Mainstreaming BIODIVERSITY in Arctic Mining
Challenges and Proposed Solutions
Mainstreaming Biodiversity in Arctic Mining: Challenges and Proposed Solutions


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» Environment and Climate Change Canada
» Faroese Museum of Natural History
» Finnish Ministry of the Environment
» Ministry of Independence, Nature, Environment and Agriculture, Greenland
» Icelandic Institute of Natural History
» Norwegian Environment Agency
» Ministry of Natural Resources and Environment of the Russian Federation
» Swedish Environmental Protection Agency
» United States Department of the Interior, Fish and Wildlife Service

CAFF Permanent Participant Organizations
» Aleut International Association (AIA)
» Arctic Athabaskan Council (AAC)
» Gwich’in Council International (GCI)
» Inuit Circumpolar Council (ICC)
» Russian Association of Indigenous Peoples of the North (RAIPON)
» Saami Council

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Open pit mining and ore dressing plant. Photo: Dim154, www.shutterstock.com
Mainstreaming Biodiversity in Arctic Mining

Challenges and Proposed Solutions

Introduction ..........................................................................................................................................3

Background ...........................................................................................................................................5

Challenges to and Suggested Solutions .............................................................................................7

Near-term Action Items for CAFF ..................................................................................................... 25

Next Steps .......................................................................................................................................... 26

Conclusion ..........................................................................................................................................27

References Cited ................................................................................................................................ 28

Organisations Represented at the Three CAFF-hosted Workshops .............................................. 29

Boxes

Box 1. Sakatti Mine Project, Finland: Early coordination between authorities; a comprehensive pre-consultation before the EIA started ................................................................. 9

Box 2. Red Dog Mine, Alaska: A wide cooperation of different federal, regional, local and tribal actors ................................................................................................................................. 10

Box 3. National networks in Canada and Finland supporting sustainable mining practices .......... 13

Box 4. Diavik Diamond Mine, Canada: Environmental and socio-economic agreements with local Aboriginal groups ................................................................................................................. 15

Box 5. Perspective from Donlin Gold regarding impacts due to lack of regulatory agency alignment ........................................................................................................................................... 16

Box 6: Arctic Biodiversity Data Service (ABDS) ....................................................................................... 19

Box 7. Proteus: Improving biodiversity information in collaboration with the private sector ...... 20

Box 8: De Beers Canada, Inc. Fish Tasting: An innovative approach to incorporating separate lines of evidence in aquatic monitoring ............................................................................ 21

Box 9. NICO polymetallic mine project Indigenous co-managed impact assessment assured meaningful engagement and utilization of TK ................................................................. 22

Box 10. Ecological compensation at the Aitik mine ................................................................................... 24
Introduction

The Arctic region is changing in rapid and unprecedented ways. The Arctic Council, an international forum comprised of the eight Arctic countries\(^1\), six Indigenous Peoples organizations\(^2\), and others interested in the Arctic seeks to collaboratively understand and address Arctic issues for the benefit of all people, biodiversity, and the environments on which they depend.

The Conservation of Arctic Flora and Fauna (CAFF) Working Group, one of six working groups of the Arctic Council, through its Arctic Biodiversity Assessment (ABA) (CAFF 2013a), has identified the primary factors impacting biodiversity\(^3\) across the Arctic and includes recommendations to policy makers on how to address those stressors. One of the stressors is development, including resource extraction. Recommendation #4 of the ABA encourages all those working on development activities in the Arctic to incorporate biodiversity considerations in their planning and operations.

Recognizing that there are a wide variety of industries that engage in Arctic activities (e.g., oil and gas, tourism), CAFF agreed to initially focus on one sector, the mining industry, with a project titled “Mainstreaming Biodiversity in Arctic Mining.” Reasons for addressing the mining sector first include:

- Increased global interest in mining in the Arctic;
- Established national and international mining or related organizations interested and engaged in biodiversity conservation; and
- Examples of good practices that can be shared.

Mining and other extractive activities are key economic drivers in the Arctic (Tolvanen et al. 2018) that provide jobs, infrastructure, training/educational opportunities, and social and other benefits to communities and states (SDWG 2011). Real and potential impacts of mining, particularly on the environment and communities—

\(^1\) Members of the Arctic Council: Canada, the Kingdom of Denmark, Finland, Iceland, Norway, the Russian Federation, Sweden, and the United States.

\(^2\) Six organizations representing Arctic indigenous peoples have status as Permanent Participants. They include: the Aleut International Association, the Arctic Athabaskan Council, Gwich’in Council International, the Inuit Circumpolar Council, Russian Association of Indigenous Peoples of the North, and the Saami Council.

\(^3\) Convention on Biological Diversity definition of biodiversity (2019a): «Biological diversity» means the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.

\(^4\) CBD definition of mainstreaming of biodiversity (2019b): can be defined as integrating or including actions related to conservation and sustainable use of biodiversity at every stage of the policies, plans, programmes and project cycles, regardless whether international organizations, businesses or governments lead the process. The objective of mainstreaming biodiversity is to help reduce the negative impacts that productive sectors, development investments and other human activities exert on biodiversity, by highlighting the contribution of biodiversity to socioeconomic development and human well-being.
in the Arctic, often Indigenous communities—where mines are located, can be concerning. Mining operations have the potential to disrupt traditional ways of life (e.g., food security and cultural practices) and could pose conflicts with other land uses (e.g., tourism). Environmental impacts can be difficult to compensate for or mitigate due to inherent uncertainty in ecological processes compounded by climate change effects, harsh conditions, and remoteness of sites (Moilanen and Kotiaho 2018, Tolvanen et al. 2018). CAFF recognizes that there are concerns regarding impacts to biodiversity due to mining in the Arctic. Through this project, CAFF seeks to help facilitate opportunities for dialogue among all stakeholders, as well as with Arctic Indigenous Peoples, with the goal of advancing biodiversity conservation and sustainable development in the Arctic.

