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Studies on Pacific Salmon (*Oncorhynchus* spp.) in Phase I of the Salmond Enhancement Program

Volume II: Data Appendices

B.G. Shepherd, J.E. Hillaby, and R.J. Hutton

Salmonid Enhancement Program
Department of Fisheries and Oceans
Vancouver, B.C. V6E 2P1

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November 1986

STUDIES ON PACIFIC SALMON (*Oncorhynchus* spp.) IN PHASE I OF THE SALMONID ENHANCEMENT PROGRAM

VOLUME II: DATA APPENDICES

by

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ABSTRACT

Shepherd, B.G., J.E. Hillaby and R.J. Hutton. 1986. Studies on Pacific salmon *(Oncorhynchus* spp.) in Phase I of the Salmonid Enhancement Program Volume II: DATA APPENDICES. Can. Tech. Rep. Fish. Aquat. Sci. 1482: vii +pp 181-364.

From 1977 to 1984 the New Projects Unit initiated 38 field studies on wild salmon stocks throughout British Columbia, in order to develop biological design criteria for proposed enhancement projects. The purpose of this report is to make the data from these studies more easily available to other users. Pertinent biological data were extracted from the individual field studies, and adjusted where necessary to make the data as consistent as possible for comparative purposes.

Data are presented on migration timing, distribution and abundance of adults and juveniles; spawner characteristics such as sex ratio, age, length at age, fecundity, egg retention rates, flesh colour, and incidence of diseases; and length, weight and condition factors of juveniles. Physical characteristics of stream habitat important for spawning and rearing of wild salmon are also reviewed. These data are tabulated by stream and stock in Volume II; Volume I overviews the information by species and region, and provides perspective on factors which may have affected the findings.

RÉSUMÉ

Shepherd, B.G., J.E. Hillaby and R.J. Hutton. 1986. Studies on Pacific salmon (*Oncorhynchus* spp.) in Phase I of the Salmonid Enhancement Program Volume II: DATA APPENDICES. Can. Tech. Rep. Fish. Aquat. Sci. 1482: vii + pp 181-364.

De 1977 à 1984, la section des nouveaux projets a amorcé 38 études sur le terrain portant sur des stocks de saumons sauvages. Ces études effectuées à l'echelle de la Colombie-Britannique ont pour objectif la détermination de critères biologiques de conception pour des projets de mise en valeur. Le rapport vise à rendre les données de ces études plus accessibles aux autres utilisateurs. Les données biologiques pertinentes ont été tirées des rapports et ajustées selon les besoins afin de les rendre les plus cohérentes possibles aux fins de comparaison.

Les données portent sur le moment des migrations, la distribution et l'abondance des adultes et des juvéniles, certaines caractéristiques des geniteurs comme le sex ratio, l'âge, la longueur selon l'âge, la fécondité, le taux de rétention des oeufs, la couleur de la chair et l'incidence des maladies, de même que sur la longueur, le poids et la condition des juvéniles. On traite aussi des caractéristiques physiques des habitats en cours d'eau importants pour le frai et la croissance des saumons sauvages. Les données sont présentées sous forme de tableaux, par cours d'eau et stocks, dans le Volume II. Le Volume I contient les renseignements sur les espèces et les régions et met en perspective les facteurs qui ont pu influer sur les résultats.

APPENDIX C-1

Comparison of TIMING DATA Obtained During New Projects (NP) Studies with Stream File (SF) Information

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New Projects (NP) data are extracted directly from the source reports and usually are more specific than that given by Stream File (SF) reports. Often, NP data are in agreement with SF information but NP start and end of run timing dates are, respectively, prior to and after those indicated by SF information. This may be a reflection of the greater effort made by personnel gathering NP data for certain species. The greatest drawback to the NP data is that project initiation and termination dates usually fall well within the boundaries of run timing, resulting in little concrete data being presented on the initial immigration or final die-off periods.

SF (avg.) indicates average run timing for the previous ten years.

COMPARISON OF CHINOOK TIMING DATA OBTAINED DURING NEW PROJECTS (NP) STUDIES WITH STREAM FILE (SF) INFORMATION

STREAM	YEAR	SOURCE	METHODS	IMMIGRATION START	IMMIGRATION PEAK	IMMIGRATION END	SPAWNING START	SPAWNING PEAK	SPAWNING END	DIE-OFF START	DIE-OFF PEAK	DIE-OFF END
SOUTH COAST - Cont'd												
Mussel Ck.	1981	NP	Boat Surveys	before July 12	-	-	Sept. 15	Oct. 1	Oct. 15	-	-	-
		SF	Included in Kilnaklini R.									
	1983	NP	Fence, Streamside & Aerial Surveys	July 20	Aug. 24	Sept. 13	Aug. 25	Sept. 25	Oct. 10	Sept. 23	Oct. 15	Oct. 22
		SF										
		SF (Avg)	Included in Kilnaklini R.									
Kilnaklini R.	1983	NP	Aerial and Foot Surveys	-	-	-	Aug. 20-22	Sept. 10-15	Sept. 25-28	Sept. 10	Sept. 20-25	Oct. 1-12
		SF			-	-				-	-	-
		SF (Avg)		May	-	-	July	late Sept.	Oct.	-	-	-
Ahnuhati R.	1981	NP	Aerial, Float, Foot Surveys	before July 28	-	-	Aug. 15	Sept. 1	Sept. 15	-	-	-
		SF	-	-	-	-	-	-	-	-	-	-
		SF (Avg)	-	-	-	-	-	-	-	-	-	-
	1983	NP	Aerial & Foot Surveys	Aug. 1-5	Aug. 10-15	Sept. 5	Aug. 20	Sept. 7	Sept. 25	Sept. 5-10	Sept. 15-20	Sept. 30
		SF	-	-	-	-	-	-	-	-	-	-
		SF (Avg)	-	-	-	-	-	-	-	-	-	-
Nitinat R.	1979	NP	Foot Surveys	late Aug.	Aug. 20	-	Sept. 20	early Oct.	Nov. 14	-	-	-
		SF		Sept.	-	-	Oct. 15	Nov. 10	Dec.	-	-	-
		SF (Avg)			-	-				-	-	-
FRASER R., N.B.C. and YUKON												
Holmes R.	1981	NP	Boat, Float, Aerial Surveys	-	early Aug.	-	-	late Aug.	mid-Sept.	-	-	-
		SF		late July	-	-	mid-Aug.	late Aug.	early Sept.	-	-	-
		SF (Avg)		early Aug.	-	-	mid-Aug.	late Aug.	early Sept.	-	-	-
Morkill R.	1981	NP	Boat, Float, Aerial Surveys	-	-	early Aug.	-	early Sept.	late Sept.	-	-	-
		SF		Aug. 1	-	-	Aug. 20	Aug. 25	Sept. 2	-	-	-
		SF (Avg)		early Aug.	-	-	mid-Aug	early Sept.	late Sept.	-	-	-
Torpy R.	1981	NP	Boat, Float, Aerial Surveys	-	-	late July	-	late Aug.	-	-	-	-
		SF		July 25	-	-	Aug. 7	Aug. 16	Aug. 25	-	-	-
		SF (Avg)		late July	-	-	-	late Aug.	-	-	-	-

COMPARISON OF CHINOOK TIMING DATA OBTAINED DURING NEW PROJECTS (NP) STUDIES WITH STREAM FILE (SF) INFORMATION

STREAM	YEAR	SOURCE	METHODS	IMMIGRATION START	IMMIGRATION PEAK	IMMIGRATION END	SPAWNING START	SPAWNING PEAK	SPAWNING END	DIE-OFF START	DIE-OFF PEAK	DIE-OFF END
NORTH COAST												
Morice R.	1978	NP	Aerial & Foot Surveys	-	-	-	early Sept.	-	-	-	-	-
		SF			-	-				-	-	-
	1980	NP	Aerial & Foot Surveys	-	-	-	early Sept.	-	-	-	-	-
		SF										
		SF (Avg)		-	-	-	July-early Sept.	Aug-mid Sept.	mid-Sept. - mid-Oct.	-	-	-
Kitlope R.	1981	NP	Aerial, Boat Foot Surveys	before mid-July	-	-	Aug. 10	-	-	Aug. 21	-	late Sept.
		SF		June	-	-	mid-July	late July	early Sept.	-	-	-
		SF (Avg)		June	-	-	July	Aug.	Sept.	-	-	-
Gamsby R.	1981	NP	Aerial, Boat, Foot Surveys	-	-	-	1st observ. Aug. 21	-	-	-	-	-
		SF	Included in Kitlope R.									
		SF (Avg)	Included in Kitlope R.									
Tezwa R.	1981	NP	Aerial, Boat, Foot Surveys	-	-	-	Aug. 12	-	-	-	-	mid Sept.
		SF	Included in Kitlope R.									
		SF (Avg)	Included in Kitlope R.									
Kemano R. (incl. tribs.)	1979	NP	Aerial & Foot Surveys	-	Aug. 23-30	Sept. 5	-	-	-	Aug. 15	-	Sept. 25
		SF			-	-						
		SF (Avg)		June	-	-	mid-July	late July	mid August	-	-	-
Kwatna R.	1983	NP	Foot, Float, Boat, Helicopter	mid June	-	-	mid Aug.	late Aug.	early Sept.	late Aug.	early Sept.	mid Sept.
		SF			-	-				-	-	-
		SF (Avg)		July	-	-	Aug.	Aug.	Sept.	-	-	-
SOUTH COAST												
Kakweiken R.	1981	NP	Fishway Survey	before July 7	-	July 27	-	-	-	-	-	-
		SF		July	-	-	Aug.	Oct.	Nov.	-	-	-
		SF (Avg)		July	-	-	Sept.	late Sept.	-	-	-	-

COMPARISON OF CHINOOK TIMING DATA OBTAINED DURING NEW PROJECTS (NP) STUDIES WITH STREAM FILE (SF) INFORMATION

STREAM	YEAR	SOURCE	METHODS	IMMIGRATION START	IMMIGRATION PEAK	IMMIGRATION END	SPAWNING START	SPAWNING PEAK	SPAWNING END	DIE-OFF START	DIE-OFF PEAK	DIE-OFF END
FRASER R., N.B.C. and YUKON - Cont'd												
Slim Ck.	1980	NP	Aerial & Boat Surveys	Aug. 7	-	-	Aug. 7-17	Aug19-Sept6	Sept. 14	Sept. 3	-	Sept. 14
		SF		early Aug.	-	-	Aug. 29	Sept. 5-7	Sept. 15	-	-	-
	1981	NP	Boat, Float, Aerial Surveys	-	-	mid-Aug.	-	early Sept.	late Sept.	-	-	-
		SF		Aug. 10	-	-	Aug. 25	Aug. 29	Sept. 6	-	-	-
		SF (Avg)		mid-Aug.	-	-	late Aug.	early Sept.	late Sept.	-	-	-
Bowron R.	1980	NP	Aerial & Boat Surveys	July 30	-	-	Aug. 15	Aug20-Sept1	Sept. 15	Aug. 15	-	Sept. 20
		SF		Aug. 1	-	-	Aug. 20	Sept. 1	Sept. 12	-	-	-
		SF (Avg)		early Aug.	-	-	late Aug.	early Sept.	mid-Sept.	-	-	-
Willow R. (Incl. Wansa Ck.)	1980	NP	Aerial and Boat Surveys	July28-Aug7	-	-	Aug. 7-17	Aug19-Sept6	Sept. 2-14	Aug20-Sept3	-	Sept. 14-17
		SF		early Aug.	-	-	Aug. 18	Aug. 23-25	Aug. 29	-	-	-
		SF (Avg)		mid-Aug.	-	-	mid-Aug.	late Aug.	-	-	-	-
Stuart R.	1980	NP	Boat Survey	-	-	-	Aug27-Sept1	Sept. 16-17	Oct. 2	-	-	-
		SF		late Aug.	-	-	Sept. 5-8	Sept. 13	Sept. 20	-	-	-
		SF (Avg)		late Aug.	-	-	early Sept.	mid-Sept.	late Sept.	-	-	-
Nechako R.	1979	NP	Boat, Float, Aerial Surveys	-	-	Sept. 3	Sept. 12	Sept. 20	Oct. 1	Sept. 5	Oct. 4	Oct. 15
		SF		mid-Aug.	-	-	-	Sept. 8-22	-	-	-	-
		SF (Avg)		late Aug.	-	-	-	mid-Sept.	-	-	-	-
West Road (Blackwater) R.	1980	NP	Aerial Survey	early Aug.	late Aug.	mid-Sept.	-	before Sept9	-	-	-	Sept. 30
		SF		Aug. 1	-	-	Aug. 22	Aug. 31	Sept. 8	-	-	-
		SF (Avg)		early Aug.	-	-	mid Aug.	late Aug.	mid-Sept.	-	-	-
Nazko R.	1980	NP	Aerial Survey	early Aug.	late Aug.	mid-Sept.	-	before Aug29	-	-	-	Sept. 15
		SF	Included in West Road R.									
		SF (Avg)	Included in West Road R.									
Cottonwood R.	1980	NP	Aerial Survey	-	Sept. 1	-	-	Sept. 1	Sept. 7	-	-	Sept. 15
		SF		Aug. 5	-	-	Aug. 16	Aug. 25	Sept. 4	-	-	-
		SF (Avg)		early Aug.	-	-	late Aug.	late Aug.	early Sept.	-	-	-

COMPARISON OF CHINOOK TIMING DATA OBTAINED DURING NEW PROJECTS (NP) STUDIES WITH STREAM FILE (SF) INFORMATION

STREAM	YEAR	SOURCE	METHODS	IMMIGRATION START	IMMIGRATION PEAK	IMMIGRATION END	SPAWNING START	SPAWNING PEAK	SPAWNING END	DIE-OFF START	DIE-OFF PEAK	DIE-OFF END
FRASER R., N.B.C. and YUKON - Cont'd												
Horsefly R.	1979	NP	Boat, Float, Aerial Surveys	Aug. 9	-	-	Aug. 23	Sept. 2	Sept. 8	-	Sept. 14	Sept. 27
		SF		Aug. 11	-	-	Aug. 24	Sept. 2	Sept. 11	-	-	-
	1980	NP	Float, Aerial Surveys	July 18	Aug. 12	Aug. 23	Aug. 22	Sept. 1	Sept. 10	Sept. 7	Sept. 20	Sept. 30
		SF		Aug. 13	-	-	Aug. 20	Aug. 30	Sept. 8	-	-	-
		SF (Avg)		mid-Aug.	-	-	late Aug.	early Sept.	mid-Sept.	-	-	-
McKinley Ck.	1980	NP	Aerial Surveys	July 31	Aug. 12	Aug. 23	-	Sept. 1-10	-	Sept. 7	Sept. 20	Sept. 30
		SF	Included in Horsefly R.									
		SF (Avg)	Included in Horsefly R.									
Quesnel R.	1979	NP	Boat, Float, Aerial Surveys	-	-	Aug. 29	Sept. 20	Sept. 28	Oct. 10	Sept. 11	Oct. 10	Nov. 1
		SF		Aug. 18	-	-	Sept. 10	Sept. 29	Oct. 14	-	-	-
	1980	NP	Float & Aerial Surveys	Aug. 7	Sept. 7	Sept. 27	Aug. 26	Sept. 21	Oct. 10	Sept. 16	Oct. 2	Oct. 27
		SF		Aug. 16	-	-	Sept. 14	Sept. 28	Oct. 8	-	-	-
		SF (Avg)		early Sept.	-	-	mid-Sept.	early Oct.	mid-Oct.	-	-	-
Eagle R.	1981	NP	Float, Foot, Boat, Aerial Surveys	Aug. 17	Sept. 15	Sept. 20	Sept. 11	Sept. 18	Sept. 25	Sept. 16	Sept. 30	Oct. 3
		SF		Aug. 1	-	-	Sept. 5	Sept. 25	Oct.	-	-	-
		SF (Avg)		mid-Aug.	-	-	mid-Sept.	late Sept.	Oct.	-	-	-
Salmon R.	1981	NP	Float, Foot, Boat, Aerial Surveys	Aug. 10	Sept. 1	Sept. 11	Aug. 29	Sept. 10	Sept. 17	Sept. 10	Sept. 20	Sept. 25
		SF		July 15	-	-	Aug. 15	Sept. 15	Oct. 1	-	-	-
		SF (Avg)		mid-July	-	-	early Sept.	mid-Sept.	late Sept.	-	-	-
Adams R. (lower)	1981	NP	Float, Boat, Aerial, Foot Surveys	Sept. 10	Oct. 1	Oct. 7	Sept. 21	Oct. 6	Oct. 14	Sept. 30	Oct. 11	Oct.18
		SF		Sept. 10	-	-	Sept. 25	Oct. 10	Oct. 31	-	-	-
		SF (Avg)		mid-July	-	-	mid-Sept.	early Oct.	late Oct.	-	-	-

COMPARISON OF CHINOOK TIMING DATA OBTAINED DURING NEW PROJECTS (NP) STUDIES WITH STREAM FILE (SF) INFORMATION

STREAM	YEAR	SOURCE	METHODS	IMMIGRATION START	IMMIGRATION PEAK	IMMIGRATION END	SPAWNING START	SPAWNING PEAK	SPAWNING END	DIE-OFF START	DIE-OFF PEAK	DIE-OFF END
FRASER R., N.B.C. and YUKON - Cont'd												
South Thompson R.	1981	NP	Float, Boat, Aerial, Foot Surveys	Sept. 15	Oct. 4	Oct. 10	Sept. 17	Oct. 7	Oct. 16	Oct. 1	Oct. 14	Nov. 10
		SF		Aug.	-	-	Sept. 20	Oct. 10	Oct. 31	-	-	-
		SF (Avg)		Aug.	-	-	late Sept.	early Oct.	late Oct.	-	-	-
Finn Ck.	1981	NP	Foot, Fence Surveys	July 21	Aug. 4	Aug. 20	July 24	Aug. 8	Aug. 24	Aug. 4	Aug. 19	Sept. 1
		SF		July 22	-	-	July 30	Aug. 14	early Sept.	-	-	-
		SF (Avg)		late July	-	-	early Aug.	mid-Aug.	early Sept.	-	-	-
Raft R.	1981	NP	Float, Foot Surveys, Carcass Examination	Aug. 13	Sept. 2	Sept. 13	Aug. 23	Sept. 5	Sept. 19	Aug. 29	Sept. 12	Sept. 24
		SF		Aug. 14	-	-	late Aug.	early Sept.	mid-Sept.	-	-	-
		SF (Avg)		mid-Aug.	-	-	late Aug.	early Sept.	mid-Sept.	-	-	-
North Thompson R.	1981	NP	Foot Surveys, Carcass Examination	Aug. 22	Sept. 9	Sept. 24	Aug. 28	Sept. 15	Oct. 2	Sept. 2	Sept. 24	Oct. 10
		SF		late Aug.	-	-	early Sept.	mid-Sept.	late Sept.	-	-	-
		SF (Avg)		mid-Aug.	-	-	early Sept.	mid-Sept.	early Oct.	-	-	-

COMPARISON OF COHO TIMING DATA OBTAINED DURING NEW PROJECTS (NP) STUDIES WITH STREAM FILE (SF) INFORMATION

STREAM	YEAR	SOURCE	METHODS	IMMIGRATION START	IMMIGRATION PEAK	IMMIGRATION END	SPAWNING START	SPAWNING PEAK	SPAWNING END	DIE-OFF START	DIE-OFF PEAK	DIE-OFF END
NORTH COAST												
Mathers Ck.	1978	NP	Foot Surveys	before Sept12	-	-	Oct. 20	-	after Nov10	-	-	-
		SF		Aug. 27	-	-	Oct. 18	Nov. 8	-	-	-	-
	1979	NP	Float, Foot Surveys	before Sept12	Nov. 8	-	-	-	-	-	-	-
		SF		mid Sept.	-	-	early Oct.	-	Nov.	-	-	-
		SF (Avg)		mid Sept.	-	-	July	Aug.	Sept.	-	-	-
Kitlope R	1981	NP	Aerial, Boat, Foot Surveys	Aug. 26	-	-	late Oct.	early Nov.	mid-Dec.	-	-	-
		SF		Aug.	-	-	Sept.	Oct.	Nov.	-	-	-
		SF (Avg)		Aug.	-	-	Sept.	Oct.	early Nov.	-	-	-
Kwatna R.	1983	NP	Foot, Float, Boat, Helicopter	early Aug.	-	-	late Oct.	Nov.	Dec.	Nov.	Nov./Dec.	Dec./Jan.
		SF			-	-				-	-	-
		SF (Avg)		Aug.	-	-	Sept.	Oct.	Dec.	-	-	-
Nootum R.	1983	NP	Foot, Boat Helicopter	Aug.	-	-	Sept.	Oct.	Dec.	Nov.	Nov./Dec.	Dec./Jan.
		SF			-	-				-	-	-
		SF (Avg)			-	-				-	-	-
SOUTH COAST												
Kakweiken R.	1981	NP	Counting Fence	before July11	Aug. 19	Sept. 12	-	-	-	-	-	-
		SF		July		-	Sept.	Oct.	Dec.	-	-	-
		SF (Avg)		Aug.	-	-	Sept.	Oct.	Nov.	-	-	-
Glendale/ Tom Browne Cks.	1981	NP	Foot Surveys	Aug. 26	-	-	after Oct24	-	-	-	-	-
		SF			-	-				-	-	-
		SF (Avg)		late Aug.	-	-	Sept.	Oct.	Oct.	-	-	-
Mussel Ck.	1981	NP	Foot Surveys	Aug. 20	-	-	Oct. 20	Oct. 30	-	-	-	-
		SF	Included in Klinaklini River									
	1983	NP	Fence, Foot, Aerial Surveys	July 20	Aug. 20	Oct. 20	Oct. 15	Oct. 25	-	-	-	-
		SF	Included in Klinaklini River									
		SF (Avg)	Included in Klinaklini River									

COMPARISON OF COHO TIMING DATA OBTAINED DURING NEW PROJECTS (NP) STUDIES WITH STREAM FILE (SF) INFORMATION

STREAM	YEAR	SOURCE	METHODS	IMMIGRATION			SPAWNING			DIE-OFF		
				START	PEAK	END	START	PEAK	END	START	PEAK	END
SOUTH COAST - Cont'd												
Klinaklini R.	1983	NP	Foot and Aerial Surveys	Oct. 1	Oct. 8	Oct. 25	Oct. 15	Oct. 30	Nov. 15	Oct. 20	Nov. 10	Nov. 30
		SF			-	-				-	-	-
		SF (Avg)		June	-	-	Sept.	Nov.	Dec.	-	-	-
Ahnuhati R.	1981	NP	Foot Surveys	Aug. 28	-	-	after Oct26	-	-	-	-	-
		SF			-	-				-	-	-
	1983	NP	Foot & Aerial Surveys	Aug. 10-20	Oct. 5-10	Oct. 28	-	-	-	-	-	-
		SF			-	-				-	-	-
		SF (Avg)			-	-				-	-	-
Franklin R.	1981	NP	Foot Surveys	Oct. 29	-	-	-	-	-	-	-	-
		SF										
		SF (Avg)		Oct.	-	-	Nov.	Nov.	Dec.	-	-	-
Kwalate Ck.	1981	NP	Foot Surveys	before Aug28	-	-	after Oct23	-	-	-	-	-
		SF		Aug.	-	-	Aug.	Sept.	Oct.	-	-	-
		SF (Avg)		July	-	-	Sept.	Oct.	Nov.	-	-	-
Nitinat R.	1979	NP	Foot Surveys	Oct. 14	-	-	Nov. 11	Nov. 15-30	after Nov30	-	-	-
		SF		Oct.	-	-	Nov.	Dec.	Jan.	-	-	-
		SF (Avg)		Oct.	-	-	Oct.	Nov.	Dec.	-	-	-
FRASER R., N.B.C., and YUKON												
Eagle R. (Incl. South Pass Ck.)	1982	NP	Foot Surveys	before Oct20	-	-	Oct. 20-25	Nov. 1-10	Dec. 1-5	Oct. 25-28	Nov. 15-20	Dec. 5-10
		SF		Oct. 1	-	-	Oct. 20	Nov. 10	Dec.	-	-	-
		SF (Avg)		early Oct.	-	-	late Oct.	mid-Nov.	Dec.	-	-	-
Salmon R. (Incl. Bolean Ck.)	1982	NP	Foot Surveys	-	-	-	Oct. 20-25	Nov. 1-5	Nov. 25-30	Oct. 25-29	Nov. 15-20	Nov. 30
		SF		Sept. 20	-	-	Oct. 5	Nov. 1	Dec.	-	-	-
		SF (Avg)		mid-Oct.	-	-	late Oct.	early Nov.	late Nov.	-	-	-
Adams R. (lower) (Incl. Hiuihill, Nikwikwaia, Sinmax Cks.)	1982	NP	Foot & Aerial Surveys	-	-	-	Oct. 20-25	Nov. 1-15	Nov. 15-30	Oct. 27-30	Nov. 10-20	Nov. 25-30
		SF		Oct. 1	-	-	Nov. 1	Nov. 15	Nov. 30	-	-	-
		SF (Avg)		mid-Oct.	-	-	late Oct.	mid-Nov.	Dec.	-	-	-

COMPARISON OF COHO TIMING DATA OBTAINED DURING NEW PROJECTS (NP) STUDIES WITH STREAM FILE (SF) INFORMATION

STREAM	YEAR	SOURCE	METHODS	IMMIGRATION START	IMMIGRATION PEAK	IMMIGRATION END	SPAWNING START	SPAWNING PEAK	SPAWNING END	DIE-OFF START	DIE-OFF PEAK	DIE-OFF END
FRASER R., N.B.C., and YUKON - Cont'd												
Adams R. (upper) (Incl. Momich R., Cayenne Ck.)	1982	NP	Foot Surveys	-	-	-	Oct. 20-30	Nov. 1-5	Nov. 20-25	Nov. 1-5	Nov. 1-15	Nov. 20-30
		SF		early Nov.	-	-	mid-Nov.	late Nov.	-	-	-	-
		SF (Avg)		mid-late Oct.	-	-	early Nov.	mid-Nov.	late Nov.	-	-	-
Albreda R.	1982	NP	Foot Surveys	early Nov.	-	-	mid-Nov.	early Dec.	late Dec.	-	mid-late Dec.	-
		SF	Foot Surveys	mid Oct.	-	-	early Nov.	Nov. 20	early Dec.	-	-	-
		SF (Avg)		early Oct.	-	-	late Oct.	early Nov.	late Nov.	-	-	-
Blue R.	1982	NP	Foot Surveys	early-mid Nov	-	-	late Nov. - early Dec.	late Dec. - early Jan.	mid-Jan.	-	early mid-Jan.	-
		SF	Foot, Boat Survey	mid-Oct.	-	-	early Nov.	Nov. 20	early Dec.	-	-	-
		SF (Avg)		late Oct.	-	-	early Nov.	mid-Nov.	early Dec.	-	-	-
Lion Ck.	1982	NP	Foot Surveys	mid-Sept.	-	-	late Sept.	early-mid Nov.	mid-late Jan.	-	late Nov.	-
		SF	Foot Surveys	mid-Oct.	-	-	early Nov.	mid-Nov.	early Dec.	-	-	-
		SF (Avg)		mid-Oct.	-	-	late Oct.	mid-Nov.	late Nov.	-	-	-
Wire Cache Ck.	1982	NP	Foot Surveys	-	-	-	-	-	mid-Nov.	-	-	-
		SF	Foot Surveys	mid-Oct.	-	-	late Oct.	early Nov.	late Nov.	-	-	-
		SF (Avg)	no records previous to 1982									
Lemieux Ck.	1982	NP	Foot Surveys	mid-Oct. - late Nov.	-	-	mid-Nov. - mid-Dec.	late Nov. - early Dec.	late Dec.	-	mid-Dec.	-
		SF	Foot Surveys	late Oct.	-	-	early Nov.	Nov. 20	early Dec.	-	-	-
		SF (Avg)		late Oct.	-	-	mid-Nov.	late Nov.	mid-Dec.	-	-	-
Barriere R.	1982	NP	Foot Surveys	-	-	-	-	-	mid-Jan.	-	-	-
		SF	Foot Surveys	mid-Oct.	-	-	early Nov.	Nov. 20	early Dec.	-	-	-
		SF (Avg)		mid-Oct.	-	-	early Nov.	mid-Nov.	early Dec.	-	-	-
Louis Ck. (Incl. Christian Ck.)	1982	NP	Foot Surveys	late Aug.	-	-	-	mid-Nov.	-	-	-	-
		SF	Foot Surveys	early Oct.	-	-	late Oct.	early Nov.	late Nov.	-	-	-
		SF (Avg)		mid-Oct.	-	-	late Oct.	mid-Nov.	early Dec.	-	-	-
Coldwater R.	1982	NP	Foot Surveys	-	-	-	Oct. 20-30	Nov. 5-10	Nov. 25-30	Nov. 10-15	Nov. 15-25	Dec. 5
		SF		Oct.	-	-	Nov. 10	Nov20-Dec1	Dec.	-	-	-
		SF (Avg)		Oct.	-	-	late Oct.	mid-Nov.	late Nov.	-	-	-

COMPARISON OF CHUM TIMING DATA OBTAINED DURING NEW PROJECTS (NP) STUDIES WITH STREAM FILE (SF) INFORMATION

STREAM	YEAR	SOURCE	METHODS	IMMIGRATION START	IMMIGRATION PEAK	IMMIGRATION END	SPAWNING START	SPAWNING PEAK	SPAWNING END	DIE-OFF START	DIE-OFF PEAK	DIE-OFF END
NORTH COAST												
Mathers Ck.	1978	NP	Float, Foot Surveys	-	-	-	Sept. 22	Oct. 17-20	3rd week Oct	-	-	-
		SF		Sept. 15	-	-	Sept. 17	Oct. 15	Oct. 30	-	-	-
	1979	NP	Foot Surveys	Oct. 1	-	-	-	-	-	-	-	-
		SF		early Oct.	-	-	Oct.	late Oct.	early Nov.	-	-	-
		SF (Avg)		-	-	-	early Sept.	late Sept.	late Sept.	-	-	-
Kitlope R.	1981	NP	Aerial, Boat, Foot Surveys	-	-	-	mid-Aug.	-	-	-	-	late Sept.
		SF		mid-Aug.	-	-	late Aug.	early Sept.	mid-Sept.	-	-	-
		SF (Avg)			-	-				-	-	-
Gamsby R.	1981	NP	Aerial, Boat, Foot Surveys	-	-	-	early Aug.	early Sept.	mid-Sept.	mid-Aug.	mid-Sept.	late Sept.
		SF	Included in Kitlope R.									
		SF (Avg)	Included in Kitlope R.									
Kemano R.	1979	NP	Aerial, Foot Surveys	-	-	-	before Aug9	-	-	Aug. 16	Aug. 27 - Sept. 14	Sept. 25
		SF		late July	-	-	early Aug.	late Aug.	early Sept.	-	-	-
		SF (Avg)		late July	-	-	early Aug.	late Aug.	mid-Sept.	-	-	-
Kwatna R.	1983	NP	Foot, Float, Boat, Helicopter	mid July	-	-	early Aug.	late Aug.	early Oct,	mid Aug.	early Sept.	mid Oct.
		SF			-	-				-	-	-
		SF (Avg)		early Aug.	-	-	Aug.	Aug.	late Sept.	-	-	-
Quatlena R.	1983	NP	Foot, Helicopter	mid Aug.	-	-	late Aug.	mid Sept.	late Sept.	mid Sept.	late Sept.	mid Oct.
		SF			-	-				-	-	-
		SF (Avg)		Aug.	-	-	Aug.	Aug.	Sept.	-	-	-
Nootum R.	1983	NP	Foot, Boat, Helicopter	early Aug.	-	-	early Sept.	mid Sept.	late Sept.	mid Sept.	late Sept.	early Oct.
		SF			-	-				-	-	-
		SF (Avg)		Aug.	-	-	mid Aug.	late Aug.	Oct.	-	-	-
SOUTH COAST												
Kakweiken R.	1981	NP	Aerial, Foot Surveys	July 21	Aug. 25-28	-	-	-	-	-	-	-
		SF		Sept.	-	-	Sept.	Late Sept.	Oct.	-	-	-
		SF (Avg)			-	-				-	-	-

COMPARISON OF CHUM TIMING DATA OBTAINED DURING NEW PROJECTS (NP) STUDIES WITH STREAM FILE (SF) INFORMATION

STREAM	YEAR	SOURCE	METHODS	IMMIGRATION START	IMMIGRATION PEAK	IMMIGRATION END	SPAWNING START	SPAWNING PEAK	SPAWNING END	DIE-OFF START	DIE-OFF PEAK	DIE-OFF END
						SOUTH COAST - Cont'd						
Glendale/ Tom Browne Cks.	1981	NP	Foot Surveys	Sept. 20	-	-	Sept. 20	Oct. 15	Nov. 1	-	-	-
		SF			-	-				-	-	-
	1983	NP	Aerial, Foot Surveys	Sept. 5-10	Oct. 1-5	Oct. 15	Sept.10-15	Oct. 10-15	Nov. 1-5	Sept. 20	Oct. 25	Nov. 10-15
		SF										
		SF (Avg)		Sept.	-	-	Oct.	Oct.	Nov.	-	-	-
Mussel Ck.	1981	NP	Foot Surveys	Oct. 7	-	-	Oct. 7	Oct. 20	-	-	-	-
		SF	included in Klinaklini River									
	1983	NP	Foot Surveys	Oct. 7	-	-	Oct. 7	Oct. 20	-	-	-	-
		SF	included in Klinaklini River									
		SF (Avg)	included in Klinaklini River									
Klinaklini R.	1983	NP	Aerial & Foot Surveys	Sept. 20-25	-	-	Oct. 1-15	Nov. 1-5	-	-	-	-
		SF			-	-				-	-	-
		SF (Avg)		Sept.	-	-	Oct.	Nov.	Nov.	-	-	-
Ahnuhati R.	1981	NP	Foot Surveys	July 23	-	-	July 28	Aug. 3	Sept. 15	-	-	after mid-Oct.
		SF			-	-				-	-	-
	1983	NP	Aerial, Foot Surveys	July 20-25	Aug. 10-15	Aug. 20	Aug. 1	Aug. 20-22	Sept. 10	Aug. 12	Sept. 2-5	Sept. 23
		SF			-	-				-	-	-
		SF (Avg)			-	-				-	-	-
Sucwoa R.	1978	NP	Foot Surveys	-	-	-	Sept. 24	Oct. 13	Nov. 6	Oct. 3	Oct. 22	Nov. 15
		SF	no report									
		SF (Avg)		-	-	-	Sept.	Oct.	Nov.	-	-	-
Canton Ck.	1978	NP	Foot Surveys	-	-	-	Sept. 24	Oct. 13	Oct. 30	Oct. 3	Oct. 22	Nov. 8
		SF		Sept.	-	-	Sept.	Oct.	Nov.	-	-	-
		SF (Avg)		Sept.	-	-	Sept.	late Oct.	late Nov.	-	-	-
Conuma R.	1978	NP	Foot Surveys	-	-	-	Sept. 7	Oct. 5	Oct. 26	Sept. 20	Oct. 18	Nov. 8
		SF		Sept.	-	-	Sept.	Sept.	-	-	-	-
		SF (Avg)		Sept.	-	-	Oct.	Nov.	Dec.	-	-	-
Tlupana R.	1978	NP	Foot Surveys	-	-	-	Sept. 16	Oct. 5	Oct. 15	Sept. 25	Oct. 14	Oct. 24
		SF		Sept.	-	-	Sept.	Oct.	Nov. 30	-	-	-
		SF (Avg)		Sept.	-	-	Sept.	Oct.	Nov.	-	-	-

COMPARISON OF CHUM TIMING DATA OBTAINED DURING NEW PROJECTS (NP) STUDIES WITH STREAM FILE (SF) INFORMATION

STREAM	YEAR	SOURCE	METHODS	IMMIGRATION START	IMMIGRATION PEAK	IMMIGRATION END	SPAWNING START	SPAWNING PEAK	SPAWNING END	DIE-OFF START	DIE-OFF PEAK	DIE-OFF END
						SOUTH COAST - Cont'd						
Deserted Ck	1978	NP	Foot surveys	-	-	-	Sept. 30	Oct. 27	late Nov.	Oct. 9	Nov. 5	early Dec.
		SF		Sept.	-	-	Sept.	Oct. 26	Nov. 30	-	-	-
		SF (Avg)		Sept.	-	-	Sept.	Oct.	Nov.	-	-	-
Nitinat R.	1979	NP	Foot Surveys	-	-	-	Sept. 26	Oct28-Nov20	Nov. 27	-	-	-
		SF		Oct. 15	-	-	Oct. 31	Nov.	Nov.	-	-	-
		SF (Avg)		early Oct.	-	-	mid-Oct.	early Nov.	Nov.	-	-	-
Little Qualicum R.	1978	NP	Fence, Foot Surveys	-	late Oct. - mid-Nov.	-	early Nov.	Nov. 4-21	late Dec.	-	-	-
		SF		Aug.	-	-	Sept.	Oct.	Dec.	-	-	-
		SF (Avg)		early Oct.	-	-	Oct.	Nov.	late Dec.	-	-	-

COMPARISON OF SOCKEYE TIMING DATA OBTAINED DURING NEW PROJECTS (NP) STUDIES WITH STREAM FILE (SF) INFORMATION

STREAM	YEAR	SOURCE	METHODS	IMMIGRATION			SPAWNING			DIE-OFF		
				START	PEAK	END	START	PEAK	END	START	PEAK	END
NORTH COAST												
Tezwa R.	1981	NP	Aerial, Boat, Foot Surveys	before July18	-	-	Aug. 15	early Sept.	late Sept.	Aug. 20	mid-Sept.	early Oct.
		SF	Included in Kitlope R.									
		SF (Avg)	Included in Kitlope R.									
Kalitan Ck.	1981	NP	Aerial, Boat, Foot Surveys	before July18	-	-	Aug. 15	early Sept.	late Sept.	Aug. 20	mid-Sept.	early Oct.
		SF	Included in Kitlope R.									
		SF (Avg)	Included in Kitlope R.									
Kwatna R.	1983	NP	Foot, Float, Boat, Helicopter	mid Aug.	-	-	mid Sept.	early Oct.	mid Oct.	late Sept.	mid Oct.	late Oct.
		SF			-	-				-	-	-
		SF (Avg)		-	-	-	-	-	-	-	-	-
SOUTH COAST												
Kakweiken R.	1981	NP	Fishway Surveys	July 15	July 27	Aug. 29	-	-	-	-	-	-
		SF		July	-	-	Aug.	Sept.	Oct.	-	-	-
		SF (Avg)		July	-	-	Sept.	late Sept.	-	-	-	-
Glendale/ Tom Browne Cks.	1981	NP	Foot Surveys	-	-	-	-	-	Oct. 3	-	-	-
		SF			-	-				-	-	-
		SF (Avg)		Aug.	-	-	Sept.	-	-	-	-	-
Mussel Ck.	1981	NP	Foot Surveys	Sept. 1	-	-	Sept. 30	-	-	-	-	-
		SF	Included in Klinaklini River									
	1983	NP	Fence, Aerial, Foot Surveys	Aug. 22	Sept. 10	-	Sept. 18	Sept. 28	-	-	-	-
		SF	Included in Klinaklini River									
		SF (Avg)	Included in Klinaklini River									
Klinaklini R.	1983	NP	Aerial, Foot Surveys	-	-	-	-	Oct. 1-5	-	-	-	-
		SF			-	-				-	-	-
		SF (Avg)		Aug.	-	-	Sept.	Oct.	Oct.	-	-	-
Ahnuhati R.	1981	NP	Foot Surveys	Sept. 16	-	-	Sept. 8	-	-	-	-	-
		SF			-	-				-	-	-
		SF (Avg)			-	-				-	-	-

COMPARISON OF SOCKEYE TIMING DATA OBTAINED DURING NEW PROJECTS (NP) STUDIES WITH STREAM FILE (SF) INFORMATION

STREAM	YEAR	SOURCE	METHODS	IMMIGRATION START	IMMIGRATION PEAK	IMMIGRATION END	SPAWNING START	SPAWNING PEAK	SPAWNING END	DIE-OFF START	DIE-OFF PEAK	DIE-OFF END
SOUTH COAST - Cont'd												
Nitinat R.	1979	NP	Foot Surveys	Sept. 9-15	-	Nov. 4-10	-	-	-	-	-	-
		SF	no reports									
		SF (Avg)	no reports									
FRASER R., N.B.C. and YUKON												
Bowron R.	1980	NP	Foot Surveys	July 31	-	Aug. 25	-	-	-	-	-	-
		SF		Aug. 3	-	-	Aug. 22	Sept. 1	Sept. 15	-	-	-
		SF (Avg)		early Aug.	-	-	mid-Aug.	late Aug.	early Sept.	-	-	-
Nechako R. (incl. tribs.)	1979	NP	Foot Surveys	-	early Sept.	-	-	-	-	-	-	-
		SF	no reports									
		SF (Avg)	no reports									
Adams R. (lower)	1981	NP	Foot Surveys	before Sept23	-	-	Sept. 25	-	-	Oct. 2	-	-
		SF		Sept. 15	-	-	Oct. 1	Oct. 20	Oct. 31	-	-	-
		SF (Avg)		mid-Sept.			early Oct.	late Oct.	Nov.	-	-	-
South Thompson R.	1981	NP	Foot Surveys	Aug. 29	-	-	Oct. 1	-	-	Oct. 10	-	late Nov.
	*	SF			-	-				-	-	-
		SF (Avg)		Sept.	-	-	early Oct.	mid-Oct.	Nov.	-	-	-
Finn Ck.	1981	NP	Foot Surveys	-	-	-	Aug. 28	-	-	-	-	-
		SF		-	-	-	-	late Aug.	early Sept.	-	-	-
		SF (Avg)	no reports									
Raft R.	1981	NP	Foot Surveys	Aug. 21	Aug. 22	Sept. 13	Aug. 23	-	-	Aug. 22	-	-
		SF		mid-Aug.	-	-	late Aug.	early Sept.	mid-Sept.	-	-	-
		SF (Avg)		mid-Aug.	-	-	late Aug.	early Sept.	mid-Sept.	-	-	-
North Thompson R.	1981	NP	Foot Surveys	Sept. 23	-	-	-	late Sept.	after Oct.5	-	-	-
		SF		mid-Aug.	-	-	late Aug.	early Sept.	late Sept.	-	-	-
		SF (Avg)		mid-Aug.	-	-	early Sept.	mid-Sept.	early Oct.	-	-	-

* Spawning file report gives an escapement but no timing data.

COMPARISON OF PINK TIMING DATA OBTAINED DURING NEW PROJECTS (NP) STUDIES WITH STREAM FILE (SF) INFORMATION

STREAM	YEAR	SOURCE	METHODS	IMMIGRATION START	IMMIGRATION PEAK	IMMIGRATION END	SPAWNING START	SPAWNING PEAK	SPAWNING END	DIE-OFF START	DIE-OFF PEAK	DIE-OFF END
NORTH COAST												
Mathers Ck.	1978	NP	Float, Foot Surveys	before Sept. 8	-	-	before Sept. 8	last week Sept.	Oct. 22	Sept. 13	-	-
		SF		Aug. 29	-	-	Sept. 14	Sept. 25	Oct. 30	-	-	-
	1979	NP	Float, Foot Surveys	-	-	-	mid-Sept.	-	mid-Oct.	-	-	-
		SF*		-	-	-	-	-	-	-	-	-
		SF (Avg.)		-	-	-	early Oct.	mid-Oct.	late Oct.	-	-	-
Kitlope R.	1981	NP	Aerial, Boat, Foot Surveys	early Aug.	-	-	mid-Aug.	early Sept.	late Sept.	-	-	-
		SF		mid-Aug.	-	-	late Aug.	early Sept.	mid-Sept.	-	-	-
		SF (Avg.)		July	-	-	Aug.	early Sept.	late Sept.	-	-	-
Kwatna R.	1983	NP	Foot, Float, Boat, Helicopter	late July	-	-	mid Aug.	mid Sept.	early Oct.	late Aug.	late Sept.	mid Oct.
		SF			-	-				-	-	-
		SF (Avg.)		Aug.	-	-	Aug.	early Sept.	Oct.	-	-	-
Quatlena R.	1983	NP	Foot, Helicopter	early Aug.	-	-	early Sept.	mid Sept.	mid Oct.	early Sept.	late Sept.	mid Oct.
		SF			-	-				-	-	-
		SF (Avg.)		Aug.	-	-	Aug.	Aug.	Sept.	-	-	-
Nootum R.	1983	NP	Foot, Boat, Helicopter	early Aug.	-	-	late Aug.	mid Sept.	late Sept.	mid Sept.	late Sept.	early Oct.
		SF			-	-				-	-	-
		SF (Avg.)		Aug.	-	-	Sept.	Sept.	Oct.	-	-	-
SOUTH COAST												
Kakweiken R.	1981	NP	Fishway Survey	July 15	Aug. 13	after Sept11	-	-	-	-	-	-
		SF		July	-	-	Aug.	Sept.	Oct.	-	-	-
		SF (Avg)		Aug.	-	-	Sept.	Sept.	Oct.	-	-	-
Glendale/ Tom Browne Cks.	1981	NP	Aerial, Foot Surveys	July 24	-	-	Sept. 7	Sept. 26	Oct. 24	-	-	-
		SF			-	-				-	-	-
	1983	NP	Aerial, Foot Surveys	July 20-25	Sept. 20	Oct. 10-15	Aug. 20-25	Sept30-Oct5	Nov. 5	Aug. 20	Oct. 15-25	Nov. 15
		SF			-	-				-	-	-
		SF (Avg)			-	-				-	-	-

* no Information

COMPARISON OF PINK TIMING DATA OBTAINED DURING NEW PROJECTS (NP) STUDIES WITH STREAM FILE (SF) INFORMATION

STREAM	YEAR	SOURCE	METHODS	IMMIGRATION START	IMMIGRATION PEAK	IMMIGRATION END	SPAWNING START	SPAWNING PEAK	SPAWNING END	DIE-OFF START	DIE-OFF PEAK	DIE-OFF END
Mussel Ck.	1981	NP	Aerial, Foot Surveys	Aug. 29	-	-	Sept. 15	Sept. 15	Oct. 15	-	-	-
		SF	— Included in Klinaklini River —									
	1983	NP	Fence, Foot, Aerial Surveys	Aug. 19	Aug. 25	-	Aug. 25	Sept. 15	-	Sept. 7	-	Sept. 29
		SF	— Included in Klinaklini River —									
		SF (Avg)	— Included in Klinaklini River —									
Ahnuhati R.	1981	NP	Aerial, Foot Surveys	July 23	-	-	Aug. 30	Sept. 1-7	Oct. 1	-	-	-
		SF			-	-				-	-	-
	1983	NP	Aerial, Foot Surveys	Aug. 1	Aug. 25	Aug. 31	Aug. 15	Sept. 2-5	Oct. 1	Aug. 29	Sept. 22	Oct. 15
		SF			-	-				-	-	-
		SF (Avg)		July	-	-	Aug.	Sept.	Oct.	-	-	-
Sucwoa R.	1978	NP	Foot Surveys	-	-	-	early Sept.	-	-	-	-	-
		SF			-	-				-	-	-
		SF (Avg)		Aug.	-	-	Sept.	Sept.	Oct.	-	-	-
FRASER R., N.B.C. and YUKON												
Adams R. (lower)	1981	NP	Foot Surveys	Oct. 2	-	-	-	-	-	-	-	-
		SF		Sept. 25	-	-	Oct. 1	Oct. 1	Oct. 31	-	-	-
		SF (Avg)		late Sept.	-	-	early Oct.	early Oct.	mid-Oct.	-	-	-
South Thompson R.	1981	NP	Foot Surveys	-	-	-	Oct. 1	-	-	Oct. 1	-	mid-Oct.
		SF*		-	-	-		-	-	-	-	-
		SF (Avg)		Sept.	-	-	Oct.	early Oct.	Oct.	-	-	-
North Thompson R.	1981	NP	Foot Surveys	-	-	-	before Sept. 26	-	-	-	-	Oct. 5
		SF			-	-				-	-	-
		SF (Avg)	— no reports —									

* no information - escapement given but no timing data.

- As with spawning escapement estimates, timing estimates provided by fishery officers are often based on limited observations, ie field excursions are generally planned for the dates when it is believed that, (1) immigration will be starting, (2) spawning will be starting (3) spawning activity will be peaking, and (4) spawning and die-off will be complete, or nearly so.

- Often the NP vs. SF information is in agreement but NP start and end run timing dates are, respectively, prior to and after those indicated by SF information, in many cases. This may be a reflection of the grater effort made by personnel gathering NP data. Unfortuately, the greatest drawback to the NP data is that project initiation and termination dates usually fall well within the boundaries of run timing, resulting in little concrete data being presented on the initial immigration or final die-off periods.

- NP timing data is usually more specific than that given by Stream file (Spawning Ground) Reports.

- SF (avg) indicates average run timing for previous ten years.

APPENDIX C-2

SPAWNER DISTRIBUTIONS

This section contains subjective notes on the habitat type, river location and degree of concentration for actual and potential spawning and holding areas. The "methods" column refers to methods of observing fish and habitat, rather than methods for determining fish distribution (eg. tag and recovery methods). All kilometer values denote distances above the stream mouth unless otherwise indicated.

CHINOOK SPAWNER DISTRIBUTIONS

STREAM	YEAR	SOURCE	METHODS	PARTICULARS OF HOLDING AND SPAWNING
			NORTH COAST - Cont'd	
Kowesas R.	1981	Rosberg et al, 1982	Helicopter & Fixed-Wing Overflights, Boat & Foot Surveys	Holding was documented some 27 km from the mouth. The high turbidity and presence of extensive logjams in this stream are believed to provide suitable conditions for holding salmon. Spawning, while not observed during the course of of the survey, was assessed as having limited potential.
Tsaytis R.	1981	Rosberg et al, 1982	Helicopter & Fixed-Wing Overflights, Boat & Foot Surveys	Holding fish were sighted only at approx. kilometer 5 and no spawning activity was observed. Shifting bed materials likely limit spawning potential, which exists only in reaches 2 and 5.
Kwatna	1983	Rice, 1984	Foot, Float, Boat Helicopter Surveys	All six fish observed were located about 22 km upstream from the mouth. Unused, but potential areas exist at about km 16, between km 28.2 and 30.0 and in several tributary streams. Holding areas were not documented.
			SOUTH COAST	
Kakweiken R.	1981	Slaney and Milko, 1982	Float and Foot Surveys	Holding fish were observed in deep pools at approx. 3 km from the mouth. Information on spawning distribution is lacking.
Mussel Ck.	1981	Fielden and Slaney, 1982	Float, Foot and Aerial Surveys	Holding fish primarily utilized pool habitat in the lower 4 km of this stream and between kilometers 5 and 7. Spawning was most concentrated between kilometers 6 and 7, while activity was observed to a lesser degree between kilometers 3 and 6.
	1983	Whelen and Morgan, 1984	Foot and Aerial Surveys	Fish held in shallow pools throughout the stream and major holding pools were located at approx. 0.5, 1.5 and 5.5 km from the mouth. Ninety-five percent of the population spawned between km 1.5 and 6.0, while the greatest densities were recorded between kms 1.5 and 2.5.
Kilnaklini R.	1983	Whelen and Morgan, 1984	Foot and Aerial Surveys	Holding fish were not reported in the mainstem. Spawning activity also appeared to be absent from the mainstem but was observed in the lower 1.5 km of Link Channel and the lower 1.0 km of Dice Creek, both located on the west side of the river above the Mussel Creek confluence.
Ahnuhati R.	1981	Fielden and Slaney, 1982	Float, Foot and Aerial Surveys	Scattered holding was observed throughout the lower 3 km of stream. Spawning activity was low and limited to the area between kilometers 7 and 10.5. Holding fish were also seen in this area.
	1983	Whelen and Morgan, 1984	Foot and Aerial Surveys	Holding fish were reported in pools between 7 and 10.5 km from the mouth. In addition, 45% of the population spawned in this section. Lesser concentrations of spawners were also seen between approx. 2 and 6 km.

CHINOOK SPAWNER DISTRIBUTIONS

STREAM	YEAR	SOURCE	METHODS	PARTICULARS OF HOLDING AND SPAWNING
			NORTH COAST	
Morice R.	1978	Smith and Berezay, 1983	Helicopter Overflights	Scattered to heavy spawning activity occurred throughout the mainstem between the Morice/Bulkley confluence and Morice Lake. Spawner density increased with distance upstream from the river mouth. The greatest proportion of spawners (48% of the population) was observed in a 3.2 kilometer section immediately below the Morice Lake outlet.
	1979	Smith and Berezay, 1983	Boat Survey	Spawner distribution was similar to that observed in 1978 and an even greater proportion of the spawning population, approx. 80%, utilized the 3.2 km long stretch of river below the Morice Lake outlet. The 3 holding areas were island perimeters in reach 8, 8.2 km downstream from Morice Lake and near the Gosnell Creek mouth.
	1980	Smith and Berezay, 1983	Helicopter Overflights	Between 13 and 22% of the total escapement spawned between Lamprey and Owen Creeks; no other information on spawning was given and holding areas were not documented.
Kitlope R.	1981	Rosberg et al, 1982	Helicopter & Fixed-Wing Overflight & Boat & Foot Surveys	Spawners were distributed roughly between 12 and 45 km upstream from the mouth, while the greatest activity was reported at the outlet of Kitlope Lake (at the junction of the Kitlope River). Both holding activity and suitability were rated as low.
Gamsby R.	1981	Rosberg et al, 1982	Helicopter & Fixed-Wing Overflight & Boat & Foot Surveys	Holding areas are limited and only 1 location, approx. 3.5 Km upstream from the mouth, was utilized. Spawning activity was low or scattered to ~ 8 km. and nil upstream of this point. Spawning potential ranges from scattered to moderate between roughly 20 and 30 km above the mouth.
Tezwa R.	1981	Rosberg et al, 1982	Helicopter and Fixed-Wing Overflights, Boat & Foot Surveys	Holding locations were not noted and spawning areas located between approx. 13 and 15 km from the mouth were utilized only sparsely.
Kalltan Ck.	1981	Rosberg et al, 1982	Helicopter & Fixed-Wing Overflights, Boat & Foot Surveys	Holding areas were described as abundant but area-specific descriptions were not discussed for individual species. Overall spawning potential was assessed as moderate between the mouth and approx. 10 km but actual utilization was low and restricted to an area approx. 8 km upstream from the mouth. Some limited spawning potential exists as far upstream as kilometer 14.

