Nechako Fisheries Conservation Program 1988 - 2012

- Nechako River and Fish Population
- History of NFCP
- Technical Data Review - 2005
- Five Year Plan 2007-2012
- Strategic Planning Initiative
- Five Year Plan 2012-2017

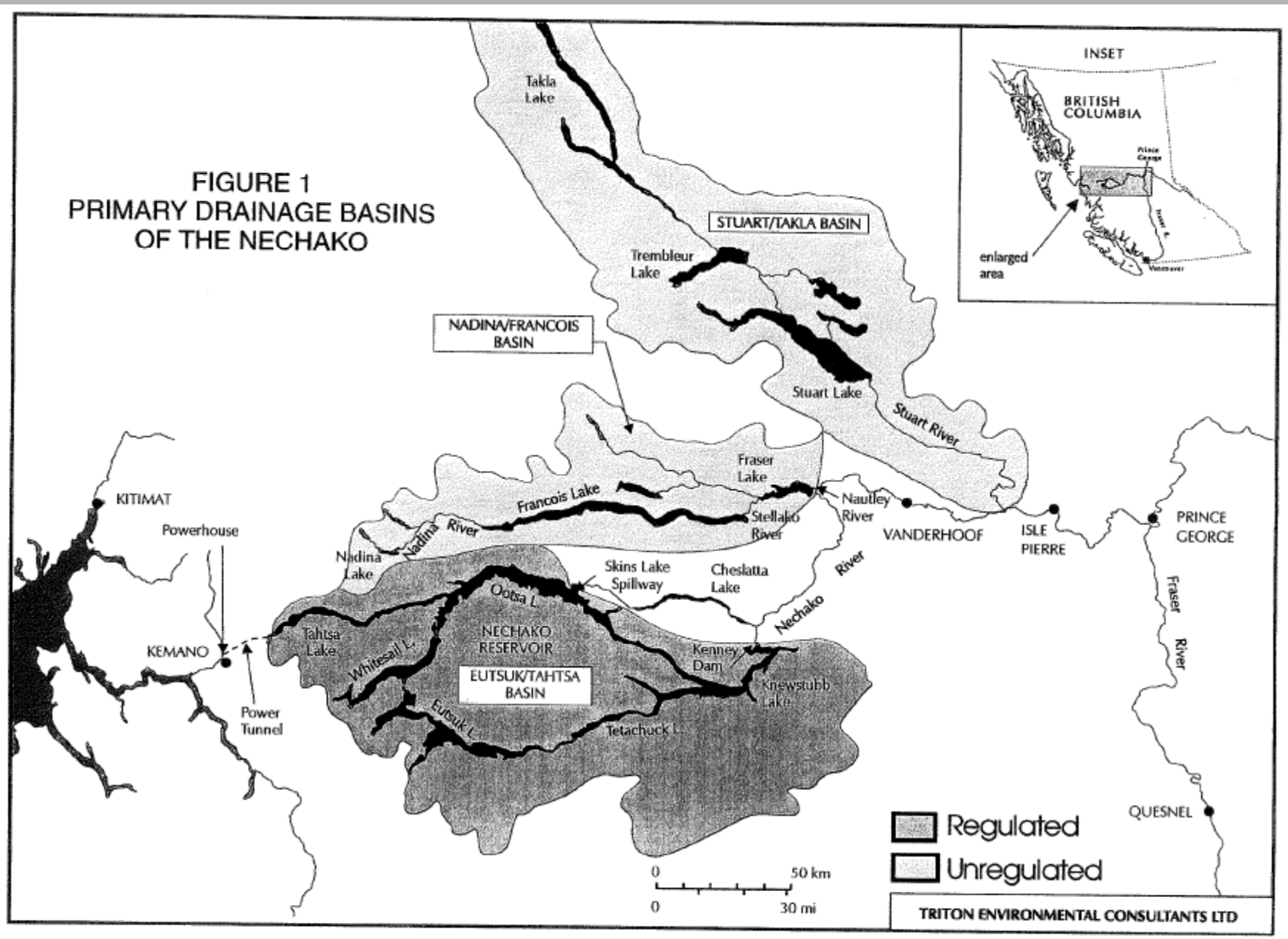
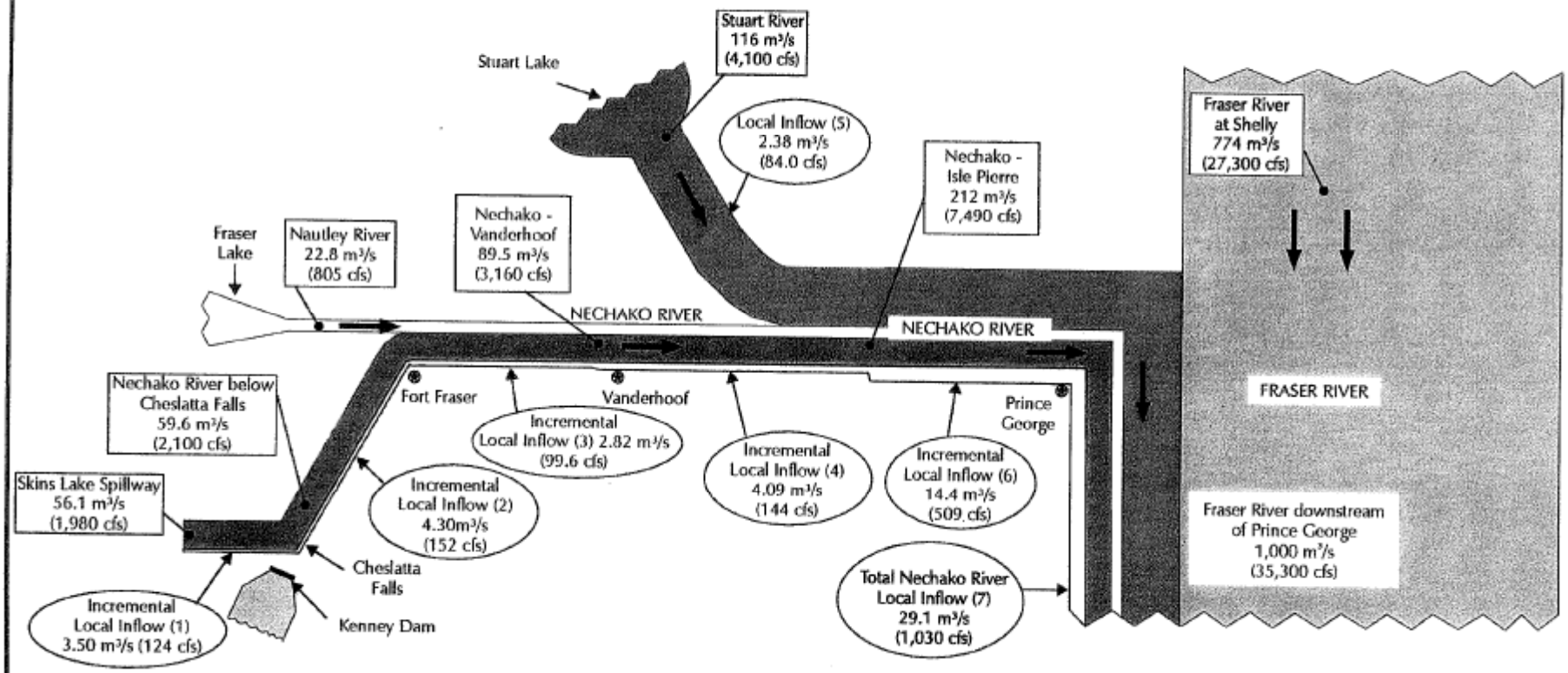


FIGURE 1
PRIMARY DRAINAGE BASINS
OF THE NECHAKO
INSET
BRITISH COLUMBIA
enlarged area
Takla Lake
STUART/TAKLA BASIN
Trembleur Lake
NADINA/FRANCOIS BASIN
Stuart Lake
Stuart River
Fraser Lake
Francois Lake
Nadina River
Stellako River
Nautley River
VANDERHOOF
ISLE PIERRE
PRINCE GEORGE
Fraser River
KITIMAT
Powerhouse
Nadina Lake
Skins Lake Spillway
Cheslatta Lake
Nechako River
Ootsa L.
NECHAKO RESERVOIR
EUTSUK/TAHTSA BASIN
Tahtsa Lake
Whitesail L.
KEMANO
Power Tunnel
Kenney Dam
Knewstubb Lake
Eutsuk L.
Tetachuck L.
QUESNEL
Regulated
Unregulated
0 50 km
0 30 mi
TRITON ENVIRONMENTAL CONSULTANTS LTD

FIGURE 2: SCHEMATIC OF NECHAKO RIVER INFLOWS (1980 to 1994)