This report identifies key challenges and possible solutions for incorporating biodiversity considerations into mining operations in the Arctic. It is based on information received from:

- A series of CAFF-hosted workshops with participation by representatives from the mining industry and related companies (e.g., consultants), government agencies, Indigenous Peoples and other entities (e.g., mining associations and networks) held in Anchorage and Finland in 2018 and 2019;
- discussions with representatives of the mining industry operating in the Arctic;
- discussions with and/or contributions from subject matter experts; and
- published materials.

While this report is not representative of the entirety of perspectives of Arctic Indigenous Peoples, governments or of the mining industry operating in the Arctic, it does reflect input gained through the CAFF process to date and serves as an important foundation for future discussion and action. This process has included input and review from a broad array of experts, beyond those individuals who participated in the roundtable dialogues and workshops. The intention of this project is to continue to engage with the mining industry (including industry groups involved in all aspects of the mining process from operation to reclamation and beyond), government agencies, Indigenous Peoples and representative organizations, communities, Non-governmental Organizations (NGOs) and others interested in this topic to ensure broader perspectives and contributions are included.

It is important to note that there is no perfect or one-size-fits-all solution. Our goal is to share ideas and good practices that have been used, or innovative ideas suggested, with the goal of advancing this discussion for the benefit of biodiversity. This report is a deliverable of the Finnish Chairmanship of the Arctic Council for the meeting of the Foreign Ministers of the Arctic States in May 2019.
Background

The work of the Arctic Council (e.g. technical assessments, projects and policy recommendations related to critical issues facing the Arctic region) is undertaken by six working groups. In 2013, CAFF released the *Arctic Biodiversity Assessment (ABA)* (CAFF 2013b), a report containing the best available science informed by Traditional Knowledge (TK) and Local Knowledge on the status and trends of Arctic biodiversity and accompanying policy recommendations for biodiversity conservation.

The ABA explored factors that adversely affect species and their habitats in the Arctic, providing critical information to policy makers. The ABA found that large tracts of the Arctic remain relatively undisturbed, providing a unique opportunity for proactive action that can minimize or even prevent future problems that would be costly, or impossible, to reverse.

In 2013, the Arctic Council Ministers approved the seventeen recommendations articulated in the *Arctic Biodiversity Assessment, Report for Policy Makers* (CAFF 2013b). At the 2015, Arctic Council Ministerial meeting, the Arctic states approved an eight-year implementation plan *Actions for Biodiversity 2013-2021* (CAFF 2015) to guide implementation of the ABA recommendations.

One of the six cross-cutting ABA themes focuses on the importance of mainstreaming biodiversity, and ABA recommendation #4 called for “… the incorporation of biodiversity objectives and provisions into all Arctic Council work and encouraged the same for on-going and future international standards, agreements, plans, operations and/or other tools specific to development in the Arctic. This should include, but not be restricted to, oil and gas development, shipping, fishing, tourism and mining.”

The Mainstreaming Biodiversity in Arctic Mining Initiative led by the United States, Canada and Sweden with the support of the CAFF Secretariat is the first step towards implementation of ABA recommendation #4. Through this initiative, CAFF aims to establish a long-term relationship with the mining sector and other interested groups in order to identify challenges and good practices, other information and tools that could be used to enhance incorporation of biodiversity considerations into the work of the mining sector in the Arctic.
Old coal mine transportation pillar and majestic view across Adventdalen, Longyearbyen, Svalbard, Norway.

Photo: Thomas Hagenau, www.shutterstock.com
Challenges and Suggested Solutions

The following are key challenges and possible solutions to incorporating biodiversity consideration into mining operations in the Arctic. Although we recognize that other Arctic Council working groups, NGOs, universities and other stakeholders can make significant contributions to further defining and addressing these challenges, for the purposes of this report, we limited input on the suggested actions to government agencies, the mining industry and CAFF. We see this as a follow-up area for the mainstreaming work as we move into subsequent phases. The extent to which these challenges impact individual mining or related companies may vary by situation and country. The examples presented in box texts offer perspective and illustrate some of the points made and suggestions offered in this report.

A. Lack of trust and coordination: (1) within and among permitting agencies; (2) among agencies and the mining industry; and (3) across agencies, mining industry, and the public, especially in relation to Indigenous communities.

Lack of coordination, meaningful communication (e.g., listening), transparency and follow-through among parties often results in enduring mistrust and missed opportunities for collaboration that could benefit biodiversity. Coordination and agreement on good sustainability practices could result in an improved public image and greater trust of the mining industry.

Suggestions for how this challenge could be addressed:

In general, trust can be established among all entities via early, transparent and sincere communication practices and collaboration during the visioning and planning process and continuing through production, restoration and beyond.

Government agencies could:

- Engage with industry and communities early and, as possible, outside of the permitting process, with the caveat that conflicts of interest can be an issue during the permitting process (Boxes 1 and 2).
- Ensure in the pre-project phase, alignment within and between government entities involved.
- Ensure effective communication of relevant information, helping to minimize misinformation that is sometimes conveyed about proposed mining projects.
- Support creation and maintenance of an entity to help facilitate sustainable mining practices (Box 3).

Mining industry could:

- Engage with communities and permitting agencies early and often, recognizing that industry may not have all of the answers early in the process (Boxes 1 and 4).
- Continue to engage regularly with agencies and communities after permits are granted.
- Recognize the importance of participation and knowledge of Indigenous Peoples and communities, especially Elders.
- Create agreements with communities to ensure participation and interests are considered that can lead to mutually beneficial outcomes (Boxes 2 and 4).
• Engage local people in research design, data gathering and analysis (Challenge E).

