# APPENDIX 3-B KSM PROJECT FACTSHEETS (2010-2012)





# **Project Overview**

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### **Project Overview**

The KSM Project is a proposal to build a gold, copper, silver and molybdenum mine in northwest BC. The project is located about 65 km northwest of Stewart, 20 km northwest of the now-closed Eskay Creek mine and 30 km northeast of the Alaska border. The project will employ an average of approximately 1,800 people during its 5 year construction and will create an average of approximately 1,040 permanent jobs during its 52 year mine operations.

Placer gold was discovered in the proposed KSM Project area in the late 1800s.



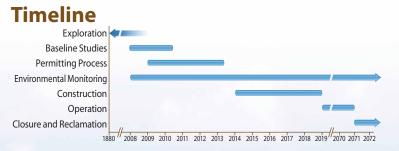


### **Project Details**

• The KSM Project is made up of four large gold and copper deposits. The total resources identified to date are described in the following table:

Category	Tonnes (000)	Gold Grade (g/t)	Gold Ounces (000)	Copper Grade (%)	Copper Lbs (millions)
Measured	724,000	0.65	15,130	0.18	2,872
Indicated	2,055,900	0.51	33,873	0.22	9,845
Inferred	1,127,200	0.41	14,976	0.17	4,172
Total	3,907,100		63,979		16,889

- Within this total, the preliminary feasibility study (2012) determined that these deposits contain proven and probable reserves of 38.2 million ounces of gold, 9.9 billion pounds of copper, 191 million ounces of silver and 213 million pounds of molybdenum.
- The Kerr, Sulphurets and Mitchell deposits will be mined as open pits using earth-moving equipment. Mitchell will be mined as an underground operation later in the mine life. Iron Cap will only be mined as an underground operation.
- The mine will produce up to 130,000 tonnes of ore per day.
- Trucks will take the gold/copper concentrate to Stewart for transport by ship to market.
- The proposed mine has a 52 year life. This duration creates multi-generation job opportunities.
- The project's capital cost is estimated at approximately US \$5.2 billion.
- During operation, the project will generate significant tax revenues and royalties to governments.



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# **Project Components**

### **Coulter Creek Access Road**

- Controlled access to limit effects on fish and wildlife.
- 35 km addition to existing road.
- Bridge over Unuk River.

### **Treaty Creek Access Road**

- 33 km access road to Highway 37.
- Controlled access limits effects on fish and wildlife.Bridge over Bell-Irving River.

### **Transmission Line**

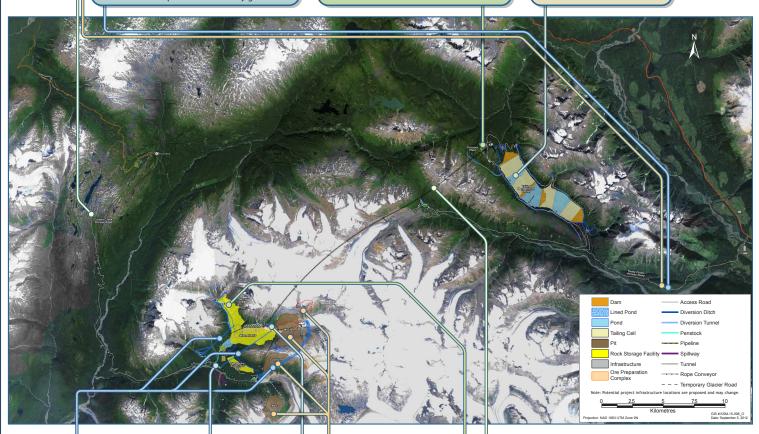
- Parallels Treaty Creek access road.
- Provides link to provincial electricity grid.

### **Processing Plant**

- Located near the end of the ore transport tunnels.
- Copper, gold and molybdenum are separated from the ore using a flotation process.
- Cyanide, used to extract more gold, is recovered and residual cyanide is subjected to two separate destruction methods.
- Copper, molybdenum and gold are trucked off-site for further processing.
- Ground ore with metals removed, "tailing," is pumped to the tailing management facility.
- Camp nearby to house employees.

### **Tailing Management Facility**

- Dams constructed with locally quarried rock and non-sulphide bearing tailing.
- Sulphide bearing tailing submerged in a lined pond to ensure permanent saturation.
- Dams at either end have low permeability cores.
- Seepage collection dams downstream of tailing dams.



### Water Treatment Facilities

- Dam on lower Mitchell Creek collects water
- from the Mitchell Pit and rock storage facilities.
  Drainage from facilities piped to the dam.
- Water piped by gravity to a treatment plant.
- Turbine installed in the pipeline generates
- Camp nearby to house employees.

### **Ore Preparation Complex**

 Ore is crushed and transported on a conveyor to the processing plant.

