

NFCP Presentation to the Nechako Water Engagement Initiative Sep. 16, 2020


 NECHAKO FISHERIES  
Conservation Program

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NFCP Focus is on Nechako Chinook and Sockeye Conservation

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Conservation Program



### NFCP Technical Committee




- Fisheries and Oceans Canada
- BC FLNROD
- Rio Tinto
- Independent Member

Reporting:

- Decision Records
- Annual Reports
- Steering Committee Briefing Documents
- Technical Reports
- Five Year Plans
- Annual Brochures
- Newspaper articles


### NFCP Goals and Objectives



Goals:


- Nechako Chinook conservation;
- Chinook target population of the Conservation Goal is an escapement between 1,700 to 4,000;
- Manage the operation of the computer models and flow release protocols necessary to protect migrating sockeye salmon (STMP); and,
- Manage water releases consistent with the Annual Water Allocation in the *Settlement Agreement* (AWA)

NFCP Reports

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Type of Report	
NFCP Annual Reports	Summer Temperature Management Program
Steering Committee Annual TOR Reports	Implementation and monitoring of habitat complexes
NFCP Annual brochures	Sand mapping
NFCP 5-year plans	Pilot fertilization reports
Chinook enumeration Nechako R.	Physical data summaries
Chinook enumeration Stuart R.	Cross-sectional survey of the Nechako River
Chinook carcass recovery Nechako R.	Riparian zone
Chinook carcass recovery Stuart R.	Winter physical conditions
Chinook fry emergence	Dissolved oxygen monitoring and substrate quality
Chinook juvenile outmigration	Evaluation framework and trend analysis
Chinook winter habitat utilization	Murray-Cheslatta data collection
Flow control	Technical Data Review

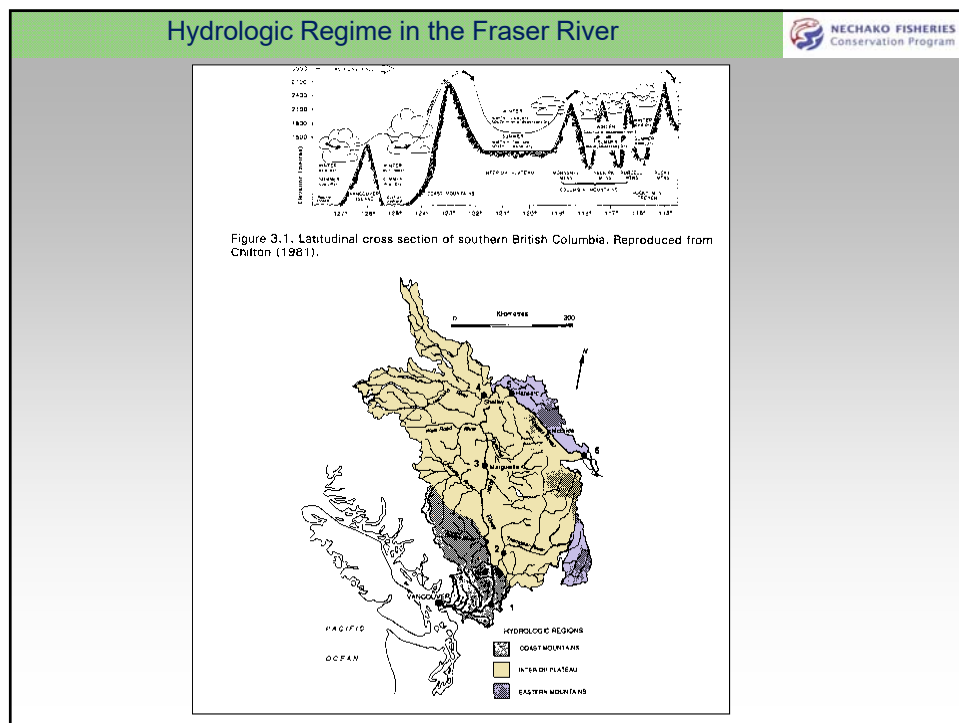
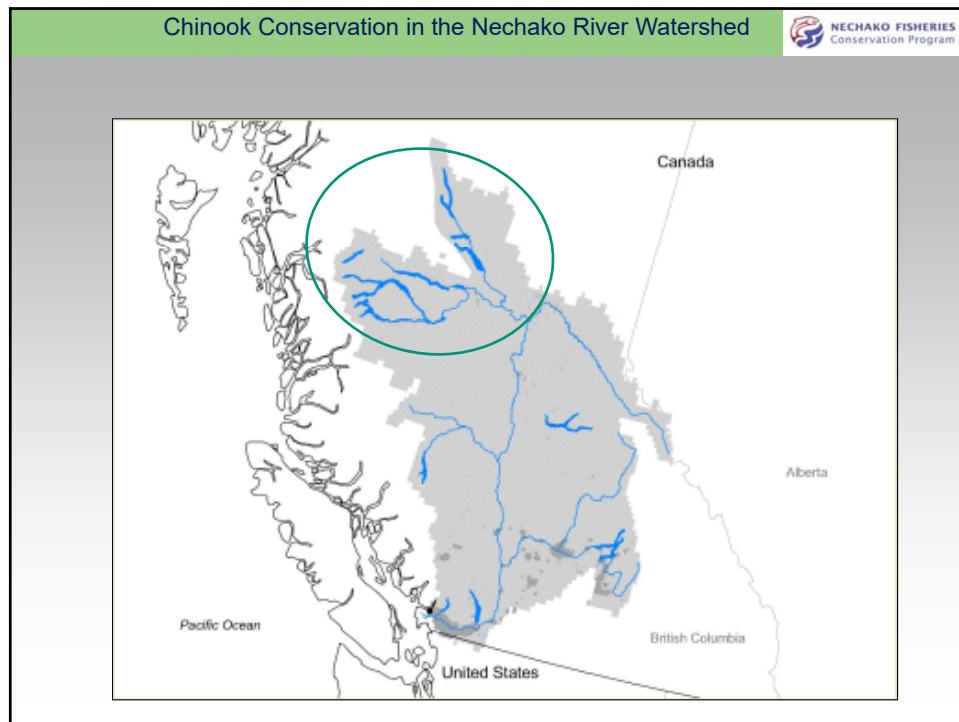
Summary of NFCP Activities

