oct.-Dec.
PINK (ODD YR.)		
PINK (EVEN YR.)		
CHUM		

POTENTIAL OF INACCESSIBLE PORTION OF STREAM
Several miles of good gravel above cascades

GENERAL REMARKS: The heavily forested Dallery Creek valley is narrow in its lower portion but widens into a swamp about 6 miles upstream. There are cascades at the creek mouth and still-water spawning grounds for 2½ to 3½ miles. The river is wide and slow flowing with excellent gravel in the spawning areas.

Two separate stands of virgin timber are located in the Dallery valley. There is a stand of about 6 square miles in the lower 6 miles of the valley and a second stand of about 1.5 square

miles starting about 6 miles upstream and ending 10 miles upstream. The lower valley would probably be logged from Owikeno Lake - but with considerable difficulty because of steep valley sides and swampy soft ground. The upper timber stand could probably be reached by the Nekite River valley; an area which is presently being truck logged. Logging of a timber lease at the mouth of Dallery Creek would appear to offer only a limited threat to salmon spawning areas. To date there has been no logging in this valley.

ESCAPEMENT RECORD FOR DALLERY* (DALLAC) CREEK

Year	Pink	Sockeye	Coho	Chum	Spring
1934					
35					
36					
37					
38					
Mean					
1939					
40					
41					
42					
43					
Mean					
1944					
45					
46					
47					
48		1- 2,000			
Mean		1- 2,000			
1949		12,000			
50		50-100,000			
51		20- 50,000	50-100		
52		100,000+			
53		50-100,000			
Mean		40- 70,000	50-100		
1954		65,000			
55		100,000+			
56		50-100,000			
57		20- 50,000			
58		10- 20,000			
Mean		50- 70,000			
1959		100,000+			
60		20- 50,000			
61		20- 50,000			
62		20- 50,000			
63		100,000+			
Mean		50- 70,000			
1964		100,000+			
65	50-100	10- 20,000	500-1,000		100-300
66		10- 20,000			50-100
67		2- 5,000			100-300
68		10- 20,000			50-100
Mean	50-100	30- 35,000	500-1,000		80-200
G Mean	50-100	30- 50,000	300-600		80-200

Age-sex composition of adult sockeye.

	Year	3_2M	4_2M	4_2F	5_2M	5_2F	5_3M	5_3F	6_3M	6_3F
a	1952	18,792	21,476	10,738	30,872	18,121				
a	1955	8,530	36,430	12,400	16,280	26,360				
	1960	2,750	9,750	7,650	11,300	18,400			150	
	1961	1,800	10,950	9,000	10,600	17,650				
	1962	250	17,400	7,750	6,950	13,900				3,750
b	1963	1,300	39,000	23,900	6,300	27,000	1,900			600
c	1964	1,000	14,500	5,600	33,500	43,900	1,000	500		
d	1965	2,220	4,260	2,040	1,670	4,730			90	
e	1966	130	4,430	2,080	1,910	6,150			130	170

a. Foskett, 1958

b. Bilton et al, 1963

c. Bilton et al, 1964

d. Bilton et al, 1965

e. Bilton et al, 1966.

STREAM NAME GENESEE CREEK
DISTRICT 6 STAT. AREA 9 COMPUTER CODE AREA 09-7-09
LOCATION OF MOUTH Flows west into Owikeno L. north of Machmell R. coast dist. POSITION 51° 126° NW
ACCESSIBLE LENGTH 1 mi.; WIDTH _____ mi.;
DRAINAGE 7 sq. mi.
COMPOSITION:
BEDROCK _____ BOULDER _____ COARSE _____
FINE _____ SILT AND SAND _____
UNCLASSIFIED _____

GRADIENT FALL IN FT./100	
0.0-2.5	
2.5-5.0	
5.0-7.5	
7.5-10.0	
> 10.0	

WETTED AREA _____ sq. yd.; SPAWNING AREA _____ sq. yd.
DISCHARGE _____ cfs; MAX 150 cfs;
MIN 10 cfs
TEMPERATURE _____
BARRIER OR POINTS OF DIFFICULT ASCENT
Impassable falls

SPAWNING DISTRIBUTION

SPECIES	SECTION OF STREAM USED	TIMING
SOCKEYE	From breakthrough to falls	Oct.
CHINOOK		
COHO	From breakthrough to falls	Oct.
PINK (ODD YR.)		
PINK (EVEN YR.)		
CHUM		

POTENTIAL OF INACCESSIBLE PORTION OF STREAM _____

GENERAL REMARKS: Genesee Creek flows from Walkus Lake, located in the hills, 500 to 1000 feet above Owikeno Lake. The creek flows about 2 miles from the lake to a bluff which it falls over. The mile of creek from the falls to the lake flows across the Machmell River delta as a low gradient stream. The entire drainage area is heavily forested. Genesee Creek is a natural controlled flow stream as Walkus Lake has two outlet streams, the Genesee being a low water outlet. Excessive runoff

is, to some extent, discharged through the high water outlet into the Machmell River. Because of this controlled flow situation, Genesee Creek is relatively stable and an excellent producer for its size.

The Machmell River has broken through into the lower portion of the Genesee with the result that large amounts of silt are deposited in that area making it of no value for spawning. The Machmell is threatening to break through into the Genesee at or near the falls. If this happens the spawning area will at least be badly silted, if not badly scoured. If this breakthrough occurs it is probable that the Genesee spawning area will be destroyed. In 1951 the Machmell River delta in the immediate vicinity of the Genesee Creek was surveyed as a preliminary to remedial work to prevent the Machmell breaking through.

There are about 6 square miles of mature and over mature timber in the Genesee watershed. At least 5 timber leases have been granted to date. The Genesee-Machmell area is included in plans for major logging operations in the future, but to date the only logging in the area is from Owikeno Lake near the mouth of the creek and is of no consequence to Genesee spawning areas.

The Genesee has been chosen as a logging study area. A moratorium on logging in the area has been granted for about five years during which time the unlogged environment will be monitored. When logging commences in the area its effects on the environment will be monitored.

Genesee Creek was a site of egg collection for the federal salmon hatchery when it operated. Because of this, and the ease of access and nearness of accommodation this creek has one of the most thorough sets of data of any stream in the Owikeno system.

ESCAPEMENT RECORD FOR GENESEE CREEK

Year	Pink	Sockeye	Coho	Chum	Spring
1934					
35					
36					
37					
38					
Mean					
1939					
40					
41					
42					
43					
Mean					
1944					
45					
46					
47					
48	2-5,000	1-2,000			
Mean	2-5,000	1-2,000			
1949	1-2,000	10- 20,000			
50	1-2,000	5- 10,000			
51	1-2,000	2- 5,000	50-100		
52	300-500	10- 20,000			
53	1-2,000	10- 20,000			
Mean	900-2,000	7- 2,000	50-100		
1954		1- 2,000			
55	1-50	2- 5,000			
56	100-300	2- 5,000			
57		300-500			
58	1-50	2- 5,000			
Mean	30-100	1- 3,000			
1959	50-100	2- 5,000			
60		2- 5,000			
61		2- 5,000			
62		20- 50,000			
63	1-50	50-100,000			
Mean	30-80	20- 30,000			
1964		10- 20,000	Pres.		
65		5- 10,000	N/O		
66		10- 20,000	50-100		
67		10- 20,000	Present		
68		20- 50,000			
Mean		10- 20,000	50-100		
G Mean	700-2,000	8- 10,000	50-100		

GENESEE CREEK

Genesee Creek - 1961 **FRY CATCH**

(1) 1500 - 15/4/61 to 1000 - 16/4/61

1' x 2' fyke net (with live box) - 300 yds. upstream of mouth.

TOTAL CATCH. 1140 sockeye fry
(140 sockeye fry = 22.7 qms.)

(2) 1500 - 21/4/61 to 1000 - 22/4/61

1' x 2' fyke net - same site as above

TOTAL CATCH 1344 sockeye fry
(244 sockeye fry = 40.8 qms.)
2 lamprey larvae.

(3) 1330 - 7/5/61 to 1700 - 8/5/61

1' x 2' fyke net - same site as above.

TOTAL CATCH about 1500-2000 sockeye fry
(143 sockeye fry = 22.6 qms.)

(4) 1930 - 20/5/61 to 1200 - 21/5/61

1' x 2' fyke net - same site as above.

TOTAL CATCH 38 sockeye fry = 4.8 qms.
10 coho fry = 3.4 qms.

Age-sex composition of adult sockeye:

	Year	3_2M	4_2M	4_2F	5_2M	5_2F	5_3M	5_3F
a	1952	5,730	2,860	1,090	2,730	2,600		
	1960	430	1,570	2,150	150	720		
	1961	3,340	430	430	160	660		
	1962	5,550	13,600	20,500	4,350	5,700		
b	1963	1,400	38,000	21,100	9,900	26,800	1,400	1,400
c	1964	830	1,200	380	5,480	7,120		
d	1965	1,310	2,390	3,450	20	250	40	
e	1966	1,600	4,260	3,130	730	5,210		60
	1967	-	11,270	7,570	120	2,740		

a. Foskett, 1958
b. Bilton et al, 1963
c. Bilton et al, 1964
d. Bilton et al, 1965
e. Bilton et al, 1966.

