Joint Water Quality Monitoring Program for Transboundary Waters
PRELIMINARY DRAFT Program Description and Two-Year Work Plan

[NOTE: This preliminary draft program description and two-year work plan are not approved or funded by Alaska or British Columbia. Approval of this preliminary draft does not indicate funding approval.]

Program Description

In accordance with the Statement of Cooperation (SoC), British Columbia (BC) and Alaska (AK) plan to implement a defined, coordinated monitoring effort to support the protection of Transboundary Waters.

Goals: The Water Quality Monitoring Program (Program) is intended to provide a reliable and adequate process: 1) for the collection, summarization and dissemination of baseline, regional and project-specific water quality and related data that describes the quality and quantity of Transboundary Waters before, during and after mining and other industrial development; and 2) to monitor the condition of fish and other aquatic life that might be impacted by pollutants in waste water associated with industrial development that might be discharged into Transboundary Waters.

Engagement: Engagement with Tribes, state and federal agencies/ministries, and non-governmental organizations occurred at events such as the Alaska Transboundary Environmental Data Workshop and the Alaska Forum on the Environment, as well as targeted meetings in communities. In March 2017, the AK Co-Chair of the Technical Working Group on Monitoring (TWG-M) met with Tribes, state agencies, and non-governmental organizations in Juneau and Ketchikan to review the SoC goals and identify related concerns. The Alaska Co-Chair also met with state and federal agencies in April 2017 to review the SoC and discuss collaborative opportunities and leveraging resources.

Throughout these engagement activities, two main concerns were expressed: understanding the existing environmental conditions, and potential impacts of mining and other industrial activities in the BC/AK transboundary watersheds of the Alsek, Unuk, Taku and Stikine. The first concern is the need to develop an understanding of current environmental conditions in the priority BC/AK transboundary watersheds of the Alsek, Unuk, Taku and Stikine that can serve as a reliable baseline to evaluate future trends or potential effects on water quality from upstream events and discharges related to mining and other industrial activities. The second concern is the need to develop an understanding of potential impacts of current activities on subsistence resources, primarily related to fish consumption safety.

BC's and AK's understandings of these and other concerns will continue to be refined through ongoing engagement with Tribes, First Nations, Nisga'a Nation, federal agencies, communities and non-governmental organizations.

Key Questions: As a result of concerns expressed during various engagement activities, the TWG-M recommends the following questions to guide implementation of a Joint BC/AK Water Quality Monitoring Program:

1) What are the baseline (i.e. existing) environmental conditions of the Alsek, Unuk, Taku and Stikine rivers?
2) Is mining or other industrial activity in the transboundary watersheds affecting fish tissue metal concentrations?

Scope: The Program's primary geographic areas of focus are the Alsek, Stikine, Taku and Unuk watersheds. To make effective use of limited resources, the Program will prioritize initial data collection efforts on the Stikine, Taku and Unuk rivers (i.e. "priority watersheds") as there are no known active or closed mines or planned industrial developments in the BC or AK portions of the Alsek watershed. The program will also focus on areas where there are significant gaps in data or related information to address the need to establish baseline water quality in anticipation of developing mine projects.

Elements: The Program may include: reconnaissance surveys; monitoring of water quality, water quantity, sediment, and biological indicators; impact assessments; and incorporation of traditional ecological knowledge, industry data or other available data or information. BC and AK will design elements of the Program according to their own capacities and budgets, coordinating approaches where possible.

Collaboration: BC and AK plan to coordinate, where feasible, to align monitoring locations, methods and parameters to minimize duplication of effort and use resources efficiently. BC and AK also plan to collaborate with non-governmental organizations, Tribes, First Nations, the Nisga'a Nation, industry, and federal agencies that conduct monitoring in the priority watersheds. Traditional ecological knowledge (TEK) may also be incorporated in the Program, including through collaboration with local experts on enhancing the collection, documentation and sharing of TEK.

Funding: BC and AK may seek funding for proposed elements of the Program through internal budget processes and/or by working in partnership with non-governmental organizations, First Nations, Tribes, the Nisga'a Nation, industry, or federal agencies.