• Provide support for and participate in national (Box 3) and international sustainable mining initiatives, groups or networks (e.g., the International Council on Mining and Metals, Convention on Biological Diversity’s Mainstreaming Biodiversity in the Energy and Mining, Infrastructure, and Manufacturing and Processing, and Health Sectors).

CAFF could:

• Continue to facilitate workshops and other opportunities for dialogue, partnerships, and other actions to help build common understanding and trust among parties.

• Continue to increase awareness about and help facilitate opportunities for cross-sector engagement. For example, continue to invite industry to biodiversity meetings and conferences; and collaborate on sessions, presentations and events at mining industry meetings and conferences.

• Work with Permanent Participants and industry to facilitate design of good practices for engaging communities and government agencies throughout all aspects of mining operations.

BOX 1.

Sakatti Mine Project, Finland:
Early coordination between authorities; a comprehensive pre-consultation before the EIA started

From Good Practices for Environmental Impact Assessment and Meaningful Engagement in the Arctic: Including Good Practice Recommendations (SDWG 2019)

The Sakatti project is a Copper-Nickel-Platinum discovery that is situated 150km north of the Arctic Circle in Finland. AA Sakatti Mining Ltd is an affiliate of Anglo American, a South African company with headquarters in Johannesburg and London. Part of the planned mine site is situated on a Natura 2000 nature conservation area, making the conditions of the planned mine especially sensitive.

Before the start of the Environmental Impact Assessment (EIA) in 2017, three preliminary consultation meetings were held that included the AA Sakatti Mining Ltd, participants from various authorities including those that oversee the EIA process (EIA competent authority), permitting, the Nature Conservation Act, Reindeer Husbandry Act, and Mine Act as well as representatives from Sodankylä municipality, and the regional authority in charge of land use planning.

Preliminary consultation resulted in better coordination among the various authorities in terms of overall project planning and has been beneficial to the mining company, as it helps them integrate and streamline studies and manage the intricate web of necessary approvals. It also facilitates planning meaningful engagement with the public, as the whole process is better planned and coordinated by the EIA competent authority, other authorities and AA Sakatti Mining Ltd.
BOX 2.

**Red Dog Mine, Alaska:**
A wide cooperation of different federal, regional, local and tribal actors

*From Good Practices for Environmental Impact Assessment and Meaningful Engagement in the Arctic: Including Good Practice Recommendations (SDGW 2019)*

The landowner of the Red Dog Mine, the NANA Regional Corporation has been the first to implement a Relationship Agreement with affected communities, which precedes any other agreement such as a Memorandum of Understanding or Letter of Intent and extends into perpetuity. The Relationship Agreement is the first interaction with communities and defines the nature and scope of the relationship between NANA and community. To date these have been very well received by communities.

There is a partnership between the Landowner (NANA Regional Corporation) and the Company (formerly Cominco Alaska Inc. now Teck Alaska, Inc.). The intent of the agreement between NANA and the Company was to allow development in a manner that provided a long-term economic base for the NANA region and jobs for NANA shareholders and other Alaskans, while also providing economic return for the Company and ensuring minimal impacts on the region’s hunting and gathering culture and way of life.

Red Dog Mine began operations in 1989. In 2009, the Environmental Protection Agency finalized a Supplemental Environmental Impact Statement (SEIS) for an expansion of the existing mine operations. The 2009 SEIS supplements the “original” 1984 Environmental Impact Statement in evaluating the environmental effects associated with development of a new ore deposit, Aqqaluk. The cooperating agencies that participated in this Supplemental Environmental Impact Statement process include the U.S. Army Corps of Engineers, National Park Service, the State of Alaska, the Northwest Arctic Borough, and the tribal governments representing the Native communities of Buckland, Kiana, Kivalina, Kobuk, Kotzebue, Noatak, Noorvik, Selawik and Shungnak. The tribal governments authorized the Maniilaq Association, the region’s tribal non-profit health services provider, to prepare a health impact assessment and represent their cooperating agency interests and responsibilities.

U.S. Federal, State, local and tribal agencies with jurisdiction or expertise were brought together in a wide cooperation to address environmental, social, cultural and economic interests. Building of the relationship between NANA and affected communities was founded in the very beginning by a Relationship Agreement. A health impact assessment was given special emphasis.
B. Establishment of mutually beneficial partnerships with communities impacted by mining operations.

In order to operate effectively, the mining industry needs buy-in from impacted communities (i.e., Social License to Operate) (Tolvanen et al. 2018). This is especially important across much of the Arctic where Indigenous Peoples and/or local communities often depend on ecosystem services for food security, cultural and spiritual connections and other purposes. Because of differences in cultures and/or values, limited shared understanding and lack of trust (Challenge A), it can be difficult to meaningfully engage with Indigenous and/or local communities, develop positive relationships and work towards common goals. Although there are good examples of where the mining industry operating in the Arctic is working collaboratively with government agencies, communities and others to minimize their impacts on biodiversity, public perception of the mining industry in impacted communities is not always favourable.

Suggestions for how this challenge could be addressed

The proposed solutions regarding this challenge focus on building relationships, establishing trust and demonstrating respect that result in mutually beneficial relationships. The interrelatedness between the well-being of the community (e.g., human health, preserving cultural practices, healthy environment, economic and social prosperity) and biodiversity is a key theme.

Mining industry could:

- Engage in community partnerships where community members have real input and decision-making authority (e.g., co-management of resources) (Box 4).
- Provide tangible economic incentives for community residents (e.g., employment at mine or related support jobs and community enhancement efforts)
- Use of agreements (e.g., “good neighbour”/Impact and Benefit Agreements) (Tolvanen 2018) to attain social license to operate prior to mining activities taking place (Boxes 2 and 4). Agreements could designate, for example, how to monitor impacts and address compensation for unavoidable effects (Tolvanen 2018).
- Ensure protection of traditional uses of the surrounding area, including linkages to food security and the biodiversity it supports as an important consideration during all phases of the project.

