Nahatlatch Watershed Aquatic Biophysical and Fisheries Habitat

Department of Fisheries and Oceans
Fraser River Action Plan
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NAHATLATCH WATERSHED AQUATIC BIOPHYSICAL AND FISHERIES HABITAT

by

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ABSTRACT

This report describes the aquatic biophysical and fisheries habitat of the Nahatlatch watershed. Six reaches have been delineated on the basis of similar biophysical attributes and an accompanying map provides general information on species present, obstructions (both natural and constructed) and enhancement & management activities.

RÉSUMÉ

Ce rapport décrit l'habitat biophysique aquatique et halieutique du bassin hydrographique de Nahatlatch. Six tronçons ont été délimités en fonction d'attributs biophysiques emblables, et une carte jointe fournit de l'information générale sur les espèces présentes, les obstacles qu'elles subissent (naturels et artificiels) et les activités de gestion et de mise en valeur.

1 NAHATLATCH RIVER REACH DESCRIPTIONS

Reaches have been delineated on the basis of similar biophysical attributes.

1.1 Reach 1

Reach 1 is seven (7) km in length, and extends from the mouth at the Fraser River to 100 m upstream of the first active logging bridge. Reach 1 has an average gradient of 3.3% and is characterized by steep, bedrock canyon walls (30 - 50m). The channel is entrenched and laterally stable with the exception of the lower most 100m, downstream of the railway track which is located in the Fraser River floodplain. Rock chutes, deep holding pools with limited spawning substrates at the tailouts predominate Reach 1. Isolated patches of suitable spawning substrates also occur behind large boulders. Given the relatively high gradient, narrow and confined river width (10 - 25m), Reach 1 is particulary sensitive to log jams and excessive in-stream debris accumulations which could impede fish movements and anadromous migration.

Pink salmon spawn in all available habitats throughout Reach 1, particulary in the boulder/gravel habitat in the lower 100m. Although unconfirmed, steelhead probably also spawn in the pool tailouts in Reach 1. Reach 1 serves as a migration corridor and important holding area for pink salmon and steelhead, as well as chinook, coho, sockeye and Dolly varden.

1.2 Reach 2

Reach 2 is six (6) km in length and extends upstream to include the lower 150m of Francis Lake. Reach 2 has an average gradient of 1.8% and is characterized by terraced canyon walls (unconsolidated) and narrow floodplain. Three islands occur in Reach 2 and are susceptible to large debris accumulations. The channel banks are laterally stable with the exception of a large (100m) clay/sand bank failure approximately 2.0 km upstream from the reach boundary. Boulder/gravel habitat and important holding pools predominate Reach 2. Spawning substrates occur in pool tailouts, behind boulders and along stream margins. Kookipi and Log Creeks enter Reach 2 from the south and north sides, respectively.

Reach 2 is a major spawning reach. Pink salmon and steelhead trout spawn throughout the reach, while chinook, sockeye and coho spawning is generally restricted to a 500m section immediately downstream from Francis Lake. Lake spawning by coho and chinook also occurs in the lower 150m along the north side of Francis Lake. Reach 2 as well as Kookipi and Log Creeks support populations of resident rainbow trout and Dolly varden char and offer good angling opportunities. Given it's importance as a spawning area, Reach 2 is particularly sensitive to silt/fines deposition and potential in-gravel egg mortality.

1.3 Reach 3

Reach 3 is 14 km long and extends to approximately two (2) km upstream from west Nahatlatch Lake. Reach 3 has an average gradient of 0.11% and encompasses Nahatlatch Lake (east and west), Hannah and most of Francis Lakes. (Specific gradients in the lake connecting riverine sections are somewhat greater than determined for the entire reach.) Francis Lake has a maximum depth of 15m, and a littoral zone (< 6m) comprising 32% of the lake area. Nahatlatch Lake (east) has a maximum depth of 29m and a littoral zone of 24% of the lake area. Nahatlatch Lank (west) has a maximum depth of 62m and a littoral zone comprising 15% of the lake area.

The riverine section between Francis and Hannah Lakes is characterized by boulder/gravel habitat, moderate to fast flows and two major holding pools. The channel is confined with minimal lateral movements. A gravel shoal exists along the north side of Francis Lake at it's inlet.

The riverine section between Nahatlatch Lake (east) and Hannah Lake and the narrows between Nahatlatch Lake east and west are lower gradient with even flows, and predominantly small gravel/fines and boulder substrate. A gravel fan exists at the mouth of Squakum Creek on the northeast side of the Nahatlatch narrows; a gravel beach also exists along the north side of the river between Nahatlatch and Hannah Lakes.