STREAM NAME Inziana (Indian) River
DISTRICT 6 STAT. AREA 9 COMPUTER CODE AREA 09-7-17
LOCATION OF MOUTH Flows E into head of Owikeno L.
Rge. 2 Coast Dist. POSITION 51° 126° NW
ACCESSIBLE LENGTH .75 mi.; WIDTH _____ mi.;
DRAINAGE 66 sq. mi.
COMPOSITION:
BEDROCK _____ BOULDER _____ COARSE _____
FINE _____ SILT AND SAND _____
UNCLASSIFIED _____

GRADIENT FALL IN FT./100	
0.0-2.5	
2.5-5.0	
5.0-7.5	
7.5-10.0	
> 10.0	

WETTED AREA _____ sq. yd.; SPAWNING AREA _____ sq. yd.
DISCHARGE _____ cfs; MAX _____ cfs;
MIN _____ cfs
TEMPERATURE _____
BARRIER OR POINTS OF DIFFICULT ASCENT _____
Impassable falls

SPAWNING DISTRIBUTION

SPECIES	SECTION OF STREAM USED	TIMING
SOCKEYE	Total accessible	Sept.-Oct.
CHINOOK		
COHO	Total accessible	Oct.
PINK (ODD YR.)		
PINK (EVEN YR.)		
CHUM		

POTENTIAL OF INACCESSIBLE PORTION OF STREAM Favourable

GENERAL REMARKS: The Inziana River, approximately 13 miles in length, has only about 3/4 of a mile accessible to salmon. Much of the river flows through mature stands of timber. In its lower portion the river, which is generally clear and uncoloured, flows slowly through a wide bed of good gravel, with considerable sand near the mouth. Above an impassible falls the river and its tributary, Keet Creek, flow from steep hillsides into lower gradient valleys which appear to have stretches of good spawning

gravel (inaccessible).

There are approximately 5 square miles of mature timber in the Inziana drainage but at present much of it might be considered too inaccessible or uneconomical for logging. A timber lease covers the lower portion of the river valley. To date the only logging in the immediate area has been a small area along the Owikeno lakeshore near the mouth of the Inziana.

ESCAPEMENT RECORD FOR INZIANA* RIVER (INDIAN)

Year	Pink	Sockeye	Coho	Chum	Spring
1934					
35					
36					
37					
38					
Mean					
1939					
40					
41					
42					
43					
Mean					
1944					
45					
46					
47					
48		20- 50,000			
Mean		20- 50,000			
1949		10- 20,000			
50		20- 50,000			
51		20- 50,000			
52		50-100,000			
53		50-100,000			
Mean		30- 60,000			
1954		25,000			
55		2-5000			
56		10- 20,000			
57		5- 10,000			
58		5- 10,000			
Mean		10- 15,000			
1959		50-100,000			
60		2-5000			
61		5- 10,000			
62		20- 50,000			
63		100,000+			
Mean		40- 50,000			
1964		50-100,000			
65		10- 20,000			
66		5- 10,000			
67		1- 2,000			
68		100,000+			
Mean		30- 50,000			
G Mean		30- 50,000			

INZIANA RIVER

INZIANA River - 1961 FRY CATCHES

(1) 2030 - 18/5/61 to 1530 - 19/5/61

1' x 2' fyke net - near mouth.

TOTAL CATCH. 3 sockeye fry.

Age-sex composition of adult sockeye

	Year	3_2M	4_2M	4_2F	5_2M	5_2F	6_3M	6_3F
a	1952	2,660	7,140	1,780	36,420	12,000		
	1960	160	1,740	840	740	1,530		
	1961	1,200	230	70	4,830	3,600		70
	1962	550	12,000	12,850	15,850	7,650	250	850
b	1963		11,000	12,000	38,500	38,500		
c	1964		1,170	380	36,340	36,750		380
d	1966	20	320	30	2,940	4,170	20	

a. Foskett, 1958

b. Bilton et al, 1963

c. Bilton et al, 1964

d. Bilton et al, 1966

STREAM NAME MACHMELL (Markwell) RIVER
DISTRICT 6 STAT. AREA 9 COMPUTER CODE AREA 09-7-07
LOCATION OF MOUTH Flows west into Owikeno L.
Rge. 2 coast dist. POSITION 51° 126° NW
ACCESSIBLE LENGTH Unknown mi.; WIDTH mi.;
DRAINAGE sq. mi.
COMPOSITION:
BEDROCK BOULDER COARSE
FINE SILT AND SAND
UNCLASSIFIED

GRADIENT FALL IN FT./100	
0.0-2.5	
2.5-5.0	
5.0-7.5	
7.5-10.0	
≥ 10.0	

WETTED AREA sq. yd.; SPAWNING AREA sq. yd.
DISCHARGE cfs; MAX cfs;
MIN cfs
TEMPERATURE
BARRIER OR POINTS OF DIFFICULT ASCENT Canyon appears to be a point of difficult ascent but fish have been observed in feeder streams above it.

SPAWNING DISTRIBUTION

SPECIES	SECTION OF STREAM USED	TIMING
SOCKEYE	Side channels + feeder streams	Sept.-Oct.
CHINOOK		
COHO		
PINK (ODD YR.)		
PINK (EVEN YR.)		
CHUM		

POTENTIAL OF INACCESSIBLE PORTION OF STREAM

GENERAL REMARKS: The Machmell river valley is extensively wooded for about 28 miles. The lower 10 miles of river are unstable and the river wanders considerably. Approximately 10 miles upstream from the river mouth is a narrow canyon approximately 5 miles in length. Above the canyon a number of large tributary streams enter the Machmell. Most of the system is heavily silted as large coastal ice fields are the major source of water. The heavily silted water and dangerous canyon of this river have prevented

any real evaluation of the spawning in this system. In the lower portion of the river sockeye have been observed spawning in shallow side channels. Some of the tributaries above the canyon are clear water streams and old records show that sockeye have been observed spawning in them.

There are approximately 50 square miles of mature timber in the Machmell river valley. There was a 7000 acre forest fire in the upper area of the river valley in 1958. A small portion of the delta near the river mouth was logged in 1968, and there are at least 13 timber licences in the Machmell valley. Some of the more accessible areas are expected to be logged in the near future.

As spawning areas are not defined, the effect of future logging cannot readily be evaluated. To date logging in the area has not had any direct effect on the river.

ESCAPEMENT RECORD FOR MACHMELL* (MARKWELL) RIVER

Year	Pink	Sockeye	Coho	Chum	Spring
1934					
35					
36					
37					
38					
Mean					
1939					
40					
41					
42					
43					
Mean					
1944					
45					
46					
47					
48					
Mean					
1949					
50					
51					
52					
53					
Mean					
1954		Not Inspected			
55		"			
56		Unknown			
57		"			
58		"			
Mean					
1959		Unknown			
60		"			
61		"			
62		"			
63		Present			
Mean					
1964		Unknown			
65		N/O			
66		Unknown			
67		"			
68		Present			
Mean					
G Mean					

MACHMELL RIVER

Machmell River - 1961 FRY CATCHES

(1) 1300 - 21/4/61 to 1730 - 21/4/61

1' x 2' fyke net - near river mouth (fish probably from Neechanz River)

TOTAL CATCH — 32 sockeye fry = 4.6 qms.
12 coho fry = 9.7 qms.

(2) 1300 - 7/5/61 to 1600 - 8/5/61

1' x 2' fyke net - in channel above Neechanz outlet.

TOTAL CATCH - no fish of any species caught.

Machmell River - 1967 FRY CATCHES

(1) Afternoon 20/3/67 to afternoon 21/3/67

1' x 2' fyke net catches in side channel just above break-through.

TOTAL CATCH — 1 sockeye fry
1 sculpin
1 lamprey

(2) Four days fishing (21/3/67 to 24/3/67) with no catch.

(3) Afternoon 28/3/67 to afternoon 29/3/67

Site - as above

TOTAL CATCH — 13 sockeye fry
5 sculpins

(4) 29/3/67 to 30/3/67

Site - as above

TOTAL CATCH — 22 sockeye fry
1 lamprey

(5) 30/3/67 to 31/3/67

Site - as above

TOTAL CATCH — 37 sockeye fry
5 sculpin

(6) 3/4/67 to 4/4/67

Site - as above

TOTAL CATCH 9 sockeye fry (many yolk sac fry)
1 sculpin

(7) 4/4/67 to 5/4/67

TOTAL CATCH 16 sockeye fry
1 sculpin

(8) 5/4/67 to 6/4/67

TOTAL CATCH 23 sockeye fry

(9) 10/4/67 to 11/4/67

TOTAL CATCH 32 sockeye fry
5 sculpin
1 coho smolt

(10) 11/4/67 to 12/4/67

TOTAL CATCH 77 sockeye fry

(11) 12/4/67 to 13/4/67

TOTAL CATCH 110 sockeye fry
1 frog

(12) 16/4/67 to 17/4/67

TOTAL CATCH 223 sockeye fry
1 sculpin

(13) 17/4/67 to 18/4/67

TOTAL CATCH 250 sockeye fry

(14) 22/4/67 to 23/4 67

TOTAL CATCH 300 sockeye fry

(river rising rapidly) 3 holes in net.

(15) 23/4/67 to 24/4/67

TOTAL CATCH 335 sockeye fry (large hole in net)

(16) 24/4/67 to 25/4/67

Moved net to top of rapids (shallower and slower)

TOTAL CATCH 4 sockeye fry - not fishing properly

STREAM NAME Neechanz (Nookins) River
DISTRICT 6 STAT. AREA 9 COMPUTER CODE AREA 09-7-08
LOCATION OF MOUTH Flows north into Machmell R.
Rge. 2 coast dist. POSITION 51° 126° NW
ACCESSIBLE LENGTH 2 mi.; WIDTH _____ mi.;
DRAINAGE 160 sq. mi.
COMPOSITION:
BEDROCK _____ BOULDER _____ COARSE _____
FINE _____ SILT AND SAND _____
UNCLASSIFIED _____

GRADIENT FALL IN FT./100	
0.0-2.5	
2.5-5.0	
5.0-7.5	
7.5-10.0	
> 10.0	

WETTED AREA _____ sq. yd.; SPAWNING AREA _____ sq. yd.
DISCHARGE _____ cfs; MAX _____ cfs;
MIN _____ cfs
TEMPERATURE _____
BARRIER POINTS OF DIFFICULT ASCENT _____

SPAWNING DISTRIBUTION

SPECIES	SECTION OF STREAM USED	TIMING
SOCKEYE	¼ mile above confluence to canyon	Aug.-Oct.
CHINOOK	Middle	Aug.
COHO	Total accessible length	Oct.
PINK (ODD YR.)		
PINK (EVEN YR.)		
CHUM		

POTENTIAL OF INACCESSIBLE PORTION OF STREAM _____

GENERAL REMARKS: The Neechanz River flows into the Machmell River about ½ mile above its mouth. The Neechanz has a fairly narrow wooded valley which becomes extremely narrow and steep a few miles upstream. Marble Creek is the only tributary which has any amount of spawning in it. The accessible spawning area in the Neechanz is limited but produces reasonably well.

