FISHERIES RESEARCH BOARD OF CANADA

MANUSCRIPT REPORT SERIES

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FOREWORD

This summary on the salmon and trout resource of the Nanaimo River and other streams emptying into Nanaimo Harbour was prompted by the recent proposal of the Nanaimo Harbour Commission to greatly expand port facilities. The proposal involves extensive land filling for storage and docking in estuarial areas inhabited according to season by adult and juvenile salmon and trout.

Sources of information on local stocks were records of the Fisheries Service, Department of the Environment, personnel of the Fish and Wildlife Branch of the British Columbia Department of Recreation and Conservation, and local anglers.

The records show the Nanaimo River to be a substantial producer of salmon and trout and one of British Columbia's superior steelhead trout rivers. These fish contribute importantly to our commercial fishery, a local Indian food fishery and a vigorous and high quality sports fishery.

The Nanaimo River rises in the southern Vancouver Island mountains and drains eastward into Nanaimo Harbour (Fig. 1). The river is about 35 miles long and has a drainage area of approximately 320 square miles. The system has several lakes including First, Second, Third and Fourth Lakes. Important tributaries are Sadie Creek, Green Creek, North Nanaimo River, South Nanaimo River, and Haslam Creek. The flow of the Nanaimo River is affected by operation of storage dams at the outlet of Fourth Lake and on the South Nanaimo River. From May 1965 to December 1969 the daily discharge of the Nanaimo River near the Trans Canada Highway Bridge has varied between 15,200 and 120 cfs with a mean daily discharge around 1,500 cfs. In the estuary area the Nanaimo River is joined by three streams (Fig. 2), Hong Kong Creek and Chase River which drain into the main (westernmost) channel of the Nanaimo River, and Holden Creek which drains from Quennel and Holden Lakes to the southeast corner of the Nanaimo River flats. Another stream, the Millstone River, empties into Nanaimo Harbour north of the Nanaimo River. The Millstone River, which drains Westwood, Brannen, Diver, and Long Lakes, has an impassable fall about three-quarters of a mile upstream from the mouth.

Since 1950, five species of Pacific salmon (chum, coho, chinook, pink, and sockeye) and two species of migratory trout (steelhead and cutthroat) have been reported to occur in the streams draining into Nanaimo Harbour. All seven species occur in the Nanaimo River, whereas only steelhead are reported in the Millstone River, coho and cutthroat in Hong Kong and Holden Creeks, and chum, coho, steelhead and cutthroat in Chase River. No estimates are available of the total contribution of the salmon runs originating from these streams to the commercial and sport fisheries. These runs contribute not only to catches in the local area but also to catches in other parts of the Strait of Georgia and its approaches. Nanaimo River chum salmon are caught in the commercial gillnet and seine fisheries in the Strait of Georgia and Johnstone Strait. Coho and chinook salmon from Nanaimo Harbour streams may be caught in the troll fisheries off the west coast of Vancouver Island as well as in the Strait of Georgia troll and sport fisheries, and in the commercial net fisheries in Johnstone Strait, and the Straits of Georgia and Juan de Fuca. The local sport fishery in tidal waters takes place mainly outside the confines of Nanaimo Harbour and therefore can be expected to contain fish of mixed origin. However, during August a sport fishery develops in Northumberland Channel near Jack Point for maturing chinook bound for the Nanaimo River. The fish caught in this fishery are especially large and attractive as they have achieved their maturity. Up to 20 or 30 boats, containing visiting as well as local fishermen, may fish in this area at any one time. In addition, coho and chinook are taken by anglers in non-tidal portions of the Nanaimo River. The Nanaimo River is a popular steelhead stream not only for local anglers but also for Lower Mainland fishermen. Since 1966 the annual catch in the Nanaimo River, as estimated from steelhead punch cards by personnel of the Fish and Wildlife Branch of the British Columbia Department of Recreation and Conservation, has varied between a low of 664 and a high of 2,573 steelhead. During this period the river ranked from the fifth to the fourteenth in size in anglers' catches among the over 300 streams fished by steelhead anglers in British Columbia. Unknown numbers of migratory cutthroat are taken by anglers in the Nanaimo River and adjacent streams.

