Briefing Note

Policy Brief of the Arctic Resources Working Group with Introduction: Fulbright Arctic Initiative IV

Rachael Lorna Johnstone, Penny Gage, Anna Karlsdottir, Alexandra Middleton, Åsa Rennermalm, Lars H. Smedsrud, and Rikke Østergaard

Introduction and Context: The Fulbright Arctic Initiative IV and the Arctic Resources Working Group

In June 2024, 20 scholars were selected from around the Arctic to participate in the Fulbright Arctic Initiative IV (Fulbright Scholar Program, n.d.). Seven of us participated in the working group on Arctic Resources and delivered a policy brief pivoting on five recommendations for mining companies and investors to improve community engagement, improve public trust and streamline mining operations in the Arctic (Gage et al 2026). We approached the topic from the perspective of intersecting timescales, recognising how different perceptions of time, natural, human, and economic, can lead to tensions. We considered the long timescales of environmental and cryospheric systems that shape physical operating conditions; the multi-decadal timelines typical of mine planning, permitting, construction, operation, and closure; and the generational dynamics within local communities. These intersect with much shorter time horizons associated with market demand for critical minerals, with political decision-making shaped by electoral cycles, and increasing discourses of urgency for an energy transition. Together, these overlapping timeframes

Rachael Lorna Johnstone is Research Director and Professor of Law at the University of Akureyri, Iceland.

Penny Gage is Chief Policy & Partnerships Officer at Launch Alaska in Anchorage, Alaska.

Anna Karlsdóttir is Docent in Human Geography and Tourism studies, University of Iceland.

Alexandra Middleton is Adjunct Professor at Oulu Business School, University of Oulu, Finland.

Åsa K. Rennermalm is Professor, Department of Geography at Rutgers, The State University of New Jersey, USA.

Lars H. Smedsrud is Professor at the Geophysical Institute, University of Bergen & Bjerknes Centre for Climate Research, Norway.

Rikke Østergaard is PhD Fellow in Arctic Social Science at Ilisimatusarfik, University of Greenland.

create both constraints and opportunities that must be understood to support responsible, durable, and locally beneficial development in the Arctic. Below, we provide an expanded policy brief, including more nuanced recommendations and real-world examples, and without the editorial interventions introduced independently of the authors to the version published by the Fulbright Commission to align grammar, style and terminology with current US federal government standards in 2026.

Our academic disciplines include natural and social science, law, business studies, physical oceanography, and physical and human geography and one of us has extensive professional experience in the business world. Our group has members from Iceland, Greenland, Finland, Norway and the United States. Elsewhere in this volume of the *Arctic Yearbook,* we present a more detailed and theoretical account of the process (Middleton et al 2026).

The entire Fulbright cohort met for three intensive sessions of approximately one week each: in Sápmi, Norway in September 2024; Nuuk and Sisimiut, Greenland in June 2025; and Anchorage, US in April 2026. The Arctic Resources working group additionally met in Reykjavík in October 2025 and each member undertook an individual exchange (the Americans to Nordic countries; and the Europeans to the US). The working group held six community listening sessions, each individually designed and conducted in light of the experience and position of the 'community' concerned and our objectives and expectations at the time of the meeting. These were held with: the Municipal League Infrastructure Symposium, Alaska; the Greenland Human Rights Council; Lucid Motors, Alaska and DC; NANA Corporation and Resource Development Council, Alaska; and invited Indigenous representatives at the Arctic Circle Assembly, Iceland.

The Fulbright Commission is organised under the United States Department of State in cooperation with the partner Commissions around the world supported by their national governments. The design of the research project, methodology, selection of materials, selection of partners for listening sessions, organisation and dissemination of results are all determined and conducted independently by us. We take full responsibility for the text of the policy brief below which is not reviewed or endorsed by the Fulbright Commission, any government or any of our employers.

Time to Mine? Mining With and For Arctic Communities

Policy Brief for Mining Companies and Investors in the Arctic

Fulbright Arctic Initiative IV (2024-26), Working Group on Arctic Resources

Attention is turning increasingly to the Arctic to meet growing demand for critical minerals from stable, democratic jurisdictions. This renewed interest brings significant economic opportunity, but it also intensifies longstanding governance challenges related to community priorities, environmental protection, Indigenous rights, and equitable benefit sharing.