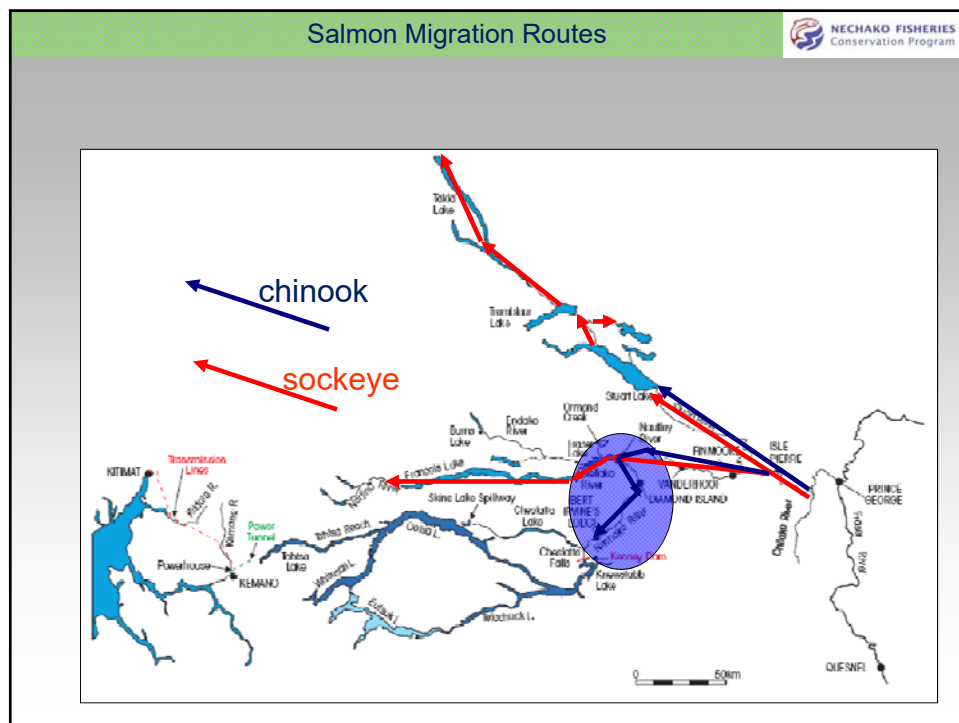
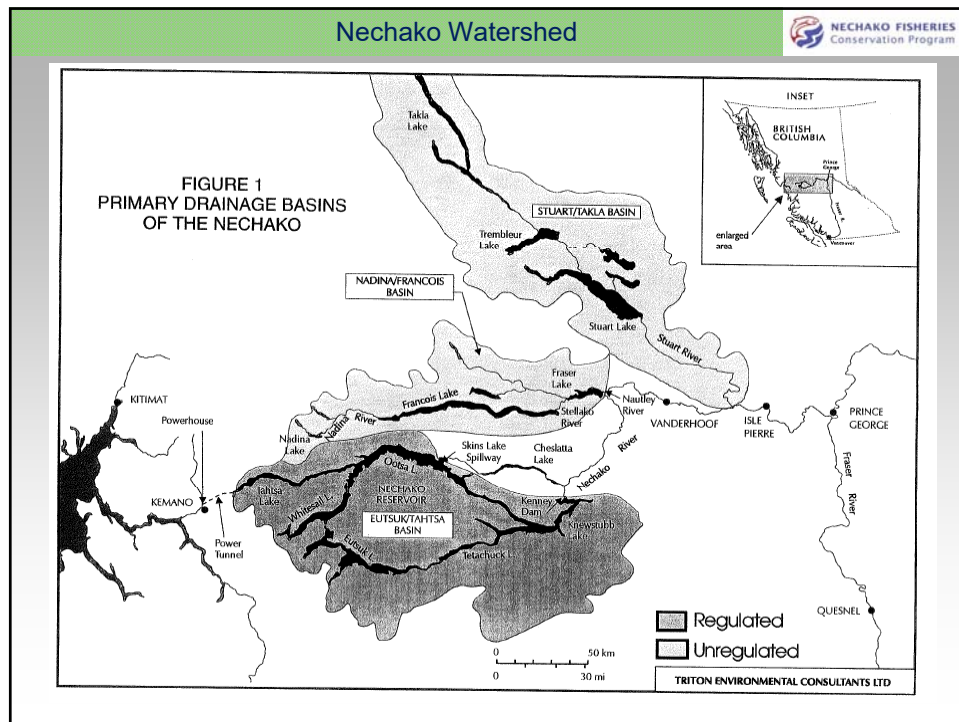