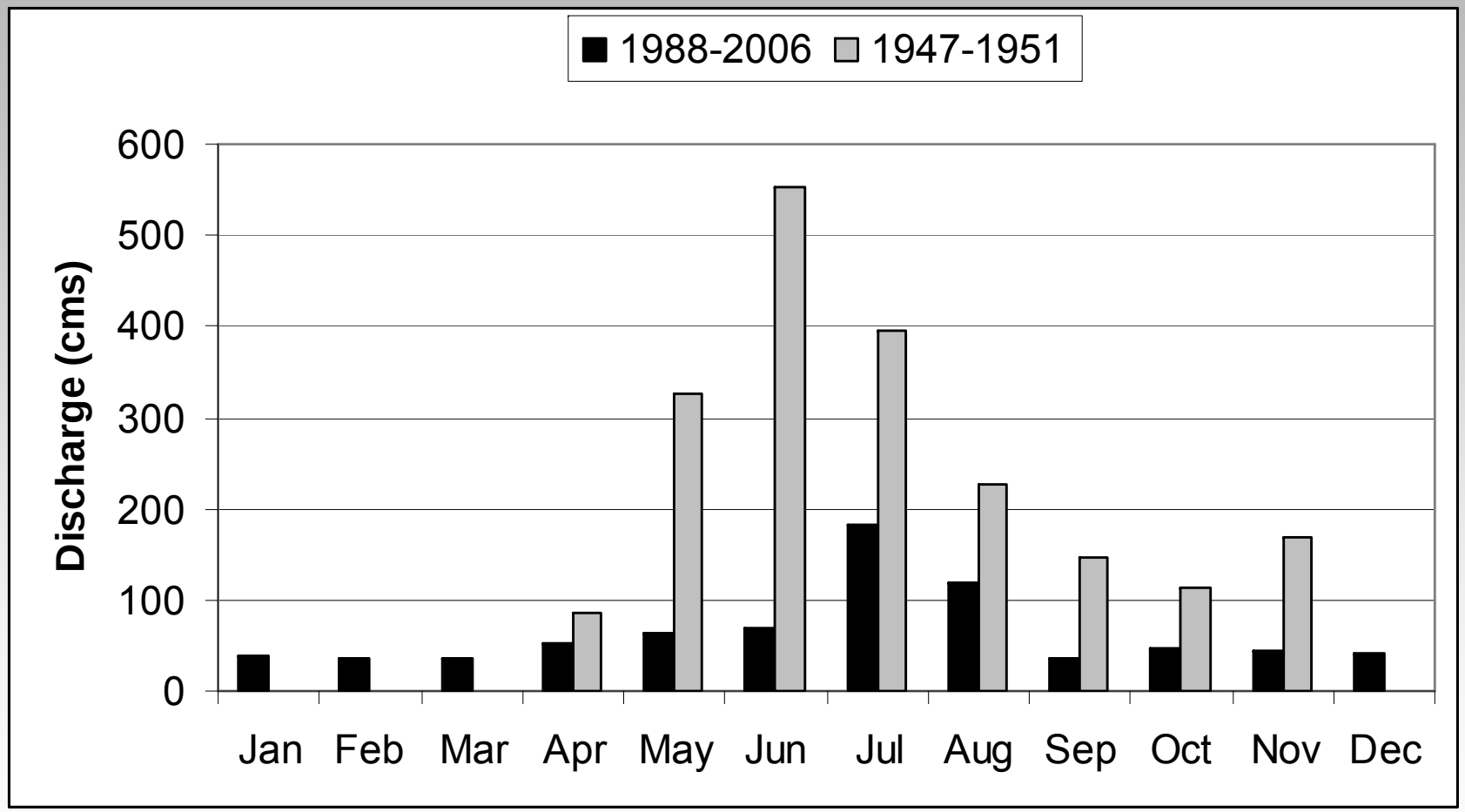
Notes:

1. Local inflow between Skins Lake Spillway and Cheslatta Falls.
2. Nechako River local inflow between Cheslatta Falls and Nautley River.
3. Nechako River local inflow between Nautley River and Vanderhoof.
4. Nechako River local inflow between Vanderhoof and Isle Pierre (excluding local inflow to Stuart River).
5. Stuart River local inflow between Stuart Lake outlet and Nechako River.
6. Nechako River local inflow between Isle Pierre and Prince George.
7. Total Nechako River Local Inflow Between Skins Lake Spillway and Prince George.

Denotes Water Survey of Canada gauging station location.

Data Period For Inflows 1980 - 1994

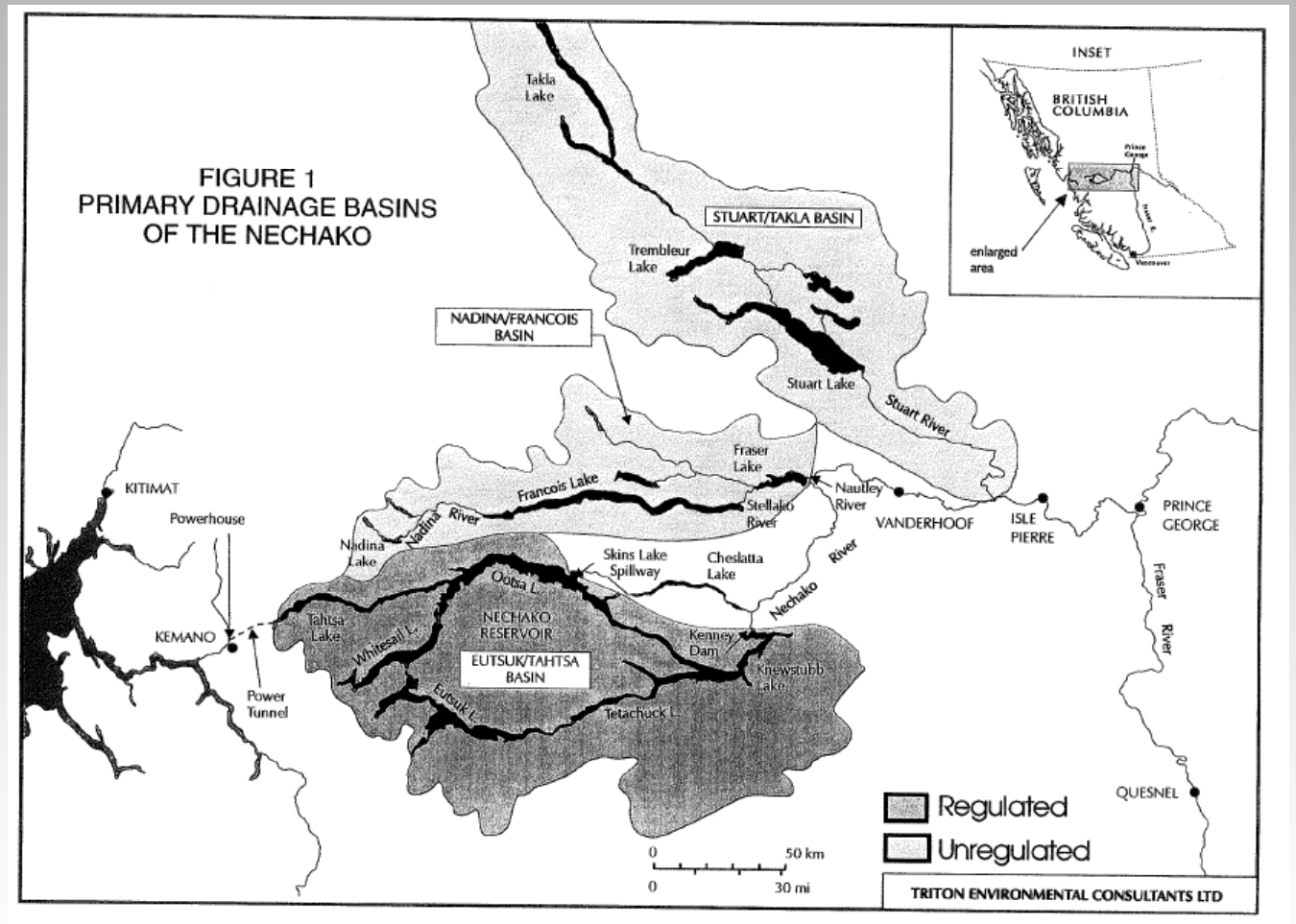
Nechako River Discharge Pre- and Post- Impoundment



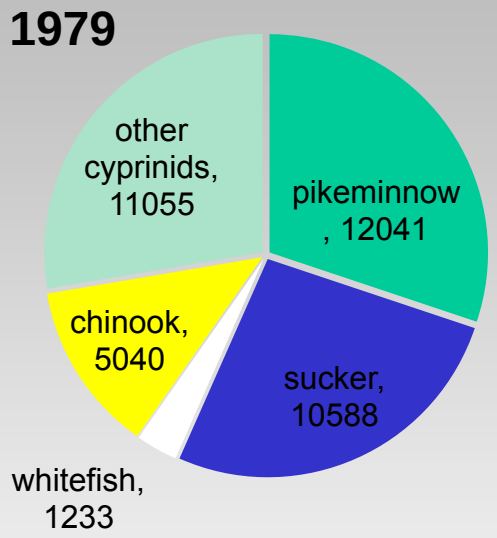
Nechako Chinook

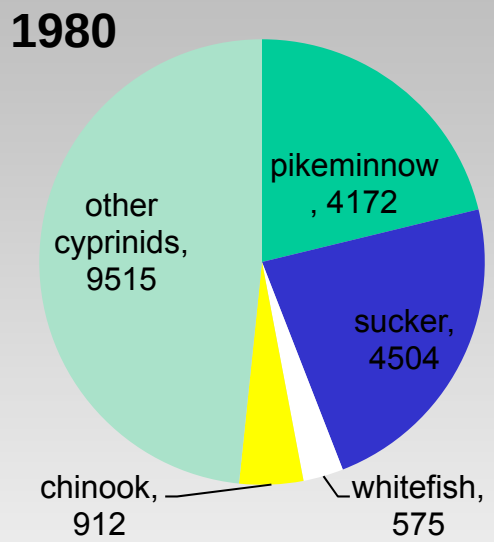
- 70 known Chinook spawning locations in the Fraser R.
- around 20 support average escapements of at least 1000 fish
- part of the Summer 5_2 run
- sensitive to in-river habitat conditions

5 Populations of Sockeye Salmon



Nechako fish community – 19 species





Also:

- Nechako White Sturgeon Recovery Initiative
- Provincial interest in rainbow trout and bull trout

NFCP: 1987 September

1987 Settlement Agreement created the NFCP and established its mandate: prepare for KCP flow change.

NFCP: 1987 - 1994

- scientific program that anticipated future KCP flow reduction
- data base & indices to detect change in chinook abundance
- ‘remedial measures’ if required after lower flows