Arctic mining projects operate across competing time horizons (Figure 1). Exploration and permitting can stretch for decades; construction and operation may last a generation; closure and post-closure impacts extend far longer. These timelines intersect with electoral cycles, seasonal harvesting activities, seasonal local labor and income patterns, and short-term commodity price volatility. At the same time, rapid climate and environmental change is altering the physical

conditions on which both infrastructure and livelihoods depend. When these time horizons are not explicitly aligned, expectations diverge, trust erodes, and projects become more vulnerable to conflict and long-term risk.

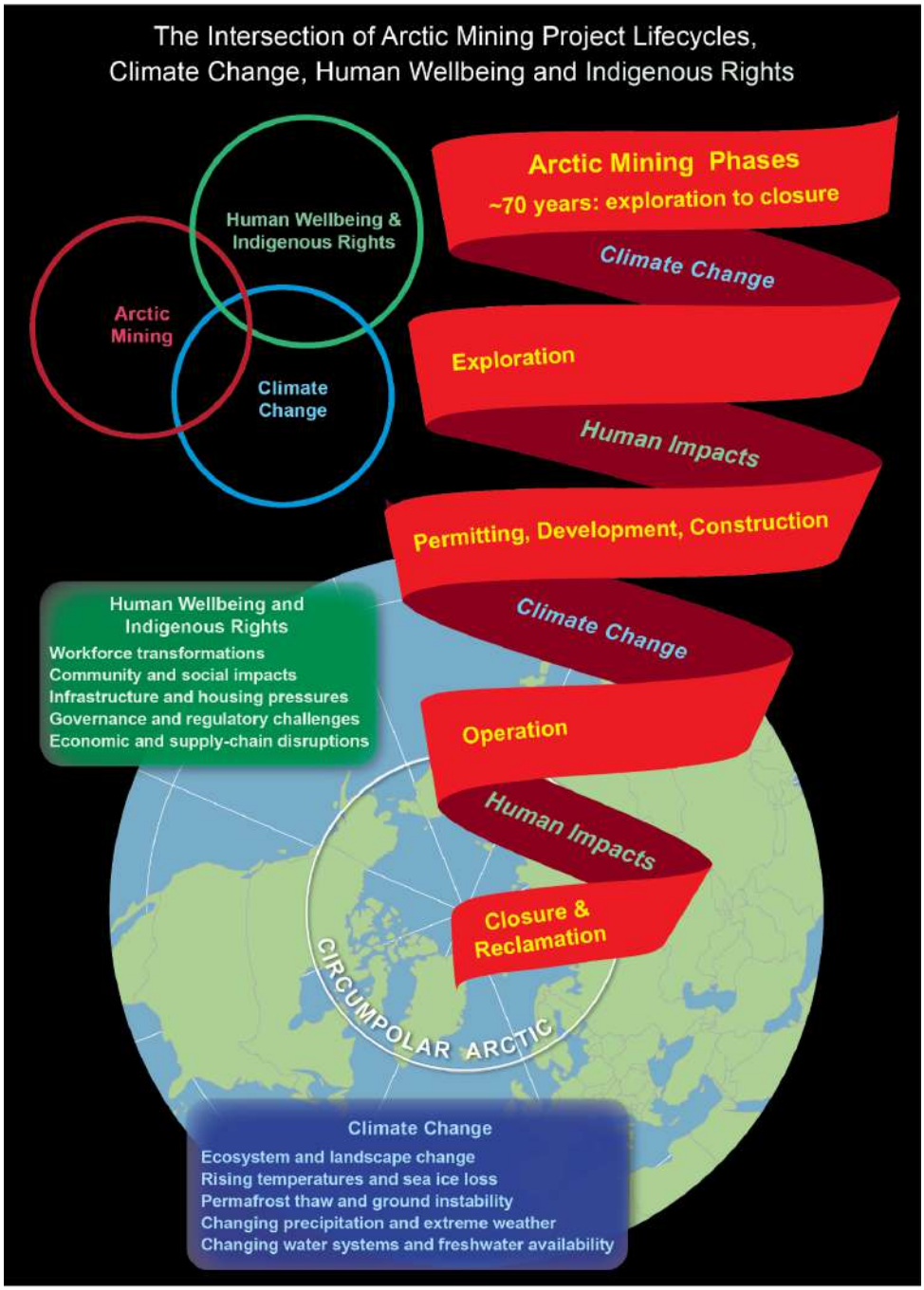

Figure 1. Conceptual illustration of the intersection between Arctic mining project lifecycles, climate change, human wellbeing, and Indigenous rights. Arctic mining projects may span several decades, from exploration through closure and reclamation, and therefore unfold within rapidly changing environmental and social conditions. Throughout the project lifecycle, climate change can directly affect mining operations through processes such as permafrost thaw, changing precipitation patterns, and sea ice loss. At the same time, mining activities may influence human wellbeing and Indigenous rights through workforce transformations, community and housing pressures, governance challenges, and broader socioeconomic disruptions.