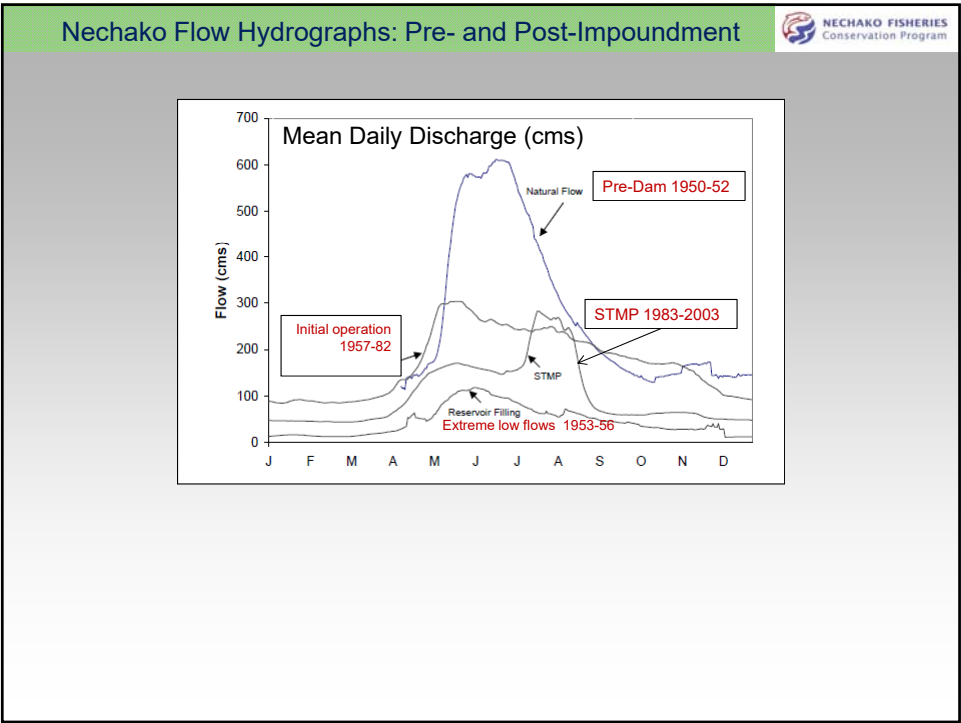
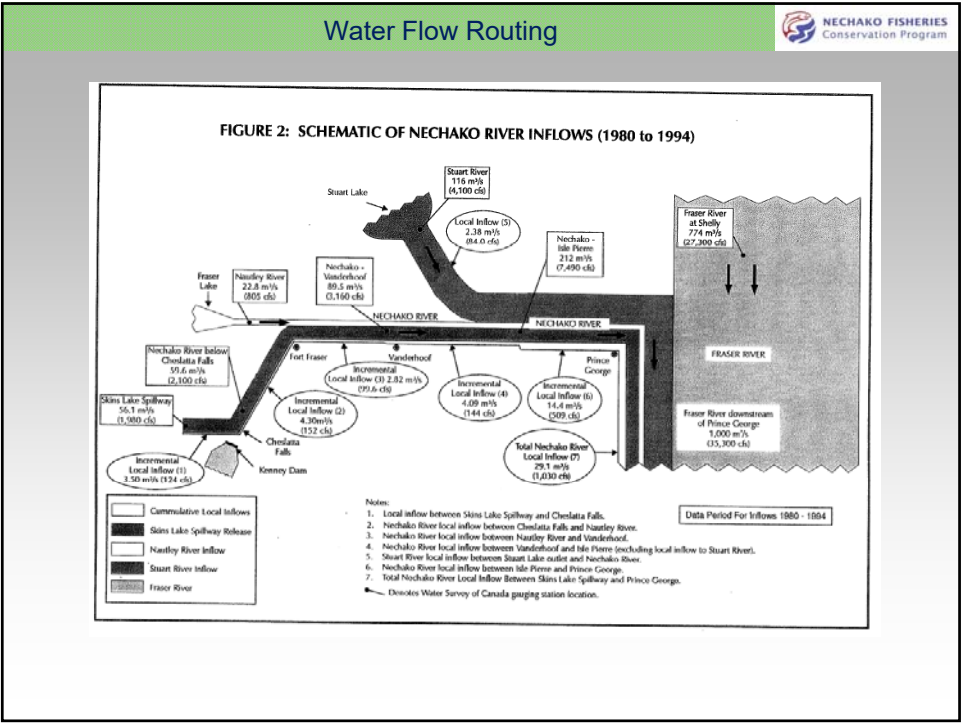
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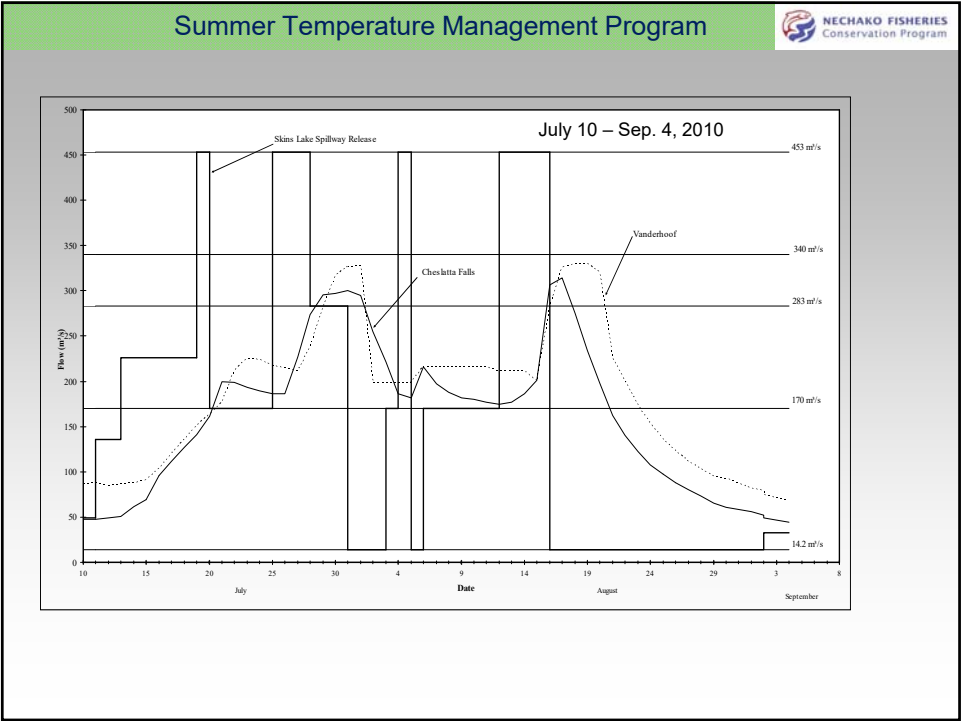
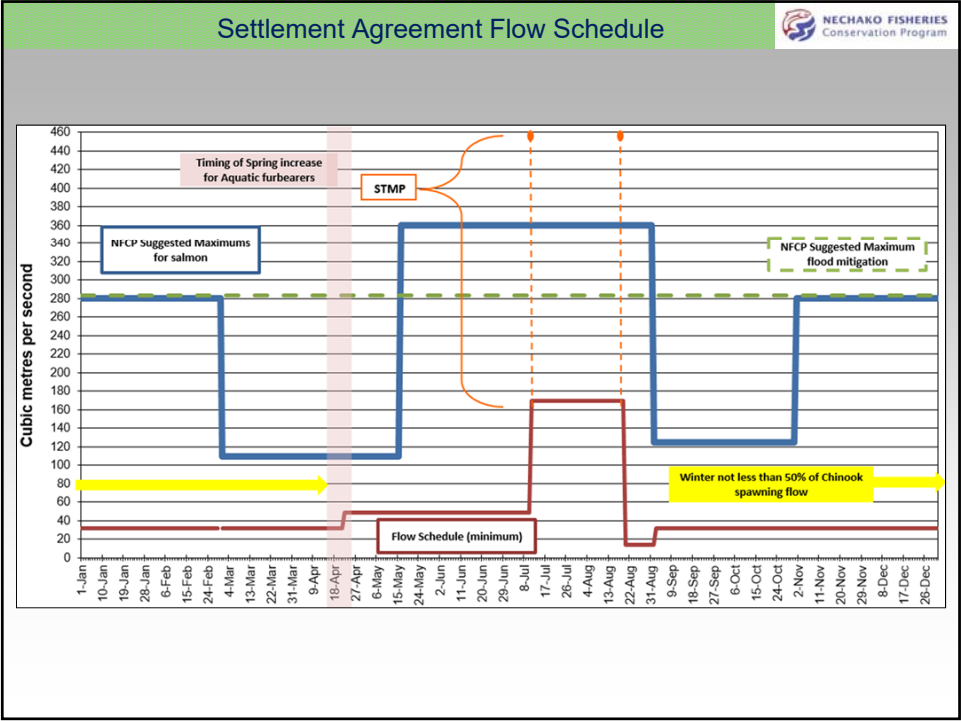
Summary of NFCP Activities