CHINOOK SPAWNER DISTRIBUTIONS

STREAM	YEAR	SOURCE	METHODS	PARTICULARS OF HOLDING AND SPAWNING
			SOUTH COAST - Cont'd	
Sucwoa R.	1978	Glova and McCart, 1979	Foot Surveys	Localized spawning was observed in relatively fast flows and coarse substrates between 1.0 and 2.5 km from the mouth.
Canton Ck.	1978	Glova and McCart, 1979	NA*	Chinook spawning activity, while not noted, was probable between kms 3.5 and 3.8, immediately below the canyon.
Conuma R.	1978	Glova and McCart, 1979	NA	It was believed that spawning occurred prior to survey initiation.
Nitinat R.	1979	McCart et al, 1980	Boat Surveys	Spawning was noted throughout the study area, from the river outlet into Nitinat Lake upstream to just past Parker Creek. The largest proportion of spawners were located upstream of the confluence with the Little Nitinat River, between kms 4.8 and 5.0.
Little Qualicum R.	1978	Lister, 1979	Foot Surveys	All spawning was observed in the upper portion of the survey area, between 6.5 and 9.5 kilometers from the mouth.
			FRASER R., N.B.C., and YUKON	
Holmes R.	1981	Rosberg and Aitken, 1982	Boat, Float, Foot and Helicopter Surveys	Suitable holding areas were found in an area below km 21 and near the mouth as well as under logjams scattered throughout the lower reaches; site-specific details on the distribution of holding salmon were not given. The bulk of spawning activity occurred between kms. 4 and 5.5, although this was rated as low and underutilized.
Morkill R.	1981	Rosberg and Aitken, 1982	Helicopter Survey	It is believed that adults first hold in the Upper Fraser mainstem and subsequently enter this stream just prior to spawning, due to the general lack of suitable holding areas in the Morkill. Spawning was restricted to an area located at km 18.0, and immediately above the Hellroaring Creek outlet. The highest potential for spawning (rated as moderate) exists between kms 17 and 20, while scattered spawning potential occurs between kms 11.5 and 14.
Torpy R.	1981	Rosberg and Aitken, 1982	Foot and Helicopter Surveys	One large pool, located 34 km above the mouth, was utilized for holding, otherwise, stream features generally do not lend themselves well to such activity. Spawning was most concentrated between kms 54 and 72; actual and potential use of this area was rated as low-medium and medium, respectively. Observed and potential utilization for areas further downstream was rated from nil to scattered, while the area above km 86 was rated as having medium potential although passage is currently blocked at approx. 80 km. Presently, spawning occurs to km 75.

* - Not applicable.

CHINOOK SPAWNER DISTRIBUTIONS

STREAM	YEAR	SOURCE	METHODS	PARTICULARS OF HOLDING AND SPAWNING
			FRASER R., N.B.C. and YUKON - Cont'd	
West Torpy R.	1981	Rosberg and Aitken, 1982	Foot and Helicopter Surveys	No suitable areas for holding exist in this stream. Spawner distribution was scattered from the Torpy River confluence to km. 9.5 and nil above this point. Overall spawning potential is low.
Walker Ck.	1981	Rosberg and Aitken, 1982	Foot and Helicopter Surveys	Suitable areas for holding were observed but holding fish were no longer present by survey commencement. Both observed and potential spawning was highest in the lower 6.5 kilometers of stream. The remaining activity was confined to an area between kms. 7.0 and 8.5.
Slim Ck.	1980	Murray et al, 1981	Boat, Helicopter and Foot Surveys	Spawning concentrations were greatest immediately below Tumuch Lake, between kms 37 and 38, and below Slim Lake, between kms 31 and 32.5. Over 60% of the total population spawned in this latter section. Lesser concentrations of spawning fish were observed throughout the remainder of the area surveyed, between km 43 and the mouth.
	1981	Rosberg and Aitken, 1982	Canoe, Foot, Helicopter Surveys	Major holding areas are located between kms 14 and 15 as well as 100 m downstream from the mouth of Everett Creek. Both potential and actual spawner utilization were greatest between kms 32 and 33, and use was likely at or near capacity. Lower concentrations of spawners were scattered below this point to km 16 and above to km. 47.
Bowron R.	1980	Murray et al, 1981	Boat, Helicopter and Foot Surveys	Spawning was observed in all surveyed sections of the river between approx. 110 and 143 km upstream of the mouth. Primary concentrations occurred between kms. 118.5 and 123.5 and kms. 133 and 137.
Willow R. and Wansa Ck.	1980	Murray et al, 1981	Boat, Helicopter and Foot Surveys	About 80% of the population spawned between kms. 20 and 30.5 in the mainstem, while 73% of the Wansa Ck. population spawned between kms. 11 and 12.5 of that stream. Scattered spawning was also present over a 6.5 km area immediately below Wansa Lake.
Stuart R.	1980	Hickey and Lister, 1981	Helicopter and Boat Surveys	The majority of spawners (73.2%) were concentrated along a 1 km section of the mainstem immediately downstream from Dog Creek. Only 3% of the population spawned between the Stuart Lake outlet and the upper end of the canyon. Only scattered spawning was observed throughout the remainder of the river.

CHINOOK SPAWNER DISTRIBUTIONS

STREAM	YEAR	SOURCE	METHODS	PARTICULARS OF HOLDING AND SPAWNING
				FRASER R., N.B.C. and YUKON - Cont'd
Nechako R.	1979	Olmsted et al, 1980	Float, Boat, Helicopter Surveys	Holding pools were located at 2.7, 14.6, 58.8, 83.7, 85.3 and 91.7 kms upstream from Vanderhoof. Although spawning occurred through much of the area surveyed, between Vanderhoof and Cheslatta Falls, some 50% of the total escapement spawned over a 7.5 km long section, beginning 5.8 km downstream of Cheslatta Falls. Superimposition of redds was noted in this section.
Blackwater R.	1980	Olmsted et al, 1981	Helicopter Survey	Spawning occurred primarily in shallow riffles between the confluences with the Nazko and Euchiniko Rivers. Below the Euchiniko River spawning activity was very limited.
Nazko R.	1980	Olmsted et al, 1981	Helicopter Survey	Primary concentrations of spawning chinook were found in a series of riffles 5km below the Chisbako River confluence and at a point 1 km. upstream of the Nazko River bridge. These two areas were well-utilized by spawners, whereas the remainder of the river contained only very limited activity.
Cottonwood R.	1980	Olmsted et al, 1981	Helicopter Survey	The majority of the spawning effort occurred between the confluences of Victoria and Soverign Creeks. Much of the remaining effort was concentrated about 3 km downstream from the Sovereign Creek Outlet.
Horsefly R.	1979	Olmsted et al, 1980	Foot, Float, Helicopter Surveys	Several holding areas were identified between the McKinley Creek confluence and a point approx. 1 km downstream from Tisdall Creek. Intensive spawning activity (87%) was documented from approx. 1.5 km below McKinley Creek to approx. 0.75 km above. The remaining 13% of the population spawned below this section over a 2 km area.
	1980	Olmsted et al, 1981	Foot, Float, Helicopter Surveys	Holding pools were scattered between the McKinley Creek confluence and a point approx. 0.5 km downstream from Tisdall Creek. The major spawning area occurred just below the McKinley Creek confluence over a 1.5 km stretch of river. Spawning activity over the rest of the study area, from below Horsefly River Falls to just below Tisdall Creek, was fairly even.
McKinley Ck.	1980	Olmsted et al, 1981	Foot and Helicopter Surveys	An estimated 97% of the population spawned from the Horsefly River confluence to a point approx. 2.5 km upstream.
Quesnel R.	1979	Olmsted et al, 1980	Foot, Float, Boat, Helicopter Surveys	Pools suitable for holding occurred, approximately, at 2.5, 3.0, 4.5 and 8.0 km downstream from the outlet of Quesnel Lake. Spawning was concentrated near the lake outlet and between 3 and 4 km downstream.
	1980	Olmsted et al, 1981	Foot, Float, Helicopter Surveys	Holding pools were identified in several locations between the Quesnel Lake outlet and a point 5.8 km downstream, the most suitable of these were between 1.3 and 3.7 km downstream from Quesnel Lake. Spawning effort was highest between the confluence with the Cariboo River and Lawless Creek and over a 1.2 km area beginning 2.0 km downstream of Quesnel Lake. Although the section between Lawless Creek and the Cariboo River contained over 23% of the estimated escapement, spawner density was very low, due to optimal gravel conditions throughout. Other areas, while containing low numbers of spawners, had greater utilization of suitable substrates as these were generally lacking.

CHINOOK SPAWNER DISTRIBUTIONS

STREAM	YEAR	SOURCE	METHODS	PARTICULARS OF HOLDING AND SPAWNING
				FRASER R., N.B.C. and YUKON - Cont'd
Eagle R.	1981	Whelen and Olmsted, 1982	Foot, Float, Boat, Helicopter Surveys	Three major holding pools occurred 4.5 to 5.5 km upstream from the Perry River confluence, while other holding locations were situated at 0.7, 1.1, 7.3 and 8.1 kms upstream from the Perry River confluence. An estimated 67% of the population spawned from the Griffin Lake outlet to Tumbler Creek. Most of the remaining activity was confined to the section between Kay Falls and the Perry River.
Salmon R.	1981	Whelen and Olmsted, 1982	Foot, Float, Helicopter Surveys	Holding fish were most concentrated in pools and under logjams from Glenemma to about 5 kms above Falkland. Spawning activity was greatest over a 2.5 km section above Glenemma and a 4 km section above Falkland. Spawning was observed as far downriver as 2.5 km below Silver Creek. Redd superimposition was evident in areas with the greatest spawner densities.
Adams R. (lower)	1981	Whelen and Olmsted, 1982	Foot, Float, Boat, Helicopter Surveys	An area of Shuswap Lake near the river mouth and between km 1.1 of the mainstem and Adams Lake were utilized by holding fish. Spawning effort was highest between km 2 and Adams Lake, where approx. 83% of the population reproduced. The balance of the fish spawned below this area. No use was made of the 3 tributary streams.
South Thompson R.	1981	Whelen and Olmsted, 1982	Foot, Float, Boat, Helicopter Surveys	Deep pools in the mainstem between Pritchard and a point just downstream of the Little Shuswap Lake outlet were preferred holding areas, while holding fish were also observed in similar habitat in the Little River. Spawning activity was concentrated between Little Shuswap Lake outlet and a point 2.5 km downstream; some 58% of the population reproduced in this section. The areas adjacent to Campbell and Monte Creeks were also well-utilized and contained approx. 4% and approx. 9% of the total escapement, respectively. Spawning was scattered and occasionally intense in localized areas of the remainder of the area surveyed.
Finn Ck.	1981	Scott et al, 1982	Foot Surveys	Pools in the lower 1.8 km of this stream were utilized by spawning chinook, while spawning was conducted over the lower 3.9 km, the area between kms 1.6 and 2.3 receiving the most intensive use.
Raft R.	1981	Scott et al, 1982	Foot and Float Surveys	Holding fish were observed in pools along the lower 3 km of the river. Eighty-seven percent of the river escapement spawned between kms 1.1 and 3, while the remainder spawned upstream to km 3.4 and downstream to the mouth. In the areas of highest spawning intensity, concurrent spawning by sockeye may have resulted in some displacement and redd superimposition.
North Thompson R.	1981	Scott et al, 1982	Foot and Helicopter Surveys	Holding, although not observed, was believed to have occurred in slow runs between Little Fort and Clearwater. Spawner densities were highest between 6.2 and 17.9 kilometers upstream of Little Fort. Roughly 88% of the total population spawned in this section. Moderate activity was also noted over a 1 km area just downriver from Little Fort.

COHO SPAWNER DISTRIBUTIONS

STREAM	YEAR	SOURCE	METHODS	PARTICULARS OF HOLDING AND SPAWNING
				NORTH COAST
Mathers Ck. (incl. tribs)	1978	Glova et al, 1979	Foot and Float Surveys	Large groups of holding fish were observed in pools from 0.4 to 2.0 kms and 4.5 to 8.4 kms from the mouth. Spawning coho were sighted in an area approx. 8.4 km from the mouth, in Fukawa Creek between 0.9 and 2.0 kms upstream from its confluence with Mathers Creek, and in the major tributary at the south end of Mathers Lake.
	1979	Grant and McCart, 1980	Foot, Float and Helicopter Surveys	Holding fish were concentrated in the area immediately below the lake outlet. Limited spawning was also observed near the lake outlet and in the main tributary at the south end of the lake.
Kitlope R.	1981	Rosberg et al, 1982	Foot, Boat and Aerial Surveys	Holding activity was not documented and only limited spawning information was gathered. Site specific details were not given.
Gamsby R.	1981	Rosberg et al, 1982	Foot, Boat and Aerial Surveys	The heaviest spawning activity was found below km 8.4 and no spawning was evident above km 12.5.
Tezwa R.	1981	Rosberg et al, 1982	Foot, Boat and Aerial Surveys	Only limited information on spawner distribution was collected. Areas located between approx. 11.6-17.4 km and 29.4-39.3 km from the mouth were identified as having medium or better spawning potential. However, rapid fluctuations in water levels may impede egg survival.
Kawesas R.	1981	Rosberg et al, 1982	Foot, Boat and Aerial Surveys	Coho heavily utilized the area between km 15.5 and 25.2 for spawning, particularly where a spring entered the stream at km 25.
Tsaytis R.	1981	Rosberg et al, 1982	Foot, Boat and Aerial Surveys	All spawning activity occurred between km 6.7 and 15.8. Low to medium potential exists in various locations between the mouth and 6.7 kms as well as between km 16.4 and 20.1.
Kwatna R.	1983	Rice, 1984	Foot, Float, Boat, Heli-copter Surveys	Holding was observed between approx. km 7 and km 22.0. Although no spawning was actually observed, potential sites exist over much of the river to km 32.3.
Oak-Beck Ck.	1983	Rice, 1984	Foot, Helicopter Surveys	Coho were observed holding in pools to approx. km 8. Spawning, while not observ-ed, was likely conducted to approx. km 8.5.
Nootum R.	1983	Rice, 1984	Foot, Boat, Helicopter Surveys	Holding fish were present at approx. km 8 but no spawning activity was observed.

COHO SPAWNER DISTRIBUTIONS

STREAM	YEAR	SOURCE	METHODS	PARTICULARS OF HOLDING AND SPAWNING
			SOUTH COAST - Cont'd	
Tlupana R.	1978	Glova and McCart, 1979	Foot Surveys	Spawning is distributed throughout this stream between 0.5 and 5.7 kms from the mouth, and it is probable that spawning takes place over much of the accessible length.
Nitinat R.	1979	McCart et al, 1980	Boat Surveys	The largest concentration of holding fish were observed from 2.5-2.9 km above the Little Nitinat River, while much of the spawning was conducted in tributary streams.
Little Qualicum R.	1978	Lister, 1979	Foot Surveys	A few large pools, located at the mouth of Whiskey Creek, below the power line and at the mouth of Kinkade Creek, serve as holding areas for the majority of fish. Tributaries appear to receive the greatest use by spawning coho.
			FRASER R., N.B.C. and YUKON	
Eagle R. (incl. South Pass Ck.)	1982	Whelen et al, 1983	Foot Surveys	Numerous pools in the area between the Crazy Creek confluence and Griffin Lake and between Three Valley and Victor Lakes were utilized by holding coho. Spawning was observed from the Perry River confluence to Summit Lake and in South Pass Creek. Maximum spawner density was reached over a 1 km area immediately below Summit Lake.
Salmon R. (incl. Bolean Ck.)	1982	Whelen et al, 1983	Foot Surveys	Holding fish were enumerated in numerous small pools from 2.1 km above to 18.3 km below Falkland. Spawning fish were concentrated along an approx. 4 km stretch of river, roughly centered at Falkland. Extensive redd superimposition was recorded near the upper limit of this section. Spawning was also observed in Bolean Creek to 7.2 km.
Adams R. (lower) (incl. tribs.)	1981	Whelen and Olmsted, 1982	Foot, Float, Boat and Helicopter Surveys	Coho were observed holding near the mouth of Hiuihill Creek. No other information was presented.
	1982	Whelen et al, 1983	Foot Surveys	Holding areas were widely distributed and included small pools in all 3 tributaries. Spawning density was highest in Nikwikwaia Creek but overall numbers were low and the area of suitable habitat was small.
Adams R. (upper) (incl. Momich R. and Cayenne Ck.)	1982	Whelen et al, 1983	Foot Surveys	Holding pools were identified at km 42 and 63 of the mainstem and in Cayenne Creek near its confluence with the Momich River. Seventy-eight percent of the total escapement spawned in Cayenne Creek. Only low numbers of spawners were observed in the mainstem. These utilized the river from km 48 to the upper limit of the survey area (km 84).

COHO SPAWNER DISTRIBUTIONS

STREAM	YEAR	SOURCE	METHODS	PARTICULARS OF HOLDING AND SPAWNING
			SOUTH COAST	
Kakweiken R.	1981	Slaney and Milko, 1982	Foot, Float and Helicopter Surveys	Most holding fish were observed above the fishway, in deep pools or riffles, as far as 8 km above Kakweiken Lake. Spawning was also observed above Kakweiken Lake.
Glendale/Tom Browne Cks.	1981	Fielden and Slaney, 1982	Foot and Helicopter Surveys	Large numbers of coho were observed (holding?) off the mouth of a tributary on the north shore of Glendale Lake.
	1983	Whelen and Morgan, 1984	Foot Surveys	The high pink escapement may have forced fish upstream to hold in Glendale Lake as none were observed in the stream.
Mussel Ck.	1981	Fielden and Slaney, 1982	Foot, Float and Helicopter Surveys	Four pools below Mussel Lake contained the greatest proportion of holding coho, while small groups were observed in pools located at approximately 5 and 12 km. The majority of spawning salmon were observed in side channels located at approx. 5 km. at 0.8-1.3 km and 1.8-2.5 km upstream of Mussel Lake. It is believed that Mussel Lake also served as a holding area, as water levels in the upper watershed were low during immigration.
	1983	Whelen and Morgan, 1984	Foot and Helicopter Surveys	Ninety-five percent of the population spawned between km 11.7 and 12.5, while 4% spawned from km 1.7 to 2.2. Distribution of spawners varied considerably from that observed in 1981 by Fielden and Slaney.
Kilnaklini R.	1983	Whelen and Morgan, 1984	Foot and Helicopter Surveys	Coho were observed in Icy Creek (Lower Link Channel) throughout Link Channel and in lower Dice Creek. The majority of holding fish were observed in a single pool in the upper area of Link Channel.
Ahnuhati R.	1981	Fielden and Slaney, 1982	Foot, Float and Helicopter Surveys	Holding salmon were observed between kms. 1.7 and 3.5, 5.0 and 6.0, 7.7 and 8.4, 9.7 and 10.2. At no time were coho sighted above km. 10.2, although surveys were terminated prior to the initiation of spawning.
	1983	Whelen and Morgan, 1984	Foot and Helicopter Surveys	Holding fish were concentrated between km 0.8 and 4.7. Small groups of holding fish were sighted in various upstream locations to km 14.4. Spawning distribution was not determined.
Franklin R.	1981	Fielden and Slaney, 1982	Foot and Helicopter Surveys	Only 1 coho was observed digging a redd in a small tributary on the west side of the river.
Kwalate Ck.	1981	Fielden and Slaney, 1982	Foot and Helicopter Surveys	The majority of holding fish were observed near the creek mouth, below the cascades. Scattered holding areas were reported in several locations to km 10.

COHO SPAWNER DISTRIBUTIONS

STREAM	YEAR	SOURCE	METHODS	PARTICULARS OF HOLDING AND SPAWNING
				FRASER R., N.B.C. and YUKON- Cont'd
Albreda R.	1982	Hutton et al, 1983	Foot Surveys	Holding fish were not observed due to the late start of the project. However, numerous small pools in the upper river and a few larger pools in the lower river provide a suitable environment for holding. Spawning was widely distributed and scattered above the Clemina Creek confluence. The major spawning area appeared to lie within a 1 km stretch of river some 5 km above the Clemina Creek confluence.
Blue R.	1982	Hutton et al, 1983	Foot Surveys	Several relatively large pools between approx. 1.5 and 2.0 km from the mouth contained holding coho, the most significant of these, in terms of utilization, was located approx. 100 m upstream of the CNR railway bridge. Only scattered spawning was observed between km 1.5 and 2.0.
Lion Ck.	1982	Hutton et al, 1983	Foot Surveys	The majority of holding fish were observed in a single pool, located approx. 0.5 km from the mouth. Spawning activity was observed throughout the lower 2.7 km of stream and was most intense over the lower 0.8 km.
Wire Cache Ck.	1982	Hutton et al, 1983	Foot Surveys	No holding fish were observed and very little suitable area exists for this purpose. Spawning occurred throughout the 300 m accessible area.
Lemieux Ck.	1982	Hutton et al, 1983	Foot Surveys	Holding fish were widely distributed amongst the many small pools present over much of the lower 8 km of stream. The largest number of holding fish were observed in a large pool near the Demers Creek confluence. Scattered spawning occurred between the creek mouth and km 10 and was most concentrated between km 6 and 7.
Barriere R.	1982	Hutton et al, 1983	Foot Surveys	Spawning activity was concentrated near the outlet of North Barriere Lake, where approx. 86% of the population spawned in a 0.5 km stretch of river.
Louis Ck.	1982	Hutton et al, 1983	Foot Surveys	The heaviest spawning occurred between km 42.2 and 46.7.
Coldwater R.	1982	Whelen et al, 1983	Foot Surveys	Holding pools were located at km 28.6, 33.6, 35.7, 42.8, 46.4 and 53.6. Spawning occurred between km 25.7 and 54.3 and was heaviest between km 33.6 and 35.5.

CHUM SPAWNER DISTRIBUTIONS

STREAM	YEAR	SOURCE	METHODS	PARTICULARS OF HOLDING AND SPAWNING
			NORTH COAST	
Mathers Ck. (incl. tribs.)	1978	Glova et al, 1979	Foot and Float Surveys	Spawning was most concentrated in the upper watershed, particularly between km 5.0 and 7.5. In the lower portion of stream, spawning was scattered and most of the activity occurred between km 0.7 and 1.4.
	1979	Grant and McCart, 1980	Foot, Float and Helicopter Surveys	Spawning was concentrated at 2 sites, both within 1 km of the mouth. Distribution of spawning was significantly altered from 1978, due to modification of the stream bed by flooding.
Kitlope R.	1981	Rosberg et al, 1982	Helicopter, Fixed Wing, Boat and Foot Surveys	The majority of spawning fish were observed between 8.8 and 26.6 kms upstream of the mouth; a small number were sighted below this. No spawning or holding was noted above 26.6 km.
Gamsby R.	1981	Rosberg et al, 1982	Helicopter, Fixed-Wing, Boat and Foot Surveys	Spawning was observed only in 2 side channels, located at the mouth and at 3 km upstream. The mainstem exhibited little suitability for spawning.
Kowesas R.	1981	Rosberg et al, 1982	Helicopter, Fixed-Wing, Boat and Foot Surveys	All spawning was conducted at roughly km 9.6 and spawning potential was described as low at best.
Tsaytis R.	1981	Rosberg et al, 1982	Helicopter, Fixed-Wing, Boat and Foot Surveys	Holding fish were observed in groundwater-fed side channels at km 6.0, 9.0, 9.6 and 12.6. It is believed they also spawned in these side channels. Limited spawning potential exists as far upstream as km 15.8.
Kemano R. (incl. tribs.)	1979	Murray and Hamilton, 1981	Ground and Aerial Surveys	The majority of fish spawned between km 5.2 and 8.4, and other than a section between km 8.4 and 10.5, spawners were observed throughout the river to km 12.5.
Kwatna R.	1983	Rice, 1984	Foot, Float, Boat, Heli-copter Surveys	Spawning was observed to km 15.0, the most intense activity occurring in the upper portion of this area. Areas further downstream exhibited good potential and were considered as underutilized. The majority of chums spawned in tributary streams.
Gus Ck.	1983	Rice, 1984	Foot, Helicopter	Spawning fish were observed to approx. km 0.6.
Oak-Beck Ck.	1983	Rice, 1984	Foot, Helicopter	Spawning was conducted over the lower 2 km of this stream. Sixty-three percent of the chum escapement to the Kwatna River watershed was observed in this stream.
Slousiska Ck.	1983	Rice, 1984	Foot, Helicopter	Although suitable spawning gravels were present to 560 m upstream from the mouth, chums were not observed spawning past approx. the 200 m point.
Glaciers Ck.	1983	Rice, 1984	Foot, Helicopter	Only low utilization occurred and was confined to the lower 200 m, approximately.

CHUM SPAWNER DISTRIBUTIONS

STREAM	YEAR	SOURCE	METHODS	PARTICULARS OF HOLDING AND SPAWNING
NORTH COAST - Cont'd				
Quatlena R.	1983	Rice, 1984	Foot, Helicopter	All chum spawning was confined to the lower-most portion of the river, in close proximity to the estuary. Most activity (62% of the population) spawned in a narrow side channel immediately above the mouth.
Nootum R.	1983	Rice, 1984	Foot, Boat, Helicopter	Spawning was observed to approx. 3.5 km from the mouth, with the highest counts occurring in the upstream portion of this area. Habitats were classed as substantially underutilized.
SOUTH COAST				
Kakweiken R.	1981	Slaney and Milko, 1982	Foot and Float Surveys	Chum were observed holding at km 5.6, 9.0 and in lower Elbow Creek. Spawning was noted in several locations below Lower Kakweiken Lake, the most notable of these being a 1.6 km section extending upstream from the mouth.
Glendale/Tom Browne Cks.	1981	Fielden and Slaney, 1982	Foot and Aerial Surveys	Spawning effort was concentrated between km 1.2 and 2.2 in Tom Browne Creek. Limited spawning also occurred from km 1.7 to 2.4 and from km 7.5 to 8.0 in Glendale Creek.
	1983	Whelen and Morgan, 1984	Foot Surveys	Tom Browne Creek contained 97.2% of the spawning population while scattered spawning was reported to km 4.8 of Glendale Creek. Under 3% of the total population spawned in Glendale Creek.
Mussel Ck.	1981	Fielden and Slaney, 1982	Foot, Float and Aerial Surveys	Holding appeared to be of short duration and confined to the lower 1.6 km of stream. Spawning was observed between km 1.6 and 2.0. Spawning intensity was rated as heavy in this section.
	1983	Whelen and Morgan, 1984	Foot and Aerial Surveys	Holding and spawning distributions were similar to those encountered in 1981.
Klinaklini R.	1983	Whelen and Morgan, 1984	Foot and Aerial Surveys	Chum spawning occurred in upper and lower Link Channel. In addition, observations of chum were made in Icy and Dice Creeks.
Ahnuhati R.	1981	Fielden and Slaney, 1982	Foot, Float and Aerial Surveys	Holding was observed in the lower 0.9 km, while spawning was noted in several locations between km 2.2 and 8.8.
	1983	Whelen and Morgan, 1984	Foot, Float and Aerial Surveys	Spawning intensity was greatest between km 3.4 and 5.1, while low to moderate activity was reported for other areas between km 0.5 and 10.4.
Kwalate Ck.	1981	Fielden and Slaney, 1982	Foot and Aerial Surveys	All observed spawning and holding was restricted to a 400 m reach below the cascades near the creek mouth.

CHUM SPAWNER DISTRIBUTIONS

STREAM	YEAR	SOURCE	METHODS	PARTICULARS OF HOLDING AND SPAWNING
				SOUTH COAST - Cont'd
Sucwoa R.	1978	Glova and McCart, 1979	Foot Surveys	Spawning was widespread and most concentrated in those areas which exhibited an intermediate velocity and water depth and moderate-sized gravels. Four areas in the mainstem, located at kms 0.3 to 0.4, 0.8 to 1.0, 1.1 to 1.2 and 1.3 received the highest use. The lower 0.2 km section of tributary "A", which flows into the mainstem near the estuary, was also well-utilized. Above km 1.3 only scattered spawning was observed. The upper limit of spawning activity was at km 2.1. High velocities and coarse substate material impeded spawning above this point.
Canton Ck.	1978	Glova and McCart, 1979	Foot Surveys	Spawning was primarily conducted at km 0.5 to 0.7, 0.8-1.0 and 1.2. Generally scattered spawning was reported upstream to km 3.2.
Conuma R.	1978	Glova and McCart, 1979	Foot Surveys	Spawning occurs from the estuary to within 1 km of the base of the canyon (km 5.8) but is concentrated between the mouth and the hatchery site and between km 2.9 and 3.3.
Tlupana R.	1978	Glova and McCart, 1979	Foot Surveys	Spawning activity was observed from the short canyon near the mouth to km 5.3, over variable habitat. The most concentrated spawning areas were found at kms 0.8 to 0.9 and 1.4 to 2.1. No spawning was observed in the Nesook River.
Deserted Ck.	1978	Glova and McCart, 1979	Foot Surveys	Utilization of the accessible portion of this stream was complete, excepting 2 deep bedrock-controlled pools. Superimposition of redds was a frequent occurrence and, in response to crowding, spawning in the intertidal zone was intense but fluctuated with the tides, the most activity taking place during low tide.
Nitinat R.	1979	McCart et al, 1980	Boat Surveys	Spawning was observed throughout the accessible length of the mainstem, ie: to km 8.6, and was concentrated below the confluence of the Little Nitinat R. Approximately 86% of the population spawned in the lower 2.6 km of the mainstem.
Little Qualicum R.	1978	Lister, 1979	Foot Surveys	Spawning occurred between the mouth and km 12.3 and was most intense between the mouth and km 3.0, where 35.9% of the population spawned.

SOCKEYE SPAWNER DISTRIBUTIONS

STREAM	YEAR	SOURCE	METHODS	PARTICULARS OF HOLDING AND SPAWNING
NORTH COAST				
Kitlope Lk.	1981	Rosberg et al, 1982	Helicopter, Fixed-Wing and Boat Surveys	Large numbers of fish were observed near the lake outlet. Spawning occurred in alluvial deposits of 2 glacial streams on the southeast margin of the lake. These locations are well-documented in spawning ground reports since 1947.
Tezwa R.	1981	Rosberg et al, 1982	Helicopter, Fixed-Wing, Boat, and Foot Surveys	Holding areas are limited and observations of holding fish were restricted to one location at km 1.8. The major spawning areas were located between km 11.0 and 16.0. The area between km 27 and 37 appears to have good spawning potential.
Kalitan Ck.	1981	Rosberg et al, 1982	Helicopter, Fixed-Wing, Boat, and Foot Surveys	Although holding areas are abundant over the lower 9 km, the presence of suitable areas further downstream, in the Tezwa River and Kitlope Lake, results in very little holding in Kalitan Creek. Spawning activity is greatest along the lower 9.0 km of stream, particularly near the mouth. Scattered spawning was observed between km 9.0 and roughly 12.0.
Kowesas R.	1981	Rosberg et al, 1982	Helicopter, Fixed-Wing, Boat and Foot Surveys	Only one observation of sockeye was made. Potential for spawning is generally nil or low.
Kemano R.	1979	Murray and Hamilton, 1981	Ground and Aerial Surveys	Sockeye were observed holding in the tailrace at Kemano and spawning in Horetzky Creek. As this system contains no lakes there is a possibility that these fish were strays from another system.
Kwatna R.	1983	Rice, 1984	Foot, Float, Boat, Heli-copter	Spawning occurred throughout much of the mainstem from the mouth to km 12.6, with the majority of the activity being recorded adjacent to the Slousiska Creek confluence.
Oak-Beck Ck.	1983	Rice, 1984	Foot, Helicopter	One spawning pair only was observed. This observation was made below km 2 in the east fork.
Slousiska Ck.	1983	Rice, 1984	Foot, Helicopter	Scattered spawning occurred over the lower 200 m of stream.
McNally Ck.	1983	Rice, 1984	Foot, Helicopter	No spawning or holding fish were seen. A single observation of 2 sockeye was made, these were jumping a small falls located 500 m upstream from the south. This stream exhibits little potential for spawning.
SOUTH COAST				
Kakweiken R.	1981	Slaney and Milko, 1982	Foot, Float and Helicopter Surveys	Holding sockeye were present in deep pools at km 2.3, near the falls. Spawning sockeye were observed between Kakweiken and Lower Kakweiken Lakes, with the highest concentration located between the outlet of Kakweiken Lake and the 1st set of cascades downstream.

SOCKEYE SPAWNER DISTRIBUTIONS

STREAM	YEAR	SOURCE	METHODS	PARTICULARS OF HOLDING AND SPAWNING
				SOUTH COAST - Cont'd
Glendale/Tom Browne Cks.	1981	Fielden and Slaney, 1982	Foot and Helicopter Surveys	A limited number of fish were observed in the lower portion of this stream but specific information on holding and spawning was not gathered.
	1983	Whelen and Morgan, 1984	Foot Surveys	Holding fish were sighted in pools at unspecified locations.
Mussel Ck.	1981	Fielden and Slaney, 1982	Foot, Float and Helicopter Surveys	Spawning was observed within the lower 1.5 km of stream and sightings were made at roughly km 5.0.
	1983	Whelen and Morgan, 1984	Foot and Helicopter Surveys	The majority of both holding and spawning fish were observed between roughly 4.3 and 6.0 km above the mouth, while only scattered spawning occurred below km 4.3.
Klinaklini R.	1983	Whelen and Morgan, 1984	Foot and Helicopter Overflights	Low numbers of spawning sockeye were observed in upper and lower Link Channel and 1 fish was observed in Dice Creek.
Ahnuhati R.	1981	Fielden and Slaney, 1982	Foot, Float and Aerial Surveys	Several observations were made of sockeye. All were below km 11.0.
	1983	Whelen and Morgan, 1984	Foot and Helicopter Surveys	Observations were confined to an area between kms 1.9 and 5.3, the majority of which were sighted below km 3.2.
Sucwoa R.	1978	Glova and McCart, 1979	Foot Surveys	A single observation of holding sockeye was made at the Gold River - Tahsis road crossing. It is believed that sockeye may spawn near Malaspina Lake in the mainstem or in tributaries. Several spent carcasses were recovered from tributary "A" and in another tributary at km 1.1.
Conuma R.	1978	Glova and McCart, 1979	Foot Surveys	Spawning was observed at the mouth of a wide side channel approx. 0.3 km below the Hatchery site and also at the mouth of a small tributary located at km 3.9.
Little Qualicum R.	1978	Lister, 1979	Foot Surveys	All observations of sockeye were made between the pools off the mouth of Kinkade Creek to km 10.6 in the mainstem.
				FRASER R., N.B.C. and YUKON
Bowron R.	1980	Murray et al, 1981	Boat, Helicopter and Foot Surveys	Sightings were made between 2.4 and 19 kms upstream from the Indianpoint Creek confluence.
Nechako R.	1979	Olmsted et al, 1980	Float, Boat and Helicopter Surveys	Holding was observed in the pool at the base of Cheslatta Falls, at 5.3 km below Cheslatta Falls and at Vanderhoof. Holding in other areas was not described as to site but apparently holding areas were present between 13 and 24 kms downstream from Cheslatta Falls; spawning areas also fell into this section.

SOCKEYE SPAWNER DISTRIBUTIONS

STREAM	YEAR	SOURCE	METHODS	PARTICULARS OF HOLDING AND SPAWNING
				FRASER R., N.B.C. and YUKON - Cont'd
Stuart R.	1980	Hickey and Lister, 1981	Boat and Helicopter	Several fish, presumed to be sockeye, were observed in the Dog Creek area.
Mitchell R.	1980	Olmsted et al, 1981	Helicopter Survey	Holding or spent fish were observed in the lower portion of the river.
Horsefly R.	1979	Olmsted et al, 1980	Helicopter Survey	Observations of sockeye were made in the upper Horsefly River.
	1980	Olmsted et al, 1981	Helicopter Survey	Holding and spawning took place between 45.5 and 49.7 kms upstream from the Quesnel River confluence.
McKinley Ck.	1980	Olmsted et al, 1981	Helicopter Survey	Holding and spent fish were found from the mouth to McKinley Lake, with the majority sighted from the McKinley Lake outlet to a point located 2.3 km downstream.
Quesnel R.	1980	Olmsted et al, 1981	Helicopter Survey	Holding and spent fish were observed approx. 1 km downstream from Likely.
Adams R.	1981	Whelen and Olmsted, 1982	Foot, Boat, Float and Helicopter Surveys	Holding areas occurred throughout much of the river course, while spawning, also observed throughout, was concentrated between km 1.1 and 2.0.
South Thompson R.	1981	Whelen and Olmsted, 1982	Foot, Boat, Float and Helicopter Surveys	Sockeye were observed spawning in the Little River. No other observations were documented.
Finn Ck.	1981	Scott et al, 1982	Foot Survey	Spawning was restricted to the creek mouth and marked the first occurrence of sockeye above the Raft River.
Raft R.	1981	Scott et al, 1982	Foot and Float Surveys	Spawners were distributed fairly evenly between the mouth and km 3.1; thereafter, no sightings were made.
North Thompson R.	1981	Scott et al, 1982	Ground and Aerial Surveys	Spawning was observed between the Little Fort area and Clearwater. The majority of spawners appeared to be 5.3 to 8.7 km upstream of Little Fort.

PINK SPAWNER DISTRIBUTIONS

STREAM	YEAR	SOURCE	METHODS	PARTICULARS OF HOLDING AND SPAWNING
			NORTH COAST	
Mathers Ck. (incl. tribs.)	1978	Glova et al, 1979	Foot and Float Surveys	The most heavily-used areas for spawning were from km 0 to 1.9 and km 3.3 to 7.3 in the mainstem, and from km 0 to 1.9 in Fukawa Creek. Spawning was most concentrated in Fukawa Creek between km 0.1 and 0.2.
	1979	Grant and McCart, 1980	Foot, Float and Helicopter Surveys	Spawning was observed in the lower portion of the stream.
Kitlope R.	1981	Rosberg et al, 1982	Helicopter, Fixed-Wing, Boat and Foot Surveys	Holding fish were observed in a pool 1.5 km below the Gamsby River confluence. Spawning was reported in a small, tidal tributary near the mouth and in several other locations to km 27. All spawning above the Kitlope Lake outlet was restricted to side channels.
Kemano R.	1979	Murray and Hamilton, 1981	Ground and Aerial Surveys	Pink salmon spawned from km 3.0 to 5.5 and 6.3 to 7.8 in the mainstem and in Horetzky Creek. Numbers of mainstem spawners were roughly equivalent to those in Horetzky Creek.
Kwatna R.	1983	Rice, 1984	Foot, Float, Boat, Helicopter	Extensive use was made of the mainstem for spawning, from the mouth to approximately km 20. About 65% of the total Kwatna drainage population spawned in the mainstem between kms 7.5 and 14.0. Generally, suitable habitats throughout the river course were fully utilized, with those occurring in more downstream areas being over-utilized. Highest spawning densities and redd superimposition occurred in the mainstem near the mouths of both Oak-Beck and Slousiska Creeks.
Gus Ck.	1983	Rice, 1984	Foot, Helicopter	Intensive spawning occurred over the lower 200 m of this stream.
Oak-Beck Ck.	1983	Rice, 1984	Foot, Helicopter	Spawning took place over the lower 2 km of this stream. Redd superimposition was observed and, as pink and chum spawning occurred over a similar area interspecific competition for spawning gravel also occurred. Oak-Beck Creek was inaccessible to pink migrants past km 2.0.
Slousiska Ck.	1983	Rice, 1984	Foot, Helicopter	All spawning was confined to the lower 560 m of stream, where utilization was heavy throughout. Only limited redd superimposition was evident.
Glacier Ck.	1983	Rice, 1984	Foot, Helicopter	Utilization over the lower 300 m of this stream (the accessible portion) was rated as high. For the past several years pinks have not been observed in this creek.
McNally Ck.	1983	Rice, 1984	Foot, Helicopter	Although no actual spawning was observed, a limited number of pinks were observed holding near the creek mouth. This stream had little potential for spawning.

PINK SPAWNER DISTRIBUTIONS

STREAM	YEAR	SOURCE	METHODS	PARTICULARS OF HOLDING AND SPAWNING
				NORTH COAST - Cont'd
Quatlena R.	1983	Rice, 1984	Foot, Helicopter	Holding fish were found over the lower 2 km of stream but spawning was observed only in the lower 0.8 km. Spawning area use was rated as moderate to heavy.
Nootum R.	1983	Rice, 1984	Foot, Boat, Helicopter	Spawning occurred over the lower 8 km of stream, with density of spawners generally very low. Sixty five percent of the population spawned between km 2.5 and 3.5. The area between approx. km 2.0 and 3.5 potentially support a higher level of use.
				SOUTH COAST
Kakweiken R.	1981	Slaney and Milko, 1982	Foot and Float Surveys	Holding occurred in large pools below the cascades near the mouth of Lower Kakweiken Lake. Pinks spawned throughout the system to 3 km above Kakweiken Lake. Except for a short section located at km 5.4, which was used as a holding area, the entire stream below Lower Kakweiken Lake was used heavily for spawning. Spawning also occurred in several of the tributaries and, in particular, Elbow Creek, where moderate activity was noted to 1.0 km from the mouth.
Glendale/Tom Browne Cks.	1981	Fielden and Slaney, 1982	Foot and Helicopter Surveys	Holding fish were found predominantly in pools between 0.4 and 1.1 km from the mouth. Spawning was well-distributed and of moderate intensity from km 1.1 to 4.4 and from km 6.6 to 8.0; elsewhere, spawning activity was scattered or nil. Many of the redds dug early in the run were later dessicated when water levels dropped.
	1983	Whelen and Morgan, 1984	Foot and Helicopter Surveys	Limited spawning habitat resulted in a prolonged spawning period as large numbers of holding fish continually replaced those on the spawning grounds. Spawning intensity was high throughout Glendale Creek from the mouth to a point 0.5 km downstream from the outlet of Glendale Lake. Holding pools were distributed throughout.
Mussel Ck.	1981	Fielden and Slaney, 1982	Foot, Float and Helicopter Surveys	Holding fish were distributed in pools to km 1.6 while scattered spawning was observed from km 1.6 to 2.5 and from km 4.5 to 5.7, the former area containing the bulk of the population.
	1983	Whelen and Morgan, 1984	Foot and Helicopter Surveys	Approximately 90% of the population spawned between km 4.0 and 5.7. Some spawning was also carried out from the mouth to km 2.5.
Kilnaklini R.	1983	Whelen and Morgan, 1984	Foot and Helicopter Surveys	No pinks were observed in the mainstem. Spawning was conducted largely in Dice Creek, where all but one individual were sighted; this exception was found in Link Channel.

PINK SPAWNER DISTRIBUTIONS

STREAM	YEAR	SOURCE	METHODS	PARTICULARS OF HOLDING AND SPAWNING
			SOUTH COAST - Cont'd	
Ahnuhati R.	1981	Fielden and Slaney, 1982	Float, Foot and Helicopter Surveys	Spawners tended to take advantage of the gentler flow character of the lower reaches and 90% of the population spawned between km 1.6 and 5.1. No spawning was observed between km 5.3 and 8.3 and scattered spawning was documented to km 10.7.
	1983	Whelen and Morgan, 1984	Foot and Helicopter Surveys	Holding areas were numerous throughout the lower 5.6 km of this stream. Spawners utilized the Ahnuhati between km 0.7 and 10.7 with 56% of the population spawning between km 3.5 and 6.0. The increased use of upstream habitats for spawning (over 1981) may have resulted from the large escapement in 1983.
Kwalate Ck.	1981	Fielden and Slaney, 1982	Foot and Helicopter Surveys	All spawning activity took place below the first set of rapids near the mouth.
Sucwoa R.	1978	Glova and McCart, 1979	Foot Surveys	Spawning occurred between the mouth and km 1.6. In addition, intensive use was made of tributary "A".
			FRASER R., N.B.C. and YUKON	
Adams R.	1981	Whelen and Olmsted, 1982	Foot, Float, Boat and Helicopter Surveys	Spawning was conducted between km 0.5 and 2.3 approximately with only limited numbers of fish observed.
South Thompson R.	1981	Whelen and Olmsted, 1982	Foot, Float, Boat and Helicopter Surveys	The greatest proportion of spawners were observed between 0.5 and 2.7 km below Little Shuswap Lake. Spawners were also observed between 7.7 and 10.2 km downstream from Little Shuswap Lake and in the outlet area of Little Shuswap Lake.
North Thompson R.	1981	Scott et al, 1982	Foot and Helicopter Surveys	A side channel located 0.5 km below Little Fort was the only location extensively used for spawning. Single carcasses were discovered from both the area between Little Fort and Joseph Creek and the area between Mann Creek and Blackpool.

APPENDIX C-3

Comparison of SPAWNING ESTIMATES Obtained During New Projects (NP) Studies with Stream File (SF) Information

Estimates of spawner abundance were extracted directly from the source reports and are compared with SF information for the same year, species and river wherever possible. Where the consultant provided two or more estimates as a result of using several field techniques, the estimate which the consultant had the most confidence in was chosen.

COMPARISON OF CHINOOK SPAWNING ESTIMATES OBTAINED DURING NEW PROJECTS (NP) STUDIES WITH STREAM FILE (SF) INFORMATION

STREAM	YEAR	N.P. EST.	SOURCE	METHODS	S.F. EST.	METHODS	10 YR. AVG. + RANGE
				NORTH COAST			
Morice R.	1978	6000	Smith and Berezay, 1983	based on aerial count	6000		5890 (1700-12000)
	1979	4100	Smith and Berezay, 1983	based on aerial and boat counts	no report		5790 (1700-12000)
	1980	4500	Smith and Berezay, 1983	based on aerial counts	4500		5790 (1700-12000)
Kitlope R.	1981	763-844	Rosberg et al, 1982	guess, based on ground and aerial surveys	800		2200 (1000-5500)
Gamsby R.	1981	50-100	Rosberg et al, 1982	guess, based on ground and aerial surveys	——— included in Kitlope ———		
Tezwa R.	1981	50-75	Rosberg et al, 1982	guess, based on ground and aerial surveys	——— included in Kitlope ———		
Kalitan Ck.	1981	<25	Rosberg et al, 1982	guess, based on ground and aerial surveys	——— included in Kitlope ———		
Kowesas R.	1981	50-100	Rosberg et al, 1982	guess, based on ground and aerial surveys	60		63 (20-200)
Tsaytis R.	1981	<20	Rosberg et al, 1982	guess, based on ground and aerial surveys	20		24 (0-70)
Kemano R. (incl. tribs.)	1979	75	Murray and Hamilton, 1981	carcass recovery	1000		1575 (500-3500)
Kwatna R. (incl. tribs.)	1983	25	Rice, 1984	visual observation, carcass recovery	50		237 (20-750)
				SOUTH COAST			
Kakweiken R.	1981	18*	Slaney and Milko, 1982	fishway counts	200		392 (25-750)
Glendale/Tom Browne Cks.	1983	2	Whelen and Morgan, 1984	ground count	2		0 (NA****)
Mussel Ck.	1981	950	Fielden and Slaney, 1982	float and foot observations	1000		
	1983	1120	Whelen and Morgan, 1984	ground and aerial counts	-	included in Klinaklini	
Klinaklini R.	1983	100	Whelen and Morgan, 1984	-	1200		4611 (500-7500)
Ahnuhati R.	1981	200	Fielden and Slaney, 1982	ground and aerial counts	N/O**		81-(0-400)
	1983	115	Whelen and Morgan, 1984	-			101 (0-400)
Sucwoa R.	1978	981	Glova and McCart, 1979	mark and recovery	NR***		190 (20-400)
Canton Ck.	1978	500-600	Glova and McCart, 1979	visual estimate	N/O		250 (25-500)
Conuma R.	1978	300-500	Glova and McCart, 1979	based on ground counts	500		484 (75-1500)

* only a portion of this run was sampled.
** none observed.
*** none reported.
**** not applicable.

COMPARISON OF CHINOOK SPAWNING ESTIMATES OBTAINED DURING NEW PROJECTS (NP) STUDIES WITH STREAM FILE (SF) INFORMATION

STREAM	YEAR	N.P. EST.	SOURCE	METHODS	S.F. EST.	METHODS	10 YR. AVG. + RANGE
SOUTH COAST - Cont'd							
Tlupana R.	1978	7	Glova and McCart, 1979	carcass recovery total	NR		30 (20-75)
Deserted Ck.	1978	827	Glova and McCart, 1979	mark and recovery	200		197 (75-400)
Nitinat R.	1979	15599	McCart et al, 1980	mark and recovery	3500		1270 (750-3000)
Little Qualicum R.	1978	10	Lister, 1979	highest daily live count	30		365 (75-750)
FRASER R., N.B.C. AND YUKON							
Holmes R.	1981	325	Rosberg and Aitken, 1982	carcass recovery, aerial & ground counts	400		338 (75-750)
Morkill R.	1981	95	Rosberg and Aitken, 1982	carcass recovery, aerial & ground counts	150		216 (150-300)*
Torpy R.	1981	510	Rosberg and Aitken, 1982	carcass recovery, aerial & ground counts	510		485 (200-750)
West Torpy R.	1981	150	Rosberg and Aitken, 1982	carcass recovery, aerial & ground counts	Included in Torpy River		
Walker Ck.	1981	480	Rosberg and Aitken, 1982	carcass recovery, aerial & ground counts	140		194 (160-200)**
Slim Ck.	1980	2050	Murray et al, 1981	helicopter & boat	1455		1092 (750-1900)
	1981	2395	Rosberg and Aitken, 1982	average of aerial & carcass recovery totals	1335	helicopter	1221 (750-1900)
Bowron R.	1980	2000	Murray et al, 1981	comparison of carcass recovery rate with previous mark/recovery studies	1300		1440 (800-3500)
Willow R. (incl. Wansa Ck.)	1980	1060	Murray et al, 1981	as above	150		172 (75-750)
Stuart R.	1980	1837	Hickey and Lister, 1981	mark & recovery	426		513 (75-1000)
Nechako R. (incl. tribs.)	1979	1467	Olmsted et al, 1980	aerial count	1800		1100 (400-2600)
West Road (Blackwater R.)	1980	83	Olmsted et al, 1981	aerial count	900		1070 (400-1900)
Baezaeko R.	1980	87	Olmsted et al, 1981	aerial count	——— Included in West Road R. ———		

NR - no report.
* - population assessment difficult in some years due to high glacial turbidity, the likely result being low estimates.
** - creek not normally inspected by Fishery Officer, rather, escapements are estimates supplied by non-departmental sources and are of dubious reliability.

COMPARISON OF CHINOOK SPAWNING ESTIMATES OBTAINED DURING NEW PROJECTS (NP) STUDIES WITH STREAM FILE (SF) INFORMATION

STREAM	YEAR	N.P. EST.	SOURCE	METHODS	S.F. EST.	METHODS	10 YR. AVG. + RANGE
				FRASER R., N.B.C. AND YUKON - Cont'd			
Cilsbako R.	1980	1	Olmsted et al, 1981	aerial count	——— Included in West Road R. ———		
Nazko R.	1980	192	Olmsted et al, 1981	aerial count	——— Included in West Road R. ———		
Cottonwood R.	1980	151	Olmsted et al, 1981	aerial count	300		165 (75-300)
Mitchell R.	1980	1	Olmsted et al, 1981	aerial count	NR		25 (25)
Horsefly R.	1979 1980	115 206	Olmsted et al, 1980 Olmsted et al, 1981	aerial count aerial count, carcass recovery + live samples	350 250		253 (75-750) 268 (75-750)
McKinley Ck.	1980	102	Olmsted et al, 1981	aerial count + carcass recovery	——— Included in Horsefly R. ———		
Cariboo R.	1980	35	Olmsted et al, 1981	aerial count	——— Included in Horsefly R. ———		
Quesnel R.	1979 1980	800 791	Olmsted et al, 1980 Olmsted et al, 1980	aerial count aerial count	900 950	Fixed wing Fixed wing	1125 (900-1800) 1105 (900-1800)
Eagle R.	1981	305	Whelen and Olmsted, 1982	spawning effort/turnover rate	300		401 (250-756)
Salmon R.	1981	272	Whelen and Olmsted, 1982	spawning effort/turnover rate	300		256 (150-400)
Adams R. (lower)	1981	870	Whelen and Olmsted, 1982	spawning effort/turnover rate	750		1320 (350-2200)
South Thompson R.	1981	8930	Whelen and Olmsted, 1982	spawning effort/turnover rate	6000		4460 (1500-7000)
Finn Ck.	1981	878	Scott et al, 1982	mark and recovery	1000		515 (295-750)
Raft R.	1981	321	Scott et al, 1982	mark and recovery	200		203 (121-260)
North Thompson R.	1981	2980	Scott et al, 1982	carcass recovery efficiency estimates/ stream section			1435 (750-2500)

COMPARISON OF COHO SPAWNING ESTIMATES OBTAINED DURING NEW PROJECTS (NP) STUDIES WITH STREAM FILE (SF) INFORMATION

STREAM	YEAR	N.P. EST.	SOURCE	METHODS	S.F. EST.	METHODS	10 YR. AVG. + RANGE
				NORTH COAST			
Mathers Ck.	1978 1979	5000-10000 1000-2000	Glova et al, 1979 Grant and McCart, 1980	float and foot surveys est. for early portion of run	10000		5889 (0-10000)
Kitlope R.	1981	400	Rosberg et al, 1982	guess, based on ground counts and aerial surveys	2000		2800 (2000-4000)
Gamsby R.	1981	7325	Rosberg et al, 1982	guess, based on ground counts and aerial surveys	——— Included in Kitlope ———		
Tezwa R.	1981	50-75	Rosberg et al, 1982	guess, based on ground counts and aerial surveys	——— Included in Kitlope ———		
Kalitan Ck.	1981	1000	Rosberg et al, 1982	guess, based on ground counts and aeiral surveys	——— Included in Kitlope ———		
Kowesas R.	1981	1350	Rosberg et al, 1982	guess, based on ground counts and aerial surveys	N/O		50 (0-100)
Tsaytis R.	1981	4000	Rosberg et al, 1982	guess, based on ground counts and aerial surveys	N/O		75 (0-400)
Kemano R.	1979	39	Murray and Hamilton, 1981	biological samples	3000		5100 (2500-7500)
Kwatna R. (incl. tribs.)	1873	2250	Rice, 1984	visual, carcass recovery	3500		6175 (1250-15000)
Nootum R.	1983	50	Rice, 1984	visual, carcass recovery	25		160 (0-500)
				SOUTH COAST			
Kakweiken R.	1981	2418	Slaney and Milko, 1982	fishway count - not including main channel migrants	7000		7275 (750-10000)
Glendale/Tom Browne Cks.	1981 1983	300 1	Fielden and Slaney, 1982 Whelen and Morgan, 1984	stream and aerial surveys: pre-peak ground count	300 2400		295 (0-2000) 548 (0-2000)
Mussel Ck.	1981 1983	5600 >485	Fielden and Slaney, 1982 Whelen and Morgan, 1984	aerial & ground surveys aerial and ground surveys	500 -		- -*

N/O - none observed.
NR - no report.
* - included in Klinaklini River.