### **Diversion Tunnels**

- Three tunnels divert water away from the mine site.
- Keep fresh water away from surface disturbances, maintaining water quality.
- Water discharging through tunnels is mostly directed through turbines to generate electricity to supplement power from the provincial grid.
- Will remain in operation after closure and will supply power to water treatment facilities.

The Kerr, Sulphurets and Mitchell deposits will be mined as open pits using earth-moving equipment. Mitchell will be mined as an underground operation later in the mine life. Iron Cap will only be mined as an underground operation.

TOTAL proven and probable reserves at the four deposits:

- Gold: 38.2 million ounces
- Copper: 9.9 billion pounds
- Silver: 191 million ounces
- Molybdenum: 213 million pounds

### **Ore Transport Tunnels**

- Required to access the processing plant and tailing management facility from mine sites.
- Each tunnel will be 23 km long with an access about 7 km from the northern end.
- Cross connections between the tunnels provide an escape route and enable ventilation.
- Tunnels include a conveyor, diesel pipeline and transmission line.

### **Rock Storage Facilities (RSF)**

- Stores non-ore rock removed to access ore.
- Ditches and tunnels divert surface run-off.
- RSF drainage collected and treated.
- Covered with overburden and vegetated at closure.



# **Environmental Management**

Seabridge recognizes that mining affects the environment. We will work with the provincial and federal governments, Aboriginal peoples, and local communities to minimize potentially adverse project effects, discuss options, and plan for successful mine closure and reclamation.

### **Project Design**

Design provisions to protect the environment include:

- Tailing Management Facility located in an area with easily managed surface water flows.
- Water management plan for the proposed mining area to minimize effects on natural watercourses and treat affected water.
- Diversion tunnels to direct clean water around areas disturbed by mining.
- Hydro-electric generation of green energy in diversions and process streams.
- Use of energy efficient equipment will reduce energy consumption and greenhouse gas emissions.
- Conveyor to transport ore through a tunnel from the mine site to the processing plant.
- Use of existing access roads as much as possible to minimize additional road construction.
- Use of access roads limited to authorized personnel, along with restrictions on employee hunting and fishing, to prevent harvesting pressure on fish and wildlife.

### **Project Operations**

Operating policies will include:

- Use of best environmental practices.
- Spill avoidance and spill control plans.
- Emergency response plans.
- Reduce, re-use, recycle initiatives to minimize waste.
- Ongoing energy efficiency initiatives.
- Adaptive management towards continual improvement.
- Ongoing community engagement.

### **Project Closure**

Reclamation and monitoring:

- Financial security will be provided to ensure
  - appropriate restoration of the site when mining ceases.
  - ongoing water treatment and monitoring.
- An approved fish habitat compensation plan to replace affected fish habitat.

The Nass River, located downstream of the project, is a valuable commercial salmon fisheries. Protecting this resource is essential for developing a sustainable project.



The KSM Project has been designed,

and will be developed and operated, using the highest practicable standards

of environmental management.



# **Human Environment Studies**

Seabridge is conducting studies to understand the current human environment near the proposed KSM Project. This will help to assess potential project effects on regional residents.

### Socio-Economics

Socio-economic studies have identified the social, economic, heritage, and health components of regional and local communities that could potentially be affected by the proposed project.

 This information is used to guide the project's design and operation. It also helps to enhance community benefits and opportunities while minimizing potentially negative effects.

### **Archaeology**

The archaeological study identifies archaeological and historical sites within the proposed KSM Project area.

- Multiple archaeological sites were found, and are now protected.
- Historic land use sites, primarily associated with prospecting and mineral exploration, were located and recorded.







### **Traditional Knowledge**

Local Aboriginals' traditional knowledge (TK) provides valuable information important to a comprehensive environmental assessment process.

- TK may include information about wildlife and habitat as well as traditional, historical and on-going land uses with links to the social and cultural aspects of local communities.
- The KSM Project Team recognizes the sensitive nature of TK and seeks to work collaboratively with Aboriginal knowledge holders in a mutually beneficial manner.

### **Country Foods**

This study evaluates the quality of foods potentially harvested in the proposed project area.

Studies determine the naturally-occurring levels of metals found in plant and animal species that
could be harvested within the project area. This information is used to monitor the quality of
food species within or surrounding the proposed project site once development is underway.



### **Land and Resource Use**

Land and resource use studies identify land users and owners and their activities in the proposed KSM Project area and surroundings. Potential project effects on existing land use are determined, and appropriate mitigations are developed. Potential land users and owners include:

- Aboriginal peoples
- Hunters, trappers and fishers
- Guide outfitters
- Tourism and recreation operators
- Private property owners
- Users of parks and protected areas
- Mining, oil and gas tenure holders
- Forestry tenure holders





Seabridge is dedicated to establishing strong relationships with the communities surrounding the proposed KSM Project site. We initiated our community engagement process in 2008. We will continue to seek the involvement of local Aboriginal peoples, regional towns, and interested parties as the project proposal develops. In addition to creating approximately 1,040 direct jobs during operations, Seabridge is committed to hiring local employees, sourcing from local firms, and supporting local businesses wherever possible.



