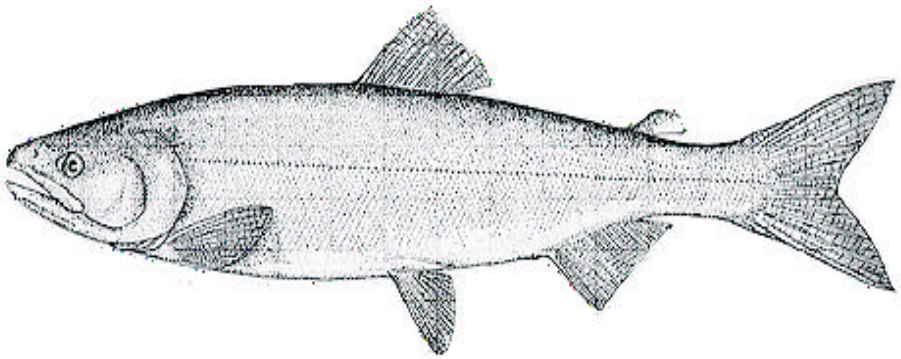
PACIFIC REGION

INTEGRATED FISHERIES MANAGEMENT PLAN SALMON STIKINE RIVER, B.C.

JUNE 1, 2001 TO MAY 31, 2002



Oncorhynchus spp

Fisheries and Oceans Canada | Pêches et Océans Canada

Canada

This Integrated Fisheries Management Plan is intended for general purposes only. Where there is a discrepancy between the Plan and the Fisheries Act and Regulations, the Act and Regulations are the final authority. A description of Areas and Subareas referenced in this Plan can be found in the Pacific Fishery Management Area Regulations.

TABLE OF CONTENTS

1. CONTACTS FOR 2001 4
2. GLOSSARY 5
3. INTRODUCTION 7
4. POLICY 7
5. BIOLOGICAL SYNOPSIS 8
    5.1. SOCKEYE SALMON 8
    5.2. CHINOOK SALMON 9
    5.3. COHO SALMON 10
    5.4. PINK SALMON 11
    5.5. CHUM SALMON 11
6. OVERVIEW OF THE FISHERY 12
    6.1. PARTICIPANTS 12
        6.1.1. FIRST NATIONS FISHERY 12
        6.1.2. COMMERCIAL FISHERY 12
        6.1.3. RECREATIONAL FISHERY 12
    6.2. LOCATIONS OF FISHERIES 12
        6.2.1. FIRST NATION FISHERIES 12
        6.2.2. COMMERCIAL FISHERIES 12
        6.2.3. RECREATIONAL FISHERIES 13
    6.3. TIMING OF FISHING SEASONS 14
        6.3.1. FIRST NATIONS 14
        6.3.2. COMMERCIAL 14
        6.3.3. RECREATIONAL 14
    6.4. LANDINGS AND MARKETS 14
    6.5. CONSULTATIVE PROCESS 14
        6.5.1. TAHLTAN-ISKUT FIRST NATIONS ABORIGINAL FISHERIES STRATEGY (AFS) 14
        6.5.2. STIKINE RIVER SALMON MANAGEMENT COMMITTEE 15
        6.5.3. PACIFIC SALMON TREATY (PST) TRANSBOUNDARY PANEL 15
    6.6. MANAGEMENT STYLE 15
    6.7. LINKS TO OTHER ACTIVITIES 16
7. SPAWNING STOCK STATUS 16
    7.1. SOCKEYE SALMON 16
    7.2. CHINOOK SALMON 18
    7.3. COHO SALMON 19
    7.4. PINK, CHUM AND STEELHEAD SALMON 20
    7.5. INTERACTIONS BETWEEN SPECIES 20
    7.6. STOCK ASSESSMENT AND RESEARCH PROCESSES 21
        7.6.1. SOCKEYE SALMON 21
        7.6.2. CHINOOK SALMON 21
        7.6.3. COHO SALMON 22
        7.6.4. PINK, CHUM AND STEELHEAD 22
8. CURRENT MANAGEMENT ISSUES 22
    8.1. PACIFIC SALMON TREATY 22
    8.2. UNCERTAIN RETURNS IN 2001 23
    8.3. UNCERTAIN MARKET CONDITIONS 23
    8.4. FISHER INTERACTIONS (COMMERCIAL FACTIONS) 23

9. LONG TERM OBJECTIVES FOR THE FISHERY 24
10. SPECIFIC MANAGEMENT OBJECTIVES 24
10.1. SPAWNING ESCAPEMENT REQUIREMENTS 24
10.1.1. SOCKEYE ESCAPEMENT 24
10.1.1.1. Tahltan Lake Stock 24
10.1.1.2. Main-Stem Stocks 25
10.1.1.3. Tuya Stock 25
10.1.2. COHO ESCAPEMENT 25
10.1.3. CHINOOK ESCAPEMENT 25
10.1.4. OTHER SPECIES 26
10.2. DEPARTMENTAL OBJECTIVES 26
10.3. ALLOCATIONS 26
10.3.1. INTERNATIONAL 26
10.3.1.1. Sockeye Salmon 26
10.3.1.2. Coho Salmon 27
10.3.1.3. Chinook Salmon 27
10.3.2. FIRST NATIONS 28
10.3.3. COMMERCIAL FISHERY 28
10.3.4. RECREATIONAL FISHERY 28
11. MANAGEMENT MEASURES 29
11.1. IN-SEASON MANAGEMENT 29
11.2. COMMERCIAL FISHERIES 31
11.2.1. LOWER STIKINE COMMERCIAL FISHERY: 31
11.2.2. UPPER STIKINE COMMERCIAL FISHERY 32
11.3. FIRST NATIONS FISHERIES 33
11.4. RECREATIONAL FISHERIES 33
11.5. CONTROL AND MONITORING OF THE FISHERIES 33
11.6. LICENSING 34
11.6.1. COMMUNAL 34
11.6.2. EXPERIMENTAL, SCIENTIFIC, EDUCATIONAL OR PUBLIC DISPLAY PURPOSES: 34
11.6.3. RECREATIONAL: 34
11.6.4. COMMERCIAL: 34
11.6.5. EXCESS SALMON TO SPAWNING REQUIREMENTS (ESSR) LICENCE: 35
12. PROSPECTS FOR THE SEASON 36
12.1. SOCKEYE SALMON 36
12.1.1. TAHLTAN LAKE SOCKEYE FORECAST 37
12.1.2. TUYA FORECAST 38
12.1.3. MAIN-STEM SOCKEYE FORECAST 38
12.1.4. EXPECTED SOCKEYE OUTCOME 39
12.1.5. SOCKEYE MANAGEMENT REFERENCE POINTS 40
12.2. CHINOOK SALMON 41
12.2.1. EXPECTED CHINOOK OUTCOME 41
12.3. COHO SALMON 41
12.3.1. EXPECTED COHO OUTCOME 41
13. HABITAT INFORMATION 42
13.1. LAND USE PLANNING: 42
13.2. MINING: 42
13.3. HIGHWAY CONSTRUCTION: 42

14. ENFORCEMENT ISSUES AND STRATEGIES 43
14.1. OVERVIEW OF CHALLENGES 43
14.2. INVESTIGATIONS / VIOLATIONS / WARNINGS....43
14.3. PRIORITIES FOR 2001....43
14.4. FOCUS FOR 2001....43
14.5. EQUIPMENT....44
14.6. AIR SURVEILLANCE....44
14.7. OTHER ENFORCEMENT CONCERNS 44
15. PROGRESS ON CURRENT MANAGEMENT ISSUES....44
16. PROGRESS ON LONG TERM OBJECTIVES 45
16.1. MEETING THE OBLIGATIONS CONTAINED IN THE PACIFIC SALMON TREATY....45
16.2. CONSERVING AND RESTORING SPAWNING STOCKS AND HABITATS ...45
16.3. DEVELOPING AND/OR MAINTAINING SUSTAINABLE AND VIABLE CANADIAN FISHERIES....45
16.4. STRATEGICALLY ENHANCING SELECTED STOCKS....46
17. MEASUREMENT OF EXPECTED OUTCOMES....46
18. PERFORMANCE REVIEW....47
18.1. 2001 OBJECTIVES 47
18.2. 2000 POST SEASON REVIEW....47
19. APPENDICES....48

1. CONTACTS FOR 2001

Fisheries and Oceans Canada Contacts

Name	Position	Location	Phone
Gord Zealand	Area Director	Whitehorse	867-393-6725
Sandy Johnston	Chief, Fisheries Mgt. and Stock Assessment	Whitehorse	867-393-6729
Pete Etherton	Senior Stock Assessment Technician	Whitehorse	867-393-6726
John Sambsmoen	Stock Assessment Technician	Tahltan Lake	
Gerry Coukell	Chief – Conservation and Protection	Whitehorse	867-393-6745
Steve Smith	Field Supervisor , C&P	Whitehorse	867-393-6724
Mary-Ellen Jarvis	A/Aboriginal Fisheries Co-ordinator	Whitehorse	867-393-6728
vacant	Community Liaison Officer	Whitehorse	867-393-6722

Stikine Salmon Management Committee

Name	Position	Location	Phone
Gord Zealand	Chair	Whitehorse	867-393-6719
Yvonne Tashoots	Tahltan FN	Telegraph Creek	250-771-5157
Cheri Frocklage	Iskut Rep	Iskut	250-771-3012
Louie Louis	Iskut Rep	Iskut	250-234-3331
Marilyn Norby	Tahltan Rep	Telegraph Creek	250-235-3144
Bill Sampson	Independent	Telegraph Creek	
John Plummer	Independent	Peace River	780-618-2411
Bob Gould	Great Glacier	Telkwa	250-846-5028
Bill Larsen	Great Glacier	Terrace	250-638-8586
Dan Pakula	A/Rec. Fishery Rep.	Telegraph Creek	250-235-3196

Pacific Salmon Treaty: Transboundary Panel

Name	Position	Location	Phone
Gord Zealand	Co-Chair	Whitehorse	867-393-6719
Stefan Jacob	Member (Stikine)	Dease Lake	250-358-2864
Chief Yvonne Tashoots	Member (FN Stikine)	Telegraph Creek	250-771-5157
Ray Kendel	Member (Taku)	Cortez Island	250-935-8508
John Ward	Member (FN Taku)	Atlin	250-651-7792
Ron Chambers	Member (FN Alsek)	Haines Jct	867-634-2288

British Columbia Government Contacts

Name	Position	Location	Phone
Dana Y. Atagi	A/ Head of Fisheries	Smithers, B.C.	250-847-7290
Mike Newton	Conservation Officer	Dease Lk. BC	250-771-3566

2. GLOSSARY

SPA	Scale patterns analysis: spawning streams will create varying – unique scale patterns that allow specific point of origin assessments to be made.
0+ juveniles	Salmon fry in their first year of life.
AFS	Aboriginal Fisheries Strategy.
ADF&G	Alaska Department of Fish and Game.
C&P	Conservation and Protection: the section of DFO primarily involved in enforcement.
CPUE	Catch per unit effort: for the Stikine River this is usually expressed as catch by species/fisher/day.
cut banks	Under cutting of stream banks by stream flow.
CWT	Coded Wire Tagging.
spawning escapement	The number of salmon that reach the spawning grounds.
border escapement	The number of salmon that escape U.S. fisheries and reach the Canada/U.S border.
freshet	A sudden increase in stream flow usually associated with spring runoff.
fecundity	Number of eggs within a female fish.
HEB	Habitat and Enhancement Branch
headwater tributaries	The streams located where runoff begins.
HRSEP	Habitat Restoration and Salmon Enhancement Program
IFMP	Integrated Fisheries Management Plan
in-migrations	Movement of salmon from the ocean to rivers and spawning streams
mark-recapture	A method used to estimate population size where fish are live-captured, tagged and released. Subsequent recaptures of tagged fish provide data for estimation.
natal stream	Streams where spawning takes place.
out-migrations	Movement of juvenile salmon from natal streams/lakes to rivers and then the ocean.

PST	Pacific Salmon Treaty
R/S	Adult returns per brood year spawner
RCMP	Royal Canadian Mounted Police
riffle	Small rapid.
salmonid	Salmon
sibling forecast	A forecast that uses the number of salmon of age-x to predict the number of age-(x+1) salmon returning the following year.
SMM	Stikine Management Model: a sockeye run forecasting model developed by the Transboundary Technical Committee of the PST based on the historical relationship between commercial and test fishery CPUE and run size. The model is used in-season to assist in management decisions.
subsistence fishery	A fishery that fills a basic need for food purposes.
TAC	Total allowable catch
tagging site	A site where fish are tagged for later recapture
thermal regimes	Temperature variances found in a stream or streams.
USFWS	United States Fish and Wildlife Service

3. INTRODUCTION

Fisheries and Oceans Canada is committed to achieving long term goals of salmon conservation, sustainable use of the resource and improved decision making processes through consultation with those who have an interest in the fisheries resource. The Department is the primary instrument of salmon management in British Columbia and operates in partnership with provincial agencies such as the British Columbia Ministry of Fisheries and Forestry Renewal B.C. on some habitat issues, and others as required. Contact names for each agency are identified at the beginning of this document in Section 1. The national Fisheries and Oceans Canada web-site address is:

www.dfo-mpo.gc.ca

The Pacific Region site can be reached through the national site or at:

www.pac.dfo-mpo.gc.ca

This Integrated Fisheries Management Plan (IFMP) covers a one-year span, June 1, 2001 to May 31, 2002. It is aimed toward the management of chinook, sockeye, coho, pink and chum salmon and steelhead. This document is meant to inform fishers, processors and other interested parties about the expected run sizes, management considerations and plans for the Stikine River in the 2001 season. As the United States (U.S.) fishery at the mouth of the Stikine River has significant influence on the salmon that return to the Canadian section of the drainage, there are references to Alaskan fisheries and the Transboundary Panel of the Pacific Salmon Treaty. This plan was developed with input from stakeholders through domestic and international consultation processes.

Responsibility for implementing the IFMP rests with the Yukon/Transboundary Area office of Fisheries and Oceans Canada. Personnel working out of the Whitehorse office and field stations on the lower Stikine accomplish in-season management.

4. POLICY

Significant policy reform has occurred in Pacific Region salmon management programs in the past six years. Continued change and evolution of new policy is expected to occur for the next several years. These policy changes are being guided by both international and domestic considerations, both of which highlight a commitment to manage marine resources in an ecosystem-based, precautionary approach that stresses the importance of integrated management and conserving biological diversity.

In October 1998, the Minister of Fisheries and Oceans presented a vision for the future through the release of “A New Direction for Canada’s Pacific Salmon Fisheries”. This paper sets out a broad policy direction for management of the salmon fisheries. The paper has formed the basis of a permanent move to conservation-based salmon fisheries management in the Pacific Region. This new direction has three key components:

a) Conservation

b) Sustainable Use
c) Improved Decision Making

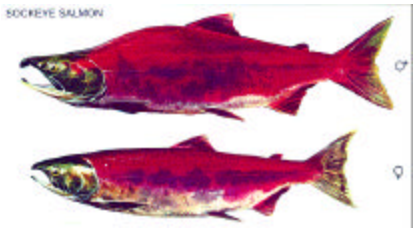
A number of new policy initiatives have been initiated based on the principles of this paper, including a salmon allocation framework, a selective fishing protocol and discussion papers on the management of wild salmon stocks and improved decision-making. Additional policy papers are expected to follow under the New Directions policy series.

Salmon management programs in 2001 (and future years) will continue to be guided by these policy initiatives. More information on these policies can be found at:

www.dfo-mpo.gc.ca/publication_e.htm

5. BIOLOGICAL SYNOPSIS

5.1. Sockeye Salmon



Sockeye salmon are found from the Sacramento River of California to the Kotzebue Sound of Alaska. The Stikine River drainage supports significant populations of spawning and rearing sockeye salmon although approximately 75 per cent of drainage is inaccessible to anadromous fish due to natural barriers, including the Tuya River falls, the Grand Canyon of the Stikine, and the Forest Kerr Canyon located on the Iskut River. Stikine River sockeye spawn at several sites within the drainage including but not limited to Tahltan, Christina and Chutine lakes; Craig, Jeckell and Katete rivers; side sloughs of the Porcupine, Scud, Iskut and Stikine rivers; and Verrett Creek. Sockeye also spawn in the main-stem of the Stikine River. The largest single producer of Stikine sockeye is Tahltan Lake, which accounts for 30-60 per cent of the total production. For management purposes, the total wild population is categorised as Tahltan Lake sockeye or main-stem sockeye salmon. Enhanced (hatchery origin) sockeye returns from Tuya and Tahltan lake are monitored and managed based on the abundance of naturally produced sockeye from the main-stem and Tahltan Lake stocks. For evaluation and management purposes, all enhanced sockeye are thermally marked with distinct ring patterns embedded on the otoliths (ear bones).

