

PERMAFROST PATHWAYS

A New Era for Permafrost Science-Policy Interfaces

Opportunities for Integrating Permafrost Carbon Science into Climate Governance & Decision-making

Policy Access Points at Every Level of Arctic Governance

THE PERMAFROST POLICY PROBLEM. The best available science confirms that the Arctic is warming three to four times faster than the rest of the world, but due to complex geopolitical dynamics and conflicting national priorities, the most serious consequences and drivers of environmental change in the region remain unresolved. Permafrost thaw represents one of the detrimental impacts of a warming Arctic; this once-frozen soil underlies 15% of the global exposed land surface in the Northern Hemisphere (and roughly 85% of the Alaska land area). As it thaws, permafrost has the potential to destabilize local ecosystems, causing major damage to critical infrastructure, permanently altering the natural landscape, and contributing to greenhouse gas emissions at an unprecedented rate. Nevertheless, permafrost remains nearly absent from legal and policy frameworks. Due to scientific uncertainty and lack of meaningful circumpolar cooperation, government decision-makers are not adequately addressing permafrost thaw as a major threat to climate mitigation and adaptation, and as such, are failing to adequately protect human health, economic resilience, and fundamental rights of Indigenous and Arctic communities.

RECOGNITION, COORDINATION, AND RESPONSE. Every stage of the policy-making process (agenda setting, formulation, decision-making, implementation, and evaluation) provides an opportunity for scientists to inform key policy outcomes. To facilitate more constructive exchanges between the scientific and policy arenas, governing entities in the Arctic are increasingly creating formal access points for science-policy integration. Science-Policy Interfaces (SPIs) are formal mechanisms that are intended to bring together scientific experts and government decision-makers to support the development of science-informed policy solutions. These interfaces exist at various levels of governance, e.g. the Intergovernmental Panel on Climate Change (IPCC), is widely regarded as one of the most visible and effective SPIs in global climate governance. Unfortunately, formal SPIs have not always afforded the greatest attention or access to Arctic experts or equitably included Indigenous Knowledge; as the impacts of climate change in the Arctic become more severe, however, it is necessary to respond to these critiques and to support more robust and meaningful participation of Western-trained scientists, Arctic Indigenous knowledge-holders, and policy collaborators in Arctic governance.



Science-Informed Adaptation and Mitigation Policy

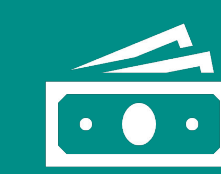
Bridging the Science-Policy Gap via Permafrost Pathways

Efforts to improve 'on the ground' monitoring frameworks and enhance support for community and Indigenous-led monitoring of permafrost thaw will help to inform adaptation decisions and to facilitate the inclusion of permafrost emissions in national GHG emission reduction commitments. Greater representation of permafrost thaw processes in Earth System Models will help to improve carbon budgets and direct policy advocacy in the US and globally.



Consultation with select partner communities in the US-Arctic provides direction for strategic policy changes to national and sub-national adaptation and disaster response policies that do not currently account for slow-onset hazards; collaboration with other Arctic researchers, policy experts, and Indigenous communities is helping to set goals for broader climate policy change at the pan-Arctic and international levels.

Priority Action Areas & Policy Tactics for Permafrost Scientists Engaged in SPIs



FUNDS FOR MONITORING, MODELING, MEASUREMENT, AND NEW RESEARCH

Leveraging annual government appropriations, organizational budget reviews, and building public-private partnerships can support a much-needed influx in funding for grant programs and spending that will expand permafrost monitoring, modeling, and data collection efforts. US federal grants from NSF, USDA, US ACE, FEMA, FWS and others, are currently supporting efforts to conduct permafrost risk-assessments, community adaptation planning, and boreal wildfire management, but are severely underfunded.



TECHNICAL ASSISTANCE FOR IMPACT ASSESSMENTS, HAZARD MITIGATION, AND RISK REDUCTION

State, national, and pan-Arctic entities are leading hazard mitigation planning and resilience projects for the most environmentally-threatened Arctic communities. There is still limited technical expertise and capacity amongst these organizations and government agencies. Independent researchers and experts can fill knowledge and implementation gaps via *ad hoc* and informal consultation and by responding to formal requests for public comment, technical inputs, and information.



GUIDELINES FOR CO-PRODUCED, COORDINATED, AND COMMUNITY-LED RESEARCH

Existing communities of practice and SPIs should prioritize the development of a methodology to better assess risk from compounding and slow-onset environmental hazards (including permafrost thaw, erosion, flooding, and "Usteq"). Governing entities at all levels would also benefit from setting a clear definition of and standardized approaches to co-production with Arctic Indigenous communities. SPIs provide a space for this clarification by drawing upon diverse expertise of and perspectives on permafrost thaw, boreal wildfires, and other Arctic-specific hazards.