This policy brief offers recommendations to better align mining development with the long-term priorities of Arctic communities. It emphasizes early engagement, lifecycle planning, environmental risk integration, and business model design that reduces volatility and strengthens trust. The aim is not only improved communication, but more durable, equitable, and resilient mining projects.

1. Engage Early with Local Communities and Uphold Rights

Mining operators need to understand and address potential impacts, both positive and negative, on communities and their environment. Early-stage mineral interest often triggers immediate concern within nearby communities about whether and when development will occur. Yet of all mineral showings, defined as deposits identified but not yet quantified, fewer than 1 in 10,000 ultimately become operating mines (Government of Canada 2013). Lengthy and uncertain preparation phases can amplify both hopes and fears, particularly when communities lack access to clear, trusted information.

Standardized engagement approaches frequently fail to reflect local contexts. Indigenous Peoples hold rights distinct from those of other local communities, including land and resource rights that require different decision-making processes. In Arctic regions, youth and other structurally marginalized groups often face barriers to participating in formal consultation mechanisms. Projects that undergo substantial revision or expansion may generate conflict later in the project lifecycle, even when initial permitting was successful. Gender imbalance in Arctic mining workforces can reinforce stereotypes and contribute to an unequal distribution of unpaid care and community labor and in turn restrict the pool of talent from whom mining operations recruit.

Recommendations: Invest time and resources early to build trust by maintaining a consistent presence in the community and developing an understanding of local governance, social dynamics, and communication norms. Communicate early and continuously, providing realistic assessments of project likelihood, timelines, benefits, risks, and impacts. Clearly explain how community input will be incorporated into project planning and decision-making, including how local and Indigenous Knowledge will be used. Consider differing views about land, including its role as an economic asset, a source of food and way of life, a cultural homeland, and a place of spiritual significance.

Be aware of the internal stressors that many local residents and their communities face in the struggle to protect livelihoods and their ways of life. Adapt engagement strategies to local contexts, using both formal and informal communication channels that reflect prevailing habits and internet connectivity. On Indigenous territories, follow Indigenous decision-making processes, respect land and resource rights, and engage proactively throughout the project lifecycle to continuously secure free, prior, and informed consent as required by the UN Declaration on the Rights of Indigenous Peoples (United Nations 2007, article 32).

To promote inclusion, encourage diversification beyond traditional mining labor profiles. Integrate equity considerations into project entry planning through, e.g., gender budgeting tools, to increase accountability. Consider diverse outreach and recruitment tools, ensuring inclusive imagery and language to reach under-represented talent and reduce structural inequalities across hierarchies in the mining operation. Support training and re-training pathways for local youth, women, elders, and people with disabilities.

The Kuannersuit Project: Residents of Narsaq, in southern Greenland, have waited nearly 20 years for a final decision on the Kuannersuit rare earth and uranium project located roughly 10km from town. Prolonged regulatory, political, and legal uncertainty has hindered long-term planning, property investment, business development, and household decision-making in the community, illustrating how pre-development phases can impose economic and social costs even if a mine is never built (Merrild Hansen and Johnstone 2019).

2. Develop Entry and Exit Plans Together with the Community

Mining projects are often evaluated primarily on their entry and operational phases, while closure and post-closure impacts receive limited attention until late in the project lifecycle. In Arctic contexts, the government and local community bear the risks if the exit phase is not sufficiently integrated into project design and financial planning. Rapid environmental, climatic, and social change means that assumptions considered reasonable at project entry may no longer hold over time. Failure to plan transparently for both entry and exit can undermine trust, increase long-term environmental liabilities, and create fiscal and governance risks for companies and public authorities alike.