Sockeye salmon enter the Stikine from mid to late June through to late August. In general, Tahltan and Tuya fish migrate into the river first followed by the other main-stem stocks. The majority of spawning occurs in September for both Tahltan and main-stem fish. Emergence occurs in May and the majority of the juveniles rear for one year in freshwater before they migrate to sea in May and June of the second year of life. Up to 10 per cent of the main-stem fish, however, migrate to sea immediately after emergence. All of the Tahltan Lake juvenile fish remain in the lake for a minimum of one year before they migrate to sea as smolts. Over 70 per cent of the fish return to the Stikine River as age-five fish and weigh an average of 3.2 kg. Age-four fish account for approximately 25 per cent of the return and on average weigh 2.6 kg. The balance of the fish are three and six-year-olds. Ocean survival of Tahltan Lake smolts has varied between 2-13 per cent, with an average survival of 6 per cent; in the past three years it has been closer to 3 per cent. Little is known in regards to the survival of juvenile sockeye from the main-

stem group, but it is thought that this grouping of fish is less productive due to the vagaries of their spawning and rearing habitat located within the Stikine River floodplain.

Canada harvests Stikine sockeye in commercial fisheries located near the Canada-U.S. border and near the townsite of Telegraph Creek, B.C. Sockeye are also harvested by Tahltan and Iskut First Nations at fishing sites located on the Stikine R. from the mouth of the Chutine River upstream to the mouth of, and in, the Tahltan River. Stikine sockeye are harvested in U.S. fisheries located near the mouth of the Stikine River, primarily in Alaska gill net fishing Districts 108 and 106. There are also U.S. interceptions in other net fisheries located in the Alaska panhandle.

5.2. Chinook Salmon

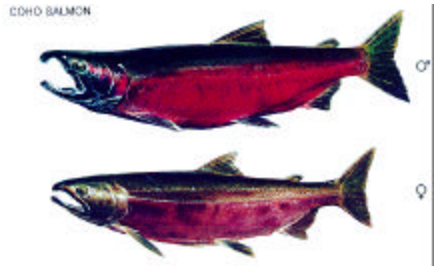
Chinook salmon are found from central California to the northern pacific coast of Alaska and as far east as the Mackenzie River. The Stikine River drainage supports significant populations of spawning and rearing chinook salmon, although approximately 75 per cent of drainage is inaccessible to anadromous fish due to natural barriers including the Tuya River falls, the Grand Canyon of the Stikine, and the Forest Kerr Canyon located on the Iskut River. Stikine River chinook salmon spawn at several sites within the drainage including but not limited to Tahltan, Little Tahltan, Craig, Jeckell, Iskut, Katete, Chutine, and main-stem Stikine rivers; and Christina, Verrett, Beatty, Bear, Tashoots, Shakes and Andrew creeks (Andrew Creek is located in Alaska). The largest single producer of Stikine chinook salmon is the Little Tahltan River which accounts for 18-24 per cent of the total Stikine River production.

The majority of spawning occurs in August for most Stikine chinook, including Verrett Creek fish spawning in the lower reaches of the Iskut River, and fish located in the upper reaches of the Stikine River including Little Tahltan R. and Beatty Cr. Emergence occurs in May and the majority of the juvenile fish rear for one year in freshwater areas in their natal streams and in the main-stem Stikine River before migrating to sea as smolts in May and June during their second year of life. A small portion of the run, however, remains in freshwater an additional year before smoltification. Approximately 65 per cent of the fish return to the Stikine River as age-six fish and weigh approximately 10 kg. Age-five fish account for approximately 25 per cent of the return and weigh, on average, 6.4 kg. The balance of the fish returns at age-three, four and seven. Typically, fish returning at age-three and four are small (<600 mm hypural length) precocious males commonly referred to as “jack” salmon.

Tagging studies conducted on juvenile fish in the late 1970’s showed that the majority of juvenile Stikine chinook ocean residency is beyond the Alaska panhandle and, therefore, it is believed they are not subjected to harvest by the U.S. winter troll fleet fishing the inside waters of the panhandle. No studies have been conducted to assess the marine survival of Stikine River chinook salmon; however, ocean survival is thought to fluctuate due to changes in ocean productivity. For example, the high variance of return per spawner at similar spawning levels as measured at the Little Tahltan weir (0.64-3.5 fish per spawner at an escapement near 4,500 fish) is thought to be due to changes in ocean survival. Canada harvests Stikine chinook in commercial fisheries located near the Canada-U.S. border and near the townsite of Telegraph Creek, B.C. Chinook salmon are also harvested by Tahltan First Nations at fishing sites located in the Stikine River from the mouth of the Chutine River upstream to the mouth of, and into, the

Tahltan River. A recreational fishery, located near the mouth of the Tahltan River and in the river, catches an estimated 100 plus fish annually. Stikine chinook salmon are harvested incidentally in U.S. gill net fisheries located near the mouth of the Stikine River. There are also some U.S. fishery interceptions in south-east Alaska troll fisheries, but based on limited coded wire tagging studies, catches of Stikine chinook are thought to be quite small. U.S. recreational fishing derbies held near the mouth of the Stikine River in May and June intercept a significant number of Stikine-bound chinook salmon.

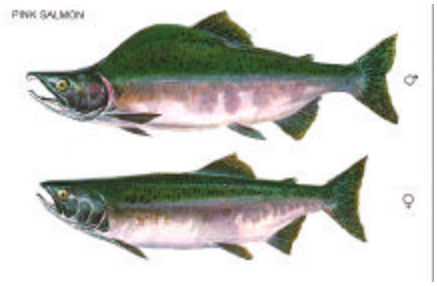
5.3. Coho Salmon



Coho salmon are found from as far north as Point Hope, Alaska south to the Sacramento River drainage in California. The Stikine River drainage supports a significant population of spawning and rearing coho salmon, although approximately 75 per cent of the drainage is inaccessible to anadromous fish due to natural barriers, including the Tuya River falls, the Grand Canyon of the Stikine, and the Forest Kerr Canyon located on the Iskut River. Most Stikine River coho salmon spawn and rear within the mid to lower reaches of the Stikine River from and including Chutine River downstream to the estuary. Spawning locations include, but are not limited to Tahltan, Tuya, Porcupine, Scud, Craig, Jeckell, Iskut, Katete, Chutine, and main-stem Stikine rivers; and Verrett and Pendant creeks. The majority of spawning occurs in October extending into November and perhaps later. It appears that Verrett Creek fish tend to spawn slightly earlier than the Porcupine or Scud River coho and by deduction, may enter the Stikine River early as well. Verrett, Scud, and Porcupine coho appear to use the same spawning gravels as used by the sockeye salmon earlier in the season. The affect on sockeye production that may be caused by this activity is unknown. Emergence of the coho fry occurs in the spring and approximately 60 per cent of the fry rear for one year in freshwater before smoltification and seaward migration. The remainder of the fry spend an additional year rearing in the main-stem Stikine and side sloughs, including small lakes (Barnes, Kakati and Katili) before migrating to sea as smolts in April, May and June. Coho spend only one year (16-18 months) rearing in the ocean and return in August through to October as sexually mature age-four (3 years freshwater) and age-three (2 years freshwater). On average, approximately 58 per cent of the fish are age-four, while 42 per cent are age-three. The average weight of Stikine coho is approximately 4 kg.

Canada harvests Stikine coho salmon primarily in the commercial fishery located near the Canada-U.S. border. Few coho salmon appear to migrate as far upstream as Telegraph Cr. and therefore catches in the upper river First Nations, recreational and commercial fisheries are low and infrequent. Tagging studies conducted on juvenile Stikine River coho in the late 1970's and early 1980's indicated that Stikine River coho were caught in troll fisheries from as far south as the Queen Charlotte Islands to as far north as U.S. troll fisheries located in the northern end of the Alaskan panhandle near Fairweather Point. Stikine coho are also caught in U.S. gill net and recreational fisheries located near the mouth of the Stikine River.

5.4. Pink Salmon



Pink salmon are the most abundant species of Pacific salmon. Spawning populations are found from central California, north and east to near the Mackenzie River system. In Asia, pink salmon distribution extends from Korea, north along the pacific coast and into the Arctic as far west as the Lena River in northern Russia (in: Groot and Margolis, 1991).

The Stikine River does not appear to support large numbers of spawners and there is little information about Stikine pink salmon. Mature fish enter the river from mid July through August, with the peak of the migration usually occurring in early August. Spawning has been observed in the lower Iskut River and side sloughs (e.g. mouth of Zappa Cr.) and as far upstream in the Stikine as Shakes Cr. Spawning likely occurs from August through September. Typically, pink fry emerge the following spring and as with chum salmon, smoltification and seaward migration occurs shortly afterward. The species is not known to overwinter in freshwater. After only eighteen months in the ocean they return as adults to spawn.

In Canada, most of the catch occurs in the lower Stikine commercial fishery, but pink salmon are not targeted. Pink salmon are seldom encountered in the upper Stikine fisheries around Telegraph Creek. Stikine River pink salmon are likely intercepted in U.S. gill net fisheries in Districts 106 and 108; some may also be taken in outer Alaskan seine fisheries (e.g. upper District 104).

5.5. Chum Salmon

Chum salmon have the widest natural geographic distribution of all Pacific salmon species. In North America they are found from the San Lorenzo River in Monterey, California to as far north and east to the Mackenzie River system. In Asia, they occur in Japan, along the Okhotsk and Kamchatka coasts into the Arctic and westward to the Laptev Sea, northern Russia (in: Groot and Margolis, 1991).

Two sub-species of chum have been identified, summer chum and fall chum. Fall chum can be distinguished by a number of factors: later entrance into spawning streams, less developed reproductive systems at the time of entry into these streams, later spawning period, larger size and greater fecundity. Most of the Stikine chum appear to be summer chum although in some years timing suggests there are also fall chum salmon.

Adult spawners enter the Stikine River mid July through early September. Little is known about the timing and location of chum spawning in the Stikine drainage although it likely occurs from August into October (and possibly later). Spawning chum salmon have been observed in the lower Iskut at the confluence with the Stikine River, at the mouth of Verrett Creek and side sloughs of the lower Iskut River. Emergence timing is not known although it likely occurs in the spring followed shortly thereafter by smoltification and seaward migration. Stikine chum spend from two to five years in the ocean before they return as adults to spawn, however, the majority return after three or four years in the ocean.

In Canada, most of the catch occurs in the lower Stikine commercial fishery but chum salmon are not targeted. Chum salmon are seldom encountered in the upper Stikine fisheries around Telegraph Creek. Stikine River. chum salmon are likely intercepted in U.S. gill net fisheries in Districts 106 and 108; some may also be taken in outer Alaskan net fisheries (e.g. upper District 104).

6. OVERVIEW OF THE FISHERY

6.1. Participants

There are three groups of fishers that utilise the Canadian portion of the Stikine river salmon run: First Nation, commercial and recreational.

6.1.1. First Nations Fishery

The longest standing fisheries in North America are First Nation fisheries. The current First Nations that fish the Stikine River drainage include the Tahltan and Iskut First Nations. After conservation needs are met, priority in terms of allocation is to fulfil the Section 35, constitutional priority of the First Nations fishery. This priority has been re-affirmed by a series of Supreme Court rulings, (i.e. Sparrow, NTC Smokehouse, Delgamuukw, Nikal). All other fisheries, therefore, are managed to accommodate the fundamental priorities of conservation and First Nations fishery requirements. Fishing gear consists primarily of set gill nets.

6.1.2. Commercial Fishery

The commercial fishery has been in existence on the Stikine system since 1975. Currently there are twenty-three licences available to fish commercially; four licences in the upper Stikine near Telegraph Creek and the remainder in the lower Stikine. Gear consists of drift and set gill nets.

6.1.3. Recreational Fishery

The Stikine has not been subject to heavy recreational fishing activity in the past, however, anecdotal and local knowledge points to an increase in usage in recent years for chinook recreational fishing as well as general recreational fishing on Tahltan Lake.

6.2. Locations of Fisheries

6.2.1. First Nation Fisheries

First Nations fisheries generally occur in the Stikine River upstream from the confluence of the Chutine River and as far upstream as the mouth of the Tahltan River. Fishing also occurs in the lower reaches of the Tahltan River. With the advent of the joint Canada/U.S. sockeye enhancement program, fishing for salmon considered to be excess to spawning requirements has occurred in the lower Tuya River and at the outlet of Tahltan Lake.

6.2.2. Commercial Fisheries

There are two commercial fishing areas in the Stikine River:

a) The upper Stikine River where fishers are permitted to fish that portion of the Stikine River, from the confluence of the Chutine River upstream to the confluence of the Tahltan River, but excluding any other tributaries of the Stikine River

b) Subject to conservation concerns, the lower river fishing area includes: that portion of the Stikine River, from the international boundary between Canada and the U. S. upstream to the boundary signs located approximately two km above the confluence with the Flood River (see closed area described below); and the portion of the Iskut River from its confluence with the Stikine River to the boundary signs located 1.5 km upstream from the water survey station of the Iskut River, but excluding any other tributaries of the Stikine or Iskut Rivers.

In 2001, the portion of the Stikine River between the Porcupine River and 2 km above the Flood River will be closed until further notice. This is in response to sockeye conservation concerns raised by the Tahltan and Iskut First Nations, DFO and some Stikine commercial fishers. Due to expected poor sockeye abundance it is likely the Porcupine to Flood closure will persist throughout the 2001 sockeye season. However, if sockeye abundance warrants, consideration may be given to opening this area.

To examine whether closing the portion of the Stikine River between the Porcupine River and 2 km above the Flood River confluence would address the concern that fish might be subject to more than one fishing period, salmon migration rates were examined from Stikine tagging data collected in 2000. A total of 72 tags were returned in 2000 from upper Stikine areas including 54 from the Telegraph Creek area, 13 from the Tuya and 5 from Telegraph Creek. Average migration rates for sockeye salmon recovered in each of these areas were as follows:

a) Upper Stikine: 7.4 km/day (range: 5.5 – 11.2 km/day);
b) Tuya : 9.0 km/day (range: 6.5 – 14.2 km/day);
c) Tahltan Lake: 6.2 km/day (range: 5.1 –7.8 km/day).

The weighted average migration rate for sockeye captured in these sites was 7.6 km/day. For comparison, the migration rate of Little Trapper Lake sockeye in the Taku drainage, based on tagging data, is about 5.3 km/day (these fish travel about 160 km from the tagging site versus 260 km in the Stikine). At a migration rate of 7.6 km/day, upper river sockeye stocks would be expected to migrate upstream approximately 53 km in one week. This distance upstream from the Canada/U.S. border would take them just upstream of the Porcupine/Stikine confluence. Therefore, based on the tagging data, it appears that on average, upper river stocks should clear the fishery within a one-week period with the upper boundary located near the Porcupine River. However, lower river stocks may be more vulnerable since lower river stocks tend to exhibit slower migration rates.

6.2.3. Recreational Fisheries

Most recreational fishing activity is centred around the Tahltan River.

Fishery locations are outlined in Appendix 1.

6.3. Timing of Fishing Seasons

6.3.1. First Nations

First Nations begin harvesting salmon as early as late April in the case of steelhead and continue to fish salmon through October.

6.3.2. Commercial

Commercial fishers commence their season in late June and continue to harvest until early October. Commercial fisheries are dependent on the run timing and strength of the run, which is reviewed in-season on a daily/weekly basis by Stock Assessment personnel of Fisheries and Oceans Canada. In 2001, the season will open at 12:00 noon July 23 for 24 hours (1 day) in both upper and lower fishing areas.

6.3.3. Recreational

The recreational fishery commences with the steelhead run in late April and continues through the salmon season, generally ending in October. For specific area closed times, fishers should check the British Columbia Freshwater Sport Fishing Regulations Synopsis and the B.C. Freshwater Salmon Supplement. Both publications can be viewed on-line at:

British Columbia Freshwater Sport Fishing Regulations Synopsis:

www.bcfisheries.gov.bc.ca/pdf/Region_6.pdf

B.C. Freshwater Salmon Supplement:

www-comm.pac.dfo-mpo.gc.ca/english/freshwater

6.4. Landings and Markets

Landing stations are operated in the lower river to handle commercially caught salmon. Fish are then either processed on-site or transported to commercial buyers via boat to Wrangell or Petersburg, Alaska. Marketed products include fresh frozen, fresh, smoked and canned salmon. Historical catch information for the combined commercial and First Nations fisheries is provided in Appendix 2-5. The 1991-2000 average combined commercial and First Nations catch includes 44,400 sockeye, 2,400 large chinook, 500 jack chinook, 1,700 coho, 100 pink, 200 chum and 100 steelhead (Appendix 2). First Nations catches over the same period averaged 5,500 sockeye, 800 large chinook, 200 jack chinook, and less than 100 for each of pink, chum and steelhead (Appendix 5).