Estimates of the annual escapements of salmon to the Nanaimo River are available from fishery officers' reports (see Appendix Tables 1 to 4). These estimates include escapements to the Chase River and to Hong Kong and Holden Creeks. The escapements are described by species below.

Chum

Since 1949 the annual escapement of chum salmon has varied from a high in excess of 100,000 to a low between two and five thousand. In the 10-year period, 1962 to 1971, the average escapement was about 24,000 chum annually. Chum salmon spawn in the Nanaimo River from its confluence with the Chase River upstream as far as Haslam Creek. Most of the spawning takes place in the main channel up to and adjacent to Indian Reserve No. 3 and above the Cedar Road Bridge in Polkinghorne's Slough and Side Channel and in Maffeo's Side Channel. Some chum also spawn in the lower reaches of Haslam Creek. Returning chum salmon begin arriving in the river from late August to late September. Spawning commences shortly after arrival in the stream, reaches a peak in mid to late October, and ends by late November or early December.

Coho

Annual estimates of coho spawners have varied since 1949 from a high of about 15,000 to a low of about 1,000. From 1962 to 1971 the estimated escapements averaged about 2,500 coho annually. Earlier running coho spawn in the Nanaimo River and its tributaries upstream as far as Second Lake. Later running coho spawn in the lower part of the river in the same areas as do the chum. As mentioned earlier, some coho spawn also in Chase River and in Hong Kong and Holden Creeks. Coho commence arriving in the river in late August and in September. Spawning takes place from late September to late December or early January with the peak in late October - early November.

Chinook

The annual escapements of chinook since 1949 have varied from a few hundred to about 7,500. From 1962 to 1971 the average escapement was about 1,400 chinook annually. The Nanaimo River chinook run has spring and fall components. The spring chinook enter the river from early April to late June and spawn in the Nanaimo River below First Lake. The fall chinook enter the river in late August and September and spawn in the river below the Trans Canada Highway Bridge downstream as far as Cedar. Generally, spawning commences in September, reaches a peak in October and ends in November and December.

Pink

In the fifties, small numbers of pink salmon were reported in the Nanaimo River in both even- and odd-numbered years. None have been reported since 1960. The pinks spawned in the lower 3 miles of the Nanaimo River and lower quarter mile of Haslam Creek. According to long-time residents of the area, substantial numbers of pinks spawned in Haslam Creek before mine washings made the stream unsuitable for pinks.

Sockeye

Since 1949, sockeye salmon have been reported in the Nanaimo River in 1951, 1957, and 1958. These sockeye either were strays from other river systems, or were the descendants of sockeye which may have resulted from the introduction of eyed sockeye eggs in the Nanaimo River in 1933, or resulted from kokanee which may have migrated to sea as juveniles. Kokanee are present in the Nanaimo Lakes and are known to have been present there prior to the introduction of sockeye eggs to the system in 1933.

No estimates are available of the number of steelhead and migratory cutthroat spawners in the Nanaimo River. From studies of the ratio of catch to escapement of steelhead in other systems it is likely that annual catches represent less than one-third of the total steelhead run. As mentioned earlier, the steelhead catch in the Nanaimo River has been estimated to be between 664 and 2,573 steelhead annually in the years 1966 to 1971. The Nanaimo River steelhead run consists of a winter run, a spring run, and a fall run of "jacks". Steelhead spawn in the Nanaimo River to a point slightly upstream from its confluence with Sadie Creek, and in many of its tributaries, including Haslam Creek, Elkhorn Creek, South Nanaimo River, North Nanaimo River, Rush Creek, Green Creek, and Sadie Creek. Spawning occurs between February and May. Migratory cutthroat also occur in the Nanaimo River and its tributaries as far upstream as Sadie Creek. As mentioned earlier, steelhead also occur in the Chase and Millstone Rivers, and migratory cutthroat in the Chase River and in Hong Kong and Holden Creeks.

A small Native food fishery occurs in the Nanaimo River. In the years 1968 to 1971, the Fisheries Service issued an average of 27 Native food fishery permits for the Nanaimo River to an average of 30 families consisting of about 145 persons (see Appendix Table 5). During this period, the average annual catch was about 1,400 chum, 400 coho, and 157 chinook. Some steelhead were also taken but no estimates of the numbers caught are available for all years. The fish are taken mainly with gillnets operated in the Nanaimo River from its confluence with the Chase River up to the Cedar Road Bridge. A few salmon are taken by spears, in places such as Polkinghorne's Slough.