	STMP	AWA	Nechako Chinook	Chinook Bio Sampling	Stuart Chinook	Chinook Fry	Chinook Juveniles	Sediment Quality	Instream Habitat	Annual Reports	Summary Reports
1988											
1989											
1990											
1991											
1992											
1993											
1994											
1995											
1996											
1997											
1998											
1999											
2000											
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2003											
2004											
2005											Technical Data Review
2006											
2007											5 yr Plan 2007-2012
2008											
2009											
2010											
2011											
2012											5-yr Plan 2012 - 2017
2013											
2014											PG Closures
2015											Ck Escapement
2016											NFCP History
2017											
2018											UFTCA/NFCP Report
2019											
2020											




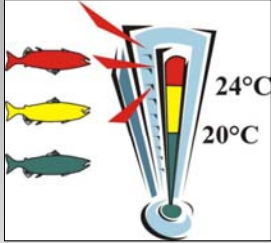








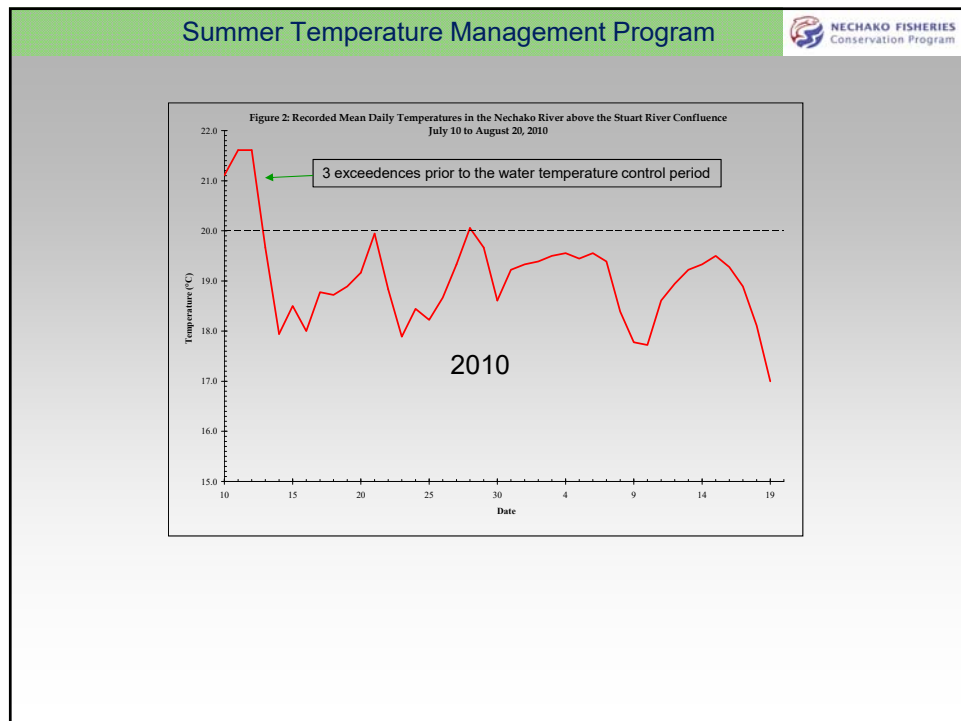
Summer Temperature Management Program




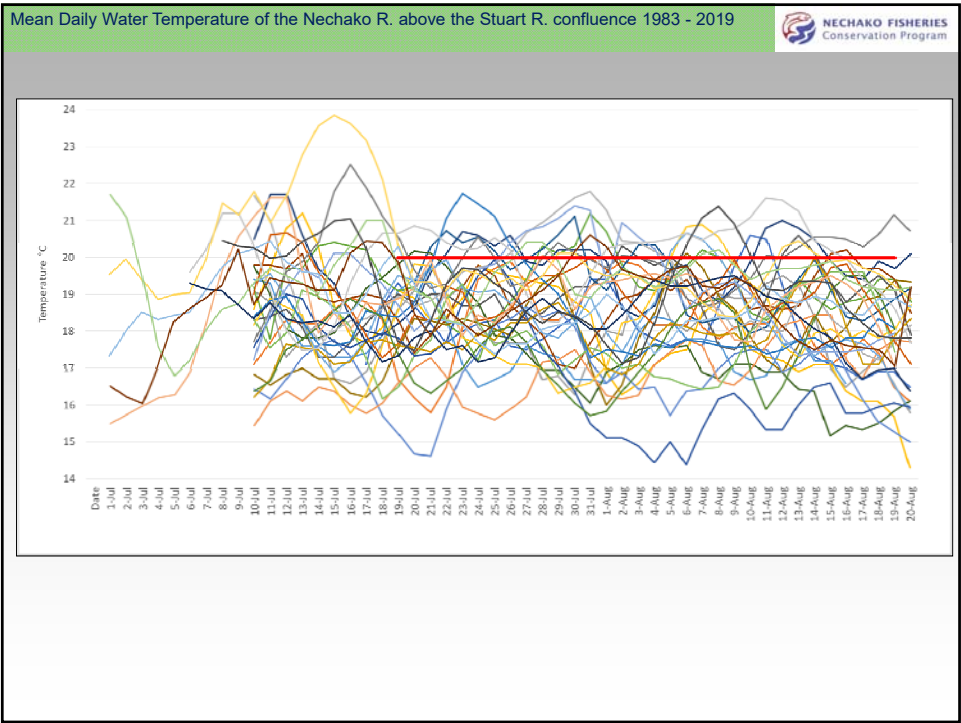
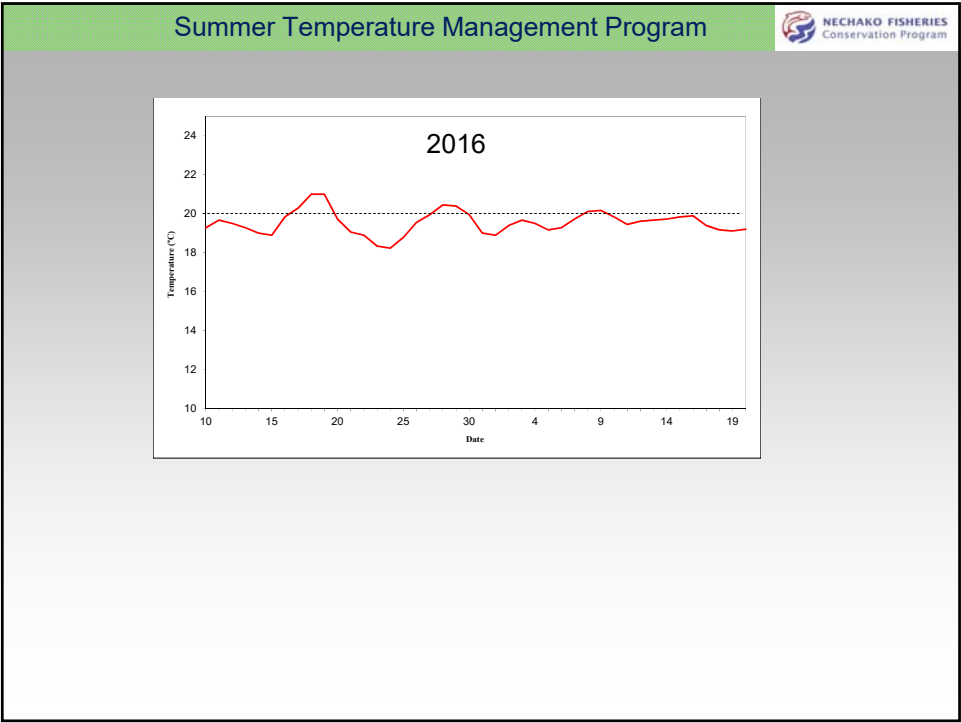
Criteria: Limit frequency of high water temperatures ( $>20^{\circ}\text{C}$ ) during July 20 - August 20

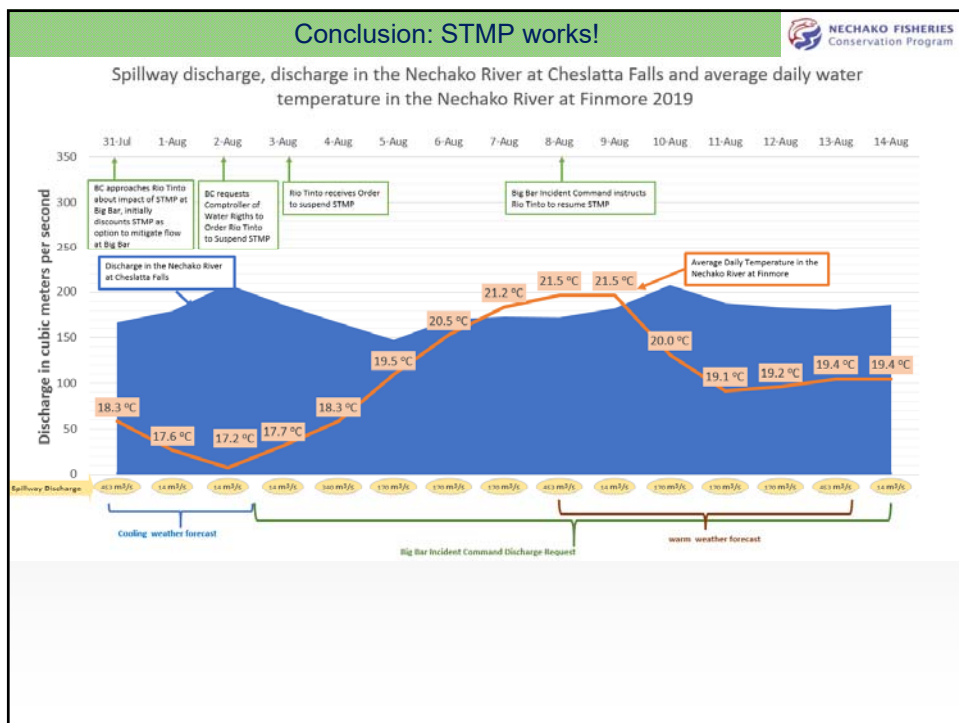
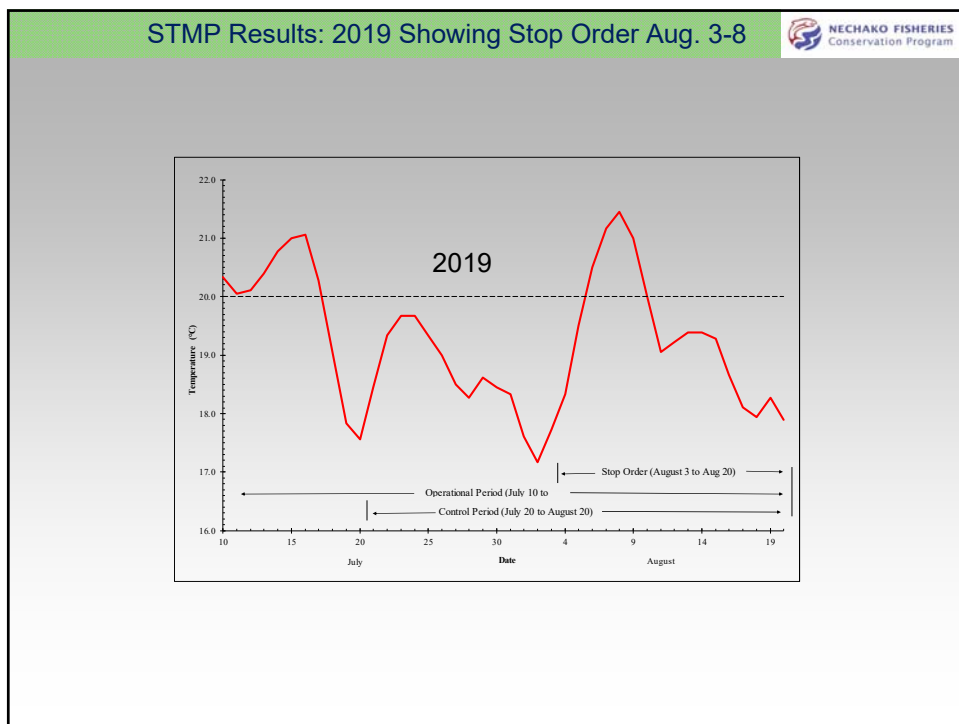
STMP Components