6.5. Consultative Process

Consultative processes for the management of Stikine River salmon stocks are described below.

6.5.1. Tahltan-Iskut First Nations Aboriginal Fisheries Strategy (AFS) Consultation

AFS consultations with the Tahltan and Iskut First Nations occur throughout the year. Results of these consultations are contained within a multi-year DFO/FN Fisheries Agreement. The Agreement details fish management and stock assessment programs, enforcement protocols, communal and commercial

licences, selective fishing, and the First Nation fishery and communal licence provisions.

6.5.2. Stikine River Salmon Management Committee

The Stikine River Salmon Management Committee is comprised of representatives of First Nations, commercial and recreational users of the Stikine system. This committee is also represented on the Transboundary Panel of the PST to ensure continuity and co-ordination in domestic and international discussions and decisions. The committee meets at least twice annually to discuss management plans, conduct post-season reviews, and address issues such as licensing, allocations, licence conditions, etc. Membership on this committee is noted at the beginning of this document. Fisheries and Oceans Canada have compiled this plan with input from First Nations, commercial and recreational users. This plan is discussed in the Stikine River Fishery Management Committee and other proponents during bi-annual review and planning meetings.

6.5.3. Pacific Salmon Treaty (PST) Transboundary Panel

One of the arrangements reached in 1999 under the PST was the creation of a Transboundary Panel, which began meeting bi-laterally in late 1999. The Panel provides a forum for Canada/U.S. consultations. Membership on the Canadian section of the Panel is appointed by the Minister and includes two members with Stikine River interests (see Section 1). In-season management protocols are, where possible, set in advance of the impending season either in discussions of the Transboundary Technical Committee or the Transboundary Panel. The Technical Committee usually meets three times annually and the Transboundary Panel is tentatively scheduled to meet at least on a bi-annual basis to examine stock status and review other information relevant to the Transboundary rivers. Membership of the Panel is also noted in Section 1 at the beginning of this document. Records are kept by the Panel and Technical Committee chairs and/or by the Pacific Salmon Commission. See the web site at:

www.psc.org/Index.htm

6.6. Management Style

The cornerstone of fish management arrangements negotiated in 1999 under the Pacific Salmon Treaty is “Abundance Based Management”. This approach means resource conservation is paramount and harvesting will fluctuate according to actual abundance rather than to pre-set levels. On the Stikine River, an abundance-based management regime has already been established and implemented for a number of years for sockeye salmon. Similar regimes are being developed for both chinook and coho salmon.

For Stikine sockeye salmon, in-season management relies on weekly forecasts of the total run size provided from a joint Canada/U.S. Stikine Management Model (SMM). The SMM is a regression model based on the historically strong relationships between catch-per-unit-of-effort (CPUE) in the lower Stikine commercial, lower Stikine test and Alaskan District 106-41 gill net fisheries with the in-river abundance. The SMM projects the seasonal run size, total allowable catch (TAC) and national allocations (as per the PST) for four stock components: total Stikine, Tahltan, main-stem and Tuya. Historical timing in each fishery is then used to apportion the national allocations to provide weekly guideline harvest levels for use by Canadian and U.S. fisheries managers. The SMM has

not performed well during the past four years; it has tended to over-estimate run sizes. As a result, modifications to it will be incorporated in 2001 in attempts to improve its performance. Until confidence is regained with the SMM, a cautious approach to management will be followed that will involve using the most conservative options provided by the model.

There is considerable interest in developing new directed fisheries both in Canada and the U.S. for Stikine chinook salmon. In the PST, the parties have agreed not to implement new directed fisheries until an acceptable abundance-based management regime has been developed. To this end, joint Canadian and U.S. stock assessment projects will be aimed at providing the necessary data required to develop and test an acceptable management regime. The program will include: a mark-recapture program to estimate total in-river population size, a test fishery to recapture tagged fish and hopefully to provide in-season estimates of abundance; a coded-wire tagging program to estimate marine distribution and harvest and perhaps smolt production; and catch monitoring, including sampling.

The least developed management process is that for Stikine coho salmon. However, a similar program to that for chinook salmon is being developed with some component projects scheduled to commence this year.

6.7. Links To Other Activities

a) Transboundary Technical Committee and the Transboundary Panel of the Pacific Salmon Treaty. For more information see the web site at:

www.psc.org/Index.htm

b) Tahltan/Iskut FN Fisheries Program
c) Stikine River Salmon Management Committee
d) Land and Resource Management Planning Processes. For more information see the web site at:

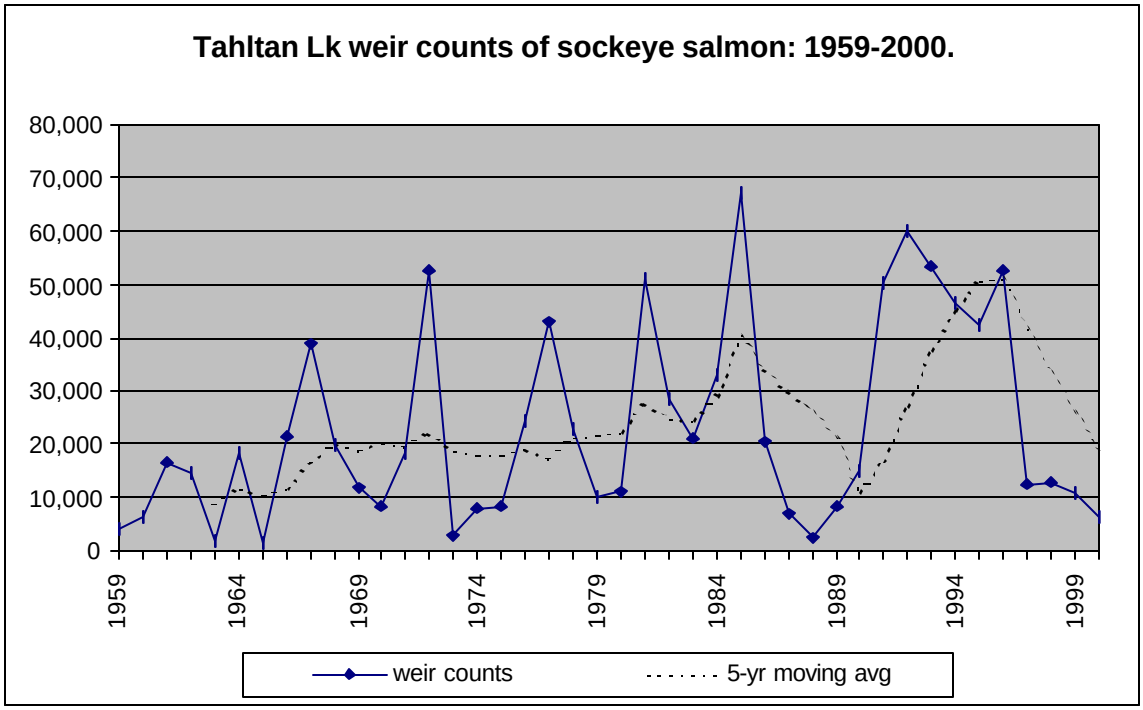
www.luco.gov.bc.ca/lrmp/spatial/toca.htm

7. SPAWNING STOCK STATUS

7.1. Sockeye Salmon

For Stikine sockeye salmon, spawning escapements are monitored for three stock groupings: Tahltan Lake, main-stem and Tuya.

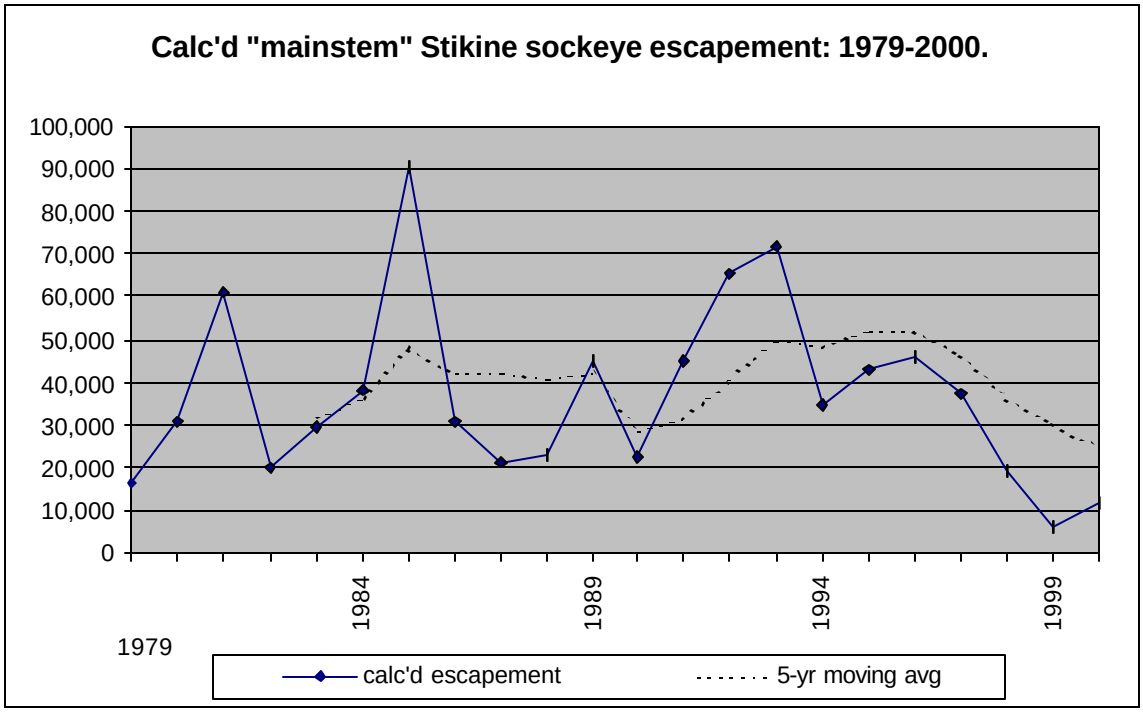
Tahltan Lake sockeye escapements have been assessed since 1959 through the use of an enumeration weir located at the lake outlet. The annual weir counts and a trend line (five-year moving average) are summarised in the following figure:



Counts have ranged from 1,471 (1965) to 67,326 (1985) and the long-term average is approximately 23,000 (1959 to 2000). The record of annual counts exhibits somewhat of a cyclic pattern with a series of dominant years each of which is usually followed by three to five years of lower counts. Although there is a wide range in the weir counts from year to year, the long-term trend in weir counts since 1959 has generally been an increasing one. For example, the five-year cycle average in the mid-1960's was approximately 11,000; this increased to about 20,000 in the 1970's and remained well above 20,000 through the mid-1980's. The cycle average declined markedly from late 1980's through the early 1990's reaching a low of approximately 11,000 for the 1986-1990 period. However this was followed by a sharp increase in counts to a record peak cycle average of 51,000 (1992-1996). Since 1996, weir counts have declined dramatically and have fallen to the 6,100 (2000) to 12,700 range. Since 1985 when the PST was first signed, the weir count has met or exceeded the management goal range of 18,000 to 30,000 sockeye through the weir in 8 years and has fallen below it in 8 years.

The escapement of the "main-stem" sockeye stock conglomerate is calculated from the total in-river run reconstruction of all stocks. First, the Tahltan Lake stock is reconstructed from the weir count plus the total in-river catch of Tahltan Lake sockeye as determined from stock ID programs. The total in-river run is then estimated by expanding the Tahltan in-river run by its proportion in the lower Stikine test fishery. The in-river run size of main-stem is estimated by applying the proportion of "main-stem" stocks in the lower river test fishery to the total in-river run estimate. Main-stem escapement estimates are obtained by subtracting the in-river catch of main-stem sockeye from the estimated total in-river run size of main-stem sockeye.

Estimates of main-stem sockeye escapement date back to 1979 and are portrayed in the following figure:

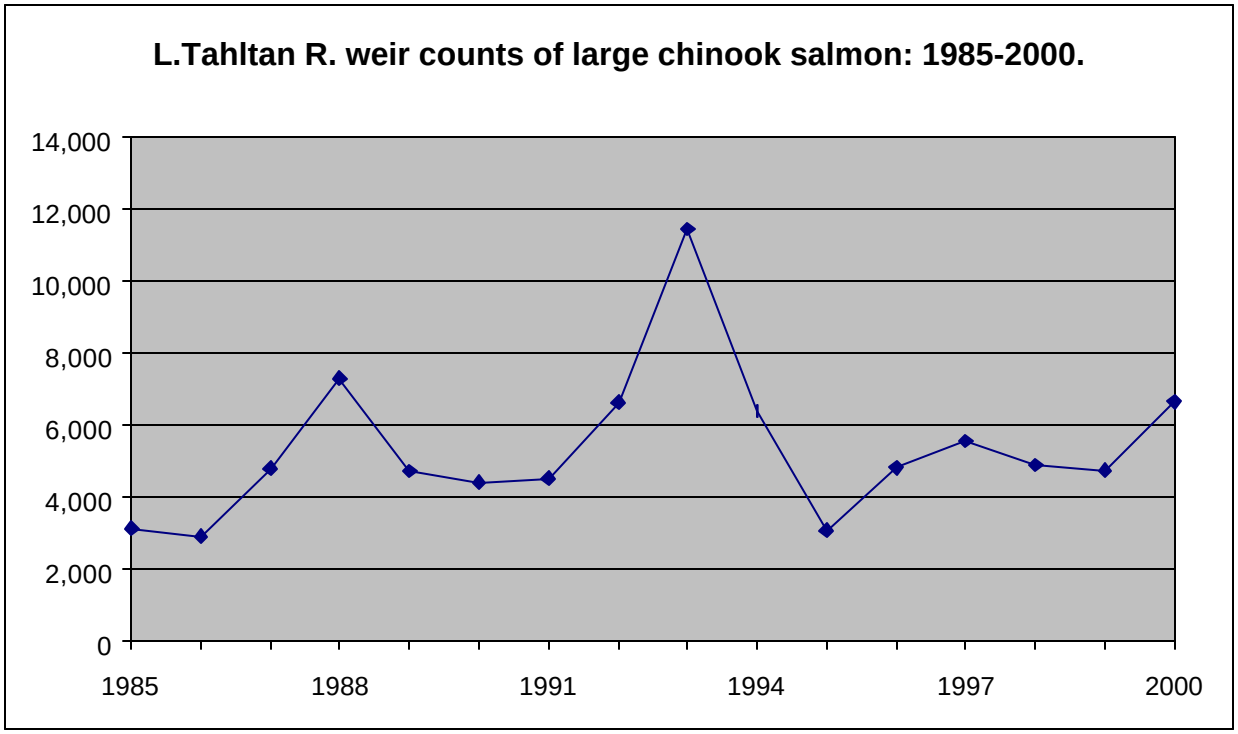


Main-stem sockeye escapement estimates range from 6,384 (1999) to 90,617 (1985) and average 36,800 (1979-2000). Generally, although the time series is 20 years less than that for Tahltan Lake sockeye, the data for main-stem sockeye shows a similar pattern to that of Tahltan sockeye, somewhat cyclical with peaks every three years or so. The trend in main-stem escapement appears to be a declining one over the past decade. Since 1985, the estimated escapement has fallen below the management goal range of 20,000 to 40,000 fish in only three years, 1998, 1999 and 2000. Recent low escapements in both main-stem and Tahltan stocks are attributed to reduced marine survival combined with excessive harvest in some years.

7.2. Chinook Salmon

The primary index of Stikine chinook escapement is the Little Tahltan River, where chinook salmon have been enumerated by means of an enumeration weir. Since 1985, when the weir was first installed, the count has averaged about 5,400 large fish (fish generally > 660 mm) and 200 jacks, and has ranged from 2,891 large fish (1986) to 11,449 (1993). The 2000 count included 6,640 large chinook and 108 jacks. Counts have consistently fallen within or exceeded the management goal range of 2,700 to 5,300, which was updated in 2000 based on stock-recruitment analysis.