NFCP: 1995 - 1997

1995 January:

KCP rejected by provincial government

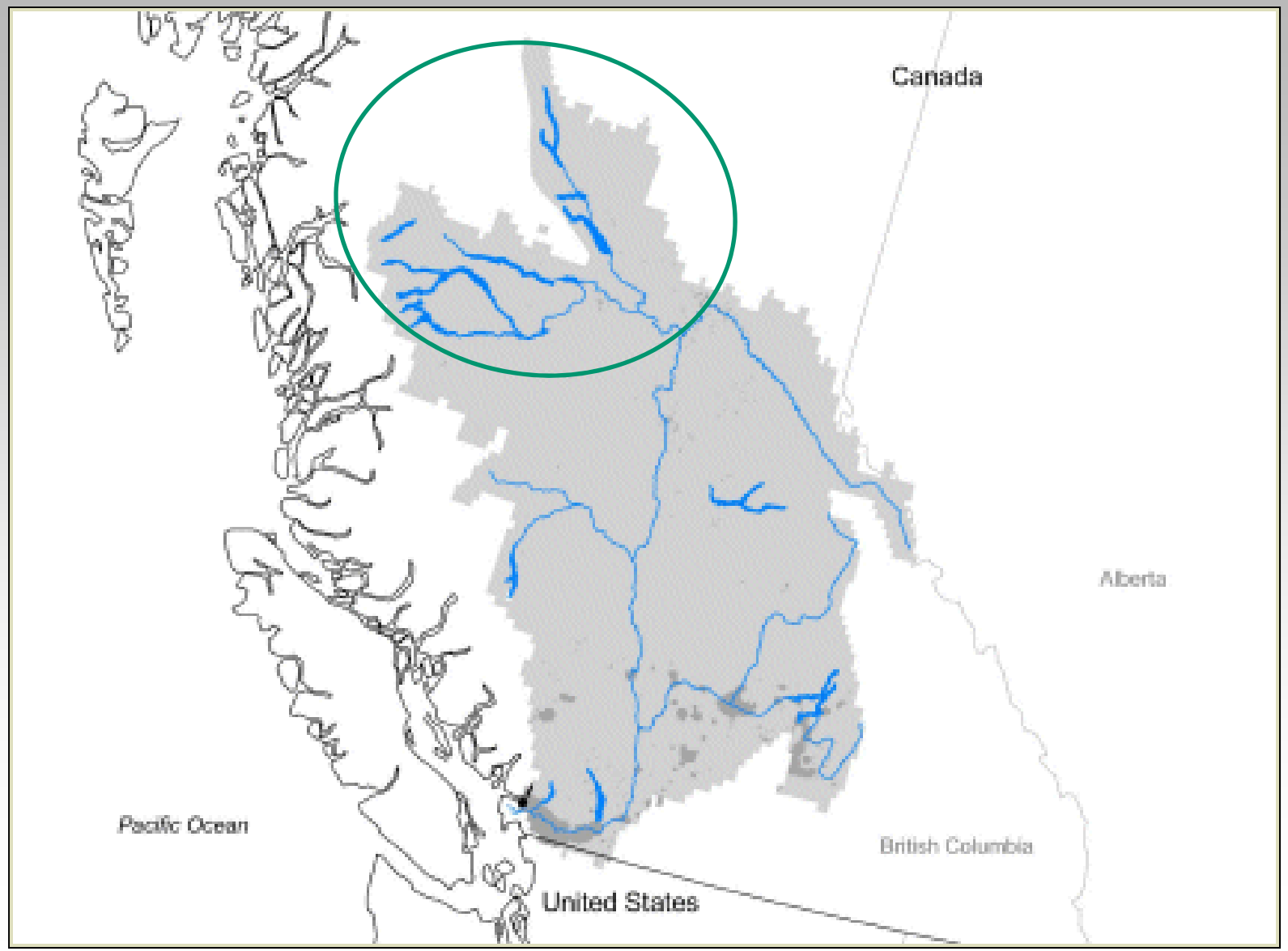
1995 - 1997:

Uncertainty about KCP outcome until legal issues resolved

1997 August:

- 1997 BC-Alcan Agreement to resolve legal issues
- KCP legally dead
- lower flows to Nechako will not occur
- *status quo* for NFCP

Oncorhynchus tshawytscha


Canada
Alberta
British Columbia
Pacific Ocean
United States

Adult Enumeration

$$\text{Estimate} = \frac{\text{AUC (spawners x days)}}{\text{Residence Time (days)}}$$

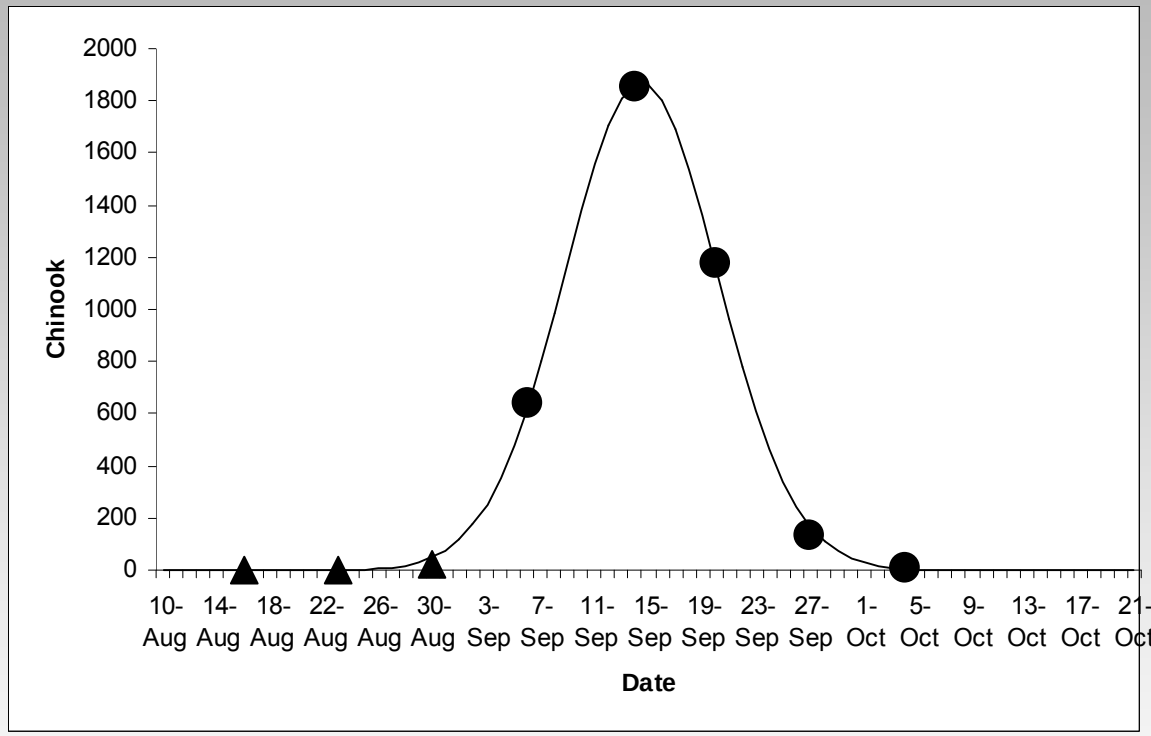
Adult Enumeration

Enumeration consists of 2 components:

- calculating the Area-under-the-Curve via weekly helicopter observations along the entire river

- estimating residence time via daily observations at selected locations along the river

1989 Maximum Likelihood Analysis



Round circles indicate the five observations that fall within a September/first week of October timing window;
triangles are observations that fall outside the recommended sampling window.

