



DFO 2021 SALMON POST-SEASON REVIEW & PRELIMINARY 2022 SALMON OUTLOOK SUMMARY

Prepared for Upper Fraser First Nations by
the Upper Fraser Fisheries Conservation Alliance



DFO 2021 SALMON POST-SEASON REVIEW

DFO delivered their 2021 salmon post-season review on December 15 and their preliminary 2022 salmon outlook on December 16.

Information was presented for the whole Pacific Region including BC and Yukon. This summary focuses on salmon populations of interest to Upper Fraser First Nations.

All information is preliminary. 2021 post-season data is still being analyzed, and there's lots more information to come through the winter and spring to inform expectations for the 2022 season.

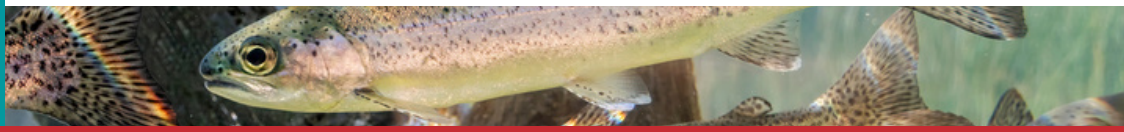
Environmental Conditions:

- Early season water temperatures during Early Stuart and Early Summer migration were above average, but dropped to average levels for most of the season.
- Discharge/flow conditions were below average for most of the season, creating favourable conditions for salmon passage, including at Big Bar (2021 passage much improved over 2019 and 2020, which saw much lower survival due to above average flows).

FRASER SOCKEYE:

Overview:

- 2021 return forecasts were lower than average due to low brood year escapement levels and expected poor ocean survival.
- Timing was delayed for some sockeye runs by up to 3 weeks, which is thought to increase survival for returning spawners.
- The total sockeye run size estimate was 72% above the brood year (1.5 million), but 64% below the historical cycle line (7.08 million).



Fraser Sockeye Preliminary Run Size Estimates Summary:

Management Group	p50 Forecast	Run Size Est.	Difference
Early Stuart	18,000	70,000	289% above p50
Early Summer	108,000	120,000	11% above p50
Summer Run	1,046,000	1,762,000	68% above p50
Late Run	159,000	597,000	275% above p50
Total Sockeye	1,331,000	2,549,000	92% above p50

Very good return relative to forecast, but still a major conservation concern compared to historical returns.

Majority of Summers returning were Chilko sockeye

Fraser Sockeye Fisheries and Management:

- Feedback in pre-season consultations widely recommended a conservative management approach (slow, cautious start to fisheries).
- Due to low forecasted returns and migration concerns for all sockeye management units, fisheries were managed in a low abundance exploitation scenario and planned to limit sockeye impacts.
- No total allowable catch (TAC) was identified for most of the season. A late adjustment to the summer run size by the Fraser Panel (Sept 7) created a small amount of TAC, but it was too late in the season to consider substantive fishing opportunities.
- DFO licensed two FSC fisheries in terminal areas: an ESSR fishery on Chilko sockeye in the Chilcotin system, and a LAER fishery on Late Stuart sockeye in the Stuart system.

Preliminary Escapement – Early Stuart:

- Preliminary escapement: 54,014 (significantly higher than the 2017 brood year; highest escapement on this cycle line since 2013).
- Good news relative to recent years, but only 28% of the long-term cycle average of 194,632.
- 636 Early Stuart sockeye spawners were captured for emergency enhancement brood stock.
- Preliminary escapement for Early Summers, Summers, and Lates will be available in January 2022. Near-final run sizes and escapements will be available in May 2022.

FRASER PINK:**Overview:**

- Pre-season run size estimate: 3,009,000 / End of season run size estimate: 7,986,000
- The total pink salmon run size estimate exceeded the p50 forecast by 165%.
- The run size was 10% below the brood year (8.9 million), and 30.5% below the historical cycle line (11.49 million).

Pink Fisheries:

- Retention of pinks was allowed in FSC fisheries directed on other species.
- Some FSC pink fisheries were allowed in the Lower Fraser using selective gear (beach seine and fish wheel).
- Had a limited recreational pink fishery in the Lower Fraser.
- Commercial pink fisheries: Area H troll; Area B seine; Lower Fraser economic opportunity and demonstration fisheries.