It was estimated that there were approximately 31 square miles of mature timber in the Neechanz drainage. However, the upper

Neechanz valley was extensively burned in 1958, so there is considerably less marketable timber than originally estimated. There are five timber leases in the lower areas of the Neechanz but to date there has been no logging in this drainage area.

ESCAPEMENT RECORD FOR NEECHANZ* (NOOKINS) RIVER

Year	Pink	Sockeye	Coho	Chum	Spring
1934					
35					
36					
37					
38					
Mean					
1939					
40					
41					
42					
43					
Mean					
1944					
45					
46					
47					
48		500-1,000			
Mean		500-1,000			
1949		50-100,000			
50		10- 20,000			
51		10- 20,000			
52		20- 50,000			
53		5- 10,000			
Mean		20- 40,000			
1954		2,000			
55		2- 5,000			
56		5- 10,000			
57		5- 10,000			
58		5- 10,000			
Mean		4- 7,000			
1959		5- 10,000			
60		5- 10,000			
61		5- 10,000			
62		10- 20,000			
63		20- 50,000			
Mean		9- 20,000			
1964		10- 20,000			
65		5- 10,000			300-500
66		10- 20,000			1-50
67		5- 10,000			1-50
68		20- 50,000			1-50
Mean		10- 20,000			80-200
G Mean		9- 20,000			80-200

NEECHANZ RIVER

Age-sex composition of adult sockeye:-

	Year	3_2M	4_2M	4_2F	5_2M	5_2F	6_3M	6_3F
a	1952	1,400	700	2,800	11,900	18,200		
	1960	-	220	1,330	1,330	6,890	220	
	1961	70	440	70	4,230	5,180		
	1962	720	5,100	6,280	4,520	3,220	140	20
b	1963	-	3,850	3,850	11,550	29,500	-	1,300
c	1964	260		510	2,300	11,690		230
d	1966	50	630	230	5,840	8,170	90	

a. Foskett, 1958

b. Bilton et al, 1963

c. Bilton et al, 1964

d. Bilton et al, 1966

STREAM NAME SHEEMAHANT (SHUMAHALT) RIVER
DISTRICT 6 STAT. AREA 9 COMPUTER CODE AREA 09-7-11
LOCATION OF MOUTH FLOWS WEST INTO OWIKENO LAKE
RGE. 2 COASTAL DIST. POSITION 51° 126° NW
ACCESSIBLE LENGTH 17 mi.; WIDTH _____ mi.;
DRAINAGE _____ sq. mi.
COMPOSITION:
BEDROCK _____ BOULDER _____ COARSE _____
FINE _____ SILT AND SAND _____
UNCLASSIFIED _____

GRADIENT FALL IN FT./100	
0.0-2.5	
2.5-5.0	
5.0-7.5	
7.5-10.0	
> 10.0	

WETTED AREA _____ sq. yd.; SPAWNING AREA _____ sq. yd.
DISCHARGE _____ cfs; MAX _____ cfs;
MIN _____ cfs
TEMPERATURE _____
BARRIER OR POINTS OF DIFFICULT ASCENT
IMPASSABLE FALLS

SPAWNING DISTRIBUTION

SPECIES	SECTION OF STREAM USED	TIMING
SOCKEYE	Total accessible (17 mi.)	Sept.-Oct.
CHINOOK	Mid-upper	Aug.-Sept.
COHO	Total accessible (Flats too)	Oct.-Nov.
PINK (ODD YR.)		
PINK (EVEN YR.)		
CHUM		

POTENTIAL OF INACCESSIBLE PORTION OF STREAM
Aereal surveys suggest almost same potential above falls as below

GENERAL REMARKS: The Sheemahant is a large, heavily silted river situated in an extensive wooded valley. Below an impassable falls 17 miles from the mouth the river is accessible to salmon and has excellent spawning areas. Aerial surveys suggest almost the same spawning potential above the falls as below them. The large size and heavy silting of this river make observations in it difficult. The river wanders considerably near its mouth and suffers often from numerous large log jams.

There are about 45 square miles of mature and a considerable amount of immature timber in the Sheemahant drainage area. Some of this timber has been burned but most is left. There are six timber leases in the lower reaches of the river. Cutting on one of these leases is expected in the immediate future.

ESCAPEMENT RECORD FOR SHEEMAHANT* (SHUMAHALT) RIVER AND FLATS

Year	Sockeye (River)	Sockeye (Flats)	Coho (River)	Coho (Flats)	Spring
1934					
35					
36					
37					
38					
Mean					
1939					
40					
41					
42					
43					
Mean					
1944					
45					
46					
47					
48					
Mean					
1949					
50	50-100,000	) Included			
51	20- 50,000	) in			
52	50-100,000	) river			
53	20- 50,000	) totals			
Mean	40- 80,000				
1954					
55	Unknown	) Included			
56	20- 50,000	) in			
57	20- 50,000	) river			
58	Unknown	) totals.			
Mean	20- 50,000				
1959	5- 10,000	5- 10,000		5000	
60	Unknown	Unknown	Present		Present
61	20- 50,000	300-500		Present	
62	20- 50,000	5- 10,000	Present		Present
63	50-100,000	5- 10,000	2- 5000		
Mean	20- 50,000	5- 10,000	2- 5000		
1964	50-100,000	20-50,000			
65	10- 20,000	Present		Unknown	
66	20- 50,000	10- 20,000	Present	100-300	
67	60,000	50-100,000	1- 50	Present	
68	50-100,000	Included in river total			Present
Mean	60- 70,000	10- 20,000	1- 50		
G Mean	40- 60,000		1- 3000		

ESCAPEMENT RECORD FOR SHEEMAHANT* (SHUMAHALT) RIVER

Year	Pink	Sockeye	Coho	Chum	Spring
1934					
35					
36					
37					
38					
Mean					
1939					
40					
41					
42					
43					
Mean					
1944					
45					
46					
47					
48					
Mean					
1949					
50		50-100,000			
51		20- 50,000			
52		50-100,000			
53		20- 50,000			
Mean		40- 80,000			
1954					
55		Unknown			
56		20- 50,000			
57		20- 50,000			
58		Unknown			
Mean		20- 50,000			
1959		5- 10,000			
60		N/O			
61		20- 50,000			
62		20- 50,000			
63		50-100,000	2- 5,000		
Mean		20- 50,000	2- 5,000		
1964		50-100,000			
65		10- 20,000			
66		20- 50,000	Present		
67		60,000	1-50		
68	Including Flats	50-100,000			Present
Mean		60- 70,000	1-50		
G Mean		40- 60,000	1-3,000		

SHEEMAHANT RIVER

Sheemahant River 1961 - FRY CATCHES

(1) 1900 - 28/4/61 to 1700 - 29/4/61

1' x 2' fyke net - about 200 yds. from mouth.

TOTAL CATCH
6 sockeye fry = 0.6 qms.
15 coho fry = 5.9 qms
1 coho smolt = 7.4 qms.

(2) 1500 - 10/5/61 to 1300 - 11/5/61

1' x 2' fyke net - in small side channel about 300 yds. above mouth of mainstem.

TOTAL CATCH
66 sockeye fry
(63 sockeye fry = 9.6 qms)
35 coho fry = 13.0 qms.

Age-sex composition of adult sockeye

	Year	3_2M	4_2M	4_2F	5_2M	5_2F	6_3M	6_3F
a & b	1952		53,550	5,360	5,360	10,700		
a	1955		20,760	6,480	7,770	-		
	1960	3,000	9,000	6,500	15,300	15,750		
	1961	1,930		2,600	13,800	30,900	650	
	1962	1,800	13,450	8,750	14,900	9,650	350	1,100
c	1963		39,600	8,300	10,400	41,700		
d	1964		1,560	890	28,970	43,140		440
e	1966	150	4,290	1,900	17,410	26,100	150	

a. Foskett, 1958

b. Shumahalt Flats only

c. Bilton et al, 1963

d. Bilton et al, 1964

e. Bilton et al, 1965

STREAM NAME TZEO (Cheo) RIVER
DISTRICT 6 STAT. AREA 9 COMPUTER CODE AREA 09-7-18
LOCATION OF MOUTH Flows south into Owikeno Lake
Rge. 2 Coastal Dist. POSITION 51° 126° NW
ACCESSIBLE LENGTH 4 mi.; WIDTH _____ mi.;
DRAINAGE 64 sq. mi.
COMPOSITION:
BEDROCK _____ BOULDER _____ COARSE _____
FINE _____ SILT AND SAND _____
UNCLASSIFIED _____

GRADIENT FALL IN FT./100	
0.0-2.5	
2.5-5.0	
5.0-7.5	
7.5-10.0	
> 10.0	

WETTED AREA _____ sq. yd.; SPAWNING AREA _____ sq. yd.
DISCHARGE _____ cfs; MAX _____ cfs;
MIN _____ cfs
TEMPERATURE _____
BARRIER OR POINTS OF DIFFICULT ASCENT
Cascade impassable to sockeye

SPAWNING DISTRIBUTION

SPECIES	SECTION OF STREAM USED	TIMING
SOCKEYE	Upper river (above falls)	Sept.-Oct.
CHINOOK	Upper river (above falls)	Aug.
COHO	Upper river (above falls)	Oct.-Nov.
PINK (ODD YR.)		
PINK (EVEN YR.)		
CHUM		

POTENTIAL OF INACCESSIBLE PORTION OF STREAM
The same as below cascade for first two miles.