September/first week of October sampling window

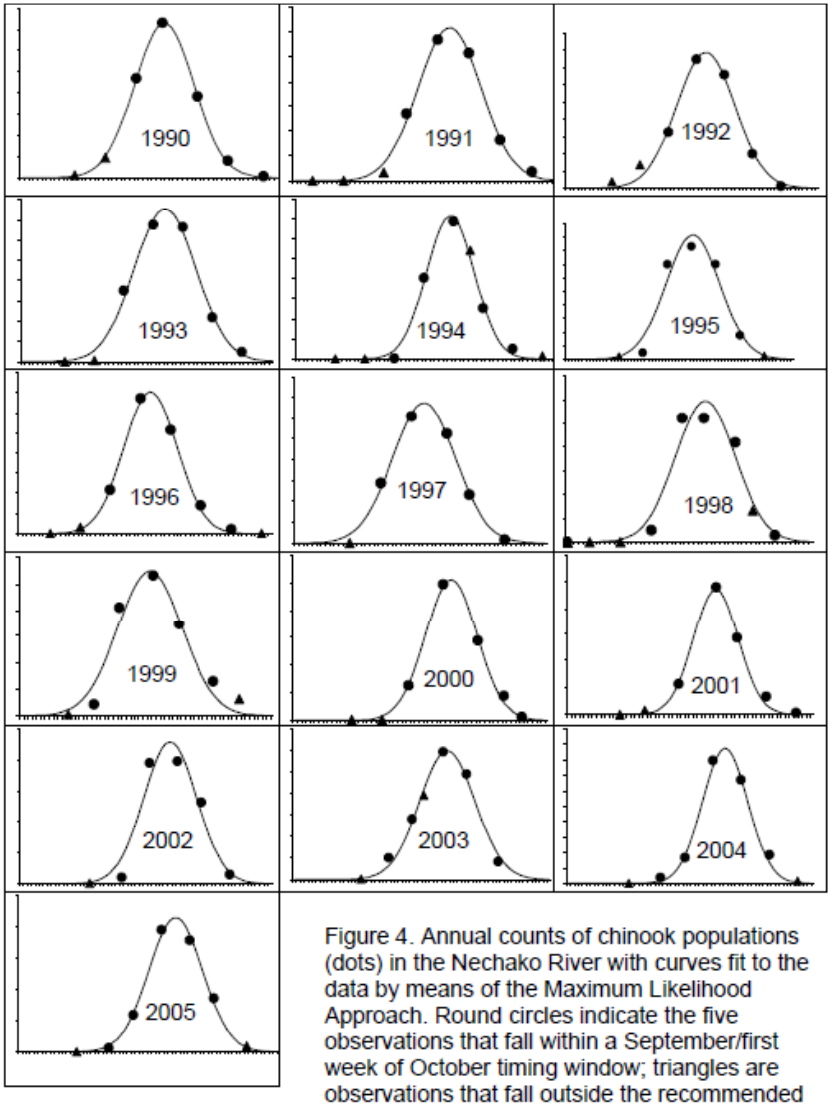
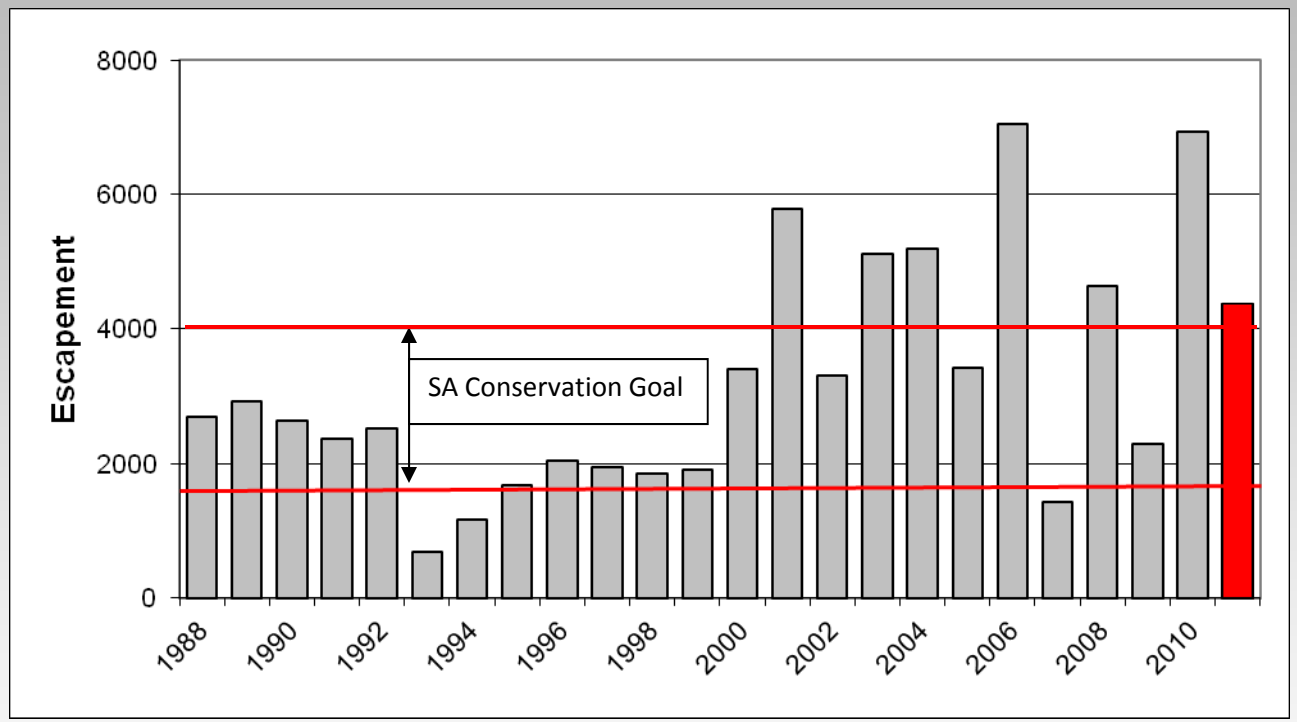


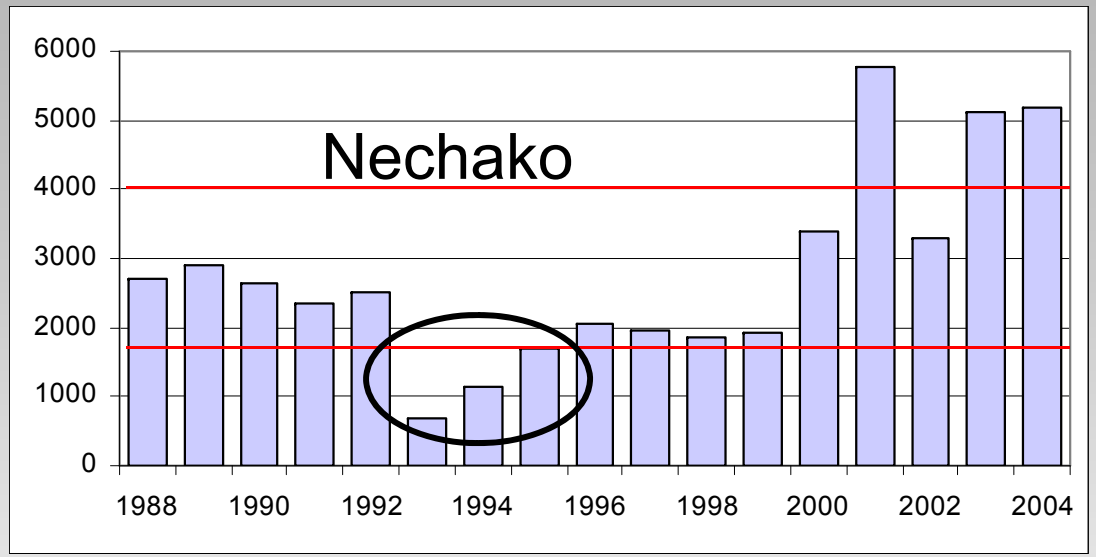
Figure 4. Annual counts of chinook populations (dots) in the Nechako River with curves fit to the data by means of the Maximum Likelihood Approach. Round circles indicate the five observations that fall within a September/first week of October timing window; triangles are observations that fall outside the recommended sampling window.