Recommendations: Co-develop preliminary entry and exit plans with the local community and Indigenous Peoples, discussing and refining them publicly from the beginning. In some Arctic jurisdictions, these will include Impact-Benefit Agreements (IBAs) which aim to ensure that investments bring local benefits and that negative impacts are fairly compensated. These plans should be treated as living documents and revisited regularly, with clear mechanisms for incorporating community feedback and responding to changing environmental, social, and economic conditions.

Entry planning should address local social priorities, including employment, skills-development, procurement, infrastructure use, and projected community impacts and benefits, with attention to Arctic-specific constraints and opportunities. Social impact assessments should extend beyond standard socioeconomic indicators to examine effects on community well-being and essential services such as healthcare, education, public safety, and cultural life.

Exit planning should be integrated from the outset and aligned with environmental change projections, long-term land use priorities, and community development goals. These should be kept under regular review as what is considered beneficial at project entry may not be appropriate at closure. Transparent, adaptive planning reduces long-term risk and improves project resilience.

Amaroq Minerals Impact Benefit Agreement (IBA): Permits for the South Greenland gold mine hinge on a binding Impact-Benefit Agreement between the project owner, Canadian company Amaroq Ltd, the national Greenland government, and the local municipality, Kujalleq. The agreement sets targets for local employment, procurement, and skills development, including requirements for a rising share of Greenlandic workers, minimum annual investment in local training and internships, local supply chain, and culture, environment and social initiatives (Naalakkersuisut 2026). There are financial penalties for non-compliance and an option for residents to purchase a share of gold production. The agreement aims to embed workforce development and local value retention into entry conditions, reduce social risk and align benefits with community and governance goals. The IBA appears comprehensive, though its implementation has yet to be tested.

Mining in Svalbard exit plan: Norway permanently closed the coal mine at Svea and Lunckefjell and undertook one of the most ambitious Arctic mine restoration efforts to date. Infrastructure was dismantled, contaminated materials removed, and landscapes reshaped to resemble pre-industrial conditions (Ødegaard 2022). Closure was treated as a core phase of the project lifecycle, not an afterthought. The exit plan was adequately financed, technically sophisticated, and explicitly aligned with long-term environmental and governance objectives for Svalbard.

3. Integrate Expertise in Local Climate and Environmental Change

Climate change is transforming the Arctic faster than any other region on Earth. The pace of climate change impacts differs dramatically from place-to-place and across physical systems, from sea ice loss to permafrost thaw to shifts in land surface hydrology, creating uncertainty for infrastructure, investment, and community resilience, and may lead to large economic losses. For example, much of the Arctic is underlain by permafrost. As the Arctic warms, widespread permafrost thaw is already underway and the economic impacts depend on how climate change unfolds (determined in large part by future greenhouse gas emissions). In Alaska, estimated future costs associated with building and road losses vary from $37 to $51 billion (Manos, Witharana and Liljedahl 2025). Because climate change trajectories depend on international actions, the projected impacts of permafrost thaw will continue to evolve and require expertise to inform planning and risk management. Key emerging hazards with impacts on mining operations include infrastructure failure, disruption of mobility and supply, decreased water quality, and exposure to infectious diseases and contaminants (Hidayat 2026).

Recommendations: Treat climate change as a binding design constraint across the full project lifecycle. Integrate climate, permafrost, and geotechnical expertise continuously, and pair this with robust governance, inspection, and maintenance systems, recognizing that failures in the Arctic are often multi-causal. Integrate scientific expertise to project and mitigate risks from changes in permafrost, weather, snow, sea ice, glaciers, and other natural conditions through the project lifecycle, including shifts in critical ecosystem services such as freshwater availability. Projects that utilize local, site-specific environmental knowledge, including Indigenous Knowledge, are more resilient and adaptable to a changing Arctic.

Glacier Retreat and Newly Accessible Mining Areas: In Canada and Southeast Alaska, glacier retreat in the headwaters of the Taku, Stikine, and Unuk Rivers is exposing previously ice-covered terrain (Graham 2025a). As mineralized areas become accessible for exploration, melting ice is also reshaping hydrology and creating new streams and lakes that may develop into productive Pacific salmon habitat. This overlap raises governance and ecological risks, as mining expands into watersheds that are simultaneously emerging as important fisheries supporting Indigenous Peoples and cross-border economies. Climate-driven landscape change is redefining both where extraction is possible and where conservation stakes are rising.