GENERAL REMARKS: The Tzeo River flows from high gradient ice field drainage creeks down into lower gradient heavily forested areas. At about 4 miles from its mouth it passes over a cascade deemed impassable to sockeye. Below the cascade the gradient progressively decreases and the valley widens into a wide flat. In the lower sections of the river there are large amounts of fines forming bars. The river has only limited areas of good spawning gravel.

There was an estimated 5.5 square miles of mature timber in the drainage area but some was destroyed by fire and some has been logged in the upper reaches of the stream. It is difficult to determine if the fire has had any effect on the spawning area as no comprehensive description of the stream bed exists. There have been no apparent changes resulting from the logging.

ESCAPEMENT RECORD FOR TZEO* (CHEO) RIVER, FLATS, AND 3RD NARROWS LAKESHORE

Year	Sockeye (river)	Sockeye (Flats & 3rd Narrow)	Coho	Spring
1934				
35				
36				
37				
38				
Mean				
1939				
40				
41				
42				
43				
Mean				
1944				
45				
46				
47				
48				
Mean				
1949	2- 5,000			
50	10- 20,000			
51	5- 10,000	Included with river totals		
52	5- 10,000			
53				
Mean	6- 10,000			
1954	2- 5,000			
55	300-500			
56	10- 20,000	Included with river totals		
57	5- 10,000			
58	5- 10,000		300-500	
Mean	4- 9,000		300-500	
1959	10- 20,000	2- 5,000		
60	300-500			
61	2- 5,000	100-300		
62	2- 5,000	1-2000		
63	20- 50,000	1-2000		
Mean	7- 20,000	1-2000		
1964	10- 20,000	10-20,000		
65	1- 2,000	Unknown		
66	5- 10,000	2- 5,000	1-50	1-50
67	2- 5,000	10-20,000		
68	10- 20,000	20-50,000	1-50	1-50
Mean	6- 10,000	10-20,000	1-50	1-50
G Mean	6- 10,000	5-10,000	200-300	1-50

ESCAPEMENT RECORD FOR TZEO* (CHEO) RIVER

Year	Pink	Sockeye	Coho	Chum	Spring
1934					
35					
36					
37					
38					
Mean					
1939					
40					
41					
42					
43					
Mean					
1944					
45					
46					
47					
48					
Mean					
1949		2- 5,000			
50		10- 20,000			
51		5- 10,000			
52		5- 10,000			
53					
Mean		6- 10,000			
1954		2- 5,000			
55		300-500			
56		10- 20,000			
57		5- 10,000			
58		5- 10,000	300-500		
Mean		4- 9,000	300-500		
1959		10- 20,000			
60		300-500			
61		2- 5,000			
62		2- 5,000			
63		20- 50,000			
Mean		7- 20,000			
1964		10- 20,000			
65		1- 2,000			
66		5- 10,000	1-50		1-50
67		2- 5,000			
68		10- 20,000	1-50		1-50
Mean		6- 10,000	1-50		1-50
G Mean		6- 10,000	200-300		1-50

CHEO RIVER

Age-sex composition of adult sockeye

	Year	3_2M	4_2M	4_2F	5_2M	5_2F
	1962	280	1,290	960	1,030	1,240
a	1963	-	7,400	1,850	27,800	12,950
b	1964	280	430	190	10,540	18,370
c	1966	240	360	140	4,240	6,020

a. Bilton et al, 1963

b. Bilton et al, 1964

c. Bilton et al, 1965

STREAM NAME WANNOCK RIVER (AND FLATS)
DISTRICT 6 STAT. AREA 9 COMPUTER CODE AREA 09-7-02
LOCATION OF MOUTH Flows west into head of Rivers Inlet.
Coastal dist. POSITION 51° 127° NE
ACCESSIBLE LENGTH 3.9 mi.; WIDTH _____ mi.;
DRAINAGE 1630 sq. mi.
COMPOSITION:
BEDROCK _____ BOULDER _____ COARSE _____
FINE _____ SILT AND SAND _____
UNCLASSIFIED _____

GRADIENT FALL IN FT./100	
0.0-2.5	
2.5-5.0	
5.0-7.5	
7.5-10.0	
> 10.0	

WETTED AREA _____ sq. yd.; SPAWNING AREA _____ sq. yd.
DISCHARGE _____ cfs; MAX _____ cfs;
MIN _____ cfs
TEMPERATURE _____
BARRIER OR POINTS OF DIFFICULT ASCENT None

SPAWNING DISTRIBUTION

SPECIES	SECTION OF STREAM USED	TIMING
SOCKEYE	Upper river & flats	Oct.-Nov.
CHINOOK	Upper river	Nov.
COHO	Upper river	Nov.
PINK (ODD YR.)		
PINK (EVEN YR.)	Lower-middle river	Aug.-Sept.
CHUM	Mid river down	Oct.-Nov.

POTENTIAL OF INACCESSIBLE PORTION OF STREAM _____

GENERAL REMARKS: The Wannock is a broad river flowing from Owikeno Lake to the head of Rivers Inlet. Extensive spawning beds for all species are in both the river and on the flats along the lakeshore near the outlet. The river is navigable and flows through a heavily forested Indian Reservation. The river is under tidal influence to above the Indian Village. The stabilizing effect of Owikeno Lake makes this river

relatively stable.

A part of the immediate drainage area of the river was logged a number of years ago. More was logged in 1968. The trees on the Indian Reservation have been slated for cutting in the very near future. There are approximately 4 square miles of mature timber left in the immediate area, most of it on steep side hills, and therefore relatively inaccessible.

ESCAPEMENT RECORD FOR WANNOCK RIVER AND FLATS

Year	Pink	Sockeye	Coho	Chum	Spring
1934					
35					
36					
37					
38					
Mean					
1939					
40					
41					
42					
43					
Mean					
1944					
45					
46					
47					
48	2- 5,000	20- 50,000	1- 2,000	5- 10,000	500-1,000
Mean	2- 5,000	20- 50,000	1- 2,000	5- 10,000	500-1,000
1949	5- 10,000	20- 50,000	2- 5,000	50-100,000	1-2,000
50	2- 5,000	50-100,000	2- 5,000	20- 50,000	1-2,000
51	2- 5,000	20- 50,000	1- 2,000	20- 50,000	500-1,000
52	1- 2,000	50-100,000	2- 5,000	5- 10,000	1-2,000
53	1- 2,000	50-100,000	2- 5,000	20- 50,000	1-2,000
Mean	2- 5,000	40- 80,000	2- 4,000	20- 50,000	1-2,000
1954					
55	300-500	2- 5,000	2- 5,000	500-1,000	1-2,000
56		20- 50,000		10- 20,000	2-5,000
57	300-500	20- 50,000		10- 20,000	1-2,000
58	1- 2,000	500- 1,000		10- 20,000	1-2,000
Mean	500- 1,000	10- 30,000	2- 5,000	8- 20,000	1-3,000
1959		50,100,000			
60					5-10,000
61		20- 50,000	500-1,000	2- 5,000	500-1,000
62		100,000+	1- 2,000	2- 5,000	2- 5,000
63		100,000+	1- 2,000	10- 20,000	5-10,000
Mean		70- 90,000	800-2,000	5- 10,000	3- 7,000
1964		50-100,000		20- 50,000	5-10,000
65	Present	50-100,000	Present	Present	2- 5,000
66		20- 50,000	N/O	2- 5,000	1- 2,000
67	N/O	125,000	Unknown	5- 10,000	1- 2,000
68	Unknown	50-100,000	Unknown	10- 20,000	500-1,000
Mean		60-100,000		9- 20,000	2- 4,000
G Mean	2- 4,000	40- 70,000	2- 3,000	9- 20,000	1- 3,000

Wannock River 1961 - Tow Net Catches

	13/4/61		21/5/61		31/5/61		7/6/61		22/6/61		13/7/61	
	No.	T.WT	No.	T.WT	No.	T.WT	No.	T.WT	No.	T.WT	No.	T.WT
24-26									3	0.5		
26-28									4	0.7	1	0.2
28-30									6	1.2		
30-32									7	2.2	1	0.2
32-34									1	0.4	2	0.6
34-36											2	0.6
36-38	1						2	1.2				
38-40			1	0.6			2	1.2				
40-42	1						2	1.3			1	0.7
42-44			1	0.7			3	2 4			1	0.9
44-46			4	3.4	1	0.8	6	5.7			1	1.0
46-48			21	20.4	1	1.0	11	11.5			1	1.1
48-50			39	41 2	5	5.7	29	34.5				
50-52	1		50	60.8	10	12.7	33	41.6			1	1.3
52-54			73	98.1	8	11.4	23	30.8			1	1.6
54-56			35	51.8	10	15.4	9	13.9			1	1.6
56-58			24	39.7	8	14.1	2	3.4				
58-60			5	9.3	2	3.9	1	1.8				
60-62			7	14.4			1	2.1				
62-64			2	4.5								
64-66			1	2.5	2	5.1	1	2.7				
66-68			1	2.6			1	2.9				
68-70					1	3.1						
70-72					1	3.5						
72-74					2	7.5						
	3	2.2										
	Smolts only		Smolts only		Smolts only		Smolts only		Total Catch		Total Catch	