COMPARISON OF COHO SPAWNING ESTIMATES OBTAINED DURING NEW PROJECTS (NP) STUDIES WITH STREAM FILE (SF) INFORMATION

STREAM	YEAR	N.P. EST.	SOURCE	METHODS	S.F. EST.	METHODS	10 YR. AVG. + RANGE
SOUTH COAST - Cont'd							
Klinaklini R.	1983	460	Whelen and Morgan, 1984	aerial and ground surveys	950		3071 (500-3500)
Ahnuhati R.	1981 1983	1700 1010	Fielden and Slaney, 1982 Whelen and Morgan, 1984	aerial and ground surveys foot surveys	2100 1000		358 (25-500) 578 (200-2100)
Franklin R.	1981	1	Fielden and Slaney, 1982	foot survey?	NR		89 (0-200)
Kwalate Ck.	1981	1050-1350	Fielden and Slaney, 1982	pre-spawning aerial & ground counts	300		580 (100-2000)
Sucwoa R.	1978	132	Glova and McCart, 1979	mark & recovery	NR		385 (150-750)
Canton Ck.	1978	200-300	Glova and McCart, 1979	est. based on ground surveys	N/O		239 (25-750)
Conuma R.	1978	800-1000	Glova and McCart, 1979	guess, based on ground surveys	400		965-(200-3000)
Tlupana R.	1978	800-1000	Glova and McCart, 1979	guess, based on ground surveys	300		348 (75-750)
Deserted Ck.	1978	50-100	Glova and McCart, 1979	single pre-spawning count	N/O		69 (25-200)
Nitinat R.	1979	<1000	McCart et al, 1980	foot surveys?	600		1212 (400-3500)
Little Qualicum R.	1978	455	Lister, 1979	highest daily live count (foot survey)	5500	foot survey	2680 (400-5500)
FRASER R., N.B.C. AND YUKON							
Eagle R. (incl. South Pass Ck.)	1982	1046	Whelen et al, 1983	spawning effort/turnover rate	1000		1864 (850-3500)
Salmon R. (incl. Bolean Ck.)	1982	954	Whelen et al, 1983	spawning effort/turnover rate	800		1279 (500-2000)
Adams R. (lower) - incl. Sinmax Ck. + tribs.	1981 1982	22 83	Whelen and Olmsted, 1982 Whelen et al, 1983	pre-spawning observation (foot survey) spawning effort/turnover rate	100 100		185 (10-338) 170 (10-338)
Adams R. (upper incl. Cayenne Ck. & Momich R.)	1982	205	Whelen et al, 1983	spawning effort/turnover rate	200		168 (75-475)

* only a portion of this stream was surveyed.

NR - no report.

COMPARISON OF COHO SPAWNING ESTIMATED OBTAINED DURING NEW PROJECTS (NP) STUDIES WITH STREAM FILE (SF) INFORMATION

STREAM	YEAR	N.P. EST.	SOURCE	METHODS	S.F. EST.	METHODS	10 YR. AVG. + RANGE
FRASER R., N.B.C., AND YUKON - Cont'd							
South Thompson R.	1981	1	Whelen and Olmsted, 1982	foot survey?	NR		NR
Albreda R.	1982	61*	Hutton et al, 1983	carcass recovery + final live count - (partial surveys)	550	foot survey	209 (0-500) - prev. 8 yr. avg.
Blue R.	1982	177	Hutton et al, 1983	peak live count (partial survey)	450	foot & float surveys	342 (25-600) - prev. 8 yr. avg.
Lion Ck.	1982	1200	Hutton et al, 1983	est. based on foot surveys	1200	foot surveys	900 (300-2300)
Wire Cache Ck.	1982	110	Hutton et al, 1983	est. based on foot surveys	110	foot surveys	NR
Lemieux Ck.	1982	400	Hutton et al, 1983	est. based on foot surveys	400	foot surveys	446 (180-750)
Barriere R.	1982	450	Hutton et al, 1983	est. based on foot surveys & Fishery Officers counts	450		383 (60-750)
East Barriere R.	1982	2	Hutton et al, 1983	single foot survey	75		60 (18-120)
Louis Ck. (incl. Christian Ck.)	1982	750	Hutton et al, 1983	estimate based on ground surveys and Fishery Officers counts	750	foot surveys	383 (60-750)
Coldwater R.	1982	194	Whelen et al, 1983	spawning effort/turnover rate	300		450 (70-1500)

NR - no record.

COMPARISON OF CHUM SPAWNING ESTIMATES OBTAINED DURING NEW PROJECTS (NP) STUDIES WITH STREAM FILE (SF) INFORMATION

STREAM	YEAR	N.P. EST.	SOURCE	METHODS	S.F. EST.	METHODS	10 YR. AVG. + RANGE
				NORTH COAST			
Mathers Ck.	1978 1979	1135 50-75	Glova et al, 1979 Grant and McCart, 1980	float and foot surveys estimate based on ground and aerial surveys	1000		6700 (500-17500)
Kitlope R.	1981	500-1000	Rosberg et al, 1982	estimate based on ground and aerial surveys	75		795 (0-3500)
Gamsby R.	1981	100-150	Rosberg et al, 1982	estimate based on ground and aerial surveys	Included in Kitlope River		
Kowesas R.	1981	<50	Rosberg et al, 1982	estimate based on ground and aerial surveys	25		99 (0-500)
Tsaytis R.	1981	100	Rosberg et al, 1982	estimate based on ground and aerial surveys	50		132 (0-500)
Kemano R. (incl. tribs.)	1979	15000-22500	Murray and Hamilton, 1981	adjusted aerial & ground counts	20000		45900 (12500-100000)
Kwatna R. (incl. tribs.)	1983	3175	Rice, 1984	visual, carcass recovery	5500		8500 (2500-25000)
Quatlena R.	1983	100	Rice, 1984	visual, carcass recovery	40		264 (0-800)
Nootum R.	1983	50	Rice, 1984	visual, carcass recovery	200		288 (0-800)
				SOUTH COAST			
Kakweiken R.	1981	2000	Slaney and Milko, 1982	aerial and ground surveys	300-500		4744 (400-12000)
Glendale Ck.	1981 1983	500 2139	Fielden and Slaney, 1982 Whelen and Morgan, 1984	stream surveys mean of visual est. observed & calculated	300 2100		6330 (400-40000) 5020 (300-40000)
Mussel Ck.	1981 1983	300 80	Fielden and Slaney, 1982 Whelen and Morgan, 1984	stream float and foot surveys aerial and ground surveys	300		-
Klinaklini R.	1983	600	Whelen and Morgan, 1984	aerial and ground surveys	700		11471 (300-30000)
Ahnuhati R.	1981 1983	3000 7680	Fielden and Slaney, 1982 Whelen and Morgan, 1984	stream float and foot surveys mean of observed escapement and observed turnover rate	3000 6400		4480 (1000-12000) 4730 (1000-12000)

COMPARISON OF CHUM SPAWNING ESTIMATES OBTAINED DURING NEW PROJECTS (NP) STUDIES WITH STREAM FILE (SF) INFORMATION

STREAM	YEAR	N.P. EST.	SOURCE	METHODS	S.F. EST.	METHODS	10 YR. AVG. + RANGE
				SOUTH-COAST - Cont'd			
Kwalate Ck.	1981	200	Fielden and Slaney, 1982	single foot survey	200		110 (0-300)
Sucwoa R.	1978	17865	Glova and McCart, 1979	mark and recovery	NR		4175 (750-8000)
Canton Ck.	1978	5526	Glova and McCart, 1979	mark and recovery	800		1825 (400-3500)
Conuma R.	1978	23236	Glova and McCart, 1979	mark and recovery	7500		6880 (3500-15000)
Tlupana R.	1978	9660	Glova and McCart, 1979	mark and recovery	3500		2920 (200-6000)
Deserted Ck.	1978	35000	Glova and McCart, 1979	visual estimate	9000		4222 (3500-7500)
Nitinat R.	1979	10049	McCart et al, 1980	mark and recovery	4000		62400 (4000-230000)
Little Qualicum R.	1978	162400	Lister, 1979	mark and recovery	75000		56364 (22500-104775)

COMPARISON OF SOCKEYE SPAWNING ESTIMATES OBTAINED DURING NEW PROJECTS (NP) STUDIES WITH STREAM FILE (SF) INFORMATION

STREAM	YEAR	N.P. EST.	SOURCE	METHODS	S.F. EST.	METHODS	10 YR. AVG. + RANGE
				NORTH COAST			
Kitlope Lake	1981	400-500	Rosberg et al, 1982	estimate based on aerial & ground surveys	——— included in Kitlope R. ———		
Tezwa R.	1981	5000-6000	Rosberg et al, 1982	estimate based on aerial & ground surveys	——— included in Kitlope R. ———		
Kalitan Ck.	1981	7000-8000	Rosberg et al, 1982	estimate based on aerial & ground surveys	——— included in Kitlope R. ———		
Kowesas R.	1981	<10	Rosberg et al, 1982	estimate based on aerial & ground surveys	N/O		0 (0)
Kemano R. (incl. tribs.)	1979	2	Murray and Hamilton, 1981	carcass recovery total	25		75 (0-400)
Kwatna R. (incl. tribs.)	1983	250	Rice, 1984	visual, carcass recovery	100		8 (0-50)
				SOUTH COAST			
Kakweiken R.	1981	500	Slaney and Milko, 1982	fishway counts	300-500		353 (0-1200)
Glendale/Tom Browne Cks.	1981	5	Fielden and Slaney, 1982	foot survey	N/O		67 (0-200)
	1983	6	Whelen and Morgan, 1984	aerial and ground surveys	6		57 (0-200)
Mussel Ck.	1981	50	Fielden and Slaney, 1982	foot survey			
	1983	150	Whelen and Morgan, 1984	aerial and ground surveys	included in Klinaklini River		
Klinaklini R.	1983	100	Whelen and Morgan, 1984	aerial and ground surveys	220		719 (0-1500)
Ahnuhati R.	1981	6	Fielden and Slaney, 1982	foot survey	NR		NR
	1983	10	Whelen and Morgan, 1984	maximum aerial count	10		18 (0-75)
Sucwoa R.	1978	323	Glova and McCart, 1979	mark and recovery	NR		36 (25-75)
Canton Ck.	1979	50-100	Glova and McCart, 1979	estimate based on ground surveys	75		25 (25)
Conuma R.	1978	100	Glova and McCart, 1979	mark and recovery	400		231 (25-750)
Tlupana R.	1978	present	Glova and McCart, 1979	ground surveys	NR		40 (25-70)
Deserted Ck.	1978	<100	Glova and McCart, 1979	estimate based on ground surveys	10		120 (25-500)
Nitinat R.	1979	6	McCart et al, 1980	foot survey?	80		33 (25-50)

COMPARISON OF SOCKEYE SPAWNING ESTIMATES OBTAINED DURING NEW PROJECTS (NP) STUDIES WITH STREAM FILE (SF) INFORMATION

STREAM	YEAR	N.P. EST.	SOURCE	METHODS	S.F. EST.	METHODS	10 YR. AVG. + RANGE
				FRASER R., N.B.C. and YUKON			
Little Qualicum R.	1978	24	Lister, 1979	foot survey	45		75 (25-200)
Bowron R.	1980	present	Murray et al, 1981	foot surveys	3500		8245 (1350-25000)
Nechako R. (incl. tribs.)	1979	40	Olmsted et al, 1980	foot surveys	NR		NR
Mitchell R.	1980	8	Olmsted et al, 1981	aerial survey	N/O		82880 (0-4000)
Horsefly R.	1979	present	Olmsted et al, 1980	-	400		103765 (200-475000)
	1980	175	Olmsted et al, 1981	stream float	150		72805 (200-475000)
McKinley Ck.	1980	85	Olmsted et al, 1981	aerial count	Included in Horsefly R.		
Quesnel R.	1980	20	Olmsted et al, 1981	aerial count	NR		NR
Adams R. (lower)	1981	2000	Whelen and Olmsted, 1982	highest aerial count	31000		223,232 (2500-1480600
South Thompson R.	1981	2480	Whelen and Olmsted, 1982	highest aerial count	200		1678 (0-9800)
Finn Ck.	1981	7	Scott et al, 1982	foot surveys	8		NR
Raft R.	1981	579	Scott et al, 1982	counting fence	600		3618 (525-12000)
North Thompson R.	1981	200	Scott et al, 1982	foot surveys	600		411 (0-1500)

COMPARISON OF PINK SPAWNING ESTIMATES OBTAINED DURING NEW PROJECTS (NP) STUDIES WITH STREAM FILE (SF) INFORMATION

STREAM	YEAR	N.P. EST.	SOURCE	METHODS	S.F. EST.	METHODS	10 YR. AVG. + RANGE
				NORTH COAST			
Mathers Ck.	1978 1979	25000-40000 150-200	Glova et al, 1979 Grant and McCart, 1980	float and foot surveys ground counts	50000		29750 (0-75000)
Morice R.	1979	73	Smith and Berezay, 1983	biological sample total	NR		9730 (100-50000)
Kitlope R.	1981	200-300	Rosberg et al, 1982	estimate based on aerial & ground surveys	100		565 (0-2500) -S.F. totals include Gramsby & Tezwa systems
Kemano R.	1979	15000-20000	Murray and Hamilton, 1981	aerial and ground surveys	40000		71075 (750-200000)
Kwatna R. (incl. tribs.)	1983	2000000	Rice, 1984	visual, carcass recovery	2000000		61000 (0-125000)
Quatlena R.	1983	5000	Rice, 1984	visual, carcass recovery	4000		614 (0-2000)
Nootum R.	1983	1000	Rice, 1984	visual, carcass recovery	2000		1574 (0-6000)
				SOUTH COAST			
Kakweiken R.	1981	575000-600000	Slaney and Milko, 1982	estimate based on fishway counts	600000		263200 (15000-800000)
Glendale/Tom Browne Cks.	1981 1983	20000 300000	Fielden and Slaney, 1982 Whelen and Morgan, 1984	estimate based on ground & aerial surveys approximation between visual and calculated (turnover rate) estimates	20000 300000		107400 (16000-200000) - odd years 81400 (16000-200000) - odd years
Mussel Ck.	1981 1983	16 200	Fielden and Slaney, 1982 Whelen and Morgan, 1984	single ground survey count aerial and ground surveys	included in Klinaklini		
Klinaklini R.	1983	25	Whelen and Morgan, 1984	aerial and ground surveys	225		99 (20-300)
Ahnuhati R.	1981 1983	4000-5000 9872	Fielden and Slaney, 1982 Whelen and Morgan, 1984	aerial, streamside and float surveys aerial surveys	7000 9000		61250 (3000-340000) 69800 (3000-340000)
Kwalate Ck.	1981	750-1000	Fielden and Slaney, 1982	single foot survey	1000		54 (0-100)
Sucwoa R.	1978	945	Glova and McCart, 1979	mark and recovery	NR		1733 (200-3500)
Canton Ck.	1978	110	Glova and McCart, 1979	mark and recovery	N/O		700 (25-1500)

COMPARISON OF PINK SPAWNING ESTIMATES OBTAINED DURING NEW PROJECTS (NP) STUDIES WITH STREAM FILE (SF) INFORMATION

STREAM	YEAR	N.P. EST.	SOURCE	METHODS	S.F. EST.	METHODS	10 YR. AVG. + RANGE
			SOUTH COAST - Cont'd				
Conuma R.	1978	<1000	Glova and McCart, 1979	estimate based on foot surveys	1000		1636 (25-7500)
Tlupana R.	1978	present	Glova and McCart, 1979	ground surveys	100		63 (0-200)
Deserted Ck.	1978	<100	Glova and McCart, 1979	foot surveys	50		1021 (25-3951)
			FRASER R., N.B.C. and YUKON				
Adams R. (lower)	1981	45	Whelen and Olmsted, 1982	foot and aerial surveys	1100		269 (-) -odd years
South Thompson R.	1981	1370	Whelen and Olmsted 1982	highest aerial count	1560		267 (25-1000)
North Thompson R.	1981	25	Scott et al, 1982	foot surveys	20		

APPENDIX C-4

SEX RATIOS of Stocks Sampled

Although the male:female (M:F) ratio often was assumed to be 1:1, most of the New Projects studies assessed this factor by objective means. The sex ratios detailed here have been standardized from the data provided in the source report so that jacks are included in the male population. In cases where more than one gear type was used to obtain samples, an overall average using the total number of fish also was derived.

SEX RATIOS OF CHINOOK STOCKS SAMPLED

STREAM	YEAR	SOURCE	METHODS	N	M:F	F:M
		NORTH COAST				
Morice R.	1978	Smith & Berezay, 1983	Carcass Recovery	71	0.54:1	1.85:1
	1979	Smith & Berezay, 1983	Carcass Recovery	308	1.03:1	0.97:1
	1980	Smith & Berezay, 1983	Carcass Recovery	266	0.48:1	2.08:1
Kitlope R.	1981	Rosberg et al, 1982	Carcass Recovery	55	1.39:1	0.72:1
			Live Count	40	0.67:1	1.50:1
			Overall	95	1.02:1	0.98:1
Kemano R.	1979	Murray & Hamilton, 1981	Carcass Recovery	85	0.83:1	1.21:1
		SOUTH COAST				
Mussel Ck.	1981	Fielden & Slaney, 1982	Carcass Recovery	35	1.92:1	0.52:1
	1983	Whelen & Morgan, 1984	Angling	273	0.73:1	1.37:1
			Carcass Recovery	26	7.67:1	0.13:1
			Counting Fence	14	2.50:1	0.40:1
			Overall	313	0.90:1	1.11:1
Kilnaklini R.	1983	Whelen & Morgan, 1984	Carcass Recovery	4	0.30:1	3.3:1
			Angling	1	1:0	0:1
			Overall	5	0.67:1	1.50:1
Ahnuhati R.	1983	Whelen & Morgan, 1984	Carcass Recovery	16	0.60:1	1.67:1
			Angling	7	2.50:1	0.40:1
			Overall	23	0.92:1	1.09:1
Sucwoa R.	1978	Giova & McCart, 1979	Seining	92	3.01:1	0.33:1
			Carcass Recovery	128	1.67:1	0.60:1
			Overall	220	2.01:1	48.1:1
Canton Ck.	1978	Giova & McCart, 1979	Seining	27	27:0	0:27
			Carcass Recovery	13	3.33:1	0.30:1
			Overall	40	12:33:1	0.08:1
Conuma R.	1978	Giova & McCart, 1979	Carcass Recovery	89	1.54:1	0.65:1
Tlupana R.	1978	Giova & McCart, 1979	Carcass Recovery	7	1.33:1	0.75:1
Deserted Ck.	1978	Giova & McCart, 1979	Seining	34	2.40:1	0.42:1
			Carcass Recovery	73	1.28:1	0.78:1
			Overall	107	1.55:1	0.65:1
Nitinat R.	1979	McCart et al, 1980	Seining	502	1.08:1	0.92:1
			Carcass Recovery	1900	1.05:1	0.96:1
			Overall	2402	1.05:1	0.95:1
Little Qualicum R.	1978	Lister, 1979	Carcass Recovery	9	1.25:1	0.80:1
		FRASER R., N.B.C., and YUKON				
Holmes R.	1981	Rosberg & Aitken, 1982	Carcass Recovery	12	0.50:1	2.0:1
Torpy R.	1981	Rosberg & Aitken, 1982	Carcass Recovery	38	0.65:1	1.53:1
West Torpy R.	1981	Rosberg & Aitken, 1982	Carcass Recovery	17	0.70:1	1.43:1
Walker Ck.	1981	Rosberg & Aitken, 1982	Carcass Recovery	65	0.97:1	1.03:1
Slim Ck.	1980	Murray et al, 1981	Carcass Recovery	146	0.36:1	2.74:1
	1981	Rosberg & Aitken, 1982	Carcass Recovery	268	0.83:1	1.21:1
Bowron R.	1980	Murray et al, 1981	Carcass Recovery	177	0.45:1	2.22:1
Willow R.	1980	Murray et al, 1981	Carcass Recovery	63	0.40:1	2.50:1
Wansa Ck.	1980	Murray et al, 1981	Carcass Recovery	36	0.13:1	8.0:1
Stuart R.	1980	Hickey & Lister, 1981	Carcass Recovery	1226	0.62:1	1.62:1
			Seining	105	1.33:1	0.75:1
			Overall	1331	0.66:1	1.52:1
Nechako R.	1979	Olmsted et al, 1980	Angling	27	0.80:1	1.25:1
			Carcass Recovery	17	1.13:1	0.89:1
			Overall	44	0.91:1	1.10:1
West Road (Blackwater R.)	1980	Olmsted et al, 1981	Angling	17	2.40:1	0.40:1
Nazko R.	1980	Olmsted et al, 1981	Angling	10	1.50:1	0.67:1
Cottonwood R.	1980	Olmsted et al, 1981	Angling	7	1.33:1	0.75:1
			Carcass Recovery	2	0:2	2.0:0
			Overall	9	0.57:1	1.75:1
McKinley Ck.	1980	Olmsted et al, 1981	Angling	15	2.75:1	0.36:1
			Carcass Recovery	4	0.33:1	3.0:1
			Overall	19	1.71:1	0.58:1
Horsefly R.	1979	Olmsted et al, 1980	Angling	45	0.73:1	1.36:1
			Carcass Recovery	12	0.33:1	3.0:1
			Overall	57	0.58:1	1.71:1
	1980	Olmsted et al, 1981	Angling	46	1.19:1	0.84:1
			Carcass Recovery	12	0.20:1	5.0:1
			Overall	58	0.87:1	1.18:1

SEX RATIOS OF CHINOOK STOCKS SAMPLED

STREAM	YEAR	SOURCE	METHODS	N	M:F	F:M
		FRASER R., N.B.C., and YUKON - Cont'd				
Quesnel R.	1979	Olmsted et al, 1980	Angling	65	2.10:1	0.48:1
			Carcass Recovery	66	0.74:1	1.36:1
			Overall	131	1.22:1	0.82:1
	1980	Olmsted et al, 1981	Angling	296	1.04:1	0.96:1
			Carcass Recovery	85	0.39:1	2.54:1
			Overall	381	0.85:1	1.18:1
Eagle R.	1981	Whelen & Olmsted, 1982	Angling	41	1.28:1	0.78:1
			Carcass Recovery	84	0.65:1	1.55:1
			Overall	125	0.81:1	1.23:1
Salmon R.	1981	Whelen & Olmsted, 1982	Angling	33	1.20:1	0.83:1
			Carcass Recovery	43	0.23:1	4.38:1
			Fence	22	0.83:1	1.20:1
			Overall	98	0.58:1	1.72:1
Adams R. (lower)	1981	Whelen & Olmsted, 1982	Carcass Recovery	122	0.54:1	1.84:1
South Thompson R.	1981	Whelen & Olmsted, 1982	Carcass Recovery	817	0.21:1	4.88:1
Finn Ck.	1981	Scott et al, 1982	Fence	128	0.91:1	1.1:1
			Angling	510	1.81:1	0.85:1
			Carcass Recovery	40	1.67:1	0.60:1
			Overall	678	1.15:1	0.87:1
Raft R.	1981	Scott et al, 1982	Fence	67	2.05:1	0.49:1
			Carcass Recovery	261	1.61:1	0.62:1
			Overall	328	1.69:1	0.59:1
North Thompson R.	1981	Scott et al, 1982	Seining	23	3.60:1	0.28:1
			Carcass Recovery	419	0.96:1	1.04:1
			Overall	442	1.02:1	0.98:1

SEX RATIOS OF COHO STOCKS SAMPLED

STREAM	YEAR	SOURCE	METHODS	N	M:F	F:M
		NORTH COAST				
Mathers Ck.	1978 1979	Giova et al, 1979 Grant & McCart, 1980	Seining Fence	78 10	2.55:1 1.50:1	0.39:1 0.67:1
Kemano R.	1979	Murray & Hamilton, 1981	Carcass Recovery	39	0.85:1	1.17:1
Kwatna R.	1983	Rice, 1984	Angling[1]	90	1.6:1[2]	0.6:1[2]
		SOUTH COAST				
Kakweiken R.	1981	Slaney & Milko, 1982	Fishway	326	1.17:1	0.85:1
Mussel Ck.	1983	Whelen & Morgan, 1984	Fence Angling Carcass Recovery Overall	48 35 1 84	2.43:1 2.18:1 1:0 2.36:1	0.41:1 0.46:1 0:1 0.43:1
Klinaklini R.	1983	Whelen & Morgan, 1984	Angling Carcass Recovery Overall	12 1 13	3.0:1 1:0 3.33:1	0.33:1 0:1 0.30:1
Ahnuhati R.	1983	Whelen & Morgan, 1984	Angling	14	6.0:1	0.17:1
Sucwoa R.	1978	Giova & McCart, 1979	Seining Carcass Recovery Overall	44 3 47	1.44:1 3:0 1.61:1	0.69:1 0:3 0.62:1
Canton Ck.	1978	Giova & McCart, 1979	Seining Carcass Recovery Overall	25 2 27	1.50:1 0:2 1.25:1	0.67:1 2:0 0.8:1
Conuma R.	1978	Giova & McCart, 1979	Seining Carcass Recovery Overall	52 11 63	0.86:1 1.75:1 0.97:1	1.17:1 0.57:1 1.03:1
Deserted Ck.	1978	Giova & McCart, 1979	Carcass Recovery	12	1:1	1:1
Nitinat R.	1979	McCart et al, 1980	Seining Carcass Recovery Overall	4 40 44	3.0:1 0.48:1 0.57:1	0.33:1 2.08:1 1.75:1
Little Qualicum R.	1978	Lister, 1979	Carcass Recovery	63	1.42:1	0.70:1
		FRASER R., N.B.C., and YUKON				
Eagle R. (incl. South Pass Ck.)	1982	Whelen et al, 1983	Angling Carcass Recovery Overall	71 132 203	0.61:1 0.61:1 0.61:1	1.63:1 1.64:1 1.64:1
Salmon R. (incl. Bolean Ck.)	1982	Whelen et al, 1983	Angling Carcass Recovery Overall	48 30 78	1.29:1 2.0:1 1.52:1	0.78:1 0.50:1 0.66:1
Adams R. (lower) (incl. Sinmax Hiuihill and Nikwikwaia Cks.)	1982	Whelen et al, 1983	Angling Carcass Recovery Overall	19 6 25	1.38:1 0.50:1 1.08:1	0.73:1 2.0:1 0.92:1
Adams R. (upper) (incl. Momich R. and Cayene Ck.)	1982	Whelen et al, 1983	Angling Carcass Recovery Overall	16 3 19	1.67:1 0:3 1.11:1	0.60:1 3:0 0.90:1
Albreda R.	1982	Hutton et al, 1983	Carcass Recovery	17	0.89:1	1.13:1
Lion Ck.	1982	Hutton et al, 1983	Carcass Recovery	917	0.53:1	1.87:1
Wire Cache Ck.	1982	Hutton et al, 1983	Carcass Recovery	70	0.84:1	1.19:1
Lemieux Ck.	1982	Hutton et al, 1983	Carcass Recovery	183	0.61:1	1.65:1
Barriere R.	1982	Hutton et al, 1983	Carcass Recovery	51	0.31:1	3.25:1
Louis Ck.(incl. Christian Ck)	1982	Hutton et al, 1983	Carcass Recovery	204	1.02:1	0.98:1
Coldwater R.	1982	Whelen et al, 1983	Angling Carcass Recovery Overall	18 2 20	1.25:1 1:1 1.22:1	0.80:1 1:1 0.82:1

1 caught by area loggers.
2 a 1:1 male to female ratio was assumed for the population.

SEX RATIOS OF CHUM STOCKS SAMPLED

STREAM	YEAR	SOURCE	METHODS	N	M:F	F:M
			NORTH COAST			
Mathers Ck.	1978	Glova et al, 1979	Seining Carcass Recovery Overall	311 278 589	1.41:1 0.81:1 1.08:1	0.71:1 1.24:1 0.92:1
	1979	Grant & McCart, 1980	Seining	10	2.33:1	0.43:1
Kitlope R.	1981	Rosberg et al, 1982	Seining Carcass Recovery Overall	59 38 97	1.46:1 2.45:1 1.63:1	0.69:1 0.41:1 0.61:1
Gamsby R.	1981	Rosberg et al, 1982	Carcass Recovery	19	0.90:1	1.11:1
Kemano R.	1979	Murray & Hamilton, 1981	Carcass Recovery	5474	0.72:1	1.39:1
Kwatna R.	1983	Rice, 1984	Carcass Recovery	349	1.2:1	0.8:1
Quatlena R.	1983	Rice, 1984	Carcass Recovery	55	1.2:1	0.8:1
			SOUTH COAST			
Kakweiken R.	1981	Slaney & Milko, 1982	Fishway Carcass Recovery Overall	51 17 68	1.43:1 1.43:1 1.43:1	0.70:1 0.70:1 0.70:1
Glendale/Tom Browne Cks.	1981 1983	Fielden & Slaney, 1982 Whelen & Morgan, 1984	Carcass Recovery Carcass Recovery	24 45	0.60:1 1.50:1	1.67:1 0.67:1
Mussel Ck.	1983	Whelen & Morgan, 1984	Angling	14	6.01:1	0.17:1
Ahnuhati R.	1981 1983	Fielden & Slaney, 1982 Whelen & Morgan, 1984	Carcass Recovery Carcass Recovery	22 109	0.69:1 1.37:1	1.44:1 0.73:1
Sucwoa R.	1978	Glova & McCart, 1979	Seining Carcass Recovery Overall	291 3901 4192	1.69:1 0.73:1 0.77:1	0.59:1 1.38:1 1.30:1
Canton Ck.	1978	Glova & McCart, 1979	Seining Carcass Recovery Overall	251 1343 1594	1.15:1 0.64:1 0.70:1	0.87:1 1.56:1 1.42:1
Conuma R.	1978	Glova & McCart, 1979	Seining Carcass Recovery Overall	830 5895 6725	1.48:1 0.74:1 0.84:1	0.68:1 1.35:1 1.24:1
Tlupana R.	1978	Glova & McCart, 1979	Seining Carcass Recovery Overall	140 1173 1313	0.82:1 0.77:1 0.78:1	1.22:1 1.29:1 1.29:1
Deserted Ck.	1978	Glova & McCart, 1979	Seining Carcass Recovery Overall	960 22095 23055	2.53:1 0.77:1 0.96:1	0.40:1 1.30:1 1.24:1
Nitinat R.	1979	McCart et al, 1980	Seining Carcass Recovery Overall	841 3108 3949	1.08:1 0.83:1 0.88:1	0.92:1 1.21:1 1.14:1
Little Qualicum R.	1978	Lister 1979	Carcass Recovery	65046	0.81:1	1.24:1

SEX RATIOS OF SOCKEYE STOCKS SAMPLED

STREAM	YEAR	SOURCE	METHODS	N	M:F	F:M
			NORTH COAST			
Tezwa R.	1981	Rosberg et al, 1982	Carcass Recovery	10	2.33:1	0.43:1
Kalitan Ck.	1981	Rosberg et al, 1982	Carcass Recovery Live Collection Overall	205 221 426	2.25:1 5.14:1 3.30:1	0.44:1 0.19:1 0.30:1
Kitlope R.	1981	Rosberg et al, 1982	Seining Carcass Recovery Overall	2 23 25	1:1 0.77:1 0.79:1	1:1 1.30:1 1.27:1
Kwatna R.	1983	Rice, 1984	Seining	11	1.75:1	0.57:1
			SOUTH COAST			
Kakweiken R.	1981	Slaney & Milko, 1982	Fishway	95	1.50:1	0.67:1
Mussel Ck.	1983	Whelen & Morgan, 1984	Fence Angling Carcass Recovery Overall	4 3 1 8	1:1 3:0 1:0 7:1	1:1 0:3 0:1 0.14:1
Sucwoa R.	1978	Glova & McCart, 1979	Seining Carcass Recovery Overall	153 38 191	1.32:1 0.65:1 1.30:1	0.76:1 1.53:1 0.97:1
Canton Ck.	1978	Glova & McCart, 1979	Seining	22	0.69:1	1.44:1
Conuma R.	1978	Glova & McCart, 1979	Seining Carcass Recovery Overall	40 11 51	1.35:1 1.75:1 1.43:1	0.74:1 0.57:1 0.70:1

SEX RATIOS OF PINK STOCKS SAMPLED

STREAM	YEAR	SOURCE	METHODS	N	M:F	F:M
			NORTH COAST			
Kwatna R.	1983[1]	Rice, 1984	Seining Carcass Recovery Overall	595 11737 12332	1.8:1 0.8:1 approx. 0.8:1	0.6:1 1.3:1 approx. 1.3:1
Quatlena R.	1983	Rice, 1984	Carcass Recovery	508	0.9:1	1.1:1
Kitlope R.	1981	Rosberg et al, 1982	Carcass Recovery	24	1:1	1:1
Kemano R.	1979	Murray & Hamilton, 1981	Carcass Recovery	2595	0.45:1	2.19:1
Morice R.	1979	Smith & Berezay, 1983	Carcass Recovery	73	0.62:1	1.61:1
			SOUTH COAST			
Kakweiken R.	1981	Slaney & Milko, 1982	Fishway Carcass Recovery Overall	573 333 906	0.85:1 1.87:1 1.22:1	1.17:1 0.53:1 0.82:1
Glendale/Tom Browne Cks.	1981 1983	Fielden & Slaney, 1982 Whelen & Morgan, 1984	Carcass Recovery Carcass Recovery	46 206	1.70:1 0.96:1	0.59:1 1.04:1
Mussel Ck.	1983	Whelen & Morgan, 1984	Carcass Recovery Angling Overall	4 3 7	4:0 2:1 6:1	0:4 0.5:1 0.17:1
Kilnaklini R.	1983	Whelen & Morgan, 1984	Angling Carcass Recovery Overall	18 1 19	0.80:1 0:1 0.73:1	1.25:1 1:0 1.38:1
Annuhati R.	1983	Whelen & Morgan, 1984	Carcass Recovery Angling Overall	135 75 210	1.21:1 0.50:1 0.89:1	0.82:1 2:1 1.38:1
Sucwoa R.	1978	Glova & McCart, 1979	Seining Carcass Recovery Overall	85 289 374	0.70:1 0.45:1 0.50:1	1.43:1 2.21:1 1.99:1
Canton Ck.	1978	Glova & McCart, 1979	Seining Carcass Recovery Overall	13 22 35	0.86:1 0.69:1 0.75:1	1.17:1 1.44:1 1.33:1
Conuma R.	1978	Glova & McCart, 1979	Seining Carcass Recovery Overall	1 80 81	0:1 0.31:1 0.31:1	1:0 3.21:1 3.26:1
Deserted Ck.	1978	Glova & McCart, 1979	Seining Carcass Recovery Overall	3 5 8	3:0 4:1 7:1	0:3 0.25:1 0.14:1

[1] a sex ratio of 1M:F was assumed for the population.

APPENDIX C-5

AGE COMPOSITION of Stocks Sampled (expressed as percent)

Age composition data were presented inconsistently between studies and required extensive recalculation in order to employ a standard format. Source report appendices were used as the primary data source and all age sampling data were included wherever possible. Length and age data were rejected if fish were badly decomposed, or if obvious data flaws existed. Regeneration rates were identified within each population studied so that the nonreadable scales (NR) are included only as sample totals --- the overall percent age compositions exclude NR scales. Unless otherwise indicated, ages were derived from scale analysis.

AGE COMPOSITION OF CHINOOK STOCKS SAMPLED (expressed as %)

STREAM	YEAR	SOURCE	SEX	N	AGE (in years) 2_1	2_2	3_1	3_2	4_1	4_2	5_1	5_2	5_3	6_2	6_3	NR*
NORTH COAST																
Morice R.	1978	Smith and Berezay, 1983	M	25	10.0	0	10.0	5.0	10.0	40.0	10.0	15.0	0	0	0	5/25
			F	46	0	0	0	0	35.1	8.1	18.9	35.1	0	0	2.7	9/46
			Total	71	3.5	0	3.5	1.8	26.3	19.3	15.8	28.1	0	0	1.8	14/71
	1979	Smith and Berezay, 1983	M	156	0	0	5.1	2.9	8.8	27.0	8.0	37.2	0	10.9	0	19/156
			F	152	0	0	0.7	0	9.6	2.9	16.2	53.7	0	16.9	0	16/152
			Total	308	0	0	2.9	1.5	9.2	15.0	12.5	45.4	0	13.9	0	35/308
	1980	Smith and Berezay, 1983	M	86	0	0	0	1.6	1.6	6.6	0	75.4	0	13.1	1.6	25/86
			F	180	0	0	0	1.3	2.6	9.7	1.3	75.3	0	9.1	0	26/180
			Total	266	0	0	0	1.4	2.3	8.8	0.9	75.3	0	10.2	0.5	51/266
Kitlope R.	1981	Rosberg et al, 1982	M	21	0	0	0	4.8	4.8	23.8	4.8	28.6	0	33.3	0	NG
			F	12	0	0	0	0	0	0	0	58.3	0	41.7	0	NG
			Total	33	0	0	0	3.0	3.0	15.2	3.0	39.4	0	36.4	0	NG
Kemano R.	1979	Murray and Hamilton, 1981	M	3	0	0	33.3	0	0	66.7	0	0	0	0	0	0
			F	4	0	0	0	0	0	0	100	0	0	0	0	0
			Total	7	0	0	14.3	0	0	28.6	57.1	0	0	0	0	0
SOUTH COAST																
Mussel Ck.	1981	Fielden and Slaney, 1982	M	16	0	0	0	50.0	0	16.7	0	33.3	0	0	0	10/16
			F	10	0	0	0	0	0	0	12.5	75.0	0	12.5	0	2/10
			Total	26	0	0	0	21.4	0	7.1	7.1	57.1	0	7.1	0	12/26
	1983	Whelen and Morgan, 1984	M	102	1.2	0	2.4	28.2	5.9	45.9	1.2	15.3	0	0	0	17/102
			F[1]	107	0	0	0	0	3.3	5.6	20.0	65.6	0	0	0	17/107
			Total	209	0.6	0	1.1	13.7	4.6	25.1	10.9	41.1	0	0	0	34/209
Ahnuhati R.	1983	Whelen and Morgan, 1984	M	11	0	0	0	11.1	11.1	22.2	0	33.3	11.1	0	11.1	2/11
			F	12	0	0	0	0	0	0	0	40.0	0	60.0	0	2/12
			Total	23	0	0	0	5.3	5.3	10.5	0	36.8	5.3	31.6	5.3	4/23

NG - not given

1 - 5.6% of this sample were age 6_1 (2.9% of total)

* - not readable

NOTE: unless otherwise indicated, ages were derived from scale analysis

- NR's in all tables are included in sample totals and %'s for aged fish are derived from the sample total less the NR's.

AGE COMPOSITION OF CHINOOK STOCKS SAMPLED (expressed as %)

STREAM	YEAR	SOURCE	SEX	N	AGE (in years) 2_1	2_2	3_1	3_2	4_1	4_2	5_1	5_2	5_3	6_2	6_3	NR*
SOUTH COAST - Cont'd																
Sucwoa R.	1978	Glova and McCart, 1979	M	29	44.8	0	34.5	0	10.3	0	10.3	0	0	0	0	NG
			F	13	15.4	0	7.7	0	38.5	0	38.5	0	0	0	0	NG
			Total	42	35.7	0	26.2	0	19.0	0	19.0	0	0	0	0	NG
Canton Ck.	1978	Glova and McCart, 1979	M	20	50	0	50	0	0	0	0	0	0	0	0	NG
			F	0	0	0	0	0	0	0	0	0	0	0	0	NG
			Total	20	50	0	50	0	0	0	0	0	0	0	0	NG
Deserted Ck.	1978	Glova and McCart, 1979	M	16	0	0	56.3	0	18.8	12.5	12.5	0	0	0	0	NG
			F	5	0	0	0	0	80.0	0	20.0	0	0	0	0	NG
			Total	21	0	0	42.9	0	33.3	9.5	14.3	0	0	0	0	NG
Nitinat R.	1979	McCart et al, 1980	M	82	56.1	0	3.7	0	28.1	0	12.2	0	0	0	0	NG
			F	95	0	0	0	2.1	50.5	0	47.4	0	0	0	0	NG
			Total	177	26.0	0	1.7	1.1	40.1	0	31.1	0	0	0	0	NG
Little Qualicum R.	1978	Lister, 1979	M	5	40.0	0	40.0	0	20.0	0	0	0	0	0	0	0/5
			F	4	0	0	0	0	100	0	0	0	0	0	0	1/4
			Total	9	25.0	0	25.0	0	50.0	0	0	0	0	0	0	1/9
FRASER R., N.B.C. and YUKON																
Holmes R.	1981	Rosberg and Aitken, 1982	M	4	0	0	0	0	0	0	0	75	0	25	0	0/4
			F	8	0	0	0	0	0	0	0	100	0	0	0	3/8
			Total	12	0	0	0	0	0	0	0	88.9	0	11.1	0	3/12
Torpy R.	1981	Rosberg and Aitken, 1982	M	15	0	0	0	0	0	26.7	0	66.7	0	6.7	0	0/15
			F	22	0	0	0	0	0	4.5	0	95.5	0	0	0	0/22
			Total	37	0	0	0	0	0	13.5	0	83.8	0	2.7	0	0/37
West Torpy R.	1981	Rosberg and Aitken, 1982	M	7	0	0	0	0	0	0	0	83.3	0	16.7	0	1/7
			F	10	0	0	0	0	0	0	0	80.0	0	20.0	0	0/10
			Total	17	0	0	0	0	0	0	0	81.3	0	18.8	0	1/17
Walker Ck.	1981	Rosberg and Aitken, 1982	M	31	0	0	0	0	0	45.5	0	50.0	0	4.5	0	9/31
			F	32	0	0	0	0	0	13.8	0	75.9	0	10.3	0	3/32
			Total	63	0	0	0	0	0	27.5	0	64.7	0	7.8	0	12/63

NG - not given
* - not readable
NOTE: unless otherwise indicated, ages were derived from scale analysis

AGE COMPOSITION OF CHINOOK STOCKS SAMPLED (expressed as %)

STREAM	YEAR	SOURCE	SEX	N	AGE (in years)											
					2_1	2_2	3_1	3_2	4_1	4_2	5_1	5_2	5_3	6_2	6_3	NR*
FRASER R., N.B.C. and YUKON - Cont'd																
Slim Ck.	1980	Murray et al, 1981	M	28	0	0	0	0	3.6	42.8	3.6	50.0	0	0	0	NG
			F	82	0	0	0	0	9.8	7.3	0	82.9	0	0	0	NG
			Total	110	0	0	0	0	8.2	16.4	0.9	74.5	0	0	0	NG
	1981	Rosberg and Aitken, 1982	M	112	0	0	0	1.6	1.6	39.7	0	55.6	0	1.6	0	49/112
			F	145	0	0	0	0	1.0	11.0	0	88.0	0	0	0	45/145
			Total	257	0	0	0	0.6	1.2	22.1	0	75.5	0	0.6	0	94/257
Bowron R.	1980	Murray et al, 1981	M	40	0	0	0	0	0	17.5	0	82.5	0	0	0	NG
			F	96	0	0	0	0	5.2	3.1	0	91.7	0	0	0	NG
			Total	136	0	0	0	0	3.7	7.4	0	89.0	0	0	0	NG
Willow R.	1980	Murray et al, 1981	M	10	0	0	0	10.0	0	40.0	0	40.0	0	10.0	0	NG
			F	57	0	0	0	0	0	14.0	0	86.0	0	0	0	NG
			Total	67	0	0	0	1.5	0	17.9	0	79.1	0	1.5	0	NG
Stuart R.	1980	Hickey and Lister, 1981	M	132	0	0	0	11.4	0	24.2	0	62.9	0	1.5	0	NG
			F	136	0	0	1.5	0	2.2	15.4	0	80.2	0.7	0	0	NG
			Total	268	0	0	0.7	5.6	1.1	19.8	0	71.6	0.4	0.7	0	NG
Nechako R.	1979	Olmsted et al, 1980	M	9	0	0	22.2	0	44.5	11.1	22.2	0	0	0	0	NG
			F	19	0	0	15.8	0	47.5	21.2	5.3	10.5	0	0	0	NG
			Total	28	0	0	17.9	0	46.4	17.9	10.7	7.1	0	0	0	NG
West Road R. (Blackwater R.)	1980	Olmsted et al, 1981	M	12	0	0	0	0	0	87.5	0	12.5	0	0	0	4/12
			F	5	0	0	0	0	0	80.0	0	20.0	0	0	0	0/5
			Total	17	0	0	0	0	0	84.6	0	15.4	0	0	0	4/17
Nazko R.	1980	Olmsted et al, 1981	M	6	0	0	20.0	0	0	80.0	0	0	0	0	0	1/6
			F	4	0	0	0	0	0	33.3	0	66.7	0	0	0	1/4
			Total	10	0	0	12.5	0	0	62.5	0	25.0	0	0	0	2/10
Cottonwood R.	1980	Olmsted et al, 1981	M	4	0	0	0	0	0	100	0	0	0	0	0	1/4
			F	5	0	0	0	0	60.0	0	0	40.0	0	0	0	0/5
			Total	9	0	0	0	0	37.5	37.5	0	25.0	0	0	0	1/9

NG - not given
* - not readable
NOTE: unless otherwise indicated, ages were derived from scale analysis

AGE COMPOSITION OF CHINOOK STOCKS SAMPLED (expressed as %)

STREAM	YEAR	SOURCE	SEX	N	AGE (in years) 2_1	2_2	3_1	3_2	4_1	4_2	5_1	5_2	5_3	6_2	6_3	NR*
FRASER R., N.B.C. and YUKON - Cont'd																
Horsefly R.	1979	Olmsted et al, 1980	M	6	0	0	0	0	50.0	16.7	0	33.3	0	0	0	0/6
			F	5	0	0	0	0	100	0	0	0	0	0	0	0/5
			Total	11	0	0	0	0	72.7	9.1	0	18.2	0	0	0	0/11
Horsefly R.	1980	Olmsted et al, 1981	M	26	0	0	0	15.0	5.0	30.0	0	45.0	0	5.0	0	6/26
			F	30	0	0	0	0	0	8.3	4.2	87.5	0	0	0	6/30
			Total	56	0	0	0	6.8	2.3	18.2	2.3	68.2	0	2.3	0	12/56
McKinley Ck.	1980	Olmsted et al, 1981	M	12	0	0	0	0	0	22.2	0	77.8	0	0	0	3/12
			F	6	0	0	0	0	20.0	0	0	80.0	0	0	0	1/6
			Total	18	0	0	0	0	7.1	14.3	0	78.6	0	0	0	4/18
Quesnel R.	1979	Olmsted et al, 1980	M	27	0	0	14.8	0	63.0	3.7	18.5	0	0	0	0	NG
			F	36	0	0	5.6	0	75.0	5.6	5.6	8.3	0	0	0	NG
			Total	63	0	0	9.5	0	69.8	4.8	11.1	4.8	0	0	0	NG
Quesnel R.	1980	Olmsted et al, 1981	M	184	1.8	0	0.6	17.9	2.5	16.6	2.5	47.9	0	6.1	0.6	21/184
			F	196	0	0	0	0	5.1	5.1	1.1	84.3	0	4.5	0	18/196
			Total	380	0.9	0	0.3	10.3	3.8	10.6	1.8	66.9	0	5.3	0.3	39/380
Eagle R.	1981	Whelen and Olmsted, 1982	M	51	0	0	0	8.3	12.5	66.7	0	12.5	0	0	0	27/51
			F	67	0	0	2.1	0	0	60.4	0	37.5	0	0	0	19/67
			Total	118	0	0	1.4	2.8	4.2	62.5	0	29.2	0	0	0	46/118
Salmon R.	1981	Whelen and Olmsted, 1982	M	35	0	0	11.5	34.6	0	46.2	0	7.7	0	0	0	9/35
			F	60	0	0	2.0	4.1	2.0	59.2	0	32.7	0	0	0	11/60
			Total	95	0	0	5.3	14.7	1.3	54.7	0	24.0	0	0	0	20/95
Adams R.	1981	Whelen and Olmsted, 1982	M	43	3.6	3.6	14.3	7.1	35.7	10.7	10.7	14.3	0	0	0	15/43
			F	77	0	0	0	0	56.1	5.3	5.3	33.3	0	0	0	20/77
			Total	120	1.2	1.2	4.7	2.4	49.1	7.1	7.1	27.1	0	0	0	35/120

NG - not given
* - not readable
NOTE: unless otherwise indicated, ages were derived from scale analysis

AGE COMPOSITION OF CHINOOK STOCKS SAMPLED (expressed as %)

STREAM	YEAR	SOURCE	SEX	N	2_1	2_2	3_1	3_2	4_1	4_2	5_1	5_2	5_3	6_2	6_3	NR*
					AGE (in years)											
FRASER R., N.B.C. and YUKON - Cont'd																
South Thompson R.	1981	Whelen and Olmsted, 1982	M	139	0.9	0.9	1.9	1.9	34.6	1.9	19.6	35.5	0	2.8	0	32/139
			F	678	0	0	0.3	0	50.7	3.1	9.3	32.8	0	3.8	0	68/678
			Total	817	0.1	0.1	0.6	0.3	48.3	2.9	10.9	33.3	0	3.6	0	100/817
Finn Ck.	1981	Scott et al, 1982	M	282	0	0	0.5	14.9	2.7	29.9	0	50.2	0.5	1.4	0	61/282
			F	224	0	0	0	0	6.4	14.0	0	72.7	1.7	5.2	0	52/224
			Total	506	0	0	0.3	8.4	4.3	22.9	0	60.1	1.0	3.1	0	113/506
Raft R.	1981	Scott et al, 1982	M	136	0	0	0	35.1	0	46.5	0	16.7	0.9	0.9	0	22/136
			F	92	0	0	1.2	0	2.5	28.4	0	67.9	0	0	0	11/92
			Total	228	0	0	0.5	20.5	1.0	39.0	0	37.9	0.5	0.5	0	33/228
North Thompson R.	1981	Scott et al, 1982	M	193	0	0	0	19.6	2.0	25.5	0	51.0	0	2.0	0	40/193
			F	207	0	0	0.6	0	1.8	17.1	0.6	79.9	0	0	0	43/207
			Total	400	0	0	0.3	9.5	1.9	21.1	0.3	65.9	0	0.9	0	83/400

NG - not given

* - not readable

NOTE: unless otherwise indicated, ages were derived from scale analysis

AGE COMPOSITION OF COHO STOCKS SAMPLED (expressed as %)