VISIBILITY FOR ARCTIC CHALLENGES, INNOVATION, AND COOPERATION

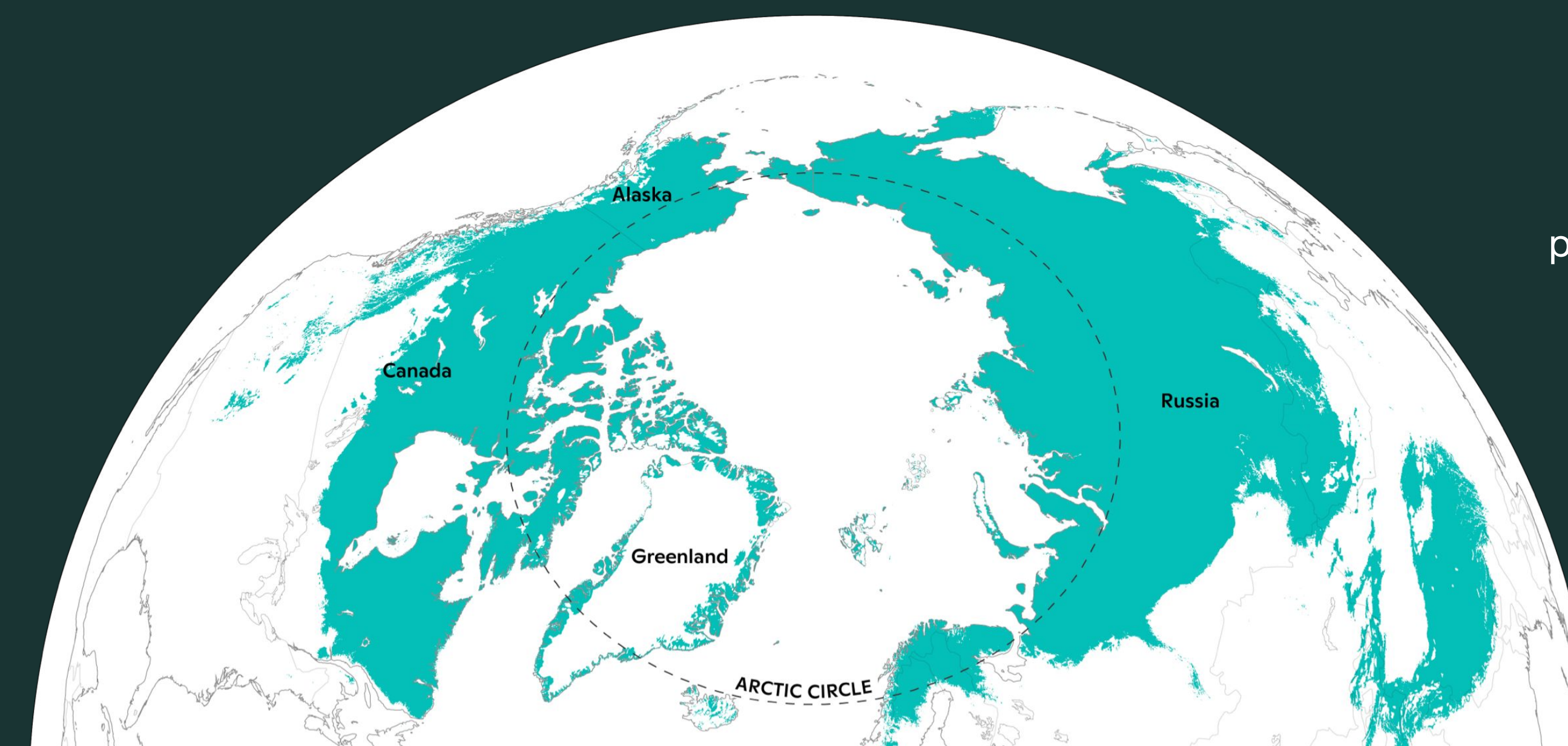
There remains insufficient attention to permafrost thaw processes and impacts in global climate dialogues, including in the context of loss and damage, adaptation, and emission reductions. Increasing research on permafrost thaw within the IPCC; participating in Arctic Council working groups; calling for the operationalization of the 2017 Arctic Science Cooperation Agreement (negotiated at the Arctic Council); and contributing to the implementation of national Arctic-focused initiatives, including through the US IARPC, will help to catalyze permafrost-relevant policy responses.

ABOUT PERMAFROST PATHWAYS

Permafrost Pathways was launched in 2022 with funding through the TED Audacious Project—a collaborative funding initiative catalyzing big, bold solutions to the world's most urgent challenges. Through a joint effort of Woodwell Climate Research Center, the Arctic Initiative at Harvard Kennedy School, the Alaska Institute for Justice, and the Alaska Native Science Commission, Permafrost Pathways harnesses the combined expertise of leading research institutions and on-the-ground organizations specializing in climate science, policy, and environmental justice to inform and develop adaptation and mitigation strategies to address permafrost thaw.

GLOBAL PERMAFROST EXTENT

The shaded area shows the current extent of permafrost. Scan the QR code to see how much permafrost is expected to remain this century under different warming scenarios and to learn how Permafrost Pathways' is helping to inform responsive solutions.



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