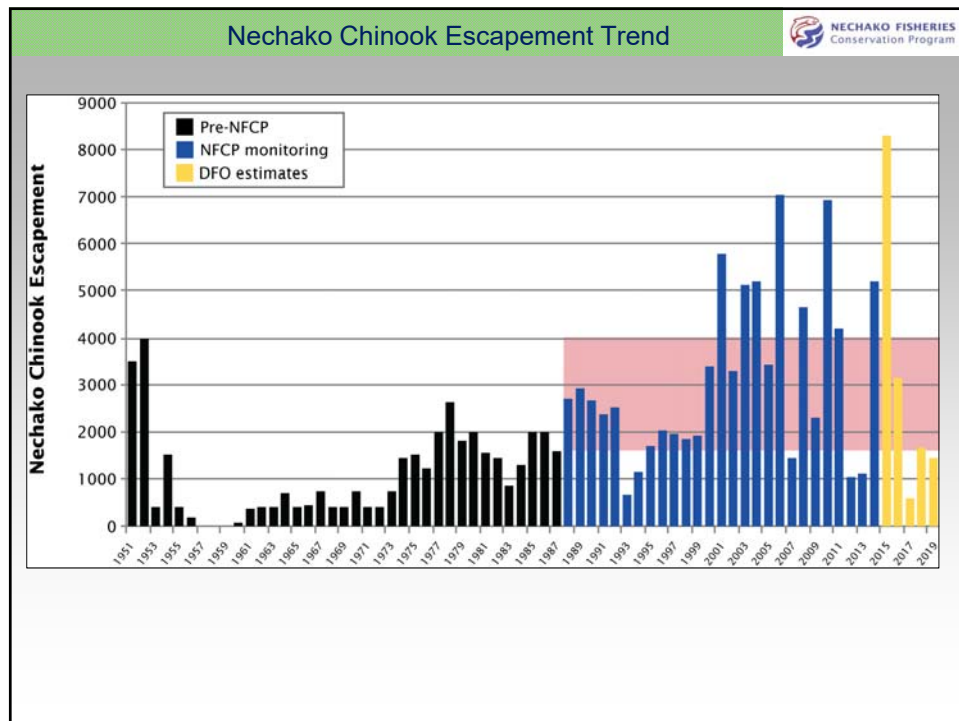
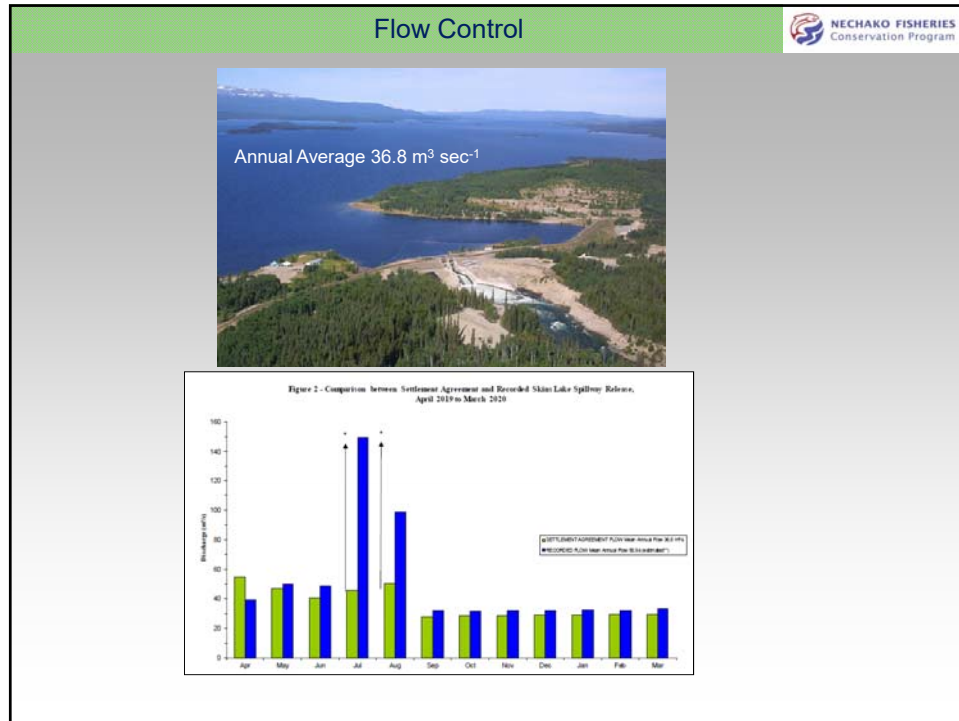
- Weather forecast
- Water temperature predictions via a computer model
- Flow releases at Skins Lake Spillway
- Flow typically regulated between 170 – 283 cms
- TDR Conclusion: Frequency of water temperatures ( $>20^{\circ}\text{C}$ ) less than historic average in spite of warmer weather conditions (1983 to 2000)

