



State of Alaska Transboundary Dialogue

WHITE PAPER – TRANSBOUNDARY MINES

Prepared by the Transboundary Working Group

July 31, 2015

INTRODUCTION

The State of Alaska is increasing its efforts to facilitate and promote the protection of water quality, quantity, and watershed integrity in Alaska, with special emphasis on salmon and other Alaska fish stocks. The State's efforts will address the risk of pollution from mines and other development projects in British Columbia by establishing: 1) standard practices with the government of the Province of British Columbia for the exchange of relevant information and meaningful dialog with Alaska state agencies on projects that could discharge wastes or other potentially deleterious materials to Transboundary waters¹; 2) convenient means for the Alaska public to obtain reliable information on these Transboundary projects, their discharges, water quality, habitat and fish health, and; 3) opportunities to provide input to the governments of British Columbia and Alaska on decisions relating to these projects.

In response to increased mining activity in northwestern British Columbia, Canada and increasing concerns from Alaskan stakeholders, Lieutenant Governor Byron Mallott established the Transboundary Working Group to improve the State's involvement in activities proposed in B.C. that could impact Alaskan waters and fish. The Transboundary Working Group is composed of the commissioners of the Departments of Environmental Conservation, Fish and Game, and Natural Resources.

This white paper summarizes mining activity occurring or proposed in transboundary watersheds², as that is the major source of concern from Alaskan stakeholders at this time. However, it is the intent of the Transboundary Working Group to establish avenues of collaboration that will ensure adequate protection for our waters and fisheries from any activities within Transboundary watersheds that could have significant adverse impacts to our resources.

¹ For purposes of this white paper *transboundary waters* means any surface or ground waters which mark, cross or are located on the International Boundary between Alaska and Canada.

² For purposes of this white paper *transboundary watershed* means any land area that naturally drains to transboundary waters.

MINES

There are currently seven major mine projects that are being tracked by State agencies. Only one of these seven are currently operating – the Red Chris Mine.

- 1) **Tulsequah Chief Mine:** A past producing mine that is now proposed as an underground copper, lead, zinc, silver, and gold project located in the Taku watershed approximately 10 miles from the Alaska border. The proponent is Chieftain Metals. The Environmental Assessment Certificate (EAC) was issued in 2002, and permits were issued to Chieftain Metals in April 2012 (previously issued to Redfern Resources in 2008). Under conditions of their EAC, Chieftain must address the existing acid rock drainage from the old mine workings in conjunction with developing the new mine workings.

In 2014, Chieftain announced an updated feasibility study that proposes barging supplies and ore on the Taku River. This will require an amendment to their EAC.

Chieftain Metals also owns the past producing Big Bull Mine, which is adjacent to their Tulsequah Chief project. Big Bull is in the advanced exploration phase of development. The Big Bull deposit is not included in the December 2012 Feasibility Study for the Tulsequah Chief Project, with further drilling, technical evaluations and studies required to advance the project beyond that of a resource.

The State provided comments to the B.C. Environmental Assessment Office as part of the environmental assessment process for the Tulsequah Chief project in 1995, 1996, 1997, and 1998.

- 2) **Red Chris:** A producing open pit copper and gold mine, approximately 150 miles from the Alaska border in the Iskut/Stikine watersheds. The project proponent is Imperial Metals. The provincial EAC was issued in July 2005 and final permits were issued in June 2015.
- 3) **Schaft Creek:** A proposed open pit copper, gold, molybdenum, and silver project, approximately 40 miles from the Alaska border in the Stikine watershed. The project proponents are Teck Resources Limited and Copper Fox. A feasibility Study released on January 2013, and the project is currently in the pre-application phase of review.
- 4) **Galore Creek:** A proposed open pit copper, gold, and silver project approximately 25 miles from Alaska in the Stikine Watershed. The project proponents are NovaGold Resources Inc. and Teck Resources Limited. The EAC was issued in February 2007, and a revised Feasibility Study was completed in 2011. Final permitting is on hold pending site optimization by project proponents.

The State commented to the EAO during the environmental assessment process for the Galore Creek Project in September 2006.

- 5) **Kerr-Sulphurets-Mitchell (KSM):** A proposed open pit copper and gold project located approximately 20 miles from Alaska in the Unuk watershed. The project proponent is Seabridge Gold Inc. If constructed, mining would occur in the Mitchell and Sulphurets watersheds, which drain to the transboundary Unuk River. The waste rock disposal areas, water storage facility, and water treatment facility would also be constructed as part of the mine site. Milling would occur outside of the Unuk Watershed and the mill tailings would be disposed in the tailings management facility located in the Teigen and Treaty Watersheds, which drain to the non-transboundary Bell-Irving and Nass rivers.