The following figure summaries the counts of large chinook at Little Tahltan since 1985:

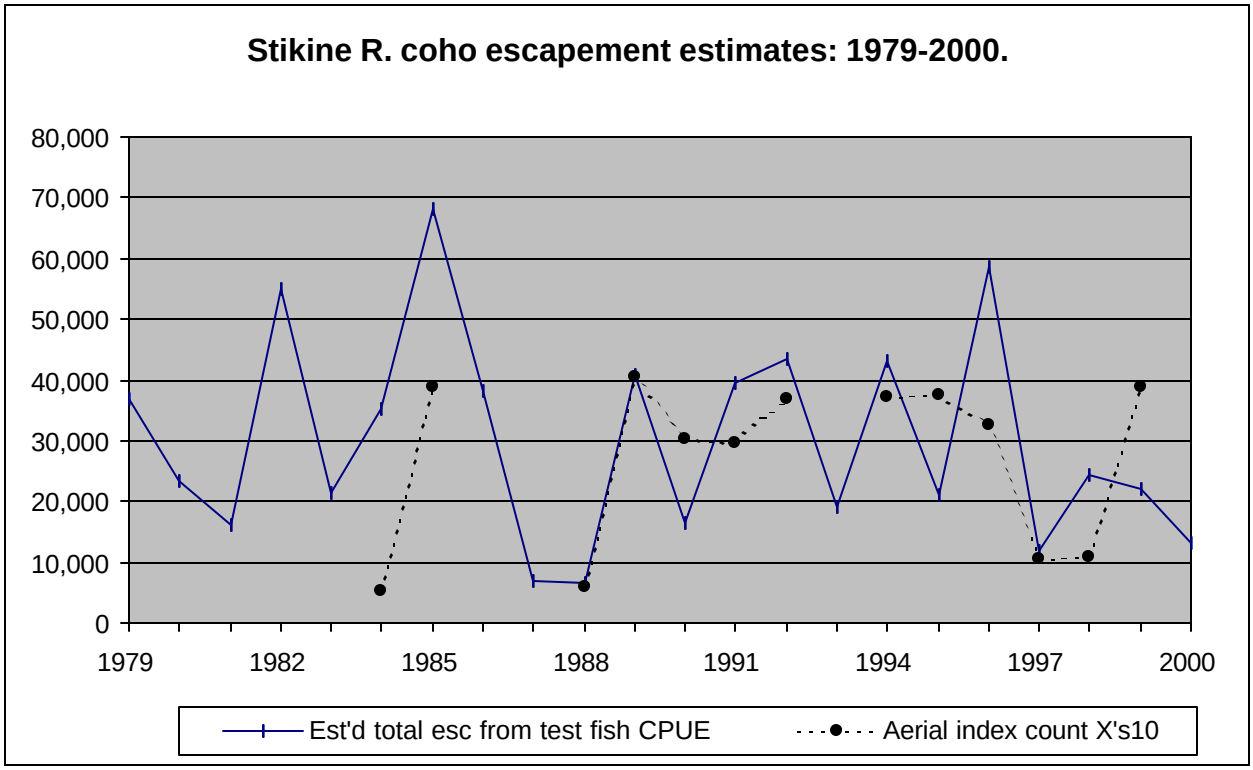


Commencing 1996, a mark-recapture program has been conducted in the lower Stikine to estimate the total in-river abundance and escapement, and to estimate the proportion of the total escapement that is represented in the Little Tahltan count. System-wide escapement estimates have ranged from 19,947 (1999) to 28,949 (1996); the recently revised system-wide MSY escapement goal range is 14,000 to 28,000 large chinook. Little Tahltan weir counts have accounted for 16.7% to 20.5% of the total escapement estimates.

7.3. Coho Salmon

Escapement data for Stikine coho salmon is not as reliable as that for sockeye and chinook salmon. System-wide estimates have been compiled based on a comparison of coho and sockeye CPUE in the lower Stikine test fishery, on the assumption they are comparable. Although it has been demonstrated that there was a significant relationship between the test fishery sockeye CPUE and in-river sockeye abundance, this relationship appears to have deteriorated in recent years, i.e. sockeye CPUE has been high, yet actual run sizes have been low. The relationship between coho CPUE and run size has not yet been determined. Frequently, the coho test fishery has not covered the entire coho migration in which case the seasonal total coho CPUE has been calculated based on expansions using historical timing data (i.e. leading to greater uncertainty).

Coho salmon escapement is also monitored through aerial surveys of select index streams. Recognising the limitations of the data, the following summarises and compares the total escapement estimates and aerial index of Stikine River coho salmon:



Based on estimates derived from test fishery CPUE, the Stikine coho escapement has exhibited strong even-year escapements and weaker odd-year escapements through the 1990's. Estimates have averaged approximately 30,000 fish since 1985 ranging from 6,400 (1988) to 68,000 (1985). The 2000 estimate, based on test fish data, is approximately 13,000 coho salmon; however the point estimate based on mark-recapture data was 25,500 (0.95 confidence interval = 13,700 to 55,812). Since 1985, the estimated escapement based on test fishery data has fallen within or exceeded the management goal range of 30,000 to 50,000 coho in seven out of sixteen years.

The combined aerial index is shown in the above figure (expanded by a factor of 10) to provide a general comparison between the two results. There is not a strong relationship between the estimated total escapement and the index counts (regression analysis for the 12 years where both data is available: $r^2 = 0.36$). Aerial counts are not nearly as cyclical as the estimates derived from test fishery CPUE although they seem to track better in years when the test fishery estimates are greater than 30,000 coho. Aerial index counts in 2000 were incomplete due to poor viewing conditions.

7.4. Pink, Chum and Steelhead Salmon

Reliable escapement data for these species is not available.

7.5. Interactions Between Species

A wide range of fish and birds are known to prey on juvenile salmon, however this has not been studied in detail within the Stikine drainage. Principal fish species that are known to predate on juvenile salmon within the Stikine River drainage are Dolly Varden, char and rainbow trout. Principal bird species that predate on juvenile salmon are believed to be mergansers, kingfishers, terns, and gulls. Mammals such as mink and otter probably also predate on juvenile salmon. Returning adults provide nutrition to a wide

range of predators/scavengers including grizzly and black bears, wolves, eagles, gulls, ravens and Canada jays.

The interactions between salmon species have not been studied in detail in the Stikine drainage. Predation of sockeye fry by larger coho juveniles has been observed in the Taku watershed and it is likely that it occurs in the lower Stikine River drainage particularly when populations of main-stem sockeye fry are abundant. It is also possible that other salmon species such as chum and pink salmon are also preyed upon by coho salmon in the lower reaches of the drainage.

7.6. Stock Assessment and Research Processes

New assessment processes for sockeye, coho and chinook salmon are being developed along similar lines. The process generally involves assessing the total in-river run size through mark-recapture programs; monitoring in-river catches to use in conjunction with in-river abundance estimates to obtain total escapement estimates; sampling catches and escapements to determine age, size and sex composition and information on the contribution of enhanced stocks; and stock specific escapement studies.

7.6.1. Sockeye Salmon

The assessment program for Stikine sockeye salmon in 2001 involves the following components:

a) Catch monitoring and sampling in the lower Stikine commercial and test fisheries to obtain weekly inputs of catch, effort and stock composition for the SMM.
b) A mark-recapture program in the lower Stikine River to provide in-season forecasts and post-season estimates of total in-river run size and escapement, major stock timing, and overall age and size distribution for comparisons with the SMM. This program was initiated last year in response to the poor performance of the SMM since 1997.
c) Sampling in other Canadian (First Nations, upper Stikine commercial and ESSR) and U.S. gill net fisheries to determine age and size distribution of catches and contributions of enhanced stocks. Sampling is also conducted for stock ID.
d) Stock-specific escapement enumeration and sampling at the Tahltan Lake weir.
e) Aerial surveys of select main-stem spawning index areas.
f) Collection of baseline samples from specific stocks for DNA analyses.
g) A number of assessment projects to evaluate the joint Canada/U.S. sockeye enhancement program on Stikine sockeye including: hydro-acoustic and limnological surveys; fry outplant and smolt emigration studies at Tahltan and Tuya lakes; otolith sampling and analyses in catches, escapements and juvenile samples to determine enhanced and wild contributions; and preliminary surveys of other potential enhancement opportunities.

7.6.2. Chinook Salmon

The assessment program for Stikine chinook salmon in 2001 involves the following components:

a) A mark-recapture program in the lower Stikine River to determine post-season estimates of total in-river run size and escapement (and test the feasibility of generating in-season estimates), major stock timing, and overall age and size distribution.
b) A Canadian test fishery which will operate to recapture tagged adult fish.
c) Sampling in Canadian and U.S. gill net fisheries to determine age and size distribution of incidental catches and contributions of enhanced stocks (in U.S. fisheries only) and to recover CWT's.
d) A coded-wire tagging program to provide smolt production estimates associated with escapement estimates, ocean survival, harvest rates, and stock identification and contributions within the marine fisheries.
e) Collection of baseline samples from specific stocks for DNA analyses.
f) A recreational creel census primarily focused on the Tahltan River.
g) Aerial surveys of select escapement index streams.

7.6.3. Coho Salmon

The assessment program for Stikine coho salmon in 2001 involves the following components:

a) A coded-wire tagging program to provide smolt production estimates associated with brood year escapement estimates, ocean survival, harvest rates, and stock identification and contributions within the marine fisheries.
b) A mark-recapture program in the lower Stikine River to obtain estimates of total in-river run size and escapement, major stock timing, and overall age and size distribution.
c) A test fishery in the lower river to measure the relative abundance of coho salmon and to recapture tagged coho.
d) Sampling in Canadian and U.S. gill net fisheries to determine age and size distribution of catches and contributions of enhanced stocks (U.S. fisheries only) and to recover CWT's.

7.6.4. Pink, Chum and Steelhead

The assessment program for Stikine pink, chum and steelhead in 2001 primarily involves monitoring catches and effort in the lower Stikine River fisheries.

8. CURRENT MANAGEMENT ISSUES

8.1. Pacific Salmon Treaty

Specific management issues noted for Transboundary rivers in the 1999 Pacific Salmon Treaty include:

a) Under the Treaty both Canada and the U.S. are obligated to develop co-operative abundance based management regimes for coho, sockeye and chinook for all three Transboundary rivers (Stikine, Taku and Alsek) by May 2004.
b) Canada and the U.S. have created a Transboundary Rivers Panel to address issues specific to these drainages. The Canadian section of the Panel includes two members with direct linkages to Stikine interests.

The main issue above relates to the timeframe for implementation of the abundance-based management regimes. Much work is required to gather the necessary background information for the development of such regimes. Additional provisions of the Treaty specific to the Stikine River include harvest sharing provisions for coho salmon and wild and enhanced sockeye salmon, and continuation of the joint sockeye enhancement program. In addition, there is potential for directed chinook salmon fisheries by mutual agreement after an acceptable management regime has been developed. Specific allocation arrangements are outlined in Section 8.3 of this document.

8.2. Uncertain Returns In 2001

The productivity of Stikine sockeye salmon has declined in both freshwater and marine environments in recent years; fry-to smolt survival rates have decreased as has smolt-to-adult survival. The latter is believed to be associated with increasing water temperatures and other shifts in the ocean regime that effect the entire ocean-based ecosystem. Reasons for the decline in freshwater survival are unclear; at Tahltan Lake both wild and enhanced juvenile sockeye salmon survivals have decreased yet plankton size and biomass have been relatively stable. Marked changes in survival can lead to difficulty in effectively forecasting run sizes preseason. In-season run forecasting accuracy has also been problematic over the past four years resulting in spawning escapement levels being below targets, particularly for the Tahltan Lake stock. This has elevated conservation concerns for both fishers and managers.

Uncertainty in in-season forecasting will result in a more conservative and precautious approach in 2001. Time, gear and area restrictions will be used to increase spawning escapements.

8.3. Uncertain Market Conditions

With the coast-wide uncertainty about returning numbers of salmon comes a difficulty in predicting the supply of salmon for the season. This can have a significant impact on the price of salmon as prices rise or fall with fluctuating catch sizes. This uncertainty can also lead to a reduction of processing and other facilities needed to process the fish. Processors are reluctant to committing to the operation of facilities without a set level of supply available to ensure commercial viability.

8.4. Fisher Interactions (Commercial Factions)

In the past, there have been a number of issues and conflicts in the commercial fishery on the Stikine River, which have had adverse affects on the fishery and the Department's ability to manage salmon stocks. Examples include conflicts over fishing areas and licence transferability. Disputes over set-net fishing locations between fishers has lead to closing specific eddies out of concerns for public safety. The elimination of productive fishing sites from the fishery increases fishing pressure in other areas which may be detrimental to local stocks and cause increased competition amongst fishers. The lack of a licence transferability protocol has impacted both fishers intending to retire from the fishery as well as new fishers wishing to enter the fishery. There are attempts being made to address these and other issues through active discussion in the Stikine River Salmon Management Committee.

9. LONG TERM OBJECTIVES FOR THE FISHERY

The long term objectives for Stikine fisheries include:

a) Meeting the obligations contained in the Pacific Salmon Treaty with respect to conservation, abundance-based management, allocations, joint enhancement and continuing to work towards equitable harvest sharing arrangements regarding Canadian-origin Stikine River salmon.
b) Developing management plans in consultation with stakeholders that are consistent with the draft Wild Salmon Policy discussion paper, and selective fishing approaches, and specifically address conserving and restoring spawning stocks and habitats
c) Developing and/or maintaining sustainable and viable Canadian fisheries while fulfilling the Section 35, constitutional priority of the First Nations fishery.
d) Strategically enhancing selected stocks.

10. SPECIFIC MANAGEMENT OBJECTIVES

10.1. Spawning Escapement Requirements

10.1.1. Sockeye Escapement

Four sockeye stocks are monitored for the Stikine River: the Tahltan Lake wild and enhanced stocks which spawn in Tahltan Lake; the Tuya Lake enhanced sockeye stock; and the main-stem wild stock which is a conglomerate of wild stocks which spawn elsewhere throughout the drainage. The Tahltan wild and Tahltan enhanced stocks are managed as a single component, as is the main-stem stock conglomerate. Tuya enhanced stocks are managed coincidentally with the other groupings, primarily with the Tahltan wild and enhanced groups.

Spawning escapement goals have been established as ranges which reflect biological data regarding stock productivity, the ability of existing management systems to deliver established goals, the accuracy and precision of estimates of escapement generated by stock assessment programs, and the degree of risk considered acceptable. At present, our best judgement of the escapement targets for these stocks are as follows.

10.1.1.1. Tahltan Lake Stock

In the spring of 1993, the Transboundary Technical Committee revised the escapement target for Tahltan Lake sockeye based on recommendations of an analysis conducted by DFO staff and reviewed by the Pacific Stock Assessment Review Committee (PSARC). The previous target of 30,000 fish was based largely on "professional judgement". Separate adult and fry stock recruitment analyses conducted on extensive data sets developed in recent years indicate that maximum sustained yield of Tahltan sockeye is more likely achieved at escapements of 15,000 - 19,000 spawners. The PSARC review recommendations lead to the establishment of a conservative goal of 24,000 fish, which takes into account a spawning escapement goal of 20,000 fish and the approximately 4,000 fish needed for broodstock to meet the objectives of the current Canada/U.S. Stikine

River enhancement program. Management goals developed by the Transboundary Technical Committee for Tahltan Lake wild and enhanced sockeye are summarised in the table below:

	TARGET = 24k (wild + enhanced)				
Escapement	**0 - 12k**	**13k - 18k**	**18k - 30k**	**30k - 45k**	**> 45k**
Mgmt. Category	**Red**	**Yellow**	**Green**	**Yellow**	**Red**

10.1.1.2. Main-stem Stocks

Management goals developed by the Transboundary Technical Committee for main-stem sockeye are summarised in the table below:

	TARGET = mid-point = 30k				
Escapement	**0 - 15k**	**15k - 20k**	**20k - 40k**	**40k - 75k**	**> 75k**
Mgmt. Category	**Red**	**Yellow**	**Green**	**Yellow**	**Red**

A post-season estimate of escapement that falls within the above-noted Green Management Category shall be considered fully acceptable; one that falls within the Yellow Management Category shall be considered acceptable but not desired; and, one that falls within the Red Management Category shall be considered undesirable.

10.1.1.3. Tuya Stock

The current enhancement program annually outplants fry (originating from Tahltan Lake brood stock) into Tuya Lake, which has significant sockeye rearing capacity. Barriers prevent adults from returning to the lake. Theoretically, the Tuya stock, an enhanced stock with no current available spawning ground except for a very limited area at the mouth of the Tuya River, has a spawning escapement goal of zero. In practice however, since the Tahltan and Tuya stocks co-mingle and have the same run timing, the Tuya stocks are only harvested at the same rate as the Tahltan sockeye so as to not over harvest the Tahltan stock. This results in Tuya sockeye returning to the Tuya River which are available for ESSR harvest.