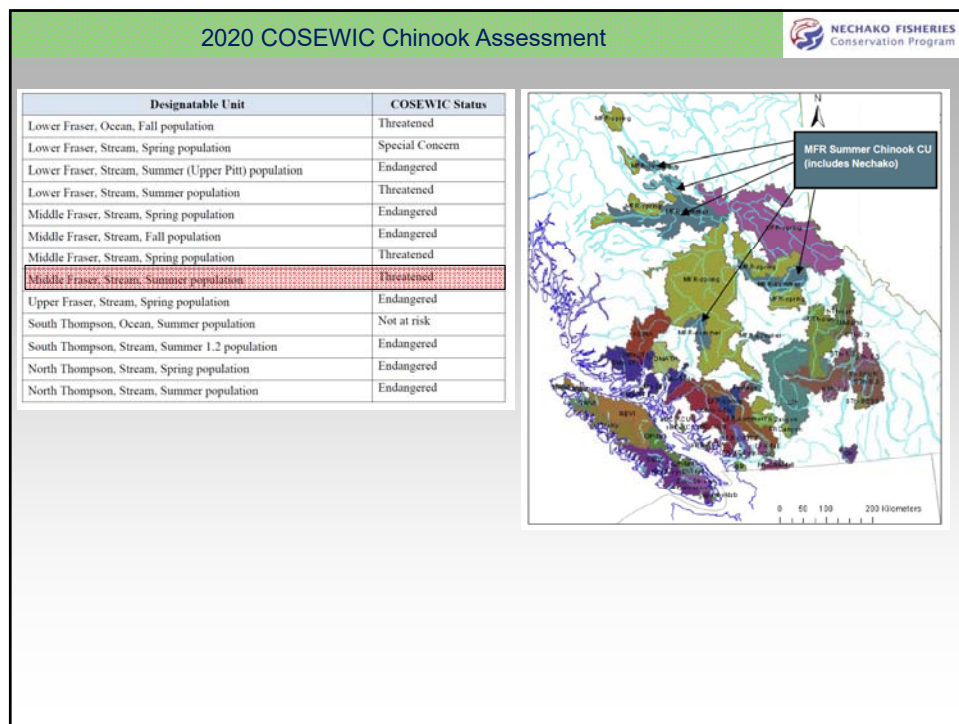













**2017 COSEWIC Sockeye Assessment**



Status	Designatable Unit	Nechako River Utilization
Endangered	Early Stuart	Migrates through lower Nechako, up Stuart River to spawning grounds
Endangered	Late Stuart	Migrates through lower Nechako, up Stuart River to spawning grounds
Special Concern	Francois	Migrates through lower and middle Nechako, up Nautley River to spawning grounds
Not at risk	Nadina (has spawning channel)	Migrates through lower and middle Nechako, up Nautley River to spawning grounds

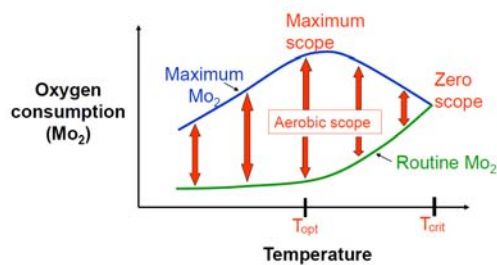
## 2016 NFCP History Report Conclusions



NFCP results demonstrate:

- over the period 2010-2015 daily exceedences of the 20°C temperature target measured at the Nechako/Stuart confluence ranged between 0-13;
- the AWA flow objective (mean annual flow above 36.8 m<sup>3</sup>/sec) has been consistently achieved; and,
- continued achievement of the Conservation Goal.


## Brauner and Hinch Study: UBC – listed on WEI web-site



Aerobic scope = O<sub>2</sub> available for fish swimming and migrating and is temperature-dependent

- Summer-run adult Chinook were able to generally tolerate up to 21°C throughout aerobic scope trials
  - At 24°C, over half of individuals died and scope reduced by 40% from that expressed at optimum (cooler) temperatures
- 24°C coincides with other studies' thermal limits for adult Chinook so this may be an important upper thermal constraint in the Nechako River
- Demonstrated that Chinook populations can differ in thermal tolerance as we ha


### Sockeye Salmon Critical Temperature





Critical water temperatures for migrating sockeye include:

- 18°C - Decreased swimming performance
- 19°C - Early signs of physiological stress and slow migration
- 20°C - Associated with high pre-spawn mortality and disease
- 21°C - Chronic exposure can lead to severe stress and early mortality