# **Natural Environment Studies**

The proposed KSM Project will be developed under strict environmental guidelines and will undergo a comprehensive regulatory review. The project must obtain an Environmental Assessment Certificate and acquire various permits prior to development. The protection of water quality, fisheries and wildlife are top priorities.

Environmental baseline studies determine the current state of environmental components that could be affected by the project, prior to developing the site. This information is used to avoid, or minimize, potential adverse effects, while maximizing positive effects of the project. Baseline studies were initiated in 2008 and some are ongoing.

**Fisheries** 

Comprehensive fish and fish habitat assessments have been conducted at stream crossings along all proposed primary road alignments and at the proposed mine and tailing management facility.



- Fish are not present in Sulphurets and Mitchell Creeks, in part because of the naturally low pH levels and high metal contents of these streams.
- · Fish tissue has been tested for baseline metals concentrations.
- Fish inventory surveys have been conducted using electrofishing, gillnets, minnow traps and beach seines.
- Habitat compensation studies are exploring the creation of optimal fish habitats to compensate for disturbed areas.

### **Aquatics and Water Quality**

Aquatic biology, sediment and water quality baseline studies have been completed for a broad area within and surrounding the proposed project site.

- Stream, river and lake water and sediment have been tested for metals, nutrients, ions, and other characteristics.
- Aquatics surveys of algae, benthic invertebrates (e.g. clams, worms, insects), and plankton have been conducted.
- Toxicity testing of select stream waters has been conducted to help classify water prior to project development.



The KSM Project will be developed in a manner consistent with the management direction provided by the Cassiar Iskut-Stikine Land and Resource Management Plan and the draft Nass South Sustainable Resource Management Plan.

### Wildlife

Comprehensive wildlife studies have confirmed the presence of 121 wildlife species, including 94 species of birds, within the proposed project area.

- Common species in the vicinity include moose, grizzly and black bear, mountain goat, and a variety of breeding birds, raptors, and waterfowl.
- Grizzly bear DNA analysis has been conducted using hair samples to determine population size and distribution in the proposed project area.
- Habitat suitability mapping studies have been conducted for key mammals to identify prime habitat.



### Vegetation

The vegetation study program describes the terrestrial ecosystems and vegetation by:

- Surveying and mapping ecosystems throughout the study area using aerial photography and satellite imagery.
- Surveying rare plant species and communities, and invasive species.
- Testing baseline metal concentrations in plant tissue (focusing on species that may be consumed by humans, or by animals that may be consumed by people).





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# **Natural Environment Studies**

### Geochemistry

Oxidation of KSM's naturally occurring mineral deposits now causes some springs to have low, or acid, pH levels (less than 3 compared to a neutral value of 7). Mitchell Creek is influenced by these springs and during the spring and early summer it is highly acidic (pH levels 2.5 to 4). Additionally, streams in the area have naturally high levels of elements such as arsenic, cadmium, copper, iron and zinc.

- Extensive rock and water sample testing has been conducted (over 2,000 rock samples and monthly water samples).
- A geochemical deposit model and a water quality model are being developed to assist with mine design and management planning.







### **Surface Water and Groundwater**

The study of the movement, distribution and quality of groundwater and surface water is being conducted to design the mine in a way that protects water quality and function.

- Installed groundwater monitoring wells throughout the study area and conducted groundwater sampling.
- A groundwater model was developed to help mitigate project effects to the groundwater system.
- Monitoring of the Mitchell Glacier.
- Continuous monitoring of streams and rivers at 17 hydrometric stations in the proposed project area, and modeling of flows.

### **Meteorology and Air Quality**

An on-going study program is defining the local climate to support project design and to enable a thorough effects assessment of the proposed project.

- Installed automated meteorology stations near proposed open pits and the tailing management facility. Data being collected include:
  - Wind speed and direction
  - Air temperature
  - Relative humidity
  - Snow depth
  - Total precipitation
  - Global solar radiation
  - Visibility
- Surveying snow courses/transects in the project area for engineering design and water management.
- Visibility sensor allows projection of times when production may be affected by fog or falling snow.
- Installation and monitoring of dustfall collectors to measure baseline air quality.



### **Soils and Terrain**

Field studies have resulted in detailed data on soil type (physical and chemical properties) in the project area and along the proposed access roads.

- Information is being used to develop site reclamation and soil handling plans for mine closure.
- Landform mapping has been carried out using aerial photo interpretation.

### Wetlands

Wetlands studies and activities to determine wetland function and distribution have been conducted in areas that could potentially be affected by project infrastructure.