Wannock River 1962

Trap Set Start Date	Time	End Date	Time	Sockeye Smolt No.	T.WT	Fry No.	T.WT	Gear	Site	Weather		Gauge In	Gauge Out	W.S.T.
6/4/62	1800	7/4/62	a.m.			40		T.N.		1.0/N/4SW	5 coho fry			40.5°
12/4/62	1800	13/4/62	a.m.			334		T.N.		0.9/N/3SW	30 coho fry		5.2	41.0°
18/4/62	1900	19/4/62	1100	1		975		T.N.		1.0/R/3NE	1 coho smolt; 108 coho fry.	6.45-7.10		42.0°
23/4/62	1200	24/4/62	1200			2000	382.0			1.0/R/2SE	3 spring smolts, (1 TN 2(1x2) on right bank of Top Rapids)			
24/4/62	1700	25/4/62	1100	1		350		T.N.		1.0/R/1NW	30 coho fry; 1 trout smolt	8.0 - 8.0		42.0°
29/4/62	1800	30/4/62	1000	2		215		T.N.		1.0/R/3SE	50 coho smolt	6.85-6.75		42.0°
2/5/62	1600	3/5/62	0900	3	3.7	350				1.0/R/	50 coho fry	6.63-6.50		42.0°
4/5/52	1700	4/5/62	0900			200				0.4/N/O	1 spring smolt. (1 TN left bank below Top Rapids)			
6/5/62	1700	7/5/62	0900	2	8.1	215				0.2/N/4W	25 coho fry	5.90		43.0°
12/5/62	p.m.	13/5/62	a.m.			25				0.4/N/3W	12 coho smolts; 6 coho fry	6.26		41.0°
15/5/62	2000	16/5/62	0800	1	2.2	70				0.0/N/3W	3 coho smolts; 3 coho fry			
16/5/62	2000	17/5/62	0800	4	9.6	7				1.0/N/O	1 coho smolt; 1 coho fry; 1 spring smolt			
17/5/62	1700	18/5/62	0500	11	23.0	153				1.0/N/5W	1 coho smolt; 12 coho fry			
18/5/62	1700	19/5/62	0500	5	10.8	110				0.5/N/O	6 coho fry; 1 sculpin			
20/5/62	2000	21/5/62	0800	8	18.8	4				0.0/N/2SW	1 coho fry			
22/5/62	1400	23/5/62	2000	34	66.2					0.7/N/1				
23/5/62	2000	24/5/62	0800	28	48.0	18				0.0/N/1	5 coho fry; 1 stickle-back			
24/5/62	2000	25/5/62	0800	14	25.9					0.0/N/1NW				
25/5/62	2000	26/5/62	0800	6	12.4					0.0/N/O				
28/5/62	0400	28/5/62	0430	13	25.3					0.5/N/2S				
28/5/62	0430	28/5/62	1930	11	20.7					0.9/R/2S				
28/5/62	1930	29/5/62	1030	69	137.6					1.0/R/3W				
28/5/62	1130	29/5/62	1930	95	161.3					1.0/R/2W				
29/5/62	2000	30/5/62	1000	71	116.5					1.0/N/2W				
30/5/62	1030	30/5/62	1830	25	45.1					1.0/R/2W				
30/5/62	1830	31/5/62	0930	43	76.6					1.0/R/2W				
31/5/62	1000	31/5/62	1800	29	52.0					0.8/N/O				
31/5/62	1830	1/6/62	1100	33	59.1					1.0/R/O				
1/6/62	1100	2/6/62	1100	58	98.7					0.8/R/O				
5/6/62	2015	6/6/62	1530	90	152.6					0.0/N/1W				
6/6/62	1600	8/6/62	1200	84	-					1.0/R/				
8/6/62	1800	9/6/62	1000	17	30.0					0.0/W/				
9/6/62	1030	11/6/62	1030	74	135.0					0.8/R/				
11/6/62	1100	12/6/62	a.m.	24	67.1					0.0/N/				
17/6/62	1100	17/6/62	1700	2	3.3				Gin Pole					
17/6/62	1700	18/6/62	0600	6	12.4	25				1.0/N/1W				
18/6/62	0600	19/6/62	1030	2	4.1	27				1.0/N/1W				
19/6/62	1100	19/6/62	1800	3		67				0.8/N/1W				
26/6/62	1900	27/6/62	0900	16	40.5	6	3.2				1 steelhead smolt=5.2 gms. (gin pole on left bank below top rapids - TN).			

26/6 - smolts
Intensive feeding prior to downstream migration is evidenced in the larger smolts. Rough qualitative examination with binocular microscope indicates that the diet consists mainly of insects and insect larvae. Microscopic zooplankton are present, however, these appear to have been ingested by the insect larvae prior to their being consumed by the smolts.

Wannock River 1961. Juvenile Salmon Netting

Sockeye

Start		Finish		Smolt		Fry		Gear[a]	Site[b]	Weather[c]	Misc. Catch
Date	Time	Date	Time	No.	T.WT	No.	T.WT				
27/3/61	1000	28/3/61	1000			47	8.3	1	1	0.8/N/2SW	Coho fry 100=62.9 gms; sculpins 13=20.4 gms.
3/4/61	1820	4/4/61	1030	3	2.2	40	8.3	1	1	0.8/N/2SW	Coho Smolts 38=23.7 gms; sculpins 14=21.5 gms.
9/4/61	1830	10/4/61	0030			125	28.5	1	1	0.8/N/4SW	Coho fry 125=28.5 gms; sculpins 15=32.7 gms.
14/4/61	1830	15/4/61	1130	1	1.0	341	68.6	1	2	1.0/R/4SE	Coho fry 152=101.9 gms; sculpins 6=13.2 gms.
14/4/61	1830	15/4/61	1130	1	7.4	243	45.0	1	2	1.0/R/4SE	Coho fry 256=165.2 gms; sculpins 6.
19/4/61	1600	20/4/61	1100	1	1.2	178	34.0	1	3	0.8/N/1W	Sculpin 1; (95% fry buttoned up)
23/4/61	2200	23/4/61	2400			20	4.4	3	1		Chinook fry 9=2.6 gms. (Thousands of sockeye fry observed along the banks of river moving upstream toward the lake.)
24/4/61	1930	25/4/61	1000			2	0.4	1	3	0.8/N/4W	Spring fry 2=1.3 gms; coho fry 11=2.1 gms.
1/5/61	2030	2/5/61	1230			12	2.2	1	3		Coho fry 4=2.4 gms.
5/5/61	1930	5/5/61	1100			52	9.4	1	1	1.0/R/2SW	Chinook fry 46=28.5 gms.
13/5/61	1945	14/5/61	0830	6				2	4	1.0/N/O	Chinook smolts 7; Sticklebacks 1; Chinook fry 2; some unidentifiable fish remains.
14/5/61	1100	14/5/61	2030	125		3		2	4		Chinook smolts 12; Sticklebacks 5; Chinook fry 3; some unidentifiable fish remains.
14/5/61	2030	15/5/61	0930	69		2		2	4		Chinook smolts 8; Sticklebacks 4; Chinook fry 4; remains of 30 to 50 fish.
15/5/61	0930	15/5/61	1230	27		2		2	4		Chinook smolts 1.
14/5/61	2030	15/5/61	1230	47	104.0			2	4		Sample of fish in best shape from previous two tows.
21/5/61	2130	22/5/61	0430	779	1029.7	20	3.1	2	4	1.0/N/O	Coho smolts 2; Sticklebacks 2=2.3; (velocity 8 to 15 fps.)
31/5/61	2100	1/6.61	0130	51	85.4	12		2	1	0.0/N/O	Spring smolt 1; Sticklebacks 4; (bright moon)
7/6/61	2145	8/6/61	0315	127	159.8	49		2	5	1.0/N/O	Sticklebacks 2.
22/6/61	1950	23/6/61	0230			21	4.5	2	5	0.8/N/O	No other fish caught.
13/7/61	2100	14/7/61	0900			17	11.4	2	5		Some fry large but did not appear to be smolts no scales left on fish

a. Gear 1 = 1' x 2' fyke net
2 = tow net
3 = dip net

b. Site 1 = Wannock Cabin
2 = Right Bank
3 = Upper Rapids
4 = 200 ft. below Rapids
5 = Fish wheel site

c. Weather: cloud cover (.8=80%)/ precipitation (N=No; R=Rain)/ wind speed & direction.

Catches of Juvenile Sockeye in the Wannock River by Half-Hour Periods during April and May 1961

21/5/61

Trap Times Start-End	Sockeye Smolt	Sockeye Fry
2130-2200	38	1
2200-2230	25	1
2230-2300	27	1
2300-2330	45	0
2330-2400	76	1
2400-0030	150	1
0030-0100	186	1
0100-0130	59	4
0130-0200	31	0
0200-0230	30	3
0230-0300	19	3
0300-0330	39	2
0330-0400	36	2
0400-0430	18	0

TOTALS.
779 Sock. smolt = 1020.7 gm.
20 Sock. fry = 3.1 gm.
2 Stickleback = 2.3 gm.
2 Coho smolts
Water velocity=8-15 fps
100% cloud, calm

31/5/61

Time Start-End	Sockeye Smolt	Stickle Fry	Chin back	Smolt
2100-2130	5	0	0	0
2130-2200	15	2	1	0
2200-2230	5	1	0	0
2230-2300	10	4	1	0
2300-2330	5	2	0	0
2330-2400	5	2	1	0
2400-0030	2	1	1	0
0030-0100	4	0	0	1
0100-0130	0	0	0	0
	51	12	4	1

51 Sockeye smolts = 85.4 gm.
Clear and calm.

7/6/61

Time Start-End	Sockeye Smolt	Stickle- Fry	back
2145-2215	56	5	1
2230-2245	12	2	
2245-2315	10	5	
2315-2345	13	12	
2345-0015	6	6	1
0015-1145	4	9	
0045-0115	4	1	
0115-0145	7	2	
0145-0215	3	2	
0215-0245	10	3	
0245-0315	3	2	
	128	49	2

127 Sock. smolts = 159.8 gm.
100% cloud, calm

22/6/61

Time Start-End	Sockeye Fry
2150-2220	9
2220-2300	3
2300-2330	2
2330-0030	3
0030-0130	2
0130-0230	2
	21

21 Sock. fry = 4.5 gm.
75% cloud, calm.

Female Yearling Sockeyes, Rivers Inlet, 1916. Lengths in Millimetres on Successive Days of Migration.