CAFF could:

- Work with the mining industry and others to continue to develop and share good practices for community engagement and partnerships specific to mining operations.
- Continue to explore opportunities for further dialogue among Permanent Participants, government agencies and the mining industry to help identify and ultimately achieve mutually beneficial outcomes.

Snapshots from various Donlin Gold, LLC. community meetings, Alaska. Photos: Colleen Laraux
C. Lack of alignment among government agencies in regard to environmental permitting, particularly environmental review requirements.

Local, state/territory and national permitting requirements can be perceived by industry to be arduous, repetitive and/or misaligned causing unnecessary burdens that do not clearly translate into useful information or benefits for biodiversity conservation or sustainable development. For example, excessive data collection and reporting requirements without strategic coordination and partnering that could benefit government agencies, industry and the public. This can lead to separate government agencies asking for the same information in different ways or seeking extraneous information that does not help inform decision-making, resulting in unnecessary time and resources expended (Box 5).

Suggestions for how this challenge could be addressed

The common theme among the solutions suggested to address this challenge is early and increased communication and coordination within and among permitting agencies and between government permitting agencies and the mining industry.

Government agencies could:

- Engage with industry as early as possible, outside of the permitting process, with the caveat that conflict of interest can be an issue during permitting so relevant laws and policies must be adhered to (Box 1).
- Align/organize internally and among different government entities who may need to be involved in particular projects and the permitting process. This alignment should happen from the outset of a project or permitting process to identify ways to streamline permit requirements without compromising the quality or integrity of the process or outputs.

Mining industry could:

- Engage with permitting agencies early regarding all aspects of the proposed project, including by offering ideas for how to streamline the permitting process while still delivering the necessary inputs.
- Ensure there is regular and meaningful communication with government agencies.

CAFF could:

- Share and gather information and report on good practices in environmental assessment/permitting and share broadly with Arctic States, industry and others.\(^5\)
- Continue to facilitate dialogue and information sharing among industry and government agencies regarding mainstreaming of biodiversity as a way to build common understanding and establish enduring relationships.

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\(^5\) For example see Good Practices of Environmental Impact Assessment and Meaningful Engagement in the Arctic—including Good Practice Recommendations (SDWG 2019)
BOX 3.
National networks in Canada and Finland supporting sustainable mining practices

Eero Yrjo-Koskinen, Secretary General, Finnish Network for Sustainable Mining

Modelled after the Mining Association of Canada’s Towards Sustainable Mining Initiative (TSM) and created by the Finnish Innovation Fund Sitra, a public foundation operating under the supervision of the Finnish Parliament. The Finnish Network for Sustainable Mining has been operating since 2014 and provides a platform for cooperation to the mining industry and key stakeholders. Since its establishment in May 2014, The Network has produced sustainability standards for mining and exploration, a common approach to corporate social responsibility (CSR) reporting and a toolbox for local actions, which provides best practices and concrete examples to mining and exploration companies that are planning to set up their operations in the field (Finnish Network for Sustainable Mining 2019).

The Network is currently focusing on implementation of its sustainability standards to ensure that eventually all mining and exploration companies will apply the same principles in their operations in Finland. The Network has currently two part-time employees, the Secretary General that coordinates the activities of the network, and a Senior Expert helping the mining and exploration companies in the implementation and reporting on the implementation of the sustainability standards. The Network operates under the umbrella of the Finnish Technology Industries and receives its funding mainly from the Finnish Mining Association.

Transporting minerals.
Photo: Evgeny Kuzhiley

Network meeting at Agnico Eagle’s gold mine in Kittilä, Lapland, in 2018.
Photo: Eero Yrjo-Koskinen
D. Agreement on data (e.g. cultural and ecological indicators of change) collection, management, and sharing of information.

Baseline data and other information about the status and health of plants, animals and ecosystems in and around mine sites are important for the mining industry, communities, government agencies and CAFF. An important challenge is to ensure that data generated by the mining industry are accessible in a form that can inform broader understandings of Arctic biodiversity status and trends (Box 6).

The responsibility for data collection related to a mining operation is often focused on the industry without consideration given to possible collaboration and partnerships, including plans and protocols for how data could be used, managed, and/or shared more broadly (Box 7). Collectively, data could be better used to the benefit of the mining industry, government agencies and others such as university researchers, if the process were managed as a partnership, including planning, sharing resources, and designing protocols when and where it makes sense. This could include broader data management and sharing plans.

Suggestions for how this challenge could be addressed:

The suggested solutions for this challenge focus on the need to collaboratively: (1) Develop standardized approaches to data collection, management and sharing in order to ensure consistency in what is monitored, how this is done and how data is shared; (2) agree upon a range of social and biological indicators of change with collaboration and buy-in from Indigenous and scientific communities that could be applicable across the Arctic; (3) align requirements as to what is monitored and the scope of the monitoring to be undertaken; and (4) increase trust by incorporating representatives of Indigenous Peoples, local communities and interested groups at the start of data collection and exploration activities to establish trust and effective collaboration.

Government agencies could:

- Agree to participate in collaborative processes to identify and use common indicators that capture the cultural, social, and economic impacts of mining.
- Provide data to a common repository where data could be available to be shared.

Mining industry could:

- Agree to participate in collaborative processes to identify and use common indicators that capture the cultural, social, and economic impacts of mining.
- Provide data to a common repository where it could be available to be shared.

