

Unlocking the Value of Open Data in British Columbia: A Mining Industry Knowledge Hub

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Introduction

In January 2016, the Canada Mining Innovation Council (CMIC) and Geoscience BC signed a one-year working agreement for the development of an initiative entitled Mining Industry Knowledge Hub ('Knowledge Hub'). The central aims of the initiative are to compile, centralize and disseminate key water quality data that are related to the mining sector.

The working agreement covers the pilot/proof-of-concept phase of the initiative. This allows the project participants to evaluate the technical feasibility of the project while gauging stakeholder buy-in. As CMIC is a national organization, the initiative may be used as a model for the development of additional Knowledge Hubs in other major mining jurisdictions across Canada.

The strategic partnership between CMIC and Geoscience BC capitalizes on the unique skills and expertise of the organizations. The project lead is CMIC, with its role as a key mining industry association for developing innovation projects. It provides overall project management and is the interface between the project participants and project stakeholders (i.e., mining companies, regulatory agencies, communities, etc.). Given Geoscience BC's strong track record of collecting, curating and distributing earth-science data, it serves as the technical lead for the initiative.

Project Background

Geoscience BC Project Background

In 2014, Geoscience BC began identifying challenges associated with accessibility to environmental data for the mining sector and the public. Water quality data was highlighted as a key priority, given the importance of sound

water management to both the resource sector and to all British Columbians.

To do so, the organization engaged in outreach to determine initiatives that would address some of the challenges surrounding access to water quality data, while also exploring many of the opportunities that exist in the realm of environmental data.

At the same time, Geoscience BC sought strategic partnerships with organizations within the mining ecosystem. This would leverage the skills and expertise of the partnering organizations and create new avenues for collaboration.

CMIC Project Background

The Canada Mining Innovation Council is a national, member-based and industry-led organization. Its mandate is to lead innovation in the Canadian mining sector. Members of CMIC—through its technical working groups—define the challenges facing the sector and then develop innovative solutions in the form of collaborative projects and programs.

The Environmental Stewardship Initiative is one of four technical working groups within CMIC. Its role is to collaborate on innovation projects and programs that address sustainability issues facing the mining sector. In 2014, CMIC completed an environmental management scoping study (Hatch Ltd., 2014), which identified water management as a key area of the mining sector requiring innovation.

In turn, the Environmental Stewardship Initiative established the water working group to develop water management initiatives. The water working group defined many challenges surrounding water management; water quality monitoring and the associated data management were identified as key challenges.

Problem Definition

Importance of Water Quality Data

Monitoring is an integral component of water management activities for mine development and operations. The data and interpretations are critical for:

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- establishing baseline water quality conditions;
- determining any deleterious effects of mining operations on water resources;
- devising water management strategies, including impact mitigation strategies;
- implementing corrective actions;
- informing water treatment strategies and their efficacy; and
- characterizing the potential cumulative impact of mining activities on the surrounding environment.

Mine operators expend significant resources collecting, storing and analyzing water quality data that are used by regulators to meet their legislated mandates. This includes predicting impacts to water resources at the outset of project development, devising operating permits and ensuring compliance with the permits.

Disparate Nature of Regulatory Water Quality Data

Individual mine developers and operators collect and store their own water quality data. The methods and tools for doing so vary by company. Additionally, companies submit their data to the following regulatory bodies throughout various stages of the mine life cycle (i.e., assessment and permitting through to operations and closure/post-closure):

- BC Environmental Assessment Office (BC EAO)
- BC Ministry of Energy and Mines (BC MEM)
- BC Ministry of the Environment (BC MoE)
- Canadian Environmental Assessment Agency (federal)
- Environment and Climate Change Canada (ECCC; federal)

Each of the above agencies have different requirements for data submission, ranging from data submission in simple PDF to electronic submission into storage platforms. For example, the BC EAO requires that baseline water quality data be appended in PDF to environmental impact statements (EIS) as part of an overall environmental assessment. Conversely, the ECCC requires Metal Mining Effluent Regulations compliance data to be submitted via an electronic platform, namely the Regulatory Information Submission System. The data are then stored in an electronic database.