Reporting: The Program may include regular reporting to the BWG. The reports to the BWG and relevant information collected under the Program may be shared publicly as directed by the Communications Plan under the SoC. BC Ministry of Environment, AK Department of Environmental Conservation, and other relevant agencies' staff may jointly review, summarize and evaluate monitoring results to ensure that the Program is responding to the Key Questions.

Program Contributions: State of Alaska

The Alaska Department of Environmental Conservation (ADEC), Alaska Monitoring and Assessment Program (AKMAP) is responsible for implementing a statistically defensible assessment of water quality, describing long-term trends in Alaska's water resources, and analyzing the extent to which Alaskan waters provide for the protection and propagation of shellfish, fish and wildlife.

This is accomplished through probabilistic/randomized designs, which describe baseline biotic and abiotic conditions within a given study area. Southeast Alaska has been selected as the focus area of the next five-year rotation of AKMAP, starting in 2017 with a lakes survey, followed by a two-year survey of rivers and streams in 2018-2019, and surveys of coastal waters and wetlands in 2020 and 2021. ADEC plans to enhance AKMAP with additional targeted sites in the priority watersheds including known or potentially impacted areas, historic sampling locations, or concurrent locations with other sampling programs. AKMAP plans to add additional methods and parameters from comparable studies and BC monitoring activities. These additions along with the targeted sites may be chosen each year to support the Program goals and key questions. AKMAP plans to leverage limited resources through partnerships with Tribes, state and federal agencies/ministries, and non-governmental organizations.

In an effort to increase the amount known about Alaska's waters, AKMAP is working with a contractor to catalog all published and, to the extent possible, unpublished current and historical valid water quality data on the lakes, streams, and coastal waters of Southeast Alaska. There are significant gaps in the data on ambient water quality for most waterbodies in Southeast Alaska. Where there are data, there is inadequate sharing of that data. A Quality Assurance Project Plan is being developed to evaluate historic dataset usability and acceptability. This project may identify historical datasets within Southeast and the priority watersheds that can be used for post hoc assessments.

Program Contributions: Province of British Columbia

BC Ministry of Environment staff inventoried current and historic monitoring information, including a review of Federal/Provincial Water Quality Agreement trend monitoring stations, provincial biomonitoring programs, baseline monitoring required under provincial *Environmental Assessment Act* and *Environmental Management Act* applications or authorizations, and issue-specific environmental impact assessment studies. Where a data gap was identified to address the key questions, supplemental monitoring programs are recommended for collection of baseline water quality, quantity or biomonitoring information in the priority watersheds. The proposed BC program builds on existing monitoring programs including federal water quality/quantity monitoring, provincial sampling programs, aquatic effects monitoring and special studies by the mining industry, and the Tulsequah Chief Aquatic Ecological Risk Assessment study being completed by the Province of BC. To address trustworthiness of data collected by industry, options for industry data validation are proposed.

PRELIMINARY DRAFT Two-year Work Plan

All Watersheds

Background Info	Project Lead	Spring/Summer 2017	Fall/Winter 2017/18	Spring/Summer 2018	Fall/Winter 2018/19	Spring/Summer 2019
Continue to engage, collaborate and consult with Tribes, First Nations, Nisga'a Nation, industry, ENGOs, public, and federal agencies to understand key questions, report on results, and present information.	**BC/AK**	Engagement: Continue to engage with stakeholders in BC and Alaska to refine key questions and identify priority site locations.	Engagement: ongoing			
		Collaborate: identify existing data sources from other agencies				
		Collaborate: identify potential funding sources / partnerships for supplemental initiatives				
		Collaborate on survey methods, parameters, and analysis for recommended supplemental monitoring program				
		Collaborate on the collection, documentation, and sharing of traditional ecological knowledge, including expert advice. *(unfunded)*				
		Report on monitoring results – ongoing				
				Mid-point Review: review, summarize and evaluate monitoring results, assessing whether the Program is answering the key questions		