The provincial EAC was issued in July 2014. Subject matter experts from the Alaska Departments of Natural Resources (ADNR), Fish and Game (ADF&G), and Environmental Conservation (ADEC) participated in the environmental assessment process as members of technical working groups comprised of provincial, federal Canadian, federal U.S., and Canadian First Nation representatives. The federal environmental review process concluded in December 2014 with an approval by the Minister of the Environment.

Initial permitting for access roads, site preparation, and interim/temporary facilities for the KSM Project was complete in 2014. Permits necessary for constructing and operating the mine and major facilities like dams, final water treatment facilities, and the mill has not yet begun. The proponent is currently seeking a funding partner.

- 6) **Brucejack:** A proposed underground gold project located approximately 25 miles from Alaska near Brucejack Lake, which drains to the Unuk River via Sulphurets Creek. The proponent is Pretium Resources, Inc.

The provincial EAC was issued in March 2015. Staff from the Alaska Departments of Natural Resources (ADNR), Fish and Game (ADF&G), and Environmental Conservation (ADEC) participated in the environmental assessment process as members of technical working groups comprised of provincial, federal Canadian, federal U.S., and Canadian First Nations. Pretium entered into funding agreements with the State in FY15 (\$43, 087) and FY16 (\$24,150), which offset the costs for DNR, DEC, and ADF&G to participate in the environmental assessment and permitting processes for the Brucejack Project.

Permitting for the Brucejack Project is currently underway, and draft permits were referred to provincial decision makers in July 2015.

- 7) **Mount Polley Mine:** An open pit copper/gold mine located in south-central B.C in the upper region of the Fraser River watershed, which does not drain to Alaska waters, but supports Alaskan fisheries. The State did not participate in the EA or permitting processes for this project.

On Aug. 4, 2014, a tailings pond breach occurred at Mount Polley Mine. The breach released approximately 17 million cubic meters of effluent water and 8 million cubic meters of tailings material into Hazeltine Creek, Polley Lake and Quesnel Lake. Production has been stopped at

the mine since the breach, but Canadian media has reported a decision by the Ministry of Energy and Mines to reopen the mine in 2015 is being considered.

The B.C. Ministry of Environment is the lead agency responding to and monitoring the breach while the B.C. Conservation Office Service is the lead agency investigating the cause of the incident. The Mount Polley Independent Expert Investigation and Review Report was released in January 2015. Two additional investigations are on-going.

EXISTING PROCESS

The State of Alaska engages in the review of large hard rock mining projects with the potential to affect Alaska's interests by relying upon or discharging to Transboundary waters. Mining activities in northwest British Columbia do not require State of Alaska approval, because the proposed activities would occur outside of Alaska and US jurisdiction. However, if the activities could potentially affect downstream water quality, fish habitat both in Alaska and Canada, or impact the quality of fishery resources, the State of Alaska participates in the Environmental Assessment (EA) process administered by the British Columbia Environmental Assessment Office (EAO). Some mining projects proposed in British Columbia also require federal environmental review administered by the Canadian Environmental Assessment Agency (CEAA).

Environmental and Permitting Review Process

In British Columbia, proposed hard rock mine projects are subject to the provincial Environmental Assessment Act, and potential environmental effects are described in an Environmental Assessment Report prepared by the B.C. EAO. The process concludes with an Environmental Assessment Certificate issued by the B.C. Ministers of Environment and Energy and Mines. The State may participate in the EA process as a member of the technical working group facilitated by the EAO to review and comment on the proposed activities and address identified significant issues.

An additional federal environmental assessment process administered by the CEAA under the Canadian Environmental Assessment Act is also required for hard rock mines proposed in B.C. This federal environmental assessment generally runs parallel to the provincial review, but ends with a separate decision by the Minister of Environment Canada.

In general, environmental reviews conducted in Alaska and B.C. for proposed hard rock mines are comparable; meaning, they each require public notice and opportunities to review and comment on the proposed activities; potential impacts to water quality, water quantity, air quality, fish habitat, fisheries, and wildlife are considered in detail; potential socio-economic impacts are also analyzed; identified potential significant effects are avoided, minimized, and mitigated through project design and monitoring and through enforceable permit conditions; all proposed discharges are regulated in accordance with published standards and applicable laws; and tailings and waste rock storage facilities and dam designs must be verified by qualified and licensed engineers.