10.1.2. Coho Escapement

The interim escapement goal range for coho salmon has been set between 30,000 and 50,000 (thirty and fifty thousand).

10.1.3. Chinook Escapement

In 1999, the Joint Chinook Technical Committee of the PSC re-examined the Stikine chinook salmon escapement target. Results of the analysis appear in the "Pacific Salmon Commission Joint Chinook Technical Committee Report TCCHINOOK (99)-3. 1999: Maximum sustained yield or biologically-based escapement goals for selected chinook salmon stock used by the Pacific Salmon Commission's Chinook Technical Committee for escapement assessment". The target range recommended in this report is 14,000 to 28,000 total Stikine River (above border) chinook salmon which was adopted by the Transboundary Technical Committee (TTC) in 2000. The point estimate of escapement that produces MSY is approximately 17,400 chinook salmon. Based on mark-recapture data, the overall escapement target range translates into a Little Tahltan River escapement goal of 2,700 to 5,300 large chinook salmon with a point target of 3,300 fish. Since 1985, when the weir was first installed, the escapement has not fallen below the lower end of this range. The escapement has however, exceeded the upper end of the range in six years (1988, 1992, 1993, 1994, 1997, 2000).

10.1.4. Other species

No escapement levels have been set for other species of salmon on this system.

10.2. Departmental Objectives

The objectives of Fisheries and Oceans Canada resource management sector are to manage the salmon stocks according to the following priorities:

a) Priority 1: Attain escapement goals and maintain fish habitat that will result in optimum production of the stocks.
b) Priority 2: Provide fishing opportunities that achieve food, social and ceremonial needs of First Nations.
c) Priority 3: Provide salmon harvesting opportunities for commercial, recreational and domestic fishers and gather associated catch data and information.

Achieving these objectives in the Stikine drainage is difficult due to many factors such as: biological complexity of the stocks; a somewhat limited, though growing stock status data base; increasing efficiency and demands of all user groups; and the requirement for a precautionary approach to fisheries management. The move to abundance based management internationally may help to address some of these concerns.

10.3. Allocations

10.3.1. International

The following arrangements will apply to the Stikine River for the 1999 to 2008 period as outlined in the Transboundary Annex of Pacific Salmon Treaty that was re-negotiated in 1999.

10.3.1.1. Sockeye Salmon

a) Assessment of the annual run of Stikine River sockeye salmon shall be made as follows:

i) A pre-season forecast of the Stikine River sockeye run will be made by the Transboundary Technical Committee (TTC) prior to April 1 of each year. This forecast may be modified by the TTC prior to the opening of the fishing season.

ii) In-season estimates of the Stikine River sockeye run and the Total Allowable Catch (TAC) shall be made under the guidelines of an agreed Stikine Management Plan and using a forecast model developed by the TTC. Both U.S. and Canadian fishing patterns shall be based on current weekly estimates of the TAC. At the beginning of the season and up to an agreed date, the weekly estimates of the TAC shall be determined from the pre-season forecast of the run strength. After that date, the TAC shall be determined from the in-season forecast model.

iii) Modifications to the Stikine Management Plan and forecast model may be made prior to June 1 of each year by agreement of both Parties. Failure to reach agreement in modifications shall result in use of the model and parameters used in the previous year.

iv) Estimates of the TAC may be adjusted in-season only by concurrence of both Parties' respective managers. Reasons for such adjustments must be provided to the TTC.

b) The Parties desire to maximise the harvest of Tahltan/Tuya sockeye salmon in their existing fisheries while considering the conservation needs of wild salmon runs. The Parties agree to manage the returns of Stikine River sockeye to ensure that each country obtains 50% of the TAC in their existing fisheries. Canada will endeavour to harvest all of the fish surplus to escapement and broodstock needs returning to the Tuya and Tahltan Lake systems.

c) The Parties agree to continue the existing joint enhancement programs designed to produce annually 100,000 returning sockeye salmon.

10.3.1.2. Coho Salmon

a) The Parties agree to develop and implement an abundance-based approach to managing coho salmon on the Stikine River no later than May 1, 2004. Assessment programs need to be further developed before a MSY escapement goal can be established.

b) In the interim, the United States' management intent is to ensure that sufficient coho salmon enter the Canadian section of the Stikine River to meet the agreed spawning objective, plus an annual Canadian catch of 4,000 coho salmon in a directed coho salmon fishery.

10.3.1.3. Chinook Salmon

a) Both Parties shall take the appropriate management action to ensure that the necessary escapement goals for chinook salmon bound for the Canadian portions of the Stikine River are achieved.

b) The Parties agree that new fisheries on Stikine River chinook salmon will not be developed without the consent of both Parties. Management of new directed fisheries will be abundance-based through an approach to be developed by the TTC no later than May 01, 2004. The Parties agree to implement assessment programs in support of the development of an abundance-based management regime.

c) The Parties shall review an appropriate MSY escapement goal for Stikine River chinook by May 1999 and establish a new goal as soon as practicable thereafter.

10.3.2. First Nations

Under terms of the Aboriginal Fisheries Strategy agreement between the Tahltan and Iskut First Nations and the Department, it has been agreed that First Nations catches of ten thousand (10,000) sockeye, two thousand (2,000) chinook and two hundred (200) coho salmon will be managed for in 2001.

10.3.3. Commercial Fishery

Allocations to the commercial fishery are based on the projections of total run strength and TAC; the TAC for the commercial fishery will have escapement goals and First Nations fishery requirements already accounted for. With abundance-based management, pre-season estimates of potential harvest are estimates only; in-season estimates of allowable catch will vary weekly based on in-season indicators.

10.3.4. Recreational Fishery

Allocations to the recreational fishery on the Stikine River are generally not actively set in-season. Rather, recreational fishing catch is limited by daily and possession limits set out in the British Columbia Freshwater Sport Fishing Regulations Synopsis and in the B.C. Freshwater Salmon Supplement. The supplement is available free of charge from licence vendors. Both publications can be viewed on-line at:

British Columbia Freshwater Sport Fishing Regulations Synopsis:

www.bcfisheries.gov.bc.ca/pdf/Region_6.pdf

B.C. Freshwater Salmon Supplement:

www-comm.pac.dfo-mpo.gc.ca/english/freshwater

On the Stikine River, the recreational fishing catch limits include:

a) 4 chinook salmon per day of which only 2 may be over 65 cm in length (from tip of nose to fork of tail).
b) 4 coho salmon per day of which only two may be over 50 cm in length.

c) retention of sockeye (except Kokanee), pink and chum salmon is not permitted.
d) 10 Kokanee per day (none from streams); and 2 steelhead of which 1 may be over 50 cm in length and none may be less than 30 cm in length.
e) The aggregate daily limit for all species of pacific salmon is four fish, except for steelhead.
f) Generally, subject to monthly and annual catch limits, possession limits are equal to twice the daily quota. Monthly catch quotas include 2 steelhead and there are annual catch quotas of 10 chinook salmon greater than 65 cm in length, and 10 steelhead.

11. MANAGEMENT MEASURES

11.1. In-Season Management

In-season management will be based on weekly forecasts of run abundance, TAC and escapement. The SMM, a model based on the linear relationship between CPUE and run size, has been updated to make weekly in-season predictions of the total run and the TAC during the 2001 season. A description of the original model is given in the Transboundary Technical Committee Report: TCTR (88)-2, "Salmon Management Plan for the Transboundary Rivers, 1988". Many subtle changes have been made in the model since that document was written and a new document is in progress. The purpose of the model is to aid managers in making weekly harvest decisions to meet U.S./Canada treaty obligations for harvest sharing and conservation of Stikine sockeye salmon.

The model for 2001 is based on CPUE data from 1985 to 2000 from District 106 and the Canadian commercial fishery in the lower river and from 1986 to 2000 from the lower Stikine test fishery. Linear regression is used to predict run size from cumulative CPUE for each week of the fisheries beginning in week 26 for all three fisheries. New for the model in 2001 is a refinement to the lower Stikine commercial CPUE which excludes catch and effort data from the Flood Glacier area, i.e. the new area introduced in 1997. In addition, the annual weekly CPUE values were increased by a factor of 1/0.75 for years prior to 1994 to account for the extra gear allowed starting in that year. This makes the historical CPUE data more comparable with the post-1993 era. These modifications helped to correct the model for 1999 and 2000, which overestimated the run significantly.

In the past, three sets of CPUE data have been used to predict the total run. These include:

a) The District 106 cumulative CPUE of Stikine sockeye stocks is used to predict the total run of Stikine sockeye salmon.

b) The cumulative CPUE from the Canadian lower river commercial fishery is used to predict the in-river Stikine sockeye run. The total run is then determined as the in-river run plus the estimated total season catch of Stikine sockeye salmon in District 108 (the minimum of: the cumulative catch proportioned out to end of season using average run timing; or, the TAC minus the assumed 106 catch of 10% of the run) and the estimated season catch in D106 (assumed to be 10% of the run). District catches will be determined from in-season model estimates of weekly Stikine catches for past

weeks and using average migratory timing to determine catch for the remainder of the season.

c) Starting in 1995, the cumulative CPUE from the Canadian test fishery has been used to predict the in-river Stikine sockeye run. The in-river run estimate was expanded as per item b) above to project total run size.

The 2001 in-season forecasts of abundance and TAC will be based on the following data sets:

a) Forecasts for weeks 26 through week 27 will be based on the preseason forecast as described in Section 10.1.
b) The forecast for week 28 will be based on the SMM with inputs from the week 27 in-river test fishery.
c) The forecasts for weeks 29 through 30 will be based on the SMM with inputs primarily from the in-river test fishery in the lower Stikine. In previous years, forecasts based on the in-river commercial fishery data were used for this period but these tended to overestimate the run.
d) The forecasts after week 30 will be based on the week 30 forecast derived from the in-river test fishery in the lower Stikine. The SMM will continue to be updated after week 29, however run forecasts will not be used for management unless both Parties agree.
e) In the event that the test fishery does not operate for a given week after week 28, the CPUE data from the lower Stikine commercial fishery will be used.
f) Historical timing data will be used in the projections weekly guideline harvests in each country.

The reason for excluding forecasts from District 106 data is that weekly regressions of CPUE on run size using the in-river data usually have higher coefficients of correlation compared to those based on District 106 data. Predictions from the District 106 data will continue to be made to verify in-season estimates and provide post-season comparisons.

Separate projections of run size will be made for the total Stikine sockeye run (wild plus planted), Tahltan stock (wild plus planted), the planted Tuya stock, and the main-stem stock. This information will be used in-season to help management and, post-seasonally, to help evaluate the performance of the model.

The part of the model which determines total and weekly TAC levels for the U.S. and Canadian fisheries has been formulated in EXCEL 5.0 for use by managers in-season. This part of the model uses the coefficients from the linear regression model, the established escapement goals, and PST provisions of harvest sharing to determine the total TAC for each country. Estimates of weekly TAC and effort are provided as guidelines for the managers and are derived from the 1985 - 2000 average run timing of the stocks and the corresponding average CPUE levels of each fishery.

For 2001, the model predictions will set the TAC levels; however, managers may use additional information on which to make decisions on the openings of their respective fisheries. They will evaluate the output of the model and look for discrepancies with other information they may have on run strength. For example, estimates from the new mark-recapture project may be used/considered and as in previous years, in-season

escapement projections particularly at Tahltan Lake may influence weekly management decisions regardless of model forecasts. The information and evaluation will be used to improve the model for the next year.

After the fishing season is over, the Transboundary Technical Committee will evaluate how well the model performed in predicting the entire run, where discrepancies occurred, and what might have caused them. The committee will also determine whether escapement goals were met. This information is presented in the annual catch and escapement reports prepared by the committee. For 2000, the preliminary evaluation may be found in: "Preliminary Estimates of Transboundary River Salmon Production, Harvest, and Escapement and a Review of Joint Enhancement Activities, 2000", Transboundary Technical Committee, January, 2001.

11.2. Commercial Fisheries

11.2.1. Lower Stikine Commercial Fishery:

The lower Stikine River commercial fishery will open at 12:00 noon, June 24, 2001 for 24 hours. Fishing times in this fishery in subsequent weeks will depend upon stock assessment and international and domestic allocation considerations. Fishing times will be adjusted accordingly however fishers should expect fishing times to be quite restricted in 2001.

Both licences and conditions will be available from DFO personnel on the river. The primary conditions of the lower Stikine commercial licence will include:

a) Although the fishing area will include that portion of the Stikine River, from the Canada/U.S. border upstream to fishery boundary signs located approximately 2 km upstream from the confluence of the Stikine and Flood rivers, the section of the Stikine River upstream of boundary signs located near the Porcupine River confluence will be closed until further notice to address conservation concerns. The fishing area also includes the portion of the Iskut River from its confluence with the Stikine River, upstream to the boundary signs located approximately 1.5 km upstream from the water survey station on the lower Iskut River.

b) Until further notice, each licence holder is permitted to fish only one gill net which may be a drift or set gill net. If run abundance is exceptional, no escapement concerns exist, and the total catch is below Canada/U.S. harvest sharing targets, consideration will be given to increasing the number of nets per licence to two.

The maximum allowable net length remains at 135 meters and there will be a maximum mesh size restriction of 150 mm in effect through noon July 16 to conserve chinook salmon. Gill nets (set or drift) must meet the following web specifications:

i) have 30 or more filaments in each twine of the web, with all filaments in the web of equal diameter. This is the web which has been typically fished on the Stikine River in the past; or,

ii) have 6 or more filaments in each twine of the web, with all filaments in the web a minimum of 0.20 mm in diameter. This web is otherwise known as "Alaska twist".
iii) The minimum allowable mesh size of gill nets used in this fishery shall not be less than 100 mm. The maximum allowable mesh size of gill nets used in this fishery shall not exceed 150 mm between noon June 24, 2001 to noon July 15, 2001.
iv) The maximum gill net depth shall not exceed 60 meshes. The maximum gill net hang ratio shall not exceed three fathoms of mesh to one fathom of corkline (3:1). The minimum corkline to web distance may not exceed zero (0) cm. The maximum corkline to web distance may not exceed zero (0) cm.

c) Unless otherwise specified in the conditions of licence, except on weekly closing days, fishers are required to land all fish caught within each 24 hour period (commencing at noon), at a registered landing station by 14:00 hours (2 p.m.) immediately following that 24 hour period. Fishers will be required to report catches segregated by:

i) fishing method: drift net (**DN**); or, set net (**SN**)
ii) general location: Above Iskut (**AI**); In Iskut (**II**); Below Iskut (**BI**); Above Porcupine (**AP**) although this area is expected to remain closed this season.

If no fish are caught during the 24-hour period then a landing slip indicating no catch shall be recorded.

On closure days, all fish must be landed at a registered landing station by 16:00 hours (4 p.m.).

d) All tags recovered during an opening must be segregated by gear type and delivered to the Fisheries and Oceans Canada Mark/Recapture Program personnel no later than four (4) hours after the closure of that opening.

e) When requested, all fish shall be made available for sampling by Fisheries and Oceans Canada personnel and/or individuals designated by the Department.

Conservation concerns generally result in fishing time and area restrictions. In the event that a more liberal regime is justified, extensions to fishing time would be granted first. If additional effort is warranted, there will be consideration for increasing gear and fishing area, however, it is not anticipated that this will occur in 2001. Additional fishing effort will be dependent on stock status and precautionary principles.

11.2.2. Upper Stikine Commercial Fishery

The upper Stikine River commercial fishery will open at 12:00 noon, June 24, 2001 for 24 hours. Subject to conservation and domestic allocation priorities, the length of subsequent openings will generally follow the commercial fishery

schedule in the lower river delayed by one week, i.e. the fishery opening in the lower river in the previous week.

The conditions of the upper Stikine commercial licence will be similar to those in 2000:

a) The fishing area will include that portion of the Stikine River between the Tahltan and Chutine rivers.
b) Only one gill net per licence holder may be used.
c) All fish caught must be immediately recorded on a fish slip. This information as well as all tag recoveries shall be delivered to the designated contact for Fisheries and Oceans Canada in Telegraph Creek B.C. Fish slips and tags must be received within 24 hours of the close of each weekly fishery.
d) When requested, all fish shall be made available for sampling by Fisheries and Oceans Canada personnel and/or individuals designated by the Department.
e) Net dimensions will be the same as those for the lower Stikine River commercial fishery as outlined above.