The 2 km section of river upstream from Nahatlatch Lake (west) is characterized by slow, meandering flows, deep corner pools, wood debris accumulations, extensive bank slumping, wetland/marsh habitats and fines/silts substrates.

Reach 3 is also a spawning reach. Sockeye spawning occurs along the north side of the lake narrows and Squakum Creek gravel fan, the gravel beach at the outlet of Nahatlatch Lake (east) and in the riverine section between Hannah and Francis Lakes. Pink, chinook and coho also spawn between Hannah and Francis Lakes, as do pink salmon between Hannah and Nahatlatch Lakes. Riverine spawning sections in Reach 3 are susceptible to silt deposition.

1.4 Reach 4

Reach 4 is 20 km in length with an average gradient of 0.23%. Reach 4 extends to approximately 2.0 km upstream from Mehatl Creek confluence, and is characterized by a narrow floodplain, predominantly single at most flows (new channels may be formed at high flows), meandering channel, extensive bank slumping and gravel substrates, with a number of temporary log jams.

Chinook and coho spawning occurs throughout most of Reach 4, while sockeye spawning is concentrated in the Tachewana Creek confluence area. Reach 4 is the primary salmon spawning area, and also supports resident populations of Dolly varden and rainbow trout. Reach 4 is extremely susceptible to bank erosion which would result in high sediment loading and siltation.

1.5 Reach 5

Reach 5 is 1.8 km in length with an average gradient of 10.0%. The reach is characterized by a series of rapids which are interspersed with numerous chutes and falls. These chutes and falls present a migration barrier to anadromous salmonids. Channel lateral movement is constricted by valley walls. Primary substrates comprise of boulders, gravel and bedrock.

Resident rainbow trout likely occur in some of the pools of Reach 5.

1.6 Reach 6

Reach 6 extends from the rapids, upstream for at least 5 km (upper limit of biophysical information). The Reach 6 study area has an average gradient of less than 2% (estimate), and is predominantly a single, entrenched (stable) channel. Substrates are comprised of gravels followed by boulders and fines respectively. Although Reach 6 is unaccessible to anadromous fish, it has an abundance of excellent salmonid spawning and rearing habitat. This reach is also very susceptible to siltation.

Resident rainbow trout and peamouth chub inhabit Reach 6 as well as at least one (1) tributary (Tin Cup Creek; MoELP, 1993).

2 NAHATLATCH RIVER TRIBUTARIES

2.1 Mehatl Creek

Mehatl Creek offers limited patches of potential spawning habitat in its lower 200m. The section between 200m and 400m upstream from its confluence with the Nahatlatch River is precipitous with an average gradient of 19% (includes numerous impassable falls and chutes).

Electrofishing sampling during the fall of 1993 captured no fish in the upper reaches of Mehatl Creek (MoELP, 1993).

2.2 Kookipi Creek

Kookipi Creek has been sampled (rod/reel; T. Andrew, Boothroyd Band) approximately 3 km upstream from it's confluence with the Nahatlatch River. Resident rainbow trout were present.

2.3 Log Creek

Log Creek has been sampled (rod/reel; P. Campbell, Boothroyd Band), approximately 8 km upstream from the Nahatlatch confluence; resident rainbow and Dolly varden were present. Although B.C.I.T. has used Log Creek as an integrated resource management planning model and has theoretical fisheries data on the watershed, we have not included their information here as it has not been verified.

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APPENDIX I

RAB / ASB Biophysical Symbols

REACH SYMBOLS: GENERAL: FISH SPECIES
(Reach) CHANNEL | SUBSTRATE

Fish Species

1. Sport and Commercial abbreviations

Symbol	Species	Symbol	Species
SK	Sockeye	BS	Bass (general)
CO	Coho	CT	Cutthroat
PK	Pink	DV	Dolly Varden
CM	Chum	KO	Kokanee
CH	Chinook	LT	Lake trout
ST	Steelhead	LW	Lake whitefish
AF	All fish	RB	Rainbow
AO	All salmon	MW	Mountain whitefish
TR	Trout (general)	PCC	Peamouth chub
SU	Suckers	CAS	Prickly Sculpin

2. ø indicates fish not detected at time and place of sampling.

3. (CO) indicates probable but unconfirmed presence.

Channel

1. Cross Section

- C canyon; bedrock entrenched.
- V ravine; entrenched in unconsolidated material or incompetent bedrock.
- W wash; unconfined channel on a steep slope.
- F fluvial fan; unconfined channel on a fluvial fan.
- P floodplain; unconfined channel on a wide floodplain.
- S slough; unconfined tributary channel on a valley flat.
- B narrow floodplain; channel movement constricted by terraces and valley walls.