STREAM	YEAR	SOURCE	SEX	N	AGE (in years) 2_2	3_2	3_3	4_2	4_3	NR*
NORTH COAST										
Mathers Ck.	1978	Glova et al, 1979	M	56	30.4	57.1	1.8	0	10.7	NG
			F	22	0	68.2	0	0	31.8	NG
			Total	78	21.8	60.3	1.3	0	16.7	NG
	1979	Grant and McCart, 1980	M	6	0	83.3	0	16.7	0	0/6
			F	4	0	66.7	0	33.3	0	1/4
			Total	10	0	77.8	0	22.2	0	1/10
Gamsby R.	1981	Rosberg et al, 1982	Total	6	0	80.0	0	0	20.0	NG
Kemano R.	1979	Murray and Hamilton, 1981	M	18	0	83.3	0	0	16.7	NG
			F	21	0	95.2	0	0	4.8	NG
			Total	39	0	89.7	0	0	10.3	NG
Kwatna R.	1983	Rice, 1984	M	24	4.2	87.5	0	0	8.3	0/42
			F	18	0	88.9	0	0	11.1	0/18
			Total	42	2.4	88.1	0	0	9.5	0/42
SOUTH COAST										
Kakweiken R.	1981	Slaney and Milko, 1982	M	102	14.7	58.8	2.9	0	23.5	0/102
			F	72	0	58.3	0	0	41.7	0/72
			Total	174	8.6	58.6	1.7	0	31.0	0/174
Mussel Ck.	1981	Fielden and Slaney, 1982	M	2	0	0	0	0	100	1/2
			F	7	0	100	0	0	0	1/7
			Total	9	0	85.7	0	0	14.3	2/9
	1983	Whelen and Morgan, 1984	M	58	1.8	94.7	0	0	3.5	1/58
			F	25	0	100	0	0	0	0/25
			Total	83	1.2	96.3	0		2.4	1/83
Klinaklini R.	1983	Whelen and Morgan, 1984	M	10	20.0	60.0	0	0	20.0	0/10
			F	3	0	100.0	0	0	0	0/3
			Total	13	15.4	69.2	0	0	15.4	0/13
Ahnuhati R.	1983	Whelen and Morgan, 1984	M	12	9.1	90.9	0	0	0	1/12
			F	2	0	100	0	0	0	0/2
			Total	14	7.7	92.3	0	0	0	1/14

NG - not given
* - not readable
NOTE: unless otherwise indicated, ages were derived from scale analysis

AGE COMPOSITION OF COHO STOCKS SAMPLED (expressed as %)

STREAM	YEAR	SOURCE	SEX	N	AGE (in years) 2_2	3_2	3_3	4_2	4_3	NR*
SOUTH COAST - Cont'd										
Sucwoa R.	1978	Glova and McCart, 1979	M	13	0	100	0	0	0	NG
			F	10	0	100	0	0	0	NG
			Total	23	0	100	0	0	0	NG
Canton Ck.	1978	Glova and McCart, 1979	M	8	0	100	0	0	0	NG
			F	5	0	100	0	0	0	NG
			Total	13	0	100	0	0	0	NG
Deserted Ck.	1978	Glova and McCart, 1979	M	2	0	100	0	0	0	NG
			F	3	0	66.7	0	0	33.3	NG
			Total	5	0	80.0	0	0	20.0	NG
Nitinat R.	1979	McCart et al, 1980	M	10	16.7	83.3	0	0	0	4/10
			F	23	0	90.9	0	9.1	0	12/23
			Total	33	5.9	88.2	0	5.9	0	16/33
Little Qualicum R.	1978	Lister, 1979	M	37	0	100	0	0	0	11/37
			F	26	0	100	0	0	0	10/26
			Total	63	0	100	0	0	0	21/63
FRASER R., N.B.C., and YUKON										
Eagle R. (incl. South Pass Ck.)	1982	Whelen et al, 1983	M	74	0	100	0	0	0	3/74
			F	126	0	96.6	0	0	3.4	8/126
			Total	200	0	97.9	0	0	2.1	11/200
Salmon R. (incl. Bolean Ck.)	1982	Whelen et al, 1983	M	47	0	100	0	0	0	5/47
			F	31	0	100	0	0	0	3/31
			Total	78	0	100	0	0	0	8/78
Adams R. (lower) (incl. Nikwikwia, Hiuihill and Sinmax Cks.)	1982	Whelen et al, 1983	M	13	0	90.9	0	0	9.1	2/13
			F	12	0	100.0	0	0	0	2/12
			Total	25	0	95.2	0	0	4.8	4/25
Adams R. (upper) (incl. Cayenne Ck. and Momich R.)	1982	Whelen et al, 1983	M	10	0	100	0	0	0	0/10
			F	8	0	100	0	0	0	0/8
			Total	18	0	100	0	0	0	0/18
Coldwater R.	1982	Whelen et al, 1983	M	11	0	81.8	0	0	18.2	0/11
			F	9	0	100	0	0	0	0/9
			Total	20	0	90.0	0	0	10.0	0/20

NG - not given
* - not readable
NOTE: unless otherwise indicated, ages were derived from scale analysis

AGE COMPOSITION OF COHO STOCKS SAMPLED (expressed as %)

STREAM	YEAR	SOURCE	SEX	N	AGE (in years)					
					2_2	3_2	3_3	4_2	4_3	NR*
FRASER R., N.B.C., and YUKON - Cont'd										
Albreda R.	1982	Hutton et al, 1983	M	8	0	87.5	0	0	12.5	0/8
			F	9	0	62.5	0	0	37.5	1/9
			Total	17	0	75.0	0	0	25.0	1/17
Lion Ck.	1982	Hutton et al, 1983	M	47	0	91.1	0	0	8.9	2/47
			F	104	0	94.0	0	0	6.0	4/104
			Total	151	0	93.1	0	0	6.9	6/151
Wire Cache Ck.	1982	Hutton et al, 1983	M	6	0	100	0	0	0	0/6
			F	4	0	100	0	0	0	0/4
			Total	10	0	100	0	0	0	0/10
Lemieux Ck.	1982	Hutton et al, 1983	M	29	0	96.2	0	0	3.8	3/29
			F	65	0	98.3	0	0	1.7	7/65
			Total	94	0	97.6	0	0	2.4	10/94
Barriere R.	1982	Hutton et al, 1983	M	7	0	100	0	0	0	0/7
			F	21	0	100	0	0	0	3/21
			Total	28	0	100	0	0	0	3/28
Louis Ck. (incl. Christian Ck.)	1982	Hutton et al, 1983	M	34	0	93.8	0	0	6.3	2/34
			F	36	0	96.8	0	0	3.2	5/36
			Total	70	0	95.2	0	0	4.8	7/70

NG - not given
* - not readable
NOTE: unless otherwise indicated, ages were derived from scale analysis

AGE COMPOSITION OF CHUM STOCKS SAMPLED (expressed as %)

STREAM	YEAR	SOURCE	SEX	N	AGE (in years) 2	3	4	5	6	NR*
NORTH COAST										
Mathers Ck.	1978	Glova et al, 1979	M	170	0	7.6	76.5	15.9	0	NG
			F	119	0	5.9	73.9	20.2	0	NG
			Total	289	0	6.9	75.4	17.6	0	NG
	1979	Grant and McCart, 1980	M	7	0	40.0	40.0	20.0	0	2/7
			F	3	0	50.0	50.0	0	0	1/3
			Total	10	0	42.9	42.9	14.3	0	3/10
Kitlope R.[1]	1981	Rosberg et al, 1982	M	49	0	4.1	93.9	2.0	0	0/49
			F	30	0	6.7	93.3	0	0	0/30
			Total	79	0	5.1	93.7	1.3	0	0/79
Kemano R.	1979	Murray and Hamilton, 1981	M	206	0	67.5	23.3	9.2	0	NG
			F	261	0	69.7	19.9	10.4	0	NG
			Total	467	0	68.7	21.4	9.9	0	NG
Kwatna R.	1983	Rice, 1984	M	138	0	6.5	63.0	30.4	0	0/138
			F	106	0	7.5	71.7	20.8	0	0/106
			Total	244	0	7.0	66.8	26.2	0	0/244
Quatlena R.	1983	Rice, 1984	M	9	0	44.4	44.4	11.2	0	0/9
			F	12	0	16.7	25.0	58.3	0	0/12
			Total	21	0	28.6	33.3	38.1	0	0/21
SOUTH COAST										
Kakweiken R.	1981	Slaney and Milko, 1982	M	20	0	25.0	75.0	0	0	0/20
			F	19	0	47.4	52.6	0	0	0/19
			Total	39	0	35.9	64.1	0	0	0/39
Glendale/Tom Browne Cks.	1981	Fielden and Slaney, 1982	M	8	0	37.5	50.0	12.5	0	0/8
			F	12	0	33.3	50.0	16.7	0	0/12
			Total	20	0	35.0	50.0	15.0	0	0/20
	1983	Whelen and Morgan, 1984	M	19	0	5.6	38.9	55.6	0	1/19
			F	5	0	0	40.0	60.0	0	0/5
			Total	24	0	4.3	39.1	56.5	0	1/24

NG - not given
* - not readable
1 - Kitlope R. fish were aged by scale and otilith, elsewhere stocks were aged by scale analysis only

AGE COMPOSITION OF CHUM STOCKS SAMPLED (expressed as %)

STREAM	YEAR	SOURCE	SEX	N	AGE (in years) 2	3	4	5	6	NR*
SOUTH COAST - Cont'd										
Mussel Ck.	1983	Whelen and Morgan, 1984	M	12	0	9.1	72.7	18.2	0	1/12
			F	2	0	0	50.0	50.0	0	0/2
			Total	14	0	7.7	69.2	23.1	0	1/14
Ahnuhati R.	1981	Fielden and Slaney, 1982	M	6	0	83.3	16.7	0	0	0/6
			F	9	0	77.8	22.2	0	0	0/9
			Total	15	0	80.0	20.0	0	0	0/15
	1983	Whelen and Morgan, 1984	M	58	0	5.4	57.1	37.5	0	2/58
			F	40	0	0	62.2	37.8	0	3/40
			Total	98	0	3.2	59.1	37.6	0	5/98
Sucwoa R.	1978	Glova and McCart, 1979	M	153	0	3.9	92.8	3.3	0	NG
			F	88	0	3.4	94.3	2.3	0	NG
			Total	241	0	3.7	93.4	2.9	0	NG
Canton Ck.	1978	Glova and McCart, 1979	M	88	0	3.4	95.5	1.1	0	NG
			F	82	0	0	100	0	0	NG
			Total	170	0	1.8	97.6	0.6	0	NG
Conuma R.	1978	Glova and McCart, 1979	M	178	0	2.8	96.1	1.1	0	NG
			F	114	0	4.4	92.1	3.5	0	NG
			Total	292	0	3.4	94.5	2.1	0	NG
Tlupana R.	1978	Glova and McCart, 1979	M	33	0	0	100	0	0	NG
			F	44	0	0	97.7	2.3	0	NG
			Total	77	0	0	98.7	1.3	0	NG
Deserted Ck.	1978	Glova and McCart, 1979	M	412	0.5	17.2	78.6	3.6	0	NG
			F	218	0	15.1	82.1	2.8	0	NG
			Total	630	0.3	16.5	79.8	3.3	0	NG
Nitinat R.	1979	McCart et al, 1980	M	41	0	56.1	31.7	7.3	4.9	NG
			F	64	0	51.6	37.5	7.8	3.1	NG
			Total	105	0	53.3	35.2	7.6	3.8	NG
Little Qualicum R.	1978	Lister, 1979	M	204	0	13.4	84.6	2.0	0	3/204
			F	201	0	7.7	91.3	1.0	0	6/201
			Total	405	0	10.6	87.9	1.5	0	9/405

NG - not given
* - not readable
Note: unless otherwise indicated, ages were derived from scale analysis

AGE COMPOSITION OF SOCKEYE STOCKS SAMPLED (expressed as %)

STREAM	YEAR	SOURCE	METHODS	SEX	N	AGE (in years) 3_1	3_2	4_1	4_2	4_3	5_2	5_3	6_3	NR*
			NORTH COAST											
Kitlope R.	1981	Rosberg et al, 1982	Scale, Otolith Analysis	M	7	14.3	0	0	0	0	71.4	0	14.3	0/7
				F	7	14.3	0	14.3	14.3	0	57.1	0	0	0/7
				Total	14	14.3	0	7.1	7.1	0	64.3	0	7.1	0/14
Tezwa R.	1981	Rosberg et al, 1982	Scale, Otolith Analysis	M	7	0	0	0	42.9	0	42.9	0	14.3	NG
				F	3	0	0	0	66.7	0	33.3	0	0	NG
				Total	10	0	0	0	50.0	0	40.0	0	10.0	NG
Kalitan Ck.	1981	Rosberg et al, 1982	Scale, Otolith Analysis	M	36	0	0	0	69.4	2.8	11.1	8.3	8.3	NG
				F	35	0	0	0	5.7	0	74.3	0	20.0	NG
				Total	71	0	0	0	38.0	1.4	42.3	4.2	14.1	NG
Kwatna R.	1983	Rice, 1984	scale analysis	M	7	0	14.2	0	42.9	0	42.9	0	0	0/7
				F	5	0	0	0	60.0	0	40.0	0	0	0/5
				Total	12	0	8.3	0	50.0	0	41.7	0	0	0/12
			SOUTH COAST											
Kakweiken R.	1981	Slaney and Milko, 1982	Scale Analysis	M	36	0	0	0	33.3	2.8	36.1	22.2	5.6	**
				F	25	0	0	0	52.0	0	24.0	20.0	4.0	**
				Total	61	0	0	0	41.0	1.6	31.1	21.3	4.9	NG
Mussel Ck.	1983	Whelen and Morgan, 1984	Scale Analysis	M	5	0	0	0	40.0	0	40.0	20.0	0	0/5
				F	2	0	0	0	50.0	0	0	50.0	0	0/2
				Total	7	0	0	0	42.9	0	28.6	28.6	0	0/7
Sucwoa R.	1978	Glova and McCart, 1979	Scale Analysis	M	54	0	9.3	0	75.9	0	11.1	3.7	0	NG
				F	25	0	0	0	56.0	0	36.0	8.0	0	NG
				Total	79	0	6.3	0	69.6	0	19.0	5.1	0	NG
Canton Ck.	1978	Glova and McCart, 1979	Scale Analysis	M	4	0	0	0	75	0	25	0	0	NG
				F	5	0	0	0	100	0	0	0	0	NG
				Total	9	0	0	0	88.9	0	11.1	0	0	NG
			FRASER R., N.B.C., and YUKON											
Adams R. (lower)	1981	Whelen and Olmsted, 1982	Scale Analysis	M	51	0	65.8	0	34.2	0	0	0	0	13/51
				F	19	0	23.1	0	76.9	0	0	0	0	6/19
				Total	70	0	54.9	0	45.1	0	0	0	0	19/70
Raft R.	1981	Scott et al, 1982	Scale Analysis	M	41	0	15.4	0	57.7	0	26.9	0	0	15/41
				F	11	0	0	0	66.7	0	33.3	0	0	2/11
				Total	52	0	11.4	0	60.0	0	28.6	0	0	17/52

NG - not given
* - not readable
** - the report gives totals of 7% (males) and 14% (females) but does not include these in sample totals

AGE COMPOSITION OF PINK STOCKS SAMPLED (expressed as %)

STREAM	YEAR	SOURCE	METHODS	SEX	N	AGE (in years) 2	NR*
NORTH COAST							
Quatna R.	1983	Rice, 1984	All pinks were assumed to be aged 2				
Quatlena R.	1983	Rice, 1984	All pinks were assumed to be aged 2				
Nootum R.	1983	Rice, 1984	All pinks were assumed to be aged 2				
SOUTH COAST							
Glendale/ Tom Browne Cks.	1983	Whelen and Morgan, 1984	Scale Analysis	M	5	100	0/5
				F	9	100	0/9
				Total	14	100	0/14
Ahnuhati R.	1983	Whelen and Morgan, 1984	Scale Analysis	M	6	100	0/6
				F	9	100	0/9
				Total	15	100	0/15
FRASER R., N.B.C. and YUKON							
Adams R.	1981	Whelen and Olmsted, 1982	Scale Analysis	M	3	100	NG
				F	5	100	NG
				Total	8	100	NG
South Thompson R.	1981	Whelen and Olmsted, 1982	Scale Analysis	M	12	100	NG
				F	21	100	NG
				Total	33	100	NG
North Thompson R.	1981	Scott et al, 1982	Scale Analysis	Total	6	100	NG

NG - not given
* - not readable

APPENDIX C-6

LENGTH AT AGE of Stocks Sampled

Similar to the age data, all the length data have been recalculated. The source report appendices were considered to be the primary authority, and baseline length data was organized to conform to the age classifications described in APPENDIX C-5. Some data for badly decomposed fish were rejected. In general, fork length (FL) was measured on live fish to avoid their injury, and postorbital-hypural length (POHL) was measured on carcasses: regressions were calculated and used for conversion where necessary. Sex was always recorded along with length.

In addition, regression equations were rejected if they were derived from a limited amount of data; new equations were developed from the largest possible data set within the source document appendices (these are noted on the tables). All equations were standardized to convert FL to POHL. Conversions to POHL used the equations developed for this study. Each equation and its applications given in the tables.

In the recalculated FL-POHL regression equations the value of "a" has been calculated to two decimal places, while the value of "b" was calculated to three decimal places. In a test using a small sample size (n=9) the FL value derived from an equation where "a" was accurate to zero decimal places and "b" was accurate to one decimal place was found to be 3.3% higher than the calculated mean. The equation with the greater accuracy (ie, two and three decimal places, respectively), deviated from the calculated mean by less than 0.1%.

LENGTH (mm) OF CHINOOK STOCKS SAMPLED

STREAM	YEAR	SOURCE	METHODS	POHL:FL REGRESSION	SEX	n	POHL at Age (± 2 S.E.) 2_1	2_2	3_1	3_2	4_1	4_2	5_1	5_2	5_3	6_1	6_2	6_3	NR	$\bar{x}$ POHL
							NORTH COAST													
Morice R.	1978	Smith and Berezay, 1983	Carcass Recovery	-	M	25	369±37	-	557±65	331	790±114	570±32	889±62	738±38	-	-	-	-	571±77	607±60
				-	F	46	-	-	-	-	713±19	708±70	804±32	704±21	-	-	671	-	759±37	732±16
				-	Total	71	369±37	-	557±65	331	723±23	608±48	823±36	711±19	-	-	671	-	711±19	688±27
	1979	Smith and Berezay, 1983	Carcass Recovery	-	M	157	-	-	596±74	517±114	748±47	562±21	817±15	761±18	-	-	834±19	-	666±71	698±21
				-	F	151	-	-	564	-	731±17	663±99	782±15	721±10	-	-	786±15	-	738±35	740±9
				-	Total	308	-	-	592±64	517±114	739±24	572±23	794±13	738±10	-	-	804±14	-	698±44	719±12
	1980	Smith and Berezay, 1983	Carcass Recovery	-	M	85	-	-	-	379	771	674±95	-	782±22	-	-	844±49	805	776±43	776±22
				-	F	182	-	-	-	331±34	710±44	627±64	856±52	732±11	-	-	803±38	812	689±44	720±14
				-	Total	267	-	-	-	347±38	718±41	637±55	856±52	746±11	-	-	818±31	809±7	732±33	738±12
Kitlope R.	1981	Rosberg et al, 1982	Carcass Recovery, Seining	POHL=55.58 + 0.709xFL r = 0.997[3]	M	23	-	-	-	380	680	560±58	880	791±15	-	-	881±31	-	-	733±74[6]
				POHL=189.39+0.610xFL r = 0.98[4] x	F	18	-	-	-	-	-	-	-	787±38	-	-	799±60	-	-	764±33[7]
				POHL=71.10 + 0.705xFL r = 0.99	Total	41	-	-	-	380	680	560±58	880	789±22	-	-	844±38	-	-	746±44
							SOUTH COAST													
Mussel Ck.	1981	Fielden and Slaney, 1982	Carcass Recovery	-	M	16	-	-	-	640±40	-	655	-	753±5	-	-	-	-	495±55	493±64[1]
				-	F	10	-	-	-	-	-	-	750	727±69	-	-	580	-	643±65	720±41[2]
				-	Total	26	-	-	-	640±40	-	655	750	733±52	-	-	580	-	520±57	521±57
	1983	Whelen and Morgan, 1984	Angling, Counting Fence	-	M	102	350	-	493±55	382±19	649±89	542±20	550	695±45	-	-	-	-	559±63	530±25
				-	F	107	-	-	-	-	607±95	597±86	730±19	707±14	-	-	723±44	-	726±20	706±29
				-	Total	209	350	-	493±55	382±19	633±64	548±20	720±26	705±14	-	-	723±14	-	643±44	620±18
Ahnuhati R.	1983	Whelen and Morgan, 1984	Angling, Carcass Recovery	-	M	11	-	-	-	385	650	468±85	-	773±47	500	-	880	-	630±220	630±102
				-	F	12	-	-	-	-	-	-	-	754±39	-	-	-	-	740±20	792±32
				-	Total	23	-	-	-	385	650	468±85	-	762±28	500	-	880	-	685±110	715±61
Sucwoa R.*[5]	1978	Glova and McCart, 1979	Carcass Recovery	-	M	29	372±	-	476±	-	766±	-	804±	-	-	-	-	-	NG	540±44
				-	F	13	448±	-	621±	-	708	-	754±	-	-	-	-	-	NG	780±24
				POHL=71.10 + 0.705xFL	Total	42	382±	-	489±	-	730±	-	773±	-	-	-	-	-	NG	591±

* Age - Specific Data for Fork Lengths only.
** overall POHL values include unaged fish.
NG - Not Given.

[1] N=23
[2] N=12
[3] N=10
[4] N=4
[5] POHL calculated from Kitlope River Regression.
[6] N=88
[7] N=37

LENGTH (mm) OF CHINOOK STOCKS SAMPLED

STREAM	YEAR	SOURCE	METHODS	POHL:FL REGRESSION	SEX	n	POHL at Age (± 2 S.E.) 2_1	2_2	3_1	3_2	4_1	4_2	5_1	5_2	5_3	6_1	6_2	6_3	NR	$\overline{x}$ POHL
SOUTH COAST – Cont'd																				
Canton Ck.*[5]	1978	Glova and McCart, 1979	Carcass Recovery	–	M	20	380±	–	414±	–	–	–	–	–	–	–	–	–	NG	461±99[6]
				–	F	0	–	–	–	–	–	–	–	–	–	–	–	–	NG	803±66[7]
				POHL=71.10+0.705xFL	Total	20	380±	–	414±	–	–	–	–	–	–	–	–	–	NG	525±
Conuma R.*[5]	1978	Glova and McCart, 1979	Carcass Recovery	–	M	0	–	–	–	–	–	–	–	–	–	–	–	–	–	579±54[8]
				–	F	0	–	–	–	–	–	–	–	–	–	–	–	–	–	778±18[9]
				–	Total	0	–	–	–	–	–	–	–	–	–	–	–	–	–	657±
Tlupana R.*[5]	1978	Glova and McCart, 1979	Carcass Recovery	–	M	0	–	–	–	–	–	–	–	–	–	–	–	–	–	688±103[10]
				–	F	0	–	–	–	–	–	–	–	–	–	–	–	–	–	730±59[11]
				–	Total	0	–	–	–	–	–	–	–	–	–	–	–	–	–	709±
Deserted Ck.*[5]	1978	Glova and McCart, 1979	Carcass Recovery	–	M	16	–	–	474±	–	729±	651±	829±	–	–	–	–	–	NG	513±54[12]
				–	F	5	–	–	–	–	682±	–	741±	–	–	–	–	–	NG	748±24[13]
				POHL=71.10+0.705xFL	Total	21	–	–	474±	–	702±	651±	800±	–	–	–	–	–	NG	615±
Nitinat R.**	1979	McCart et al, 1980	Carcass Recovery	–	M	82	373±10	–	508±12	–	716±30	–	843±31	–	–	–	–	–	–	566±
				–	F	95	–	–	–	597±53	750±11	–	798±10	–	–	–	–	–	–	784±
				–	Total	177	373±10	–	508±12	597±53	739±-	–	806±-	–	–	–	–	–	–	683±
Little Qualicum R.	1978	Lister, 1979	Carcass Recovery	–	M	5	363±65	–	608±155	–	780	–	–	–	–	–	–	–	–	544±170
				–	F	4	–	–	–	–	760±45	–	–	–	–	–	–	–	760	760±32
				–	Total	9	363±65	–	608±155	–	765±33	–	–	–	–	–	–	–	760	640±118
FRASER R., N.B.C. and YUKON																				
Holmes R.	1981	Rosberg and Aitken, 1982	Carcass Recovery	POHL=351.43+0.486xFL r = 0.98[1]	M	4	–	–	–	–	–	–	–	882±22	–	–	845	–	–	873±24
				POHL=86.75+0.927xFL r = 0.96[2]	F	8	–	–	–	–	–	–	–	727±43	–	–	–	–	680±106	709±46
				POHL=42.40+0.774xFL r = 0.98	Total	12	–	–	–	–	–	–	–	785±63	–	–	845	–	680±106	764±56
Torpy R. (Incl. West Torpy R.)	1981	Rosberg and Aitken, 1982	Carcass Recovery	POHL=23.43+0.790xFL r = 0.95[3]	M	22	–	–	–	–	–	566±31	–	770±38	–	–	850	–	–	731±48
				POHL=19.48+0.806xFL r = 0.96[4]	F	59	–	–	–	–	–	545	–	720±16	–	–	800	–	–	731±23
				POHL=33.13+0.786xFL r = 0.95	Total	81	–	–	–	–	–	562±25	–	737±18	–	–	833±33	–	–	731±21

* Age – Specific Data for Fork Lengths only.
** $\overline{X}$ overall POHL values include unaged fish.
NG – Not Given.

1 N=3
2 N=8
3 N=22
4 N=33
5 POHL calculated from Kitlope River Regression.
6 N=13
7 N=3
8 N=54
9 N=35
10 N=3
11 N=3
12 N=39
13 N=30

LENGTH (mm) OF CHINOOK STOCKS SAMPLED

STREAM	YEAR	SOURCE	METHODS	POHL:FL REGRESSION	SEX	n	POHL at Age (± 2 S.E.) 2_1	2_2	3_1	3_2	4_1	4_2	5_1	5_2	5_3	6_1	6_2	6_3	NR	$\bar{x}$ POHL
FRASER R., N.B.C. and YUKON – Cont'd																				
Walker Ck.	1981	Rosberg and Aitken, 1982	Carcass Recovery	POHL=19.61+0.775xFL r = 0.99[17]	M	31	–	–	–	–	–	565±15	–	757±27	–	–	900	–	682±53	679±36[15]
				POHL=31.78+0.867xFL r = 0.95[18]	F	32	–	–	–	–	–	596±11	–	724±15	–	–	805±57	–	733±52	713±23[16]
				POHL=15.67+0.796xFL r = 0.96	Total	63	–	–	–	–	–	574±13	–	735±14	–	–	829±62	–	695±43	696±21
Slim Ck.	1980	Murray et al, 1981	Carcass Recovery, Live Sacrifice	FL=2.61 + 1.20xPOHL	M	43	–	–	–	–	665	498±60	715	722±12	–	–	–	–	643±60	634±38[1]
				FL=13.12 + 1.02xPOHL	F	115	–	–	–	–	689±32	601±47	–	692±8	–	–	–	–	659±35	677±9[2]
				POHL=13.85+0.801xFL r = 0.96[3]	Total	158	–	–	–	–	687±29	535±47	715	698±8	–	–	–	–	653±31	666±13
	1981	Rosberg and Aitken, 1982	Carcass Recovery	POHL=19.38+0.770xFL r = 0.99[19]	M	116	–	–	–	305	810	571±24	–	739±18	–	–	840	–	636±24	644±20[19]
				POHL=16.42+0.792xFL r = 0.91[20]	F	145	–	–	–	–	765	607±22	–	714±8	–	–	–	–	695±16	700±8[20]
				POHL=10.61+0.791xFL r = 0.97	Total	261	–	–	–	305	788±45	583±19	–	721±8	–	–	840	–	664±16	675±11
Bowron R.	1980	Murray et al, 1981	Carcass Recovery, Live Sacrifice	FL=1.37 + 1.26xPOHL	M	58	–	–	–	–	705	548±50	–	729±18	–	–	–	–	737±35	711±20[4]
				FL=12.84 +1.04xPOHL	F	132	–	–	–	–	721±47	595±13	–	707±7	–	–	–	–	683±18	701±7[5]
				POHL=369.96+0.386xFL[6] r = 0.63	Total	190	–	–	–	–	719±41	567±33	–	713±7	–	–	–	–	703±20	704±8
Willow R. (Incl. Wansa Ck.)	1980	Murray et al, 1981	Carcass Recovery	POHL=96.78+0.681xFL r = 0.98[9]	M	14	–	–	–	385	–	631±42	–	733±27	–	–	830	–	648±144	685±54[7]
				POHL=0.57+0.844xFL r = 0.90[10]	F	68	–	–	–	–	–	653±13	–	706±11	–	–	–	–	664±26	688±11[8]
				POHL=137.32+0.656xFL r = 0.95	Total	82	–	–	–	385	–	645±16	–	708±11	–	–	830	–	660±40	688±14
Stuart R.	1980	Hickey and Lister, 1981	Carcass Recovery	POHL=19.48+0.776xFL r = 0.99[11]	M	154	–	–	–	377±30	–	620±22	–	767±8	–	–	843±55	–	720±54	689±21[13]
				POHL=3.50+0.818xFL r = 0.96[12]	F	152	–	–	630±40	–	793±7	632±17	715	727±8	595	–	–	–	704±21	707±8[14]
				POHL=36.16+0.769xFL r = 0.98	Total	306	–	–	630±40	377±30	793±7	625±15	715	744±6	595	–	843±55	–	713±31	698±11
Nechako R.	1979	Olmsted et al, 1980	Angling, Carcass Recovery	–	M	0*	–	–	–	–	–	–	–	–	–	–	–	–	–	–
				POHL=63.88+0.684xFL	F	20	–	–	585±22	–	667±17	708±80	679	659±41	–	–	–	–	611	642±19
				–	Total	20	–	–	585±22	–	667±17	708±80	679	659±41	–	–	–	–	611	642±19
West Road (Blackwater R.)	1980	Olmsted et al, 1981	Angling	POHL=-38.69+0.835xFL r = 0.98	M	12	–	–	–	–	–	546±31	–	715	–	–	–	–	671±48	592±41
				POHL=136.99+0.637xFL r = 0.99	F	5	–	–	–	–	–	598±16	–	670	–	–	–	–	–	612±31
				POHL=-2.67+0.798xFL r = 0.96	Total	17	–	–	–	–	–	565±25	–	693±45	–	–	–	–	671±48	598±30

* POHL was not determined from male samples.

[1] N=45 (includes unaged fish)
[2] N=125 (includes unaged fish)
[3] N=163
[4] N=60
[5] N=136
[6] N=195
[7] N=21 (includes unaged fish)
[8] N=76 (includes unaged fish)
[9] N=16
[10] N=17
[11] N=30 (includes jacks which were not included in original calculation)
[12] N=35
[13] N=172
[14] N=175
[15] N=32 (includes unaged fish)
[16] N=33 (includes unaged fish)
[17] N=28
[18] N=28
[19] N=123 (includes unaged fish)
[20] N=152 (includes unaged fish)

LENGTH (mm) OF CHINOOK STOCKS SAMPLED

STREAM	YEAR	SOURCE	METHODS	POHL:FL REGRESSION	SEX	n	POHL at Age (± 2 S.E.) 2_1	2_2	3_1	3_2	4_1	4_2	5_1	5_2	5_3	6_1	6_2	6_3	NR	$\bar{x}$ POHL
FRASER R., N.B.C. and YUKON - Cont'd																				
Adams R. (lower)	1981	Whelen and Olmsted, 1982	Angling, Carcass Recovery	POHL=39.73+0.729xFL r = 0.99	M	45	310	380	504±43	355±10	691±19	588±69	757±52	650±95	-	-	-	-	648±58	624±39
				POHL=95.90+0.704xFL r = 0.88	F	78	-	-	-	-	700±13	607±112	733±57	694±8	-	-	-	-	692±32	695±10
				POHL=40.40+0.754xFL r = 0.96[1]	Total	123	310	380	504±43	355±10	698±11	598±59	745±36	689±16	-	-	-	-	670±35	669±17
South Thompson R.	1981	Whelen and Olmsted, 1982	Carcass Recovery	POHL=28.75+0.745xFL r = 0.98[2]	M	135	300	330	590	380±200	677±13	600±100	785±20	704±17	-	-	830±20	-	654±27	688±16
				POHL=45.13+0.754xFL r = 0.89[2]	F	672	-	-	570±20	-	694±4	666±18	749±12	697±6	-	-	747±17	-	696±11	700±3
				POHL=81.74+0.706xFL r = 0.95[2]	Total	807	300	330	580±14	380±200	692±4	659±20	759±11	698±5	-	-	756±18	-	684±12	698±4
Finn Ck.	1981	Scott et al, 1982	Angling, Fence, Carcass Recovery	POHL=19.49+0.777xFL r = 0.97[2]	M	325	-	-	550	344±11	728±20	594±13	-	717±8	610	-	823±52	-	613±44	636±14[5]
				POHL=4.63+0.819xFL r = 0.91[2]	F	256	-	-	-	-	712±27	605±13	-	700±7	648±83	-	807±32	-	662±21	688±7[3]
				POHL=42.54+0.763xFL r = 0.94[4]	Total	581	-	-	550	344±11	718±21	601±11	-	707±5	640±66	-	810±23	-	635±27	661±8[6]
Raft R.	1981	Scott et al, 1982	Fence, Carcass Recovery	POHL=11.85+0.779xFL r = 0.98[9]	M	184	-	-	-	336±9	-	595±7	-	716±26	630	-	850	-	588±33	546±20[7]
				POHL=-32.39+0.849xFL r = 0.98[10]	F	106	-	-	620	-	715±10	596±16	-	704±9	-	-	-	-	669±26	671±11[8]
				POHL=0.06+0.801xFL r = 0.98	Total	290	-	-	620	336±9	715±10	595±7	-	707±10	630	-	850	-	607±27	595±15
North Thompson R.	1981	Scott et al, 1982	Seining, Carcass Recovery	POHL=5.87+0.770xFL r = 0.995[11]	M	195	-	-	-	331±8	778±75	597±13	-	764±12	-	-	840±60	-	617±51	625±24[13]
				POHL=17.52+0.790xFL r = 0.97[12]	F	202	-	-	615	-	750	626±12	770	729±7	-	-	825	-	689±21	707±8[14]
				POHL=8.35+0.783xFL r = 0.99	Total	397	-	-	615	331±8	767±44	606±10	770	743±7	-	-	835±35	-	659±27	666±13

[1] N=123
[2] N=100
[3] N=329 (includes unaged females)
[4] N=200
[5] N=360 (includes unaged females)
[6] N=689 (includes unaged fish)
[7] N=204 (includes unaged fish)
[8] N=131 (includes unaged fish)
[9] N=56
[10] N=29
[11] N=47
[12] N=40
[13] N=218
[14] N=215

STREAM	YEAR	SOURCE	METHODS	POHL:FL REGRESSION	SEX	n	POHL at Age (± 2 S.E.)													
							2_1	2_2	3_1	3_2	4_1	4_2	5_1	5_2	5_3	6_1	6_2	6_3	NR	$\overline{x}$ POHL
FRASER R., N.B.C. and YUKON – Cont'd																				
Nazko R.	1980	Olmsted et al, 1981	Angling	POHL=16.71+0.760xFL r = 0.995	M	6	–	–	375	–	–	603±100	–	–	–	–	–	–	720	584±116
				POHL=-49.34+0.866xFL r = 0.99	F	4	–	–	–	–	–	520	–	713±5	–	–	–	–	685	658±93
				POHL=0.22+0.792xFL r = 0.99	Total	10	–	–	375	–	–	586±93	–	713±95	–	–	–	–	703±35	614±79
Cottonwood R.	1980	Olmsted et al, 1981	Angling, Carcass Recovery	–	M	4	–	–	–	–	–	593±154	–	–	–	–	–	–	795	644±148
				–	F	5	–	–	–	–	687±26	–	–	730±100	–	–	–	–	–	704±41
				–	Total	9	–	–	–	–	687±26	593±154	–	730±100	–	–	–	–	795	677±68
Horsefly R.	1979	Olmsted et al, 1980	Angling, Carcass Recovery	POHL=-126.64+0.866xFL r = 1.00[9]	M	6	–	–	–	–	671±78	542	–	751±21	–	–	–	–	–	654±76[7]
				POHL=584.10+1.455xFL r = 1.00[10]	F	5	–	–	–	–	681±36	–	–	–	–	–	–	–	–	673±43[8]
				POHL=-183.36+0.967xFL r = 0.94	Total	11	–	–	–	–	677±33	542	–	751±21	–	–	–	–	–	666±39
	1980	Olmsted et al, 1981	Angling, Carcass Recovery	POHL=25.16+0.742xFL r = 0.98[3]	M	27	–	–	–	350±6	640	599±48	–	723±33	–	–	850	–	628±62	635±50
				POHL=-52.05+0.858xFL r = 0.95[4]	F	26	–	–	–	–	–	665±0	–	715±18	–	–	–	–	682±95	708±18
				POHL=20.90+0.754xFL r = 0.98	Total	53	–	–	–	350±6	640	616±41	–	718±16	–	–	850	–	646±52	670±29
McKinley R.	1980	Olmsted et al, 1981	Angling, Carcass Recovery	POHL=91.82+0.668xFL r = 0.98[5]	M	11	–	–	–	–	–	643±195	–	726±23	–	–	–	–	660±180	683±49
				POHL=-54.34+0.867xFL r = 0.94[6]	F	7	–	–	–	–	775	–	–	685±18	–	–	–	–	735	718±34
				POHL=91.57+0.677xFL r = 0.96	Total	18	–	–	–	–	775	643±195	–	711±20	–	–	–	–	685±115	697±33
Quesnel R.	1979	Olmsted et al, 1980	Angling, Carcass Recovery	–	M	0*	–	–	–	–	–	–	–	–	–	–	–	–	–	–
				POHL=17.77+.766xFL	F	37	–	–	677±42	–	690±14	637±8	731±42	661±49	–	–	–	–	672	686±12
				–	Total	37	–	–	677±42	–	690±14	637±8	731±42	661±49	–	–	–	–	672	686±12
	1980	Olmsted et al, 1981	Angling, Carcass Recovery	POHL=13.99+0.756xFL r = 0.996[13]	M	185	305±10	–	593±5	343±13	733±12	553±34	779±42	751±12	–	–	836±27	800	625±73	630±26[11]
				POHL=92.51+0.697xFL r = 0.88[13]	F	196	–	–	–	–	729±34	619±22	758±25	730±6	–	–	790±26	–	714±20	726±6[12]
				POHL=15.82+0.766xFL r = 0.99	Total	381	305±10	–	593±5	343±13	730±21	566±29	773±31	736±6	–	–	814±21	800	669±40	680±14
Eagle R.	1981	Whelen and Olmsted, 1982	Angling, Carcass Recovery	–	N	51	–	–	–	340	700±53	548±18	–	675±37	–	–	–	–	589±27	575±25
				–	F	67	–	–	630	–	–	579±16	–	670±17	–	–	–	–	614±26	617±14
				POHL=26.12+0.749xFL r = 0.95[1]	Total	118	–	–	630	340	700±53	568±13	–	671±15	–	–	–	–	600±20	598±14
Salmon R.	1981	Whelen and Olmsted, 1982	Angling, Fence, Carcass Recovery	–	M	35	–	–	463±44	394±38	–	519±23	–	603±45	–	–	–	–	528±60	486±29
				–	F	61	–	–	450	430±60	680	544±14	–	635±21	–	–	–	–	593±37	574±17
				POHL=-3.49+0.795xFL r = 0.96[2]	Total	95	–	–	460±32	400±33	680	537±13	–	632±19	–	–	–	–	559±36	540±17

* POHL was not taken from sampled males.

[1] N=122
[2] N=97
[3] N=25
[4] N=8
[5] N=11
[6] N=4
[7] N=14
[8] N=24
[9] N=14, [10] N=24 – the authors of the source report provided regression equations – however these were not presented as they utilized only a minor portion of the available POHL:FL data.
[11] N=194 (includes unaged fish)
[12] N=210 (includes unaged fish)
[13] N=160
[14] N=107

STREAM	YEAR	SOURCE	METHODS	POHL:FL REGRESSION	SEX	n	POHL at Age (± 2 S.E.) 2_1	2_2	3_1	3_2	4_1	4_2	4_3	NR	$\bar{x}$ POHL
NORTH COAST															
Mathers Ck.	1978	Glova et al, 1979			M	57	321±	-	-	534±	-	-	524±	NG	465±
					F	21	-	-	-	554±	-	-	555±	NG	554±
					Total	78	321±	-	-	540±	-	-	538±	NG	489±
	1979	Grant & McCart, 1980	Carcass Recovery	-	M	6	-	-	-	554±32	-	-	591	-	560±29
				-	F	4	-	-	-	543±26	-	-	570	598	564±38
				-	Total	10	-	-	-	551±23	-	-	581±21	598	562±20
Note: Mathers Ck. (1978) info. in FL only (see Glova et al, 1979) - can include if POHL:FL Regression eqns. avail.															
Gamsby R.*	1981	Rosberg et al, 1982	Carcass Recovery	-	M	4	-	-	-	-	-	-	-	-	579±39
				-	F	2	-	-	-	-	-	-	-	-	543±55
				-	Total	6	-	-	-	-	-	-	-	-	567±
Kwatna R.	1983	Rice, 1984	Angled	FL = 81.8 + 1.13 x POHL r = 0.94[1]	M	23	-	250	-	530±27	-	-	550±40	0/24	520±29[2]
				FL = 1.4 x POHL-68[1] r = 0.97	F	17	-	-	-	524±20	-	-	525±10	0/17	535±15[3]
				POHL=29.56+0.748xFL r = 0.95[4]	Total	40	-	250	-	527±18	-	-	538±22	0/41	527±17[4]
Note: Kwatna River Regression (POHL - 29.56+0.748xFL) used to convert FL lengths (given in report) to POHL. r = 0.95															
* - 1 Male 3_3 in sample - length = 290 mm (This <u>is</u> included in overall totals)															
SOUTH COAST															
Kakwelken R.*	1981	Slaney and Milko, 1982	Fishway	-	M	0	-	-	-	-	-	-	-	-	-
				-	F	9									576±22
				-	Total	9									576±22
Mussel Ck.	1981	Fielden and Slaney, 1982	Carcass Recovery, Gillnet	-	M	2	-	-	-	-	-	-	590	480	535±110
				-	F	7	-	-	-	554±67	-	-	-	460	540±63
				-	Total	9	-	-	-	554±67	-	-	590	470±20	539±51
	1983	Whelen and Morgan, 1984	Angling, Fence	-	M	58	-	350	-	485±17	-	-	583±15	470	487±18
				-	F	25	-	-	-	483±19	-	-	-	-	483±19
				-	Total	83	-	350	-	485±13	-	-	583±15	470	486±14
Klinaklini R.	1983	Whelen and Morgan, 1984	Angling, Carcass Recovery	-	M	10	-	340±50	-	483±80	-	-	560	-	469±59
				-	F	3	-	-	-	498±118	-	-	-	-	498±118
				-	Total	13	-	340±50	-	488±62	-	-	560	-	476±56
Ahnuhati R.	1983	Whelen and Morgan, 1984	Angling	-	M	12	-	270	-	527±49	-	-	-	530	505±59
				-	F	2	-	-	-	528±25	-	-	-	-	528±25
				-	Total	14	-	270	-	327±41	-	-	-	530	509±51
Conuma R.	1978	Glova & McCart, 1979	Carcass Recovery	-	M	8	-	-	-	495±81	-	-	-	-	495±81
				-	F	2	-	-	-	537±49	-	-	-	-	537±49
				-	Total	10	-	-	-	503±	-	-	-	-	503±
Deserted Ck.	1978	Glova & McCart, 1979	Carcass Recovery	-	M	3	-	-	-	527±93	-	-	-	-	527±93
				-	F	3	-	-	-	547±67	-	-	-	-	547±67
				-	Total	6	-	-	-	537±	-	-	-	-	537±
Nitinat R.	1979	McCart et al, 1980	Carcass Recovery	-	M	10	-	329	-	559±44	-	-	-	NG	470±75
				-	F	23	-	-	-	573±24	-	611	-	NG	570±15
				-	Total	33	-	329	-	567±	-	611	-	NG	540±

* Age-specific data not given in report or appendices.
NG - not given.

1 Includes fish not sampled for age (total n = 29 (Male), 27 (Female)).
2 N=29 (includes fish not aged)

3 N=27 (includes fish not aged)
4 N=58

LENGTH (mm) OF COHO STOCKS SAMPLED

STREAM	YEAR	SOURCE	METHODS	FOHL:FL REGRESSION	SEX	n	FOHL at Age (± 2 S.E.)								
							2_1	2_2	3_1	3_2	4_1	4_2	4_3	NR	$\bar{x}$ FOHL
SOUTH COAST – Cont'd															
Little Qualicum R.	1978	Lister, 1979	Carcass Recovery	-	M	37	-	-	-	488±24	-	-	-	476±32	484±19
				-	F	26	-	-	-	477±20	-	-	-	484±56	479±24
				-	Total	63	-	-	-	484±17	-	-	-	480±31	482±15
FRASER R., N.B.C. and YUKON															
Eagle R. (Incl. South Pass Ck.)	1982	Whelen et al, 1983	Angling, Carcass Recovery	-	M	74	-	-	-	504±10	-	-	-	492±22	504±10
				-	F	126	-	-	-	500±7	-	-	509±31	481±27	499±7
				-	Total	200	-	-	-	502±6	-	-	509±31	485±20	501±6
Salmon R. (Incl. Bolean Ck.)	1982	Whelen et al, 1983	Angling, Carcass Recovery	-	M	47	-	-	-	435±16	-	-	-	459±34	438±15
				-	F	31	-	-	-	456±16	-	-	-	477±57	458±15
				-	Total	78	-	-	-	444±12	-	-	-	466±28	445±11
Adams R. (lower) (Incl. Sinmax, Hinihill and Nikwikwala Cks.)	1982	Whelen et al, 1983	Angling, Carcass Recovery	-	M	13	-	-	-	469±47	-	-	430	328±25	444±37
				-	F	12	-	-	-	478±22	-	-	-	478±35	478±19
				-	Total	25	-	-	-	473±25	-	-	430	403±88	460±26
Adams R. (upper) (Incl. Momich R. and Cayenne Ck.)	1982	Whelen et al, 1983	Angling, Carcass Recovery	-	M	10	-	-	-	437±32	-	-	-	-	437±32
				-	F	8	-	-	-	449±33	-	-	-	-	449±33
				-	Total	18	-	-	-	442±22	-	-	-	-	442±22
Albreda R.	1982	Hutton, et al 1983	Carcass Recovery	-	M	8	-	-	-	504±42	-	-	567	-	512±44
				-	F	9	-	-	-	514±35	-	-	504±49	500	509±24
				-	Total	17	-	-	-	508±30	-	-	520±47	500	510±23
Lion Ck.	1982	Hutton et al, 1983	Carcass Recovery	-	M	45	-	-	-	468±19	-	-	493±30	428±111	469±17
				-	F	106	-	-	-	476±8	-	-	505±20	477±26	477±8
				-	Total	151	-	-	-	473±8	-	-	501±16	461±39	475±7
Wire Cache Ck.	1982	Hutton et al, 1983	Carcass Recovery	-	M	6	-	-	-	412±52	-	-	-	-	412±52
				-	F	4	-	-	-	-	-	-	-	-	427±30
				-	Total	10	-	-	-	412±52	-	-	-	-	418±32
Lemieux Ck.	1982	Hutton et al, 1983	Carcass Recovery	-	M	30	-	-	-	432±17	-	-	391	348±33	422±17
				-	F	64	-	-	-	434±10	-	-	380	427±17	433±9
				-	Total	94	-	-	-	434±9	-	-	386±11	403±28	429±9
Barriere R.	1982	Hutton et al, 1983	Carcass Recovery	-	M	7	-	-	-	411±33	-	-	-	-	411±33
				-	F	21	-	-	-	449±20	-	-	-	423±75	445±20
				-	Total	28	-	-	-	438±18	-	-	-	423±75	436±17

LENGTH (mm) OF COHO STOCKS SAMPLED

STREAM	YEAR	SOURCE	METHODS	POHL:FL REGRESSION	SEX	n	POHL at Age (± 2 S.E.)								
							2_1	2_2	3_1	3_2	4_1	4_2	4_3	NR	$\bar{x}$ POHL
FRASER., N.B.C. and YUKON - Cont'd															
Louis Ck.	1982	Hutton et al, 1983	Carcass Recovery	-	M	30	-	-	-	401±15	-	-	370	388±82	399±14
				-	F	36	-	-	-	438±16	-	-	420±40	431±25	436±13
				-	Total	70	-	-	-	419±12	-	-	403±41	419±29	418±11
Coldwater R.	1982	Hutton et al, 1983	Angling, Carcass Recovery	-	M	11	-	-	-	452±34	-	-	505±170	-	461±38
				-	F	9	-	-	-	479±34	-	-	-	-	479±23
				-	Total	20	-	-	-	466±21	-	-	505±170	-	470±23

LENGTH (mm) OF CHUM STOCKS SAMPLED

STREAM	YEAR	SOURCE	METHODS	POHL:FL REGRESSION	SEX	n	POHL at Age (± 2 S.E.) 2	3	4	5	6	NR	$\bar{x}$ POHL
NORTH COAST													
Mathers Ck.*	1978	Glova et al, 1979	Seining	POHL= 60.54 + 0.71xFL	M	170	-	535± approx 20	588± approx 7	590± approx 12	-	NG	585±13
				POHL= 83.62 + 0.69xFL	F	119	-	549± approx 14	569± approx 7	582± approx 15	-	NG	569±11
				-	Total	289	-	approx 542	approx 579	approx 586	-	NG	578±
	1979	Grant & McCart, 1980	Seining	-	M	7	-	474±51	531±117	613	-	539±162	528±57
				-	F	3	-	583	562	-	-	543	563±23
				-	Total	10	-	510±79	541±71	613	540±94	540±94	539±41
Kitlope R.	1981	Rosberg et al, 1982	Seining, Carcass Recovery	POHL=-32.35 + 0.80xFL r = 0.95[5]	M	48	-	580	645±14	700	-	NG	644±13[3]
				POHL=32.45 to .773xFL r = 0.96[6]	F	28	-	565±50	614±18	690	-	NG	615±17[4]
				POHL=145.52to.604xFL r = 0.90	Total	76	-	570±31	634±12	695±10	-	NG	632±61
Gamsby R.	1981	Rosberg et al, 1982	Carcass Recovery	-	M	3	-	-	700±163	-	-	NG	700±163[5]
				-	F	3	-	-	670±23	-	-	NG	644±38[6]
				-	Total	6	-	-	685±75	-	-	NG	665±61
Kemano R. (incl. tribs.)	1979	Murray and Hamilton, 1981	Carcass Recovery, Gillnetting (Kemano Bay)	POHL=72.51 + 0.680xFL r = 0.93[7]	M	212	-	574±5	635±12	673±16	-	602±44	599±7
				POHL=110.80+0.653xFL r = 0.86[8]	F	278	-	551±5	591±5	625±12	-	500±154	569±5
				POHL=134.98+0.610xFL r = 0.89	Total	490	-	560±4	560±4	646±12	-	585±30	582±4
Kwatna R. (incl. tribs.)	1983	Rice, 1984	Carcass Recovery	POHL=22.64 + 0.745xFL r = 0.93[9]	M	138	-	588±40	625±10	643±12	-	0/138	632±8[10]
				POHL=92.64 + 0.683xFL r = 0.90[9]	F	103	-	562±42	585±9	591±14	-	0/103	584±7[11]
				POHL=121 + 0.632xFL r = 0.92[4]	Total	241	-	576±27	606±8	626±11	-	0/241	611±6

* lengths calculated from regression equation;
** no scales taken from POHL - sampled fish.
NG - not given.

1 N=9 (includes unaged fish)
2 N=15 (includes unaged fish)
3 N=51 (includes unaged fish)
4 N=35 (includes unaged fish)

5 N=42
6 N=24
7 N=258
8 N=317

9 sample size: males = 133, females = 80 (ie.: some fish aged were not sampled for both POHL and FL; as well, not all POHL/FL sampled fish were sampled for age.
10 2N=158 (includes unaged fish)

11 3N=118 (includes unaged fish)
12 4N=213
13 5N=8(M), 6(F).

LENGTH (mm) OF CHUM STOCKS SAMPLED

STREAM	YEAR	SOURCE	METHODS	POHL:FL REGRESSION	SEX	n	POHL at Age (± 2 S.E.) 2	3	4	5	6	NR	$\bar{x}$ POHL
NORTH COAST - Cont'd													
Quatlena R.	1983	Rice, 1984	Carcass Recovery	FL=POHL x 1.294-4.26 r = 0.79	M	9	-	574±10	613±6	600	-	0/9	594±14
				FL=142.64+0.984xPOHL r = 0.83	F	12	-	555±14	542±27	586±10	-	0/12	570±14
				FL=POHLx1.396-78.29	Total	21	-	568±12	582±31	588±9	-	0/21	580±11
SOUTH COAST													
Kakweiken R.**	1981	Slaney and Milko, 1982	Fishway	-	M	10	-	-	-	-	-	-	625±12
				-	F	7	-	-	-	-	-	-	553±13
				-	Total	17	-	-	-	-	-	-	596±27
Glendale/Tom Browne Cks.	1981	Fielden and Slaney, 1982	Carcass Recovery	-	M	8	-	517±24	716±128	650	-	-	627±82[1]
				-	F	12	-	581±18	596±25	658±75	-	-	590±22[2]
				-	Total	20	-	554±29	644±63	655±44	-	-	604±33
	1983	Whelen and Morgan, 1984	Carcass Recovery	-	M	19	-	500	611±23	615±12	-	670	610±17
				-	F	5	-	-	598±21	647±37	-	-	627±31
				-	Total	24	-	500	608±19	622±14	-	670	614±15
Mussel Ck.	1983	Whelen and Morgan, 1984	Angling	-	M	12	-	520	585±23	593±45	-	595	582±23
				-	F	2	-	-	545	630	-	-	588±85
				-	Total	14	-	520	581±22	605±36	-	595	583±19
Ahnuhati R.	1981	Fielden and Slaney, 1982	Carcass Recovery	-	M	6	-	603±20	655	-	-	-	590±37[1]
				-	F	9	-	547±14	590±20	-	-	-	577±24[2]
				-	Total	15	-	571±20	612±45	-	-	-	582±20
	1983	Whelen and Morgan, 1984	Angling, Carcass Recovery	-	M	58	-	598±17	624±12	659±16	-	623±35	638±9[3]
				-	F	40	-	-	599±14	602±15	-	605±15	598±10[4]
				-	Total	98	-	598±17	614±9	637±15	-	612±16	621±8

* lengths calculated from regression equation;
** no scales taken from POHL - sampled fish.
NG - not given.