Data Loss

Environmental data loss is problematic across the mining sector. A predominant point at which this occurs is when mine projects are transferred between companies. This may occur at the project development stage (e.g., exploration, assessment) and/or during the operational stage.

Data loss can occur where mining companies submit data to regulatory agencies for assessment and/or permitting purposes and subsequently withdraw their application. In other cases, following the submission of the data, a project may be cancelled and/or the company dissolves. For both

instances, there is risk that the data-management systems and retention policies may result in data loss.

Sector Transparency

Despite high levels of regulatory compliance with respect to water quality, there is often a broad perception that the mining sector must improve its environmental stewardship. There may be distrust of mining companies as well as apprehension of the real and perceived impacts to the environment. In turn, this affects social acceptance of the sector's activities. Movement in the sector with respect to sharing information, reporting on sustainability and deeper engagement are some examples of transparency that might lead to greater social acceptance.

Government regulators are increasing transparency as well through the release of water quality data and summary reports that traditionally were used internally to determine compliance.

Developing a Solution: a Mining Industry Knowledge Hub

The Knowledge Hub initiative is exploring platforms that can ingest and store water quality data related to developing and operating mines across Canada.

Data Preservation

A key deliverable of the Knowledge Hub initiative is to compile and centralize disparate water quality data so it will be accessible for future use. Some of it is publicly available already, but not in a form that is broadly usable.

The three sources of data have been identified for inclusion in the pilot phase of the Knowledge Hub are

- baseline data submitted as part of environmental assessments to the BC EAO,
- compliance data submitted to regulatory bodies (i.e., BC MoE and BC MEM), and
- select datasets that are held by mining companies.

The above data are being stored in a temporary platform (Figures 1, 2) that uses the existing hardware and software of Geoscience BC (i.e., the Geoscience BC Earth Science Viewer). Parallel scoping work is being completed to identify a permanent platform for the data.

Extracting Value from Data

A goal of the Knowledge Hub is to enhance data-driven decision making. This requires that data is curated and presented in a way that facilitates use by a broad group of stakeholders.

Significant efforts are being made to ensure that the data platform is sufficiently user-friendly. These efforts are guided by the principle that the user experience of the