CAFF could:

- Provide a common repository to make relevant data about the status and health of plants, animals and ecosystems in the Arctic available for other uses (Box 8).
- Work in cooperation with others to help develop common methodologies for data collection, analysis, management and reporting by the mining industry.
- Collect and share good practices for data collection and sharing.
• Work to ensure data provided to the CAFF is compatible with agency-mandated data collection or other standards where appropriate.
  – Help to develop indicators that capture the relevant cultural, social and economic impacts of mining.
  – Encourage and provide assistance for national and industry adoption of CAFF monitoring plans and indicators as minimum standards for the Arctic.
  – Help to develop relevant/common questions that could be asked of mining activities across the Arctic.
  – Initiate a pilot project(s) that could incorporate elements of data collection and sharing.

• Create an expert group to address data quality and sharing, to consider how groups can work together and how TK might be equitably utilized with a focus on the engagement of TK holders.

• Optimize use of information by ensuring that CAFF data initiatives take into account ongoing mining industry data needs, activities and approaches so that they are clearly defined.

BOX 4.
Diavik Diamond Mine, Canada: Environmental and socio-economic agreement with local Aboriginal groups
Cynthia Jacobson, CAFF Chair

In 1999, prior to construction, the Diavik Diamond Mine, located 300 km northeast of Yellowknife, entered into a socio-economic monitoring agreement with the Government of the Northwest Territories. This agreement, later ratified through negotiations with five Aboriginal groups, formalized the commitment to provide mutually beneficial opportunities (e.g., employment and training) to local Aboriginal people. In addition, Diavik has an Environmental Agreement with local Aboriginal groups and federal and territorial governments to “formalize its environmental commitments, establish reclamation security requirements and provide transparency and oversight to local communities.” An Environmental Monitoring Advisory Board comprised of local Aboriginal groups, government entities and the mine ensures compliance with the agreement (Natural Resources Canada, 2014).

Further “Diavik developed and supports a community TK camp, located adjacent to the mine site. The camp runs in summer and involves the five neighbouring Aboriginal groups. As part of these camps, elders, adults, and youth representing local communities participate in workshops that blend TK with science. Studies include fish palatability, water quality monitoring, and caribou monitoring (Rio Tinto 2019).”
**BOX 5.**

**Perspective from Donlin Gold regarding impacts due to lack of regulatory agency alignment**

*Ron Rimelman, VP, Environment, Health, Safety & Sustainability, NOVA Gold*

Mining projects are often asked to address complex environmental and social issues that necessitate extensive multi-year baseline data collection and analyses. The completion of such evaluations typically form the basis for the environmental review processes and related permitting decisions undertaken by federal and state agencies. We, as mining companies, understand these requirements and are committed to doing scientifically sound and defensible work. However, the agencies often struggle among themselves on how such analyses should be performed. Therefore, we end up in a never-ending cycle of trying to meet changing, and often differing, agency expectations.

For the Donlin Gold National Environmental Policy Act (NEPA) (U.S.A.) analysis, we were asked to address many complex technical and scientific issues, a number of which relate to regional environmental and social issues. These included impacts to salmon and other important subsistence resources, mercury, spill risk from barging on the river, and community and public health. Working with Alaska Native corporation partners and the U.S. Army Corps of Engineers (the lead NEPA agency), with input provided through hundreds of community outreach meetings in the region, we designed and conducted scientific analyses that went well beyond what has historically been done for Environmental Impact Statements (EIS).

With some exceptions, the other agencies involved in the NEPA process (especially the Federal ones) did not always act fully as “co-operators” in the process. Instead of working together and bringing their own knowledge to be table, they often were critical of our work. This is not a reflection of the individuals but rather inherent, long-standing problems in the NEPA process. What we consistently see are: (1) no analysis is ever good enough (just keep doing more and more even if it takes forever), (2) the most conservative, worst-case risk must always be assumed even where there is no precedent or basis, (3) agencies are rigid in that the analysis must be done their own way, and (4) there is little or no recognition that any good (environmental or social benefits) can come from natural resource projects (despite the strong track record these industries have at existing operations in Alaska).

At Donlin Gold, we again very much feel like we worked hard to do very strong scientific work for the EIS and used this work to minimize impacts and risks from the project. In all cases, we listened to what agencies and the public, especially Alaska Native people, told us and what they wanted to see. We have committed to continuing this work and dialogue as we move forward through every stage of project development. That noted, we also believe the process could have been more constructive had the NEPA process been used in part to build collaboration in terms of data collection and analysis, public dialogue, mitigation, and establishing working relationships for future partnerships.

No area is more important than the protection of the regionally important biological resources, including fish, birds, mammals, and overall biodiversity. As we have seen, understanding these species presents extraordinary challenges for the agencies. This specifically includes defining and, where appropriate, adapting to the impacts of climate change. We very much welcome being partners with all interested parties in helping us ensure that our project does not adversely impact biological resources and helping them work more broadly to effectively manage, and where feasible, enhance the populations and diversity of these species. In our view, this must come from changes in senior agency leadership direction in how the environmental review and permitting processes should work to everyone’s benefit.
E. Difficulty establishing clear processes for engaging Indigenous Peoples and utilizing TK.

A need exists to work together with Indigenous communities in a meaningful way that respects and utilizes TK along with science to inform decisions regarding biodiversity (e.g., key research questions informing biotic and abiotic monitoring decisions). There are existing examples of design, operations, and reclamation plans of some mines located in the Arctic region that have been influenced by TK and through consultations with local communities, but there is not a consistent or systematic way for gathering and utilizing TK and science so outcomes are useful, credible and benefit communities and the mining industry to the greatest extent possible.

Suggestions for how this challenge could be addressed

Respect for and recognition of TK as important in achieving biodiversity goals is the starting point for addressing this challenge. Examples exist of the mining industry and permitting agencies working closely with Indigenous communities to utilize TK, but there is acknowledgement that they could benefit from guidance for all phases of the process, from engagement with TK holders to working with them to design research and monitoring questions, to gathering and analysing data.