Following issuance of an EAC, the provincial permitting process enters review under B.C.'s Mines Act and Environmental Management Act (MA/EMA). Permit applications are reviewed by a Mine Review Committee, which the State has participated in for the Brucejack Gold Project and to the KSM Project. The Mine Review Committee is facilitated by the Major Mines Permitting Office within the B.C. Ministry of Energy and Mines and has a similar composition of members as the technical working groups that reviewed the projects during the environmental assessment.

MA/EMA applications are reviewed internally by the Mine Review Committee for completeness and adequacy and then publicly noticed. Committee members review and discuss the permit applications, which address all activities requiring authorization. Permitting conditions or design changes are developed by the Mine Review Committee based on public comments received and recommendations made by committee members. The Mine Review Committee produces a report, which is provided by the Major Mines Permitting Office to the Statutory Decision Makers, along with draft permits.

The timeline for issuing initial permits that address access into the mine site, staging areas, and temporary facilities like camps and storm water treatment plants takes about three months. Final permits required for constructing an operating mine, including mill facilities, tailings storage facilities and dams tend to follow years later once initial site preparation has been completed.

The State is developing a good working relationship with both the federal and provincial Canadian agencies on the transboundary mining projects, and our technical staffs have had the opportunity to participate fully, to the extent that our resources allow. However, State agencies have been limited by lack of resources, as we are not generally funded to conduct the Canadian mine reviews. There have been some exceptions, with limited funding agreements for the KSM, Brucejack, and Tulsequah projects. Lack of adequate funding to participate fully on the environmental review process, permitting review, and operational monitoring will be a major challenge as we move forward, and we must look to find additional funding sources, potentially through more funding agreements with mine proponents.

In addition to strengthening our agency involvement in the environmental assessment process, the Transboundary Working Group is also looking for ways to 1) strengthen our role in permitting review (for example, closer scrutiny of dam designs, and more involvement in financial assurance calculations), 2) strengthen our involvement in operational monitoring for a project that goes into operation (for example, to ensure we get notified of any violations, permit modifications, etc), and 3) strengthen public involvement in the Canadian process by Alaskan public.

Flow charts depicting the environmental review processes in Alaska and B.C are attached.

Water Quality Standards

Questions are being asked whether the regulatory standards and practices in BC are stringent enough to avoid the risk of pollution from mining in BC adversely affecting Alaska. The answer to

these questions depends, in part, on whether the water quality criteria used in B.C. to limit how much of a pollutant may be discharged into the water are sufficiently protective of aquatic life and other uses of water.

The Clean Water Act in the United States requires all states to use a rigorous scientific and public process to develop criteria that are protective of aquatic life and other water uses. State criteria must also be reviewed and approved by EPA before they may be used by a state for Clean Water Act purposes. Alaska's criteria have been through this process, are approved by EPA, and are reviewed regularly to see if any updates are needed based on new science or data. Comparing the water quality criteria used in BC with Alaska's criteria is one way to judge the efficacy of the BC criteria.

The Alaska Department of Environmental Conservation prepared a general comparison of Alaska's and BC's water quality criteria for 19 pollutants commonly associated with mining. The comparison only applies to criteria for fresh water, not marine waters, which could be significantly different. For each pollutant, the Alaska water quality criterion that protects all types of uses (strictest limit) was compared to BC's strictest limit. This comparison is presented in the following tables. The comparison of criteria is complicated for some pollutants because of different approaches BC and Alaska take in setting their criteria. While a certain criterion may appear to be more stringent than the criterion for the same pollutant used by the other jurisdiction, more information and analysis might be needed to describe the amount of any substantive differences. **Both the Alaska and the BC water quality standards are based on contemporary science and are considered to be protective of human health and the environment by their respective regulatory programs.**

There are other critical components to an effective environmental regulatory program besides protective water quality criteria. It is also important to correctly apply the criteria in developing operating permits and closure and reclamation requirements. Having a good system for monitoring and inspecting facilities for compliance with permit requirements is also critical.

WHAT IS MISSING?