	May												June															
	18	19	20	21	22	23	24	25	27	28	29	30/31	1	2	3	4	5	6	7	8	10	11	12	13	14	15	16	17
40	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
41	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
42		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
43	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
44	..	.	..	.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..
45	.	..	..	.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
46	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
47	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
48	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	1	..	..	..	..	..	..
49	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..
50	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	3	..	..	..
51	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	1	..	2	1	..	1	1
52	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	3	..	..	..	..	3	1	..	7	9	..	..	1
53	..	..	..	..	..	..	..	1	..	..	1	..	..	..	..	..	1	..	1	..	6	3	3	4	5	1	..	..
54	..	..	..	..	..	..	..	..	..	..	..	..	3	2	1	1	..	..	3	5	10	4	5	6	10	2	..	..
55	..	..	..	..	..	..	..	1	..	..	..	1	3	..	2	1	1	2	5	5	13	8	9	24	17	1	3	1
56	..	..	..	..	1	1	1	2	2	2	..	..	2	5	2	8	2	2	9	5	6	9	5	10	4	3	1	..
57	..	..	..	..	..	..	2	1	..	..	..	4	5	6	1	3	4	2	17	10	14	7	11	11	8	1	..	..
58	..	..	1	..	..	..	..	1	1	..	..	4	2	1	2	7	7	2	14	8	12	..	4	2	4	2	1	..
59	..	..	1	1	2	1	5	2	1	1	1	5	5	3	8	6	6	4	12	5	7	1	2	3	6	2	..	..
60	..	..	2	..	2	1	6	3	3	1	..	5	4	..	7	11	5	7	19	9	8	1	..	1	2	..	1	..
61	1	..	2	1	3	1	4	1	1	5	..	2	4	2	3	7	4	4	19	8	2	..	..	2	..	..	..	..
62	..	2	4	2	6	4	6	5	6	4	..	4	5	2	2	3	..	2	13	6	1	..	..	..	1	..	..	..
63	..	..	4	3	4	3	6	5	3	4	3	5	2	..	2	3	1	5	4	2	2	1	..	..	..	..	..	..
64	..	3	2	2	6	2	7	5	2	5	..	2	1	..	1	4	..	4	5	2	1	1	..	1	..	..	..	..
65	..	..	2	2	6	1	5	5	5	11	2	..	..	..	1	1	1	3	1	2	1	..	1	..	..	..	..	..
66	1	..	1	3	2	2	2	1	1	8	..	1	..	..	..	..	1	..	2	..	..	..	..	..	..	..	..	..
67	..	..	1	1	3	3	2	1	5	4	1	3	..	..	2	1	1	..	..	..	..	..	1	..	..	..	..	..
68	..	..	5	..	2	1	..	1	4	5	1	..	1	..	..	..	..	3	1	1	..	..	..	..	..	..	..	..
69	..	..	1	..	3	1	3	..	..	..	..	..	2	..	1	..	..	1	1	1	..	..	..	..	..	..	..	..
70	..	1	..	2	1	..	2	3	..	1	1	2	1	..	..	2	..	1	..	..	..	..	..	..	..	..	..	..
71	..	..	1	..	1	..	..	2	1	1	1	..	1	..	..	..	..	2	..	1	..	..	..	..	..	..	..	..
72	..	..	..	1	..	..	2	..	..	1	1	..	..	..	..	..	..	3	1	1	..	..	..	..	..	..	..	..
73	..	1	2	..	..	..	2	1	1	..	..	1	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..
74	..	..	..	..	..	..	1	..	..	..	..	..	..	..	1	..	..	1	..	1	..	..	..	..	..	..	..	..
75	..	..	1	..	..	..	1	..	1	1	..	..	..	1	1	..	..	2	..	1	..	..	..	..	..	..	..	..
76	..	..	..	..	..	..	..	..	.	1	..	..	..	1	..	..	..	2	1	..	..	..	..	..	..	..	.	..
77	..	..	2	..	.	..	..	.	..	..	..	..	1	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..
78	1	..	1	..	..	..	1	..	..	..	..	..	..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..
79	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..
80	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..

Table adapted from Gilbert (1916)

Male Yearling Sockeyes, River Inlet, 1916. Lengths in Millimetres on Successive Days of Migration.

	May												June														
	18	19	20	21	22	23	24	25	27	28	29	30/31	1	2	3	4	5	6	7	8	10	11	12	13	14	15	16	17
40	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
41	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
42	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
43	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1
44	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
45	..	..	..	..	..	.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
46	..	..	..	..	..	.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	1
47	..	..	..	..	..	..	..	.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
48	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	1	2
49	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
50	..	..	..	..	1	..	..	..	1	..	..	..	..	1	..	..	..	..	..	..	..	..	2	1	3	..	..	1
51	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	1	2	1	..	4	6	..	..	..
52	1	..	1	..	..	..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	5	2	3	9	9	3	1	..
53	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	3	1	..	..	2	2	6	5	7	7	1	..	1
54	..	..	..	..	..	..	..	..	1	1	..	..	..	2	..	2	1	1	2	..	15	5	6	4	13	4	2	1
55	..	1	..	..	1	..	..	2	..	..	..	..	3	1	1	5	3	4	6	6	15	11	5	19	12	3	1	..
56	1	..	1	..	1	1	..	1	..	1	..	4	4	1	3	3	4	2	11	4	22	6	5	8	9	4	..	..
57	..	1	1	..	2	2	1	2	1	2	..	3	4	1	4	6	6	6	20	10	14	4	11	12	11	2	..	..
58	..	..	..	..	..	..	1	1	..	1	1	5	4	..	2	3	2	5	11	9	11	5	5	3	3	1	2	..
59	..	..	..	..	1	2	2	2	1	1	1	9	7	2	5	9	4	6	11	9	10	3	1	2	1	..	..	..
60	..	2	3	2	4	3	4	..	3	6	1	6	5	2	8	9	5	3	20	6	8	3	2	3	1	1	..	..
61	..	1	..	4	5	4	5	4	7	6	4	3	6	2	1	1	3	6	15	1	3	2	1	1	2	..	..	..
62	..	..	1	3	2	1	4	8	1	6	1	5	1	..	4	4	3	5	17	6	2	1	1	3	..	..	..	..
63	..	1	1	2	2	4	2	5	5	7	..	1	1	..	2	4	2	3	1	3	2	..	..	..	..	..	..	..
64	..	3	6	..	6	5	7	12	4	11	..	3	1	1	3	3	3	2	6	2	..	1	1	..	..	..	..	..
65	..	..	1	2	2	1	2	3	6	12	1	4	1	2	1	2	1	3	1	..	..	..	1	..	..	..	..	..
66	..	..	2	1	5	1	3	4	5	8	..	..	..	..	1	..	..	1	1	1	..	..	..	..	..	..	..	..
67	..	..	2	2	2	5	5	8	4	3	..	..	1	..	..	1	..	1	3	..	..	..	..	1	..	..	..	..
68	..	..	2	1	3	..	2	..	2	2	..	2	..	..	..	..	..	2	..	1	..	..	..	..	..	..	..	..
69	..	..	5	2	1	2	2	1	5	3	..	2	2	..	..	..	..	4	1	1	..	..	..	..	..	..	..	..
70	..	..	1	1	1	..	..	..	3	1	1	1	..	..	..	..	..	1	..	..	1	..	..	1	1	..	..	..
71	..	..	2	..	..	..	..	2	2	..	..	1	..	1	..	..	..	..	2	..	..	..	..	..	..	..	..	..
72	..	..	1	..	..	1	..	1	..	4	1	..	1	1	1	..	..	2	..	..	..	..	..	..	..	..	..	..
73	1	..	..	1	1	3	..	..	..	..	..	1	..	..	..	..	1	1	1	..	..	..	..	..	..	..	..	..
74	..	..	..	2	..	1	..	2	1	..	..	1	..	..	..	..	..	1	..	..	1	..	..	..	..	..	..	..
75	..	..	..	..	..	..	..	..	2	2	..	..	..	..	..	..	..	..	..	1	1	..	..	..	..	..	..	..
76	..	..	..	..	1	..	1	..	1	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..
77	..	..	1	..	..	..	..	..	2	..	..	..	..	..	..	..	..	4	..	..	..	..	..	1	..	..	..	..
78	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..
79	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..
80	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..

Table adapted from Gilbert (1916)

Wannock River Summer 1964

Fork Length	30/5/64 No	30/5/64 T.Wt	20/5/64 No	20/5/64 T.Wt	23/5/64 No	23/5/64 T.Wt	Summer Total No	Summer Total T.Wt
52-54					1	1.6	1	1.6
54-56	2	3.5	1	1.6			3	5.1
56-58	3	6.0	1	1.8	3	5.8	7	13.6
58-60	17	35.7	1	2.2	4	8.6	22	46.5
60-62	11	24.7	7	15.2	5	11.1	23	51.0
62-64	5	12.1	10	24.8	1	2.5	16	39.4
64-66	1	2.6	18	46.6	1	2.6	20	51.8
66-68			23	62.6	1	2.8	24	65.4
68-70			30	88.4	2	6.2	32	94.6
70-72			7	23.2			7	23.2
72-74			7	25.1			7	25.1
74-76			4	14.2			4	14.2
76-78			2	7.8			2	7.8
1								
2								
3								
T. Catch								
Mn. Len.	59.9		67.3		61.0		65.7	
Mn. Wt.	2.16		2.82		2.28		2.62	
Weather								
W.S.T.								
Time S.								

WANNOCK RIVER

Age-sex composition of adult sockeye

	Year	3_2M	4_2M	4_2F	5_2M	5_2F	5_3M	6_3F
a	1952		52,500	15,000		7,500		
	1960	1,200	12,700	29,950	200	5,300		656
	1961	17,950	9,650	18,900	950	2,500		
	1962	-	20,500	77,800	-	1,700		
b	1963	500	44,000	48,800	6,900	2,300		500
c	1964	2,100	9,660	4,640	21,650	36,430	300	80
d	1965	13,280	23,850	34,500	230	2,480		450
e	1966	6,180	8,490	12,370	740	7,230		

a. Foskett, 1958

b. Bilton et al, 1963

c. Bilton et al, 1964

d. Bilton et al, 1965

e. Bilton et al, 1966

f. Gilbert, 1916.