11.3. First Nations Fisheries

As in past years, weekly fishing time in the Stikine First Nations fishery will not be restricted other than to address serious conservation concerns. Reductions in fishing time would be considered providing no other adjustments can be made first in the lower and upper Stikine commercial fisheries. Daily records of individual First Nation fisher's catch will be collected weekly by the Tahltan First Nation and forwarded to the Fisheries and Oceans Canada office in Whitehorse.

11.4. Recreational Fisheries

Fishing restrictions for the recreational fishery are described in the B.C. Freshwater Sport Fishing Regulations Synopsis and the B.C. Freshwater Salmon Supplement 2001/2002. Gear is limited to single barbless hooks for fishing in all streams and sloughs. For specific details, see:

www-comm.pac.dfo-mpo.gc.ca/english/freshwater/

11.5. Control and Monitoring of the Fisheries

The Canadian commercial fishery will be monitored by DFO staff and contractors who will collect catch and tag recovery data from fishers and sample portions of the catch for age, size, sex and stock composition determinations. Catch and tag recovery data will be collected daily and will be recorded for each licence by species and hours fished. Conservation and Protection staff will monitor and enforce compliance in the fishery.
Catch monitoring in the First Nations fishery will be conducted by the Tahltan First Nation (TFN) in conjunction with Fisheries and Oceans Canada. Catches will be collated by TFN by fisher, species caught and hours fished. Catch and effort data will be provided to the Department weekly. In consultation with TFN, Conservation and Enforcement staff will assist TFN in monitoring and enforcement in the First Nations fishery if and when required.

Monitoring in the recreational fishery will be conducted by creel census programs undertaken by Stock Assessment staff of the Department and TFN. Compliance

monitoring and enforcement will be undertaken by enforcement personnel with the Province of B.C. and/or Fisheries and Oceans Canada.

11.6. Licensing

Prior to fishing in the Stikine watershed, a person must be the holder of a valid licence to fish in at least one of the five basic licence categories.

These categories are:

a) Communal
b) Experimental, Scientific, Educational or Public display
c) Recreational
d) Commercial
e) Excess to Salmon Spawning Requirements (ESSR)

11.6.1. Communal

This licence is issued to First Nations that have had historical access to fish in the Stikine River watershed and is for food, social and ceremonial purposes. The First Nations maintain control of this licence and have the authority to designate all persons fishing in this category. There is no fee for these licences.

11.6.2. Experimental, Scientific, Educational or Public Display Purposes:

These licences are issued pursuant to the *Fishery (General) Regulations* (FGR) Part VII and allow for fishing for the sole purpose of gathering information. The only stipulation for this type of licence is that it must be used for proper management of the fishery and be approved by the Minister. There is a fee of $100 only when the fish are to be used for display purposes.

11.6.3. Recreational:

Recreational fishing on the Stikine River is permitted provided anglers over the age of sixteen are the holders of a current B.C. angling licence. A salmon conservation stamp must be validated with the basic angling licence if the intent is to keep salmon.

If you are a resident under the age of sixteen you may fish without a licence and you do not need to be accompanied by a licence holder. Daily quotas, area restrictions and other regulations apply, see the web site at:

www.bcfisheries.gov.bc.ca/pdf/Region_6.pdf

Non-residents under the age of sixteen may fish without a licence but must be in the company of a valid licence holder. The non-resident's catch must be included as part of the possession limit of the licence holder.

Fees vary depending on the type of licence

11.6.4. Commercial

There are currently twenty-three licences available for commercial fishing on the Stikine River. Eligibility requirements include having held a licence in the previous year. Recommendations for transferring commercial licences have been

developed by the Stikine River Salmon Management Committee. These are expected to be forwarded to the Minister over the next year for review. The cost of a commercial licence is $200, except for those provided through the First Nation AFS agreements for which there is a $20 charge.

11.6.5. Excess Salmon to Spawning Requirements (ESSR) Licence:

It is possible that the number of sockeye reaching Tahltan Lake and/or the Tuya River may exceed escapement requirements, particularly for the latter. In preparation for this possibility and as per previous years, DFO has issued an ESSR licence to the Tahltan First Nation to harvest excess sockeye at the weir at Tahltan Lake, or other headwater locations such as Tuya and/or Tahltan River.

The issuance of an ESSR licence must follow stringent policy guidelines. Some of the noteworthy principles and policy guidelines include:

a) The first priority is to provide adequate escapement to perpetuate and rebuild the salmon resource.
b) DFO will attempt to manage existing fisheries to minimise surpluses. Therefore, DFO will not manage for an ESSR; fish taken under an ESSR licence are fish that are surplus to spawning requirements that could/should have been taken in existing fisheries. As a result, there is no guarantee fish will be available for an ESSR fishery and there is no guaranteed amount of salmon that may be taken.
c) In allocating an ESSR, the first priority will be to use the surplus to meet outstanding First Nations requirements for food, social and ceremonial purposes which cannot be met through approved Section 35 fisheries. This may be done under a communal licence or the Aboriginal Fisheries Strategy agreement. As a second priority, the local Tribal Councils/First Nations may be offered the first opportunity to harvest all, or part of the ESSR. In accordance with DFO policy, the Tahltan First Nation (TFN) has been given the right of first refusal for the 2001 ESSR for Tahltan Lake and Tuya River sockeye;
d) If the TFN declines the ESSR, the opportunity may be offered to other groups/individuals;
e) ESSR licence holders are required to invest profits from sales of the surplus into measures that benefit the resource.

The general operating conditions for harvesting Tahltan Lake sockeye under the 2001 ESSR licence are similar to previous licence conditions. These include:

a) Harvesting will not commence until the weir count exceeds 15,000 sockeye and the forecast is for more than 27,000 sockeye to enter the lake. Fisheries and Oceans Canada personnel will determine when the fishery commences.
b) For cumulative weir counts of less than 27,000, up to 25% of the daily sockeye escapement into Tahltan Lake may be harvested subject to (a) above.
c) Once the weir count exceeds 27,000, the percentage may be increased to 75%. In 2001, consideration will be given to increasing this percentage depending on run size and fish quality.

d) The licensee has the responsibility to inspect and record the total daily catch, and determine the incidence of marked, clipped and/or tagged fish if required by DFO.
e) The licensee shall make the catch available to DFO for sampling purposes if and when required.
f) Fish caught under this licence may be sold commercially or given away, traded or bartered. If fish are to be exported, they first must to pass through a registered landing station or processing plant. Live fish and eggs cannot be transported or transplanted under this licence.
g) Profits associated with the sale of surplus fish harvested under the authority of this licence are to be utilised to conduct future enhancement work.

The above conditions will serve as general guidelines for 2001. However, consideration may be given for modifications to address logistical, or other problems, providing such modifications do not impair the achievement of conservation objectives. Because of the migration characteristics of the fish, the actual implementation of fishing at Tahltan Lake will likely occur on very short notice.

12. PROSPECTS FOR THE SEASON

12.1. Sockeye Salmon

For 2001, the total run forecast for Stikine sockeye salmon is 108,000 fish, which constitutes a below average run. For comparison, the recent ten-year average (1991-2000) total Stikine sockeye run size is approximately 200,000 fish. The 2001 forecast includes approximately 25,000 Tahltan (23%), 5,000 planted Tahltan (5%), 35,000 Tuya (32%), and 43,000 main-stem sockeye salmon (40%).

The 2001 prediction is based on the following components:

a) A forecast of approximately 30,000 Tahltan wild and enhanced sockeye of which 5,000 are expected from the enhancement project. This is the average of a sibling-based forecast of 35,000 for the total Tahltan stock which includes approximately 4,000 enhanced sockeye, and a smolt forecast of 25,000 Tahltan sockeye of which 6,000 are expected to originate from the enhancement project.
b) A forecast of 35,000 Tuya sockeye salmon, which is a forecast based on 1997-00 average age-specific fry-to-adult survival data for Tuya sockeye.
c) a forecast of 54,000 main-stem stock based an the average of 54,000 from a sibling forecast and 52,000 sockeye from an adjusted stock recruitment forecast.

Age and stock specific catch and escapement estimates are used to reconstruct annual runs for the Stikine sockeye stocks. Marine catch estimates are based on ADF&G scale pattern analysis. In-river catch estimates from the lower Stikine River are based on a variety of stock identification techniques (SPA, egg diameters, parasite frequency, electrophoretic data). The contribution of Tahltan stocks to upper river commercial and First Nations fisheries had been assumed to

be 90% prior to 1997 and has been estimated from egg diameter analysis since 1997. The contributions of planted Tuya and Tahltan fish to various harvests are estimated from analysis of otoliths for thermal marks combined with analysis of scale patterns or egg diameters. Tahltan escapements are enumerated at the Tahltan Lake weir and Main-stem and Tuya escapements are calculated through the subtraction of the reconstructed in-river Tahltan run and the estimated in-river catches of Tuya and main-stem sockeye stocks from the total in-river run estimates.

12.1.1. Tahltan Lake Sockeye Forecast

Sibling forecast: The sibling forecast technique used for the Tahltan stock is based on the relationship between the return of age-4 fish in one year and the total run in the following year. Using data from both planted and wild Tahltan runs, the relationship between the return of age-1.2 fish (4 year olds with two years in marine waters, also designated as $4_{(2)}$) in one year and the total run (all ages) in the following year is described by the following equation:

$$N_{t+1} = 8{,}743 + 9.487 \cdot N_{1.2,t} \qquad [1.a]$$

where: N_{t+1} = total Tahltan run (all ages) in year(t+1); and
$N_{1.2,t}$ = total Tahltan return of age-1.2 in year(t).

The wild Tahltan component by itself is estimated by:

$$N_{t+1} = 7{,}380 + 9.4713 \cdot N_{1.2,t} \qquad [1.b]$$

where: N_{t+1} = wild Tahltan run (all ages) in year(t+1); and
$N_{1.2,t}$ = wild Tahltan return of age-1.2 in year(t).

The return of all age-1.2 Tahltan sockeye salmon in 2000 was estimated to have been 2,781 fish. Using equation [1a], a run size of 35,000 Tahltan sockeye salmon is expected in 2001. The estimated wild component of this forecast is 31,000 sockeye salmon (from an estimated return of 2,458 wild Tahltan age-1.2 fish in 2000 and equation 1.b). Subtracting the predicted run of wild Tahltan fish from the total Tahltan forecast yields a run projection of 4,000 planted Tahltan fish.

Smolt based forecast: The other forecast method examined for Tahltan sockeye salmon was based on smolt data and average survival rates for individual age classes of both wild and enhanced smolts from smolt years 1994 on. It is generally agreed by oceanographers that recent significant changes in marine productivity have likely affected salmon production since the 1994 year of entry into the marine environment and therefore only data from 1994 on was used.

Average rates of return for 2001 wild age classes were estimated as follows: 4.2% of the 0.288 million age 1+ smolt counted in 1998 are expected to return as age 5(2) in 2001; 1.1% of the 0.452 million age 1+ smolt counted in 1999 expected to return as age 4(2) in 2001; 3.4% of the 43,000 age 2+ smolt counted in 1998 expected to return as age 6(3) in 2001; and 3.6% of the 17,000 age 2+ smolt counted in 1999 expected to return as age 5(3) in 2001. The wild Tahltan Lake sockeye run is therefore expected to be 19,323 in 2001 based on smolt data.

Average rates of return for 2001 enhanced age classes were estimated as follows: 2.3% of the 0.210 million age 1+ enhanced smolt counted in 1998 are expected to return as age 5(2) in 2001; 0.3% of the 0.293 million age 1+ enhanced smolt counted in 1999 expected to return as age 4(2) in 2001; 1% of the 8,300 age 2+ enhanced smolt counted in 1998 expected to return as age 6(3) in 2001; and 2.4% of the 1,400 age 2+ enhanced smolt counted in 1999 expected to return as age 5(3) in 2001. The enhanced Tahltan Lake sockeye run is therefore expected to be 5,712 in 2001 based on smolt data.

Using smolt-to-adult survival data for the 1994 ocean year of entry on, gives an expected run of approximately 25,000 total Tahltan sockeye salmon, including 19,000 wild and 6,000 planted fish. By including only the survival data from the 1994 year of ocean entry on, we have attempted to incorporate the low recent survivals observed in recent years.

The 2001 preseason total Tahltan Lake sockeye forecast that will be used for management purposes at the beginning of the season is 30,000 sockeye salmon derived from the average of the sibling-based and smolt-based forecasts. A run of this magnitude would be well below the previous 10-year average of 104,000 fish and below the previous 5-year average of 61,289 sockeye. Last year's run of 21,171 fish was 36% below the preseason forecast of 33,000 fish.

12.1.2. Tuya Forecast

A total run size of approximately 35,000 Tuya Lake sockeye is expected in 2001 comprised of <500 age-4 sockeye salmon, 17,000 age-5 sockeye salmon, and 17,500 age-6 sockeye salmon. This run outlook is based on the 1997-00 average age-specific sockeye fry-to-adult survivals observed at Tuya Lake applied to the estimated number of fry outplanted in Tuya Lake in 1996 (BY 1995), 1997 (BY 1996) and 1998 (BY 1997).

The preseason forecast for last year, based on similar methodology, was 42% below the postseason estimated run size.

12.1.3. Main-stem Sockeye Forecast

The method used to produce the main-stem sockeye forecast for 2001 is based on the average of a sibling forecast technique and a stock-recruitment method.

Sibling Forecast: Linear regression of age-1.2 main-stem sockeye salmon ($N_{1.2}$) on the following year's total run (catch and escapement, all ages) of main-stem sockeye salmon (N) for the years 1983 to 2000 yielded the following equation:

$$N_{t+1} = 20{,}851 + 7.025 \cdot N_{1.2t} \qquad [2]$$

Based on equation [2] and a total return estimate of 4,473 age-1.2 main-stem sockeye salmon in 2000, the 2001 sibling forecast for main-stem sockeye salmon is approximately 52,000 fish which represents 68% of the average (1991-2000) main-stem run of 76,967 sockeye salmon.

Stock-recruitment forecast: A second method examined, was forecasting the main-stem run using the stock-recruitment relationship from 1979-1995 as described by equation:

$$Ln(R/S) = 1.5049 + 0.000020768 \cdot S \qquad [3]$$

where: R = return, and
S = spawners.

The correlation coefficient for this relationship is 0.71. Inputting the brood year escapements of 37,000 in 1995 and 1997, and 46,000 in 1996 and applying average age compositions, produced an unadjusted forecast of about 79,000 fish for the 2001 run. However, in 1998, 1999, and 2000, the actual run was on average, 42% of the forecast run size. This was likely associated with poor marine survival. Assuming a similar tendency for the method to overestimate as observed over the previous three years, the run is expected to be closer to 34,000 main-stem sockeye salmon.

The forecast return of main-stem Stikine River sockeye is projected to be 43,000 fish. This estimate is based the average of the sibling forecast method of 52,000 and the stock-recruitment outlook of 34,000 sockeye salmon.

Due to recent declines in survival for Stikine sockeye, there is a high level of uncertainty in these preseason forecasts. The various preseason forecast techniques suffer from a relatively short time series of data and, therefore, not surprisingly, there have been wide discrepancies between past forecasts and actual runs. For example in 1998, the total run was forecast as 218,500 whereas the estimate of actual run was 121,000; this poor survival could be due to both poor survival in the marine and returning freshwater environment. However, in 1999, the preseason forecast of 126,000 Stikine sockeye salmon was very close to the post-season estimate of approximately 125,000 sockeye. The run size projection in 2000 of 138,000 fish was 47% above the actual return of 94,000 fish. Despite problems with preseason forecasting, these forecasts are useful for management until we have in-season data with which to revise our forecasts.

12.1.4. Expected Sockeye Outcome

The 2001 outlook is characterised as below average for all components of the run. The preseason outlook is for a total allowable catch (TAC) for all Stikine sockeye salmon of 26,000 fish. Of this, approximately 1,800 sockeye are expected to be harvested in test fisheries (stock assessment) leaving approximately 24,200 sockeye to be shared 50:50 with the U.S. in existing fisheries, i.e. 12,100 for each country. The TAC outlook is comprised of the following components:

a) Given an escapement goal of 24,000 sockeye salmon for the total Tahltan stock, the predicted TAC is 6,000 Tahltan sockeye with an exploitation rate on this stock of 0.20.
b) Applying the Tahltan exploitation rate to the Tuya stock prediction of 35,000 fish (since Tuya is mixed with Tahltan), yields a TAC of 7,000 Tuya fish and a surplus of 28,000 fish for the Tuya stock. The Tuya surplus potentially would be exclusively available for Canadian terminal (ESSR) harvest.

c) The projected TAC of main-stem sockeye is 13,000 fish with an escapement of 30,000 fish.