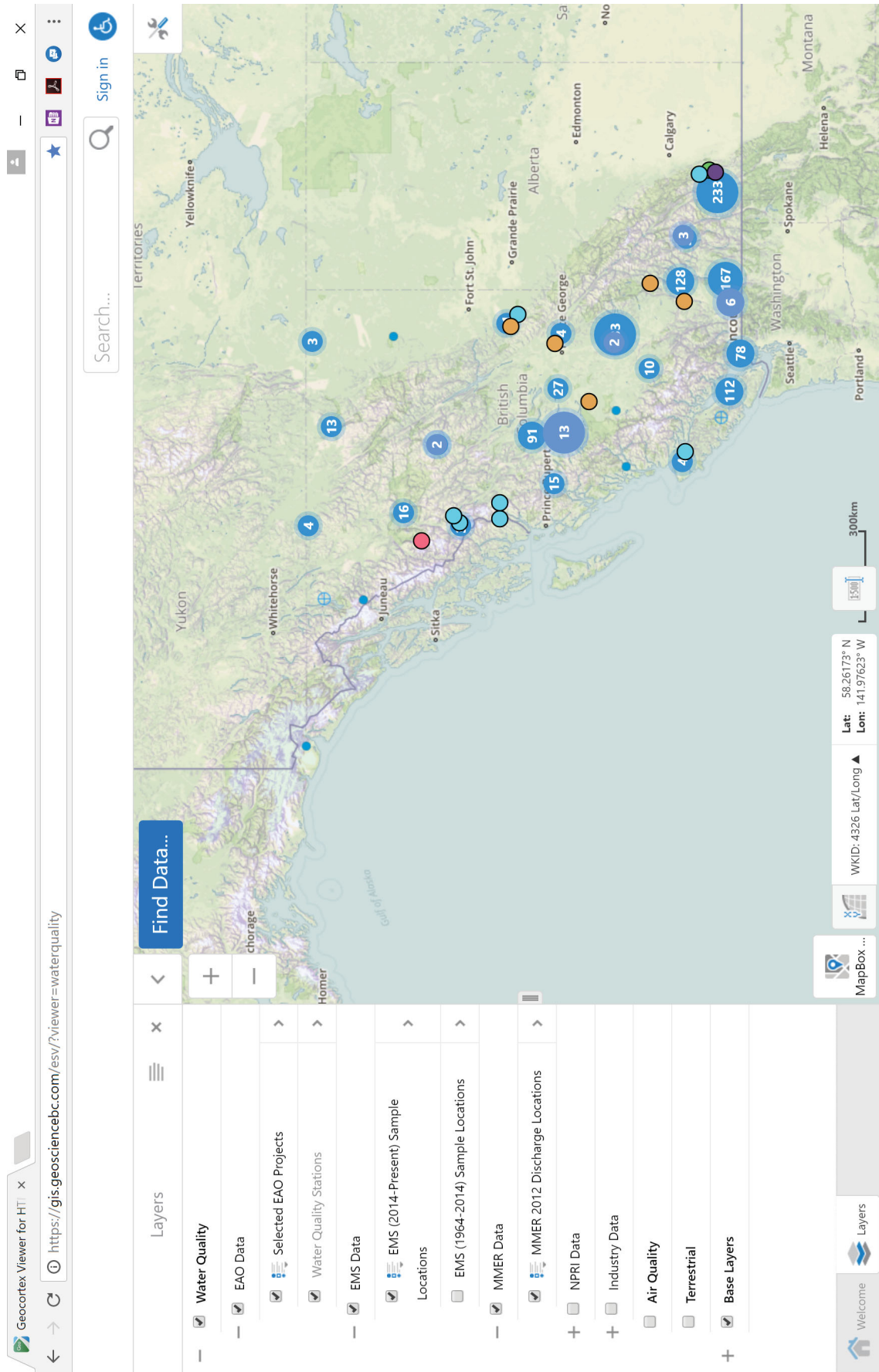


Figure 1. Screen capture showing a report (in PDF) selected that contains baseline water quality for a project in environmental assessment. A user can view the report data by clicking 'View Additional Details' or following a link back to the British Columbia Environmental Assessment Office website.