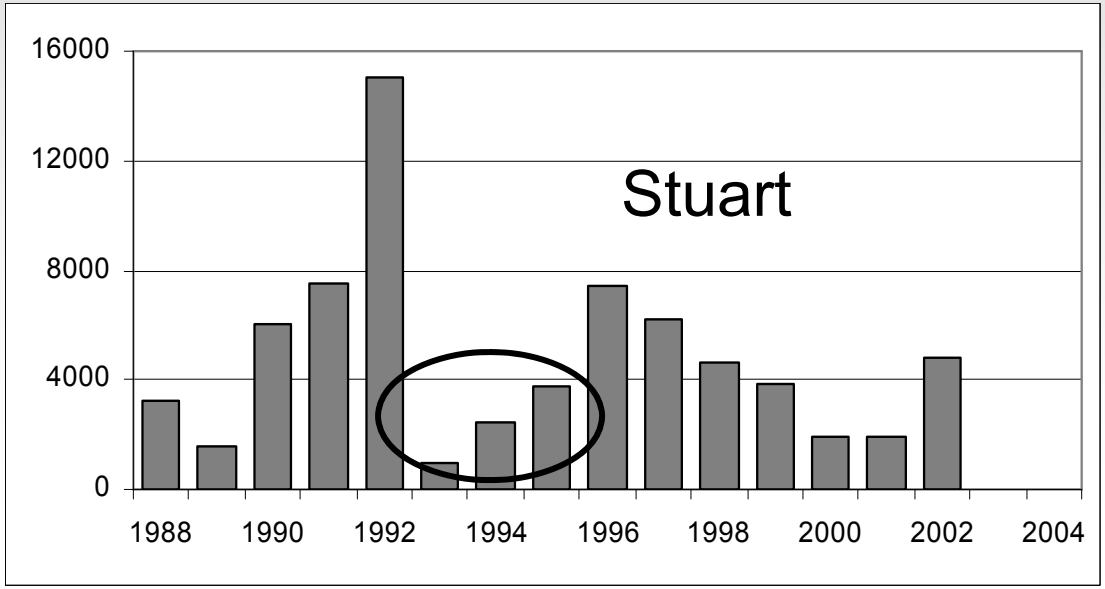
Nechako Chinook Escapement



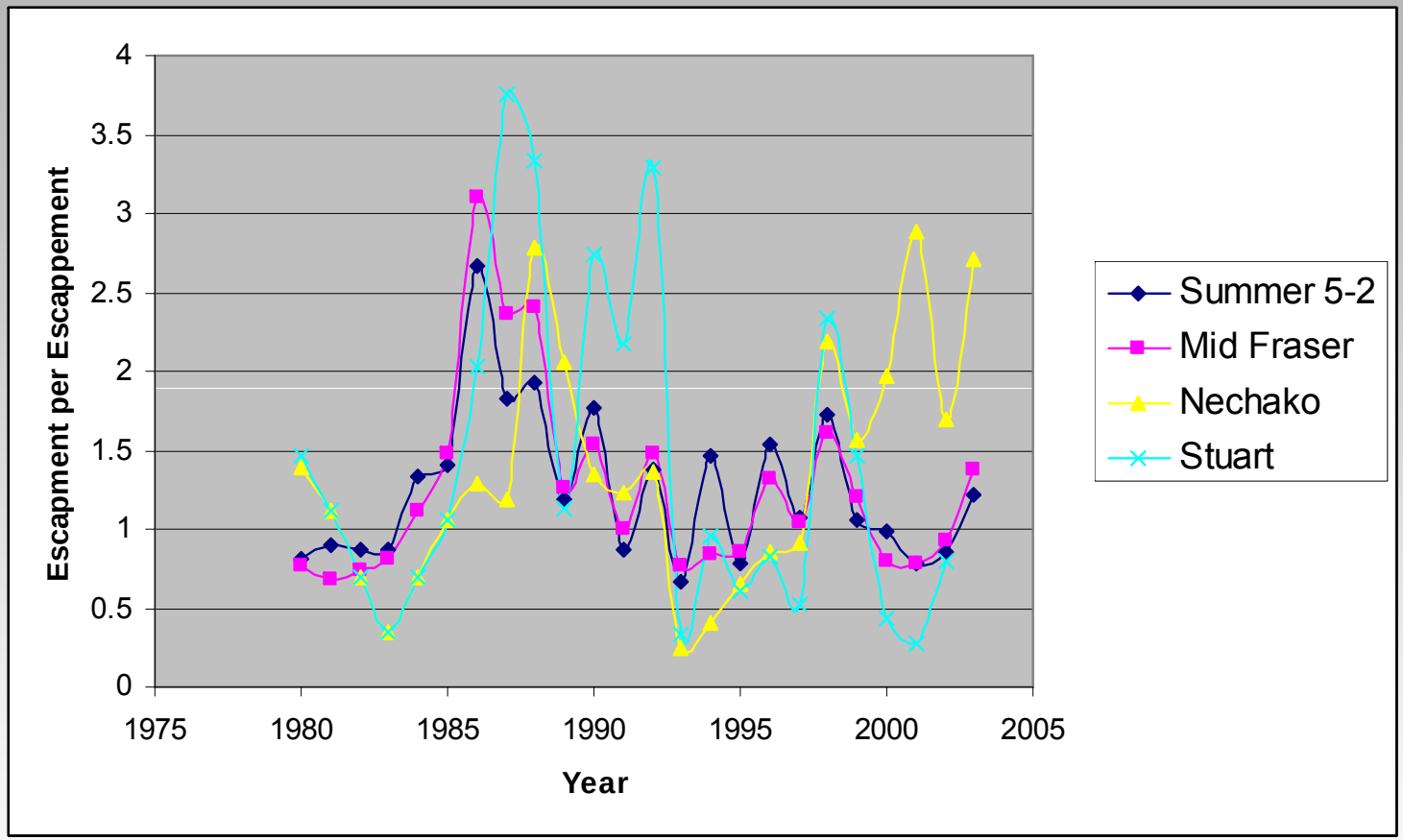
The annual estimate of the number of Nechako Chinook spawners is the primary measure of whether or not the *Conservation Goal* is being met.

Nechako chinook vs Stuart chinook



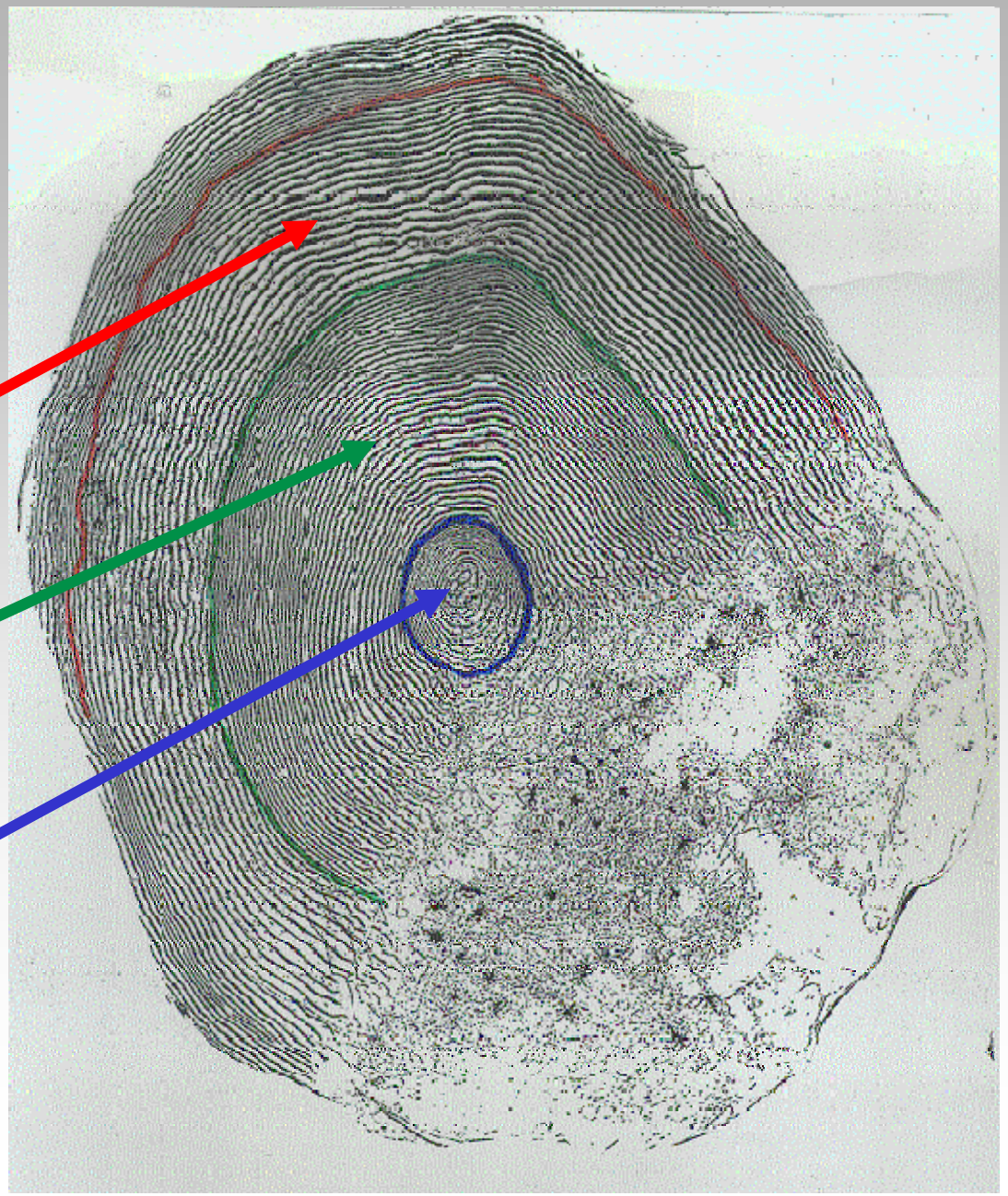


Chinook reference populations: recruits per spawner



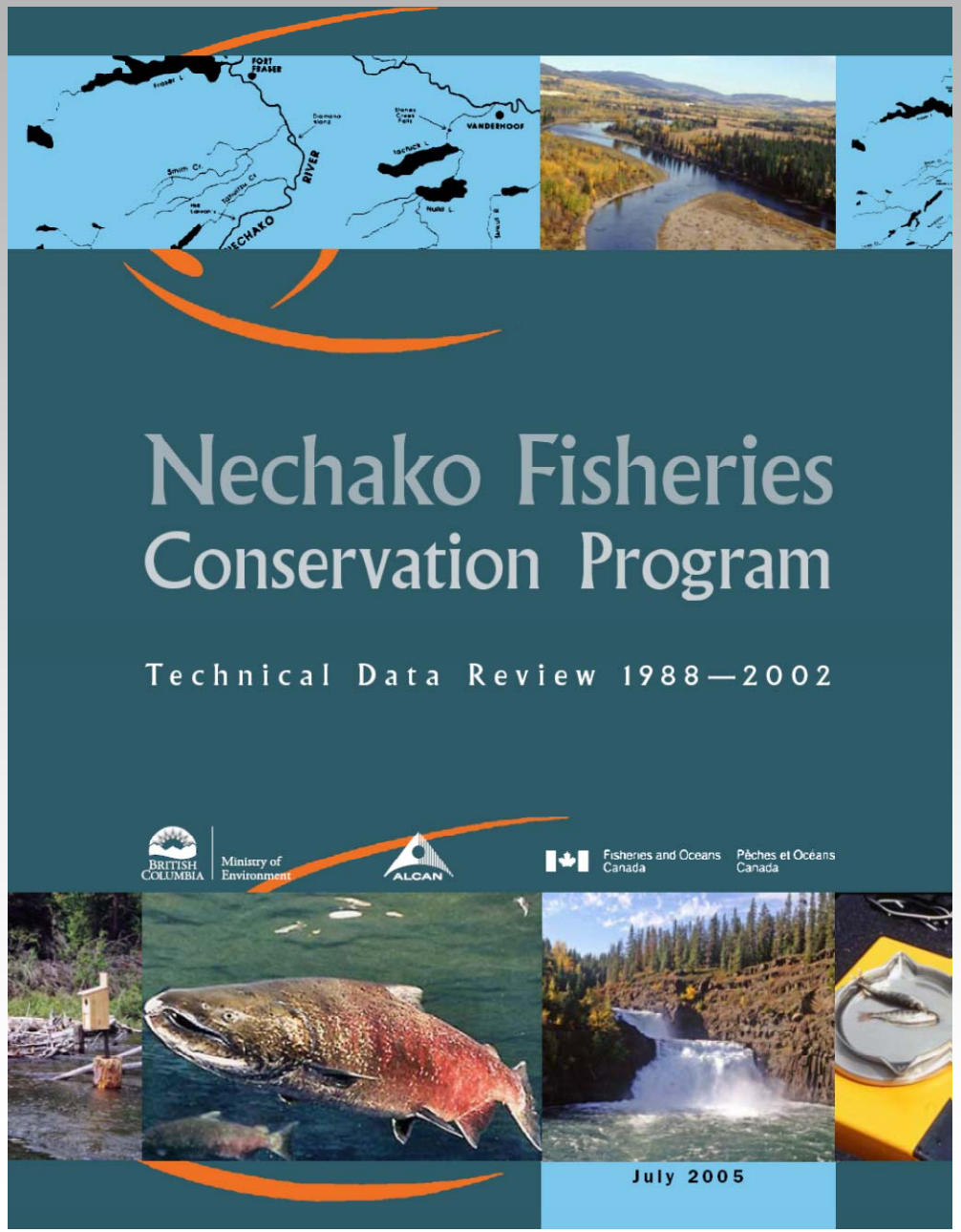
Nechako Escapement vs Stuart River,
Mid Fraser Aggregate and
Summer 5-2 Aggregate