Accounting for the harvest levels identified in the TFN Communal Fishing Licence, i.e.10,000 sockeye, leaves a potential commercial harvest according to pre-season estimates of only 2,100 sockeye. The 1991 to 2000 average commercial harvest is approximately 39,000 sockeye of which 1,300 is taken on average in the upper Stikine commercial fishery. This is a preseason outlook only; actual in-season forecasts should be available early July.

12.1.5. Sockeye Management Reference Points

The two sockeye stocks which will receive priority in management are the Tahltan Lake stock and the non-Tahltan or main-stem stock conglomerate, which are both wild stocks. Management reference points for the Tahltan Lake stock are summarised in the table below:

In-river run size: Tahltan Lk sockeye	FN Fishery	Commercial Fishery
>30,000	Unrestricted	Normal 2-3 day fishery with possible extensions
24,000 – 30,000	Unrestricted	Restricted fishery 1-2 days – possible gear/area restrictions
18,000 - 24,000	Unrestricted	Closure considered
12,000 – 18,000	Restricted – days reduced	Closed
5,000 - 12,000	Closure considered	Closed
<5,000	Closed*	Closed

*FN fishery closure imposed if commercial fishery closed for at least one week prior.

Based on the preseason forecast, it is expected that the in-river run of the Tahltan sockeye will be in the lower part of the 24,000 to 30,000 range. Initial openings in fisheries will therefore reflect the arrangements specified above at this level until in-season forecasts are available, at which time, the in-season forecasts will be used. Whenever the appropriate management action involves “closure considered” and/or “closed”, factors that will influence the consideration include, but are not limited to: escapement projections, reliability of and trends in forecasts, and conservation actions taken by the U.S. in Districts 108 and 106. Tahltan Lake stocks will have priority in harvest management until the contribution of Tahltan stocks drops to below 25%.

Management reference points for the “main-stem” stock are as follows:

In-river run size	FN Fishery	Commercial Fishery
>40,000	Unrestricted	Normal 2-3 day fishery with possible extensions.
30,000 – 40,000	Unrestricted	Restricted fishery 1-2 days – possible gear/area restrictions.
20,000 - 30,000	Unrestricted	Closure considered
<20,000	Unrestricted	Closed

Based on the pre-season forecast, it is expected that the in-river run of the main-stem sockeye stock will be near the midpoint of the 30,000 to 40,000 range.

12.2. Chinook Salmon

The Little Tahltan River chinook weir count in 1995, the primary contributing brood year for the 2001 run, was 3,072 large chinook salmon; this was 47% below the 1991-2000 average of 5,861 chinook, but within the biologically-based escapement goal range of 2,300 to 5,300 and close to point estimate of 3,300 suggested in recent analysis. The escapement in 1996, which should also contribute significantly to this year's run, was below average at 4,821 chinook salmon, but again within the escapement goal range. On average, age-6 chinook salmon account for 72% of the age composition of Little Tahltan chinook stock whereas, age-5 fish comprise 20%. The primary-parent year escapements in 1995 and 1996 suggest that the 2001 chinook run to the Stikine River will be average.

12.2.1. Expected Chinook Outcome

It is expected the catch in 2001 will be below average due to the projected reduced fishing effort on sockeye salmon. The catch is expected to fall in the range of 1,000 – 2,000 large chinook salmon. With the exception of the First Nations fishery, it is expected that all net caught chinook salmon will be taken incidentally during the directed fishery for sockeye salmon.

12.3. Coho Salmon

A qualitative prediction of the 2001 run of coho salmon is that it will be below average in magnitude. This outlook is based on the test fishery CPUE, or extrapolated Stikine test fishery CPUE, of coho salmon in the two principal brood years, 1997 and 1998. Based on a comparison of test fishery CPUE for coho salmon versus CPUE for sockeye salmon, the coho escapement was judged to be below average in 1997 and 1998 and below the interim escapement goal range of 30,000 to 50,000 coho salmon. Aerial surveys of several index coho spawning sites followed suit with the test fish estimates, in that the 1997 and 1998 counts were also below average.

12.3.1. Expected Coho Outcome

Under the terms of the PST, Canada may take a directed harvest of up to 4,000 coho salmon in the Stikine River. Taking into account the coho salmon that might be harvested incidentally during the directed sockeye fishery, which averages about 500 coho salmon, a total harvest of 4,500 coho salmon may be possible. Normally, directed coho fishing does not occur until after the middle of August (week 34 or 35). However, in recent years, the directed fishery for coho salmon has been affected by poor in-river run abundance in late August and early

September combined with miserable fishing conditions and difficult marketing. This has resulted in low effort and catch levels since the mid 1990's.

13. HABITAT INFORMATION

13.1. Land Use Planning

The Stikine Land and Resource Management Plan (LRMP) was approved in the fall of 2000. See the web site at:

www.luco.gov.bc.ca/slupinbc/cassiar/home.htm

The following recommendations have been approved for the 5.2-million-hectare Cassiar Iskut-Stikine area in north-western B.C.:

a) Fourteen new protected areas: Border Lake, Choquette Hot Springs, Craig Headwaters, Great Glacier, Iskut River Hot Springs, Klastline River, Lava Forks, Mess Creek, Ningunsaw Extension, Spatsizi Headwaters, Stikine Grand Canyon, Todagin South Slope, Tuya Mountains, Upper Stikine Spatsizi Extension.

The new protected areas total 442,000 hectares, including upgrades from recreation areas to park status. Other lands previously designated as recreation areas have been removed from that designation. These changes result in a net increase of 216,000 hectares of protected areas.

Fifteen geographic resource management zones, each with distinct biophysical characteristics, resource issues and opportunities, comprise 1.6 million hectares. One of the areas identified is the "Lower Stikine – Iskut Coastal Grizzly Salmon Management Zone" which includes the valley of the Stikine River from the Chutine confluence to the US border, and the lower Iskut River west of the Craig River. The management emphasis in this zone will be to maintain habitat values for grizzly and salmon in recognition of their role as keystone species in the ecosystems of the Iskut-Stikine.

b) The remaining land base will be under general management, taking into account resource access, biodiversity, culture, heritage, hunting, fishing, mineral and energy resources, recreation, tourism, timber and others resource values.

13.2. Mining

The Johnny Mountain gold mine started decommissioning late last summer but it may not have been finished due to inclement weather conditions.

The Snip Mine was decommissioned over a year ago. There is currently water flowing out of the portal, which is being monitored.

At the Eskay Creek mine, there is a plan to move rock and mill tailings storage to Tom Makai Lake from the current location at Albino Lake. Tom Makai is a much bigger lake devoid of fish.

13.3. Highway Construction

Highway 37 is undergoing re-construction. There may be issues, especially around the Bell Two and the stretch from Bob Quinn Lake through to Keneskan Lake.

14. ENFORCEMENT ISSUES AND STRATEGIES

14.1. Overview of Challenges

The Fisheries Act is the main legislative guide in British Columbia. The Conservation and Protection program of Fisheries and Oceans Canada is responsible for the compliance of this Act in relation to anadromous fish in both lakes and river systems, and to ensure compliance with habitat issues in all water frequented by fish. There are numerous other duties fishery officers perform as well. These may include: office administration; participating in public events that promote greater stewardship of the resource; keeping the public informed of regulation changes; the opening or closure of various fisheries; the preparation of legal documents for court; patrolling the rivers, roads and industrial areas to determine if any habitat or fishery violations have occurred; and on a less regular basis, selling fishing licences and collecting statistical data for other sectors if and when time permits.

14.2. Investigations / Violations / Warnings

In the Yukon/Transboundary Area, 41 violations were recorded by Conservation and Protection Branch. This area includes the Yukon Territory, Stikine River, Taku River and the Alsek/Tatshenshini system.

14.3. Priorities for 2001

a) Compliance patrols by vehicle, boat and aircraft along the Stikine River drainage, as randomly as possible to prevent telegraphing fishery officer movements and increase probability of apprehension and promote voluntary compliance.
b) Habitat patrols by vehicle, boat, aircraft and foot to monitor development in, and around, fish bearing waters to keep HEB informed of any developments or concerns that relate to sections 35 and 36 of the *Fisheries Act*.
c) Conduct proactive and public awareness initiatives.
d) Continue to work toward multi-agency interaction and co-operation.
e) Access and develop training opportunities and skills that are required and/or applicable to fishery officers in remote areas.
f) Work towards implementing a catch monitoring system that meets the needs of C&P, Fisheries Management and Stock Assessment programs.
g) Improve interface data capabilities to facilitate C&P access to statistical information gathering and data input systems.
h) To improve communication links with stakeholders, First Nations and other agencies.
i) Examine benefits of expanding public liaison opportunities through facilities expansion in Dease Lake.

14.4. Focus for 2001

Conservation and Protection will continue to pursue enforcement activities and to exchange information with the public and other users in regards to implementing effective operations and management practices. These advances will be achieved through the implementation of the priorities identified under 13.3 Priorities for 2001.

Conservation and Protection will continue to partner with the Canadian Coast Guard office of boating safety to disseminate information to the general public in regards to the implementation and compliance strategy for *Small Vessel Regulations.*

Continue to work with other Fisheries and Oceans Canada programs to refine the roles and responsibilities of C&P.

14.5. Equipment

C&P currently has one riverboat dedicated to the Stikine drainage.

Vehicles are an essential part of C&P's equipment. To access the hard to reach places C&P has two four wheel ATV's and two snowmobiles. All vehicles are equipped with a VHF radio and an emergency kit for winter travel.

Two other vehicles are assigned to the Stikine drainage including a suburban and a heavy-duty 4x4 p/u truck with tow package suitable to transport boats or trailers within the patrol area. Both vehicles are equipped with winch, lights, and sirens. C&P also own a two-bedroom thirty-six foot travel trailer and small four-person tents.

C&P also rely on effective, functional communication equipment for safety and basic reporting needs. This equipment includes; M-SAT radios, video cameras, digital still cameras, spotting scopes and night photo vision equipment. This technology allows fishery officers to record and report activities as well as verify their whereabouts and safety and to assist the general public in emergency situations.

14.6. Air Surveillance

C&P will, on occasion, use helicopters and fixed wing aircraft for the purposes of travel and/or investigation. Fisheries and Oceans Canada do not own any of these types of aircraft in the Yukon or Northern B.C. The Department contracts with local pilots and firms for services, as needed.

14.7. Other Enforcement Concerns

a) Concerns related to the proper and legal disposition of salmon including those harvested in Section 35 fisheries.
b) Concerns related to hydroelectric project effects on the Tanzilla watershed.
c) Concerns related to mining development throughout the watershed.
d) Concerns related to forestry development in the watershed.
e) Smoothing relationships with regards to "processing of fish" concerns on river.

15. PROGRESS ON CURRENT MANAGEMENT ISSUES

Management issues are discussed annually through the Stikine River Salmon Management Committee. Some of the are:

a) A review of the make-up of the committee and identification of a recreational fishing representative;
b) A review of commercial licence transferability with a new agreement drafted amongst interested parties.

c) Strategies for implementing management regimes that are consistent with the principles outlined in the Wild Salmon Policy discussion paper.

16. PROGRESS ON LONG TERM OBJECTIVES

16.1. Meeting the Obligations Contained in the Pacific Salmon Treaty

There has been substantial progress in this regard. The Transboundary Panel has had four bilateral meetings and the Canadian section has solidified its overall goals and objectives. Escapement goals have been bi-laterally established for all targeted salmon species in the Canadian section of the Stikine River including a revised system-wide escapement goal for chinook salmon (as was specifically called for in the Transboundary Annex of the PST). Abundance-based management (ABM) approaches are being developed for chinook and coho salmon and already have been implemented for sockeye salmon. Several projects initiated in 2000 will again be undertaken this year to provide the necessary background data upon which to fully develop and/or improve such ABM regimes. These include: chinook and coho test fisheries; chinook, sockeye and coho mark-recapture programs; and chinook and coho coded-wire tagging programs. In-season forecasting of in-river run strength of sockeye and chinook salmon is expected be possible in 2001; total run forecasting is available for sockeye salmon. There are plans to continue the joint sockeye enhancement project at Tahltan and Tuya lakes with some improvements to assessments. Other enhancement opportunities may also be examined.

16.2. Conserving and Restoring Spawning Stocks and Habitats

Generally, the management of the Stikine fisheries will be focused on improving the overall status of spawning sockeye salmon stocks in 2001. In particular, a more conservative sockeye management regime will be implemented in both Canadian and U.S. fisheries with retooling of the Stikine Management Model and the implementation of an alternate abundance forecasting method, namely the mark-recapture project. New stock identification techniques utilising DNA techniques will be tested over the next few years to improve confidence in in-season estimates. There is potential for other funding of restoration and management projects occurring within 2 to 3 years under the Northern Endowment Fund, which was established under the Pacific Salmon Treaty in 1999.

16.3. Developing And/Or Maintaining Sustainable And Viable Canadian Fisheries

Progress on this issue has been accomplished through the development and/or implementation of abundance based management approaches (particularly for sockeye and to a lesser extent, chinook and coho) and through some of the revised harvest sharing provisions negotiated in the PST. Some additional harvesting opportunities were achieved for coho salmon as well as for sockeye salmon. There is potential for developing directed chinook fisheries once an acceptable abundance-based management regime is developed.

Limited entry into the Stikine River fisheries also has helped to make them sustainable and viable.

New provisions for the conservation and sustainability of wild stocks are now being proposed Region-wide in the "Wild Salmon Policy Discussion Paper"*;* copies of this paper are available through the DFO office in Whitehorse. Consultations with Stikine

fishers on the draft policy occurred during a Stikine River Salmon Management Committee meeting in November 2000 in Dease Lake, B.C. For further information see the web site at:

www-comm.pac.dfo-mpo.gc.ca/wsp-sep-consult/wsp/wsp.pdf

16.4. Strategically Enhancing Selected Stocks

Through the PST, Canada and the U.S. have undertaken a joint sockeye enhancement program at Tahltan and Tuya lakes and have agreed to examine other prospects. The objectives of the transboundary sockeye enhancement program are to increase the production of sockeye salmon on the both Stikine and Taku rivers. The original intent of the program initiated in 1987, was to increase production by 100,000 adult sockeye in each river system. Although these goals have not yet been fully met, the current Pacific Salmon Treaty recognises the desire of Canada and the United States to continue a joint enhancement program on the transboundary rivers. Enhanced sockeye have contributed significantly to catches on the Stikine River. For example, over the 1996 to 2000 period, the enhancement program has contributed an average of 5,200 sockeye to the First Nation fishery (including ESSR harvests), and 13,100 to the commercial fishery.

The strategies currently used to expand sockeye production on the Stikine River involve:

a) Increasing egg to fry survival by collecting and fertilising eggs from donor stocks and incubating them in a hatchery environment. The increase in total adult production results from the higher egg-to-fry survival through hatchery incubation.
b) Placing the hatchery incubated fry into suitable nursery lakes that have unused or under-utilised sockeye fry rearing potential. Sockeye eggs are currently collected from Tahltan Lake on the Stikine River system. Guidelines established in the current Pacific Salmon Treaty set the egg collection goals for the Stikine watershed at 6.0 million eggs.
c) The fertilised eggs are flown to the Snettisham Hatchery in Alaska after collection at Tahltan Lake and incubated over the winter. The resultant fry are flown back the following spring to the lake. All enhanced fry possess a thermally marked otolith that is unique to the outplant lake. Wild and enhanced fish are distinguishable based on the presence or absence of the mark and all enhanced fish are identifiable based on the outplant lake of origin. All enhanced fry are screened for disease prior to entry into Canada.

17. MEASUREMENT OF EXPECTED OUTCOMES

Expected outcomes will be measured through catch, escapement and sampling programs. For sockeye salmon, test fishery and stock ID and stock-specific run reconstruction will provide estimates of major stock escapements to measure against goals; the total system-wide escapement estimates derived from this method will be compared with the estimate based on the new mark-recapture program. For the Tahltan Lake sockeye stock, the Tahltan Lake weir count will be the primary evaluation tool.

For chinook salmon, the performance of the management plan will be measured through the system-wide escapement estimate provided from the chinook mark-recapture program. For the Little Tahltan River stock, evaluation will be based on the weir count in that system.