Although the State agencies have developed a good technical working relationship with the Canadian agencies, the Transboundary Working Group believes that more must be done to ensure that Alaskan waters and fish are protected as these Transboundary mine projects are considered. The Transboundary Working Group has identified five lines of action that it proposes to pursue:

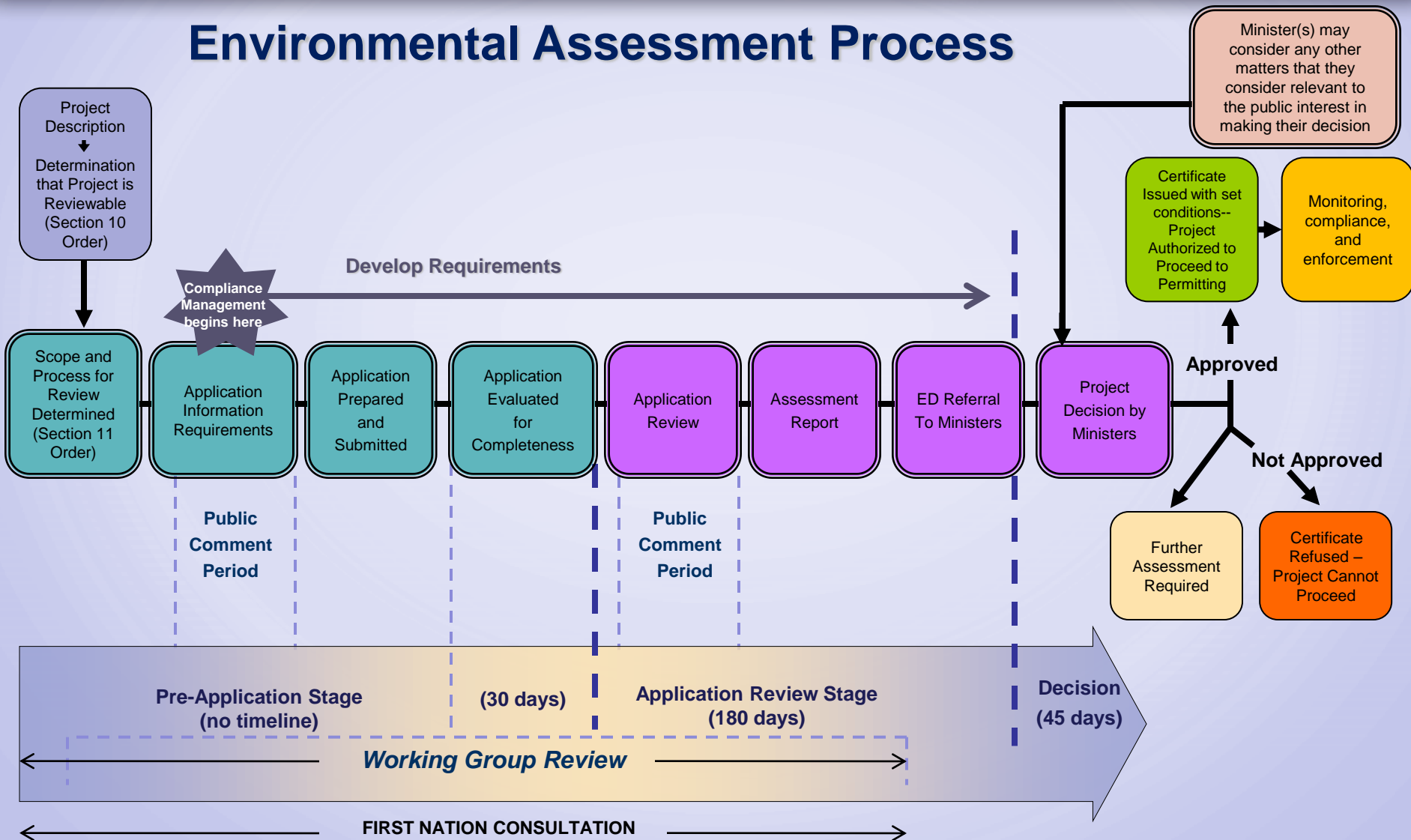
- Establishing and overseeing a joint water quality monitoring program for Transboundary rivers;
- Establishing reciprocal procedures to facilitate the ongoing involvement of interested federal, provincial, state, First Nations, and Alaska Native Tribes and their designated scientists in environmental assessments and permitting processes triggered under federal, provincial, or

state law or regulation, regarding any development in the Alaska and British Columbia transboundary area that has the potential to degrade water quality or related land resources;

- Establishing reciprocal collaboration procedures among the Transboundary Working Group members to regularly discuss and address pertinent information and concerns about new, existing and closed mines and other industrial projects that could have an adverse effect on transboundary waters and fish habitat they support; discuss and resolve concerns; and collaboratively work toward resolving these concerns;
- Developing and implementing a joint plan for effectively communicating reliable and useful information to the public in Alaska and British Columbia regarding transboundary development projects and concerns; and
- Seeking federal or private sector funding to help cover the costs incurred by the Transboundary Working Group for these efforts.