2. Slope: % (elevation gain / reach length)

> 3% measured to nearest percent.
< 3% measured to nearest tenth percent.

3. Lateral Stability

- s single, entrenched laterally stable channel.
- m single, stable unentrenched channel meandering on a marshy flat.
- p predominantly single channel, with a tendency to bank erosion and channel progression at bends of regular meanders with occasional cutoffs during high flows.
- c single or multiple channel with one dominant branch; irregular meandering, some lateral activity under most flow conditions with a tendency to severe meander cutoff and channel diversion at high flows.
- b multiple braided channel; no dominant branches; continuously shifting by progression, cutoffs and diversions under most flow conditions.

d multiple channel; no dominant branches; channels stable under most flow conditions, at high flows new channels may form by cutoff or diversion.

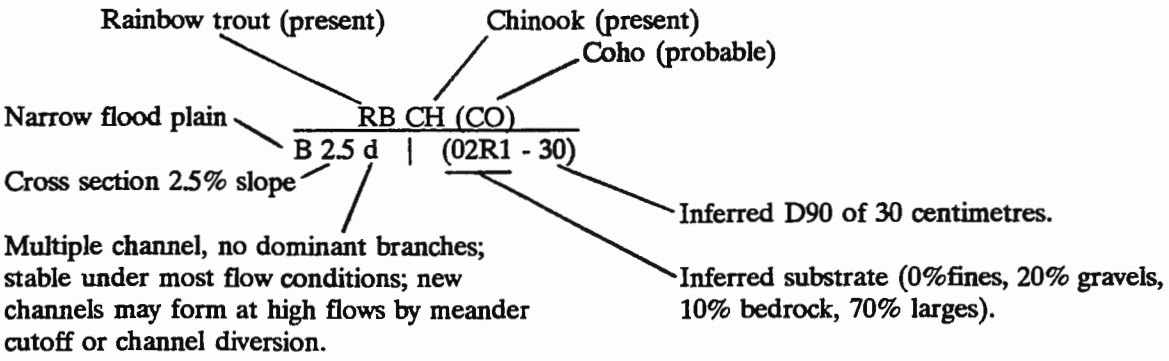
Substrate Materials

Fines, gravels and bedrock are listed in sequence to nearest 10%, expressed as an integer. Larges are inferred. (See example).

1. Fines - materials in 0 - 2 mm size class.
   Gravels - materials in 2 - 100 mm size class.
   Larges - materials greater than 100 mm in size.

2. Bedrock percentage indicated by Rn, where integer n represents percentage. R without integer implies 0 - 10%.

Example



LAKES AND WETLANDS GENERAL: (Lakes) FISH SPECIES / MAX. DEPTH | T.D.S. / % LITTORAL AREA

1. Fish species: same as streams.

2. T.D.S.: total dissolved solids, if available.

3. Maximum depth: measured to nearest metre.

4. Littoral area: measurement or visual estimate of % of total area < 6 m. When estimate is made, parenthesis will be used.

Wetlands are indicated by the symbol "D", followed by class symbols.