APPENDIX

Appendix Tables 1 to 4 provide information on escapements of salmon to the Nanaimo River. The estimated numbers of spawners in some years are indicated by letter code. The code is as follows:

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

Appendix Tables 5 and 6 provide Native food fishery statistics for the Nanaimo River and for British Columbia Statistical Area 17.

Appendix Table 1. Fishery officers' estimates of escapements of Pacific salmon to the Nanaimo River, 1949 to 1971.

Year	Chum	Coho	Chinook	Pink	Sockeye
1949	20,000	1,200	800	1,500	0
1950	N	G	E	D	0
1951	M	H	G	F	A
1952	L	G	G	E	
1953	L	H	F	E	0
1954	M	H	F	C	
1955	K	G	G	C	
1956	L	H	G	A	
1957	L	K	H	E	A
1958	M	G	G	C	Odd
1959	H	F	G	A	
1960	G	F	E	A	
1961	H	E	E	0	0
1962	H	F	E	0	0
1963	G	F	F	0	0
1964	K	G	E	0	0
1965	K	F	G		
1966	M	G	F		
1967	22,000	6,000	1,200		*
1968	26,000	800	1,500	0	*
1969	26,000	1,200	1,100	0	0
1970	30,000	4,750	1,500		0
1971	17,500	4,250	850		

*Few caught in Native subsistence fishery.

Appendix Table 2. Fishery officers' estimates of escapement size and timing of chum salmon runs to the Nanaimo River, 1962 to 1971.

Year	Escapement	Arrival in stream	Dates of duration of spawning		
			Start	Peak	End
1962	H		Sept.	Oct.	Jan.
1963	G		Oct.	Oct.	Dec.
1964	K		Oct.	Nov.	Dec.
1965	K		Oct.	Nov.	Dec.
1966	M		Sept.	Oct.	Dec.
1967	22,000	Sept.	Sept.	Oct.	Dec. 15
1968	26,000	Sept.	Sept.	Oct.	Nov.
1969	26,000	Aug. 15	Aug. 18	Oct. 15	Nov. 25
1970	30,000	Sept. 26	Sept. 29	Oct. 24	Dec. 4
1971	17,500	Sept. 25	Sept. 29	Oct. 26	Dec. 2

Appendix Table 3. Fishery officers' estimates of escapement size and timing of coho salmon runs to the Nanaimo River, 1962 to 1971.

Year	Escapement	Arrival in stream	Dates of duration of spawning		
			Start	Peak	End
1962	F		Sept.	Oct.	Jan.
1963	F		Oct.	Nov.	Dec.
1964	G		Sept.	Oct.	Dec.
1965	F		Sept.	Oct.	Dec.
1966	G		Sept.	Dec.	Jan.
1967	6,000	Sept.	Sept.	Oct.	Jan.
1968	800	Sept.	Sept.	Oct.	Dec.
1969	1,200	Aug. 25	Sept. 1	Nov. 1	Dec. 19
1970	4,750	Sept. 17	Sept. 22	Oct. 28	Dec. 30
1971	4,250	Aug. 30	Sept. 4	Oct. 30	Dec. 30

Appendix Table 4. Fishery officers' estimates of escapement size and timing of chinook salmon runs to the Nanaimo River, 1962 to 1971.

Year	Escapement	Arrival in stream	Peak of spawning	End of spawning
1962	E		Sept.	Dec.
1963	F		Sept.	Nov.
1964	E		Sept.	Nov.
1965	G		Oct.	Nov.
1966	F		Oct.	Nov.
1967	1,200	May	Oct.	Nov. 15
1968	1,500	May	Oct.	Dec.
1969	1,100	May	Aug. 14	Oct. 7
1970	1,500	May	Sept.	Oct.
1971	850	May 5	Sept.	Oct. 20

Appendix Table 5. Native food fishery statistics, Nanaimo River, 1968 to 1971.