### Climate Change Impacts on Fraser Salmon





DFO - Library / MPO - Bibliothèque  
02013234

<http://davidlevy.ca/Levy-Global-Warming-Fraser-Salmon.pdf>

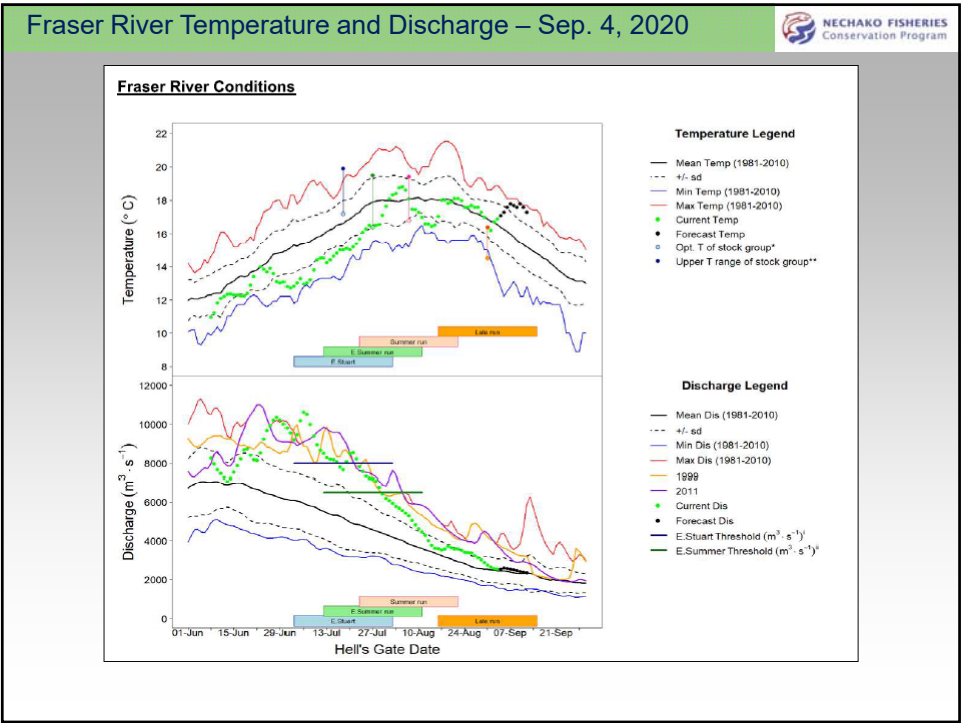
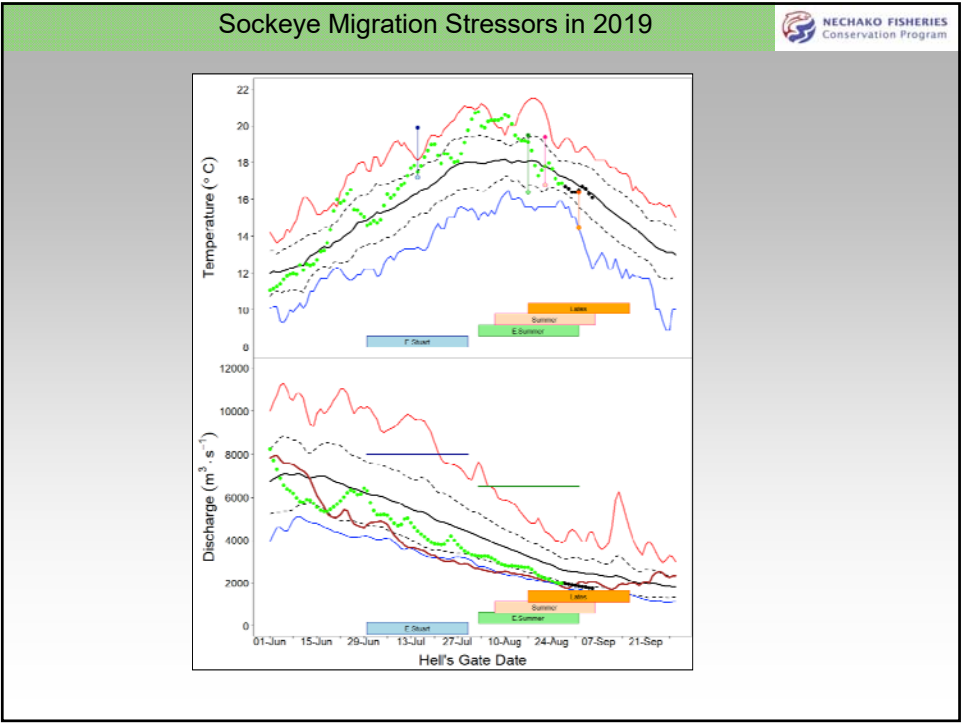
#### Potential Impacts of Global Warming on Salmon Production in the Fraser River Watershed

D. A. Levy

Fraser River Environmentally Sustainable Development Task Force  
Department of Fisheries and Oceans  
555 West Hastings Street  
Vancouver, British Columbia, V6B 5G3

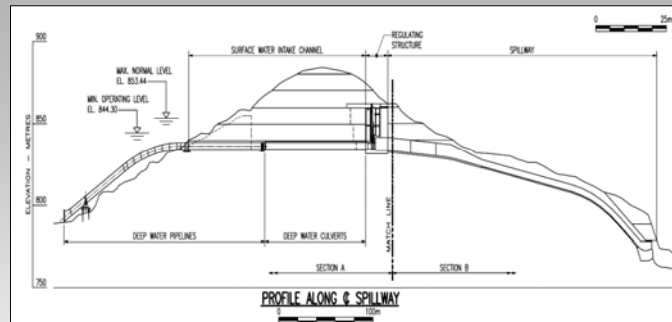
Conclusions:

- Salmon are susceptible to climatic warming via increases in water temperature and precipitation-related changes in flow regime;
- Winter runoff may increase and summer runoff may decrease;
- Existing stock monitoring programs would provide sufficient data to detect climate change impacts; and,
- Mitigating the effects of climate change does not appear feasible over the long term.





## Conceptual Design for Kenney Coldwater Release Facility



Outstanding issues identified by the NEEF Management Committee in 2012:

- Ownership
- Preparation of a Project Description and an EIA
- Technical issues described in reports commissioned by NEEF between 2003-2009
- Reduction of risks associated with sediment transfer downstream of the Cheslatta Fan
- Resolution of uncertainties in the amount of flow required to rehabilitate the Cheslatta watershed

## The Efficacy of Reservoir Flow Regulation for Cooling Migration Temperature for Sockeye Salmon in the Nechako River Watershed - DFO studies



### Conclusions:

- During most summers, the Nechako River provides a cooling influence to its downstream reaches used by the majority of the migrating sockeye salmon.
- Water temperature has a modest influence on prespawning mortality
- Attempts to reduce summer water temperatures through releases in the upper Nechako River can mitigate against poor spawning success of sockeye salmon populations that migrate through the lower reaches of the system.

### Bottom Line:

- Current temperature targets at Finmoore can be achieved with the release of smaller amounts of cooler water from Kenney Dam but may result in warmer conditions in the lower Nechako and cooler conditions in the upper Nechako River.

## What about a surface water release facility?



### Advantages

- Rewatering of Nechako Canyon
- Rehabilitation of the Cheslatta watershed
- Opportunity to generate hydropower

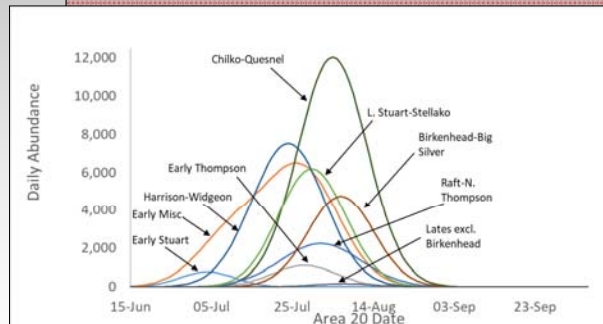
### Challenges

- Ownership
- Reduction of risks associated with sediment transfer downstream of the Cheslatta Fan
- Resolution of flow requirements to rehabilitate the Cheslatta watershed
- Other technical issues identified by NEEF between 2003-2009
- Minimal temperature improvements over present STMP

## Topics for WEI Consideration



- Future temperature and salmon migration conditions
- “The challenge of maintaining Fraser River sockeye salmon in a warming world”
- Is there an advantage to tweak the STMP timing?



Early Stuart Sockeye Escapement Surveys (DFO) commence around July 25

- How can the WEI help to create a brighter future for Nechako salmon?