FRASER CHINOOK:

2021 Overview:

- Enumeration of 2021 Chinook escapement is ongoing; some preliminary estimates are available.
- Productivity for all Chinook management units remains low.
- Brood year escapements for spring 4-2, spring 5-2, and summer 5-2 Chinook were all well below the recent averages.
- Spring 4-2 Chinook 2021 escapement was well below Smsy.
- Spring 5-2 and Summer 5-2 2021 Chinook escapements were below Smsy.
- Brood year escapement for spring 4-1 Chinook was above the recent average (near Smsy).
- Brood year escapement for Fall 4-1 Chinook was below the escapement goal and recent average; the escapement goal was only met once in the last 10 years.
- COSEWIC assessed 16 designatable units of southern BC Chinook in 2 groups in 2018 and 2020 (10 Endangered; 4 Threatened; 1 Special Concern; 1 Not At Risk).

Fraser Chinook Management:

- Fishery evaluation data for Chinook will be available in winter/spring 2022, including spawner abundance, Big Bar impacts, terminal return/run size, and fishing impacts on Fraser stocks of concern (CWT recovery, exploitation rate, and genetic stock ID analysis).
- Management measures are expected to be required for many years given poor stock status.
- Will discuss the need for further adjustments to Chinook management approaches for 2022 as part of IFMP consultations in the new year.
- As part of the PSSI, DFO is developing a discussion paper to inform future decision-making on Chinook mass marking and mark selective fisheries; details for engagement on this work will be shared in early 2022.

2019 and 2020 Fraser Chinook Results:

- DFO recently shared a technical memo on 2019 and 2020 estimated Fraser Chinook fishery mortality.
- Mortality/exploitation rate analysis is based on CWT information from Canadian and US fisheries, run reconstruction, and genetic stock ID information.
- DFO expressed that management actions successfully reduced mortalities on Spring 4-2 and Spring 5-2 Chinook in 2020; Summer 5-2s saw greater impacts due to their later timing, which coincides with retention opportunities on the stronger Spring 4-1 Chinook run.
- Potential factors impacting Chinook survival include climate change, ecosystem modification, fishing impact, and competition with hatchery fish.

INTERIOR FRASER COHO:

Overview:

- Populations have declined dramatically from peak abundances observed in the 1980s.
- Exploitation has been low since new management measures were introduced in the 1990s, suggesting other factors are impacting abundance (e.g. low ocean productivity, freshwater impacts).
- There are new programs in place to better understand escapements.
- Coho status is determined based on two factors: (1) survival of smolts to adults, and (2) escapement. While escapement goals have been met 3 years in a row, smolt to adult survival goals have not been met in the same 3 years; therefore, status remains LOW, and is likely to remain low in 2022.
- Preliminary assessment of spawner abundance is expected in early 2021.

Interior Fraser Coho Management:

- An abundance-based management framework remains in place for Interior Fraser Coho.
- A 20% exploitation cap (10% each for US and Canada) has been in place under the PST since 2002; Canada implemented a stricter 3-5% cap in domestic management in 2019.