[1] N=9 (includes unaged fish)
[2] N=13 (includes unaged fish)
[3] N=39 (includes unaged fish)
[4] N=51 (includes unaged fish)
[5] N=989
[6] N=1465
[7] N=465
[8] N=764
[9] N=2047
[10] N=2862
[11] N=377
[12] N=654
[13] N=1029
[14] N=1247

LENGTH (mm) OF CHUM STOCKS SAMPLED

STREAM	YEAR	SOURCE	METHODS	POHL:FL REGRESSION	SEX	n	POHL at Age (± 2 S.E.) 2	3	4	5	6	NR	$\bar{x}$ POHL
SOUTH COAST - Con't													
Sucwoa R.*	1978	Glova and McCart, 1979	Seining, Carcass Recovery	FL= 81.4 + 1.12xPOHL r = 0.87	M	153	-	584±	618±	626±	-	NG	599±2[5]
				FL= 85.4 + 1.06xPOHL r = 0.88	F	88	-	537±	598±	632±	-	NG	581±2[6]
				-	Total	241	-	568±	611±	628±	-	NG	588±
Canton Ck.*	1978	Glova and McCart, 1979	Seining, Carcass Recovery	FL= 23.6 + 1.26xPOHL r = 0.91	M	88	-	543±	586±	544±	-	NG	594±4[7]
				FL=285.2 + 0.72xPOHL r = 0.72	F	82	-	-	595±	-	-	NG	571±4[8]
				-	Total	170	-	543±	590±	544±	-	NG	580±
Conuma R.*	1978	Glova and McCart, 1979	Seining, Carcass Recovery	FL=260 + 0.84xPOHL r = 0.67	M	178	-	551±	600+	526±	-	NG	597±2[9]
				FL=157.1 + 0.95xPOHL r = 0.68	F	114	-	513±	584±	593±	-	NG	577±1[10]
				-	Total	292	-	532±	594±	571±		NG	585±
Tlupana R.*	1978	Glova and McCart, 1979	Seining, Carcass Recovery	FL=59.4 + 1.18xPOHL	M	33	-	-	574±	-	-	NG	587±4[11]
				FL=90.3 + 1.08xPOHL	F	44	-	-	542±	760±	-	NG	570±3[12]
				-	Total	77	-	-	556±	760±	-	NG	576±
Deserted Ck.*	1978	Glova and McCart, 1979	Seining, Carcass Recovery	FL= 59.4 + 1.18xPOHL r = 0.70	M	412	407±	543±	594±	606±	-	NG	578±3[13]
				FL= 90.3 + 1.08xPOHL r = 0.76	F	218	-	527±	576±	597±	-	NG	566±2[14]
				-	Total	630	407±	538±	588±	603±	-	NG	571±
Nitinat R.	1979	McCart et al, 1980	Carcass Recovery	-	M	41	-	560±15	592±19	619±20	629±24	NG	578±13
				-	F	64	-	539±11	586±13	592±36	618±59	NG	564±10
				-	Total	105	-	548±	588±	602±	624±	NG	569±
Little Qualicum R.	1978	Lister, 1979	Carcass Recovery	-	M	204	-	560±	598±	623±	-	NG	593±
				-	F	201	-	580±	587±	600±	-	NG	584±
				-	Total	405	-	567±	592±	615±	-	NG	588±

* lengths (POHL) calculated from FL
** Deserted Ck. Regression used to calc. POHL from FL data
NG - not given.

1 N=9 (includes unaged fish)
2 N=13 (includes unaged fish)
3 N=39 (includes uaged fish)
4 N=51 (includes unaged fish)
5 N=989
6 N=1465
7 N=465
8 N=764
9 N=2047
10 N=2862
11 N=377
12 N=654
13 N=1029
14 N=1247

LENGTH (mm) OF SOCKEYE STOCKS SAMPLED

STREAM	YEAR	SOURCE	METHODS	POHL:FL REGRESSION	SEX	n	POHL at Age (± 2 S.E.) 3_1	3_2	4_1	4_2	4_3	5_2	5_3	6_3	NR	$\bar{x}$ POHL
NORTH COAST																
Kitlope R.	1981	Rosberg et al, 1982	Seining, Carcass Recovery	POHL=16.12 + 0.754xFL r = 0.95[3]	M	7	400	-	-	-	-	530±23	-	570	-	523±31
				POHL=38.11 + .870xFL r = 0.95[4]	F	7	-	-	510	490	-	530±22	-	-	-	514±18[2]
				POHL=51.30 + 0.717xFL r = 0.91	Total	14	400	-	510	490	-	530±15	-	570	-	518±16
Tezwa R.	1981	Rosberg et al, 1982	Carcass Recovery	POHL=72.26 + 0.658xFL r = 0.996[5]	M	7	-	-	-	432±35	-	530±20	-	530	-	488±43
				-	F	3	-	-	-	480±20	-	530	-	-	-	497±35
				POHL=85.78 + 0.64xFL r = 0.97[6]	Total	10	-	-	-	451±31	-	530±14	-	530	-	491±31
Kaltan Ck.	1981	Rosberg et al, 1982	Carcass Recovery	POHL=-7.44 + 0.778XFL r = 0.99	M	36	-	-	-	397±7	270	541±10	413±48	520±20	-	403±9[7]
				POHL=-22.36 + 0.854xFL r = 0.78[10]	F	35	-	-	-	463±15	-	501±7	-	486±12	-	476±17
				POHL=-26.96 + 0.827xFL r = 0.96	Total	71	-	-	-	401±9	270	506±8	418±48	496±14	-	428±9
Kwatna R. (Incl. Slousiska Ck.)	1983	Rice, 1984	Angling, Carcass Recovery	FL=1.310 x POHL-5.60 r = 0.98	M	7	-	290	-	475±45	-	535±14	-	-	0/7	474±69
				FL=1.252 x POHL-8.68 r = 1.0	F	5	-	-	-	485±72	-	490±21	-	-	0/5	487±49
				FL=5.08 + 1.258xPOHL r = 0.97	Total	12	-	290	-	480±46	-	517±26	-	-	0/12	480±43
Mussel Ck.	1983	Whelen and Morgan, 1984	Angling, Fence	-	M	5	-	-	-	458±15	-	528±35	460	-	NG	486±36
				-	F	2	-	-	-	445	-	-	510	-	NG	478±65
				-	Total	7	-	-	-	454±12	-	528±35	485±50	-	NG	484±29

* lengths calculated from regression equation;
** no scales taken from POHL - sampled fish.
NG - not given.

[1] N=9 (Includes unaged fish)
[2] N=13 (Includes unaged fish)
[3] N=39 (Includes uaged fish)
[4] N=51 (Includes unaged fish)
[5] N=989
[6] N=1465
[7] N=465
[8] N=764
[9] N=2047
[10] N=2862
[11] N=377
[12] N=654
[13] N=1029
[14] N=1247

LENGTH (mm) OF SOCKEYE STOCKS SAMPLED

STREAM	YEAR	SOURCE	METHODS	POHL:FL REGRESSION	SEX	n	POHL at Age (± 2 S.E.) 3_1	3_2	4_1	4_2	4_3	5_2	5_3	6_3	NR	$\overline{x}$ POHL
SOUTH COAST - Cont'd																
Sucwoa R.*[11]	1978	Glova and	Carcass Recovery	POHL=-5.07 + 0.777xFL r = 0.98	M	54	-	429±	-	485±	-	503±	488±	-	NG	483±
		McCart, 1979		POHL=-2.84 to .818xFL r = 0.94	F	25	-	0	-	468±	-	489±	435±	-	NG	473±
				-	Total	79	-	429±	-	481±	-	495±	462±	-	NG	479±
Canton Ck.*[11]	1978	Glova and	Carcass Recovery	POHL=-5.07 ± 0.777xFL r = 0.98	M	4	—	-	-	508±	-	446±	-	-	NG	492±
		McCart, 1979		POHL=-2.84 + 0.818xFL r = 0.94	F	5	-	-	-	466±	-	-	-	-	NG	466±
				-	Total	9	-	-	-	482±	-	446±	-	-	NG	478±
FRASER R., N.B.C. and YUKON																
Adams R. (lower)	1981	Whelen and Olmsted, 1982	Carcass Recovery	-	M	51	-	361±4	-	433±21	-	-	-	-	NG	approx 386
				-	F	19	-	436±54	-	484±5	-	-	-	-	NG	473±
				-	Total	70	-	369±	-	455±	-	-	-	-	NG	approx 410
Raft R.	1981	Scott et al, 1982	Carcass Recovery	-	M	41	-	328±21	-	491±18	-	529±24	-	-	NG	476±
				-	F	11	-	-	-	463±20	-	501±19	-	-	NG	475±
				-	Total	52	-	328±21	-	483±	-	521±	-	-	NG	476±

* Age-Specific Data for Fork Lengths Only.
NG - Not given.

1 N=10 (includes unaged fish)
2 N=14 (includes unaged fish)
3 N=10
4 N=13
5 N=7
6 N=9 (too few female for regression)
7 N=135 (includes unaged fish)
8 N=60 (includes unaged fish)
9 N=10
10 N=6
11 Regression eqns. developed from total North Coast Data (N=27 (male), 21 (female)

LENGTH (mm) OF PINK STOCKS SAMPLED

STREAM	YEAR	SOURCE	METHODS	POHL:FL REGRESSION	SEX	n	$\bar{x}$ POHL ± 2 S.E.*
NORTH COAST							
Morice R.	1979	Smith and Berezay, 1983	Carcass Recovery	-	M	28	422±15
				-	F	45	401±7
				-	Total	73	409±8
Kitlope R.	1981	Rosberg et al, 1982	Carcass Recovery	-	M	9	436±26
				-	F	8	439±22
				-	Total	17	438±27
Kwatna R. (incl. tribs.)	1983	Rice, 1984	Seined, Carcass Recovery	FL=39 + 1.17 x POHL r = 0.69	M	899	408±2
				FL=111 + 0.96 x POHL r = 0.88	F	570	413±2
				POHL=60.22+0.678xFL r = 0.89[1]	Total	1469	409±2
Quatlena R.	1983	Rice, 1984	Carcass Recovery	-	M	23	402±14.6
				-	F	31	400±6.7
				-	Total	54	401±7.2
SOUTH COAST							
Kakweiken R.	1981	Slaney and Milko, 1982	Carcass Recovery	-	M	214	448±5
				-	F	116	430±5
				-	Total	330	442±4
Glendale/Tom Browne Cks.	1981	Fielden and Slaney, 1982	Carcass Recovery	-	M	29	462±15
				-	F	17	440±10
				-	Total	46	454±11
	1983	Whelen and Morgan, 1984	Carcass Recovery	-	M	101	429±6
				-	F	105	418±4
				-	Total	206	423±4
Mussel Ck.	1983	Whelen and Morgan, 1984	Angling, Carcass Recovery	-	M	6	398±14
				-	F	1	410
				-	Total	7	399±12

* All stocks sampled were either found or assumed to be 2 years of age.

[1] N = 273

LENGTH (mm) OF PINK STOCKS SAMPLED

STREAM	YEAR	SOURCE	METHODS	POHL:FL REGRESSION	SEX	n	$\bar{x}$ POHL ± 2 S.E.
SOUTH COAST - Cont'd							
Ahnuhati R.	1983	Whelen and Morgan, 1984	Angling, Carcass Recovery	-	M	100	421±6
				-	F	113	414±4
				-	Total	213	417±4
Sucwoa R.	1978	Glova and McCart, 1979	Carcass Recovery	-	M	75	377±9
				-	F	178	378±4
				-	Total	253	378±
Canton Ck.	1978	Glova and McCart, 1979	Carcass Recovery	-	M	9	364±24
				-	F	12	370±19
				-	Total	21	367±
Conuma R.	1978	Glova and McCart, 1979	Carcass Recovery	-	M	19	380±17
				-	F	61	388±13
				-	Total	80	386±
Deserted Ck.	1978	Glova and McCart, 1979	Carcass Recovery	-	M	2	385±10
				-	F	3	350±23
				-	Total	5	364±
FRASER R., N.B.C. and YUKON							
Adams R. (lower)	1981	Whelen and Olmsted, 1982	Carcass Recovery	-	M	3	443±
				-	F	5	438±
				-	Total	8	440±
South Thompson R.	1981	Whelen and Olmsted, 1982	Carcass Recovery	-	M	12	454±
				-	F	21	444±
				-	Total	33	448±
North Thompson R.	1981	Scott et al, 1982	Carcass Recovery	-	Total	6	425±
South Thompson	1982	Whelen and Olmsted, 1983	Carcass Recovery	POHL=-53.17+0.852xFL r = 0.97[1]	M	7	463±28
				POHL=70.50+0.684xFL r = 0.83[2]	F	15	447±16
				POHL=115.66+0.592xFL r = 0.84	Total	22	452±14

Notes to Accompany Length at Age Table

- In the POHL:FL regression eqn. the value of "a" should be accurate to 2 decimal places, while the value of the "b" should be accurate to 3 decimal places, ie.: In a test using a small sample size (n=9), the FL value derived from an eqn. where "a" was accurate to 0 decimal places and b was accurate to 1 decimal place was found to be 3.3% higher than the calculated mean. The eqn. with the greater accuracy, however, deviated from the calculated mean by < 0.1%.

- Correlation Coefficient (r) value should be entered on tables.

APPENDIX C-7

FECUNDITIES of Stocks Sampled

All contractors took few or no samples primarily due to conservation concerns. Regression equations relating POHL and fecundity were calculated for each species and stock except sockeye. Population ("standard") fecundities were calculated using mean POHL data from Appendix C-6 and are compared in the tables with observed mean fecundities.

The large standard errors for observed mean fecundities suggest that basing the fecundity of one stock on the regression relationship developed from another may not provide an accurate estimate of that figure.

FECUNDITIES OF CHINOOK STOCKS SAMPLED

STREAM	YEAR	DATA SOURCE	METHODS	N	OBSERVED $\bar{x}$ FECUNDITY (±2 S.E.)	FECUNDITY VS POHL REGRESSION	"STANDARD"[1] FECUNDITY
NORTH COAST							
Kitlope R.	1981	Rosberg et al, 1982	assumed fecundity based on length similarities with Kitimat R. stocks	-	-	-	8000
SOUTH COAST							
Mussel Ck.	1983	Whelen and Morgan, 1984	direct count or volumetric assessment - report non-specific	6	6112±1190	Fec.=59.26xPOHL - 37986	3852
Ahnuhati R.	1983	Whelen and Morgan, 1984	direct count or volumetric assessment	1	7000	-	-
Nitinat R.	1979	McCart et al, 1980	direct count	15	4943±385	$\log_{10}$ FEC = 1.327x $\log_{10}$ POHL + 1.193	5047
FRASER R., N.B.C. and YUKON							
Slim Ck.	1980	Murray et al, 1981	volumetric subsample	8	6557±1042	equation not used	-
	1981	Rosberg & Aitken, 1982	calculated from sub-sample counts	7	6057±1479	equation not used	-
Bowron R.	1980	Murray et al, 1981	volumetric subsample	9	6313±761	equation not used	-
Willow R.	1980	Murray et al, 1981	volumetric subsample	1	6656	-	-
Stuart R.	1980	Hickey & Lister, 1981	volumetric subsample	5	5184±1215	equation not used	-
Nechako R. (incl. tribs.)	1979	Olmsted et al, 1980	direct count	3	5932±1268	Fec.=20.83xPOHL - 7389	5984
West Road (Blackwater) /Nazko R's	1980	Olmsted et al, 1981	$\bar{x}$ lengths substituted into Quesnel R. regression eqn. (developed from pooled 1979 & 1980 data)	-	-	Fec.=12.93xPOHL - 2655	5258 (West Road) 5840 (Nazko)

[1] calculated from regression equation

FECUNDITIES OF CHINOOK STOCKS SAMPLED

STREAM	YEAR	DATA SOURCE	METHODS	N	OBSERVED $\bar{x}$ FECUNDITY (±2 S.E.)	FECUNDITY VS POHL REGRESSION	"STANDARD"[1] FECUNDITY
			FRASER R., N.B.C. and YUKON - cont'd				
Cottonwood R.	1980	Olmsted et al, 1981	$\bar{x}$ lengths substituted into Quesnel R. regression eqn. (developed from pooled 1979 and 1980 data)	-	-	Fec.=12.95xPOHL - 2655	6460
Horsefly R.	1979	Olmsted et al, 1980	revised fecundity obtained from Quesnel R. regression presented in Olmsted et al, 1981	-	-	Fec.=12.93xPOHL - 2655	6008
Horsefly R./ McKinley Ck.	1980	Olmsted et al, 1981	$\bar{x}$ length data substituted into Quesnel R. regression eqn. (derived from pooled 1979 & 1980 data)	-	-	Fec.=12.93xPOHL - 2655	6499
Quesnel R.	1979	Olmsted et al, 1980	direct count	11	6342±496	Fec.=37.04xPOHL - 19245	5757
			1981 readjustment	11	-	Fec.=12.93xPOHL - 2655	6073
	1980	Olmsted et al, 1981	direct count; equation developed from pooled 1979 & 1980 data	7	6653±468	Fec.=12.93xPOHL - 2655	5250
Eagle R.	1981	Whelen and Olmsted, 1982	$\bar{x}$ overall length substituted into Quesnel R. (1981) equation (Olmsted et al, 1981)	-	-	Fec.=12.93xPOHL - 2655	4750
Salmon R.	1981	Whelen and Olmsted, 1982	as for Eagle R. (1981)	-	-	Fec.=12.93xPOHL - 2655	6280
Adams R. (lower)	1981	Whelen and Olmsted, 1982	as for Eagle R. (1981)	-	-	Fec.=12.93xPOHL - 2655	6390
Finn Ck.	1981	Scott et al, 1982	as for Eagle R. (1981)	2	5321±958	Fec.=12.93xPOHL - 2655	6255
Raft R.	1981	Scott et al, 1982	as for Eagle R. (1981)	3	4856±944	Fec.=12.93xPOHL - 2655	5837
North Thompson R.	1981	Scott et al, 1982	as for Eagle R. (1981)	2	5339±322	Fec.=12.93xPOHL - 2655	6490

[1] calculated from regression equation

FECUNDITIES OF COHO STOCKS SAMPLED

STREAM	YEAR	DATA SOURCE	METHODS	N	OBSERVED $\bar{x}$ FECUNDITY (±2 S.E.)	FECUNDITY VS POHL REGRESSION	"STANDARD"[1] FECUNDITY
			NORTH COAST				
Kwatna R.	1983	Rice, 1984	subsample count (10% of skein by weight)	10	2751±546	$\log_{10}$ Fec=1.64 x $\log_{10}$ POHL - 1.08 r = 0.32	2495
			SOUTH COAST				
Kakweiken R.	1981	Slaney and Milko, 1982	direct count	9	3282±411	Fec.=3.85xPOHL + 1060	3273
Mussel Ck.	1981	Fielden and Slaney, 1982	direct count	3	3873±1724	-	-
	1983	Whelen and Morgan, 1984	direct count or volumetric subsample - report non-specific	3	3040±356	-	-
			FRASER R., N.B.C. and YUKON				
Eagle R.	1982	Whelen et al, 1983	$\bar{x}$ fecundity derived from equation developed by Beacham (1982)	-	-	Fec.=11.45xPOHL - 2649	3065
Salmon R.	1982	Whelen et al, 1983	as for Eagle R. (1982)	1	3000 (PSM)[2]	Fec.=11.45xPOHL - 2649	2595
Adams R. (lower)	1982	Whelen et al, 1983	as for Eagle R. (1982)	-	-	Fec.=11.45xPOHL - 2649	2824
Adams R. (upper)	1982	Whelen et al, 1983	as for Eagle R. (1982)	-	-	Fec.=11.45xPOHL - 2649	2400
Coldwater R.	1982	Whelen et al, 1983	as for Eagle R. (1982)	-	-	Fec.=11.45xPOHL - 2649	2835

[1] calculated from regression equation
[2] pre-spawning mortality

FECUNDITIES OF CHUM STOCKS SAMPLED

STREAM	YEAR	DATA SOURCE	METHODS	N	OBSERVED $\bar{x}$ FECUNDITY (±2 S.E.)	FECUNDITY VS POHL REGRESSION	"STANDARD"[1] FECUNDITY
NORTH COAST							
Mathers Ck.	1978	Glova et al, 1979	Direct Count	14	2711±158	logFec.=1.096xlogPOHL + 0.411	2718
Kitlope R.	1981	Rosberg et al, 1982	substitution of 1982 Kitlope R. length data into recently-developed regression eqns. for other coastal streams	-	-	various: see Glova et al, 1979; Glova & McCart, 1979; Lister, 1979; Murray & Hamilton, 1981	3067
Kemano R.	1979	Murray and Hamilton, 1981	Direct Count	8	2847±442	logFec=1.7xlogPOHL + 0.47	2890[3]
Kwatna R.	1983	Rice, 1984	subsample count (10% of skein by weight)	1	3020	-	-
SOUTH COAST							
Ahnuhati R.	1983	Whelen and Morgan, 1984	direct count or volumetric subsample - report non-specific	8	2938±667	Fec=18.86xPOHL - 8471	2675
Sucwoa R. Canton Ck. Conuma R. Tlupana R.	1978	Glova and McCart, 1979	direct egg counts were made; fecundity and POHL data were pooled to develop eqn.	16	overall range = 1896 - 3422	$\log_{10}$Fec=1.662x$\log_{10}$ POHL - 1.148	2762 2692 2734 2686
Deserted Ck.	1978	Glova and McCart, 1979	direct count	12	2512[4]	$\log_{10}$Fec=0.482x$\log_{10}$ POHL + 2.07	2531
Nitinat R.	1979	McCart et al, 1980	direct count	15	2448±306	$\log_{10}$Fec=1.987x$\log_{10}$ POHL - 0.072	2566±
Little Qualicum R.	1978	Lister, 1979	unknown	33	2935±243	Fec=127.8xPOHL - 4414	3076±

[1] calculated from regression equation
[3] The calculated fecundity was deemed unacceptable due to a wide 95% confidence interval
[4] calculated from scatterplot in source document

FECUNDITIES OF SOCKEYE STOCKS SAMPLED

STREAM	YEAR	DATA SOURCE	METHODS	N	OBSERVED $\bar{x}$ FECUNDITY (±2 S.E.)	FECUNDITY VS POHL REGRESSION	"STANDARD"[1] FECUNDITY
			NORTH COAST				
Kaitan Ck.	1981	Rosberg et al, 1982	estimates derived from comparison with data collected under a separate study in 1981	-	-	not given	4169
Kwatna R.	1983	Rice, 1984	subsample count (10% of skein by weight)	1	5225	-	-
			SOUTH COAST				
Kakweiken R.	1981	Slaney and Milko, 1982	direct count	2	3177±659	-	-
Ahnuhati R.	1983	Whelen and Morgan, 1984	volumetric subsample	1	2800	-	-

[1] calculated from regression equation

FECUNDITIES OF PINK STOCKS SAMPLED

STREAM	YEAR	DATA SOURCE	METHODS	N	OBSERVED $\overline{x}$ FECUNDITY (±2 S.E.)	FECUNDITY VS POHL REGRESSION	"STANDARD"[1] FECUNDITY
NORTH COAST							
Kwatna R.	1983	Rice, 1984	subsample count (10% of skein by weight)	8	1314±171	Fec. 1313 + 1.24 x POHL r = 0.09	1825
SOUTH COAST							
Kakweiken R.	1981	Slaney and Milko, 1980	Direct Count	1	1582	-	-
Glendale/Tom Browne Cks.	1983	Whelen and Morgan, 1984	direct count or volumetric subsample - report is non-specific	8	1534±195	Fec.=14.05xPOHL - 4558	1335
Ahnuhati R.	1983	Whelen and Morgan, 1984	direct count or volumetric subsample	9	1822±260	Fec.=14.02xPOHL - 4198	1606

[1] calculated from regression equation

1. The large standard errors of calculated fecundity rates and wide differences in observed fecundity means between stocks suggest that basing the "standard" fecundity of one stock on the FL/POHL regression relationship developed from another may not provide an accurate estimate of that figure. A case in point is the regression equation developed for the Quesnel R. in 1981. This equation was used initially to calculate fecundities for chinook stocks previously studies in the Quesnel, Cottonwood and West Road River watersheds. In 1982 the same equation was utilized in the determination of fecundities for stocks in the North and South Thompson River draingage, which characteristicly had "observed" mean fecundities approx. 20% lower than reported for the Quesnel R. However, the calculated mean fecundities for South and North Thompson tributaries corresonded closely with that calculated for the Quesnel R. This problem is lessened somewhat for other species, which do not exhibit the same degree of variation in $\bar{x}$ fecundity between stocks.

APPENDIX C-8

EGG RETENTION (Percent of Fecundity) Found in Stocks Sampled

Egg retention was estimated to calculate an egg loss factor to derive overall egg deposition for a group of spawners. Egg retention was established by estimating the number of eggs left in the body cavity of moribund females and carcasses, either in terms of actual numbers or as a percent of the assumed fecundity. Egg loss through predation or redd superimposition was not considered at this stage.

There was a large difference in rate of retention between samples with prespawning mortalities (PSM) included and those where PSMs are calculated separately, even though the percentage of PSM is small relative to the sample size. The New Projects studies assumed that the proportion of PSM remained the same throughout the spawning period, although in some cases this assumption may have been incorrect.

EGG RETENTION (% OF FECUNDITY) FOUND IN CHINOOK STOCKS SAMPLED

STREAM	YEAR	DATA SOURCE	N	AVG. % RETENTION	RANGE OF RETENTION	PERCENT OF SAMPLES RETAINING EGGS			
						0%	>0-10%	>10-50%	>50-100%
NORTH COAST									
Morice R.	1978-80	Smith and Berezay, 1983	378	NG	NG	<2.0% of sampled fish unspawned			
Kitlope R.	1981	Rosberg et al, 1982	20	0.29	0-3.0	50	50	0	0
SOUTH COAST									
Mussel Ck	1981	Fielden and Slaney, 1982	7	NG	NG	57.1	42.9	0	0
	1983	Whelen and Morgan, 1984	6	0.4	0-2.5	80	20	0	0
Ahnuhati R.	1983	Whelen and Morgan, 1984	7	<0.1	0-0.3	71.4	28.6	0	0
Sucwoa R.	1979	Glova and McCart, 1979	26	<1.0	NG	50% of fish sampled retained eggs			
Conuma R.	1978	Glova and McCart, 1979	25	<1.0	NG	16% of fish sampled retained eggs			
Deserted Ck.	1978	Glova and McCart, 1979	11	<5.50	NG	63.6% of fish sampled retained eggs			
Nitinat R.	1979	McCart et al, 1980	422	1.9	0-79.3	47.2	NG	NG	NG
FRASER R, N.B.C. and YUKON									
Torpy R.*	1981	Rosberg and Aitken, 1982	22	0.88	0-8.4	45.5	54.5	0	0
West Torpy R.*	1981	Rosberg and Aitken, 1982	10	<0.01	0-0.05	90	10	0	0
Walker Ck.*	1981	Rosberg and Aitken, 1982	33	0.45	0-5.6	69.7	30.3	0	0
Slim Ck.	1980	Murray et al, 1981	105	0.15	0-9.15	80	20	0	0
	1981	Rosberg and Aitken, 1982	66[1] 98[2]	5.4 37.41	0-66.0 0-100	43.9 29.6	42.4 28.6	10.6 7.1	3.0 34.4
Bowron R.	1980	Murray et al, 1981	120[1] 123[2]	0.03 2.96	0-0.79 0-100	65.0 63.4	35.0 34.1	0 0	0 2.4

NG - not given
* - data based on an assumed fecundity
1 - not including PSM's
2 - including PSM's

EGG RETENTION (% OF FECUNDITY) FOUND IN CHINOOK STOCKS SAMPLED

STREAM	YEAR	DATA SOURCE	N	AVG. % RETENTION	RANGE OF RETENTION	PERCENT OF SAMPLES RETAINING EGGS 0%	>0-10%	>10-50%	>50-100%
FRASER R., N.B.C. and YUKON - Cont'd									
Willow R.	1980	Murray et al, 1981	49	0.23	0-7.51	46.9	53.1	0	0
Wansa Ck.	1980	Murray et al, 1981	25	0.37	0-7.51	28.0	72.0	0	0
Stuart R.	1980	Hickey and Lister, 1981	150	1.5	0-100	56.6	39.9	2.0	1.4
Nechako R.	1979	Olmsted et al, 1980	14	21.4	0-100	78.6	0	0	21.4
Horsefly R.	1979	Olmsted et al, 1980	14	0	0	100	0	0	0
	1980	Olmsted et al, 1981	10	0.04	0-0.22	60	40	0	0
Quesnel R.	1979	Olmsted et al, 1980	32	12.57	0-100	84.4	3.1	0	12.5
	1980	Olmsted et al, 1981	61	0.96	0-14.88	31.1	63.9	4.9	0
Eagle R.	1981	Whelen and Olmsted, 1982	48	1.2	0-100	56.3	39.6	0	4.2
Salmon R.	1981	Whelen and Olmsted, 1982	32	9.5	0-63.2	75.0	21.9	3.1	0
Adams R. (lower)	1981	Whelen and Olmsted, 1982	78	1.3	0-18.2	42.3	56.4	1.3	0
South Thompson R.	1981	Whelen and Olmsted, 1982	678	2.8	0-100	22.6	55.5	21.2	0.7
Finn Ck.	1981	Scott et al, 1982	256	17.7	0-100	approx. 63	approx. 26	approx. 5	approx. 6
Raft R.	1981	Scott et al, 1982	110	15.3	0-100	80.0	15.5	1.8	2.7
North Thompson R.	1981	Scott et al, 1982	217	2.2	0-100	48.5	40.1	0.5	0.9

NG - not given
1 - not including PSM's
2 - including PSM's

EGG RETENTION (% OF FECUNDITY) FOUND IN COHO STOCKS SAMPLED

STREAM	YEAR	DATA SOURCE	N	AVG. % RETENTION	RANGE OF RETENTION	PERCENT OF SAMPLES RETAINING EGGS			
						0%	>0-10%	>10-50%	>50-100%
FRASER R., N.B.C. and YUKON									
Eagle R. (Incl. South Pass Ck.)	1982	Whelen et al, 1983	83	1.25	0-48.9	48.2	44.6	7.2	0
Salmon R. (Incl. Bolean Ck.)	1982	Whelen et al, 1983	10	11.98	0-100	50	20	20	10
Albreda R.	1982	Hutton et al, 1983	9	<2	-	---------- all fish spawned out ---------			
Lion Ck.	1982	Hutton et al, 1983	104	<2	0-100	-------- 98.1 ----		0	1.9
Lemieux Ck.	1982	Hutton et al, 1983	44	2-5	0-50±	----approx. 98----		approx. 1	approx. 1
Barriere R.	1982	Hutton et al, 1983	21	1-4	0-50±	-------- 95.3 ----		--------- 4.7 --------	
Louis Ck. (Incl. Christian Ck.)	1982	Hutton et al, 1983	22	<2	-	---------- all fish spawned out --------			

NG - not given

EGG RETENTION (% OF FECUNDITY) FOUND IN CHUM STOCKS SAMPLED

STREAM	YEAR	DATA SOURCE	N	AVG. % RETENTION	RANGE OF RETENTION	PERCENT OF SAMPLES RETAINING EGGS			
						0%	>0-10%	>10-50%	>50-100%
NORTH COAST									
Mathers Ck.	1978	Glova et al, 1979	135	1.28	0-57.9	37.8	NG	NG	NG
Kitlope R.	1981	Rosberg et al, 1982	11	0.33	0-2.2	72.7	27.3	0	0
Gamsby R.	1981	Rosberg et al, 1982	10	0.36	0.33	60	40	0	0
Kemano R. (incl. tribs.)	1979	Murray and Hamilton, 1981	347	8.6	≤100	NG	NG	NG	2.9
Kwatna R.	1983	Rice, 1984	117	5.2	0-100	55.0	--------41.6----------		3.4
Quatlena R.	1983	Rice, 1984	12	0	0	100	0	0	0
SOUTH COAST									
Glendale/Tom Browne Ck.s	1981*	Fielden and Slaney, 1982	9	0.23	0-1.9	55.6	44.4	0	0
	1983	Whelen and Morgan, 1984	16	10.3	0-50.7	25.0	50.0	12.5	12.5
Ahnuhati R.	1981	Fielden and Slaney, 1982	9	11.5	0-80.0	33.3	55.6	0	11.1
	1983	Whelen and Morgan, 1984	33	14.8	0-100	36.4	48.5	3.0	12.1
Sucwoa R.	1978	Glova and McCart, 1979	867	1.97	NG	44.8	NG	NG	NG
Canton Ck.	1978	Glova and McCart. 1979	665	0.49	NG	61.8	NG	NG	NG
Conuma R.	1978	Glova and McCart, 1979	1952	0.46	NG	62.4	NG	NG	NG
Tlupana R.	1978	Glova and McCart, 1979	528	1.05	NG	66.9	NG	NG	NG
Deserted Ck.	1978	Glova and McCart, 1979	873	1.56	NG	50.6	NG	NG	NG
Nitinat R.	1979	McCart et al, 1980	65	0.69	0-23.4	38.5	-------- 61.5 -------		0
Little Qualicum R.	1978	Lister, 1979	201	1.5	0-100	91.0			

NG - not given

* - results based on fecundity of approx. 2700 eggs per - female estimated by the authors for Ahnuhati R. chum in 1983

EGG RETENTION (% OF FECUNDITY) FOUND IN SOCKEYE STOCKS SAMPLED

STREAM	YEAR	DATA SOURCE	N	AVG. % RETENTION	RANGE OF RETENTION	PERCENT OF SAMPLES RETAINING EGGS			
						0%	>0-10%	>10-50%	>50-100%
NORTH COAST									
Kalitan Ck.	1981	Rosberg et al, 1982	34	0.5	0-7.2	47.1	44.1	8.8	0
SOUTH COAST									
Sucwoa R.	1978	Glova and McCart, 1979	12	approx. 7	NG	50.0	NG	NG	NG

NG - not given

EGG RETENTION (% OF FECUNDITY) FOUND IN PINK STOCKS SAMPLED

STREAM	YEAR	DATA SOURCE	N	AVG. % RETENTION	RANGE OF RETENTION	PERCENT OF SAMPLES RETAINING EGGS			
						0%	>0-10%	>10-50%	>50-100%
NORTH COAST									
Kitlope R.	1981	Rosberg et al, 1982	10	approx. 5	0-100	60	30	0	10
Kwatna R.	1983	Rice, 1984	343	1.8	0-100	67.9	22.2	7.6	2.3
SOUTH COAST									
Kakweiken R.	1981	Slaney and Milko, 1982	111	43.6	0-100	64.2	0	0.9	34.9
Glendale/Tom Browne Cks.*	1983	Whelen and Morgan, 1984	98	12.5	0-100	41.8	22.4	26.5	9.2
Ahnuhati R.*	1983	Whelen and Morgan, 1984	54	0.4	0-12.3	56.7	34.4	8.9	0
Sucwoa R.	1978	Glova and McCart, 1979	57	<0.2	NG	45.6	NG	NG	NG
Canton Ck.	1978	Glova and McCart, 1979	8	<0.1	NG	37.5	NG	NG	NG
Conuma R.	1978	Glova and McCart, 1979	20	<0.1	NG	25	NG	NG	NG

NG - not given
* - values shown differ from those presented in source report

Notes to Accompany Egg Retention Table

1. As can be seen from selected entries (eg: Bowron R., 1980) there is a large difference in rate of retention between samples with PSM's (pre-spawning mortalities) included and those where PSM's are separate, even though the percentage of PSM's is small, relative to the sample size. This is an important point, and one which may not be taken seriously enough in some studies, when estimations of total egg deposition are attempted. It can not be assumed that the proportion of PSM's in a population will remain the same throughout the spawning period. Only from a continuous sampling effort which includes PSMs and other <100% spawned fish can an accurate estimate of total (actual) egg deposition be made.

APPENDIX C-9

FLESH COLOUR OF CHINOOK STOCKS Sampled

Adult chinook flesh colour was determined in most of the studies by examination of the gill isthmus when the fish was alive, and by examination of the flesh during sampling of fresh carcasses. It should be noted that flesh colour is a highly judgemental factor when applied to deteriorating fish, as it is known that flesh colour pales as sexual maturity progresses.

FLESH COLOR OF CHINOOK STOCKS SAMPLED

STREAM	YEAR	SOURCE	METHODS	SEX	N	% WHITE	% RED
SOUTH COAST							
Mussel Ck.	1983	Whelen and Morgan, 1984	Isthmus flesh color[1]	M	102	45.1	54.9
				F	107	50.5	49.5
Klinaklini R.	1983	Whelen and Morgan, 1984	Isthmus flesh color[1]	M	0	-	-
				F	3	100	0
Ahnuhati R.	1983	Whelen and Morgan, 1984	Isthmus flesh color[1]	M	11	72.7	27.3
				F	12	91.7	8.3
FRASER R., N.B.C. and YUKON							
Holmes R.	1981	Rosberg and Aitken, 1982	location (from body) unknown[2]	M&F	9	100	0
Torpy R.	1981	Rosberg and Aitken, 1982	location (from body) unknown[2]	M&F	38	94.7	5.3
West Torpy R.	1981	Rosberg and Aitken, 1982	location (from body) unknown[2]	M&F	17	100	0
Walker Ck.	1981	Rosberg and Aitken, 1982	location (from body) unknown[2]	M&F	65	95.4	4.6
Slim Ck.	1981	Rosberg and Aitken, 1982	location (from body) unknown[2]	M	7	71.4	28.6
Nechako R.	1979	Olmsted et al, 1980	location (from body) unknown[1]	M	7	71.4	28.6
				F	15	93.3	6.7
Blackwater R.	1980	Olmsted et al, 1981	Isthmus flesh color[1]	M	12	0	100
				F	5	0	100
Nazko R.	1980	Olmsted et al, 1981	Isthmus flesh color[1]	M	6	0	100
				F	4	25	75
Cottonwood R.	1980	Olmsted et al, 1981	Isthmus flesh color[1]	M	4	25	75
				F	3	0	100

[1] Angled fish
[2] Carcass

FLESH COLOR OF CHINOOK STOCKS SAMPLED

STREAM	YEAR	SOURCE	METHODS	SEX	N	% WHITE	% RED
FRASER R., N.B.C. and YUKON - Cont'd							
Horsefly R.	1979	Olmsted et al, 1980	location (from body) unknown[1]	M	3	0	100
				F	0	-	-
McKinley Ck.	1980	Olmsted et al, 1981	isthmus flesh color[1]	M	11	0	100
				F	4	0	100
Quesnel R.	1979	Olmsted et al, 1980	location (from body) unknown[1]	M	17	17.6	82.4
				F	16	12.5	87.5
	1980	Olmsted et al, 1981	isthmus flesh color[1]	M	171	31.6	68.4
				F	149	24.2	75.8
Eagle R.	1981	Whelen and Olmsted, 1982	isthmus flesh color[1,2]	M	54	11.1	88.9
				F	64	21.9	78.1
Salmon R.	1981	Whelen and Olmsted, 1982	isthmus flesh color[1,2]	M	26	3.8	96.2
				F	49	6.1	93.9
Adams R. (lower)	1981	Whelen and Olmsted, 1982	isthmus flesh color[1,2]	M	45	13.3	86.7
				F	77	7.8	92.2
South Thompson R.	1981	Whelen and Olmsted, 1982	isthmus flesh color[2]	M	139	24.0	76.0
				F	678	21.2	78.8
Finn Ck.	1981	Scott et al, 1982	isthmus flesh color[1,2]	M	282	26.6	73.4
				F	224	25.4	74.6
Raft R.	1981	Scott et al, 1982	isthmus flesh color[1,2]	M	136	19.9	80.1
				F	92	21.7	78.3
North Thompson R.	1981	Scott et al, 1982	isthmus flesh color[2]	M	193	11.4	88.6
				F	207	9.7	90.3

[1] Angled fish

[2] Carcass

1) Possibly differing methods in determination of flesh color as well as personnel training and efficiency could bias ratios one way or another.

APPENDIX C-10

Results of DISEASE SURVEYS Undertaken

Surveys of the endemic disease characteristics of salmonid populations focussed on those pathogens and parasites known to cause hatchery losses. Diagnostic processes included external and internal examinations for parasites and infected areas, laboratory treatments for bacterial and viral disease agents and histological sectioning of possibly infected tissues. All microorganisms found in the samples are reported, whether or not they were associated with a particular disease. In most cases the DFO Disease Diagnostics Service (DDS) performed the analyses but in one case (Whelen et al. 1983) the E.V.S. Consulting Co. Ltd. disease laboratory was used. The reader is advised that the DDS maintains more complete and current listings of all disease survey results, which can be accessed upon request.

RESULTS OF DISEASE SURVEYS UNDERTAKEN

CHINOOK

STREAM	YEAR	SOURCE	N	DISEASE ORGANISM	# INFECTED	% INFECTED	COMMENTS
SOUTH COAST							
Mussel Ck.	1981[1]	Fielden and Slaney, 1982	13	*Aeromonas salmonicida*	3	38.5	this is considered to be a high rate of infection
			13	*Salmincola* sp.	-	-	light infections
			13	*Myxidium* sp.	-	-	light infections
	1983	Whelen and Morgan, 1984	29	*A. salmonicida*	17	58.6	this is an unusually high rate of infection
FRASER R., N.B.C. and YUKON							
Slim Ck.	1980	Murray et al, 1981	24	*Ceratomyxa shasta*	7	29.2	
			24	*Myxidium* sp.	3	12.5	
	1981	Rosberg and Aitken, 1982	55	*C. shasta*	10	18.2	no mortalities documented
Bowron R.	1980	Murray et al, 1981	25	*Henneguya salmonicida*	1	4.0	
			25	*C. shasta*	5	20.0	
			25	*Myxidium* sp.	11	44.0	
			9	*C. shasta*	9	100	
Wansa Ck.	1980	Murray et al, 1981	7	*C. shasta*	7	100	
Nechako R.	1979	Olmsted et al, 1980	17	none documented	0	0	frozen samples were considered not fully suitable for analysis
Horsefly R.	1979	Olmsted et al, 1980	9	*A. salmonicida*	1	11.1	as for Nechako R.
Quesnel R.	1979	Olmsted et al, 1980	14	*C. shasta*	1	7.1	as for Nechako R.
Quesnel R.	1980	Olmsted et al, 1981	60	*A. salmonicida*	11	18.3	present in carrier stage only; no active infections
			60	*C. shasta*	60	100	all lightly infected
			60	*Myxidium* sp.	30	50	
			60	*Dermocystidium* sp.	6	10	
			-	see comments	-	-	gills of several specimens showed numerous, abnormally large necrotic lesions

[1]several partially - decayed specimens were included in the sample.

RESULTS OF DISEASE SURVEYS UNDERTAKEN

	STREAM	YEAR	SOURCE	N	DISEASE ORGANISM	# INFECTED	% INFECTED	COMMENTS
CHINOOK					FRASER R., N.B.C. and YUKON - Cont'd			
	Salmon R.	1981	Whelen and Olmsted, 1982	20	C. shasta	20	100	
				20	Myxidium sp.	18	90	
				20	Dermocystidium sp.	-	-	found on the gills of an unspecified number of fish
	Finn Ck.	1981	Scott et al, 1982	25	A. salmonicida	see comments		10% of the sample were either infected or were carriers
				25	C. shasta	25	100	several heavy infections & 1 PSM attributed to this parasite
				25	Cryptobia sp.	2	8.0	leeches, the vector of this organism, were commonly observed on the samples
COHO					SOUTH COAST			
	Mussel Ck.	1981	Fielden and Slaney, 1982	3	Salmonicola sp.	-	-	light infections only
				3	Myxidium sp.	-	-	light infectins only
					FRASER R., N.B.C. and YUKON			
	Eagle R.	1982	Whelen et al, 1983	27	Aeromonas hydrophila	4	14.8	
				52	C. shasta	36	69.2	
				25	Anisakis simplex	3	12.0	light larval infections
				25	Piscicola salmositica	1	4.0	
				52	unidentified fungi	19	36.5	present on gills
				25	Diphyllobothriid gen. sp.	2	8.0	light infections
				27	Phocanema decipiens	1	3.7	larval form present
				25	Salmincola californiensis	1	4.0	
	Salmon R.	1982	Whelen et al, 1983	27	A. salmonicida	1	3.7	
				27	A. hydrophila	2	7.4	
				27	C. shasta	24	88.9	no associated mortalities
				27	Myxosporida gen. sp.	2	7.4	
				27	S. californiensis	2	7.4	
				27	Fungi gen. sp.	7	25.9	

RESULTS OF DISEASE SURVEYS UNDERTAKEN

	STREAM	YEAR	SOURCE	N	DISEASE ORGANISM	# INFECTED	% INFECTED	COMMENTS
COHO								
	FRASER R., N.B.C. and YUKON - Cont'd							
	Adams R. (lower)	1982	Whelen et al, 1983	12	C. shasta	4	33.3	infected fish had enlarged, discolored gall bladders
				12	Myxosporida sp.	1	8.3	
				12	Anisakis simplex	1	8.3	larval form present
				12	see comments	1	8.3	a small tumor found in the spleen
	Coldwater R.	1982	Whelen et al, 1983	15	A. hydrophila	1	6.7	
				15	Pseudomonas flourescens	1	6.7	
				15	unidentified myxobacteria	1	6.7	
				15	C. shasta	10	66.7	
				15	Myxidium minteri	1	6.7	
				15	Fungi gen. sp.	1	6.7	
				15	see comments	1	6.7	a large ulcerated area present on the right ventral body surface
	Lion Ck.	1982	Hutton et al, 1983	59	C. shasta	39	66.1	
				59	Cryptobia sp.	-	-	"several" fish affected
				59	Myxidium sp.	1	1.7	
CHUM	**NORTH COAST**							
	Kwatna R.	1983	Rice, 1984	4	Aeromonas salmonicida	2	50	the small sample size precluded conclusive findings
CHUM	**SOUTH COAST**							
	Glendale/Tom Browne Cks.	1983	Whelen and Morgan, 1984	14	A. salmonicida	3	21.4	
	Mussel Ck.	1981	Fielden and Slaney, 1982	4	Salmincola sp.	4	100	light infections
				4	A. salmonicida	1	25	light infections

RESULTS OF DISEASE SURVEYS UNDERTAKEN

	STREAM	YEAR	SOURCE	N	DISEASE ORGANISM	# INFECTED	% INFECTED	COMMENTS
					NORTH COAST			
KOKANEE/ SOCKEYE	Kwatna R.	1983	Rice, 1984	1	none found	0	0	as above.
					SOUTH COAST			
	Mussel Ck.	1981	Fielden and Slaney, 1982	3	I.H.N. (Infectious Hemotopoietic Necrosis)	1	33.3	sockeye only in sample
				30	A. salmonicida	-	-	unspecified number infected
				30	Salmincola sp.	-	-	unspecified number infected
				30	Philonema sp.	-	-	unspecified number infected
				30	Chloromyxidium sp.	-	-	unspecified number infected
		1983	Whelen and Morgan, 1984	60	Salmincola sp.	60	100	
				60	Philonema sp.	54	90	
					SOUTH COAST			
PINK	Kwatna R.	1983	Rice, 1984	68	Myxidium sp.	57	83.8	
				68	Chloromyxum sp.	2	2.9	
	Glendale/Tom Browne Cks.	1983	Whelen and Morgan, 1984	17	A. salmonicida	2	11.8	
				17	Renibacterium salmonarum	1	5.9	causative agent of B.K.D.
				17	Myxidium sp.	3	17.6	
				17	Parvicapsula sp.	5	29.4	
				17	unclassified microsporidan parasite	4	23.5	
				17	external fungus	-	approx. 25.0	
				17	BKD (Bacterial Kidney Disease)	1	5.9	
	Ahnuhati R.	1983	Whelen and Morgan, 1984	60	A. salmonicida	3	5.0	
				60	Anisakis sp.	-	-	unspecified number infected
				60	Diphyllobothrium sp.	-	-	unspecified number infected
				60	Myxidium sp.	-	-	unspecified number infected
				60	Parvicapsula sp.	-	-	unspecified number infected

APPENDIX C-11

KEY JUVENILE TIMING DATES

Downstream migrants usually were captured in inclined plane traps (IPTs) or fyke nets (FNs). Catches were calibrated for trap efficiency using trap-hours, percent of stream discharge or cross section fished and mark recovery trials. Daily population estimates, daily percentage of the run, date of peak catch and environmental factors were then compiled. Since different capture techniques select for various sizes and stages, it is noted in the tables which capture methods were used.

It was necessary to standardize migration timing statistics and definitions of various juvenile life stages to compare studies. A major challenge was to differentiate between emergent and reared fry. This distinction was particularly difficult to make for chum salmon and the reader is advised to use caution when reviewing juvenile statistics for this species. Juvenile 1+ and 2+ coho and chinook were more clearly defined, usually on the basis of scale readings or size differences.

Not all studies intercepted the peak migration due to late startup, trap washout or low catches. Peak migration was defined as the period of highest catch, or when trapping success was highest. In general, the last small or first large fish sampled (length and weight) indicated the beginning and end of the run, unless abnormally large or pinheaded fish were noted. Secondary peaks were not considered, and some degree of trap avoidance by older juveniles must be assumed. In many cases, where peak timing dates in the source reports were based on changes in weight, length or development indices, there was disagreement between the source report authors and this summary document.

KEY CHINOOK JUVENILE TIMING DATES

STREAM	YEAR	SOURCE	METHODS[1]	EMERGENTS (0+)				REARED FRY (0+)				UNDERYEARLINGS (0+)[2]				YEARLINGS (1+)			COMMENTS
				START	PEAK	50%	END	START	PEAK	50%	END	START	PEAK	50%	END	START	PEAK	END	
NORTH COAST																			
Morice R.	1979	Smith and Berezay, 1983	IP, FN	Apr 11	Apr 26	Apr 24	late June	-	-	-	-	-	-	-	-	-	-	-	a secondary peak in migration occurred April 23.
	1980	Smith and Berezay, 1983	IP, FN	before Apr 6	Apr 17	Apr 14-15	early July	-	-	-	-	-	-	-	-	-	-	-	a secondary peak in migration occurred during mid-late May.
Kitimat R.	1980	Birch et al, 1981	IP	early Apr	Apr 8 or before	Apr 16	late May	June 4	June10	-	Aug 12	early Apr	Apr 16	Apr 10	Aug 12	early Apr	Apr 23	end May	only low numbers of post-emergents caught.
Hirsch Ck.	1980	Birch et al, 1981	FN	early Apr	Apr 11	Apr 13	June 5	June10	July10	-	July11	early Apr	Apr 13	Apr 13	July11	-	-	-	
Cecil Ck.	1980	Birch et al, 1981	FN	May 7	May 12	May 12	May 14	-	-	-	-	-	-	-	-	-	-	-	
Kildala R.	1981	Slaney et al, 1982	IP	early Mar	Apr 2	Apr 9	May 25	June 1	early June	early June	June26	-	-	-	-	early Mar	Apr 28	late July	a secondary peak in emergent migration occurred in late April.
Dala R.	1981	Slaney et al, 1982	IP	Mar 15	Apr 3	Apr 12	June 4	June 8	-	-	July 2	-	-	-	-	Mar 8	May 4	May 11	a secondary peak in emergent migration occurred in late April.
SOUTH COAST																			
Mussel Ck.	1983	Whelen and Morgan, 1984	MT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	it is believed that rearing takes place outside Mussel Creek.
Sucwoa R.	1979	Glova and McCart, 1979	IP	before Apr 15	Apr 23	Apr 28	June 5	-	-	-	-	-	-	-	-	-	-	-	

1 IP - inclined plane, FN - fyke net, FN(M) - modified fyke net, WR - weir, MT - minnow trap.

2 where data do not permit emergent vs. reared fry breakout, this column will provide 0+ timing information.