Biological Sampling



Carcass Sampling

Technical Data Review: 2005



Technical Data Review

- Integrates and evaluates the results of more than 150 technical reports for period 1988 to 2002
- Represents a period of almost 3 life cycles of chinook
- Represents the work of a great number of people and agencies

	# of years implemented
Remedial Measures	
Cheslatta Murray Data Collection	6
Summer Temperature Management	17
Instream Habitat Modification	10
Biological Assessment of Habitat Complexing	9
Fertilization	5
Habitat Inventory	2
Sediment Inventory	1
Flow Control	17
Winter Remedial Measures	1
Riparian Bank Stabilization	3
Monitoring	
Adult Chinook Spawner Enumeration	17
Chinook Carcass Recovery	17
Juvenile Outmigration Monitoring	17
Winter Physical Conditions	5
Physical Data Collection	17
Fry Emergence	12
Gravel Quality	3
Dissolved Oxygen Monitoring	7
Applied Research	
Ecology of Juvenile Chinook Salmon	2
Chinook Life History Model	2
Predator Prey Studies	6
Temperature Effects	4
Chinook Overwintering	6

NFCP projects

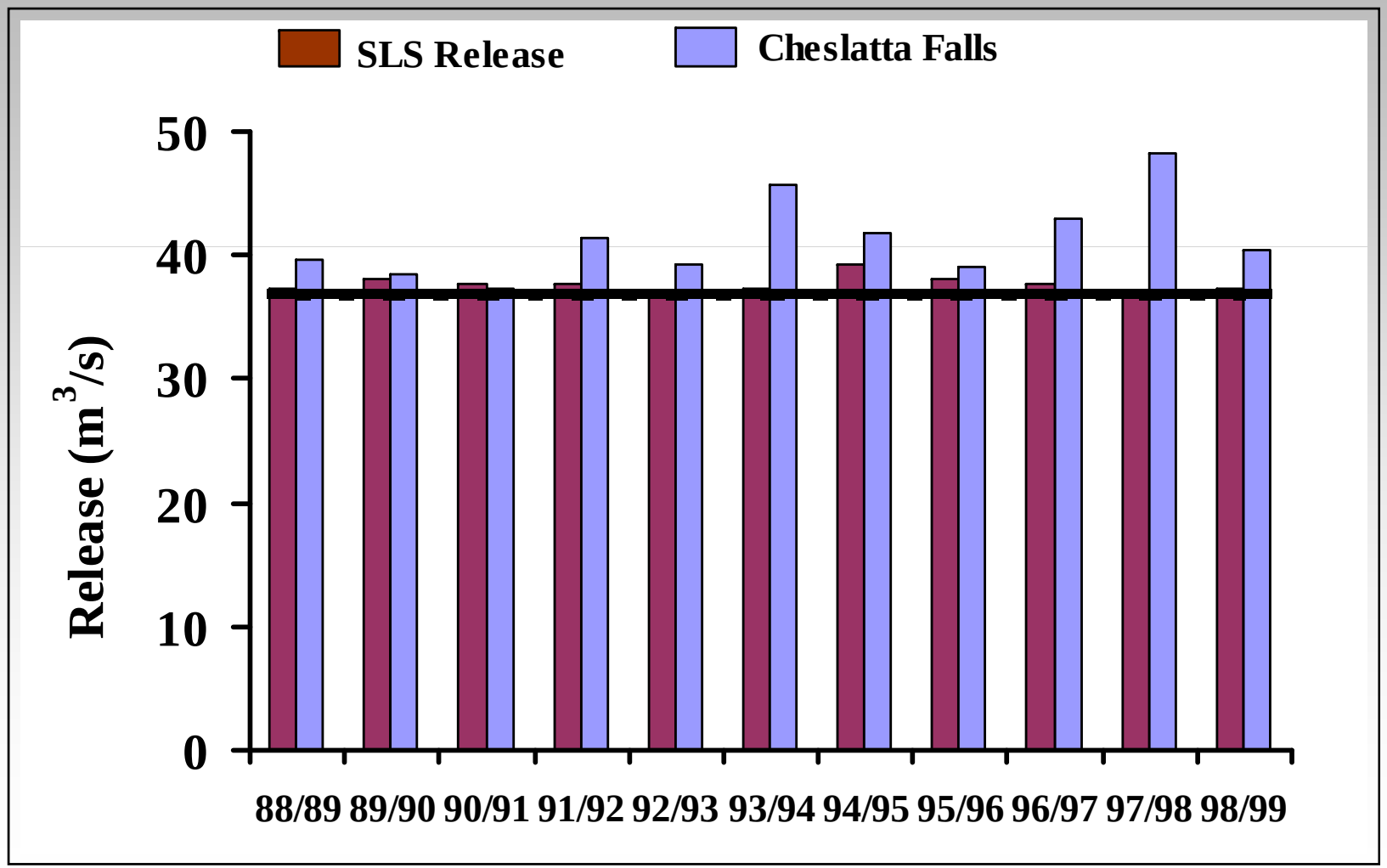
- Remedial measures
- Monitoring
- Applied Research

Flow Control

Criteria: release 36.8 m^3/s annually

Results: average release 37.7 m^3/s
(range 37.3 to 38.1 m^3/s)

Flow Control



Summer Temperature Management Program

Criteria: Limit frequency of high water temperatures (>20°C) during July August

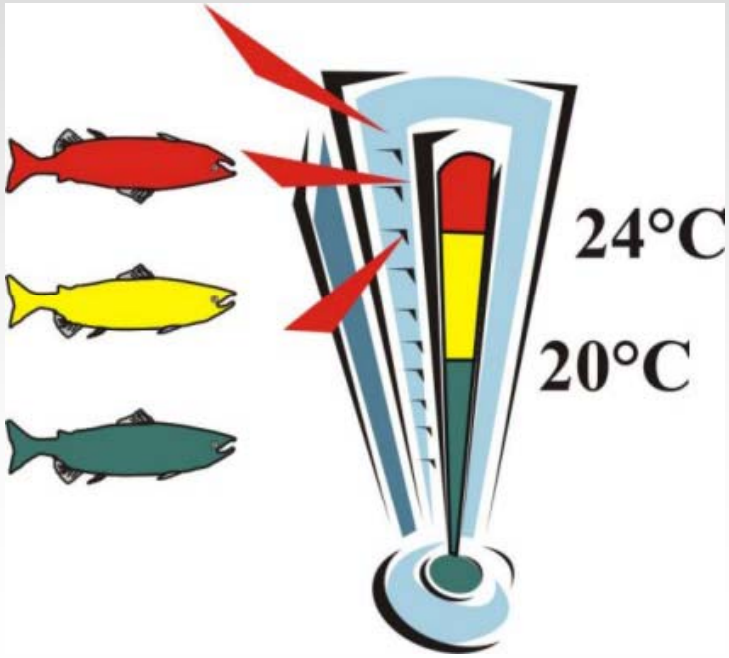
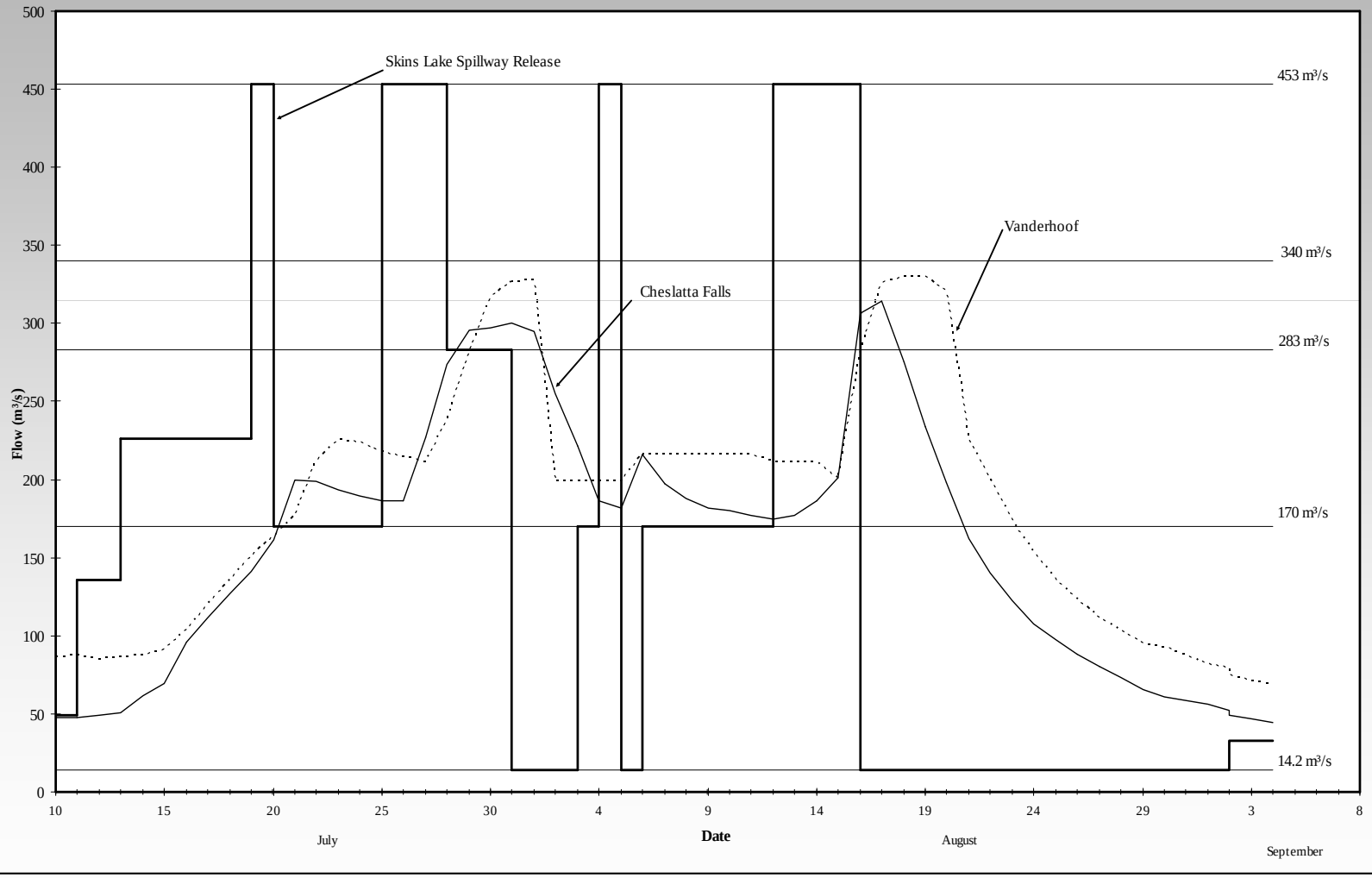