ALSEK

Background Info	Project Lead	Spring/Summer 2017	Fall/Winter 2017/18	Spring/Summer 2018	Fall/Winter 2018/19	Spring/Summer 2019
The data inventory indicated a moderate baseline information gap for the Alsek. There is no current mining or other industrial activity in the BC portion of the Alsek watershed. We are not aware of planned mining or other industrial development in the reasonably foreseeable future.	**BC**	Four Water Survey of Canada hydrometric stations				
	BC/AK					
	AK	USGS gage station: stage, discharge, water chemistry				

BC: No proposed supplemental program for the Alsek.	**Key Question #1.** Baseline concerns addressed by relatively recent water quality data collected by ECCC, proposed AKMAP target site monitoring, and no development anticipated in reasonably foreseeable future.
AK: No proposed supplemental program for the Alsek.	**Key Question #2**. Fish tissue metal concentrations addressed by no current mining or other industrial activity and no development anticipated in reasonably foreseeable future.

	Existing monitoring program
	Proposed supplemental monitoring program
	BC/AK proposed collaborative monitoring

Unuk

Background Info	Project Lead	Spring/Summer 2017	Fall/Winter 2017/18	Spring/Summer 2018	Fall/Winter 2018/19	Spring/Summer 2019
The data inventory indicated a moderate baseline information gap. The KSM mine is in development and BruceJack mine may be in production by late 2017.	BC	Two hydrometric stations associated with BruceJack mine; ten hydrometric stations associated with KSM mine				
		BruceJack mine EMA authorization aquatic effects monitoring program: benthic, sediment chemistry, periphyton				
		KSM mine EMA authorization aquatic effects monitoring program: water chemistry; selenium bioaccumulation project associated with KSM concludes in 2018				
				Baseline water quality monitoring including hydrometric station on main-stem Unuk		
				Industry data validation (KSM/BruceJack) options: one-time third party audit; communication of professional reliance standards; split sampling		
		Baseline benthic monitoring and water quality site reconnaissance		Baseline benthic monitoring		
	BC & AK			Fish tissue sampling on main - stem Unuk		Fish tissue sampling on main - stem Unuk
	AK	Central Council of Tlingit and Haida Indian Tribes of Alaska Transboundary Monitoring Project, 2 locations (historic USGS gage station and confluence Blue River): water chemistry, dissolved and total metals				
		Targeted Lake sites under AKMAP		Targeted River & Stream sites under AKMAP		Targeted River & Stream sites under AKMAP

BC: (Proposed supplemental program–scalable) 1) Baseline water quality monitoring 2018-19 including hydrometric station on main-stem Unuk. 2) Benthic monitoring 2017 & 2018 to establish sites for baseline & impact to resources. 3) Industry data validation audit (KSM/BruceJack) in 2018. 4) Fish tissue sampling (river study) – Spring/Summer 2018 & 2019 (Collaboration with AK).	**Key Question #1.** Baseline concerns addressed by recent and current mine-proponent programs, proposed 2017-18 benthic sampling, proposed AKMAP target site monitoring, and proposed industry data validation audit. **Key Question #2.** Fish tissue metal concentrations addressed by proposed 2018/19 fish tissue sampling, Brucejack and KSM effects monitoring programs and Selenium bioaccumulation impact assessment which includes fish sampling downstream of the Brucejack mine discharge.
AK: Targeted AKMAP Lake, River and Stream sites. Add parameters to survey including: • Total and dissolved metals in water column; • Total and dissolved metals in sediment; • Algae (unfunded); and • Fish Tissue sampling (unfunded) – (Collaboration with BC).	

	Existing monitoring program
	Proposed supplemental monitoring program
	BC/AK proposed collaborative monitoring