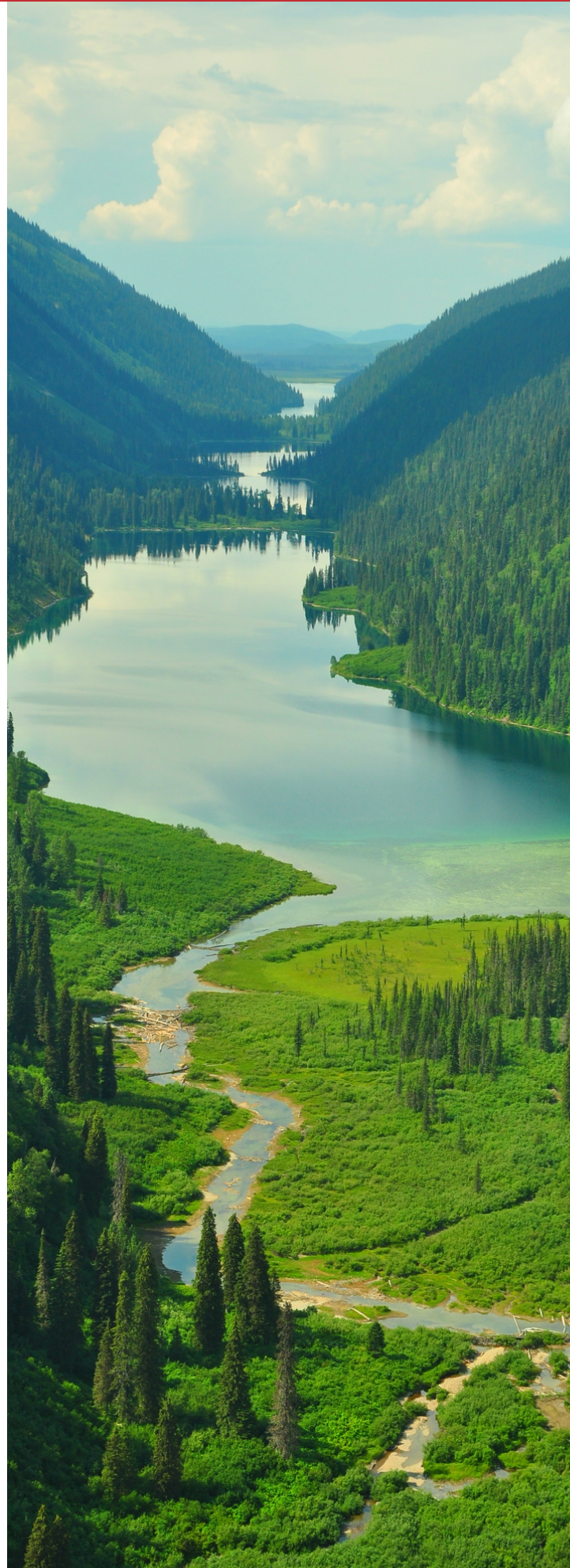
INTERIOR FRASER STEELHEAD:

Overview:

- Preliminary in-season spawning escapement projections from BC FLNRORD for steelhead spawners returning in 2021 (spawning in spring 2022) are 69 Thompson and 32 Chilcotin steelhead; final estimates will be available in late spring/early summer 2022.
- Thompson and Chilcotin Steelhead were assessed by COSEWIC as Endangered in 2018, but neither was listed under the emergency SARA listing process in 2019; re-assessment in 2020 triggers SARA listing under the 'regular' (not emergency) listing process.
- Threats to stocks include changes in the marine environment, fishing mortality, degradation of freshwater and marine habitats, predation, and competition.
- DFO announced a joint DFO-BC Steelhead Conservation Action Plan for Thompson and Chilcotin steelhead to reduce mortality, improve freshwater habitat, and increase science and monitoring.
- In August 2021, the Province of BC released an Action Plan to manage Interior Fraser Steelhead and an activities report on progress to date.

Interior Fraser Steelhead Management:

- Commercial fishery management measures for steelhead conservation include window closures on steelhead migration routes around Vancouver Island; the Minister announced additional commercial fishery closures in 2021 under the PSSI.
- Recreational fishery management measures for steelhead conservation include wild steelhead release and moving window closures downstream from steelhead spawning and holding areas.
- FSC fishery management measures for steelhead conservation include wild steelhead release, moving window closures for selective gear downstream of steelhead spawning and holding areas, and new provisions to set gillnet fisheries to reduce steelhead mortalities.
- Management measures are expected to be required for many years due to ongoing poor stock status.
- No significant changes to current management measures are expected; additional consultations are planned on longer-term commercial closures for 2022 and beyond.
- More discussion is needed on fishery sampling to improve steelhead baseline information while minimizing risk.
- DFO will work with First Nations and stakeholders to ensure that all programs including hatchery and habitat management are aligned to support steelhead recovery.