The mark-recapture program for coho salmon will provide the basis for the assessment of the coho plan. Escapement of pink and chum salmon will be indexed through examination of catches and effort in the lower Stikine; as such, no quantitative estimates of total escapement will be available for these species.

Total run reconstructions will be available for sockeye upon which to measure the performance of preseason sockeye run outlooks. Once harvest rate information is gathered for chinook and coho salmon (through CWT sampling), it may be possible to reconstruct chinook and coho runs.

18. PERFORMANCE REVIEW

18.1. 2001 Objectives

The following criteria for 2001 objectives will form the basis of the performance review conducted after the season has finished:

a) System-wide escapement targets for sockeye, coho and chinook salmon.
b) Stock specific escapement targets for Little Tahltan River chinook salmon, Tahltan Lake and Main-stem sockeye salmon.
c) Total catches of sockeye and coho salmon vs. PST allocations.
d) First Nations catches vs. allocations as per the TFN Communal Fishing Licence taking in to account the opportunity to fish and availability of species in-river.
e) Post-season run reconstruction vs. preseason run outlook for sockeye salmon.

18.2. 2000 Post Season Review

A detailed post-season review is given annually in a report prepared by the joint Transboundary Technical Committee. The report for 2000 entitled: "Preliminary Estimates of Transboundary River Salmon Production, Harvest and Escapement and a Review of Joint Enhancement Activities in 2000", is available through the Pacific Salmon Commission or the Fisheries and Oceans Canada office in Whitehorse.

The following table summarises actual results against objectives for the 2000 season:

Species	Objective	Actual
Sockeye:		
a) escapement		
Tahltan weir	18,000 to 30,000	6,076
Main-stem	20,000 to 40,000	11,643
b) Canadian catch		
all stocks	3,697	27,468
Tahltan stock	1,586	7,648
Tuya stock	2,111	12,211
Main-stem	0 (no harvestable surplus)	7,609
c) catch share		
all stocks	50% of TAC	371.6%
Tahltan stock	50% of TAC	241.2%

Tuya stock	50% of TAC	289.3%
Main-stem	50% of TAC	
d) domestic allocation		
TFN catch	10,000	6,107
ESSR		1,689
e) preseason outlook		
all stocks	138,000	94,311
Tahltan stock	51,000	27,171
Tuya stock	21,000	36,167
Main-stem	66,000	30,975
f) U.S. catch		
All Stikine stocks	3,697 (50% TAC)	34,656 (468.8% TAC)
Tahltan stock	1,586 (50% TAC)	11,550 (364.2% TAC)
Tuya stock	2,111 (50% TAC)	12,733 (301.6% TAC)
Main-stem	0 (no harvestable surplus)	10,375
Coho:		
Total escapement	30,000 to 50,000	25,500
Directed Cdn catch	4,000 (catch after week 34)	63 (catch after wk 34)
TFN catch	up to 200	3
Chinook:		
Total escapement	14,000 to 28,000	29,000
L.Tahltan stock	2,700 to 5,300	6,640
Cdn catch	incidental only	2,219 (includes 242 jks)
TFN catch	up to 2,000	1,495 (includes 386 jks)

19. APPENDICES

Appendix 1: Map Of Stikine River Drainage Accessible By Pacific Salmon

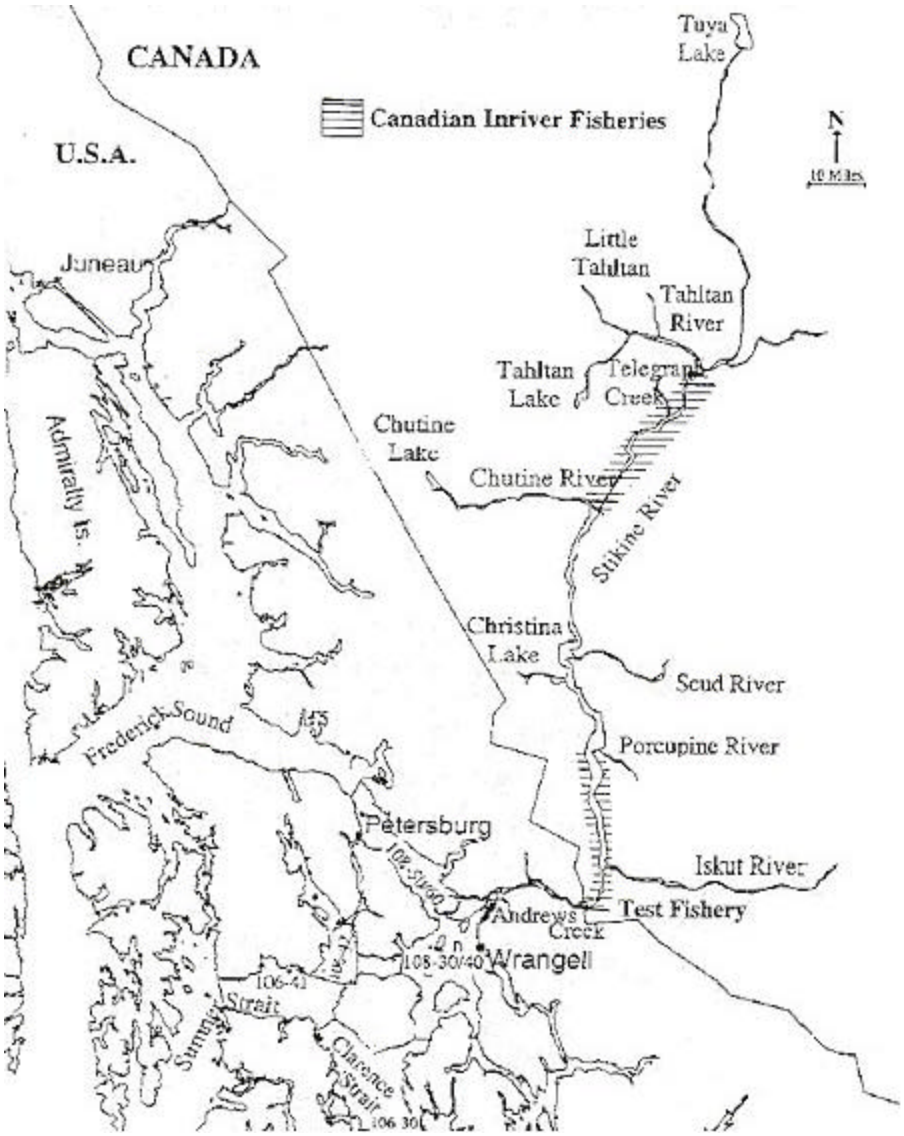
Appendix 2: Summary Of Total Canadian Gill Net Catches (First Nations Plus Commercial) Of Pacific Salmon And Steelhead In The Stikine River From 1979 To 2000

Appendix 3: Summary Of Canadian Commercial Gill Net Catches Of Pacific Salmon And Steelhead In The Lower Stikine River From 1979 To 2000

Appendix 4: Summary Of Canadian Commercial Gill Net Catches Of Pacific Salmon And Steelhead In The Upper Stikine River (Telegraph Creek Area) From 1975 To 2000

Appendix 5: Summary Of Canadian First Nations Fishery Catches Of Pacific Salmon And Steelhead In The Upper Stikine River (Telegraph Creek Area) From 1972 To 2000

Appendix 1: Map Of Stikine River Drainage Accessible By Pacific Salmon



Appendix 2

Summary of Total Canadian Gill Net Catches (First Nations Plus Commercial) of Pacific Salmon and Steelhead in the Stikine River from 1979 To 2000

Year	Chinook		Sockeye	Coho	Pink	Chum	Steelhead	Total
	Jacks	Adults						
1972			4,373	0	0	0	0	4,373
1973		200	3,670	0	0	0	0	3,870
1974		100	3,500	0	0	0	0	3,600
1975		1,202	2,252	50	0	0	0	3,504
1976		1,160	3,644	13	0	0	0	4,817
1977		162	6,310	0	0	0	0	6,472
1978		500	5,000	0	0	0	0	5,500
1979	63	1,562	13,534	10,720	1,994	424	264	28,561
1980		2,231	20,919	6,769	756	771	362	31,808
1981		1,404	27,017	2,867	3,857	1,128	284	36,557
1982		2,387	20,540	15,944	1,842	722	828	42,263
1983	645	1,418	21,120	6,173	1,120	304	714	31,494
1984	59	643	5,327	1	62	0	2	6,094
1985	185	1,111	25,464	2,175	2,356	536	240	32,067
1986	975	1,936	17,434	2,280	107	307	194	23,233
1987	444	2,201	9,615	5,731	646	459	219	19,315
1988	444	2,360	15,291	2,117	418	733	261	21,624
1989	289	2,669	20,032	6,098	825	674	127	30,714
1990	959	2,250	18,024	4,037	496	499	199	26,464
1991	660	1,511	22,763	2,648	394	208	71	28,255
1992	239	1,840	26,284	1,855	122	231	132	30,703
1993	308	1,803	47,197	2,616	29	395	67	52,415
1994	350	1,790	45,095	3,381	90	173	84	50,963
1995	860	1,646	53,467	3,418	48	263	270	59,972
1996	421	2,471	74,281	1,404	25	232	183	79,017
1997	286	4,483	65,559	401	269	222	33	71,253
1998	423	2,164	43,803	726	55	13	209	47,393
1999	1,264	2,916	38,055	181	11	8	14	42,449
2000	628	3,085	27,460	301	181	144	103	31,902
1972-00	500	1,757	23,691	2,824	541	291	168	29,540
1990-99	577	2,287	43,453	2,067	154	224	126	48,888
1991-00	544	2,371	44,396	1,693	122	189	117	49,432

note: the commercial fishery was closed in 1984.

Appendix 3

Summary of Canadian Commercial Gill Net Catches of Pacific Salmon and Steelhead in the Lower Stikine River from 1979 To 2000

Year	Chinook		Sockeye	Coho	Pink	Chum	Steelhead	TOTAL	DAYS FISHED	BOAT DAYS	AVG. NO. FISHERS
	Jacks	Adults									
1979	63	712	10,534	10,720	1,994	424	264	24,711	42.0	756.0	
1980		1,488	18,119	6,629	736	771	362	28,105	41.0	668.0	17
1981		664	21,551	2,667	3,713	1,128	280	30,003	32.0	522.0	16
1982		1,693	15,397	15,904	1,782	722	828	36,326	71.0	1063.0	15
1983	430	492	15,857	6,170	1,043	274	667	24,933	54.0	434.0	8
1984											
1985	91	256	17,093	2,172	2,321	532	231	22,696	22.5	145.5	6
1986	365	806	12,411	2,278	107	295	192	16,454	13.5	239.0	18
1987	242	909	6,138	5,728	646	432	217	14,312	20.0	287.0	14
1988	201	1,007	12,766	2,112	418	730	258	17,492	26.5	320.0	12
1989	157	1,537	17,179	6,092	825	674	127	26,591	23.0	325.0	14
1990	680	1,569	14,530	4,020	496	499	188	21,982	29.0	328.0	11
1991	318	641	17,563	2,638	394	208	71	21,833	39.0	282.4	7
1992	89	873	21,031	1,850	122	231	129	24,325	55.0	235.4	4
1993	164	830	38,464	2,616	29	395	63	42,561	58.0	483.8	8
1994	158	1,016	38,462	3,377	89	173	75	43,350	74.0	430.1	6
1995	599	1,067	45,622	3,418	48	256	208	51,218	59.0	534.0	9
1996	221	1,708	66,262	1,402	25	229	153	70,000	81.0	439.2	5
1997	186	3,283	56,995	401	269	222	33	61,389	89.0	563.4	6
1998	328	1,614	37,310	726	55	13	209	40,255	46.5	374.0	8
1999	789	2,127	32,556	181	11	8	14	35,686	31.0	261.3	8
2000	240	1,970	20,472	298	181	144	89	23,394	23.3	227.0	10
averages:											
1979-00	296	1,251	25,539	3,876	729	398	222	32,267	44	425	10
1990-99	353	1,473	36,880	2,063	154	223	114	41,260	56	393	7
1991-00	309	1,513	37,474	1,691	122	188	104	41,401	56	383	7

Appendix 4

Summary of Canadian Commercial Gill Net Catches of Pacific Salmon and Steelhead in the Upper Stikine River (Telegraph Creek Area) from 1975 To 2000

Year	Chinook		Sockeye	Coho	Pink	Chum	Steelhead	TOTAL	DAYS FISHED	BOAT DAYS	AVG. NO. FISHERS
	Jacks	Adults									
1975		178	270	45	0	0	0	493			
1976		236	733	13	0	0	0	982			
1977		62	1,975	0	0	0	0	2,037			
1978		100	1,500	0	0	0	0	1,600			
1979											
1980		156	700	40	20	0	0	916			
1981		154	769	0	0	0	0	923	5.0	11.0	2
1982		76	195	0	0	0	0	271	4.0	8.0	2
1983		75	614	0	0	4	1	694	8.0	10.0	1
1984											
1985		62	1,084	0	0	0	0	1,146	6.0	14.0	2
1986	41	104	815	0	0	0	0	960	7.0	19.0	3
1987	19	109	498	0	0	19	0	645	7.0	20.0	3
1988	46	175	348	0	0	0	0	569	6.5	21.5	3
1989	17	54	493	0	0	0	0	564	7.0	14.0	2
1990	20	48	472	0	0	0	0	540	7.0	15.0	2
1991	32	117	761	0	0	0	0	910	6.0	13.0	2
1992	19	56	822	0	0	0	0	897	13.0	28.0	2
1993	2	44	1,692	0	0	0	2	1,740	22.0	48.0	2
1994	1	76	2,466	0	1	0	0	2,544	50.0	68.0	1
1995	17	9	2,355	0	0	0	0	2,381	25.0	54.0	2
1996	44	41	1,101	0	0	0	0	1,186	59.0	75.0	1
1997	6	45	2,199	0	0	0	0	2,250	29.0	42.0	1
1998	0	12	907	0	0	0	0	919	29.0	19.0	1
1999	12	24	625	0	0	0	0	661	18.0	19.0	1
2000	2	7	889	0	0	0	0	898	9.3	19.8	2
1975-00	19	84	1,007	4	1	1	0	1,108	17	27	2
1990-99	15	47	1,340	0	0	0	0	1,403	26	38	2
1991-00	14	43	1,382	0	0	0	0	1,439	26	39	2

notes: a) jacks not segregated from 1975 - 1985;
b) in 1979, the upper Stikine commercial catch data was included with lower Stikine data; in the commercial fishery was closed for the season. 1984,

Appendix 5

Summary of Canadian First Nations Fishery Catches of Pacific Salmon And Steelhead in the Upper Stikine River (Telegraph Creek Area) from 1972 To 2000

Year	Chinook		Sockeye	Coho	Pink	Chum	Steelhead	TOTAL
	Jacks	Adults						
1972			4,373	0	0	0	0	4,373
1973		200	3,670	0	0	0	0	3,870
1974		100	3,500	0	0	0	0	3,600
1975		1,024	1,982	5	0	0	0	3,011
1976		924	2,911	0	0	0	0	3,835
1977		100	4,335	0	0	0	0	4,435
1978		400	3,500	0	0	0	0	3,900
1979		850	3,000	0	0	0	0	3,850
1980		587	2,100	100	0	0	0	2,787
1981		586	4,697	200	144	0	4	5,631
1982		618	4,948	40	60	0	0	5,666
1983	215	851	4,649	3	77	26	46	5,867
1984	59	643	5,327	1	62	0	2	6,094
1985	94	793	7,287	3	35	4	9	8,225
1986	569	1,026	4,208	2	0	12	2	5,819
1987	183	1,183	2,979	3	0	8	2	4,358
1988	197	1,178	2,177	5	0	3	3	3,563
1989	115	1,078	2,360	6	0	0	0	3,559
1990	259	633	3,022	17	0	0	11	3,942
1991	310	753	4,439	10	0	0	0	5,512
1992	131	911	4,431	5	0	0	3	5,481
1993	142	929	7,041	0	0	0	2	8,114
1994	191	698	4,167	4	0	0	9	5,069
1995	244	570	5,490	0	0	7	62	6,373
1996	156	722	6,918	2	0	3	30	7,831
1997	94	1,155	6,365	0	0	0	0	7,614
1998	95	538	5,586	0	0	0	0	6,219
1999	463	765	4,874	0	0	0	0	6,102
2000	386	1,108	6,099	3	0	0	14	7,610
1972-00	217	747	4,360	14	13	2	7	5,252
1990-99	209	767	5,233	4	0	1	12	6,226
1991-00	221	815	5,541	2	0	1	12	6,593

notes: a) jacks not segregated from 1975 - 1985.