**Government agencies could:**
- Ensure that TK is considered as part of data collection needs and other relevant permitting requirements for Arctic mines.
- Facilitate and engage early in co-production processes where TK is valued and used.

**Mining industry could:**
- Engage early in co-production processes where TK is valued and used (Box 8).
- Share examples of where industry has engaged with TK holders in a meaningful way and collaborate in developing good practices that can work effectively for all involved (Box 9).

**CAFF could:**
- Engage early in co-production processes where TK is valued and used.
- Help facilitate meaningful utilization and understanding of TK at multiple levels (e.g. local, national and international) through guidance from the Permanent Participants.
- Continue work with Permanent Participants to develop good practices on how to implement co-production of knowledge approaches to planning and decision-making (e.g., publish and share with the mining industry the approach to the co-production of knowledge outlined in the Arctic Coastal Biodiversity Monitoring Plan) (CAFF 2019).
F. Establishment of a system that is acceptable, predictable and measurable for industry, stakeholders and authorities to manage ecological compensation\(^6\), taking into account the vulnerability of Arctic nature and the long timeframes and slow pace of renewal associated with cold climates.

The process of ecological compensation for unavoidable impacts is based on many assumptions and is inherently uncertain (Moilanen and Kotiaho 2018). A primary challenge is predicting with certainty what biodiversity benefits will be gained through the compensatory action (e.g., protection or restoration of another piece of land) and then measuring actual benefits versus predictions. Compensation should be designed and implemented so that the benefits to nature in the compensation area are equal to or higher than the value lost in the affected area. Ideally, that benefit would occur prior to the development action, but practically, that is often not the case.

Suggestions for how this challenge could be addressed

Suggesting for addressing this challenge were both policy and science focused and there was a strong emphasis on the importance of having scientifically valid practices available to industry and government agencies regarding improved metrics for measuring and comparing biodiversity values over the long term.

Government agencies could:

- Facilitate access to land (e.g., assist with agreements to access and ensure long-term protection of compensation sites).
- Develop legal and administrative provisions that allow companies to create compensation areas, ensuring their long-term conservation.
- Provide guidelines for monitoring of the effects of the compensation measures carried out and provide data infrastructure to publicly disclose the results to establish a growing knowledge base and create confidence in compensation and trust between the various stakeholders.
- Collaborate with CAFF on developing products described in the “CAFF could” subsection.

The mining industry could:

- Adhere to rigorous scientific standards when designing and implementing compensation measures and present expected results openly and realistically (Box 10).
- Publicly disclose the design and implementation as well as the monitoring results of compensation actions carried out. This will establish a growing knowledge base and create confidence in compensation and trust between the various stakeholders.
- Collaborate with CAFF on developing products described in the “CAFF could” subsection.

\(^6\) Ecological compensation is “the process by which ecological damage caused by human activity is compensated by improving ecological conditions elsewhere” (Moilanen and Kotiaho 2018). Ecological compensation is also referred to as biological offsetting and compensatory mitigation. Ecological compensation is considered least desirable option after avoidance of negative impacts altogether; minimizing impacts to the development site; and reduction of damage to the impact area.
CAFF could:

- Work with mining and other industries and sectors, government agencies and interested stakeholders to evaluate existing and emerging ecological compensation practices and programs and their usefulness in Arctic situations.

- Evaluate systems of measurement and monitoring (e.g., what values should be measured, how should they be measured and when, and how should achieved compensation values such as compensation credits be compared to impacts levels).

- Evaluate existing legislation and guidelines (e.g., what can be done to encourage good ecological compensation practices).

- Consider guidelines and good practices to assist in conserving and increasing biodiversity and ecosystem services through compensation measures.

Box 6.
Arctic Biodiversity Data Service (ABDS)
Tom Barry, CAFF

One tool via which CAFF could support some of the solutions outlined in this report is by facilitating archiving and access to data using the ABDS. The ABDS is the online, interoperable data management system for biodiversity data generated by CAFF. Its goal is to facilitate access, integration, analysis and display of biodiversity information for scientists, practitioners, managers, policy makers and others working to understand, conserve and manage the Arctic’s wildlife and ecosystems. The ABDS ensures that biodiversity data provided to CAFF are organized to guarantee a lasting legacy in a manner that facilitates data discovery; increased understanding; more informed and rapid decision-making; and ongoing research. Each time a new report or product is released by CAFF the datasets involved are archived and made accessible via the ABDS.

Key data management services include supporting network data management; assigning metadata; establishing interoperable links via the ABDS with relevant data portals; hosting relevant datasets that are not accessible elsewhere; rescuing datasets and working to ensure that the appropriate standards are applied.

CAFF works with a range of partners to further develop cooperation, access to and management of biodiversity data. Partners include the Arctic Spatial Data Infrastructure (Arctic SDI); Global Biodiversity Information Facility (GBIF); Ocean Biogeographic Information System (OBIS); Group on Earth Observations Biodiversity Observation Network (GEOBON).
BOX 7.

Proteus: 
*Improving biodiversity information in collaboration with the private sector*

*Fiona Danks, UNEP World Conservation and Monitoring Centre (WCMC)*

Proteus began in 2003, as a mechanism through which the business and conservation communities could come together to make available global information on biodiversity. Since then, it has grown to be a unique collaboration between leading extractives companies and UNEP-WCMC to provide companies with the biodiversity information needed for better informed decisions and to support the development and improvement of key global biodiversity resources. The objectives of Proteus are:

- To improve significantly the accuracy, completeness and currency of information in the World Database on Protected Areas, focusing on data verification, quality assurance and enhancements in interoperability.

- To support integrated knowledge products that provide access to information on sites of global importance for biodiversity and increasingly feature sites that are considered national priorities.