Stikine

Background Info	Project Lead	Spring/Summer 2017	Fall/Winter 2017/18	Spring/Summer 2018	Fall/Winter 2018/19	Spring/Summer 2019
The data inventory indicated a moderate baseline information gap. The Red Chris Mine is in operation in the sub-watersheds of the Iskut and Klappan.	BC	Four current Water Survey of Canada hydrometric stations				
		Current Fed-Prov. water quality monitoring station on the Iskut River (sub-watershed)				
		Red Chris Mine; EMA authorization aquatic effects monitoring program: benthic invertebrates, periphyton, water chemistry, sediment chemistry, physical habitat assessment, fish tissue (lakes program includes three years of sampling for selenium)				
				Baseline water quality monitoring on main-stem Stikine		
				Industry data validation (Red Chris) options: one-time third party audit; communication of professional reliance standards; split sampling)		
		Baseline benthic monitoring and water quality site reconnaissance		Baseline benthic monitoring	Fish tissue sampling (river study)	
	BC & AK			Fish tissue sampling on main - stem Stikine		Fish tissue sampling on main - stem Stikine
	AK	Central Council of Tlingit and Haida Indian Tribes of Alaska Transboundary Monitoring Project, 2 locations (USGS gage station and confluence Goat Creek): water chemistry, dissolved and total metals				
		USGS gage station: stage, discharge, turbidity, water chemistry				
		Targeted Lake sites under AKMAP		Targeted River & Stream sites under AKMAP		Targeted River & Stream sites under AKMAP

BC: (Proposed supplemental program –scalable) 1) Baseline water quality monitoring on main-stem Stikine 2018-19. 2) Benthic monitoring in 2017 & 2018 to establish sites for baseline & impact to resources. 3) Industry data validation audit (Red Chris) in 2018. 4) Fish tissue sampling (river study) – Spring/Summer 2018 & 2019 (Collaboration with AK).	**Key Question #1.** Baseline concerns addressed by recent and current mine-proponent programs, current ECCC water quality monitoring on the Iskut River, current benthic reference site sampling, proposed 2017-18 benthic project, AKMAP target site monitoring, and proposed mine program audits.
AK: Targeted AKMAP Lake & River sites. Add parameters to survey including: • Total and dissolved metals in water column; • Total and dissolved metals in sediment; • Algae (unfunded); and • Fish Tissue sampling (unfunded) – (Collaboration with BC).	**Key Question #2.** Fish tissue metal concentrations addressed by proposed 2018/19 fish tissue sampling.

	Existing monitoring program
	Proposed supplemental monitoring program
	BC/AK proposed collaborative monitoring

Taku

Background Info	Project Lead	Spring/Summer 2017	Fall/Winter 2017/18	Spring/Summer 2018	Fall/Winter 2018/19	Spring/Summer 2019
The data inventory indicated a high information gap. The Tulsequah-Chief mine is in receivership and discharging to the Tulsequah River, a tributary to the Taku.	**BC**			Baseline water quality monitoring including hydrometric station on main-stem Taku		
		Tulsequah Chief Mine Aquatic Ecological Risk Assessment (AERA)				
		Baseline benthic monitoring		Baseline benthic monitoring		
	BC & AK			Fish tissue sampling on main - stem Taku		Fish tissue sampling on main - stem Taku
	AK	Central Council of Tlingit and Haida Indian Tribes of Alaska Transboundary Monitoring Project, two locations (USGS gage station and confluence Goat Creek): water chemistry, dissolved and total metals				
		USGS gage station: stage, discharge, water chemistry				
		Targeted Lake sites under AKMAP		Targeted River & Stream sites under AKMAP		Targeted River & Stream sites under AKMAP

BC: (Proposed supplemental program –scalable)

1) Benthic monitoring in 2017 & 2018 to establish sites for baseline & impact to resources
2) Tulsequah-Chief AERA in 2017-18
3) Baseline water quality monitoring in 2018-2019 including hydrometric station on main-stem Taku
4) Fish tissue sampling on main-stem Taku (collaboration with AK) - Spring/Summer 2018 & 2019

AK:

1) Targeted AKMAP Lake, River and Stream sites. Add parameters to survey including:
   - Total and dissolved metals in water column;
   - Total and dissolved metals in sediment;
   - Algae (unfunded); and
   - Fish Tissue sampling (unfunded) – (Collaboration with BC).

Key Question #1. Baseline concerns addressed by Tulsequah-Chief AERA, AKMAP target site monitoring, and proposed 2018-19 baseline water quality monitoring.

Key Question #2. Fish tissue metal concentrations addressed by proposed 2018/19 fish tissue sampling.

	Existing monitoring program
	Proposed supplemental monitoring program
	BC/AK proposed collaborative monitoring