KEY CHINOOK JUVENILE TIMING DATES

STREAM	YEAR	SOURCE	METHODS[1]	EMERGENTS (0+)				REARED FRY (0+)				UNDERYEARLINGS (0+)[2]				YEARLINGS (1+)			COMMENTS
				START	PEAK	50%	END	START	PEAK	50%	END	START	PEAK	50%	END	START	PEAK	END	
SOUTH COAST - Cont'd																			
Canton Ck.	1979	Glova and McCart, 1979	IP	before Apr 18	Apr 30	Apr 27	June 8	-	-	-	-	-	-	-	-	-	-	-	
Conuma R.	1979	Glova and McCart, 1979	IP	before Apr 14	May 14	May 13	mid June	-	-	-	-	-	-	-	-	-	-	-	
Tlupana R.	1979	Glova and McCart, 1979	IP	before Apr 19	May 1	May 3	June 8	-	-	-	-	-	-	-	-	-	-	-	
Deserted Ck.	1979	Glova and McCart, 1979	IP	before Apr 20	Apr 24	Apr 24	May 14	-	-	-	-	-	-	-	-	-	-	-	
Little Qualicum R.	1979	Lister et al, 1979	FN	-	-	-	-	-	-	-	-	May 18	June14	June12	June22	-	-	-	
FRASER R., N.B.C. AND YUKON																			
Holmes R.	1981	Rosberg et al, 1982	IP	before Apr 5	May 11	approx Apr 6	approx late May?	-	-	-	-	before Apr 5	May 11	May 8	after Aug 7	Apr 10	Apr 27	May 13	
Morkill R.	1981	Rosberg et al, 1982	IP	Apr 16	May 11	-	late May?	-	-	-	-	Apr 16	June17	May 18	July 9	Apr 18	-	May 6	
Torpy R.	1981	Rosberg et al, 1982	IP	Apr 16	May 2	May 3	approx late May	-	-	-	-	Apr 16	May 2	May 3	mid July	Apr 18	May 7	May 22	captures during June and July were likely reared fry.
Slim Ck.	1981	Rosberg et al, 1981	IP	before Apr 4	May 12	May 12	June	approx late June	July 7	mid July	Sept16	before Apr 4	May 12	May 12	Sept16	early Mar?	Apr 7	May 14	the break point between termination of migrant migration and initiation of reared' fry migration is vague.
Bowron R.	1980	Murray et al, 1981	IP	before Apr 8	May 17	May 16	late June	late June	July20	July 9	Aug 10	-	-	-	-	Apr 14	May 15	June19	

1 IP - inclined plane, FN - fyke net, FN(M) - modified fyke net, WR - weir, MT - minnow trap.

2 where data do not permit emergent vs. reared fry breakout, this column will provide 0+ timing information.

KEY CHINOOK JUVENILE TIMING DATES

STREAM	YEAR	SOURCE	METHODS[1]	EMERGENTS (0+)				REARED FRY (0+)				UNDERYEARLINGS (0+)[2]				YEARLINGS (1+)			COMMENTS
				START	PEAK	50%	END	START	PEAK	50%	END	START	PEAK	50%	END	START	PEAK	END	
				FRASER R., N.B.C. AND YUKON - Cont'd															
Willow R.	1980	Murray et al, 1981	IP	Apr 21	-	early June	late June	late June–early July	July14	approx July14	early Aug	Apr 21	June 7	early June	early Aug	Apr 14	late May	June11	
Stuart R.	1980	Lister et al, 1981	FN, FN(M)	early Apr	May 16	mid May	early June	late May	mid June	-	early Sept	early Apr	May 16	May 17	early Sept	mid Apr	mid May	late May	
Nechako R.	1979	Olmsted et al, 1980	IP, FN	-	-	-	-	-	-	-	-	-	early mid May ?	-	-	-	-	-	traps were installed well after initiation of migration.
Horsefly R.	1979	Olmsted et al, 1980	IP, FN	May 3	May 25	mid late May	late June	mid June	-	-	mid July	-	-	-	-	-	-	-	
Quesnel R.	1979	Olmsted et al, 1980	IP, FN	-	early June	-	end June - early July	-	July 29	-	mid Aug	-	-	-	-	-	-	-	a secondary peak in emergent migration occurred on June 11.
	1980	Whelen et al, 1981	IP, FN	before Apr 1	Apr 17	May 1	late June	June19	-	-	July21	-	-	-	-	May 8	Mid June?	July28	
Eagle R.	1981	Whelen et al, 1982	IP	before Apr 6	Apr 17-18	Apr 17	mid-late May	early May	-	-	July12	-	-	-	-	-	-	-	
Salmon R.	1981	Whelen et al, 1982	FN, WR	before Apr 3	May 6	May 4	early May	approx early May	-	-	May 20	before Apr 3	May 6	May 5	May 20	-	-	-	although the 1st capture occurred on Apr 9, distance of trap from the spawning area may have resulted in substantial delay.

1 IP - inclined plane, FN - fyke net, FN(M) - modified fyke net, WR - weir, MT - minnow trap.
2 where data do not permit emergent vs. reared fry breakout, this column will provide 0+ timing information.

KEY CHINOOK JUVENILE TIMING DATES

STREAM	YEAR	SOURCE	METHODS[1]	EMERGENTS (0+)				REARED FRY (0+)				UNDERYEARLINGS (0+)[2]				YEARLINGS (1+)			COMMENTS
				START	PEAK	50%	END	START	PEAK	50%	END	START	PEAK	50%	END	START	PEAK	END	
								FRASER R., N.B.C. AND YUKON - Cont'd											
Adams R. (lower)	1981	Whelen et al, 1982	IP	before Apr 5	May 1-2	Apr 24	early June	early Apr ?	-	-	June23	-	-	-	-	-	-	-	
South Thompson R.	1981	Whelen et al, 1982	IP	approx Apr 1	May 10	May 3	June 3	mid-late May	-	-	July 4	-	-	-	-	-	-	-	
Blue R.	1981	Scott et al, 1982	IP	before Apr 3	Apr 3-4	Apr 23	June15	mid June	-	-	July13	-	-	-	-	-	-	-	
Finn Ck.	1981	Scott et al, 1982	FN, MT, SN	before Apr 3	Apr 18-19	Apr 17	June21	approx late May	-	-	early July	-	-	-	-	Apr 10	-	Aug 30	
	1982	Stewart et al, 1983	IP	before Apr 22	May 1	-	May 14	-	-	-	July31	-	-	-	-	before Apr 22	Apr 27	May 1	
Lion Ck.	1981	Scott et al, 1982	FN	-	-	-	-	June19	-	-	July13	-	-	-	-	-	-	-	only 4 underyearings caught
Raft R.	1981	Scott et al, 1982	IP	before Apr 3	Apr20-21	Apr 26	early June	early June	June22	approx June10	July11	-	-	-	-	-	-	-	
	1982	Stewart et al, 1983	IP	before Apr 7	May 16	-	June 2	early June?	approx June10	-	late July-early Aug	-	-	-	-	Apr 13	-	May 4	yearling catch data limited
Clearwater R.	1982	Stewart et al, 1983	IP	before Apr 8	May 22	-	June 2	early June	approx July 20	-	early Aug?	-	-	-	-	Apr 14	-	July 24	

1 IP - inclined plane, FN - fyke net, FN(M) - modified fyke net, WR - weir, MT - minnow trap.

2 where data do not permit emergent vs. reared fry breakout, this column will provide 0+ timing information.

KEY COHO JUVENILE TIMING DATES

STREAM	YEAR	SOURCE	METHODS[1]	EMERGENTS (0+) START	EMERGENTS (0+) PEAK	EMERGENTS (0+) 50%	EMERGENTS (0+) END	REARED FRY (0+) START	REARED FRY (0+) PEAK	REARED FRY (0+) 50%	REARED FRY (0+) END	UNDERYEARLINGS (0+)[2] START	UNDERYEARLINGS (0+)[2] PEAK	UNDERYEARLINGS (0+)[2] 50%	UNDERYEARLINGS (0+)[2] END	YEARLINGS (1+) START	YEARLINGS (1+) PEAK	YEARLINGS (1+) END	COMMENTS
FRASER R., N.B.C. AND YUKON - Cont'd																			
Joseph Ck. (incl. tribs.)	1982	Stewart et al, 1983	IP	before Apr 10	early May	-	early June	mid July	-	-	approx July20	-	-	-	-	Apr 20	-	-	catches of both 0+ and 1+ fish were limited
Lemelux Ck.	1982	Stewart et al, 1983	IP	before Apr 10	early Apr ?	-	early June	early June	approx June10	-	late July	-	-	-	-	before Apr 10	Apr 10	Apr 28	
Barriere R.	1982	Stewart et al, 1983	IP	before Apr 10	-	-	early June	late June	-	-	mid July	-	-	-	-	Apr 22	-	-	catch data limited
North Thompson R.	1981	Scott et al, 1982	IP, MT, SN	before Apr 3	May 1-2	May 1	late May	mid May	early June	-	July21	-	-	-	-	Apr 12	-	Aug 20	trap located at Little Fort
	1982	Stewart et al, 1983	IP	approx Apr 12	approx May 22	-	early June?	early June	approx July12	-	after early Aug	-	-	-	-	Apr 27	May 15	July22	trap located at Barriere.

1 IP - inclined plane, FN - fyke net, FN(M) - modified fyke net, WR - weir, MT - minnow trap.

2 where data do not permit emergent vs. reared fry breakout, this column provides 0+ timing information.

KEY COHO JUVENILE TIMING DATES

STREAM	YEAR	SOURCE	METHODS[1]	EMERGENTS (0+) START	EMERGENTS (0+) PEAK	EMERGENTS (0+) 50%	EMERGENTS (0+) END	REARED FRY (0+) START	REARED FRY (0+) PEAK	REARED FRY (0+) 50%	REARED FRY (0+) END	UNDERYEARLINGS (0+)[2] START	UNDERYEARLINGS (0+)[2] PEAK	UNDERYEARLINGS (0+)[2] 50%	UNDERYEARLINGS (0+)[2] END	YEARLINGS (1+) START	YEARLINGS (1+) PEAK	YEARLINGS (1+) END	COMMENTS
NORTH COAST																			
Mathers Ck.	1979	Northern Natural Resource Services Ltd., 1979	IP	early Apr ?	May 11	May 6	mid late May	-	-	-	-	-	-	-	-	Apr 23	May 5	May 14	
Morice R. (incl. tribs.)	1979	Smith and Berezay, 1983	IP, FN	-	-	-	-	-	-	-	-	early May	June11	-	late June	before May 3	late May-early June	after June 28	varying distances of traps from spawning grounds likely influenced timing results
	1980	Smith and Berezay, 1983	IP	-	-	-	-	June24	July 1	-	July 9	-	-	-	-	before May 14	June27	approx mid July	2+ coho caught likely exhibited similar timing to 1+ fish.
Kitimat R.	1980	Birch et al, 1981	IP	before Apr 8	June10	approx mid June	July18	early July	late July ?	-	after Aug 18	-	-	-	-	before Apr 8	Apr 23	Aug 10	erratic migration pattern and misidentification of trout as coho render data unreliable.
Hirsch Ck.	1980	Birch et al, 1981	FN	before Apr 6	early June ?	-	early July	late May ?	early July ?	-	mid-late Aug	-	-	-	-	Apr 18	-	July26	there appears to be a large area of overlap between termination of emergent migration and initiation of reared fry migration.
Cecil Ck.	1980	Birch et al, 1981	FN	before Apr 7	June 6	approx June 6	mid July ?	late June ?	-	-	after Aug 19	-	-	-	-	before Apr 7	Apr 16	after Aug 19 ?	the yearling migration was essentially over by mid May.
Kidala R.	1981	Slaney et al, 1982	IP	Mar 21	June4?	approx June 1	Aug 18	late May ?	-	-	-	Mar 21	June 4	June 1	Aug 18	before Mar 8	May 4	July22	no pattern in size increase exists for 0+ fish; difficult to separate emergents & reared fry.

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2 where data do not permit emergent vs. reared fry breakout, this column will provide 0+ timing information.

KEY COHO JUVENILE TIMING DATES

STREAM	YEAR	SOURCE	METHODS[1]	EMERGENTS (0+) START	EMERGENTS (0+) PEAK	EMERGENTS (0+) 50%	EMERGENTS (0+) END	REARED FRY (0+) START	REARED FRY (0+) PEAK	REARED FRY (0+) 50%	REARED FRY (0+) END	UNDERYEARLINGS (0+)[2] START	UNDERYEARLINGS (0+)[2] PEAK	UNDERYEARLINGS (0+)[2] 50%	UNDERYEARLINGS (0+)[2] END	YEARLINGS (1+) START	YEARLINGS (1+) PEAK	YEARLINGS (1+) END	COMMENTS
NORTH COAST - Cont'd																			
Dala R.	1981	Slaney et al, 1982	IP	Mar 8	May 24	May 24	early July ?	late May ?	mid-late June ?	-	Aug 13	-	-	-	-	early Mar	Apr 29	June24	1 smolt was captured on Aug 14
Bish Ck.	1981	Slaney et al, 1982	FN	mid-late Mar	late May	late May ?	late June	late May ?	-	-	-	mid-late Mar	May 29	approx May 29	July21	mid-late Mar	late Mar	June20	limited sampling effort resulted in an uncertain picture of timing.
SOUTH COAST																			
Sucwoa R.	1979	Glova and McCart, 1979	IP	Apr 18	June 4	May 22	after June 9	-	-	-	-	-	-	-	-	before Apr 15	early May	May 12	peaks in migration occurred during major floods; fry do not appear to rear in this system.
Canton Ck.	1979	Glova and McCart, 1979	IP	Apr 21	May 31	May 20	after June10	-	-	-	-	-	-	-	-	before Apr 18	May 3	May 17	
Conuma R.	1979	Glova and McCart, 1979	IP	before Apr 14	June 6	May 25	after June12	-	-	-	-	-	-	-	-	mid-late Apr	May 3	late May	at DFO - operated Fyke Trap caught 0+ fry initially on Mar 20.
Tlupana R.	1979	Glova and McCart, 1979	IP	Apr 24	Apr 28	May 15	after June 3	-	-	-	-	-	-	-	-	Apr 21	May 4	May 17	
Deserted Ck.	1979	Glova and McCart, 1979	IP	before Apr 20	Apr 30	May 2	May 30	-	-	-	-	-	-	-	-	before Apr 23	May 2	May 15	
Little Qualicum R.	1979	Lister et al, 1979	FN	Apr 30	May 24	May 17 ?	mid-late June ?	late May ?	-	-	after June26	Apr 30	May 24	May 17	after June26	Apr 24	May 21	June26	post-yearlings not separated from yearlings.

[1] IP - inclined plane, FN - fyke net, FN(M) - modified fyke net, WR - weir, MT - minnow trap.
[2] where data do not permit emergent vs. reared fry breakout, this column will provide 0+ timing information.

KEY COHO JUVENILE TIMING DATES

STREAM	YEAR	SOURCE	METHODS[1]	EMERGENTS (0+)				REARED FRY (0+)				UNDERYEARLINGS (0+)[2]				YEARLINGS (1+)			COMMENTS
				START	PEAK	50%	END	START	PEAK	50%	END	START	PEAK	50%	END	START	PEAK	END	
SOUTH COAST - Cont'd																			
Glendale Ck.	1983	Shepherd, 1984	IP	Apr 1	Apr 29 -May 4	May 3	after May 30	-	-	-	-	-	-	-	-	Apr 13	May 8	May 15	
Tom Brown Ck.	1983	Shepherd, 1984	IP	Apr 10	May 14	May 1	May 30	after	-	-	-	-	-	-	-	-	-	-	
FRASER R., N.B.C. AND YUKON																			
Horsefly R.	1979	Olmsted et al, 1980	IP, FN	-	-	-	-	-	-	-	-	May 19	July 3	-	after July15	-	-	-	apparently no coho yearlings or post-yearlings were caught.
Quesnel R.	1979	Olmsted et al, 1980	IP, FN	-	-	-	-	-	-	-	-	May 20	July13	-	mid-late Aug	-	-	-	no indication of coho smolt captures was given.
	1980	Whelen et al, 1981	IP, FN	Apr 13	May 28	late May	late June - early July	late June	mid - late July	-	Aug 3	-	-	-	-	Apr 26	-	May 5	data for 1+ coho is limited.
Eagle R.	1981	Whelen et al, 1982	IP	before Apr 6	Apr 20	approx Apr 18	early June ?	early May ?	June 14-15	-	Aug 11	-	-	-	-	Apr 21	-	May 23	data for coho is limited.
Salmon R.	1981	Whelen et al, 1982	FN, WR	before Apr 3	May 4-5	May 5	May 31	-	-	-	-	-	-	-	-	-	-	-	It appears that all 0+ fish migrated as emergents.
Adams R.	1981	Whelen et al, 1982	IP	before Apr 5	May 3	May 2	early June ?	-	-	-	July 9	-	-	-	-	Apr 9	-	Apr 18	very few 1+ migrants were trapped.
South Thompson R.	1981	Whelen et al, 1982	IP	Apr 27	-	-	May 19	-	-	-	-	-	-	-	-	-	-	-	very few migrants were caught.

1 IP - inclined plane, FN - fyke net, FN(M) - modified fyke net, WR - weir, MT - minnow trap.
2 where data do not permit emergent vs. reared fry breakout, this column will provide 0+ timing information.

KEY COHO JUVENILE TIMING DATES

STREAM	YEAR	SOURCE	METHODS[1]	EMERGENTS (0+)				REARED FRY (0+)				UNDERYEARLINGS (0+)[2]				YEARLINGS (1+)			COMMENTS
				START	PEAK	50%	END	START	PEAK	50%	END	START	PEAK	50%	END	START	PEAK	END	
FRASER R., N.B.C. AND YUKON - Cont'd																			
Blue R.	1981	Scott et al, 1982	IP	before Apr 2	Apr 21	May 2	-	early June ?	-	-	-	before Apr 2	Apr 21	May 2	Aug 4	Apr 4	-	June12	recruitment of fish <35 mm in length and <0.35g in weight was continuous throughout the survey.
Finn Ck.	1981	Scott et al, 1982	FN, WR	Apr 28	July 1	June25	July24	-	-	-	-	Apr 28	July 1	June25	Aug 29	Apr 20	-	June 4	with the exception of Aug 29, no fish were caught in that month.
	1982	Stewart et al, 1983	IP, EF	-	-	-	-	-	-	-	-	late May	July17	-	July24	Apr 27	May 1	-	only a small (n=7) num-ber of 1+ fish caught.
Lion Ck.	1981	Scott et al, 1982	FN	before Apr 3	Apr 20-21	mid-May	Aug ?	late May	July 9 ?	-	late Aug or after	before Apr 3	Apr 20-21	May 16	late Aug or after	Apr 11	-	June15	few 1+ fish were captured.
Raft R.	1981	Scott et al, 1982	IP	before Apr 3	approx June 5			Apr 20 ?	June30 ?	-	July 7	before Apr 3	June 29-30	June27	July 7	Apr 26		July 2	few 1+ fish captured.
	1982	Stewart et al, 1983	IP	Apr 16	-	-	July 6 ?	-	-	-	-	Apr 16	June30	late June	end July ?	Apr 30	-	May 4	only 4 1+ coho caught.
Clearwater R.	1982	Stewart et al, 1983	IP	Apr 16	-	-	-	-	-	-	-	-	-	-	-	-	Apr 25		
Joseph Ck. (incl. tribs.)	1982	Stewart et al, 1983	IP, EF	Apr 19	May 11	-	May 25	-	-	-	-	Apr 19	May 11	-	late July	May 11	-	May 19	only 6 1+ coho caught by all methods.
Lemieux Ck.	1982	Stewart et al, 1983	IP, EF	Apr 15	-	-	-	-	-	-	-	-	-	-	-	Apr 15	Apr 24	June16	
Barriere R. (incl North Barriere R)	1982	Stewart et al, 1983	IP	Apr 22	-	-	-	-	-	-	-	-	-	-	-	Apr 23	-	June30	

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2 where data do not permit emergent vs. reared fry breakout, this column will provide 0+ timing information.

KEY COHO JUVENILE TIMING DATES

STREAM	YEAR	SOURCE	METHODS[1]	EMERGENTS (0+)				REARED FRY (0+)				UNDERYEARLINGS (0+)[2]				YEARLINGS (1+)			COMMENTS
				START	PEAK	50%	END	START	PEAK	50%	END	START	PEAK	50%	END	START	PEAK	END	
FRASER R., N.B.C. AND YUKON - Cont'd																			
North Thompson R.	1981	Scott et al, 1982	IP	Apr 8	May 1	May 1	late July ?	early May ?	-	-	Aug 13	-	-	-	-	Apr 26	-	June 9	very few 1+ coho captured.
	1982	Stewart et al, 1983	IP	Apr 26	-	-	-	-	-	-	-	-	-	-	-	-	May 15		May 15 is the only capture date for 1+ coho.

1 IP - inclined plane, FN - fyke net, FN(M) - modified fyke net, WR - weir, MT - minnow trap.

2 where data do not permit emergent vs. reared fry breakout, this column will provide 0+ timing information.

KEY CHUM JUVENILE TIMING DATES

STREAM	YEAR	SOURCE	METHODS[1]	EMERGENTS (0+)				REARED FRY (0+)				UNDERYEARLINGS (0+)[2]				YEARLINGS (1+)			COMMENTS
				START	PEAK	50%	END	START	PEAK	50%	END	START	PEAK	50%	END	START	PEAK	END	
NORTH COAST																			
Mathers Ck.	1979	Northern Natural Resources Services Ltd, 1979	IP	before Apr 14	May 5	approx late Apr-early May	after May 14	-	-	-	-	-	-	-	-	-	-	-	substantial catches were being recorded at project termination.
Kitimat R.	1980	Birch et al, 1981	IP	before Apr 8	before Apr 8	-	early May ?	before Apr 8	-	-	June 2	before Apr 8	before Apr 8	-	June 2	-	-	-	fry which were not positively identified as chum were caught up to July 23
Hirsch Ck.	1980	Birch et al, 1981	FN	before Apr 6	Apr 22 ?	-	-	-	-	-	-	before Apr 6	Apr 22 ?	before Apr 22	May 24	-	-	-	
Kildala R.	1981	Slaney et al, 1982	IP	-	-	-	approx May 20	early Mar ?	-	-	June10	before Mar 8	Mar 25	Mar 26	June10	-	-	-	separation of emergents from reared fry is difficult as emergent recruitment was ongoing throughout much, if not all, of the sampling period.
Dala R.	1981	Slaney et al, 1982	IP	-	-	-	early May ?	before Mar 7?	-	-	May 16	before Mar 7	Mar 26	Mar 26	May 16	-	-	-	
Bish Ck.	1981	Slaney et al, 1982	FN	-	-	-	-	-	-	-	-	before Mar 17	before Mar 17 ?	before Mar 17 ?	May 1	-	-	-	
SOUTH COAST																			
Sucwoa R.	1979	Glova and McCart, 1979	IP	-	-	-	-	-	-	-	-	before early Apr	May 2	late Apr ?	June 5	-	-	-	start of migration was much later in tributary A of this stream (Apr. 9th).
Canton Ck.	1979	Glova and McCart, 1979	IP	-	-	-	-	-	-	-	-	before mid Apr	mid-Apr ?	mid-Apr ?	June 3	-	-	-	

1 IP - inclined plane, FN - fyke net, FN(M) - modified fyke net, WR - weir, MT - minnow trap.

2 where data do not permit emergent vs. reared fry breakout, this column will provide 0+ timing information.

KEY CHUM JUVENILE TIMING DATES

STREAM	YEAR	SOURCE	METHODS[1]	EMERGENTS (0+)				REARED FRY (0+)				UNDERYEARLINGS (0+)[2]				YEARLINGS (1+)			COMMENTS
				START	PEAK	50%	END	START	PEAK	50%	END	START	PEAK	50%	END	START	PEAK	END	
SOUTH COAST - Cont'd																			
Conuma R.	1979	Glova and McCart, 1979	IP	-	-	-	-	-	-	-	-	before early Apr	mid-Apr ?	mid-Apr ?	mid-June	-	-	-	a fyke trap operated by DFO caught chum initially on March 10 (1st day of effort)
Tlupana R.	1979	Glova and McCart, 1979	IP	-	-	-	-	-	-	-	-	before Apr 19	Apr 23	approx Apr 20 ?	after June 10	-	-	-	
Deserted Ck.	1979	Glova and McCart, 1979	IP	-	-	-	-	-	-	-	-	before Apr 19	Apr 25	approx Apr 25	late May	-	-	-	
Little Qualicum R.	1979	Lister et al, 1979	FN	-	-	-	-	June 6 ?	-	-	-	before Apr 24	May 21	mid-May	June 26	-	-	-	
Glendale Ck.	1983	Shepherd, 1984	IP	Apr 1	May 4	Apr 29	May 30	-	-	-	-	-	-	-	-	-	-	-	
Tom Browne Ck.	1983	Shepherd, 1984	IP	Before Mar 31	Apr 11	Apr 14	May 10	-	-	-	-	-	-	-	-	-	-	-	

1 IP - inclined plane, FN - fyke net, FN(M) - modified fyke net, WR - weir, MT - minnow trap.
2 where data do not permit emergent vs. reared fry breakout, this column will provide 0+ timing information.

KEY SOCKEYE JUVENILE TIMING DATES

STREAM	YEAR	SOURCE	METHODS[1]	EMERGENTS (0+)				REARED FRY (0+)				UNDERYEARLINGS (0+)[2]				YEARLINGS (1+)			COMMENTS
				START	PEAK	50%	END	START	PEAK	50%	END	START	PEAK	50%	END	START	PEAK	END	
NORTH COAST																			
Mathers Ck.	1979	Northern Natural Resource Services Ltd, 1979	IP	-	-	-	-	-	-	-	-	-	-	-	-	Apr 27	May 5	after May 14	some underyearling migration likely took place.
Morice R.	1979	Smith and Berezay, 1983	IP	-	-	-	-	-	-	-	-	-	-	-	-	before May 15	May 16	June23	
	1980	Smith and Berezay, 1983	IP	-	-	-	-	-	-	-	-	-	-	-	-	before May 13	May 19	June29	
Kitimat R.	1980	Birch et al, 1981	IP									July 4	-	-	July22				
Kildala R.	1981	Slaney et al, 1982	IP	-	-	-	-	-	-	-	-	Apr 3	July 1	June17	July 2	-	-	-	only 16 underyearlings were caught.
Dala R.	1981	Slaney et al, 1982	IP	-	-	-	-	-	-	-	-	before Mar 7	Mar 25 - 26	Apr 8	June 7	-	-	-	
SOUTH COAST																			
Sucwoa R.	1979	Glova and McCart, 1979	IP	-	-	-	-	-	-	-	-	mid-Apr	Apr 29	May 3	June 4	-	-	-	
Canton Ck.	1979	Glova and McCart, 1979	IP	-	-	-	-	-	-	-	-	Apr 19	Apr 23	Apr 27	May 21	-	-	-	
Conuma R.	1979	Glova and McCart, 1979	IP	-	-	-	-	-	-	-	-	before Apr 14	May 4	May 4	June 6	-	-	-	a DFO fyke trap caught low numbers of migrants between Mar 11 and Apr 7.
Tlupana R.	1979	Glova and McCart, 1979	IP	-	-	-	-	-	-	-	-	before Apr 19	May 17	May 17	approx mid-June	-	-	-	

1 IP - inclined plane, FN - fyke net, FN(M) - modified fyke net, WR - weir, MT - minnow trap.

2 where data do not permit emergent vs. reared fry breakout, this column will provide 0+ timing information.

KEY SOCKEYE JUVENILE TIMING DATES

STREAM	YEAR	SOURCE	METHODS[1]	EMERGENTS (0+) START	EMERGENTS (0+) PEAK	EMERGENTS (0+) 50%	EMERGENTS (0+) END	REARED FRY (0+) START	REARED FRY (0+) PEAK	REARED FRY (0+) 50%	REARED FRY (0+) END	UNDERYEARLINGS (0+)[2] START	UNDERYEARLINGS (0+)[2] PEAK	UNDERYEARLINGS (0+)[2] 50%	UNDERYEARLINGS (0+)[2] END	YEARLINGS (1+) START	YEARLINGS (1+) PEAK	YEARLINGS (1+) END	COMMENTS
SOUTH COAST - Cont'd																			
Glendale Ck.	1983	Shepherd, 1984	IP	-	-	-	-	-	-	-	-	-	-	-	-	Apr 19	May 9	after May 30	Presmolts
Glendale Ck.	1983	Shepherd, 1984	IP	-	-	-	-	-	-	-	-	-	-	-	-	Apr 21	May 8	May 30	Smolts
Tom Browne Ck.	1983	Shepherd, 1984	IP	-	-	-	-	-	-	-	-	-	-	-	-	-	Apr 17 29		Presmolts, n=2
Tom Browne Ck.	1983	Shepherd, 1984	IP	-	-	-	-	-	-	-	-	-	-	-	-	-	Apr 13	-	Smolts, n=1
Deserted Ck.	1979	Glova and McCart, 1979	IP	-	-	-	-	-	-	-	-	before Apr 22	Apr 29	Apr 29	May 28	before Apr 23	Apr 24 ?	May 5	
FRASER R., N.B.C. AND YUKON																			
Bowron R.	1980	Murray et al, 1981	IP	-	-	-	-	-	-	-	-	May 14	-	-	May 27	May 15	-	May 16	migrant numbers were very low.
Nechako R.	1979	Olmsted et al, 1980	IP, FN	-	-	-	-	-	-	-	-	June 2	-	-	June 4	-	-	-	only 9 migrants trapped
Horsefly R.	1979	Olmsted et al, 1980	IP, FN	-	-	-	-	-	-	-	-	early Apr ?	May 23	-	June29	-	-	-	
Quesnel R.	1979	Olmsted et al, 1980	IP, FN	-	-	-	-	-	-	-	-	May 9	June22	-	Aug 2	-	-	-	6 smolts (1+) were caught during mid-June.
	1980	Whelen et al, 1981	IP, FN	-	-	-	-	-	-	-	-	Apr 6	May 17	May 11	July28	Apr 19	May 7	July20	timing results are somewhat influenced by the distance between downstream trapping locations.
Eagle R.	1981	Whelen et al, 1982	IP	-	-	-	-	-	-	-	-	Apr 26	May 9	May 9	May 17	-	-	-	although 1+ fish were absent from IPT catches a substantial number were caught by seine.

[1] IP - inclined plane, FN - fyke net, FN(M) - modified fyke net, WR - weir, MT - minnow trap.
[2] where data do not permit emergent vs. reared fry breakout, this column will provide 0+ timing information.

KEY SOCKEYE JUVENILE TIMING DATES

STREAM	YEAR	SOURCE	METHODS[1]	EMERGENTS (0+)				REARED FRY (0+)				UNDERYEARLINGS (0+)[2]				YEARLINGS (1+)			COMMENTS
				START	PEAK	50%	END	START	PEAK	50%	END	START	PEAK	50%	END	START	PEAK	END	
FRASER R., N.B.C. AND YUKON - Cont'd																			
Salmon R.	1981	Whelen et al, 1982	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	substantial numbers of rearing fry and smolts were captured by seine.
Adams R. (lower)	1981	Whelen et al, 1982	IP	-	-	-	-	-	-	-	-	before Apr 5	May 12	May 10	June16	-	-	-	
South Thompson R.	1981	Whelen et al, 1982	IP	-	-	-	-	-	-	-	-	Apr 29	-	-	July14	-	-	-	
Raft R.	1981	Scott et al, 1982	IP	-	-	-	-	-	-	-	-	Apr 5	Apr 20	Apr 27	June26	-	-	-	
	1982	Stewart et al, 1983	IP	-	-	-	-	-	-	-	-	Apr 30	May 14	-	early June ?		-	-	
Barriere R.	1982	Stewart et al, 1983	IP	-	-	-	-	-	-	-	-	-	-	-	-	-	May 6	-	low numbers of 0+ fish were caught but timing details are not given.
North Thompson R.	1981	Scott et al, 1982	IP	-	-	-	-	-	-	-	-	before Apr 5	May 3	May 4	July21	-	-	-	
	1982	Stewart et al, 1983	IP	-	-	-	-	-	-	-	-	Apr 30 ?	May 22	-	early June ?	-	July	-	Indicated yearling peak may not be indicative of true peak.

1 IP - inclined plane, FN - fyke net, FN(M) - modified fyke net, WR - weir, MT - minnow trap.
2 where data do not permit emergent vs. reared fry breakout, this column will provide 0+ timing information.

KEY PINK JUVENILE TIMING DATES

STREAM	YEAR	SOURCE	METHODS[1]	EMERGENTS (0+)				REARED FRY (0+)				UNDERYEARLINGS (0+)[2]				YEARLINGS (1+)			COMMENTS
				START	PEAK	50%	END	START	PEAK	50%	END	START	PEAK	50%	END	START	PEAK	END	
NORTH COAST																			
Mathers Ck.	1979	Northern Natural Resource Services Ltd., 1979	IP	before Apr 14	Apr 29	approx end Apr	after May 14	-	-	-	-	-	-	-	-	-	-	-	
Kitimat R.	1980	Birch et al, 1981	IP	before Apr 8	before Apr 8?	-	May 21	-	-	-	-	-	-	-	-	-	-	-	
Hirsch Ck.	1980	Birch et al, 1981	IP	before Apr 6	Apr 23	Apr 23	May 4	-	-	-	-	-	-	-	-	-	-	-	
Kildala R.	1981	Slaney et al, 1982	IP	before Mar 8	Mar 26	Mar 26 -27	May 6	-	-	-	-	-	-	-	-	-	-	-	
Dala R.	1981	Slaney et al, 1982	IP	before Mar 7	Apr 3	early Apr.	May 4												
Bish Ck.	1981	Slaney et al, 1982	FN	before Mar 17	Mar 26	late Mar ?	May 23	-	-	-	-	-	-	-	-	-	-	-	
SOUTH COAST																			
Sucwoa R.	1979	Glova and McCart, 1979	IP	before Apr 15	Apr 16 ?	-	May 2	-	-	-	-	-	-	-	-	-	-	-	
Canton Ck.	1979	Glova and McCart, 1979	IP	before Apr 18	Apr 22 ?	-	May 14	-	-	-	-	-	-	-	-	-	-	-	
Conuma R.	1979	Glova and McCart, 1979	IP	before Apr 14	Apr 14 ?	-	early June	-	-	-	-	-	-	-	-	-	-	-	a DFO fyke trap initially caught pink fry on March 10.
Tlupana R.	1979	Glova and McCart, 1979	IP	before Apr 19	Apr 20 ?	-	May 6	-	-	-	-	-	-	-	-	-	-	-	

1 IP - Inclined plane, FN - fyke net, FN(M) - modified fyke net, WR - weir, MT - minnow trap.

2 where data do not permit emergent vs. reared fry breakout, this column will provide 0+ timing information.

KEY PINK JUVENILE TIMING DATES

STREAM	YEAR	SOURCE	METHODS[1]	EMERGENTS (0+)				REARED FRY (0+)				UNDERYEARLINGS (0+)[2]				YEARLINGS (1+)			COMMENTS
				START	PEAK	50%	END	START	PEAK	50%	END	START	PEAK	50%	END	START	PEAK	END	
SOUTH COAST - Cont'd																			
Glendale Ck.	1983	Shepherd, 1984	IP	before Mar 31	Apr 16	Apr 16	May 20	-	-	-	-	-	-	-	-	-	-	-	
Tom Browne Ck.	1983	Shepherd, 1984	IP	before Mar 31	Apr 4 (or prior)	Apr 11	May 15	-	-	-	-	-	-	-	-	-	-	-	
FRASER R., N.B.C. AND YUKON																			
Barriere R.	1982	Stewart et al, 1983	IP	mid-Apr	-	-	May 6	-	-	-	-	-	-	-	-	-	-	-	only small numbers of migrants present.
North Thompson R.	1982	Stewart et al, 1983	IP	Apr 26	-	-	May 22	-	-	-	-	-	-	-	-	-	-	-	

1 IP - inclined plane, FN - fyke net, FN(M) - modified fyke net, WR - weir, MT - minnow trap.

2 where data do not permit emergent vs. reared fry breakout, this column will provide 0+ timing information.

General Notes:

1) In many cases my estimates, where based on changes in weight and/or length and/or developmental indices (K_D), did not reflect the conclusions of the source report Authors. In addition, where a clear picture of timing was not drawn by the authors, there was often a considerable degree of guesswork involved in interpreting appended data.

2) A major and recurring problem has been in differentiating the timings of emergents vs. reared fry, ie: where emergent migration terminates and where reared fry migration begins. Typically, I have looked for the last small or first large samples (lengths/weights) to appear but have approached this cautiously, as abnormally small or large fish may appear at any time during the first several months of migration/rearing, ie: pinheads, diseased fish (which for whatever cause may retain water but may not be gaining weight as growth.

3) Older juveniles are more likely to avoid detection in traditional trapping surveys (ie: IPT, FNT) as they are more able to swim against the current and escape from the mouth/throat of the trap before being swept into the holding box.

APPENDIX C-12

DIEL VARIATION IN JUVENILE MIGRATIONS

Many studies did not address diurnal variation in downstream migration timing, but noted the general proportions of nocturnal and daylight migrations. Four studies that addressed diurnal variation on an hourly basis are described in these tables.

DIEL VARIATION IN JUVENILE CHINOOK MIGRATIONS

STREAM	YEAR	SOURCE	TYPE OF JUVENILE	PERCENT OF TOTAL FRY CAPTURED											
				12:00 - 14:00*	14:00 - 16:00*	16:00 - 18:00*	18:00 - 20:00*	20:00 - 22:00*	22:00 - 24:00*	24:00 - 02:00*	02:00 - 04:00*	04:00 - 06:00*	06:00 - 08:00*	08:00 - 10:00*	10:00 - 12:00*
NORTH COAST															
←				no	information →										→
SOUTH COAST															
Sucwoa R.	1979	Glova and McCart, 1979	0+	0	0	0	approx 1.0	approx 4.5	approx 19.5	approx 12.5	approx 54.0	approx 6.0	approx 3.5	0	0
Canton Ck.	1979	Glova and McCart, 1979	0+	approx 1.0	approx 1.0	0	0	approx 4.5	approx 51.5	approx 27.0	approx 12.0	approx 1.5	approx 1.5	0	0
Conuma R.	1979	Glova and McCart, 1979	0+	approx 1.5	approx 1.5	approx 1.5	0	approx 11.0	approx 42.0	approx 16.5	approx 19.5	approx 4.5	0	approx 1.5	0
Tlupana R.	1979	Glova and McCart, 1979	0+	0	0	0	0	approx 15.0	0	approx 36.5	approx 33.5	approx 15.5	0	0	0
FRASER R., N.B.C. AND YUKON															
Bowron R.	1980	Murray et al, 1981	0+	continued from 1000 hours →				←	6.4 →	←	67.7 →	←		25.9	→

* Pacific Standard Time.

DIEL VARIATION IN JUVENILE CHUM MIGRATIONS

STREAM	YEAR	SOURCE	TYPE OF JUVENILE	PERCENT OF TOTAL FRY CAPTURED											
				12:00 - 14:00*	14:00 - 16:00*	16:00 - 18:00*	18:00 - 20:00*	20:00 - 22:00*	22:00 - 24:00*	24:00 - 02:00*	02:00 - 04:00*	04:00 - 06:00*	06:00 - 08:00*	08:00 - 10:00*	10:00 - 12:00*
NORTH COAST															
Kitimat R.	1980	Birch et al, 1981	0+	- results shown as Diurnal: 5.8%, Nocturnal: 94.2%											
Hirsch Ck.	1980	Birch et al, 1981	0+	- results shown as Diurnal: 1.9%, Nocturnal: 98.1%											
SOUTH COAST															
Sucwoa R.	1979	Glova and McCart, 1979	0+	approx 1.0	approx 1.0	approx 1.0	approx 2.0	approx 2.5	approx 12.5	approx 7.5	approx 57.5	approx 8.5	approx 3.5	approx 1.0	approx 1.5
Canton Ck.	1979	Glova and McCart, 1979	0+	approx 0.5	approx 0.5	approx 0.5	approx 1.0	approx 17.5	approx 46.5	approx 18.0	approx 11.0	approx 3.0	approx 1.0	approx 0.5	approx 0.5
Conuma R.	1979	Glova and McCart, 1979	0+	approx 1.5	approx 1.5	approx 0.5	0	approx 29.0	approx 29.0	approx 16.0	approx 13.5	approx 7.0	approx 1.0	approx 1.0	approx 1.0
Tlupana R.	1979	Glova and McCart, 1979	0+	<0.5	approx 1.0	approx 1.0	approx 0.5	approx 14.0	approx 49.5	approx 17.0	approx 10.0	approx 6.5	0	<0.5	<0.5
Little Qualicum R.	1979	Lister et al, 1979	0+												
			May 14-15	←			1.0 →	←		89.0 →	←		10.0		→
			May 21-22	←			0.6 →	←		73.8 →	←		25.6		→
			May 28-29	←			0.2 →	←		67.3 →	←		32.5		→

* Pacific Standard Time.

APPENDIX C-13

Fork LENGTH (mm), Wet WEIGHT (g) and CONDITION of JUVENILES Sampled During Peak Migration

In preparing the data for between-study comparisons, individual fish were categorized as emergent or rearing, using the timing of peak catches (See APPENDIX C-11). Consideration was also given to the capture technique used, as some methods (inclined plane traps and fyke nets) probably intercept migrants, while others (minnow traps, seines, dipnet and electrofishing) tend to capture non-migrants. Daily average lengths and weights were then calculated according to age class over the peak timing period and condition factors were derived which were then averaged for the season. Although chum salmon were considered to be largely emergent fry, some probably had reared; thus, condition factors for some stocks may be somewhat inaccurate. In many cases our estimates, which were based on changes in weight, length and/or developmental indices, did not reflect the conclusions of the source report authors.

Two different condition factors were calculated from length and weight data:

(1) $$K_D = \frac{10\sqrt[3]{\text{weight in mg}}}{\text{length in mm}}$$ Bams' development factor for emergent fry

(2) $$K = \frac{100\ (\text{weight in mg})}{(\text{length in mm})^3}$$ Fulton's condition factor for rearing fry and fingerlings

Equation (1) specifically describes emergent fish and assumes some degree of yolk absorption. Equation (2) assumes that fish shape does not change as it grows, and is often used to describe differing condition factors between fish of similar lengths within a species. In this report, only emergent fry were described using the K_D development factor: K was used for all other fish.

FORK LENGTH (mm), WET WEIGHT (g) AND CONDITION[1] OF JUVENILE CHINOOK SAMPLED[2] DURING PEAK MIGRATION

STREAM	YEAR	SOURCE	TYPE OF JUVENILE	SAMPLING PERIOD	n	LENGTH (mm)	WEIGHT (g)	CONDITION FACTOR K_D	CONDITION FACTOR K	COMMENTS
NORTH COAST										
Morice R.	1979	Smith and Berezay, 1983	0+	Apr 27	50	39.3±0.48	0.52±0.02	2.046	-	S.E. calculated from 95% confidence limits for lengths and weights given in source report.
			1+	Apr 25 - 30	50	83.6±2.93	7.67±0.79	-	1.313	as above
	1980	Smith and Berezay, 1983	0+	Apr 18	50	36.8±0.51	0.57±0.016	2.253	-	as above
Kitimat R.	1980	Birch et al, 1981	0+	Apr 9	16	39.5±2.2	0.43±0.07	1.911	-	
			1+	Apr 26	5	86.0±6.6	6.30±1.76	-	0.990	
Hirsch Ck.	1980	Birch et al, 1981	0+	Apr 11	50	39.4±0.57	0.40±0.01	1.870	-	
			1+	Apr 19	1	68.0	2.82	-	0.897	
Cecil Ck.	1980	Birch et al, 1981	0+	May 12	17	41.6±0.27	0.51±0.01	1.921	-	
Kildala R.	1981	Slaney et al, 1982	0+	Mar 31	10	39.8±1.08	0.42±0.06	1.882	-	emergents
			0+	June 5, 6, 8, 9	7	56.7±2.78	1.86±0.25	-	1.012±0.028	reared fry
			1+	Apr 26	6	80.6±5.56	4.98±0.99	-	0.94±0.09	
Dala R.	1981	Slaney et al, 1982	0+	Apr 2	5	38.8±1.60	0.34±0.04	1.799	-	
			1+	May 4	19	79.9±2.31	5.15±0.50	-	1.00±0.028	
SOUTH COAST										
Sucwoa R.	1979	Glova and McCart, 1979	0+	Apr 25	10	42.7±0.6	0.56	1.930	-	source report did not provide S.E. for x weights.

1 condition expressed as $K_D = \dfrac{10 \sqrt[3]{\text{weight in mg}}}{\text{length in mm}}$ (for emergent fry) or $K = \dfrac{100 \times \text{weight in mg}}{(\text{length in mm})^3}$ (reared fry and yearlings)

2 all parameters ± 2 S.E.

FORK LENGTH (mm), WET WEIGHT (g) AND CONDITION[1] OF JUVENILE CHINOOK SAMPLED[2] DURING PEAK MIGRATION

STREAM	YEAR	SOURCE	TYPE OF JUVENILE	SAMPLING PERIOD	n	LENGTH (mm)	WEIGHT (g)	CONDITION FACTOR K_D	CONDITION FACTOR K	COMMENTS
				SOUTH COAST - Cont'd						
Canton Ck.	1979	Glova and McCart, 1979	0+	May 1	29	41.3±0.4	0.54	1.972	-	source report did not provide S.E. for x weights.
Conuma R.	1979	Glova and McCart, 1979	0+	May 14	20	41.4±0.8	0.51	1.930	-	as above.
Tlupana R.	1979	Glova and McCart, 1979	0+	May 1	30	42.9±0.4	0.61	1.977	-	as above.
Deserted Ck.	1979	Glova and McCart, 1979	0+	Apr. 19	14	41.3±0.8	0.55	1.984	-	as above.
Little Qualicum R.	1979	Lister et al, 1979	0+	June 11-17	50	75.8±1.7	4.7±0.3	-	1.079	
				FRASER R., N.B.C. AND YUKON						
Holmes R.	1981	Rosberg et al, 1982	1+	overall	?	83.30	6.76	-	1.170	weight and K value may be misleading as many samples were slightly dessicated.
Morkill R.	1981	Rosberg et al, 1982	1+	overall	?	81.54	6.50	-	1.200	as above
Torpy R.	1981	Rosberg et al, 1982	1+	overall	?	83.97	6.40	-	1.081	as above
Slim Ck.	1981	Rosberg et al, 1982	1+	overall	?	80.92	6.00	-	1.132	as above
Bowron R.	1980	Murray, et al, 1981	0+ 0+ 1+	May 15 July 18 May 13-17	50 16 26	38±0.04 56±0.22 75.2±3.64	0.36±0.01 1.76±0.22 -	1.872 - -	- 1.002 -	emergents reared fry no weights were taken from 1+ fish.
Willow R.	1980	Murray et al, 1981	0+ 0+ 1+	May 22 July 17 May 26-31	48 58 11	38±0.07 57±0.15 86.9±3.96	0.38±0.03 1.93±0.16 7.01±1.02	1.906 - -	- 1.042 1.049±0.037	emergents reared fry

1 condition expressed as $K_D = \frac{10\sqrt[3]{\text{weight in mg}}}{\text{length in mm}}$ (for emergent fry) or $K = \frac{100 \times \text{weight in mg}}{(\text{length in mm})^3}$ (reared fry and yearlings)

2 all parameters ± 2 S.E.

FORK LENGTH (mm), WET WEIGHT (g) AND CONDITION[1] OF JUVENILE CHINOOK SAMPLED[2] DURING PEAK MIGRATION

STREAM	YEAR	SOURCE	TYPE OF JUVENILE	SAMPLING PERIOD	n	LENGTH (mm)	WEIGHT (g)	CONDITION FACTOR K_D	CONDITION FACTOR K	COMMENTS
FRASER R. N.B.C. AND YUKON - Cont'd										
Stuart R.	1980	Lister et al, 1981	0+	May 11-18	50	37.7±0.39	0.39±0.02	1.938	-	emergents
			0+	June 12-19	59	48.7±1.01	1.15±0.08	-	0.996	reared fry
			1+	May 9-24	7	72.9±6.07	3.82±1.17	-	0.947±0.111	
Quesnel R.	1979	Olmsted et al, 1980	0+	Aug. 2	10	55.8±3.86	2.06±	-	1.186	reared fry
	1980	Whelen et at, 1981	0+	Apr. 17	10	38.9±1.01	0.46±0.05	1.984	-	
			1+	June 14, 17	7	112.7±4.95	13.5±2.05	-	0.931±0.022	2 samples IPT captures, 5 samples Seine captures.
Eagle R.	1981	Whelen et al, 1982	0+	Apr. 16	10	38.3±1.01	0.37±0.04	1.874	-	
			1+	May 22	4	88.3±8.30	7.63±2.26	-	1.087±0.151	samples captured by minnow trap.
Salmon R.	1981	Whelen et al, 1982	0+	May 7	10	41.6±3.02	0.59±0.14	2.016	-	
			1+	overall	?	107.0	13.5	-	1.10	samples caught by minnow trap and seine.
Adams R. (lower)	1981	Whelen et al, 1982	0+	May 3	10	39.8±1.02	0.46±0.05	1.940	-	
			1+	Apr. 9	2	84.0±2.0	5.95±1.50	-	1.000±0.182	
South Thompson R	1981	Whelen et al, 1982	0+	May 9	10	38.2±1.29	0.43±0.05	1.976	-	
			1+	July 10	7	89.0±3.06	7.7±1.02	-	1.086±0.078	samples captured by seine.
Blue R.	1981	Scott et al, 1982	0+	Apr. 3	10	37.2±0.49	0.32±0.02	1.839	-	
			1+	Apr. 16-28	3	58.0	2.2	-	1.04	samples captured by minnow trap.
Finn Ck.	1981	Scott et al, 1982	0+	Apr. 18	10	37.1±0.54	0.41±0.03	2.002	-	
			1+	unknown	6	84.2	7.0	-	1.05	method of capture is unknown.
	1982	Stewart et al, 1983	0+	-	-	-	-	-	-	
			1+	Apr. 27	9	93.3±5.57	-	-	-	95% confidence limits

[1] condition expressed as $K_D = \frac{10\sqrt[3]{\text{weight in mg}}}{\text{length in mm}}$ (for emergent fry) or $K = \frac{100 \times \text{weight in mg}}{(\text{length in mm})^3}$ (reared fry and yearlings)

[2] all parameters ± 2 S.E.

FORK LENGTH (mm), WET WEIGHT (g) AND CONDITION[1] OF JUVENILE CHINOOK SAMPLED[2] DURING PEAK MIGRATION

STREAM	YEAR	SOURCE	TYPE OF JUVENILE	SAMPLING PERIOD	n	LENGTH (mm)	WEIGHT (g)	CONDITION FACTOR K_D	CONDITION FACTOR K	COMMENTS
FRASER R. N.B.C. AND YUKON - Cont'd										
Lion Ck.	1981	Scott et al, 1982	0+	June 19, 20	3	41.7±3.3	0.72±0.23	-	0.993	reared fry
Raft R.	1981	Scott et al, 1982	0+	Apr. 22	10	37.5±1.17	0.39±0.04	1.948	-	
	1982	Stewart et al, 1983	0+	May 16	UK	approx 38.0	approx 0.40	approx 1.94	-	emergents
			0+	June 10	UK	approx 43	approx 0.78	-	approx 0.981	reared fry
Clearwater R.	1982	Stewart et al, 1983	0+	May 22	UK	approx 38.0	approx 0.28	approx 1.72	-	emergents
			0+	July 20	UK	approx 52.0	approx 1.60	-	approx 1.14	reared fry
			1+	overall	3	77.7	4.27	-	0.91	
Lemieux Ck.	1982	Stewart et al, 1983	1+	overall	43	68.4	3.42	-	1.07	
North Thompson R.	1981	Scott et al, 1982	0+	Apr. 28	10	39.0±1.12	0.47±0.05	1.994	-	emergents
			0+	June 11	10	45.0±3.44	0.97±0.31	-	1.06	reared fry
			1+	Apr. 20	60	84.4±1.41	6.34±0.33	-	1.054	samples captured by seine.
	1982	Stewart et al, 1983	0+	May 22	UK	approx 38.0	approx 0.35	approx 1.85	-	emergents
			0+	July 12	UK	approx 62.0	approx 2.25	-	0.94	reared fry
			1+	overall	99	77.6	5.56	-	1.19	

1 condition expressed as $K_D = \frac{10\sqrt[3]{\text{weight in mg}}}{\text{length in mm}}$ (for emergent fry) or $K = \frac{100 \times \text{weight in mg}}{(\text{length in mm})^3}$ (reared fry and yearlings)

2 all parameters ± 2 S.E.

FORK LENGTH (mm), WET WEIGHT (g) AND CONDITION[1] OF JUVENILE COHO SAMPLED[2] DURING PEAK MIGRATION

STREAM	YEAR	SOURCE	TYPE OF JUVENILE	SAMPLING PERIOD	n	LENGTH (mm)	WEIGHT (g)	CONDITION FACTOR K_D	CONDITION FACTOR K	COMMENTS
North Coast										
Mathers Ck.	1979	Northern Natural Resource Services Ltd., 1979	0+	May 8	10	35.1	0.38	2.06	-	
Morice R.	1979	Smith and Berezay, 1983	0+	June 6-11	2	83.5±9.0	7.96±2.77	-	1.367	reared fry
			1+	June 6-11	15	94.8	10.96	-	1.286	
			2+	June 6-11	2	124.0±2.0	24.57±3.16	-	1.289	
	1980	Smith and Berezay, 1983	1+	June 20-22	27	106.6	14.75	-	1.218	
			2+	June 20-22	16	109.5	15.13	-	1.152	
Kitimat R.	1980	Birch et al, 1981	0+	June 10	50	34.4±0.40	0.32±0.01	1.988	-	emergents
			0+	July 24	5	41.9±5.56	0.71±0.37	-	0.965	reared fry
			1+	Apr. 22	28	84.4±4.23	5.79±0.80	-	0.963	
			2+	Apr. 22	6	86.8±6.20	6.37±1.58	-	0.974	
Hirsch Ck.	1980	Birch et al, 1981	0+	June 3	52	35.0±0.42	0.31±0.01	1.934	-	
			1+	May 26	2	61.8±5.52	2.58±0.69	-	1.093	
Cecil Ck.	1980	Birch et al, 1981	0+	June 4	42	35.5±0.44	0.34±0.01	1.966	-	
			1+	April 14	27	72.3±5.48	3.84±0.52	-	1.016	
			2+	April 14	6	92.1±3.21	7.29±0.61	-	0.933	
Kildala R.	1981	Slaney et al, 1982	0+	June 4	10	35.3±0.89	0.33±0.04	1.964	-	
			1+	May 4	10	89.6±10.12	7.66±2.66	-	1.065	
			2+	May 4	4	106.9±3.80	13.01±1.46	-	1.065±0.12	
Dala R.	1981	Slaney et al, 1982	0+	May 24	10	35.6±0.83	0.30±0.03	1.880	-	
			1+	Apr. 29	10	77.6±5.65	4.67±0.96	-	1.00±0.12	
			2+	Apr. 29	8	92.3±3.92	8.13±1.32	-	1.03±0.05	
Bish Ck.	1981	Slaney et al, 1982	0+	May 23	10	34.4±0.74	0.37±0.03	2.087	-	
			1+	March 26	12	71.8±3.93	3.89±0.61	-	1.075	

1 condition expressed as $K_D = \frac{10\ \sqrt[3]{\text{weight in mg}}}{\text{length in mm}}$ (for emergent fry) or $K = \frac{100 \times \text{weight in mg}}{(\text{length in mm})^3}$ (reared fry and yearlings)

2 all parameters ± 2 S.E.