JUVENILE SIZE: SOCKEYE FRY (1914) mean length 28.5 mm (25-31) (Wannock trap)
COHO FRY (1914) mean length 36.0 mm (32-38)
COHO FINGER (1914) length 72-126 mm.
SOCKEYE SMOLTS (1916)

Wannock River Discharge (cfs), October 1927 to September 1934 (Mean monthly discharge (cfs), maximum monthly discharge (cfs), minimum monthly discharge (cfs). Run-off, as depth in inches on drainage area (in.))

		January	February	March	April	May	June	July	August	September	October	November	December
1927	Mean										22,100	5,100	5,770
	Max.										52,900	9,140	14,900
	Min.										6,280	3,410	2,680
	Run-Off										15.91	3.56	4.16
1928	Mean	13,000	3,870	5,140	4,090	15,400	21,300	25,800	22,400	13,700	10,000	7,360	4,490
	Max.	53,700	4,940	11,950	6,700	33,800	37,900	34,600	52,900	27,200	21,900	15,400	6,080
	Min.	2,580	2,790	2,580	3,200	5,100	11,600	20,700	12,800	5,850	5,850	5,100	3,410
	Run-Off	9.37	2.52	3.70	2.86	11.09	14.85	18.58	16.14	9.55	6.25	4.60	2.81
1929	Mean	2,980[a]					15,600[b]	19,500	21,800	13,700	16,300	5,750	4,430
	Max.	3,820					21,900	25,500	31,200	23,600	61,400	10,100	12,300
	Min.	2,180					11,400	13,700	18,300	5,080	4,830	450	2,710
	Run-Off	1.94					5.44	14.05	15.70	9.55	11.75	4.00	3.19
1930	Mean	3,580	7,370	3,780	7,410	7,740	23,500	21,100	19,700	16,700	12,400	12,300	8,920
	Max.	8,820	23,400	7,370	11,900	11,100	54,500	30,800	28,300	34,400	23,500	31,500	29,600
	Min.	2,470	2,660	2,940	4,910	5,510	10,400	15,900	11,700	8,610	5,500	3,480	3,380
	Run-Off	2.58	4.80	2.72	5.17	5.58	16.38	15.21	14.19	11.65	8.94	8.38	6.43
1931	Mean	4,970	4,920	4,490	5,110	11,600	20,400	18,600	16,300	14,600	9,910	12,300	2,790
	Max.	18,600	14,200	6,740	11,600	18,100	33,900	28,800	22,800	35,500	26,300	38,000	3,181
	Min.	3,100	2,980	3,180	3,250	7,700	10,000	10,200	16,300	6,050	4,240	3,070	2,380
	Run-Off	3.59	3.21	3.24	3.56	8.36	14.23	13.41	11.75	10.18	7.14	8.58	2.01

a. January 1-28
b. June 16-30

Run-Off - Depth in inches on drainage area.

		January	February	March	April	May	June	July	August	September	October	November	December
1932	Mean	3,960	4,130	4,850	5,420	10,300	20,800	20,000	22,300	17,000	17,600	18,000	6,200
	Max.	8,930	18,600	12,500	10,000	14,600	31,400	31,700	27,400	33,400	60,500	75,300	15,400
	Min.	2,280	1,800	3,100	3,760	7,100	10,500	11,600	15,100	10,200	7,040	5,820	3,050
	Run-Off	2.86	2.78	3.49	3.78	7.42	14.50	14.40	16.00	11.80	12.70	12.50	4.46
1933	Mean	3,740	2,130	2,520	4,940	10,800	15,200	25,600	24,700	18,400	19,700	18,500	5,740
	Max.	5,350	2,600	2,860	8,120	16,100	24,600	36,100	32,300	55,200	64,000	30,800	13,300
	Min.	2,350	1,850	2,210	2,800	6,560	9,300	18,400	18,300	9,350	6,000	7,550	2,800
	Run-Off	2.70	1.38	1.82	3.45	7.78	10.60	18.40	17.80	12.80	14.19	12.90	4.14
1934	Mean	6,130	7,690	6,090	12,800	14,100	19,100	21,400	20,000	18,200			
	Max.	10,100	14,200	8,370	30,900	21,700	25,700	37,900	28,000	38,300			
	Min.	3,520	4,100	4,600	5,620	9,000	13,900	15,100	16,200	7,250			
	Run-Off	4.42	5.01	4.39	8.93	10.16	13.32	15.43	14.41	12.70			

July 26, 1935 measured flow was 21,800 sec.-ft.

WANNOCK RIVER DISCHARGE (cfs) March 1961 to December 1968. (Mean monthly discharge (cfs), maximum monthly discharge (cfs), minimum monthly discharge (cfs); Run-Off, as depth in inches on drainage area (in.))

		January	February	March	April	May	June	July	August	September	October	November	December
1961	Mean			3,740	5,420	11,200	22,500	22,800	18,600	16,900	15,500	10,100	3,530
	Max.			6,000	8,210	19,000	34,800	30,600	31,300	46,300	31,700	18,600	6,750
	Min.			2,710	4,030	2,030	15,500	16,100	15,300	7,610	6,210	3,500	2,260
	Run-Off			2.64	3.72	7.92	15.40	16.13	13.16	11.57	10.97	6.92	2.50
1962	Mean	9,910	12,700	1,680	6,600	9,950	18,700	21,200	25,800	9,810	24,400	14,600	14,000
	Max.	20,300	49,700	2,240	12,400	20,400	29,800	26,900	49,200	17,800	54,000	37,600	24,700
	Min.	3,250	2,390	1,490	1,840	4,830	10,200	16,400	14,400	6,750	8,740	6,060	6,910
	Run-Off	7.01	8.11	1.19	4.52	7.03	12.80	15.00	18.25	6.72	17.25	9.99	9.90
1963	Mean	6,270	9,410	3,890	3,580	9,120	18,000	19,200	17,900	20,500	20,400	8,690	9,440
	Max.	12,500	21,800	6,940	3,980	19,900	25,700	26,200	23,300	32,600	44,600	20,600	24,300
	Min.	2,000	1,920	2,510	3,070	3,780	13,300	13,300	13,700	11,600	10,100	4,160	3,480
	Run-Off	4.43	6.01	2.75	2.45	6.45	12.32	13.58	12.66	14.03	14.43	5.95	6.68
1964	Mean	6,900	5,890	2,850	4,840	7,520	28,100	29,200	20,500	15,100	20,600	9,240	
	Max.	21,700	12,500	3,930	6,780	23,300	40,600	42,500	26,500	29,100	44,400	31,300	
	Min.	2,790	2,970	2,070	3,960	3,250	18,600	18,800	17,500	7,060	7,460	4,000	
	Run-Off	4.88	3.90	2.02	3.31	5.32	19.23	20.65	14.50	10.34	14.57	6.32	
1965	Mean							22,800	19,200	8,800	30,900	8,820	6,740
	Max.							28,700	23,500	16,500	70,700	18,400	13,200
	Min.							20,100	11,300	7,200	14,100	4,060	3,110
	Run-Off							16.13	13.58	6.02	2.19	6.04	4.77
1966	Mean	3,410	3,220	5,370	10,200	12,500	19,600	22,900	19,800	14,500	2,200	9,910	8,010
	Max.	4,610	3,620	33,400	25,300	25,200	29,600	30,000	26,700	21,900	53,500	24,800	17,600
	Min.	2,340	2,720	2,630	5,010	5,140	11,400	16,900	14,900	11,300	8,380	5,060	3,730
	Run-Off	2.40	2.06	3.80	6.98	8.84	13.42	16.20	14.00	9.93	14.88	6.78	5.67

		January	February	March	April	May	June	July	August	September	October	November	December
1967	Mean	5,600	5,150	2,910	2,860	14,600	31,600	26,700	21,100	27,400	25,700	13,700	8,760
	Max.	8,180	8,280	3,860	4,190	22,600	43,400	36,100	26,300	67,800	70,300	43,400	18,400
	Min.	3,240	3,400	2,340	2,450	4,910	18,900	21,800	17,000	14,400	10,100	6,360	4,660
	Run-Off	3.96	3.29	2.06	1.96	10.33	21.63	18.89	14.92	18.75	18.18	9.38	6.20
1968	Mean	10,600	6,220	6,760	4,370	12,700	17,200	24,200	15,600	18,300	19,000	11,800	4,670
	Max	96,000	10,600	11,600	7,400	21,900	38,500	38,700	22,900	33,800	57,700	27,500	10,800
	Min.	4,280	3,860	4,060	3,470	6,590	12,600	16,600	11,600	11,600	6,840	5,040	2,040
	Run-Off	7.497	4.12	4.78	2.99	8.98	11.77	17.12	11.03	12.53	13.44	8.08	3.30

* Data subsequent to September 30, 1966 are unpublished and subject to revision

Run-Off is depth in inches on drainage area.

STREAM NAME Washwash (Waukwash) River
DISTRICT 6 STAT. AREA 9 COMPUTER CODE AREA 09-7-19
LOCATION OF MOUTH Flows S.W. into Owikeno L.
Rge. 2 coastal dist. POSITION 51° 126° NW
ACCESSIBLE LENGTH 1.5 mi.; WIDTH _____ mi.;
DRAINAGE 50 sq. mi.
COMPOSITION:
BEDROCK _____ BOULDER _____ COARSE _____
FINE _____ SILT AND SAND _____
UNCLASSIFIED _____

GRADIENT FALL IN FT./100	
0.0-2.5	
2.5-5.0	
5.0-7.5	
7.5-10.0	
> 10.0	

WETTED AREA _____ sq. yd.; SPAWNING AREA _____ sq. yd.
DISCHARGE _____ cfs; MAX 1500 cfs;
MIN 100 cfs
TEMPERATURE _____
BARRIER OR POINTS OF DIFFICULT ASCENT
Impassable falls

SPAWNING DISTRIBUTION

SPECIES	SECTION OF STREAM USED	TIMING
SOCKEYE	Throughout accessible length	Aug.-Nov.
CHINOOK	Upper river	Aug.-Sept.
COHO	Throughout accessible length	Oct.-Nov.
PINK (ODD YR.)		
PINK (EVEN YR.)		
CHUM		

POTENTIAL OF INACCESSIBLE PORTION OF STREAM _____

GENERAL REMARKS: The Washwash River valley has extensive wooded flats. Below cascades located 1.5to 2 miles upstream there are medium flows over excellent gravel. Above the cascades the river and tributaries are high gradient. There are a number of small lakes in the system but none large enough to moderate the rate of discharge. About one mile from the mouth the river divides into two branches; one proceeding directly to Owikeno Lake, the other flowing into the Tzeo River. The Washwash first

broke through into the Tzeo in 1936. Since that time both main channels of the Washwash have subdivided and wandered considerably. There have been at least three separate breakthroughs into the Tzeo. In 1961 the breakthroughs into the Tzeo began to take all the medium flows. The "old channel" which went directly to the lake, had water in it only under high water conditions. During the fall freshets considerable spawn was deposited in this channel - only to be left high and dry by winter low water conditions. In 1968 an attempt was made to reopen the blocked channel and divide the flow equally between it and the channel which broke through into the Tzeo.