Environmental Assessment Office

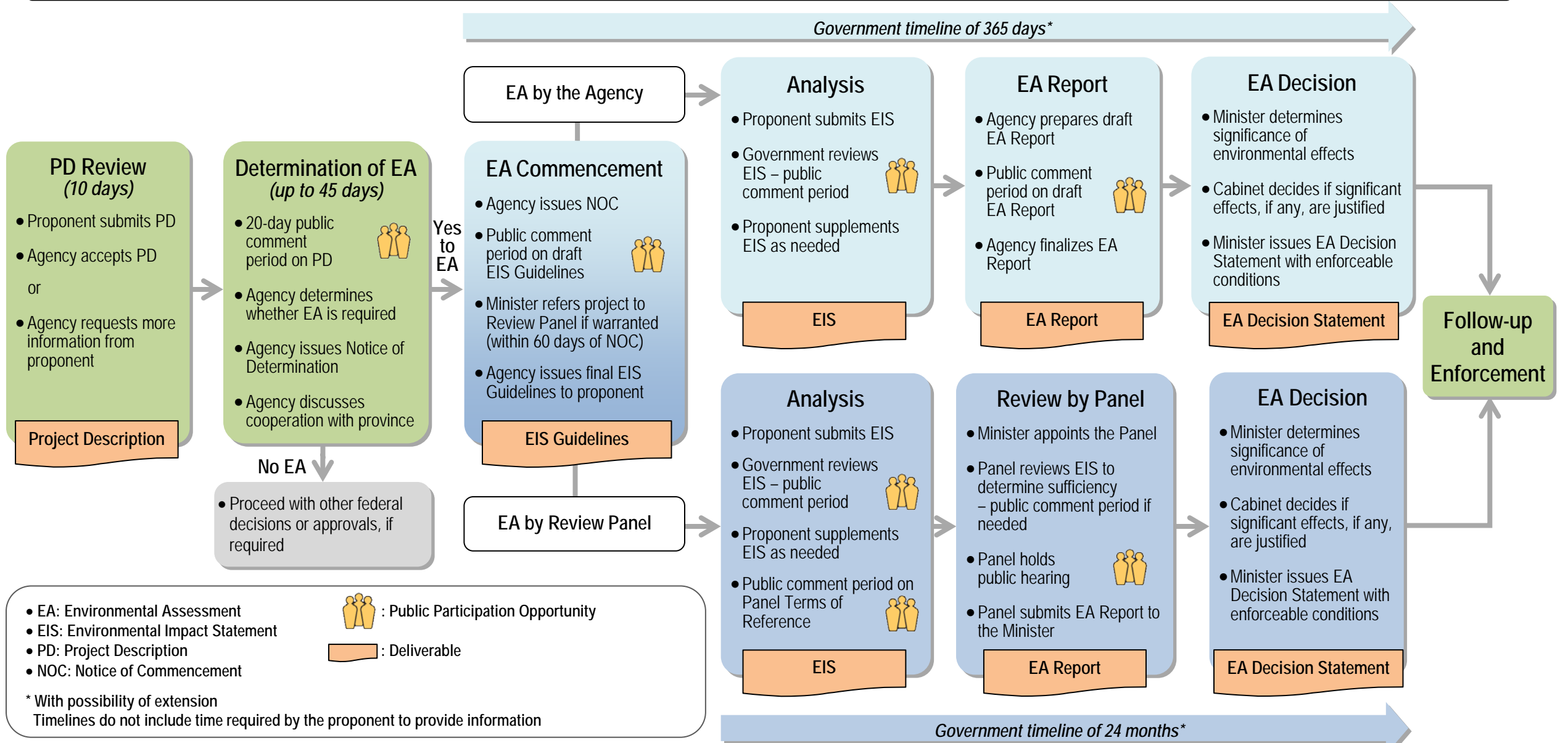
Environmental Assessment Process





ENVIRONMENTAL ASSESSMENT PROCESS MANAGED BY THE AGENCY

Aboriginal consultation is integrated into the EA to the extent possible



The information on BC water quality standards presented in this table has not been vetted by Canadian officials. Direct comparison of water quality standards is difficult, as the implementation of standards differs between BC and Alaska. More information and analysis might be needed to meaningfully interpret any differences between standards.