- Following extensive surveying of the proposed project area, wetland ecosystems have been mapped and classified.
- No "red listed" (endangered, threatened, or extirpated) wetlands have been identified in the study area.





# **Regulatory Review**

Typically, to establish a large operating mine in British Columbia, the project must be reviewed and approved under the *BC Environmental Assessment Act* (BCEAA) and the *Canadian Environmental Assessment Act* (CEAA). These acts and associated regulations define thresholds or triggers that determine the requirements for review. In the case of the KSM Project, the BC process is triggered by the rate of ore production. The federal process is triggered by the requirement for federal agencies to issue permits or approvals for fish habitat effects, road crossings over navigable streams. The BC Environmental Assessment Office (EAO) coordinates the provincial and federal government harmonized review process.

### Permitting

Permits, granted by provincial and federal regulatory bodies, are needed throughout the life of the project. The permits authorize the company to carry out specified activities. There will be additional opportunities for public input during the permitting process. Provincial and federal permits and approvals for project development cannot be issued until the respective environmental assessment processes have been successfully completed.



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### **BC Governments Permits and Licenses**

Environmental Assessment Certificate
Permit Approving Work System & Reclamation Program
Water Licence
Licence to Cut
Special Use Permit – Plant Access Road,
Extension of Eskay Road
Road Use Permit
Licence of Occupation
Pipeline Permit – Diesel Pipeline
Surface Lease – Mine Site Facilities
Waste Management Permit
Camp Operation Permits (Drinking Water, Sewage,

Disposal, Sanitation and Food Handling)

### **Enabling Legislation**

BC Environmental Assessment Act Mines Act Water Act Forest Act Forest Act

Forest Act Land Act Pipeline Act Mineral Tenures Act Environmental Management Act Health Act/Environmental Management Act

### **Federal Governments Approvals and Licenses**

### **Enabling Legislation**

CEAA Approval
Metal Mining Effluent Regulations (MMER)
Fish Habitat Compensation Agreement
Navigable Water: Stream Crossings Authorization
Explosives Factory Licence
Ammonium Nitrate Storage Facilities
Radio Licences

Canadian Environmental Assessment Act
Fisheries Act/Environment Canada
Fisheries Act
Navigable Waters Protection Act
Explosives Act
Canada Transportation Act
Radio Communication Act

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# **Environmental Assessment (EA) Process**

### **EA Process**

### **Project Milestones**

Early Project Definition March 2008: Seabridge submits the KSM Project Description to EAO.

April 2008: EAO issues Section 10 Order requiring an EA Certificate for the KSM Project.

**March 2008 - ongoing:** Seabridge conducts environmental and social baseline studies, community engagement activities, and consultation with regulatory agencies and Aboriginal groups to confirm scope and depth of studies.

Definition of Project Scope, Issues and Assessment

March 2008 - ongoing: Community engagement activities with Aboriginal and non-Aboriginal governments, regulatory agencies, interest groups and the general public to share project information and obtain feedback for consideration in the EA.

**July 2009:** CEA Agency determines KSM Project must undergo a comprehensive study EA review under the CEAA.

**November 2009:** EAO issues Section 11 Order defining the EA process, including which groups require consultation.

**December 2009 - ongoing:** Seabridge continues environmental and social baseline studies in development of the project design.

**June 2010:** CEA Agency releases a Draft Comprehensive Study Scope of Assessment document for public review.

June - July 2010: Public Open Houses in Northwest BC to share project information and invite public comments on the draft Application Information Requirements.

June 25 - July 26, 2010: EAO administers a public comment period for the project.

**January 2011:** EAO issues the final Application Information Requirements outlining the detailed requirements of the environmental assessment.

**Fall 2011 - Fall 2012:** Seabridge and EAO hold meetings to refine the project design based on feedback from regulators and Aboriginal governments.

Fall 2012: Submission of EA Certificate Application and concurrent permit applications.

pplication Review **Fall 2012 - Spring 2013:** Screening,180-day review phase, including public comment period, following EA Application submission. Seabridge will respond to all comments received and will submit the responses to EAO.

Fall 2012 - Spring 2013: Seabridge continues its consultation program throughout the review period.

**Spring 2013:** Provincial and federal governments prepare assessment reports summarizing the issues brought up and resolved during the review, and draft permits are prepared.

Project Decision **Spring - Summer 2013:** Provincial ministers determine whether to issue an EA Certificate within 45 days of receiving recommendations from EAO.

**Spring - Summer 2013:** Federal Minister of Environment determines whether the proposed project will create a significant environmental effect, enabling issuance of federal permits.

Permits, granted by provincial and federal regulatory bodies, are needed throughout the life of the project. The permits grant the project approval to carry out specified activities. Once regulatory approvals are granted, it is expected to take an additional five years of construction and start-up before the mine is operational.