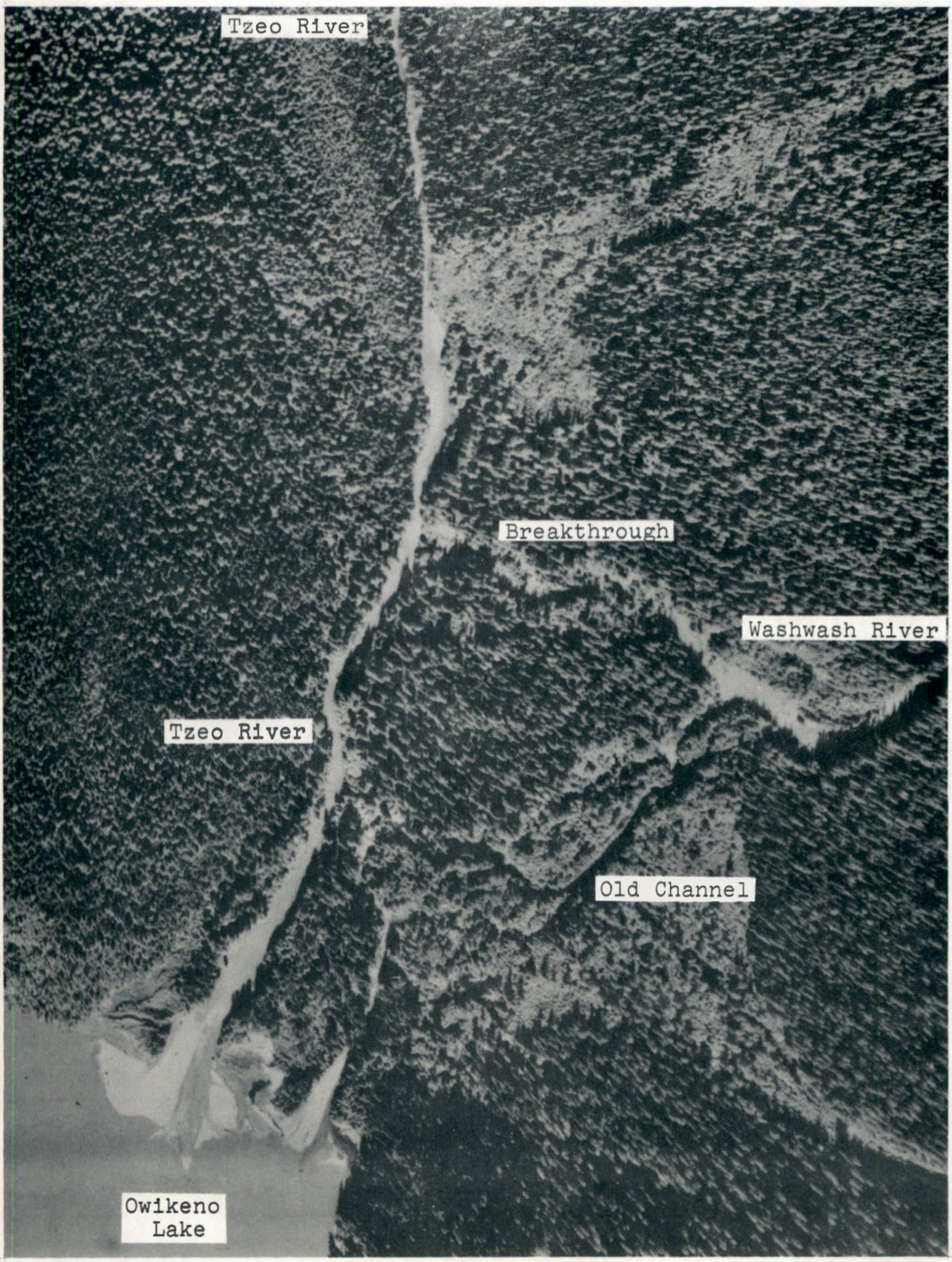
The remedial work was effective until severe flooding in the fall of 1968 and 1969 when major gravel movement, stream cutting and log jams completely changed the area.

The high discharge of the system and the loose gravel substrate of the lower valley tend to make the Washwash river bed very unstable. Artificial stabilization has been suggested as a possible solution to the problem.

There are approximately 4 square miles of mature timber in the Washwash drainage area. A small part of the area is covered by a timber licence, but to date there has been no logging in the area.

The potential of this stream is considerable. It normally has strong spawning stocks; utilizing excellent gravel. Fish hatched in this basin enter a relatively productive section of the lake.

This river was a donor stream for both sockeye and chinook eggs for the Federal Salmon Hatchery which operated in the area. The remains of a fence are still present near the mouth of the main channel.



Delta of Washwash and Tzeo Rivers Showing Breakthrough and Old Channels of the Washwash.

ESCAPEMENT RECORD FOR WASHWASH* (WAUKWASH) RIVER

Year	Pink	Sockeye	Coho	Chum	Spring
1934		1- 2,000			
35		2- 5,000			1-50
36		10- 20,000			1-50
37					
38		2- 5,000			
Mean		4- 8,000			1-50
1939		1- 2,000			50-100
40		10- 20,000			50-100
41		10- 20,000			50-100
42		10- 20,000	100-300		
43		5- 10,000			50-100
Mean		7- 10,000	100-300		50-100
1944		2- 5,000			1-50
45		10- 20,000			100-300
46		5- 10,000			1-50
47		10- 20,000			1-50
48		2- 5,000	500-1,000		300-500
Mean		6- 10,000	500-1,000		80-200
1949		20- 50,000	1-2,000		100-300
50		50-100,000			300-500
51					
52		100,000+			50-100
53		100,000+			50-100
Mean		70- 90,000	1-2,000		100-300
1954		500			1-2,000
55		5- 10,000			
56		5- 10,000	100-300		50-100
57		20- 50,000			50-100
58		50-100,000	1-50		1-50
Mean		20- 30,000	50-200		300-600
1959		10- 20,000			50-100
60		2- 5,000			
61		10- 20,000			
62		50-100,000			
63		100,000+	300-500		
Mean		30- 50,000	300-500		50-100
1964		50-100,000	500-1,000		
65		5- 10,000	300-500		
66		20- 50,000	1-50		
67		125,000	1-50		
68		100,000+	50-100		
Mean		60- 80,000	200-300		
G Mean		30- 40,000	400-700		100-200

Washwash River - 1961 Fry Catches

(1) 1900 - 12/4/61 to 1200 - 13/4/61.
1' x 2' fyke net - about 100 yds. upstream from stream mouth.

TOTAL CATCH — 224 sockeye fry = 29.3 qms
(all with yolk sac visible)

(2) 1930 - 28/4/61 to 1300 - 29/4/61
1' x 2' fyke net (same site as above)

TOTAL CATCH — 30 sockeye fry = 5.2 qms.

(3) 1630 - 10/5/61 to 0230 - 11/5/61
1' x 2' fyke net (same site as above)

TOTAL CATCH — 83 sockeye fry = 10.9 qms;
1 stickleback = adult.

Age-sex composition of adult sockeye

	Year	3_2M	4_2M	4_2F	5_2M	5_2F	6_3M	6_3F
a	1952	4,970	19,890	9,320	30,940	34,800		
	1960	450	2,620	290	330	1,320		
	1961	8,200	2,220	420	4,720	4,440		
	1962	6,600	28,300	14,800	28,900	19,200	600	1,600
c	1963		13,200	11,100	31,100	43,600	500	500
d	1964	1,060	700	800	33,140	36,970	350	1,990
e & b	1965	3,640	3,640	2,720				
f	1966	3,700	7,810	2,290	3,896	17,310		

a. Foskett, 1958
b. small sample size
c. Bilton et al, 1963
d. Bilton et al, 1964
e. Bilton et al, 1965
f. Bilton et al, 1966

SPRING SALMON EGG TAKE - WAUK-WASH RIVER - 1931-1935

Year	No. of Salmon Estimated on Wauk-Wash River	No. of Eggs Taken	Remarks	No. of Fry & Fingerlings Released	Remarks
1930	1500-2000	-	-	-	-
1931	1000	485,000	254 Adult Salmon speared from Wauk-Wash River	195,000 fingerlings	Released in Wauk-Wash R.
1932	1500	668,000	402 Adult Salmon speared from Wauk-Wash River	16,700 fry	Released in Meadows Cr. No record of fingerling release in Wauk-Wash R.
1933	500	No record	182 Springs taken from Wauk-Wash R. for spawning	No record	-
1934	500	460,000	Collected from Wauk-Wash	157,000 fry 97,000 fry 30,000 fry 30,000 fry 162,000 fingerlings 57,000 "	Wauk-Wash R. Meadows Cr. Deep Pools Spring Pools Owikeno Lake " "
1935	-	-	198,360	198,360 fingerlings 119,780 " 318,140 fry 57,800 "	Owikeno Lake Meadows Cr. - -

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