Survey of AK and BC Water Quality Standards (Fresh Water, Similar Conditions)

Constituent (units)	AK Standard*	BC Standard*	Description
Aluminum (µg/L)¹	87	50 (dissolved)	<ul style="list-style-type: none"> Aluminum occurs naturally in most rocks and soils. Aluminum can be toxic to aquatic life in some forms.
Antimony (µg/L)	6	9	<ul style="list-style-type: none"> Antimony is a metalloid commonly associated with ore deposits. Antimony can be toxic to humans.
Arsenic (µg/L)	10	5	<ul style="list-style-type: none"> Arsenic occurs naturally in rocks and soils. Arsenic can be toxic to humans and to aquatic life.
Cadmium (µg/L)	0.16 ²	0.13 ² (dissolved)	<ul style="list-style-type: none"> Cadmium is a metal commonly associated with ore deposits. Cadmium can be toxic to humans and to aquatic life.
Copper (µg/L)	5.2 ²	2.0 ²	<ul style="list-style-type: none"> Copper is a common contaminant in water draining from hard rock mines. Copper can be toxic to aquatic life and can have behavioral effects.
Cyanide (µg/L)	5.2	5.0	<ul style="list-style-type: none"> Cyanide is commonly used in mineral processing. Cyanide can be toxic to humans and to aquatic life in some forms.
Iron (µg/L)	1,000	1,000	<ul style="list-style-type: none"> Iron is ubiquitous throughout the earth's crust. Iron can be toxic to aquatic life and iron precipitates can impede spawning.
Lead (µg/L)	1.3 ²	4.6 ²	<ul style="list-style-type: none"> Lead occurs naturally in some ore deposits. Lead can be toxic to humans and to aquatic life.
Manganese (µg/L)	50	800 ²	<ul style="list-style-type: none"> Manganese is a metal that occurs naturally in rocks and soils. Manganese can be toxic to humans.
Mercury (µg/L)	0.012	0.010 ³	<ul style="list-style-type: none"> Mercury is a metal that can be associated with some ore deposits. Mercury is toxic and accumulates in the environment.
Molybdenum (µg/L)	10	10	<ul style="list-style-type: none"> Molybdenum is a metal that occurs naturally in rocks and soils. Molybdenum can be toxic to livestock.
Nickel (µg/L)	29 ²	25	<ul style="list-style-type: none"> Nickel is a metal that occurs naturally in rocks and soils. Nickel can be toxic to aquatic life and to humans.

* All water quality standards are expressed in terms of total concentration (solid and dissolved phases), unless otherwise noted.

¹ The aluminum limits are for pH ≥ 6.5 and < 7.

² Some limits depend on water hardness (calcium and magnesium content). A hardness of 50 mg/L was used for hardness dependent limits.

³ The BC limit for mercury is scaled based on percent of methylmercury present.

⁴ The turbidity standard is expressed in terms of the allowable increase above natural conditions.

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Constituent (units)	AK Standard*	BC Standard*	Description
Nitrate as N (µg/L)	10,000	3,000	<ul style="list-style-type: none"> Nitrates are used in explosives and are commonly found in mine drainage. Nitrates can be toxic to humans and can cause algae blooms.
pH (s.u.)	6.5-8.5	6.5-8.5	<ul style="list-style-type: none"> Water draining from acid generating rock can be very acidic. Changes in pH can harm fish and shellfish and can impair waterbodies.
Selenium (µg/L)	5	2	<ul style="list-style-type: none"> Selenium is a metal that occurs naturally in rocks and soils. Selenium can be toxic to humans and to aquatic life.
Silver (µg/L)	1.2 ²	10.0 ²	<ul style="list-style-type: none"> Silver occurs naturally in some ore deposits. Silver can be toxic to aquatic life.
Total Dissolved Solids (TDS) (mg/L)	500	500	<ul style="list-style-type: none"> Runoff from development or the treatment of water can elevate TDS levels. High TDS levels can harm fish and are a nuisance in drinking water.
Turbidity (NTU)⁴	5 NTU over natural background	2 NTU over natural background	<ul style="list-style-type: none"> Stormwater runoff can increase the turbidity (cloudiness) of water. Increases in turbidity can harm fish and increase disease risks to humans.
Zinc (µg/L)	66.6 ²	7.5 ²	<ul style="list-style-type: none"> Zinc is a metal that can be associated with some ore deposits. Zinc can be toxic to aquatic life and to humans.

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