FORK LENGTH (mm), WET WEIGHT (g) AND CONDITION[1] OF JUVENILE COHO SAMPLED[2] DURING PEAK MIGRATION

STREAM	YEAR	SOURCE	TYPE OF JUVENILE	SAMPLING PERIOD	n	LENGTH (mm)	WEIGHT (g)	CONDITION FACTOR K_D	CONDITION FACTOR K	COMMENTS
				SOUTH COAST						
Sucwoa R.	1979	Glova and McCart, 1979	0+	June 5	30	35.4±0.6	0.34	1.972	-	
			1+	overall	?	77.9	-	-	-	
Canton Ck.	1979	Glova and McCart, 1979	0+	May 28	28	36.3±0.6	0.35	1.941	-	
			1+	overall	?	86.1	-	-	-	
Conuma R.	1979	Glova and McCart, 1979	0+	June 5	29	35.7±0.6	0.32	1.916	-	
			1+	overall	?	85.2	-	-	-	
Tlupana R.	1979	Glova and McCart, 1979	0+	May 1	26	38.0±0.6	0.40	1.939	-	
			1+	overall	?	77.7	-	-	-	
Deserted Ck.	1979	Glova and McCart, 1979	0+	May 1	21	36.6±0.8	0.35	1.925	-	
			1+	overall	?	112.7	-	-	-	
Little Qualicum R.	1979	Lister et al, 1979	0+	May 21-27	87	35.8±0.41	0.36±0.02	1.991	-	
			1+	May 21-27	42	96.1±2.87	8.90±0.91	-	1.003	
Glendale Ck.	1983	Shepherd, 1984	0+	Apr 18-May 11	24	36.8±0.97	0.39±0.05	1.987		
			1+	Apr 22-May 11	14	79.2±30.86	5.86±5.56		1.072	
Tom Browne Ck.	1983	Shepherd, 1984	0+	Apr 18-May 14	27	36.1±2.82	.38±0.10	2.001		
				FRASER R., N.B.C. AND YUKON						
Quesnel R.	1980	Whelen et al, 1981	0+	May 28	10	31.5±0.80	0.24±0.03	1.973	-	emergents
			0+	July 22	5	44.0±2.53	0.86±0.08	-	1.010	reared fry
			1+	May 10	17	100	8.9	-	0.890	samples captured by seine.
Eagle R.	1981	Whelen et al, 1982	0+	April 21	10	35.1±1.78	0.34±0.05	1.988	-	emergents
			0+	June 15	10	44.5±6.56	1.05±0.49	-	1.192	reared fry
			1+	Apr. 26-30	16	78.0±4.66	5.22±0.82	-	1.100	samples captured by seine and minnow trap.
Salmon R.	1981	Whelen et al, 1982	0+	May 5	10	31.9±1.038	0.26±0.05	2.001	-	
			1+	Apr. 25	20	88.6±3.68	6.81±0.90	-	0.979	samples caught by minnow trap

1 condition expressed as $K_D = \frac{10 \sqrt[3]{\text{weight in mg}}}{\text{length in mm}}$ (for emergent fry) or $K = \frac{100 \times \text{weight in mg}}{(\text{length in mm})^3}$ (reared fry and yearlings)

2 all parameters ± 2 S.E.

FORK LENGTH (mm), WET WEIGHT (g) AND CONDITION[1] OF JUVENILE COHO SAMPLED[2] DURING PEAK MIGRATION

STREAM	YEAR	SOURCE	TYPE OF JUVENILE	SAMPLING PERIOD	n	LENGTH (mm)	WEIGHT (g)	CONDITION FACTOR K_D	CONDITION FACTOR K	COMMENTS
				FRASER R., N.B.C. AND YUKON - Cont'd						
Adams R.	1981	Whelen et al, 1982	0+	May 3	10	34.2±0.78	0.32±0.02	2.000	-	
			1+	April 14	20	79.3±3.77	4.78±0.65	-	0.959	samples caught by minnow trap
South Thompson R.	1981	Whelen et al, 1982	0+	Apr. 27-May 30	4	31.8±1.5	0.25±0.04	1.981	-	
Blue R.	1981	Scott et al, 1982	0+	April 23	10	34.4±0.80	0.27±0.04	1.876	-	
			1+	April 10	13	58.3±5.95	2.08±0.65	-	1.050	samples caught by minnow trap
Finn Ck.	1981	Scott et al, 1982	0+	July 3	10	31.9±1.05	0.27±0.03	2.026	-	
			1+	April 12	6	63.2±8.09	2.95±1.29	-	1.169	samples caught by minnow trap
	1982	Stewart et al, 1983	1+	overall	9	79±12	-	-	-	95% confidence limits
Lion Ck.	1981	Scott et al, 1982	0+	April 23	10	33.9±0.70	0.23±0.03	1.807	-	emergents
			0+	July 26	10	49.6±2.94	0.975	-	0.799	reared fry weight calculated from emigrant underyearling length-weight regression: lnw = 0.43 (lnl) - 1.15
			1+	May 1	22	78.9±2.50	5.33±0.51	-	1.085	
Raft R.	1981	Scott et al, 1982	0+	June 2	10	31.7±1.16	0.20±0.02	1.845	-	emergents
			0+	July 1	10	41.7±8.98	1.07±0.64	-	1.476	reared fry
			1+	Apr. 1	25	76.0±2.24	4.11±0.33	-	0.936	
	1982	Stewart et al, 1983	0+	June 30	?	approx 48.0	approx 1.10	approx 2.15	approx 1.00	peak migration-emergents & reared fry
			1+	overall	4	80.0	5.38	-	1.05	
Joseph Ck. (incl. tribs.)	1982	Stewart et al, 1983	1+	overall	6	105.2	13.04	-	1.12	

[1] condition expressed as $K_D = \frac{10 \sqrt[3]{\text{weight in mg}}}{\text{length in mm}}$ (for emergent fry) or $K = \frac{100 \times \text{weight in mg}}{(\text{length in mm})^3}$ (reared fry and yearlings)

[2] all parameters ± 2 S.E.

FORK LENGTH (mm), WET WEIGHT (g) AND CONDITION[1] OF JUVENILE COHO SAMPLED[2] DURING PEAK MIGRATION

STREAM	YEAR	SOURCE	TYPE OF JUVENILE	SAMPLING PERIOD	n	LENGTH (mm)	WEIGHT (g)	CONDITION FACTOR		COMMENTS
								K_D	K	
FRASER R., N.B.C. AND YUKON - Cont'd										
Lemieux Ck.	1982	Stewart et al, 1983	1+	overall	45	81.0	5.85	-	1.10	
Barriere R.	1982	Stewart et al, 1983	1+	overall	8	71.1	3.34	-	0.93	
North Thompson R.	1981	Scott et al, 1982	0+	April 30	7	33.4±1.05	0.26±0.04	1.911	-	
			1+	May 15-18	6	85.3±8.09	6.45±1.64	-	1.039	
	1982	Stewart et al, 1983	1+	overall	2	58.5±5.00	2.06	-	1.03	

[1] condition expressed as $K_D = \frac{10 \sqrt[3]{\text{weight in mg}}}{\text{length in mm}}$ (for emergent fry) or $K = \frac{100 \times \text{weight in mg}}{(\text{length in mm})^3}$ (reared fry and yearlings)

[2] all parameters ± 2 S.E.

FORK LENGTH (mm), WET WEIGHT (g) AND CONDITION[1] OF JUVENILE COHO SAMPLED[2] DURING PEAK MIGRATION

STREAM	YEAR	SOURCE	TYPE OF JUVENILE	SAMPLING PERIOD	n	LENGTH (mm)	WEIGHT (g)	CONDITION FACTOR		COMMENTS
								K_D	K	
FRASER R., N.B.C. AND YUKON - Cont'd										
Lemieux Ck.	1982	Stewart et al, 1983	1+	overall	45	81.0	5.85	-	1.10	
Barriere R.	1982	Stewart et al, 1983	1+	overall	8	71.1	3.34	-	0.93	
North Thompson R.	1981	Scott et al, 1982	0+	April 30	7	33.4±1.05	0.26±0.04	1.911	-	
			1+	May 15-18	6	85.3±8.09	6.45±1.64	-	1.039	
	1982	Stewart et al, 1983	1+	overall	2	58.5±5.00	2.06	-	1.03	

1 condition expressed as $K_D = \frac{10\sqrt[3]{\text{weight in mg}}}{\text{length in mm}}$ (for emergent fry) or $K = \frac{100 \times \text{weight in mg}}{(\text{length in mm})^3}$ (reared fry and yearlings)

2 all parameters ± 2 S.E.

FORK LENGTH (mm), WET WEIGHT (g) AND CONDITION[1] OF JUVENILE CHUM SAMPLED[2] DURING PEAK MIGRATION

STREAM	YEAR	SOURCE	TYPE OF JUVENILE	SAMPLING PERIOD	n	LENGTH (mm)	WEIGHT (g)	CONDITION FACTOR K_D	CONDITION FACTOR K	COMMENTS
NORTH COAST										
Mathers Ck.	1979	Northern Natural Resource Services Ltd., 1979	0+	May 5	25	39.6	0.47	1.963	-	some reared fry were likely in sample.
Kitimat R.	1980	Birch et al, 1981	0+	Apr. 8	50	40.5±0.62	0.42±0.02	1.849	-	as above.
Hirsch Ck.	1980	Birch et al, 1981	0+	Apr. 23	50	39.7±0.51	0.37±0.02	1.808	-	as above.
Kildala R.	1981	Slaney et al, 1982	0+	March 8	10	40.2±0.38	0.37±0.02	1.786±0.025	-	as above.
Dala R.	1981	Slaney et al, 1982	0+	March 7	10	40.7±0.69	0.42±0.03	1.840±0.025	-	as above.
Bish Ck.	1981	Slaney et al, 1982	0+	March 17	10	40.9±0.65	0.36±0.02	1.739±0.02	-	
SOUTH COAST										
Sucwoa R.	1979	Glova and McCart, 1979	0+	May 1	20	41.8±0.6	0.44	1.820	-	some reared fry possibly in sample
Canton Ck.	1979	Glova and McCart, 1979	0+	April 19	30	40.9±0.6	0.44	1.860	-	as above.
Conuma R.	1979	Glova and McCart, 1979	0+	April 19	30	40.6±0.4	0.47	1.915	-	as above.
Tlupana R.	1979	Glova and McCart, 1979	0+	April 25	30	40.5±0.4	0.46	1.906	-	as above.
Deserted Ck.	1979	Glova and McCart, 1979	0+	April 25	29	39.4±0.8	0.44	1.930	-	as above.
Little Qualicum R.	1979	Lister et al, 1979	0+	May 21-27	241	38.9	0.36	1.835	-	
Glendale Ck.	1983	Shepherd, 1984	0+	Apr 12-May 10	29	38.1±0.92	.33±0.03	1.808±.058	-	Daily averages
Tom Browne Ck.	1983	Shepherd, 1984	0+	Apr 3-21	19	38.4±1.37	.34±0.03	1.823±0.050	-	Daily averages

1 condition expressed as $K_D = \frac{10 \sqrt[3]{\text{weight in mg}}}{\text{length in mm}}$ (for emergent fry) or $K = \frac{100 \times \text{weight in mg}}{(\text{length in mm})^3}$ (reared fry and yearlings)

2 all parameters ± 2 S.E.

FORK LENGTH (mm), WET WEIGHT (g) AND CONDITION[1] OF JUVENILE SOCKEYE SAMPLED[2] DURING PEAK MIGRATION

STREAM	YEAR	SOURCE	TYPE OF JUVENILE	SAMPLING PERIOD	n	LENGTH (mm)	WEIGHT (g)	CONDITION FACTOR K_D	CONDITION FACTOR K	COMMENTS
NORTH COAST										
Morice R.	1979	Smith and Berezay, 1983	1+	May 24	12	84.6	6.37	-	1.052	
			2+	May 24	4	119.3	18.03	-	1.062	
	1980	Smith and Berezay, 1983	1+	May 18	86	90.0	6.97	-	0.928	
			2+	May 18	10	120.9	16.6	-	0.939	
Kildala R.	1981	Slaney et al, 1982	0+	July 1	5	29.4±0.27	0.16±0.01	1.847	-	
Dala R.	1981	Slaney et al, 1982	0+	April 8	5	28.4±1.47	0.12±0.01	1.737	-	
SOUTH COAST										
Sucwoa R.	1979	Glova and McCart, 1979	0+	May 1	30	29.0±0.6	0.13	1.747	-	
Canton Ck.	1979	Glova and McCart, 1979	0+	April 25	30	29.1±0.2	0.13	1.741	-	
Conuma R.	1979	Glova and McCart, 1979	0+	May 7	25	28.2±0.4	0.15	1.884	-	
Tlupana R.	1979	Glova and McCart, 1979	0+	May 14	30	28.6±0.2	0.12	1.725	-	
Deserted Ck.	1979	Glova and McCart, 1979	0+	May 1	30	28.9±0.6	0.14	1.797	-	
			1+	overall	92	85.9±1.8	-	-	-	
Glendale, Ck.	1983	Shepherd, 1984	1+	Apr 22-May 8	14	80.2±5.92	4.71±1.35		0.903±0.195	
FRASER R., N.B.C. AND YUKON										
Quesnel R.	1980	Whelen et al, 1981	0+	May 16	6	28.5±1.94	0.24±0.06	2.181	-	
			1+	overall	?	92.8	7.32	-	0.916	
Eagle R.	1981	Whelen et al, 1982	0+	May 9	?	25.7	0.11	1.864	-	
			1+	July 18	10	83.5	5.6	-	0.962	samples captured by seine.
Salmon R.	1981	Whelen et al, 1982	0+	May 5	?	34.9	0.37	2.057	-	samples captured by seine.
South Thompson R.	1981	Whelen et al, 1982	1+	June 14	2	135.5	20.8	-	0.836	

1 condition expressed as $K_D = \frac{10\sqrt[3]{\text{weight in mg}}}{\text{length in mm}}$ (for emergent fry) or $K = \frac{100 \times \text{weight in mg}}{(\text{length in mm})^3}$ (reared fry and yearlings)

2 all parameters ± 2 S.E.

FORK LENGTH (mm), WET WEIGHT (g) AND CONDITION[1] OF JUVENILE PINK SAMPLED[2] DURING PEAK MIGRATION

STREAM	YEAR	SOURCE	TYPE OF JUVENILE	SAMPLING PERIOD	n	LENGTH (mm)	WEIGHT (g)	CONDITION FACTOR K_D	CONDITION FACTOR K	COMMENTS
NORTH COAST										
Mathers Ck.	1979	Northern Natural Resource Services Ltd.	0+	April 29	25	35.5	0.28	1.849	-	
Kitimat R.	1980	Birch et al, 1981	0+	April 9	40	34.4±0.76	0.24±0.01	1.810	-	
Hirsch Ck.	1980	Birch et al, 1981	0+	April 23	50	35.7±0.31	0.25±0.01	1.765	-	
Kildala R.	1981	Slaney et al, 1982	0+	March 25	10	34.7±0.70	0.20±0.02	1.685±0.044	-	
Dala R.	1981	Slaney et al, 1982	0+	April 2	10	34.6±0.44	0.19±0.01	1.662±0.032	-	
Bish Ck.	1981	Slaney et al, 1982	0+	March 26	10	34.9±0.53	0.20±0.01	1.676±0.038	-	
SOUTH COAST										
Sucwoa R.	1979	Glova and McCart, 1979	0+	April 19	13	35.1±0.8	0.22	1.720	-	
Canton Ck.	1979	Glova and McCart, 1979	0+	April 19	19	33.7±1.2	0.18	1.675	-	
Conuma R.	1979	Glova and McCart, 1979	0+	April 19	7	33.7±1.6	0.19	1.706	-	
Tlupana R.	1979	Glova and McCart, 1979	0+	April 19	4	35.0±1.4	0.23	1.751	-	
Glendale Ck.	1983	Shepherd, 1984	0+	Apr 8-25	18	34.1±0.79	0.22±0.02	1.753±0.039	-	
Tom Browne Ck.	1983	Shepherd, 1984	0+	Apr 2-26	25	34.2±0.082	0.22±0.02	1.748±0.050	-	

1 condition expressed as $K_D = \frac{10 \sqrt[3]{\text{weight in mg}}}{\text{length in mm}}$ (for emergent fry) or $K = \frac{100 \times \text{weight in mg}}{(\text{length in mm})^3}$ (reared fry and yearlings)

2 all parameters ± 2 S.E.

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APPENDIX C-14

BIOPHYSICAL FACTORS WHICH MAY AFFECT JUVENILE MIGRATIONS

Almost all studies associated downstream migration with monitored changes in water temperature and river discharge. However, to identify these factors as migration triggers may be inaccurate. In these tables, all observations are treated subjectively and the reader is advised to refer to the source documents for more detailed information.

BIOPHYSICAL FACTORS WHICH MAY AFFECT JUVENILE CHINOOK MIGRATIONS

STREAM	YEAR	SOURCE	EMERGENTS & REARED FRY (0+)	YEARLLNGS (1+)
			NORTH COAST	
Morice R.	1979	Smith and Berezay, 1983	increases in migration coincided with increasing temperature and flow.	-
	1980	Smith and Berezay, 1983	increase in river height possibly affected peaking of migration	-
Kitimat R.	1980	Birch et al, 1981	a peak in reared fry migration roughly corresponded with a peak in discharge	-
Hirsch Ck.	1980	Birch et al, 1981	a peak in reared fry migration corresponded with a peak in discharge	-
Kildala & Dala R's.	1981	Slaney et al, 1982	main migrations followed storm freshets in both streams	-
			SOUTH COAST	
Sucwoa R.	1979	Glova and McCart, 1979	a large number of migrants flushed out during flood.	-
Canton Ck.	1979	Glova and McCart, 1979	as for Sucwoa R.	-
Conuma R.	1979	Glova and McCart, 1979	as for Sucwoa R.	-
Tlupana R.	1979	Glova and McCart, 1979	as for Sucwoa R.	-
			Fraser R., N.B.C. and Yukon	
Holmes R.	1981	Rosberg et al, 1982	decreasing flows, causing a reduction in rearing area, caused increase in migration	increasing temperature was the major factor in migration response
Morkill R.	1981	Rosberg et al, 1982	decreasing flows caused increase in migration	as for Holmes R.
Torpy R.	1981	Rosberg et al, 1982	as for Morkill	as for Holmes R.
Slim Ck.	1981	Rosberg et al, 1982	as for Morkill	as for Holmes R.

BIOPHYSICAL FACTORS WHICH MAY AFFECT JUVENILE CHINOOK MIGRATIONS

STREAM	YEAR	SOURCE	EMERGENTS & REARED FRY (0+)	YEARLLNGS (1+)
			FRASER R., N.B.C. AND YUKON - Cont'd	
Bowron R.	1980	Murray et al, 1981	water temperature, discharge rate, and lunar periodicity all affected migration timing	as for Holmes R.
Willow R.	1980	Murray et al, 1981	increasing water temperature affected migration timing	as for Holmes R.
Stuart R.	1980	Lister et al, 1981	increasing water temperature coincided with increasing migration	-
Salmon R.	1981	Whelen et al, 1982	-	initial discharge peak coincided with peak in migration.
Adams R.	1981	Whelen et al, 1982	rapidly increasing flow was responsible for peak in emigration	-
South Thompson R.	1981	Whelen et al, 1982	substantial increases in discharge generally triggered peaks in migration	-
Finn Ck.	1981	Scott et al, 1982	peak emigration coincided with an initial increase in discharge	-
Raft R.	1981	Scott et al, 1982	initial increases in both water temperature and discharge coincided with emigration peak	
North Thompson R.	1981	Scott et al, 1982	as for Raft R.	-

BIOPHYSICAL FACTORS WHICH MAY AFFECT JUVENILE COHO MIGRATIONS

STREAM	YEAR	SOURCE	EMERGENTS & REARED FRY (0+)	YEARLINGS (1+)
			SOUTH COAST	
Sucwoa R.	1979	Glova and McCart, 1979	-	the peak catch occurred during a flood.
Canton Ck.	1979	Glova and McCart, 1979	-	the peak catch occurred on the 1st day of a major flood, no smolts were captured during a 10 day period of low flow.
Conuma R.	1979	Glova and McCart, 1979	-	as for Canton Ck.
Tlupana R.	1979	Glova and McCart, 1979	-	the peak in migration coincided with the day of peak discharge.
			FRASER R., N.B.C. AND YUKON	
Eagle R.	1981	Whelen et al, 1982	increasing migration coincided with increasing discharge.	-
Salmon R.	1981	Whelen et al, 1982	peak migration occurred over a period of decreasing discharge.	emigration rate was highest during peak discharge.
Adams R. (lower)	1981	Whelen et al, 1982	peak emigration occurred during increasing discharge.	emigration timing linked to increasing discharge.
Blue R.	1981	Scott et al, 1982	peak emigration was coincident with initial peak in water temperature.	-
Finn Ck.	1981	Scott et al, 1982	peak emigration occurred during decreasing flows and increasing water temperatures.	-
Lion Ck	1981	Scott et al, 1982	peak emigration occurred during increasing water temperature and increasing discharge.	-
Raft R.	1981	Scott et al, 1982	peak emigration occurred during decreasing discharge and increasing temperature.	-
North Thompson R.	1981	Scott et al, 1982	peak emigration occurred during increasing discharge and increasing temperature.	-

BIOPHYSICAL FACTORS WHICH MAY AFFECT JUVENILE CHUM MIGRATIONS

STREAM	YEAR	SOURCE	EMERGENTS & REARED FRY (0+)
			NORTH COAST
Hirsch Ck.	1980	Birch et al, 1981	Colder water temperatures (than in the Kitimat R.) were thought to have had a delaying effect on outmigration in this tributary stream.
Kildala R.	1981	Slaney et al, 1982	Early peaks in migration occurred during increases in discharge, while secondary peaks later on were not related to water levels.
Dala R.	1981	Slaney et al, 1982	The major peak period in migration coincided with a storm-induced freshet.
			SOUTH COAST
Sucwoa R.	1979	Glova and McCart, 1979	Timing of peak emigration coincided with the peak in zooplankton abundance.
Canton Ck.	1979	Glova and McCart, 1979	as for Sucwoa R.
Conuma R.	1979	Glova and McCart, 1979	as for Sucwoa R.
Tlupana R.	1979	Glova and McCart, 1979	as for Sucwoa R.
Deserted Ck.	1979	Glova and McCart, 1979	as for Sucwoa R.
Tom Browne Cr.	1983	Shepherd, 1984	Peak emigration coincided with 1,000 ATUs, calculated from subgravel water temperatures.
Glendale Cr.	1983	Shepherd, 1984	as for Tom Browne Cr.

BIOPHYSICAL FACTORS WHICH MAY AFFECT JUVENILE SOCKEYE MIGRATIONS

STREAM	YEAR	SOURCE	EMERGENTS & REARED FRY (0+)	YEARLINGS (1+)
			NORTH COAST	
Mathers Ck.	1979	Northern Natural Resource Services Ltd., 1979	-	Migration peaks corresponded with peaks in discharge
			SOUTH COAST	
			No Information	
			FRASER R., N.B.C. AND YUKON	
Quesnel R.	1980	Whelen et al, 1981	-	Peak migration coincided with rapidly increasing flow

BIOPHYSICAL FACTORS WHICH MAY AFFECT JUVENILE PINK MIGRATIONS

STREAM	YEAR	SOURCE	EMERGENTS & REARED FRY (0+)
			NORTH COAST
Mathers Ck.	1979	Northern Natural Resource Services Ltd., 1979	Increases in migrant numbers were related to increases in discharge.
			SOUTH COAST
Tom Browne Cr.	1983	Shepherd, 1984	Peak emigration coincided with 950 ATUs, calculated from subgravel water temperatures.
Glendale, Cr.	1983	Shepherd, 1984	as for Tom Browne.

APPENDIX C-15

REARING DISTRIBUTIONS of Juveniles

Juvenile salmon were captured and recorded using various combinations of minnow traps, seines, visual inspection, electrofishing, dipnetting, angling, snorkelling and gillnetting. These tables contain subjective notes on the habitat type, river location, degree of concentration and migratory routes for 0+ and 1+ juveniles. The "methods" column refers to observation methods rather than the overall strategy used to determine distribution (eg. mark recapture). All kilometer values denote distances above the stream mouth unless otherwise indicated.

REARING DISTRIBUTIONS OF CHINOOK JUVENILES

STREAM	YEAR	SOURCE	METHOD	TYPE OF JUVENILE	PARTICULARS OF REARING DISTRIBUTIONS
					NORTH COAST
Morice R.	1979	Smith and Berezay, 1983	MT	0+	Catch per unit effort was highest, overall, from Lamprey Creek to a point 7.5 km downstream. Generally, the lower 9 km approx. and the area beginning 7.5 km below Lamprey Creek and ending at the Goswell Creek confluence, was preferred by rearing chinook.
Kitimat R.	1980	Birch et al, 1981	MT, SN, EF	0+	Juveniles were present throughout most of the lower system including the mainstem, the lower portions of Hirsch, Humphreys, Cecil, Crist and Nalbeelah Creeks, and the Big and Little Wedeene Rivers. Rearing was also noted in the upper Big Wedeene River (below Aveling Creek), McKay and Hunter Creeks, the mouth of Davies-Hoult Creeks and the Kitimat River headwaters. The highest catch over a given period occurred on lower Hirsch Creek.
					SOUTH COAST
Mussel Ck.	1983	Whelen et al, 1984	MT	0+	Juveniles were absent from this system and likely rear in the Klinaklini mainstem.
					FRASER R., N.B.C. and YUKON
Fraser R. (mainstem)	1981	Rosberg et al, 1982	MT, SN, DN	0+	The entire study area, from Penny to McBride, is utilized by rearing fry. Extensive backwater areas, side channels and marginal debris dams provide good rearing habitat.
Holmes R.	1981	Rosberg et al, 1982	MT, SN, DN, EF,	0+	Sampling sites were located between km 0.5 and 18.0. In the lower areas, large backwaters behind logjams are primary rearing sites, while small backwaters and side channels are utilized in the upstream portions.
Morkill R.	1981	Rosberg et al, 1982	EF, MT, SN	0+	The distribution of underyearlings in this system appears restricted to the mainstem between the mouth and a point between Hellroaring and Forget-Me-Not Creeks. Much of the rearing area was comprised of river margins and the inside portion of meanders. Both actual and potential use of this system by rearing chinook was assessed as low.
Torpy R.	1981	Rosberg et al, 1982	EF, MT, SN	0+	Rearing fry were present in the mainstem to a point 1 km above Pass Lake Creek mouth, and in several tributaries, namely, Walker Creek (lower 10 km approx.), Goodson Creek, Humbug Creek and West Torpy River (to headwaters). Preferential habitat for rearing included areas having slow flow, undercut banks and/or debris accumulations.

MT - Minnow Trap; SN - Seine; VI - Visual; EF - Electrofishing; DN - Dip Netting; AN - Angling; SK - Snorkeling; GN - Gill Netting

REARING DISTRIBUTIONS OF CHINOOK JUVENILES

STREAM	YEAR	SOURCE	METHOD	TYPE OF JUVENILE	PARTICULARS OF REARING DISTRIBUTIONS
			FRASER R., N.B.C. and YUKON - Cont'd		
Slim Ck.	1981	Rosberg et al, 1982	EF, MT, SN, DN, AN	0+	Fry were encountered over the entire length of stream from the mouth to Centennial Creek, including Slim and Tumuch Lakes and the mouth area of Everett Creek. Whether fry captured in Slim and Tumuch Lakes were transient or actually rearing was not successfully determined. The most productive capture sites were located in a beaver pond near the mouth, in Slim Lake and a backwater area adjacent to the major spawning grounds below Slim Lake.
Bowron R.	1980	Murray et al, 1981	SN, EF	0+	Catch per unit effort was relatively uniform for all sampling stations, from the hwy. #16 crossing to Bowron Lake. Fry were abundant in several tributaries, namely Towkuh, Craze, 10-Mile, 14-Mile, 18-Mile, Tsus and Swamp Creeks. Low numbers of rearing chinook were captured in Sow, Purden and Grizzly Creeks.
Willow R.	1980	Murray et al, 1981	SN, EF	0+	Rearing chinook were captured throughout the mainstem between the mouth and a point approx. 4 km downstream of the Hwy. 16 crossing. Rearing utilization was highest between approx. 15 and 28 km from the mouth. Habitats in tributary streams were not considered as valuable for rearing with the exception of Tsadesta Creek, although catches were documented in Bowes and Wansa Creeks.
Stuart R.	1980	Lister et al, 1981	SN, EF, MT	0+	The highest densities of rearing fry were encountered between Stuart Lake and Dog Creek in the mainstem, while numerous tributaries contained rearing activity. Kec, Mud, Welch and Chinohchey Creeks all contained densities comparable with or higher than those found in prime rearing areas of the mainstem. The highest single catch (by density) was recorded on Creek "A", which enters the Stuart approx. 10 km below Stuart Lake, at Six Mile Island.
Nechako R.	1979	Olmsted et al, 1980	MT, SN	0+	Sampling was conducted between Cheslatta Falls and a point approx. 10 km downstream of Greer Creek. Sites of intensive utilization were scattered throughout this area but were most concentrated around Greer Creek and over the lower 4 km of Swanson Creek, two tributaries to the mainstem.
Horsefly R.	1979	Olmsted et al, 1980	MT, SN	0+	Sampling locations were not well-distributed and thus, some principal rearing areas may have been overlooked. However, it appears that rearing occurred throughout much of the mainstem from the outlet at Quesnel Lake upstream to the McKinley Creek confluence and in two tributaries, McKinley and Patenaude Creeks. Intensive rearing occurred in the mainstem, between Patenaude and McKinley Creeks.

MT - Minnow Trap; SN - Seine; VI - Visual; EF - Electrofishing; DN - Dip Netting; AN - Angling; SK - Snorkeling; GN - Gill Netting

REARING DISTRIBUTIONS OF CHINOOK JUVENILES

STREAM	YEAR	SOURCE	METHOD	TYPE OF JUVENILE	PARTICULARS OF REARING DISTRIBUTIONS
			FRASER R., N.B.C. and YUKON - Cont'd		
Quesnel R.	1979	Olmsted et al, 1980	MT, SN	0+	As with the Horsefly River, sampling locations were limited by access and a complete picture of rearing distribution is not available. However, over the sections sampled, a 1 km area above Likely and another similar in length, near the Cariboo River confluence, were well utilized by rearing fry.
	1980	Whelen et al, 1981	MT, SN	0+	Sampling locations were similar to those adopted in 1979 but distributions were somewhat altered, as the main rearing area occurred between 0.5 and 1.0 km upstream from the Cariboo River. An area of moderate utilization occurred over an area situated approx. 1.5 km either side of the road crossing at Likely.
Middle Shuswap R.	1983	Fee and Jong, 1984	EF, SN, SK	unspecified	Juvenile chinook were present throughout suitable habitat from about 4 km above the outlet at Mabel Lake to approx. 2 km above Bessette Creek. Utilization generally increased with distance from the mouth.
Bessette Ck.	1983	Fee and Jong, 1984	EF, SN	unspecified	Abundance of rearing chinook was classed as low throughout the accessible length of the mainstem and in 2 principal tributaries, Duteau and Creighton Creeks.
Trinity Ck.	1982	Sebastian, 1983	EF	0+	Very low densities of chinook fry were present in the lower 1.1 km of stream, and although an additional 0.4 km of stream is accessible, it was not utilized during the period of study.
Eagle R.	1981	Whelen et al, 1982	MT, SN	0+	Numerous areas exist where habitat is suitable for rearing and the most extensively utilized were located: (1) near Malakwa, (2) between the Perry R. confluence and Kay Falls and, (3) approx. 0.5 km above and below Mitikan Creek.
Crazy Ck.	1982	Sebastian, 1983	EF	0+	Anadromous rearing habitat was restricted to the lower 300 m of stream. Fry densities in this area were very low.
Perry R.	1982	Sebastian, 1983	EF, ?	0+	Rearing occurs in stream margin and side channel habitat over the lower 200m of stream.
Salmon R.	1981	Whelen et al, 1982	SN, MT	0+	In the areas surveyed, utilization was greatest between Stephen Creek and Falkland. Chinook underyearlings were captured in numerous locations throughout the area, from the river mouth upstream to a point approx. 18 km above Falkland.
				1+	Low numbers of yearlings were captured at several points along the lower 38 km of river, the greatest proportion of which occurred over the upper portion.

MT - Minnow Trap; SN - Seine; VI - Visual; EF - Electrofishing; DN - Dip Netting; AN - Angling; SK - Snorkeling; GN - Gill Netting

REARING DISTRIBUTIONS OF CHINOOK JUVENILES

STREAM	YEAR	SOURCE	METHOD	TYPE OF JUVENILE	PARTICULARS OF REARING DISTRIBUTIONS
					FRASER R., N.B.C. and YUKON - Cont'd
Seymour R.	1982	Sebastian, 1983	EF, SK	0+	Fry were encountered in low densities between the mouth and the McNomee Creek confluence.
				1+	Yearlings were present in somewhat greater abundance than fry over the same section of stream (indicated above).
Adams R.	1981	Whelen et al, 1982	SN, MT	0+	Rearing areas were identified between the mouth and Hiuihill Creek, while the most abundant rearing populations were located around the Hiuihill Creek mouth, around the lower bridge crossing and at the mouth.
South Thompson R.	1981	Whelen et al, 1982	SN, MT	0+	Rearing occurred throughout the area surveyed from Shuswap Lake to 2 km below Pritchard, while the foreshores at either end of Little Shuswap Lake and an area at the mouth of Niskonlith Creek were the most utilized.
Blue R.	1981	Scott et al, 1982	SN, MT	0+	Rearing fry were present in low numbers over portions of the lower 11.5 km of stream (several areas within this area were not surveyed), although the greatest proportion were found between the CNR bridge and the mouth.
				1+	Three yearlings were caught between the CNR bridge and the mouth, indicating this as being possibly the preferred rearing area.
Finn Ck.	1981	Scott et al, 1982	SN, MT	0+	The areas of most intensive utilization by rearing fry appeared to lie just downstream of the hwy. bridge and over the lower 1.0 km, although much of the area falling between these 2 sections was not surveyed.
	1982	Stewart et al, 1983	SN, EF	0+	Low densities of rearing fry were encountered from the hwy. bridge downstream to the mouth.
Lion Ck.	1981	Scott et al, 1982	MT	0+	Limited rearing occurred between the access road and CNR bridges.
Raft R.	1981	Scott et al, 1982	MT, SN	0+	Rearing occurred over the lower 3.5 km of stream and was most intensive for the first 2.0 km approx. below the hwy. bridge.
	1982	Stewart et al, 1983	EF, SN	0+	The rearing area was similar to that encountered in 1981 but only low fry densities were encountered.

MT - Minnow Trap; SN - Seine; VI - Visual; EF - Electrofishing; DN - Dip Netting; AN - Angling; SK - Snorkeling; GN - Gill Netting

REARING DISTRIBUTIONS OF CHINOOK JUVENILES

STREAM	YEAR	SOURCE	METHOD	TYPE OF JUVENILE	PARTICULARS OF REARING DISTRIBUTIONS
					FRASER R., N.B.C. and YUKON - Cont'd
Clearwater R.	1982	Stewart et al, 1983	EF, SN	0+	Rearing fry were captured at various locations over the lower 37 km of stream, approximately, and densities were typically low.
Joseph Ck. (incl. tribs.)	1982	Stewart et al, 1983	EF, ?	0+	Although 0+ fish were captured in this stream, the absence of fry following emergent migration is a likely indication that rearing is conducted outside this system (ie. in the North Thompson River).
Lemieux Ck.	1982	Stewart et al, 1983	EF, ?	0+	as above
Barriere R. (incl. tribs)	1982	Stewart et al, 1983	EF, ?	0+	as above
North Thompson R.	1981	Scott et al, 1982	SN, MT	0+	Rearing fry were distributed throughout the study area, from approx. 5 km below Little Fort to Vavenby. In all the areas sampled, rearing was intensive.
				1+	The majority of yearling chinook were captured between Blackpool and Clearwater, although captures were documented over the entire study area. It is not known whether these fish were rearing or were merely emmigrants. However, due to the decline in captures following peak freshet it is likely that most yearlings did not remain to rear for a second summer.
	1982	Stewart et al, 1983	EF, ?	0+	Generally, fry densities were higher in the mainstem than in any of the tributaries studied. Rearing fry were encountered in various locations of the area surveyed, between Barriere and Finn Creek, with the highest occurrance from Barriere to Blackpool. Rearing did not occur over an approx. 6 km section beginning approx. 8 km above Vavenby.
	1982	Stewart et al, 1983	EF, ?	1+	Captures of yearlings occurred generally throughout the areas sampled for fry, although by July the area between Blackpool and approx. Vavenby contained the only yearling populations.

MT - Minnow Trap; SN - Seine; VI - Visual; EF - Electrofishing; DN - Dip Netting; AN - Angling; SK - Snorkeling; GN - Gill Netting

REARING DISTRIBUTIONS OF COHO JUVENILES

STREAM	YEAR	SOURCE	METHOD	TYPE OF JUVENILE	PARTICULARS OF REARING DISTRIBUTIONS
				NORTH COAST	
Morice R.	1979	Smith and Berezay, 1983	MT	0+	The preferred area for rearing extended from the Morice Lake outlet to a point approx. halfway between Lamprey and Owen Creeks, while the section running between the Thautil River and Lamprey Creek contained 60% of the fish captured.
Kitimat R. (incl. tribs.)	1980	Birch et al, 1981	MT, SN, EF	0+	Rearing coho were found throughout the accessible portions of the mainstem and tributaries utilized by spawning adults and consisting of suitable habitat.
				1+	as above
Kwatna R.	1983	Rice, 1984	VI, AN, MT	unspecified	Juveniles were distributed from the mouth to km 22.8, while the highest concentrations were encountered between km 11 and 15.6.
Gus Ck.	1983	Rice, 1984	VI	unspecified	Juveniles were observed between the bridge and the mouth; most were located in a deep pool at the mouth.
Oak-Beck Ck.	1983	Rice, 1984	VI	unspecified	Juveniles were observed in the west fork.
Slousiska Ck.	1983	Rice, 1984	VI, MT	unspecified	Juveniles were widely distributed below the waterfall.
Quatlena R.	1983	Rice, 1984	VI	unspecified	Rearing was observed between km 0.8 and 2.1.
Nootum R.	1983	Rice, 1984	VI	unspecified	Rearing occurred between the mouth and km 3.5.
				SOUTH COAST	
Glendale/Tom Browne Cks.	1983	Whelen and Morgan, 1984	MT, VI	0+ & 1+	Substantial numbers of juveniles were observed in pools throughout the accessible portions of both Tom Browne and Glendale Creeks.
Mussel Ck.	1983	Whelen and Morgan, 1984	MT	0+ & 1+	Although rearing juveniles were observed throughout the survey area, 94% of the captures were made from large pools located within the lower 1.2 km of stream.
Klinaklini R.	1983	Whelen and Morgan, 1984	MT	0+	Dice Creek was the only location from which captures were made (n=6).
Ahnuhati R.	1983	Whelen and Morgan, 1984	MT, VI	0+	Fry were observed throughout the area located between 1.0 and 7.0 km from the mouth.

MT - Minnow Trap; SN - Seine; VI - Visual; EF - Electrofishing; DN - Dip Netting; AN - Angling; SK - Snorkeling; GN - Gill Netting

REARING DISTRIBUTIONS OF COHO JUVENILES

STREAM	YEAR	SOURCE	METHOD	TYPE OF JUVENILE	PARTICULARS OF REARING DISTRIBUTIONS
FRASER R., N.B.C. and YUKON					
Horsefly R.	1979	Olmsted et al, 1980	MT, SN	unspecified	Juveniles were sampled throughout the mainstem below McKinley Creek, save the section between Hooker Creek and the Little Horsefly River. Abundance was greatest between McKinley Creek and Patenaude Creek. Limited numbers of coho were also captured from McKinley Creek.
Quesnel R.	1980	Whelen et al, 1981	MT, SN	0+	Captures of fry were made at Quesnel Forks (86%) and the "Burling Pond" (14%) near Likely.
				1+	Six yearling coho were caught in the Burling Pond; no other captures were documented.
Middle Shuswap R.	1983	Fee and Jong, 1984	EF, SN, SK	0+	Coho rearing was restricted to the lower 23 km of stream, although the lower portion of this (length unspecified) contains no rearing coho.
Bessette Ck. (incl. tribs.)	1983	Fee and Jong, 1984	EF, SN	0+	Fry were found throughout the anadromous sections of Bessette, Duteau and Creighton Creeks in low, moderate and very low abundance, respectively.
Trinity Ck.	1982	Sebastian, 1983	EF	0+	Very low densities of fry were present over the lower 1.1 km of this stream.
Eagle R.	1981	Whelen et al, 1982	MT, SN	0+	Rearing coho were distributed from the river mouth at Shuswap Lake upstream to Victor Lake. Primary concentrations were found between the Perry River and Crazy Creek, between Mitikan and Tumbler Creeks and at several locations between Three Valley and Victor Lakes. Generally, use of rearing areas upstream of Yard Creek was moderate heavy, as this portion of the river was more suitable for rearing than the downstream area.
				1+ & 2+	Yearlings and post-yearlings were sampled at various locations between Shuswap Lake and the head of Three Valley Lake, while highest CPUE occurred between Kay Falls and Tumbler Creek and from the head of Griffin Lake to the head of Three Valley Lake.
South Pass Ck.	1982	Sebastian, 1983	EF	0+ & 1+	Although the anadromous section extends for 1.2 km above Three Valley Lake, the area suitable for rearing terminates at the 0.7 km point.
Crazy Ck.	1982	Sebastian, 1983	EF, SK	0+	Coho fry density is very low and is confined to the lower 0.6 km of stream.
Perry R.	1982	Sebastian, 1983	EF	0+	Low numbers of coho were found in the lower 0.9 km of stream.

MT - Minnow Trap; SN - Seine; VI - Visual; EF - Electrofishing; DN - Dip Netting; AN - Angling; SK - Snorkeling; GN - Gill Netting

REARING DISTRIBUTIONS OF COHO JUVENILES

STREAM	YEAR	SOURCE	METHOD	TYPE OF JUVENILE	PARTICULARS OF REARING DISTRIBUTIONS
					FRASER R., N.B.C. and YUKON - Cont'd
Salmon R.	1981	Whelen et al, 1982	MT, SN	0+	The river was utilized from the foreshore of Shuswap Lake near the mouth upstream to approx. 14 km above Falkland. Extensively utilized areas were scattered between Stephen and Bolean Creeks. However, as many areas were not surveyed, extensive utilization may have occurred elsewhere.
				1+	Yearlings were distributed between the river mouth and Falkland, with the highest concentrations occurring between Apalmer and Gordon Creeks; the highest CPUE was also recorded in this section.
Tappen Ck.	1982	Sebastian, 1983	EF	0+	Fry were present over the lower 1.5 km of stream, with the highest densities occurring in the first 300 m.
Seymour R.	1982	Sebastian, 1983	EF, SK	0+ & 1+	Fry and yearlings were present along stream margins to km 4.5.
McNomee Ck.	1982	Sebastian, 1983	EF	0+ & 1+	Coho were present to km 2.3 in densities some 4 times higher than those found for the Seymour River (reach average).
Adams R. (lower)	1981	Whelen et al, 1982	MT, SN	0+	Underyearlings were found in most areas sampled, between Adams Lake and Shuswap Lake but were concentrated over 3 small sections located at: (1) approx. 1 to 2 km above the mouth, (2) just above the lower bridge crossing and (3) around the mouth of Hiuihill Creek (coho also utilized the lower portion of Hiuihill Creek).
				1+	Yearlings were concentrated over the lower 2.5 km of stream, although most of the captures were made in April and May, indicating that most yearlings do not rear for a second summer.
South Thompson R.	1981	Whelen et al, 1982	SN	0+	Limited numbers of fry reared in the South Thompson, as indicated by the total catch (n=102). The majority were found in Little Shuswap Lake and the lower portion of the Little River.
				1+	Based on limited data, it would appear that most of the population reared along the eastern foreshore of Little Shuswap Lake and in the lower half of the Little River.
Albreda R.	1982	Hutton et al, 1983	MT	0+	Only a limited number of locations were sampled but from the available data it appears that distribution was restricted to the upper portion of stream, beginning at approx. km 11.

MT - Minnow Trap; SN - Seine; VI - Visual; EF - Electrofishing; DN - Dip Netting; AN - Angling; SK - Snorkeling; GN - Gill Netting

REARING DISTRIBUTIONS OF COHO JUVENILES

STREAM	YEAR	SOURCE	METHOD	TYPE OF JUVENILE	PARTICULARS OF REARING DISTRIBUTIONS
					FRASER R., N.B.C. and YUKON - Cont'd
Blue R.	1981	Scott et al, 1982	MT, SN	0+	This stream was utilized over much of the lower 12.5 km and was extensively utilized between the mouth and the hwy. bridge.
				1+	Distributions were similar to those documented for 0+ fish.
Goose Ck.	1982	Hutton et al, 1983	MT	unspecified	Captures (n=6) were made immediately above and below the hwy crossing. Although sampling was confined to this relatively short stretch of stream, conditions appear good for rearing over much of the stream's length.
Peddle Ck.	1982	Hutton et al, 1983	MT	0+ & 1+	A substantial number (n=159) of juveniles were trapped from a swampy area adjoining Peddle Creek. The rearing area is restricted to the lower 0.6 km of Peddle Creek and the surrounding swampy areas.
Finn Ck.	1981	Scott et al, 1982	SN, MT	0+	Coho fry were distributed between the confluence with the North Thompson River and a point approx. 400 m upstream of the hwy. crossing. Rearing appeared to be most concentrated over the lower 1 km but very little sampling was conducted over the next 2.5 km and the relative abundance is largely unknown.
				1+	Distribution and abundance patterns were similar to those given for 0+ fish.
	1982	Stewart et al, 1983	SN, MT	0+	Very low densities of fry occurred between the mouth and the hwy. crossing.
Lion Ck.	1981	Scott et al, 1982	SN, MT	0+	Fry were distributed throughout the lower 1.5 km of this stream and were most concentrated between the access road bridge and the CNR crossing.
				1+	Distribution and abundance were similar to those discussed for 0+ fish, although a higher utilization was made of the lower section of the stream.
Wire Cache Ck.	1982	Hutton et al, 1983	MT	0+ & 1+	Substantial numbers of reared fry and yearlings were caught over the lower 0.3 km of stream (n=2906) during the fall and again during the winter (n=198, total effort=18.0 trap hours), suggesting that this small stream is important both as a rearing area and as an overwintering area. It is believed that many of these fish were immigrants from upstream locations of the North Thompson drainage.
Raft R.	1981	Scott et al, 1982	MT, SN	0+	Coho fry were distributed from the mouth area to approx. 600 m upstream of the hwy. bridge. The areas of most concentrated rearing were located within the lower 1 km of river. As reported for Wire Cache Creek, it is believed that immigration of underyearling coho from the North Thompson River occurred.
			SN	1+	Distribution was similar to that given for fry but as no captures were made after May, it is possible that no summer rearing took place.

MT - Minnow Trap; SN - Seine; VI - Visual; EF - Electrofishing; DN - Dip Netting; AN - Angling; SK - Snorkeling; GN - Gill Netting

REARING DISTRIBUTIONS OF COHO JUVENILES

STREAM	YEAR	SOURCE	METHOD	TYPE OF JUVENILE	PARTICULARS OF REARING DISTRIBUTIONS
			FRASER R., N.B.C. and YUKON - Cont'd		
Clearwater R.	1982	Stewart et al, 1983	EF, SN	1+	Very low densities of yearlings were present between km 14 and 18, although certain margin areas contained substantial numbers.
Dunn Ck.	1982	Stewart et al, 1983	EF, ?	0+	Reared fry appeared in catches (at low densities) during fall surveys over the lower 2.5 km of stream.
				1+	Yearlings exhibited a similar pattern of distribution and abundance to that described for 0+ fish but, as catches dropped off in May, it seems likely that no summer rearing took place.
McTaggart Ck.	1982	Stewart et al, 1983	EF, ?	0+	Early summer fry densities were higher here than in other Joseph Creek tributaries. Specifics on distribution were not available but, as the entire stream contains suitable conditions for rearing, it is assumed that fry occur throughout.
Lemieux Ck.	1982	Stewart et al, 1983	EF, ?	0+ & 1+	Data suggest that fry rear throughout the anadromous section of stream but drop down into the lower reaches to overwinter.
Barriere R.	1982	Stewart et al, 1983	EF, ?	0+	Fry captures were made in survey areas from the North Thompson confluence to km 37 (not including North Barriere Lake). The highest densities were present in the lower 5 km of stream.
East Barriere R.	1982	Stewart et al, 1983	EF, ?	0+	Fry were present over the lower 5 km during June but, as effort did not extend beyond this area, upstream distribution and abundance is unknown.
	1982	Hutton et al, 1983	MT	unspecified	Limited catches of coho (n=14) were made between the confluence with the Barriere River and the outlet of East Barriere Lake.
Louis Ck.	1982	Hutton et al, 1983	MT	0+ & 1+	Fry and yearling coho were distributed between approx. km 13.5 and km 45, with the majority utilizing the upstream portion of this area (km 42-45). Although the survey failed to include the section of stream below km 13, the likelihood of substantial rearing activity is poor, due to high velocity and unsuitable substrate.
North Thompson R.	1981	Scott et al, 1982	MT, SN	0+	As effort was not continuous for each section throughout the study period, an accurate description of distribution is not practical. However, it appears that abundance was greatest towards the upper and lower ends of the survey area, which were, respectively, Raft River-Vavenby and Little Fort. The highest occurrances were just downriver from Vavenby.
				1+	Although captures were made at various sites throughout the study area, their early emigration (most captures were made in April and May) suggests that only limited summer rearing occurs among yearlings.

MT - Minnow Trap; SN - Seine; VI - Visual; EF - Electrofishing; DN - Dip Netting; AN - Angling; SK - Snorkeling; GN - Gill Netting

REARING DISTRIBUTIONS OF CHUM JUVENILES

STREAM	YEAR	SOURCE	METHOD	TYPE OF JUVENILE	PARTICULARS OF REARING DISTRIBUTIONS
NORTH COAST					
Kitimat R. (tribs.)	1980	Birch et al, 1981	MT, SN, EF	0+	Chum fry reared for a short period of time in the lower reaches of the following streams: Hirsch, Nalbeelah and Humphreys Creeks, and the Big Weedene River.
SOUTH COAST					
no information					
FRASER R., N.B.C. and YUKON					
no information					

MT - Minnow Trap; SN - Seine; VI - Visual; EF - Electrofishing; DN - Dip Netting; AN - Angling; SK - Snorkeling; GN - Gill Netting

REARING DISTRIBUTIONS OF SOCKEYE JUVENILES

STREAM	YEAR	SOURCE	METHOD	TYPE OF JUVENILE	PARTICULARS OF REARING DISTRIBUTIONS
NORTH COAST					
no information					
SOUTH COAST					
no information					
FRASER R., N.B.C. and YUKON					
Bowron R.	1980	Murray et al, 1981	SN	0+	A limited number of sockeye (n=8) were caught 0.5 km downstream from the outlet of Bowron Lake; these were believed to be strays from the lake-rearing population.
Quesnel R.	1980	Whelen et al, 1981	SN	0+	Although fry catches occurred at nearly all survey sites between Quesnel Forks and Quesnel Lake, virtually all captures were recorded from 2 sites located approx. 0.5 km upstream from the Likely Bridge, near the Quesnel Lake outlet.
Eagle R.	1981	Whelen et al, 1982	SN	0+	Virtually all rearing took place between the river mouth and the Camble Bridge crossing, although the most likely nursery area would be Shuswap Lake.
Salmon R.	1981	Whelen et al, 1982	SN	0+	The majority of underyearlings were found below Stephen Creek to the mouth. However, as very few captures were evident after early June and the obvious sockeye rearing area is Shuswap Lake (into which the Salmon River drains), it seems likely that few sockeye encountered were rearing. Two yearling sockeye captured may be indicators of residualization among small numbers of this stock.
South Thompson R.	1981	Whelen et al, 1982	SN	0+ & 1+	Most juveniles encountered were seined from the foreshore areas of Little Shuswap Lake (east end) and Shuswap Lake (west end).
Raft R.	1981	Scott et al, 1982	SN	0+	Virtually all captures were made between km 1.0 and the highway bridge, and were probably all migrants, rather than rearing fry. No yearlings were encountered.
North Thompson R.	1981	Scott et al, 1982	SN	0+	The majority of sockeye were caught between approx. Little Fort and Mann Creek, it is likely that many of these were rearing.
	1982	Stewart et al, 1983	EF?	0+	High smolt densities were encountered at points along the river from Barriere to the Vavenby area, suggesting that this section contains suitable rearing sites.
	1982	Hutton et al, 1983	MT	1+ ?	Twenty-one juveniles were caught in a shallow, still side-channel near Little Fort on January 7; these fish appeared to be overwintering yearlings.