Figure 3: Skins Lake Spillway Releases and Flows in the Nechako River below Cheslatta Falls and at Vanderhoof
July 10 to September 4, 2010



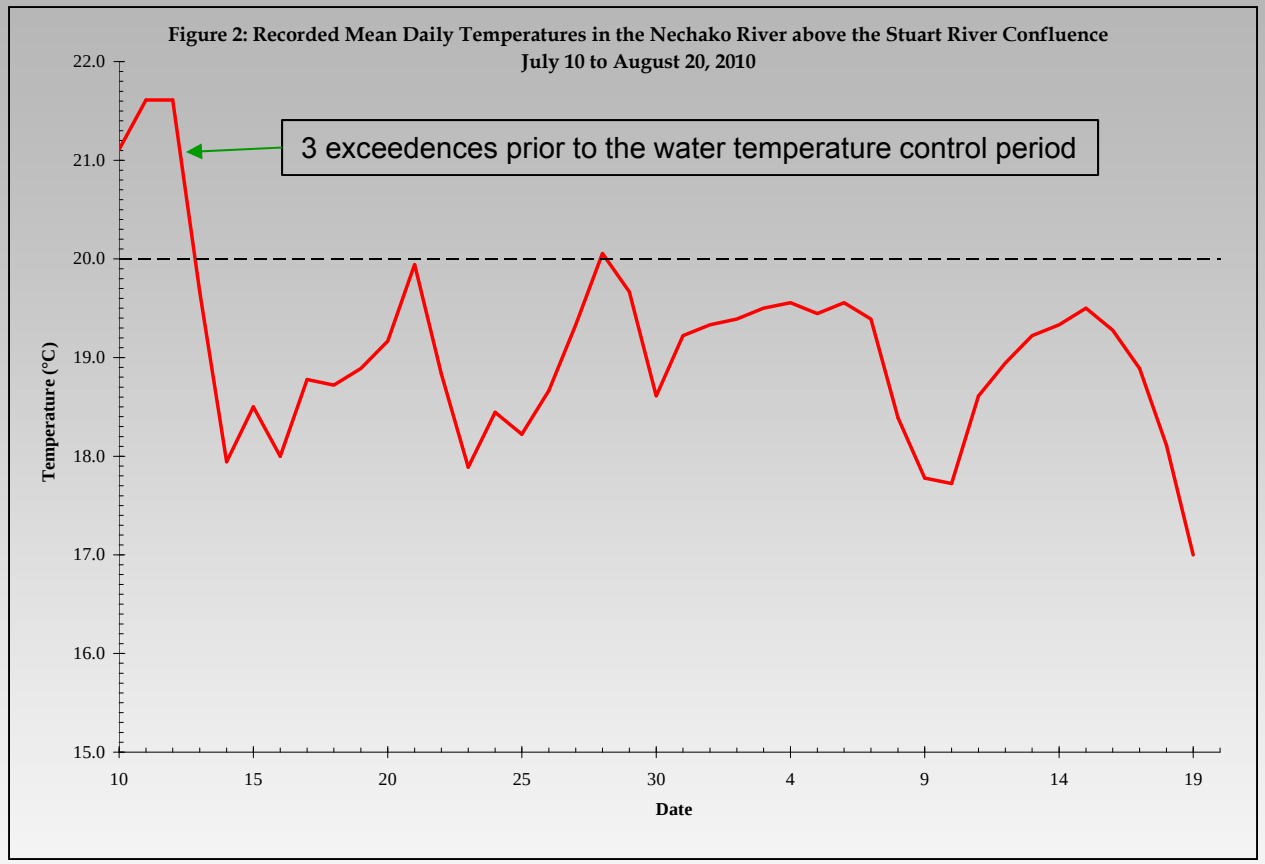


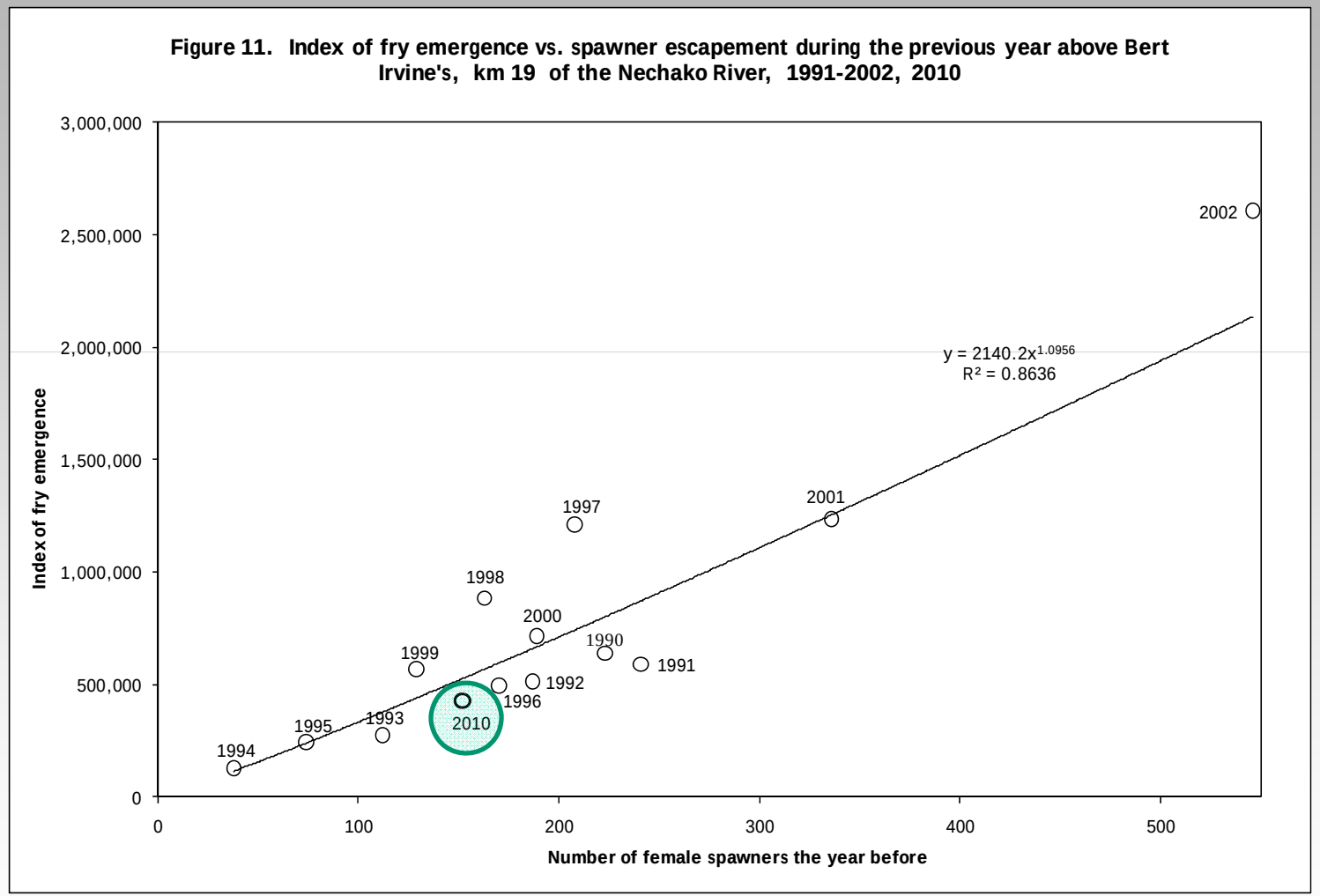
Figure 2: Recorded Mean Daily Temperatures in the Nechako River above the Stuart River Confluence
July 10 to August 20, 2010
3 exceedences prior to the water temperature control period
Temperature (°C)
22.0
21.0
20.0
19.0
18.0
17.0
16.0
15.0
10
15
20
25
30
4
9
14
19
Date