Permafrost Thaw and Water Permitting Risk: Permafrost thaw is affecting water management and discharge permit compliance at the Red Dog Mine in northwest Alaska. As warming temperatures increase the rate of the thaw, rivers contain increasing levels of minerals hitherto stored in the permafrost. These react to turn waters orange and increase acidity, iron and toxic metals (O'Donnell et al 2024). The natural levels currently exceed the limits of Red Dog's permit for deliberate discharges (Graham 2025b). Teck, the operator of Red Dog mine, is operating under a temporary Compliance Schedule and seeking an extension while it investigates alternatives

(Alaska Department of Environmental Conservation 2026). This case underscores a broader point: climate-driven environmental change can invalidate baseline engineering assumptions over time, directly increasing compliance risk and operating costs.

4. Align Business Models with Community Time Horizons

Mining faces a fundamental timing mismatch. Commodity markets move rapidly, with prices fluctuating sharply over short periods, while communities change slowly. Building infrastructure, services, workforce capacity, and cultural resilience requires steady, predictable investment over the long-term. If local revenues track volatile mineral prices too closely, communities can become trapped in boom-and-bust cycles, characterized by overspending during price peaks and shortfalls for essential services during downturns.

Business model choices, including whether value is created primarily through raw material export or through local enrichment and processing, shape how benefits accrue and how risks are distributed. Without clear rules to manage market volatility, short-term profitability can undermine long-term community stability and erode trust.

Recommendations: Mining businesses and investors should explicitly explain how their business model responds to both short-term market shifts and long-term community needs. This includes defining how benefits will be generated, shared over time, and protected against price volatility. Clear fiscal mechanisms can decouple community well-being from market swings, ensuring predictable support during downturns while allowing communities to benefit during periods of high prices.

Minimum Annual Payments: One approach is to establish minimum annual payments that provide predictable local revenue across commodity cycles, e.g., a 'payment-in-lieu-of-taxes' or similar negotiated annual payment with local governments, complemented by profit-linked royalties. At Alaska's Red Dog Mine near Kotzebue, the operator pays royalties to the Indigenous-owned NANA Regional Corporation that owns the land under a net proceeds structure and makes recurring payments to the Northwest Arctic Borough regional government (Teck 2026). The payment is calculated as a percentage of the assessed value of land, buildings, and equipment. The most recent annual payment agreement added both a minimum floor and a cap, increasing predictability. The Borough had leverage in negotiations because, without a deal, the mining company would have had to pay a local severance tax.

5. Apply Arctic-Relevant Sustainability Reporting Standards

Mining projects are subject to a growing mix of mandatory and voluntary requirements related to social, environmental, and governance performance. Poorly coordinated reporting can overwhelm stakeholders with excessive or inconsistent information, reducing transparency rather than enhancing it. At the same time, institutional investors increasingly require credible evidence that projects comply with sustainability, climate, and human rights standards (Pacces 2021). Companies that cannot demonstrate this alignment face higher perceived risk, increased cost of capital, and reduced access to global markets.

Recommendations: Select and clearly communicate a sustainability reporting approach that is appropriate for the project considering its geographic, social, and regulatory context. Where mandatory requirements apply, such as the European Union Corporate Sustainability Due Diligence Directive (European Union 2024), these should be integrated with selected well-

recognized voluntary standards relevant to the Arctic, especially where Indigenous territories are involved.

Initiative for Responsible Mining Assurance (IRMA): The IRMA standard for responsible mining is a global standard which can be applied both to new and existing mines in the Arctic. It consists of over 400 metrics in four intertwined areas: business integrity; planning for positive legacies; social responsibility; and environmental responsibility (IRMA 2018). Companies commit, for example, to respecting UNDRIP, with emphasis on the right of Indigenous Peoples to free, prior and informed consent (FPIC) regarding projects on their territories. This explicitly includes the right of Indigenous Peoples to end negotiations on their own terms (Ibid, Chapter 2.2.2.4). Companies must also secure FPIC for changes to operations that increase impacts on Indigenous Peoples' rights and interests (ibid, Chapter 2.2).

Notes

1. Corresponding author rlj@unak.is.
2. Conceptualization, methodology, investigation, and drafting: all authors.
3. Visualisation: Rennermalm and Østergaard.
4. Review, editing and formatting: Johnstone.
5. The authors thank Michael Siegel, Rutgers, The State University of New Jersey, for developing the illustration used in this article in collaboration with Rennermalm and Østergaard. They also express their gratitude to the individuals who participated in the listening sessions and shared their insights, experiences, and perspectives.