SPECIES AT RISK (SARA) LISTING PROCESSES:

Species at Risk Act listing processes are currently underway for 41 designatable units (DUs) of Pacific salmon and trout:

- Sakinaw Sockeye: 2016 COSEWIC assessment – Endangered
- Interior Fraser Coho: 2016 COSEWIC assessment – Threatened
- Okanagan Chinook: 2017 COSEWIC assessment – Endangered
- Fraser Sockeye Group 1 (24 DUs): 2017 COSEWIC assessment – 8 Endangered; 2 Threatened; 5 Special Concern; 9 Not At Risk
- Southern BC Chinook Group 1 (16 DUs): 2018 COSEWIC assessment – 8 Endangered; 4 Threatened; 1 Special Concern; 1 Not At Risk; 2 Data Deficient.
- Southern BC Chinook Group 2 (12 DUs): 2020 COSEWIC assessment – 4 Endangered; 3 Threatened; 1 Special Concern; 1 Not At Risk; 3 Data Deficient.
- Thompson and Chilcotin Steelhead (2 DUs): COSEWIC re-assessment in 2020 – both Endangered; neither DU was listed under the emergency SARA listing process in 2019, but re-assessment triggers a listing process under the ‘regular’ process.
- Fraser sockeye Group 2 (7 DUs): 2021 COSEWIC assessment – 3 Extirpated; 2 Endangered; 2 Special Concern.

DFO PACIFIC SALMON STRATEGY INITIATIVE (PSSI):

- This \$647 million program was launched by the Fisheries Minister in June 2021 to stem historic declines for key Pacific salmon stocks and rebuild these species to a sustainable level.
- Four key pillars: (1) Conservation and Stewardship, (2) Salmon Enhancement, (3) Harvest Transformation, and (4) Integration and Collaboration.
- Under the Harvest Transformation pillar, DFO introduced extensive new commercial fishery closures for 2021 and a voluntary license retirement program to support transition to a smaller commercial harvest sector.
- Comprehensive engagement is now underway to determine longer-term conservation measures for commercial fisheries in advance of the 2022 season. DFO recently distributed a letter with details and timelines for engagement on commercial fishery closures and mitigation measures.



PRELIMINARY 2022 SALMON OUTLOOK

ENVIRONMENTAL CONDITIONS INFORMING 2022 SALMON RETURNS:

Overview:

- Global temperatures are warming due to greenhouse gas emissions and human activities; we're consistently hitting records for the hottest years on the planet's record.
- Climate change increases extreme weather events (e.g. BC wildfires, rainfall events, flooding, heat waves, drought, etc.).
- DFO manages several salmon species/stocks with different life cycles/histories; reviewed environmental conditions that salmon have experienced throughout their lives, starting with 2017 (earliest brood year for 2022 returns).

Freshwater Conditions – Spring:

- Spring temperatures in 2017 to 2020 were generally above average (2018 was extra warm; 2020 was less intense); contributes to early snowpack melt.
- Snow pack was low in 2017, 2018, and 2019 for most of the province; 2020 was a bit better. Snow pack releases cool water, which is important for moderating high temperatures in watersheds.

Freshwater Conditions – Summer:

- 2017 was hot; 2018 was above average; 2019 and 2020 were closer to average temperatures.
- Above average temperatures mean warmer freshwater habitat; water temperatures exceeding 18-20 degrees Celsius negatively influence salmon survival.
- Drought conditions in 2017; 2018 was dry but less extreme; 2019 and 2020 were much dryer than average in southern BC. Dry conditions can lead to dewatering events, stranded eggs, and reduced availability of freshwater habitat.
- Dry conditions also contribute to wildfire events; 2017 and 2018 were fire record years. Wildfires have direct impacts on salmon habitat and can also lead to legacy impacts in subsequent years (slope destabilization, sedimentation, loss of shading effect from forest canopy, etc.); we're still uncertain of the full impacts of major wildfires in recent years.

Marine Conditions:

- Most of the Earth's excess heat (90%) is absorbed by the ocean; there is a trend of ocean warming for the entire water column (to the ocean floor).
- A profound heat wave began developing in 2013 and was amplified in 2014 (referred to as "the blob"); ocean temperatures quickly rose to 3.5 degrees above average, and which persists today.
- La Niña conditions have an ocean cooling effect. A La Niña pattern developed in 2020 and another is now forming, but these events are having less positive influence on ocean temperatures.
- Heat waves are expected to increase in frequency and magnitude. Warming continues in 2021, and is accelerating/amplifying warming in the northeast Pacific.
- Warmer ocean conditions impact food webs, resulting in increased southern zooplankton (less nutritious), and reduced northern zooplankton (more nutritious); this negatively impacts ocean survival for salmon.