Year	Number of fish caught				Number of		
	Chum	Coho	Chinook	Steelhead	Permits	Families	People
1968	680	300	255	30	17	17	85
1969	760	65	10	-	25	26	130
1970	2,450	750	150	-	34	40	200
1971	1,800	545	175	-	32	37	165

Appendix Table 6. Native food fishery statistics, British Columbia Statistical Area 17, 1957 to 1971.

Year	Number of fish caught						No. of permits
	Chum	Coho	Chinook	Pink	Sockeye	Steelhead	
1957	1,800	500	170	60		35	
1958	1,720	198	55	15		15	
1959	950	100	30			35	
1960	750	375	150	10		50	
1961	700	200	75			30	
1962	860	300	40				
1963	280	95	35				
1964	580	300	20				
1965	400	100	25			20	
1966	1,480	560	325	10		50	45
1967	850	625	60		6	10	38
1968	905	410	255			30	36
1969	1,745	150	15				51
1970	3,230	910	150				65
1971	2,275	760	205				

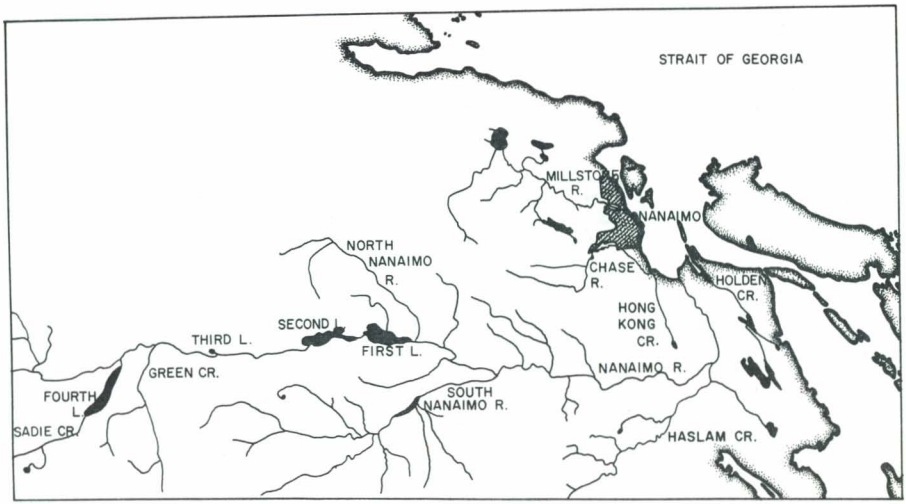

Fig. 1. Nanaimo River drainage.

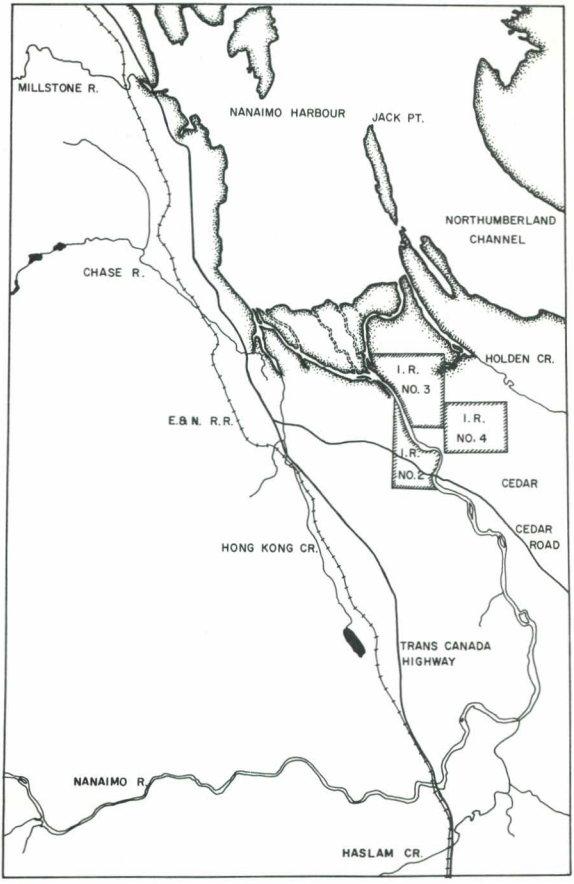

Fig. 2. Nanaimo Harbour and the downstream portion of the Nanaimo River.