- To compile globally consistent, comprehensive and validated datasets for important coastal and marine ecosystems and develop a business-relevant baseline of biodiversity priorities in the marine realm.

- To share context and insights into the latest trends and developments in biodiversity and ecosystem policy, initiatives, data and tools of importance to business.
BOX 8.

**De Beers Canada, Inc. Fish Tasting:**
An innovative approach to incorporating separate lines of evidence in aquatic monitoring

*Alex Hood, Environment Superintendent, Victor Mine, De Beers Group*

De Beers Canada Inc. (DBCI) currently own two mines in the Northwest Territories, the Gahcho Kué and Snap Lake mines. Both are fly-in/fly-out remote locations, with year-round access by air travel and temporary winter access via an ice road. Northern Canada has an abundance of lakes, and both mine sites have a surface waterbody, which plays a vital role in the aquatic ecosystem.

During the Environmental Assessment for the projects, the company committed to ensuring that the water would continue to be safe to drink and the fish safe to eat. As such, the company and its partners were tasked with developing a mechanism for evaluating these metrics at a community level. De Beers Canada recognizes the fish tasting program as an annual gathering of First Nation community representatives and De Beers Canada staff at the mine site to taste fish harvested from the lake. The Elders share their experience and TK about the taste and texture of fish in the North during this fish tasting event.

The fish tasting serves as a gathering where local Elders and De Beers Canada employees can evaluate the condition of large bodied fish (Lake Trout) in lakes that receive discharge from the mine through qualitative/traditional inspection methods.

The principal objective of the fish tasting is to obtain feedback from community Elders relating to taste, flavour, texture and general condition of fish harvested from receiving lakes. A secondary objective is to meet requirements related to the inclusion of TK set out under existing licenses and permits. This commitment is closely linked to the corporate commitment that fish will remain safe to eat and water safe to drink in the lakes downstream of the mines post closure.

The Elders’ observations are documented in a final report that is incorporated into the Annual Aquatic Effects Monitoring Program Report and submitted to regulators and stakeholders. TK incorporates the deep-rooted respect and understanding of the land and provides insight into changes within the ecosystem and inhabitants. It is important for aquatic monitoring as an additional line of evidence and provides information that scientific knowledge cannot. Using TK and Scientific Knowledge in conjunction with one another allows for a comprehensive picture of the true effect of impacts, and therefore, also the possibility of collaborative solutions if necessary.

*Fish tasting. Photo: De Beers Canada, Inc.*
BOX 9.
NICO polymetallic mine project Indigenous co-managed impact assessment assured meaningful engagement and utilization of TK

*From Good Practices for Environmental Impact Assessment and Meaningful Engagement in the Arctic: Including Good Practice Recommendations (SDGW 2019)*

In 2012, the Tłı̨chǫ Indigenous Government participated in the environmental assessment for the proposed Fortune Minerals’ NICO poly-metallic mine project in the Northwest Territories.

Throughout the assessment, the Tłı̨chǫ Government was actively involved to ensure that key issues related to scoping, TK and adequate Indigenous engagement were meaningfully dealt with. For example, public hearing dates were changed to accommodate the completion of key TK studies and the Tłı̨chǫ Government required additional public hearings for community members to speak about the project. During the public hearings, the Tłı̨chǫ Government requested a two-hour window be allotted for youth and women to speak. Elders’ land use knowledge was the focus in a commissioned TK study and the hearings themselves (Olsen et al. 2013). Effluent discharge levels and locations were changed to protect land use; this could only be established through detailed TK collection. Also permits require annual cultural monitoring at K’eagoti (Hislop Lake) for the duration of the project.

Ultimately, the Tłı̨chǫ Government accepted the Report of Environmental Assessment, which had been issued by the quasi-judicial Mackenzie Valley Review Board. The project was approved and an Impact and Benefit Agreement (IBA) negotiated with the intent of generating net benefits, captured through financial payments, employment, training, and contracting.

Financial resources held by the Tłı̨chǫ were used to hire technical reviewers, engage the community, and ensure community-based capacity building. Although the Tłı̨chǫ Government contributed some of their own funding toward the review process, the uniqueness of this example lies in the fact the Tłı̨chǫ negotiated with both the proponent and the government to have long-term capacity and continuous funding through taxation and revenue sharing power to support the review and ongoing monitoring activities.

This case is an example of the co-management process laid down in the legislation and land claims agreement between Indigenous Government and the Crown. The Tłı̨chǫ Indigenous Government’s central role assured the appropriate involvement of both TK and western scientific methods in the assessment and conditions for project approval. Hiring technical reviewers and promoting capacity building was possible for Tłı̨chǫ as they negotiated with both the proponent and the government for financing to help local communities and Indigenous Peoples in the North to gain a better understanding of the EIA process and documents. The Canadian government may offer financing for such technical support.
BOX 10.

Ecological compensation at the Aitik mine

Anders Forsgren, Senior Project Manager, Boliden Mines

The Aitik mine operated by Boliden in northern Sweden is the largest open pit mine in Europe with a production rate of 45 Mton a year. An expansion of the tailings pond was needed and even though the mitigation hierarchy was thoroughly worked through some new ground had to be incorporated into the industrial area. Inventories on natural values and protected species were done and identified that an area of 167 hectares of forest with high natural values were affected.

Boliden voluntarily decided to compensate for the remaining impacts of the project and started an evaluation of suitable areas. Boliden evaluated four sites with field studies and proposed measures to add natural values and ecosystem services. The Sarkanenä Leipipir area, close to Aitik, was chosen as it was not deemed to be of high ecological value, but had the potential to create a similar environment to the one that was lost in the expansion project. The area consists of mature forest and has good plant biodiversity, but lacks dead wood for some species of fungi and insects to thrive. Its current owners had also designated the area for deforestation, which means that the mature forest will be preserved by Boliden’s compensation project.