Salmon Impacts:

- Climate change is driving a broad trend of salmon decline – not just in Canada, but across species/stocks from the southern US to Alaska (70% decline in the last decade). This is expected to continue.
- Salmon productivity is generally below historical averages (exceptions and conditions vary by population).
- The future for salmon will depend on how successfully we can curb greenhouse gas emissions.
- Dramatic environmental changes have resulted in more uncertainty for salmon, which dictates more precautionary management approaches. The PSSI aims to transform fisheries to be more responsive/resilient to these conditions.

2022 UPPER FRASER SOCKEYE OUTLOOK:

Preliminary 2022 outlook and COSEWIC status were reviewed for all Pacific salmon stocks in BC and Yukon. Outlook/forecasts for Upper Fraser stocks are summarized below. Revised stock forecasts will be completed in early April.

To implement the Wild Salmon Policy (WSP), salmon stock status is assessed against biological benchmarks to assign an outlook category:

- **Category 1 (Red zone)** – Well below average expected spawning abundance (below 25th percentile); critical zone for precautionary management.
- **Category 2 (Amber zone)** – Below average expected spawning abundance (25th to 40th percentile); cautious zone for management.
- **Category 3 (Green zone)** – Near average expected spawning abundance (40th to 60th percentile); healthy zone for management.
- **Category 4 (Green zone)** – Good expected spawning abundance (above 60th percentile); healthy zone for management.
- **Data Deficient (DD)** – insufficient information to determine expected spawning abundance.

Early Stuart Sockeye:

- Below average return expected in 2022.
- 2018 brood year total spawners were below the WSP lower benchmark.
- 2018 brood year effective female spawners were above the recent cycle line average but below the long-term cycle line average.
- Heavily impacted by the Big Bar Landslide in 2019 and 2020; expected to be alleviated in 2022 with significant work done at the site to improve salmon passage.
- **Early Stuart Sockeye:** Category 1

Upper Fraser Early Summer Sockeye:

- **Nadina/Francois** (Not at Risk): Category 4
- **Bowron** (Endangered): Category 2
- **Taseko** (Endangered): Category 1

Upper Fraser Summer Sockeye:

- **Quesnel** (Endangered): Category 3
- **Stellako** (Special Concern): Category 4
- **Chilko** (Not At Risk): Category 4
- **Late Stuart** (Endangered): Category 1

Sockeye planning considerations for 2022:

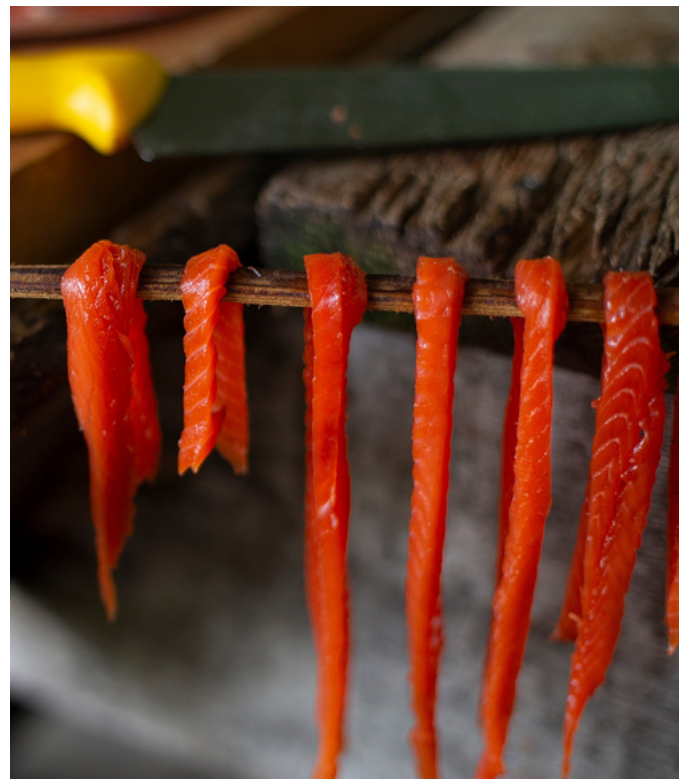
- The 2018 brood year sockeye return was moderate (10.73 million) compared to cycle line averages; the 2022 forecast is expected to be below the cycle line average.
- Given continued poor productivity, a range of possibilities will need to be considered for 2022, as well as management measures to protect and rebuild stocks of concern, including window closures to protect weak stocks migrating within aggregates, escapement plans for each aggregate, additional management measures for stocks of concern, and FSC fishery planning for low-return scenarios.