m	marsh	s	swamp
b	bog	p	pond
f	fen		

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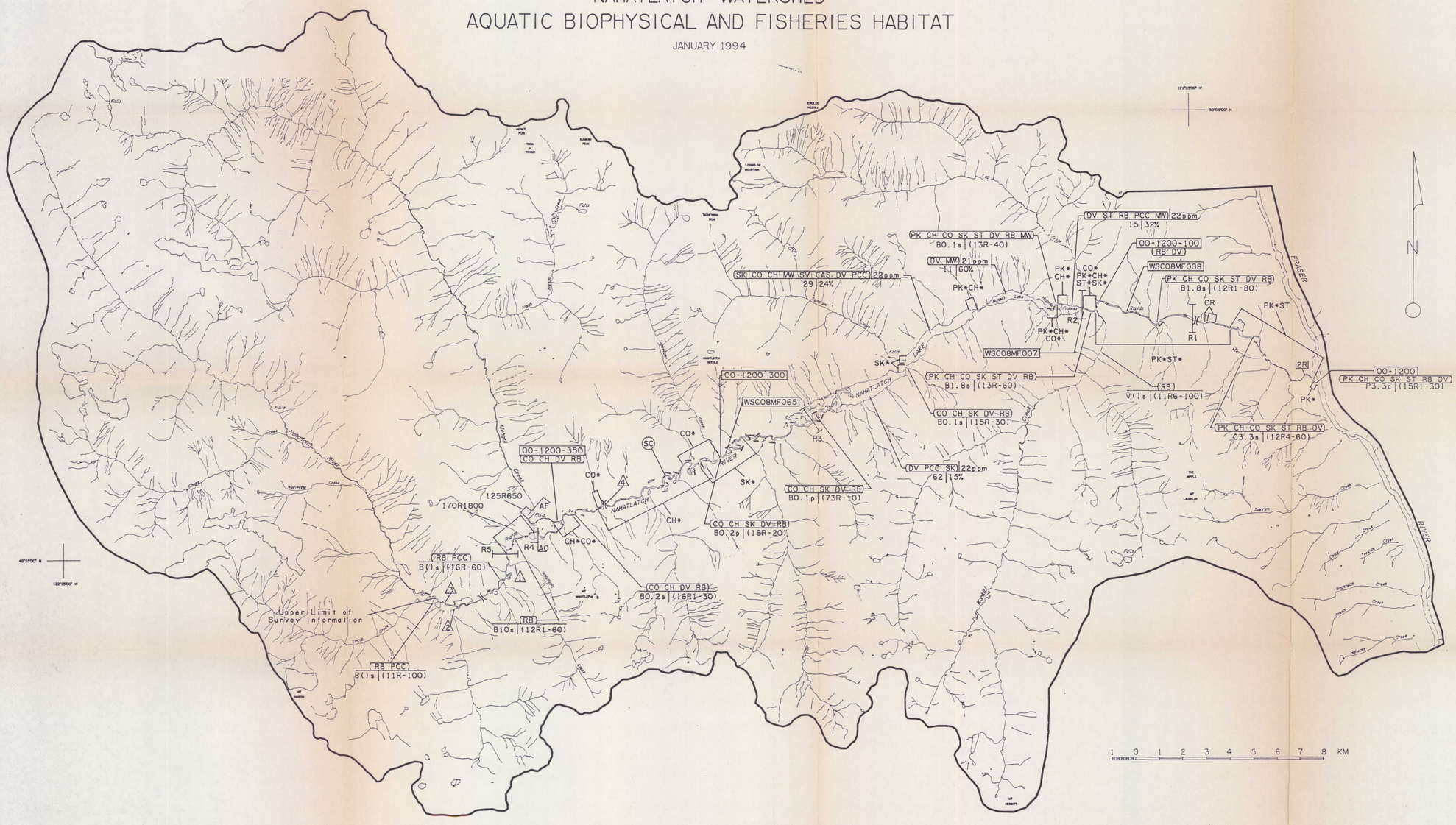

LEGEND

- 00-1200 / CO CM ST — Watershed Code and Species Summary
- R3 — reach number at upstream reach boundary
- major bank or valley side wall slump zone
- bridge

SPECIES INFORMATION

- SK CO PK CM CH — species present
- CO ST — lower limit of distribution
- CO ST — upper limit of distribution
- PK* — specific site of spawning
- SK*, CO*, CO* — major spawning zone
- CM* — upper limit of spawning

FLOW

OBSTRUCTIONS
(measurements included where known)

- log jam (persistent)
- 3F — D = dam; F = falls (3m high); CV = culvert; BD = beaver dam; L = logs; R = rock; C = cascade or chute
- 2C100 — cascade, chute or canyon (height=2m, length=100m)

ENHANCEMENT/MANAGEMENT ACTIVITIES

- HY — HY = hatchery; FW = fishway; SC = side channel; CH = spawning channel
- WSC08FB003 — Water Survey of Canada Gauging Station
- 4 — water quality sampling site
- -300 / CO — tributary watershed code

Reach Symbols[1]: Fish Species / Channel | Substrate

Lake Symbols[1]: Fish Species | TDS / Max Depth | % Littoral Area

SPECIES ABBREVATION LIST

SK - Sockeye	BS - Bass (general)
CO - Coho	CT - Cutthroat
PK - Pink	DV - Dolly Varden
CM - Chum	KO - Kokanee
CH - Chinook	LT - Lake trout
ST - Steelhead	LW - Lake whitefish
AF - All fish	RB - Rainbow
AO - All salmon	MW - Mountain whitefish
TR - Trout (general)	PCC - Peamouth chub
SU - Suckers	CAS - Prickly Sculpin

NOTES:

This stream information summary map incorporates available DFO/MOELP Stream Information Summary System (SISS) data, supplemented with additional biophysical information.

Aquatic Biophysical Codes adopted from DFO/MOELP Fish Habitat and Information Program.

[1] Refer to RAB channel substrate symbols in accompanying report

Aquatic biophysical and fisheries data compiled by Coast River Environmental Services Ltd.
Digital base map provided by the B.C. Ministry of Forests, Chilliwack Forest District.
Computer mapping and plotting by DIAND Technical Services, PWGSC.