The compensation areas are around four times as large as the area around Aitik being affected. The aim of the measures to raise natural values is to ensure biological diversity and ecosystem services in the area, which would otherwise have been negatively impacted. The measures being implemented include moving dead wood, promoting deciduous tree growth, damaging living trees, instituting controlled burns, release cutting old, coarse trees, and much more besides.

Up to today, approximately 700 logs of dead and dying wood from the affected area have been moved to the compensation area. Dead wood has also been created in the compensation area and measures have been taken with the help of local NGOs for nature protection to improve the birdlife. Baseline studies were done both in the affected area and compensation area, and in detail of the logs moved. An extensive platform for research projects has thereby been set up to be able to evaluate to what extent it is possible to create new habitats, move species and facilitate dispersal to new areas. The platform for research has been established in cooperation with the Swedish University of Agricultural Sciences, and Boliden is also financing a Ph.D. student.
Near-term Action Items for CAFF

Through our interactions with the mining industry, government agencies, Permanent Participants, NGOs and others, we recognize, that to fully mainstream biodiversity into Arctic mining, considerable actions are needed and those actions are the responsibility of all that have an interest or stake in biodiversity conservation in the Arctic. Some of those actions are implicit in the suggestions listed above, and it is our goal to help initiate discussions leading to their implementation.

The following is a list of near-term actions to which CAFF could contribute:

- Share challenges and suggested solutions regarding mainstreaming biodiversity in Arctic mining, starting with this report to the Arctic Council and continuing on with subsequent outreach opportunities.
- Continue to build relationships with the Arctic mining industry by convening dialogues and participating in cross-sector engagement opportunities; including by participating in pre-existing or external events that address similar topics where appropriate.
- Develop a communication and outreach effort based on good practice stories to distribute among the Arctic mining industry, permitting agencies, and Indigenous and other communities impacted by mining.
- Work with mining and other industries and sectors, government agencies, and interested stakeholders to evaluate existing and emerging ecological compensation practices and programs and their usefulness in Arctic situations.
- Work with Permanent Participants and industry to facilitate a discussion and develop and share good practices for meaningfully engaging communities, including utilizing TK, throughout the entire mining process in the Arctic.
- Consistently, and as relevant, share Arctic Council products and information to the mining industry as soon as they are available, e.g., Good Practices for Environmental Impact Assessment and Meaningful Engagement in the Arctic: including Good Practices Recommendations (SDWG 2019), State of the Arctic Freshwater Biodiversity Report (CAFF 2019), Arctic Coastal Biodiversity Monitoring Plan (CAFF 2019), Meaningful Engagement of Indigenous Peoples and Local Communities in Marine Activities (PAME 2019).
- Develop and share good practices for biodiversity data collection, analysis and management, emphasizing collaborative partnership efforts among companies, agencies, communities, and others.
- Encourage and provide assistance for national and industry adoption of CAFF monitoring plans and indicators as a model for monitoring in the Arctic.
- Initiate pilot project(s) with mining company(ies) to facilitate data collection and sharing based on CAFFs monitoring plans and focal ecosystem components.
Next Steps

- Report delivered to the May 2019 Arctic Council Ministerial meeting. Ministers and Permanent Participants can share this information with their governments and membership, respectfully, as they deem appropriate and useful.

- Continue to advance this project under the Swedish Chairmanship of CAFF, with a particular focus on further strengthening CAFF’s relationship with the mining industry.

- Continue to explore and encourage cross-sector engagement between the mining industry and CAFF in order to build relationships and increase understanding leading to collaborative actions to benefit biodiversity and mining interests in the Arctic.
Conclusion

As pointed out in the introduction, this report and the workshops and discussions that led to it, represent the beginning of a dialogue and relationship that CAFF has initiated with representatives of the mining industry and other interested groups. There are many important perspectives yet to be heard and explored in this topic, and CAFF recognizes that there is much work to do and is looking forward to filling in these gaps over the long term. We also recognize that you have to start somewhere, so we hope that this work helped identify areas where we can collaborate with industry, government agencies, Indigenous and other communities to address challenges facing the mining industry in mainstreaming biodiversity in its work in the Arctic. Further, we hope that this project paves the way for future work on mainstreaming with other industry sectors that operate in the Arctic.
References Cited


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## Organisations Represented at the Three CAFF-hosted Workshops

- Aarhus University
- Aleut International Association (AIA)
- Anglo American
- Arctic Economic Council
- Arctic Values
- ArtDatabanken/SLU
- Boliden Mineral AB
- Botnia Exploration Holding AB
- Conservation of Arctic Flora and Fauna (CAFF)
- Canadian Wildlife Service
- Centre for Economic Development, Transport and the Environment, Lapland
- Crowley/ AEC
- Center for Science in Public Participation (CSP2)
- Environmental Resources Management (ERM)
- Finnish Network for Sustainable Mining
- Gwich’in Council International (GCI)
- Golder Associates Oy
- Hannukainen Mining Oy
- Inuit Circumpolar Council (ICC)
- InuNorth Strategies
- Lapin liitto; Regional Council of Lapland
- Mawson Oy
- Metsähallitus (Finnish Forestry Institute)
- Ministry of the Environment, Finland
- Natural Resources Institute, Finland
- North Star Group
- NOVAGOLD
- Pöyry Finland Oy
- Red Mountain Consulting LLC
- Roszapovedcenter
- The Saami Parliament, Finland
- Saami Council
- Sabina Gold & Silver Corp.
- Stockholm Environment Institute
- The Swedish Environmental Protection Agency
- Trilogy Metals Inc.
- The University of Jyväskylä
- U.S. Bureau of Land Management
- U.S. Fish and Wildlife Service
- U.S. National Park Service
- UNEP-WCMC
- University of Helsinki
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