Summer Temperature Management Program

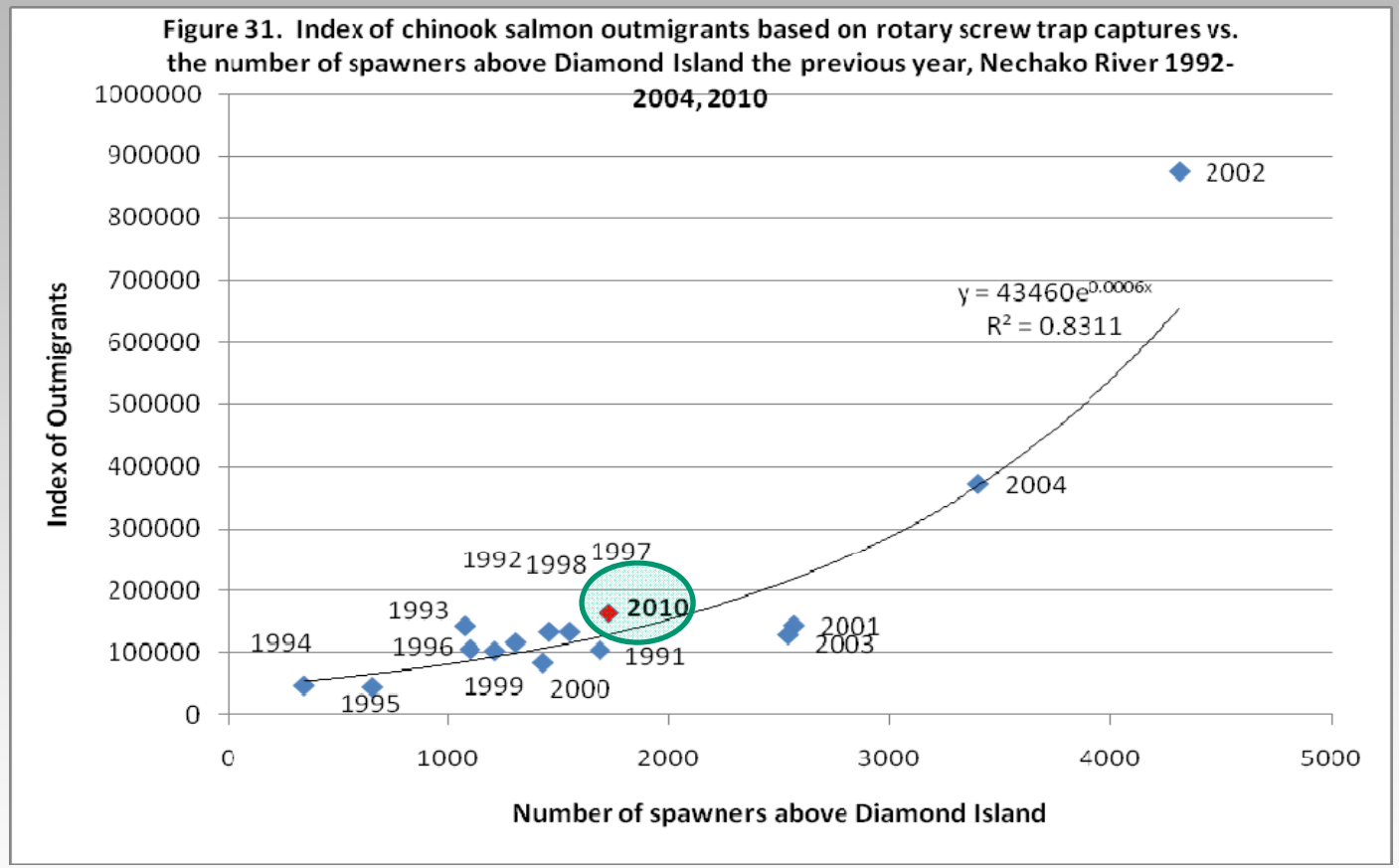
Frequency of water temperatures (>20^{o}C) less than historic average in spite of warmer weather conditions (1983 to 2000)

Juvenile Chinook monitoring

Fry Emergence



Juvenile Chinook Outmigrants



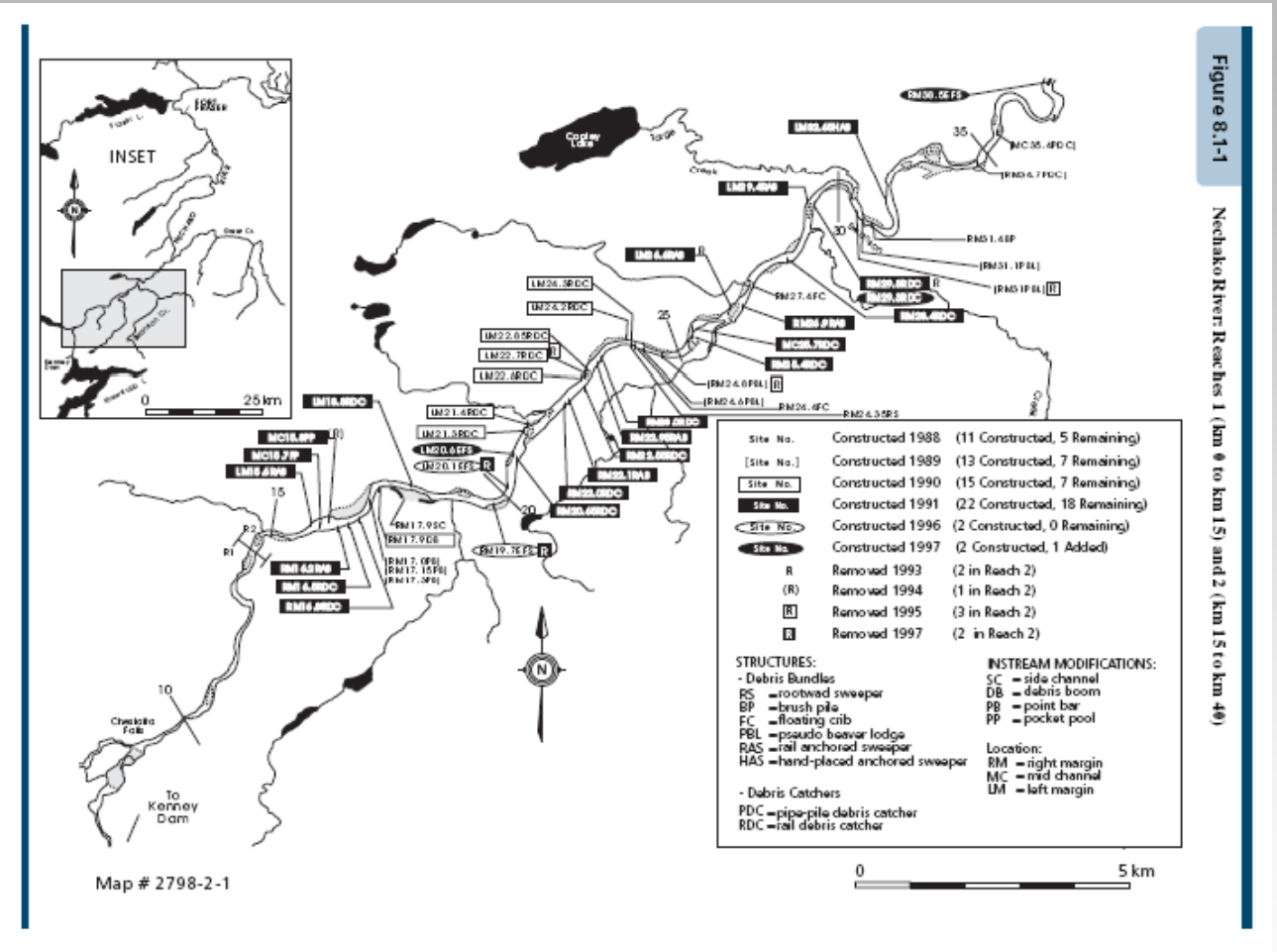
Instream Structures

Instream Structures

Physical stability and biological benefits:

- objective: increase rearing habitat for juvenile chinook
- design and test habitat structures to replace natural features
- structures provide habitat equivalent to natural systems

NFCP Habitat Complexes
82 installed between 1988 - 1997



Applied Research

Chinook salmon knowledge gaps:

- predator/competition/prey interactions
- juvenile chinook winter habitat use
- temperature effects on food and fish growth
- factors limiting chinook productivity

TDR Summary

→ Flow releases consistently >36.8 cms

→ STMP effective

→ Stable habitat conditions for juvenile chinook

→ Adult chinook generally within the target population range

→ Suite of remedial measures pilot-tested

→ Applied research has increased the understanding of Nechako chinook

NFCP TC Conclusions

Nechako Fisheries Conservation Program

"… it is the opinion of the [NFCP] Technical Committee that the current in-river conditions examined by the committee are sufficient to sustain a population of chinook salmon that fluctuates generally within the "target population" range identified by the Conservation Goal."

NFCP TC Conclusions

Nechako Fisheries Conservation Program

- "… the Nechako Fisheries Conservation Program Technical Committee concludes that the spirit and intent of the Conservation Goal has been met."

5 Year Plan

Nechako Fisheries Conservation Program
5 Year Plan: 2007-2012

January, 2007

Prepared by:

NFCP Technical Committee

Recommendations

- STMP and AWA remain unchanged
- AUC method for adult chinook using MLA
- 5 helicopter flights - Sept/first week Oct
- Use mean residency time of 10.6 days
- Measure residency time year prior to fry/juvenile monitoring

Recommendations (cont'd)

- Annual chinook carcass recovery
- Continue to evaluate the utility of using reference populations
- Measure residency time 1 year in 5
- Fry emergence program 1 year in 5
- Juvenile outmigration program 1 year in 5

Recommendations (cont'd)

- Physical data collected during fry/juvenile program
- Measure substrate quality and composition 1 yr in 10
- Annual inspections of instream structures

Carcass Biological Sampling

Maintain minimum sample size of 200 fish

Continue sampling across upper, middle and lower sampling areas

Change from daily sampling across period of die-off (15 to 21 days) to one sampling run before peak and one after (3-4 days each, totally 6-8 days)

Strategic Planning Initiative – background information

- NFCP 10 Year Review Background Report (1997) – used to support NFCP refocussing
- NFCP: the last 10 years and the next 10 years (ESSA 1998)
- Report of the NEEF MC (2001)
- NFCP – TC Memo: Options for the Future (2005)
- NFCP – “The Future” (ESSA 2005)
- NFCP: Technical Data Review (2005)
- NFCP – Five Year Plan (2007)

Options for future NFCP

1. Status quo
2. Sunset the NFCP
3. Sunset the NFCP and create a new agreement
4. Reduce the scope of the NFCP to a bare minimum
5. Set new objectives and renew the NFCP with modified mandate

Discussed with Steering Committee in 2005 and recently in June 2011 and November 2011

Current NFCP Activities

- Continue with core activities:
  - AWA
  - STMP
  - Chinook monitoring
  - Sediment survey (if required)

- 5 year plan 2012 – 2017 same as previous