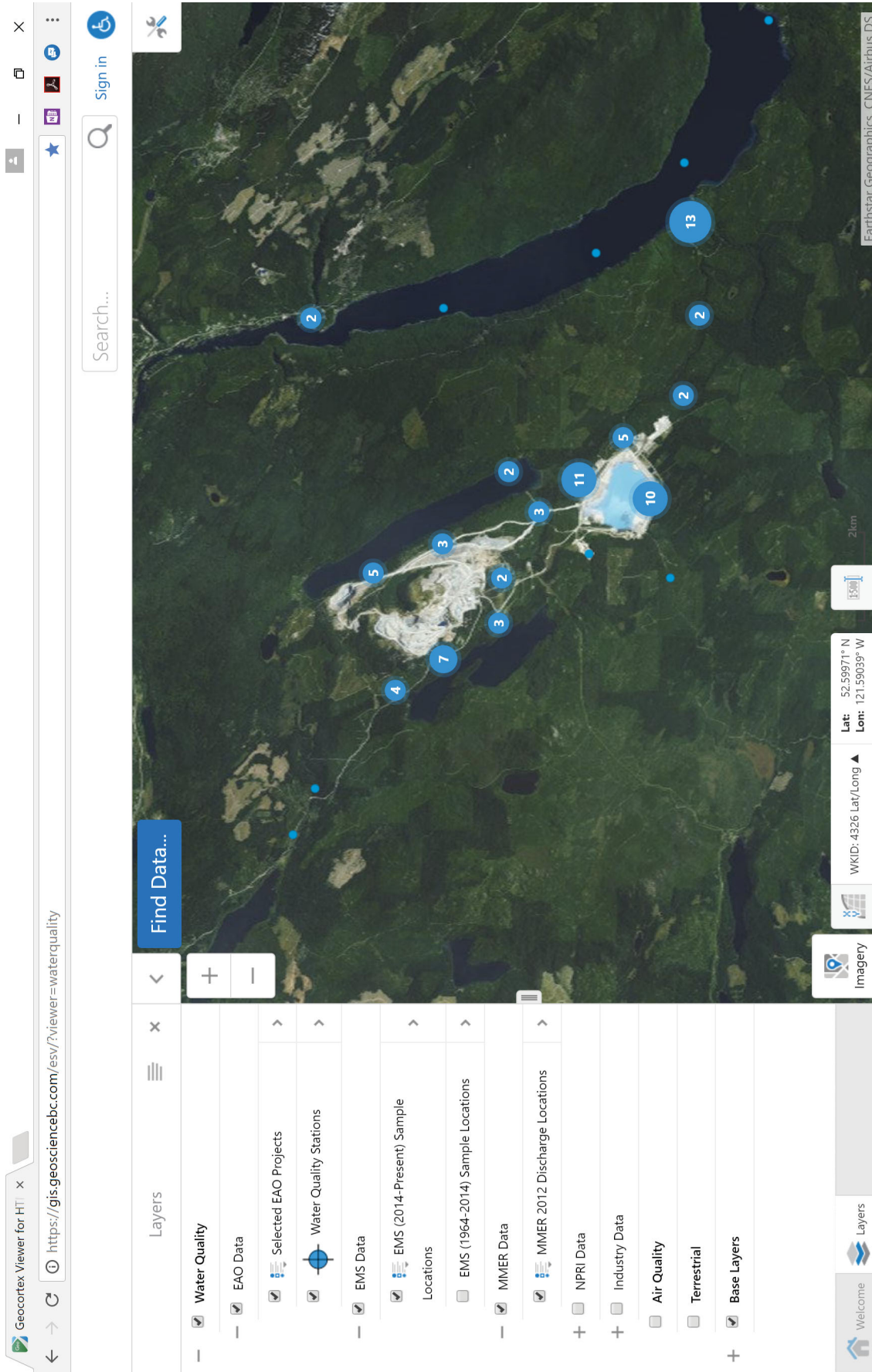


Figure 2. Screen capture from the temporary platform showing a satellite image of a mine operation with water quality monitoring points from the British Columbia Ministry of Environment Environmental Management System. A user can select a point to see what the water quality parameters are at that point. Additional functionality allows the changes in water quality parameters over time to be charted.

Knowledge Hub should be similar to that of consumer-based platforms.

Quality assurance (QA) and quality control (QC) protocols are critical for data usability and defensibility. To address this, the project team has developed a QA-QC strategy to guide data collection and ingestion. A key component of the strategy is presenting existing, publicly available data in an ‘as is, where is’ format. Although less than ideal, this approach mitigates validation and verification risks that may arise during data conversion. Where possible, the project team is working with mining companies and analytical labs to access datasets directly. This approach further helps to mitigate QA-QC risks.

Transparency Through ‘Open Data’

The concept of ‘open data’—defined generally as data that can be accessed and used by anyone—is rapidly capturing the attention of stakeholders, from governments and regulatory agencies to local communities and the public. The value and possibilities of ‘open data’ are myriad, including within the mining sector.

The Knowledge Hub is a first step toward capturing and unlocking these opportunities. The initiative will increase transparency within the mining sector by making water quality data publicly available. By doing so, the sector demonstrates the efficacy of their water management strategies and highlights the sustainability trends of the industry.

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