
Revitalising Arctic Council Cooperation: Permafrost Thaw and the Wider Climate Challenge

The climate challenge is reshaping the Arctic more rapidly than current governance frameworks can absorb, and permafrost thaw is one of its most urgent, fast-moving expressions, testing infrastructure, ecosystems, and community well-being across the circumpolar North. As the Arctic Council marks its 30th anniversary, engagement remains constrained by wider geopolitical tensions, even as the scientific case for coordinated action grows more urgent. A focused agenda on climate and permafrost thaw offers a pragmatic path to rebuild trust and deliver tangible impact.

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2026 marks the Arctic Council's 30th anniversary, and the Kingdom of Denmark is midway through its 2025-2027 chairship, making this a timely moment to take stock of what the Council can deliver. With cooperation still limited by the wider geopolitical divide, but gradually resuming in a few areas, the Council, its member states and permanent participants can achieve real impact by focusing on the wider climate challenge, of which permafrost thaw is a leading example.

Building on the precedent set by the Council's [Wildland Fire Initiative](#) – the first new project launched after cooperation was disrupted by Russia's 2022 invasion of Ukraine – a similarly focused effort on permafrost and climate resilience could catalyse renewed engagement among all Arctic states and the Council's permanent participants. Advancing a focused agenda on these fronts – ranging from the climate-human security nexus to infrastructure and carbon risks linked to permafrost thaw – would allow the Council to reaffirm its mandate while simultaneously mitigating urgent Arctic-related risks.

A first avenue: the climate-human security nexus

A first avenue for renewed engagement could be that of advancing work on the climate-human security nexus in the Arctic – a framing centred on

climate-related impacts on people, livelihoods and relations between states rather than traditional hard security, which remains outside the Council's mandate. As environmental transformations reshape access to resources, infrastructure stability, and strategic mobility, the climate challenge is increasingly acting as a threat multiplier that intensifies geopolitical competition and poses an urgent human security risk at the national, European, and global levels. An [ongoing assessment of the societal implications of Arctic climate change](#), which is due to feed into the next assessment cycle of the Intergovernmental Panel on Climate Change, already provides much of the evidence base here, so the Council's role would be to help focus political-level attention on this assessment rather than to commission it afresh.

To support this broader understanding of climate-related risks, the Council could also consider using the [Planetary Boundaries framework](#) as an analytical lens. By situating Arctic change within wider Earth-system processes, this framework helps illustrate how environmental pressures on climate, biodiversity, freshwater, and ecosystems can ultimately affect human well-being, livelihoods, and regional stability. The concept may also have political value, because it is not among the terms that some countries have become increasingly reluctant to use in international climate-related

discussions. These cross-cutting risks call for enhanced early-warning capacities, stronger risk assessments of infrastructure and environmental challenges, and a neutral platform for dialogue on shared risks. This would not constitute a move into traditional security domains, which remain outside the Council's mandate, but could play a stronger role in providing the scientific basis and dialogue platforms to inform policy.

A second avenue: permafrost thaw

The Arctic is warming three to four times faster than the global average, and permafrost thaw is its most visible and rapidly developing expression: thawing ground is destabilising homes, transport corridors and infrastructure across the circumpolar North, compounded by the continued absence of harmonised, circum-Arctic data, which limits risk assessment. Three examples illustrate the challenge.

The first is that of infrastructure. Several peer-reviewed studies estimate that a significant share of circumpolar infrastructure – potentially [30-50% by 2050 under high-emissions scenarios](#) – could be at risk, with repair and adaptation costs estimated at [USD 37-51 billion in Alaska alone](#) and up to [USD 276 billion in the Arctic as a whole by 2050](#). These figures may be debated, given infrastructure's normal replacement cycle, but the literature is clear: designing for a warming Arctic carries real growing costs. Structural gaps compound the problem: [up to 47% of buildings are missing from widely used datasets such as OpenStreetMap](#), which leads to the underestimating of risk, and permafrost thaw is not consistently recognised as a natural hazard in national frameworks, limiting access to disaster relief and adaptation funding.

The second example is that of carbon and climate feedbacks. The Arctic land surface is now close to being balanced as a carbon sink or source, and is trending towards becoming a net source of greenhouse gases, as [rising methane and nitrous oxide emissions](#) from newly waterlogged, thawing landscapes increasingly offset its historic cooling effect. This is a self-reinforcing feedback loop: thawing landscapes subside into wetlands and thermokarst lakes where methane production dominates – and methane's warming impact is roughly [80 times greater than CO₂ over 20 years](#). Recent modelling suggests that [permafrost regions may continue to lose carbon for decades](#), even under net-zero scenarios, implying a degree of irreversibility. Much of this evidence base is already being built through [an existing assessment of how](#)

[vegetation and hydrology shape permafrost emissions](#), with a fuller synthesis due next year. The Arctic Council's task is to translate these findings into coordinated monitoring and national risk frameworks, not to duplicate the science.

The third example is contamination and health. Thawing permafrost is mobilising long-stored mercury into Arctic waterways: the Northern Hemisphere permafrost zone holds an [estimated 1,656 gigagrams of mercury](#) – nearly twice the amount found in all other soils, oceans, and the atmosphere combined – with [measurable increases already detected in rivers such as the Yukon and roughly 15 million gallons of mercury being transported into the Arctic Ocean each year](#). Although much of the monitoring and assessment work already exists – including an [existing Arctic mercury assessment](#) and an [interactive tracker of Arctic mercury trends](#) – the more open and important task is that of carrying this evidence into regulatory follow-through, including through the [Minamata Convention](#). Also, a related and only recently documented phenomenon is the abrupt acidification of headwater streams in sulfide-bearing Yukon and Mackenzie basin bedrock, mobilising toxic metal concentrations and accelerating CO₂ release (which is a further link to the carbon feedbacks discussed above). First documented in a [2026 study in Science](#), the phenomenon has so far been confirmed in these two river basins. Whether and how far it extends to other sulfide-bearing permafrost regions and what it means for downstream ecosystems beyond the headwaters remain open questions.

Given the above, the Arctic Council could further strengthen its work by considering the establishment of a dedicated permafrost initiative structured around the three priority areas outlined above: (a) infrastructure and cost assessment; (b) carbon emissions and climate feedbacks; and (c) contamination and health. For infrastructure, this means closing the building and asset-mapping gaps identified above. For carbon and contamination, harmonised monitoring already exists within the Council's own [working groups](#). The more pressing task is that of integrating this evidence into national risk frameworks and international regulatory processes, where there is a governance gap rather than a lack of data. This builds on existing working and expert groups, reinforcing the Council's coordination role.

Conclusion

Together, these two themes – the climate-human security nexus and permafrost thaw – offer the Arctic Council a pragmatic path for strengthening cooperation and addressing trends that threaten both the region and the planet as a whole. By anchoring cooperation in rigorous science, reliable data, and shared governance, the Council's leadership can help rebuild trust and reaffirm its role in safeguarding the Arctic at a moment of profound change. With Denmark's chairship running through 2027, this agenda could also help shape the incoming Swedish chairship.