MT - Minnow Trap; SN - Seine; VI - Visual; EF - Electrofishing; DN - Dip Netting; AN - Angling; SK - Snorkeling; GN - Gill Netting

REARING DISTRIBUTIONS OF PINK JUVENILES

STREAM	YEAR	SOURCE	METHOD	TYPE OF JUVENILE	PARTICULARS OF REARING DISTRIBUTIONS
NORTH COAST					
---------- no information ----------					
SOUTH COAST					
---------- no information ----------					
FRASER R., N.B.C. and YUKON					
---------- no information ----------					

MT - Minnow Trap; SN - Seine; VI - Visual; EF - Electrofishing; DN - Dip Netting; AN - Angling; SK - Snorkeling; GN - Gill Netting

Rearing Distributions of Juveniles during New Projects Studies

Juvenile salmon were captured and recorded using a variety of means -- minnow traps, seines, visual inspection, electrofishing, dipnetting, angling, snorkelling, gillnetting and combination of the above. These tables contain subjective notes on the habitat type, river location, degree of concentration and migratory roles for 0+ and 1+ juveniles. The "methods" column refers to observational methods rather than the overall strategy used to determine distribution (eg. mark-recapture). All kilometer values denote distances above the stream mouth unless otherwise indicated.

APPENDIX C-16

PHYSICAL CHARACTERISTICS OF PRIME SPAWNING AREAS Found During New Projects Studies

Although there were large amounts of data collected in the New Projects Studies describing the physical characteristics of salmon habitats, it was not approached consistently. Study purposes often differed, from focussing on spawning or rearing capability and from addressing actual versus potential (ie. inaccessible) capability. Data collection was also extremely inconsistent, both as to the number and type of habitat parameters recorded as well as the manner in which the numbers were derived.

There was considerable variability in the manner in which habitat descriptive factors were measured. Temperature could be either a spot check or range calculation from a thermograph. Substrate size was most inconsistent, in that definitions (fines, sand, small and large gravel, cobble and boulder) varied considerably. Gravel could be considered as substrate with diameters ranging up to 15 cm. Depth, velocity and gradient were more easily quantified, although velocity (meter or drifting leaf method) may refer to surface velocity rather than velocity over the redd.

In these tables, "prime" spawning areas are generally those which contained the greatest spawner densities or those with present use/access and the best potential or suitability for spawning.

PHYSICAL CHARACTERISTICS OF PRIME CHINOOK SPAWNING AREAS

STREAM	YEAR	SOURCE	TEMP. (°C) DURING SPAWNING $\bar{x}$	TEMP. (°C) DURING SPAWNING Range	$\bar{x}$ DEPTH (cm)	VELOCITY (cm/sec)	SUBSTRATE COMPOSITION[1] % (mm) Fines	Small Gravel	Large Gravel	Cobble	Boulder	SPAWNERS/m^2	COMMENTS
						NORTH COAST							
Kitlope R. - reach 2	1981	Rosberg et al, 1982	8.6	6.5-11.0	-	-	10 (0-2)	— 60 — (2-100)		— 30 — (>100)		-	substrate consists largely of marginally compacted large gravel and cobble
Gamsby R. - reach 1	1981	Rosberg et al, 1982	-	-	-	-	0	0	— 100 — (unk.->100)		0	-	
Tezwa R. - reach 2	1981	Rosberg et al, 1982	approx. 10.5	8.5-13.5	40-50	70-90	0	— 60 — (2-100)		40 (100-?)	0	-	
						SOUTH COAST							
Mussel Ck. - reach 4	1981	Fielden and Slaney, 1982	-	9.0-16.0	25	-	0	— 100 — (2->100)			0	-	
- reaches 2-4	1983	Whelen and Morgan, 1984	-	9.0-17.0	50-100	100-150 (at surface)	5-15 (0-1)	10-35 (1-40)	20-30 (40-100)	30 (100-300)	0-30 (>300)	$\bar{x}$ = 0.0936 max=0.112 (reach 2)	this area contained higher proportions of large gravel-cobble substrate than other surveyed reaches
Klinaklini R. - Link Ch.	1983	Whelen and Morgan, 1984	-	-	-	-	-	-	-	-	-	0.0034 (Link Ch.)	
- Dice Ck.			-	-	-	-	-	-	-	-	-	0.0081 (Dice Ck.)	
Ahnuhati R. - reach 4	1981	Fielden and Slaney, 1982	-	10.0-13.0*	-	-	-	-	-	most	-	-	
	1983	Whelen and Morgan, 1984	-	9.0-14.0	130	100 (at surface)	5 (0-1)	10 (1-40)	20 (40-100)	50 (100-300)	15 (>300)	0.0027	this reach and others are considerably underutilized, possibly due to competition with other salmonids for spawning/rearing habitat

[1] figures within brackets indicate the range in diameter assigned to each substrate category
- where figures are absent source report has not provided a breakout in substrate sizes

* spot temperatures

PHYSICAL CHARACTERISTICS OF PRIME CHINOOK SPAWNING AREAS

STREAM	YEAR	SOURCE	TEMP.(°C) DURING SPAWNING $\bar{x}$	Range	$\bar{x}$ DEPTH (cm)	VELOCITY (cm/sec)	SUBSTRATE COMPOSITION[1] % (mm) Fines	Small Gravel	Large Gravel	Cobble	Boulder	SPAWNERS/m²	COMMENTS
SOUTH COAST - Cont'd													
Sucwoa R. - sections 9-13	1978	Glova and McCart, 1979	-	-	34-61	-	0-15 (<5)	—0-100— —(5-70)—		0-90 (80-290)	0 (>300)	-	
Nitinat R. - sections 13-14	1979	McCart et al, 1980	-	6.5-16.0	43	30	0 (<5)	— 40 — —(5-70)—		45 (80-290)	15 (<300)	-	
Little Qualicum R. - section 5c	1978	Lister, 1979	-	-	-	-	5 (0-2)	—45— (2-100)		—40— (>100)		-	bedrock comprised the remaining 5% of the substrate
FRASER R., N.B.C. and YUKON													
Holmes R. - reach 2	1981	Rosberg and Aitken, 1982	approx. 11.0	7.0-15.5	-	-	0 (0-2)	—30— (2-100)		—70— (>100)		-	the gradient ranged from 0.5-1.0% over the spawning area
Morkill R. - reach 5	1981	Rosberg and Aitken, 1982	-	6.0-14.5+	-	-	10 (0-2)	—30— (2-100)		—60— (>100)		-	gradient = 0.5%
Torpy R. - reach 3	1981	Rosberg and Aitken, 1982	approx. 15.0	10.5-20.0	-	-	30 (0-2)	—70— (2-100)		—0— (>100)		-	gradient = 0.2%
Walker Ck. - reach 1	1981	Rosberg and Aitken, 1982	approx. 12.0	11.5-17.0	-	-	20 (0-2)	—80— (2-100)		—0— (>100)		-	gradient = 0.5%
Slim Ck. - area 7	1980[2]	Murray et al, 1981	-	-	-	-	0.5 (0-2)	34.1 (2-16)	57.5 (16-64)	7.9 (64-254)	0 (>254)	-	
- reach 6	1981	Rosberg and Aitken, 1982	approx. 12.0	7.0-15.0+	-	-	10 (0-2)	—60— (2-100)		—30— (>100)		-	gradient = 0.1%

[1] figures within brackets indicate the range in diameter assigned to each substrate category
- where figures are absent source report has not provided a breakout in substrate sizes

[2] gravel composition measured for redds only

PHYSICAL CHARACTERISTICS OF PRIME CHINOOK SPAWNING AREAS

STREAM	YEAR	SOURCE	TEMP.(°C) DURING SPAWNING $\bar{x}$	Range	$\bar{x}$ DEPTH (cm)	VELOCITY (cm/sec)	SUBSTRATE COMPOSITION[1] % (mm) Fines	Small Gravel	Large Gravel	Cobble	Boulder	SPAWNERS/m^2	COMMENTS
							FRASER R., N.B.C. and YUKON - Cont'd						
Bowron R. - area 4	1980[2]	Murray et al, 1981	-	-	-	-	5.0 (0-2)	25.5 (2-16)	58.2 (16-64)	11.3 (64-254)	0 (>254)	-	
Wansa Ck. - area 4	1980[2]	Murray et al, 1981	-	-	-	-	0.75 (0-2)	88.7 (2-64)		10.5 (>64)		-	
Stuart R. - Dog Ck. area	1980	Hickey and Lister, 1981	-	<12.0->16.5	150	50-100	25 (0-10)	50 (10-150)		25 (>150)		0.017	
Nechako R. - section 3	1979	Olmsted et al, 1980	0	13.0-16.0	100	see comments						-	this section characterized by intermediate velocity and abundant gravels >10 cm in diameter
West Road R. - section 2	1980	Olmsted et al, 1981	-	13.5 (spot temp. taken Sept. 9)	150	-	5	90		5		<0.0001	flow pattern primarily riffle-type
Nazko R.	1980	Olmsted et al, 1981	-	14.0 (spot temp. taken Aug. 29)	100	-	0 (0-2)	100 (2-150)		0 (>150)		0.0002	riffles are predominant flow-type
Cottonwood R. - section 1	1980	Olmsted et al, 1981	-	<10.0->12.0	150	-	5 (0-2)	90 (2-150)		5 (>150)		0.0010	riffles are predominant flow-type
Horsefly R. - sections 2 & 3	1979	Olmsted et al, 1980	-	-	approx. 100	see comments	-	-	-	-	-	-	flows are of "intermediate" velocity and gravels <10 cm in diameter are abundant.
	1980	Olmsted et al, 1981	approx. 12.0	11.5-12.0	200	-	10 (0-2)	90 (2-150)		0 (>150)		0.010	riffles are predominant flow-type

[1] figures within brackets indicate the range in diameter assigned to each substrate category
- where figures are absent source report has not provided a breakout in substrate sizes

[2] gravel composition measured for redds only

PHYSICAL CHARACTERISTICS OF PRIME CHINOOK SPAWNING AREAS

STREAM	YEAR	SOURCE	TEMP.(°C) DURING SPAWNING $\bar{x}$	TEMP.(°C) DURING SPAWNING Range	$\bar{x}$ DEPTH (cm)	VELOCITY (cm/sec)	SUBSTRATE COMPOSITION[1] % (mm) Fines	Small Gravel	Large Gravel	Cobble	Boulder	SPAWNERS/m^2	COMMENTS
FRASER R., N.B.C. and YUKON - Cont'd													
McKinley Ck. - section 3	1980	Olmsted et al, 1981	approx. 15.5	approx. 15.0-16.0	150	-	5 (0-2)	90 (2-150)		5 (>150)		approx. 0.006	riffles are predominant flow-type
Quesnel R.	1979	Olmsted et al, 1980	approx. 14.0	12.5-15.0	approx. 150-200	see comments						-	flows are intermediate to fast and substrates are variable (mostly <10 cm in section 1 & sand/gravel/boulder in section 4)
	1980	Olmsted et al, 1981	13.0	11.0-14.0	100-1000+	-	30 (0-2)	30 (2-150)		20 (>150)		0.086	20% of the substrate was composed of bedrock; flow character was 50% pool and 50% run
Eagle R. - section 7	1981	Whelen and Olmsted, 1982	-	10.5-18.0	38	-	10	60		30		0.202	gravels between 50 and 150mm in diameter were preferred
Salmon R. - section 8	1981	Whelen and Olmsted, 1982	-	<7.0-21.0	100	-	79	19		2		0.032	gravels from 10-75mm in diameter were utilized due to lack of larger substrates
Adams R. (lower) -section 4	1981	Whelen and Olmsted, 1982	20.0	10.0-20.0	300	-	0	30		70		0.0045	gravels between 10 and 200mm in diameter were utilized, runs are predominant flow type
South Thompson R. - section 5	1981	Whelen and Olmsted, 1982	approx. 15.0	8.0-21.0	1000+[2]	-	10	80		10		0.090	gravels between 10 and 150mm in diameter were utilized
- section 6			approx. 15.0	8.0-21.0	3000+[2]	-	85	10		5		0.255	gravels between 50 and 150mm in diameter were utilized
Finn Ck. - section 2	1981	Scott et al, 1982	12.5	9.0-16.5	40	-	5	15		55	25	0.060	moderate flows and gravels between 50 & 150mm in diam. preferred
Raft R. - section 2	1981	Scott et al, 1982	13.5	11.0-18.5	70	-	25	65		5	5	0.0225	moderate flows and gravels between 50 & 150mm in diameter were preferred
North Thompson R. - section 2	1981	Scott et al, 1982	-	-	200	-	30	60		10	0	0.0024	flow is entirely run-type

[1] figures within brackets indicate the range in diameter assigned to each substrate category
- where figures are absent source report has not provided a breakout in substrate sizes

[2] Maximum depth.

PHYSICAL CHARACTERISTICS OF PRIME COHO SPAWNING AREAS

STREAM	YEAR	SOURCE	TEMP. (°C) DURING SPAWNING $\bar{x}$	Range	$\bar{x}$ DEPTH (cm)	VELOCITY (cm/sec)	SUBSTRATE COMPOSITION[1] % (mm) Fines	Small Gravel	Large Gravel	Cobble	Boulder	SPAWNERS/m^2	COMMENTS
NORTH COAST													
Mathers Ck. - section 11-12	1978	Glova et al, 1979	-	approx. 5.0-11.5	<100	-	10 (0-5)	—90— (5-70)		0 (80-290)	0 (>300)	-	spawning was conducted in flows of moderate velocity; substrate scoured to 25cm depth during spawning
Gamsby R. - reach 1	1981	Rosberg et al, 1982	-	-	-	-	-	-	— most —		-	-	pool/riffle ratio was 1:19
Kowesas R. - reach 2	1981	Rosberg et al, 1982	<6.0	-	-	-	-	-	-	-	-	-	areas containing suitable spawning gravel were intermittent and well-utilized; gradients range from 2-5%
Tsaytis R. - reach 2	1981	Rosberg et al, 1982	-	-	-	-	-	-	— most —		-	-	spawning occurred in deep water and substrates of mixed gravel & cobble, typically in close proximity to groundwater inflow points; gradient = <5%
SOUTH COAST													
Glendale/Tom Browne Cks.	1983	Whelen and Morgan, 1984	-	-	-	-	-	-	-	-	-	-	although there exists 55100m^2 of potential habitat and past escapements have averaged 2400 fish (@0.0436 fish/m^2), no fish were observed in 1983, likely due to displacement by large numbers of pinks

[1] figures within brackets indicate the range in diameter assigned to each substrate category
- where figures are absent source report has not provided a breakout in substrate sizes

PHYSICAL CHARACTERISTICS OF PRIME COHO SPAWNING AREAS

STREAM	YEAR	SOURCE	TEMP. (°C) DURING SPAWNING x̄	Range	x̄ DEPTH (cm)	VELOCITY (cm/sec)	SUBSTRATE COMPOSITION[1] % (mm) Fines	Small Gravel	Large Gravel	Cobble	Boulder	SPAWNERS/m²	COMMENTS
SOUTH COAST - Cont'd													
Mussel Ck. - reach 7	1983	Whelen and Morgan, 1984	-	<9.0-10.0	50	70 (at surface)	25 (0-1)	25 (0-40)	30 (40-100)	15 (100-300)	5 (>300)	0.0560	this section contained the highest proportion of riffle flow (50%) and side channel area.
Klinaklini R. - Link Channel	1983	Whelen and Morgan, 1984	-	<3.5-6.0	70	50 (at surface)	25 (0-1)	15 (1-40)	25 (40-100)	35 (100-300)	<2 (>300)	0.0333	spawning density was near optimum
- Dice Creek			-	-	40	70 (at surface)	10 (0-1)	40 (1-40)	30 (40-100)	20 (100-300)	>2 (>300)	0.0091	spawning density was approx. 30% of optimum
Ahnuhati R. - reach 6	1983	Whelen and Morgan, 1984	-	-	100	70 (at surface)	10 (0-1)	30 (1-40)	35 (40-100)	25 (100-300)	>5 (>300)	-	although spawning had not begun by project termination, potential was greatest of any reach & holding fish were abundant
FRASER R., N.B.C. and YUKON													
Eagle R. - section 13	1982	Whelen et al, 1983[2]	3.8	2.0-5.0	30	50	10	35	30	20	5	0.0726	spawner density at 90% of optimum
Salmon R. - section 8	1982	Whelen et al, 1983[2]	1.6	0.0-6.0	50	40	50	15	30	<5	>1	0.0340	spawner density at 67% of optimum
Adams R. (lower) - section 5	1982	Whelen et al, 1983[2]	5.5	4.5-7.0	400	-	0	10	30	20	10	0.0004	utilization was low, however, suitable habitat was more extensive than in other sections

[1] figures within brackets indicate the range in diameter assigned to each substrate category
- where figures are absent source report has not provided a breakout in substrate sizes

[2] Assume Whelen and Morgan (1984) substrate sizes.

PHYSICAL CHARACTERISTICS OF PRIME COHO SPAWNING AREAS

STREAM	YEAR	SOURCE	TEMP.(°C) DURING SPAWNING $\bar{x}$	TEMP.(°C) DURING SPAWNING Range	$\bar{x}$ DEPTH (cm)	VELOCITY (cm/sec)	SUBSTRATE COMPOSITION[1] % (mm) Fines	Small Gravel	Large Gravel	Cobble	Boulder	SPAWNERS/m^2	COMMENTS
							FRASER R., N.B.C. and YUKON - Cont'd						
Adams R. (upper) - Cayenne Ck.	1982	Whelen et al, 1983[2]	1.5	-	50	80	30	40	25	5	0	0.050	density of spawners was twice that of optimum
Albreda R. - reach 2	1982	Hutton et al, 1983	-	approx. 0.5-1.0	-	-	see comments					-	100% of substrate under cobble size
Lion Ck. - reach 2	1982	Hutton et al, 1983	-	approx. 3.5-10.0	50	-	see comments					-	substrate is mainly gravels with lesser proportions of fines and cobbles
Wire Cache Ck. - lower 300 m	1982	Hutton et al, 1983	-	> 0.0	50	0	100 (0-40)		0	0	0	-	
Lemieux Ck. - reach 3B	1982	Hutton et al, 1983	-	0.00-2.0	30	-	see comments					-	substrate consists of fines, gravels and smaller cobble, in varying proportions
Barriere R. - reach 1	1982	Hutton et al, 1983	-	2.0-3.0+	-	-	see comments					-	substrate is mainly fines along shorelines, tending to coarser material (gravel-boulder) towards mid-stream; flows are slow & depth is great
Louis Ck. - reach 1	1982	Hutton et al, 1983	-	2.0 -approx. 9.0	-	-	see comments					-	substrate consists of suitable gravel interspersed by areas of fines
Coldwater R.	1982	Whelen et al, 1983[2]	1.0	0.0 - 2.0	40	50	<5	25	40	30	<5	0.0045	spawner density was 17% of optimum

[1] figures within brackets indicate the range in diameter assigned to each substrate category
- where figures are absent source report has not provided a breakout in substrate sizes

[2] Assume Whelen and Morgan (1984) substrate sizes.

PHYSICAL CHARACTERISTICS OF PRIME CHUM SPAWNING AREAS

STREAM	YEAR	SOURCE	TEMP.(°C) DURING SPAWNING $\bar{x}$	Range	$\bar{x}$ DEPTH (cm)	VELOCITY (cm/sec)	SUBSTRATE COMPOSITION[1] % (mm) Fines	Small Gravel	Large Gravel	Cobble	Boulder	SPAWNERS/m²	COMMENTS
							NORTH COAST						
Mathers Ck. - section 10-11	1978	Glova et al, 1979	-	9.5 - 14.5	≤ 100	-	30 (0-5)	70 (5-70)		0 (80-290)	0 (>300)	-	many pools and short glides of moderate velocity are present
Kitlope R. - reach 2	1981	Rosberg et al, 1982	approx. 8.0	7.0-9.0	<50	-	10 (0-2)	60 (2-100)		30 (>100)		-	spawning occurred in side channels partially fed by tributary streams
Kemano R. - reach 2	1979[2]	Murray and Hamilton, 1981	-	8.0-14.0	-	-	5.5 (0-2)	12.1 (2-20)	70.6 (20-64)	11.8 (>64)		-	approx. 30% of available habitat was utilized
Kwatna R.	1983	Rice, 1984	approx. 9.5	5.0-12.5	-	-	20 (0-2)	70 (2-64)		10 (> 64)		-	stream channlized; many mid-stream bars present; x gradient = 0.1%; flow mainly riffle/glide.
Oak-Beck Ck.	1983	Rice, 1984	-	-	-	-	10 (0-2)	90 (2-64)		0 (> 64)		-	flow character pool/riffle; gradient approx. 0.05%.
Quatlena R.	1983	Rice, 1984	approx. 11.0	8.0-16.5	-	-	20 (0-2)	70 (2-64)		10 (> 64)		-	this area tidally influenced; gradient = 0.5%; mainly riffle/glide mainly pool/glide.
Nootum R.	1983	Rice, 1984	approx. 8.5	5.0-13.0			10 (0-2)	40 (2-64)		50 (> 64)		-	lower portion of area is tidal; gradient approx. 1.0; flow character mainly pool/glide.
							SOUTH COAST						
Kakweiken R. - section 10	1981	Slaney and Milko, 1982	-	approx. 7.0-12.0	-	-	100 (0-75)			0	0	-	this is a low gradient area consisting of a series of long shallow glides running between pools

[1] figures within brackets indicate the range in diameter assigned to each substrate category
- where figures are absent source report has not provided a breakout in substrate sizes

[2] gravel composition measured for redds only

PHYSICAL CHARACTERISTICS OF PRIME CHUM SPAWNING AREAS

STREAM	YEAR	SOURCE	TEMP.(°C) DURING SPAWNING x̄	Range	x̄ DEPTH (cm)	VELOCITY (cm/sec)	SUBSTRATE COMPOSITION[1] % (mm) Fines	Small Gravel	Large Gravel	Cobble	Boulder	SPAWNERS/m^2	COMMENTS
SOUTH COAST - Cont'd													
Tom Browne Ck. - reach 2	1983	Whelen and Morgan, 1984	-	<8.0-15.0	30	50 (at surface)	10 (0-5)	25 (1-40)	30 (40-100)	30 (100-300)	5 (>300)	0.1772	habitat was apparently over-utilized
Mussel Ck. - reach 2	1981	Fielden and Slaney, 1982	-	<7.5-12.0	50	-	-	-	-	-	-	-	substrate described as gravel; flows swift; gradient 2%
- reach 2	1983	Whelen and Morgan, 1984	-	approx. 8.0-11.0	100	100 (at surface)	5 (0-1)	35 (1-40)	35 (40-100)	30 (100-300)	0 (>300)	approx. 0.040	
Kilnaklini R. - Link Channel	1983	Whelen and Morgan, 1984	-	3.0-6.0	70	50 (at surface)	25 (0-1)	15 (1-40)	25 (40-100)	35 (100-300)	>2 (>300)	0.0294	optimal density is likely much higher than that observed
Ahnuhati R. - reach 2a & 2b	1981	Fielden and Slaney, 1982	approx. 11.0	10.0-13.0	approx. 100	-	-	-	-	-	-	-	areas of glide and riffle flow contain mainly gravel/cobble, while fines predominate in deeper pools.
- reach 3	1983	Whelen and Morgan, 1984	[illegible]	9.0-14.0	100	150 (at surface)	5 (0-1)	10 (1-40)	20 (40-100)	30 (100-300)	35 (>300)	0.1780	
- reach 2c			-	9.0-14.0	80	80 (at surface)	5 (0-1)	30 (1-40)	40 (40-100)	20 (100-300)	5 (>300)	0.1571	
Sucwoa R. - sections 6-8 & 9-12	1978	Giova and McCart, 1979	-	8.5-14.5	>50	30-50	-	-	-	-	-	-	medium-sized gravels <100mm in diameter were preferred

[1] figures within brackets indicate the range in diameter assigned to each substrate category
- where figures are absent source report has not provided a breakout in substrate sizes

PHYSICAL CHARACTERISTICS OF PRIME CHUM SPAWNING AREAS

STREAM	YEAR	SOURCE	TEMP.(°C) DURING SPAWNING		$\bar{x}$ DEPTH (cm)	VELOCITY (cm/sec)	SUBSTRATE COMPOSITION[1] % (mm)					SPAWNERS/m²	COMMENTS
			$\bar{x}$	Range			Fines	Small Gravel	Large Gravel	Cobble	Boulder		
						SOUTH COAST - Cont'd							
Canton Ck. - four locations within sections 2-7	1978	Giova and McCart, 1979	-	2.0-14.0	-	-	-	-	-	-	-	-	preferred locations exhibited a glide/riffle flow, intermediate velocity and depth and medium-sized gravels
Conuma R. - several locations in sections 3-7	1978	Giova and McCart, 1979	-	approx. 10.5-12.0	- -	- -	- -	- -	- -	- -	- -	- -	riffle areas with gravel bottoms and intermediate velocities and depths were preferred
Tlupana R. - sections 5 & 7-13	1978	Giova and McCart, 1979	-	approx. 9.0-12.5	-	-	-	-	-	-	-	-	gradients are slight and suitable spawning gravels abundant in these sections
Deserted Ck. - accessible portion	1978	Giova and McCart, 1979	-	2.5-16.0	<30	-	-	-	-	-	-	-	a portion of the spawning area is intertidal
Little Qualicum R. - section 1	1978	Lister, 1979	-	4.0-10.0	-	-	10-20 (0-2)	50-70 (2-100)		20-25 (>100)		2.0-2.6	maximum density occurred in section 4, where 8.6 fish/m² spawned

[1] figures within brackets indicate the range in diameter assigned to each substrate category

- where figures are absent source report has not provided a breakout in substrate sizes

PHYSICAL CHARACTERISTICS OF PRIME SOCKEYE SPAWNING AREAS

STREAM	YEAR	SOURCE	TEMP.(°C) DURING SPAWNING $\bar{x}$	Range	$\bar{x}$ DEPTH (cm)	VELOCITY (cm/sec)	SUBSTRATE COMPOSITION[1] % (mm) Fines	Small Gravel	Large Gravel	Cobble	Boulder	SPAWNERS/m²	COMMENTS
NORTH COAST													
Tezwa R. - reach 2	1981	Rosberg et al, 1982	approx. 9.5	7.0-12.5	-	-	10 (0-2)	20 (2-100)		80 (>100)		-	substrate is free of silt
Kalitan Ck. - reach 1	1981	Rosberg et al, 1982	-	-	-	-	10 (0-2)	20 (2-100)		80 (>100)		-	pool/riffle ratio = 1:1.5
Kwatna R.	1983	Rice, 1984	approx. 6.5	4.0-8.5	-	-	20 (0-2)	70 (2-64)		10 (> 64)		-	stream channelized; many mid stream bars; $\bar{x}$ gradient = 0.1%; flow character predominantly riffle/glide.
SOUTH COAST													
Kakweiken R. - reach 9₄	1981	Slaney and Milko, 1982	-	approx. 11.0-15.0	-	-	-	-	-	-	-	-	this 600m area consists of a series of narrow, shallow glides and fast, shallow riffles
Mussel Ck. - reach 4	1983	Whelen and Morgan, 1984	-	approx. 10.0-14.0	50	100 (at surface)	15 (0-1)	20 (1-40)	30 (40-100)	30 (100-300)	5 (>300)	-	
FRASER R., N.B.C. and YUKON													
Adams R. - section 3	1981	Whelen and Olmsted, 1982	-	approx. 10.0-12.0	250[2]	-	0	40		60		-	
South Thompson R. - Little R.	1981	Whelen and Olmsted, 1982	-	8.0-17.0	3000+[2]	-	0	40		60		-	flows are moderate to fast
Raft R. - sections 1 & 2	1981	Scott et al, 1982	-	11.5 - approx. 15.0	50-70	-	25	65		5-10	0-5	-	

[1] figures within brackets indicate the range in diameter assigned to each substrate category
- where figures are absent source report has not provided a breakout in substrate sizes

[2] these figures are suspect

PHYSICAL CHARACTERISTICS OF PRIME PINK SPAWNING AREAS

STREAM	YEAR	SOURCE	TEMP. (°C) DURING SPAWNING $\bar{x}$	TEMP. (°C) DURING SPAWNING Range	$\bar{x}$ DEPTH (cm)	VELOCITY (cm/sec)	SUBSTRATE COMPOSITION[1] % (mm) Fines	Small Gravel	Large Gravel	Cobble	Boulder	SPAWNERS/m[2]	COMMENTS
NORTH COAST													
Mathers Ck. - sections 9-11 & 1-6	1978	Glova et al, 1979	-	9.5 - 14.5	-	-	-	-	-	-	-	-	preferred substrates were <50mm in diameter
Fukawa Ck. - section 16-17	1978	Glova et al, 1979	-	<7.0->9.0	-	-	90	10		0	0	-	preferred substrates were <50mm in diameter
Kwatna R.	1983	Rice, 1984	approx. 8.5	5.0-11.5	-	-	20 (0-2)	30-70 (2-64)		10-50 (> 64)		-	flow character predominantly riffle/glide; gradient = 0.05 - 0.1%.
Gus Ck.	1983	Rice, 1984	<10.0	<9.0-12.5	-	-	10 (0.2)	80 (2-64)		10 (> 64)		-	flow character is pool/riffle; gradient = 0.5%.
Oak-Beck Ck.	1983	Rice, 1984	-	-	-	-	10 (0-2)	90 (2-64)		0 (> 64)		-	flow consists maily of riffle; gradient = 0.5%.
Siousiska Ck.	1983	Rice, 1984	approx. 10.0	>6.5-13.0	-	-	20 (0-2)	80 (2-64)		0 (> 64)		-	flow character mainly riffle/pool; gradient = 0.5%
Glacier Ck.	1983	Rice, 1984	-	-	-	-	10 (0-2)	30 (2-64)		60 (> 64)		-	flow consists of riffle and rapids; gradient = 0.5%
Quatlena R.	1983	Rice, 1984	approx. 9.5	6.0-16.5	-	-	20 (0.2)	70 (2-64)		10 (> 64)		-	flow is mainly riffle/glide; gradient = 0.5%.
Nootum R.	1983	Rice, 1984	approx. 8.5	5.0-14.5	-	-	10 (0-2)	40 (2-64)		50 (>64)		-	flow is predominantly pool/glide; gradient is 1.0%
SOUTH COAST													
Glendale Ck. - reaches 3-6	1983	Whelen and Morgan, 1984	-	8.0-21.5	40-70	30-80 (at surface)	x=23 range= 5-75 (0-1)	x=24 range= 5-75 (1-40)	x=20 range= 5-35 (40-100)	x=25 range= 5-35 (100-300)	x=9 range= <1-25 (>300)	x=6.882 range= 5.558-8.170	these reaches were over-utilized and redd super-imposition was observed

[1] figures within brackets indicate the range in diameter assigned to each substrate category

[2] this figure is highly suspect

PHYSICAL CHARACTERISTICS OF PRIME PINK SPAWNING AREAS

STREAM	YEAR	SOURCE	TEMP. (°C) DURING SPAWNING $\bar{x}$	TEMP. (°C) DURING SPAWNING Range	$\bar{x}$ DEPTH (cm)	VELOCITY (cm/sec)	SUBSTRATE COMPOSITION[1] % (mm) Fines	Small Gravel	Large Gravel	Cobble	Boulder	SPAWNERS/m²	COMMENTS
SOUTH COAST - Cont'd													
Tom Browne Ck. - reach 1	1983	Whelen and Morgan, 1984	-	-	40	40-60 (at surface)	10 (0-1)	30 (1-40)	45 (40-100)	15 (100-300)	<1 (<300)	3.459	spawning areas were over-utilized
- reach 2			-	-	30	50 (at surface)	10 (0-1)	25 (1-40)	30 (40-100)	30 (100-300)	5 (<300)	5.400	spawning areas were over-utilized
Ahnuhati R. - reach 2	1981	Fielden and Slaney, 1982	10.3	10.0-13.0	-	-	-	-	-	-	-	-	spawning was conducted along long, shallow glides; much of the substrate is composed of gravel and cobble
- reach 3	1983	Whelen and Morgan, 1984	-	6.5-14.0	100	150 (at surface)	5 (0-1)	10 (1-40)	20 (40-100)	30 (100-300)	35 (>300)	0.3864	combined pink and chum spawner densities approached the optimum level
- reach 2c	1983	Whelen and Morgan, 1984	-	6.5-14.0	80	80 (at surface)	5 (0-1)	30 (1-40)	40 (40-100)	20 (100-300)	5 (<300)	0.2107	combined pink and chum spawner densities approached the optimum level
FRASER R., N.B.C. and YUKON													
South Thompson R. - section 4	1981	Whelen and Olmsted, 1982	-	8.0?-17.0	500+[2]	-	5	90		5		-	

[1] figures within brackets indicate the range in diameter assigned to each substrate category
[2] this figure is highly suspect

NOTES TO ACCOMPANY PHYSICAL CHARACTERISTICS OF PRIME SPAWNING AREAS TABLE

1. "Prime" spawning areas are generally those which contained the greatest spawner densities or those with present use/access and the best potential or suitability for spawning.

APPENDIX C-17

PHYSICAL CHARACTERISTICS OF PRIME REARING AREAS Found During New Projects Studies

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See APPENDIX C-16. Values for depth, velocity and fry density were derived from sampling methods that varied considerably between and within New Projects studies. In addition, these values were developed as an average or mode of conditions for a stream section or reach, rather than on a microhabitat basis. Physical characteristics of the habitats consists mostly of subjective descriptions of macrohabitat. The reader is advised that as sampling methods varied considerably, the fry per square meter figures should be treated simply as a general indicator of fry density.

PHYSICAL CHARACTERISTICS OF PRIME CHINOOK REARING AREAS

STREAM	YEAR	SOURCE	TYPE OF JUVENILE	MACRO HABITAT DESCRIPTION	DEPTH (cm)	FLOW (cm/sec)	DOMINANT SUBSTRATE	TYPES OF COVER	FRY/m^2
				NORTH COAST					
Morice R.	1979[1]	Smith and Berezay, 1983	0+	various	various	"slow"	logs/debris	-	-
Kitimat R. (tribs.)	1980[2]	Birch et al, 1981	0+	deep pools "associated with current" and unspecified overhanging cover	-	-	-	-	-
				SOUTH COAST					
				———— no information ————					
				FRASER R., N.B.C. and YUKON					
Fraser R. (mainstem)	1981	Rosberg et al, 1982	0+	various, including backwaters, side channels, shoreline debris accumulations -the river meanders and has a low velocity.	-	-	-	high turbidity as a form of cover	-
Holmes R.	1981	Rosberg et al, 1982	0+	-backwater areas, frequently associated with extensive debris dams.	-	-	-	-	-
Morkill R.	1981	Rosberg et al, 1982	0+	-although not considered as preferred habitat, river margins and slow flowing sections along the inside of meanders were utilized by the majority of rearing fry, as more suitable conditions were, at best, transient with water level. -gradient averages 0.1% -flow character often swirling	- -	-	fines	-	-
Torpy R.	1981	Rosberg et al, 1982	0+	-slow flow areas, undercut banks and debris accumulations preferred rearing sites.	-	-	usually small gravel or fines		-
Slim Ck.	1981	Rosberg et al, 1982	0+	-generally, backwater areas, beaver ponds and lakeshore habitats were preferred; Slim Lake constituted a major rearing area.	-	nil - slow	-	-	-
Bowron R. (tribs.)	1980	Murray et al, 1981	0+	-until July areas with dense cover, sand and gravel substrate and run/riffle/pool flow, were preferred after which areas exhibiting larger substrates appeared to be preferred.	-	-	-	-	-

1 Highest mean catches of fry occurred in differing habitats, depending on the sampling period; the information given in the table depicts overall trends and, where information is not given, no trends were evident.

2 Describes the preferred habitat of summer fry in Cecil and Hirsch Creeks and represents a change from that which was preferred in the spring. Spring habitats were not described, however.

PHYSICAL CHARACTERISTICS OF PRIME CHINOOK REARING AREAS

STREAM	YEAR	SOURCE	TYPE OF JUVENILE	MACRO HABITAT DESCRIPTION	DEPTH (cm)	FLOW (cm/sec)	DOMINANT SUBSTRATE	TYPES OF COVER	FRY/m^2
				FRASER R., N.B.C. and YUKON - Cont'd					
Stuart R.	1980	Lister et al, 1981	0+	-highest fry densities occurred in areas of gently sloping or level substrate with slow to moderately-flowing current (mainstem)[3,4]	60 - 100	0 - 50	-	-	max = 0.012
Nechako R.	1979	Olmsted et al, 1980	0+	-concentrations of fry were typically found in backwaters or areas with sluggish flow	< 100	nil - slow	generally fines and/or small gravel	high canopy cover, ie. deciduous trees.	
Swanson Ck.	1979	Olmsted et al, 1980	0+	-	<50	moderate - fast	cobble	mixed deciduous and coniferous trees	-
Horsefly R.	1979	Olmsted et al, 1980	0+	slow riffle and pool areas were preferred.	approx 100	nil - slow	sand/gravel	low alder/willow.	
Quesnel R.	1979	Olmsted et al, 1980	0+	-	1000	approx 100	boulder/mud	grasses/alder	-
	1980	Whelen et al, 1981	0+	-riffle is the predominating flow type	200	fast	gravel	alder/willow	-
Middle Shuswap R.	1983	Fee and Jong, 1984	un-specified	-habitat preference appeared to be linked with discharge; with moderate to high water level and turbidity, sidechannels with velocities not exceeding 30 cm/sec. were most-utilized. As levels dropped, deepwater habitats associated with log debris were preferred, the larger and more complex the debris site and the greater the velocity, the higher the density of juveniles become.	-	moderate - fast	gravel	log debris & over stream vegetation	-[5]
Bessette Ck. System	1983	Fee and Jong, 1984	un-specified	primary rearing locations were situated in relatively deep pool/glide habitats with low velocity and good cover.	-	slow	gravel	log/cutbank	0.18-0.61 g/m^2
Trinity Ck.	1982	Sebastian, 1983	0+	the area most suitable for rearing exhibits low gradient (0.5%), shallow riffles and glides and some channelization.	-	-	gravel	log debris, overstream vegetation	-
Eagle R.	1981	Whelen et al, 1982	0+	prime rearing areas have predominantly a run-type flow character.	$\bar{x}$ = 65-180	-	gravel	overhanging vegetation	-

[3] Accompanying parameters are representative of the sampling station with the highest overall fry density/m^2. However, the number of fry/m^2 is indicative only of the highest daily catch.
[4] It should be noted that tributary streams often contained much higher densities of fry than the mainstem but macro-habitat characteristics were not explained. The most notable of these were Creek A, Welch Creek and Kee Creek, whose respective peak (site-specific) fry densities were: 0.082/m^2, 0.046/m^2 and 0.043/m^2.
[5] The report lists only an estimate of abundance for the whole anadromous length of stream; this figure is 1.0-7.0g/m^2 of Σ 0+ and 1+ fish biomass.

PHYSICAL CHARACTERISTICS OF PRIME CHINOOK REARING AREAS

STREAM	YEAR	SOURCE	TYPE OF JUVENILE	MACRO HABITAT DESCRIPTION	DEPTH (cm)	FLOW (cm/sec)	DOMINANT SUBSTRATE	TYPES OF COVER	FRY/m^2
				FRASER R., N.B.C. and YUKON - Cont'd					
Crazy Ck.	1982	Sebastian, 1983	0+	the area contains a riffle/glide flow, and a gradient described as low (4%)	-	-	gravel/cobble	overstream vegetations & log debris	-
Perry R.	1982	Sebastian, 1983	0+	rearing fish are restricted to a small side-channel area and to stream margins.	-	100	gravel/cobble	log debris and boulders	-
Salmon R.	1981	Whelen et al, 1982	0+	flow character is riffle/run, often in or near debris accumulations.	$\bar{x}$ = 75-100	-	gravel	chiefly overhanging vegetation	-
Seymour R.	1982	Sebastian, 1983	0+	primary rearing areas were typically located in side channels, often in association with log debris in low gradient situations.	-	<40	gravel	log debris	-
Adams R.	1981	Whelen et al, 1982	0+	flow character is predominantly run	400	-	gravel	overhanging vegetation and high canopy	-
South Thompson R.	1981	Whelen et al, 1982	0+	lake foreshore	-	nil	fines	some canopy	-
Blue R.	1981	Scott et al, 1982	0+ & 1+	flow type is predominantly run in the main channel, but rearing typically in backwaters and along margins of channel	50	-	gravel/cobble	overhanging vegetation	-
Finn Ck.	1981	Scott et al, 1982	0+	the predominating flow types were runs and riffles	30	-	gravel/cobble	overstream vegetation & log debris	-
	1982	Stewart et al, 1983	0+	suitable flows typically consisted of riffles	-	-	gravel/cobble	ovehanging vegetation	0-0.025
Lion Ck.	1981	Scott et al, 1982	0+	riffle-run flow.	30	-	gravel	overhanging vegetation	-
Raft R.	1981	Scott et al, 1982	0+	gradient moderate, flow velocity moderate, flow character run/riffle/pool.	70	-	gravel	overhanging vegetation & canopy; both extremely limited	-
	1982	Stewart et al, 1983	0+	see above	-	-	gravel/sand	cutbanks & log debris	0-0.036
Clearwater R.	1982	Stewart et al, 1983	0+	-	-	-	cobble/boulder	overstream vegetation & log debris	0-0.028

PHYSICAL CHARACTERISTICS OF PRIME CHINOOK REARING AREAS

STREAM	YEAR	SOURCE	TYPE OF JUVENILE	MACRO HABITAT DESCRIPTION	DEPTH (cm)	FLOW (cm/sec)	DOMINANT SUBSTRATE	TYPES OF COVER	FRY/m^2
				FRASER R., N.B.C. and YUKON - Cont'd					
North Thompson R.	1981	Scott et al, 1982	0+	flow character typically 100% run.	approx 200	-	gravel	various	-
			1+	as above.	200-250	-	gravel	very little	-
	1982	Stewart et al, 1983	0+	-	-	-	gravel	log debris & undercut banks	0-0.0224

PHYSICAL CHARACTERISTICS OF PRIME COHO REARING AREAS

STREAM	YEAR	SOURCE	TYPE OF JUVENILE	MACRO HABITAT DESCRIPTION	DEPTH (cm)	FLOW (cm/sec)	DOMINANT SUBSTRATE	TYPES OF COVER	FRY/m²
				NORTH COAST					
Kitimat R. & Tribs.	1980	Birch et al, 1981	0+	preferred areas were shallow side channels and pools.	shallow	slow	-	-	-
			1+	smolts typically were found in slow current situations, ie. backchannels or pools.	-	slow	-	overhanging veg. or instream debris	-
Kwatna R.	1983	Rice, 1984	un-specified	the majority of the juveniles encountered were situated in pools associated with root wads and debris jams	-	slow	-	instream debris	-
Gus Ck.	1983	Rice, 1984	un-specified	1 pool at the mouth of the stream contained most of the observed juveniles.	< 150	slow	-	log debris	-
				SOUTH COAST					
Oak-Beck Ck	1983	Rice, 1984	un-specified	suitable rearing was offered by extensive windfall, instream debris and overstream cover areas.	-	-	-	various	-
Glendale/Tom Browne Cks.	1983	Whelen and Morgan, 1984	0+ & 1+	pool habitat was preferred	-	-	-	-	-
Mussel Ck.	1983	Whelen and Morgan, 1984	0+ & 1+	most captures of juveniles were made in large pools	-	-	-	-	-
				FRASER R., N.B.C. and YUKON					
Horsefly R.	1979	Olmsted et al, 1980	un-specified	area consisted of riffle/pool flow.	<100	slow	gravel/cobble	alder/willow - overstream cover.	-
Quesnel R.	1980	Whelen et al, 1981	0+	area consists of fast riffle flow	200-300	fast	gravel/cobble	low canopy on bar, sidechannel margins.	-
Middle Shuswap R.	1983	Fee and Jong, 1984	0+	at low flows, coho fry were found only in association with log debris but no preference was given to the size and complexity of the debris sites, as was the case with chinook.	-	-	gravel	mainly log debris	-

PHYSICAL CHARACTERISTICS OF PRIME COHO REARING AREAS

STREAM	YEAR	SOURCE	TYPE OF JUVENILE	MACRO HABITAT DESCRIPTION	DEPTH (cm)	FLOW (cm/sec)	DOMINANT SUBSTRATE	TYPES OF COVER	FRY/m²
				FRASER R., N.B.C. and YUKON - Cont'd					
Bessette Ck. System	1983	Fee and Jong, 1984	0+	-juveniles found throughout preferred glide -riffle habitats, except where cover was poor			gravel	log debris, overstream veg. & cutbank.	-
Trinity Ck.	1982	Sebastian, 1983	0+	riffle/pool habitats in association with good cover offer excellent rearing	-	-	gravel	primarily log debris, secondarily overstream veg. & undercut banks.	
Eagle R.	1981	Whelen et al, 1982	0+	areas of greatest fry occurrance had normally a run flow character but riffle and pool areas were common also.	$\bar{x}$ = 25-125	-	gravel	typically overhead canopy	-
			1+ & 2+	flow type typically run/pool	$\bar{x}$ = 50-65	-	gravel	overhang predominant	-
South Pass Ck.	1982	Sebastian, 1983	0+ & 1+	most rearing likely occurs in pool/riffle habitats in the lower portion of stream	20	-	gravel	overhang & canopy roughly equivalent and abundant.	-
Crazy Ck.	1982	Sebastian, 1983	0+	best rearing conditions are afforded in pools and slow glides, which are extremely limited.	-	-	>10 cm	limited overstream veg. and log debris.	-
Perry R.	1982	Sebastian, 1983	0+	rearing is restricted to sidepools and narrow sections of stream margins		<40	gravel, cobble, boulder	log debris, boulders	-
Salmon R.	1981	Whelen et al, 1982	0+	riffle/run flow pattern predominated in areas of concentrated rearing.	$\bar{x}$ = 75-80	-	gravel	primarily overhang, frequent canopy cover	-
			1+	flow consists of long runs	40	-	fines	canopy and overhang (mainly grass)	-
Tappen Ck.	1982	Sebastian, 1983	0+	riffle/glide habitats with abundant cover form suitable rearing areas.	-	-	fines	overstream veg.	-
Seymour R.	1982	Sebastian, 1983	0+ & 1+	concentrations occurred along shore margins	-	<40	gravel	log debris, overstream veg.	0.8[6]
McNomee Ck.	1982	Sebastian, 1983	0+ & 1+	low velocity pool and glide areas associated with complex log cover	-	-	gravel, large	primarily log debris	0.54[6]

[6] Figures represent maximum site - specific densities

PHYSICAL CHARACTERISTICS OF PRIME COHO REARING AREAS

STREAM	YEAR	SOURCE	TYPE OF JUVENILE	MACRO HABITAT DESCRIPTION	DEPTH (cm)	FLOW (cm/sec)	DOMINANT SUBSTRATE	TYPES OF COVER	FRY/m^2
FRASER R., N.B.C. and YUKON - Cont'd									
Adams R.	1981	Whelen et al, 1982	0+	flow character is run/riffle	$x = < 20$	-	gravel	high degree of both canopy and overhanging veg.	-
South Thompson R.	1981	Whelen et al, 1982	0+ & 1+	lake foreshore area and slow runs in river	-	nil - slow	fines/gravel	very little	-
Albreda R.	1982	Hutton et al, 1983	0+	rearing is chiefly conducted along sections exhibiting undercut banks or debris accumulations.	$\bar{x} = 80$	slow	fines/gravel	primarily log debris, many undercut banks	-
Blue R.	1981	Scott et al, 1982	0+ & 1+	-	50	-	gravel/cobble	overhanging vegetation	-
Goose Ck.	1982	Hutton et al, 1982	un-specified	sheltered, slow glides provide good rearing habitat	-	slow	fines	undercut banks, low overstream vegetation	-
Peddle Ck.	1982	Hutton et al, 1982	0+ & 1+	glide sections between beaver dams well-utilized	-	slow	fines	low overstream veg.	-
Finn Ck.	1981	Scott et al, 1982	0+ & 1+	streamflow consists primarily of runs	30	-	cobble	occasional overhanging veg.	-
	1982	Stewart et al, 1983	0+	lower flow velocities and good cover, especially in sidechannels, provide good habitat	-	fast	gravel/cobble	log debris, abundant bank veg.	0-0.025
Lion Ck.	1981	Scott et al, 1982	0+ & 1+	pools and backwater areas associated with broken beaver dams are preferred rearing areas.	30	-	gravel	overhanging veg.	-
Wire Cache Ck.	1982	Hutton et al, 1983	0+ & 1+	small pools and riffles associated with undercut banks and small debris accumulations and overhanging vegetation provided a suitable rearing environment.	approx 20	generally slow	small gravel	overhanging veg., instream debris & undercut banks.	-
Raft R.	1981	Scott et al, 1982	0+	the area is characterized by a riffle/run flow and occasional deep pools. -debris and root wads along sections of stream margins offered suitable rearing habitat.	40	slow	gravel	overhang & canopy: both limited	-
Clearwater R.[7]	1982	Stewart et al, 1983	1+	utilization was highest in margin areas where flow was slow.	-	fast	boulder/bedrock	none present	0-0.006

[7] As catches were only recorded in April, these yearlings may have been emigrating.

PHYSICAL CHARACTERISTICS OF PRIME COHO REARING AREAS

STREAM	YEAR	SOURCE	TYPE OF JUVENILE	MACRO HABITAT DESCRIPTION	DEPTH (cm)	FLOW (cm/sec)	DOMINANT SUBSTRATE	TYPES OF COVER	FRY/m^2
FRASER R., N.B.C. and YUKON - Cont'd									
Dunn Ck.	1982	Stewart et al, 1983	0+ & 1+	use was highest in backeddies containing organic debris; the section as a whole exhibits a riffle/glide flow character	-	-	gravel	limited over, stream veg.	0-0.2 (fry)
McTaggart Ck.	1982	Stewart et al, 1983	0+	riffle/pool flow along meanders offers good rearing habitat.	-	-	gravel/sand	extensive canopy, in-stream debris	0.015 - 0.058
Lemieux Ck.	1982	Stewart et al, 1983	0+ & 1+	sidechannels and backwaters in association with log debris, offer moderately good rearing.	-	-	gravel/cobble	undercut banks and log debris	0.003 - 0.173 (fry) 0-0.013 (yearlings)
Barriere R.	1982	Stewart et al, 1983	0+	many sidechannels and back-eddies are present and the stream is fairly turbid. -flow is swift through a deep mainchannel.	-	-	cobble	bank vegetation (extensive, aquatic vegetation	1.17-2.06
Louis Ck.	1982	Hutton et al, 1983	0+ & 1+	habitat appears suitable in sections where logjams, windfalls and beaver dams occur.	-	-	gravel	overstream veg., canopy, log debris	-

PHYSICAL CHARACTERISTICS OF PRIME CHUM REARING AREAS

STREAM	YEAR	SOURCE	TYPE OF JUVENILE	MACRO HABITAT DESCRIPTION	DEPTH (cm)	FLOW (cm/sec)	DOMINANT SUBSTRATE	TYPES OF COVER	FRY/m^2
				NORTH COAST					
				No Information					
				SOUTH COAST					
				No Information					
				FRASER R., N.B.C. and YUKON					
				No Information					

PHYSICAL CHARACTERISTICS OF PRIME SOCKEYE REARING AREAS

STREAM	YEAR	SOURCE	TYPE OF JUVENILE	MACRO HABITAT DESCRIPTION	DEPTH (cm)	FLOW (cm/sec)	DOMINANT SUBSTRATE	TYPES OF COVER	FRY/m^2
NORTH COAST									
				No information					
SOUTH COAST									
				No information					
FRASER R., N.B.C. and YUKON									
Quesnel R.	1980	Whelen et al, 1981	0+	river widens to a narrow lake in this area	1000	approx 100	boulder/mud	grasses, low and high canopy	-
Eagle R.	1981	Whelen et al, 1982	0+	the river flow is mainly runs	200	slow	fines/gravel	overhanging veg. & canopy	-
Salmon R.	1981	Whelen et al, 1982	0+	-	$\bar{x}$ = 40-100	-	fines (lower area) gravel (upper area)	overhanging veg. (fairly abundant canopy (limited)	-
South Thompson R.	1981	Whelen et al, 1982	0+ & 1+	Little Shuswap and Shuswap Lake foreshores	-	nil	fines/gravel	limited canopy, very limited overhanging veg	-
Raft R.	1981	Scott et al, 1982	0+	flow character is riffle/run/pool/	70	moderate	gravel	very limited canopy & overhanging vegetation, several debris accumulations.	-
North Thompson R.	1981	Scott et al, 1982	0+	the flow is primarily long runs.	$\bar{x}$ = 200-300	-	gravel	instream debris and [8] extensive bank vegetation (sidechannels).	-
	1982	Stewart et al, 1983	1+	-	-	-	gravel	instream debris; overhanging veg. (primarily in sidechannels).	0.014-0.203

[8] From Stewrt et al (1983)

PHYSICAL CHARACTERISTICS OF PRIME PINK REARING AREAS

STREAM	YEAR	SOURCE	TYPE OF JUVENILE	MACRO HABITAT DESCRIPTION	DEPTH (cm)	FLOW (cm/sec)	DOMINANT SUBSTRATE	TYPES OF COVER	FRY/m^2
NORTH COAST									
				No Information					
SOUTH COAST									
				No Information					
FRASER R., N.B.C. and YUKON									
				No Information					