2022 UPPER FRASER CHINOOK OUTLOOK:

- Continued low abundance is expected due to depressed parental escapement, unfavourable marine and freshwater survival conditions, and low productivity.
- **Spring 5-2 (Endangered/Threatened):** Category 1
- **Summer 5-2 (Endangered/Threatened):** Category 1

2022 INTERIOR FRASER COHO OUTLOOK:

- **Interior Fraser Coho (Threatened):** Category 1 (tentative; still gathering information).





Significant Dates/Events - Mark your calendars!

DECEMBER 3, 2021: Release of DFO salmon IFMP planning letter and dates/timelines

DECEMBER 15, 2021: DFO Southern BC salmon post-season review

DECEMBER 16, 2021: DFO 2022 salmon outlook

JANUARY 18-20, 2022: Forum on Conservation and Harvest Planning

JANUARY 27, 2022: UFFCA Technical Meeting

JANUARY 27, 2022: DFO deadline for CSAF/demonstration fisheries proposals

FEBRUARY 2, 2022: Northern IHPC meeting – key IFMP issues

FEBRUARY 8, 2022: Southern IHPC meeting – key IFMP issues

FEBRUARY 24, 2022: Draft DFO salmon IFMP release for public comment

MARCH 1-3, 2022: Forum on Conservation and Harvest Planning

MARCH 9, 2022: Northern IHPC meeting – draft IFMP review

MARCH 10, 2022: Southern IHPC meeting – draft IFMP review

MARCH 10, 2022: UFFCA Technical Meeting

APRIL 5, 2022: DFO revised 2022 salmon outlook

APRIL 7, 2022 (Tentative - TBC): FSMC Regional Session – Upper Fraser

APRIL 12-14, 2022: Forum on Conservation and Harvest Planning

APR 15, 2022: DFO deadline to submit IFMP comments

MAY 4-5, 2022: Full IHPC meeting – discuss IFMP feedback

JUNE 30, 2022: DFO target for salmon IFMP public release

The Upper Fraser Fisheries Conservation Alliance promotes accountability in the conservation, protection, and sustainable harvest of Upper Fraser fish populations and the health of ecosystems on which they depend. We help to build technical capacity in salmon management, field science, habitat, and Indigenous Knowledge through cooperation and collaboration.

For more information about the UFFCA, please visit

www.upperfraser.ca

or contact us at **info@upperfraser.ca**



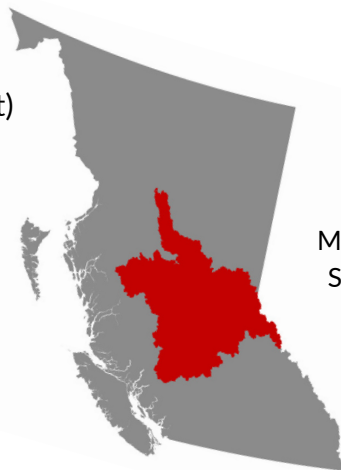


UFFCA Member Communities and Tribal Councils:

Burns Lake First Nation • Carrier-Chilcotin Tribal Council • Carrier-Sekani Tribal Council
 ʔEsdilagh (Alexandria First Nation) • Esk'etemc First Nation • Lheidli T'enneh First Nation
 Lhoosk'uz (Kluskus First Nation) • Lhtako (Red Bluff First Nation) • Nak'azdli First Nation
 Ndazkho (Nazko First Nation) • Northern Shuswap Tribal Council • Saik'uz First Nation • Stellat'en First Nation
 Stswecem'c Xgat'tem (Canoe Creek Band) • T'exelc (Williams Lake First Nation) • Takla Lake First Nation
 Tl'azt'en Nation • Tl'etinqox (Anaham First Nation) • Tl'esqox (Toosey Band)
 Tsi Del Del (Alexis Creek First Nation) • Tsilhqot'in National Government • Tsq'escen (Canim Lake Band)
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 Jordan Geoghegan – IT Specialist

with special thanks to the many expert advisors and project partners who work closely with us!