References

Alaska Department of Environmental Conservation. (2026). *Notice of proposed reissuance of an Alaska Pollutant Discharge Elimination System (APDES), Permit No. AK0038652.* https://dec.alaska.gov/media/3dkd1hsb/ak0038652-red-dog-public-notice.pdf

European Union. (2024). *Directive (EU) 2024/1760 of the European Parliament and of the Council.* https://eur-lex.europa.eu/eli/dir/2024/1760/oj/eng

Fulbright Scholar Program. (n.d.). *Fulbright Arctic Initiative* (accessed March 17, 2026). https://fulbrightscholars.org/arctic

Gage, P., et al. (2026) "Time to Mine? Mining With and For Arctic Communities," Arctic Resource Group Policy Brief, Fulbright Arctic Initiative 2024-26, eds. Elizabeth Lynne Rink and Lill Rastad Bjørst, https://fulbrightscholars.org/sites/default/files/2026-04/Fulbright-Arctic-Policy-Brief-2026.pdf

Government of Canada. (2013). *Exploration and mining guide for Aboriginal communities.* https://natural-resources.canada.ca/sites/nrcan/files/mineralsmetals/files/pdf/abor-auto/mining-guide-eng.pdf

Graham, M. (2025a, May 21). *Who will benefit from melting glaciers?* Grist. https://grist.org/indigenous/melting-glacier-alaska-canada-bc-mining-salmon-territory/

Graham, M. (2025b, December 2). *Thawing permafrost is causing trouble for the Red Dog mine: Solutions could be costly*. Northern Journal. https://www.northernjournal.com/thawing-permafrost-is-causing-trouble-for-the-red-dog-mine-solutions-could-be-costly/

Hidayat, M. (2026, March 20). *Arctic mining permafrost infrastructure challenges: Arctic mining infrastructure under siege – The hidden engineering crisis reshaping northern operations*. Discovery Alert. https://discoveryalert.com.au/arctic-mining-infrastructure-engineering-crisis-2026

IRMA. Initiative for Responsible Mining Assurance. (2018). *IRMA Standard for Responsible Mining (Version 1.0)*. https://responsiblemining.net/wp-content/uploads/2018/07/IRMA-Standard-for-Responsible-Mining-v1.0-EN.pdf

Manos, E., Witharana, C., & Liljedahl, A. K. (2025). Permafrost thaw-related infrastructure damage costs in Alaska are projected to double under medium and high emission scenarios. *Communications Earth & Environment, 6*, 221. https://doi.org/10.1038/s43247-025-02191-7

Merrild Hansen, A., & Johnstone, R. L. (2019). In the shadow of the mountain: Assessing early impacts on community development from two mining prospects in South Greenland. *The Extractive Industries and Society,* 6(2). https://doi.org/10.1016/j.exis.2019.01.012

Middleton, A., et al. (2026) "Transdisciplinary Intelligence for Sustainable Arctic Mining." *Arctic Yearbook 2026*.

Naalakkersuisut. (2026, January 7). *Aftale om samfundsmæssig bæredygtighed indgået mellem Naalakkersuisut, Kommune Kujalleq og Nalunaq A/S*. https://naalakkersuisut.gl/Nyheder/2026/01/0701_IBA?sc_lang=da

O'Donnell, J. A., Carey, M. P., Koch, J. C., et al. (2024). Metal mobilization from thawing permafrost to aquatic ecosystems is driving rusting of Arctic streams. *Communications Earth & Environment, 5*, 268. https://doi.org/10.1038/s43247-024-01446-z

Pacces, A. M. (2021). *Will the EU taxonomy regulation foster sustainable corporate governance? Sustainability, 13*(21), 12316. https://doi.org/10.3390/su132112316

Teck. (2026, January 30). *Northwest Arctic Borough & Red Dog reach renewed tax payment agreement* [Local news release]. https://www.teck.com/media/RDO-PILT-Agreement-News-Release-Jan-30-2026.pdf

United Nations. (2007). *United Nations Declaration on the Rights of Indigenous Peoples* (UN General Assembly Resolution 61/295). Article 32.

Ødegaard, C. V. (2022). Returning to nature: Post-carbon utopias in Svalbard, Norway. *Social Analysis: The International Journal of Anthropology, 66*(2), 1–22.