THE ARCTIC SEA ICE

RESTORATION RESEARCH FUND

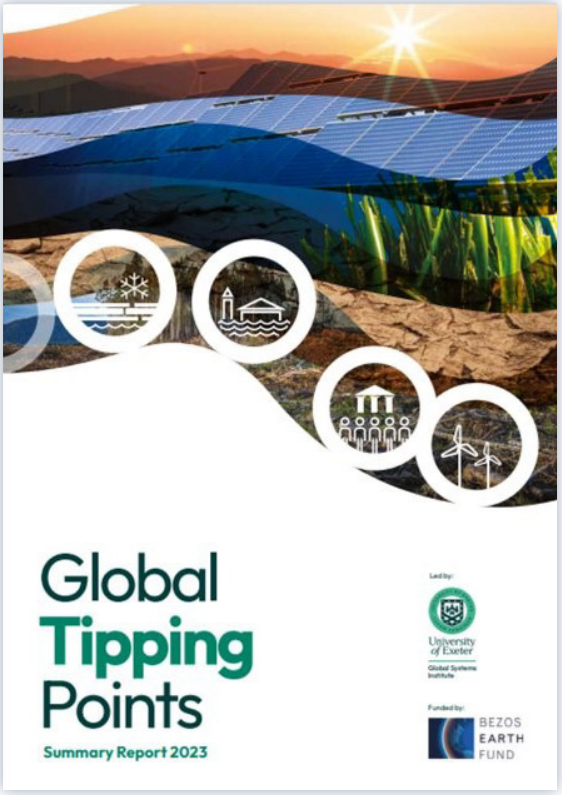
OCEAN VISIONS

Rationale

Climate disruption poses an unprecedented threat to nature and civilization, demanding multifaceted responses that encompass rapid and deep reduction of greenhouse gas emissions, massive clean-up of greenhouse gas legacy pollution, large-scale societal adaptation, and ever-more likely, intervention tools to forestall or avoid dangerous tipping points and ecosystem loss.

A report on Global Tipping Points published in 2023 led by the University of Exeter with support of more than 200 researchers from over 90 organizations in 26 countries, opens with these sentences:

"Harmful tipping points in the natural world pose some of the gravest threats faced by humanity. Their triggering will severely damage our planet's life-support systems and threaten the stability of our societies."

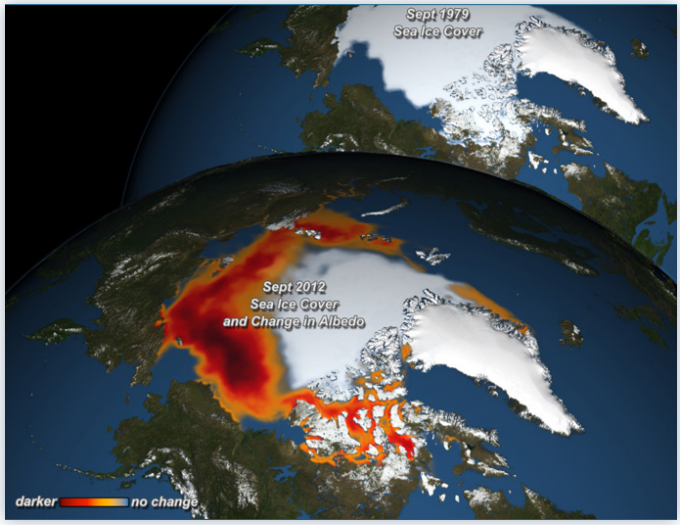


The Arctic contains a high number of these planetary tipping points, including the Greenland ice sheet, permafrost, boreal forests, and critical ocean circulation systems. Arctic sea ice, while not always identified as a tipping point, is in many ways the lynchpin to slowing or even avoiding many of these tipping points because of its direct connection to overall temperatures in the Arctic.

Ice is highly reflective, and it reflects a substantial portion of incoming solar radiation back into space. As sea ice shrinks, darker ocean surfaces are exposed, and they absorb more solar energy and heat up more rapidly. This leads to a cycle of more ice melt and further warming—known as a positive feedback loop. As a result, temperature is increasing 4 times higher in the Arctic than the global average, a phenomenon known as "Arctic amplification."

Arctic sea ice is one of the fastest changing systems on the planet due to anthropogenic climate change. At current rates of loss, summer sea ice is expected to disappear as early as 2035 for all emissions reductions scenarios. This rapid warming in the Arctic puts critical global tipping elements at risk.

The Arctic has been a critical pillar in the Earth's climate system. Keeping it frozen is vital for maintaining global climate stability, protecting ecosystems, and preventing far-reaching impacts on human societies.



Is Prolonging Arctic Sea Ice Possible?

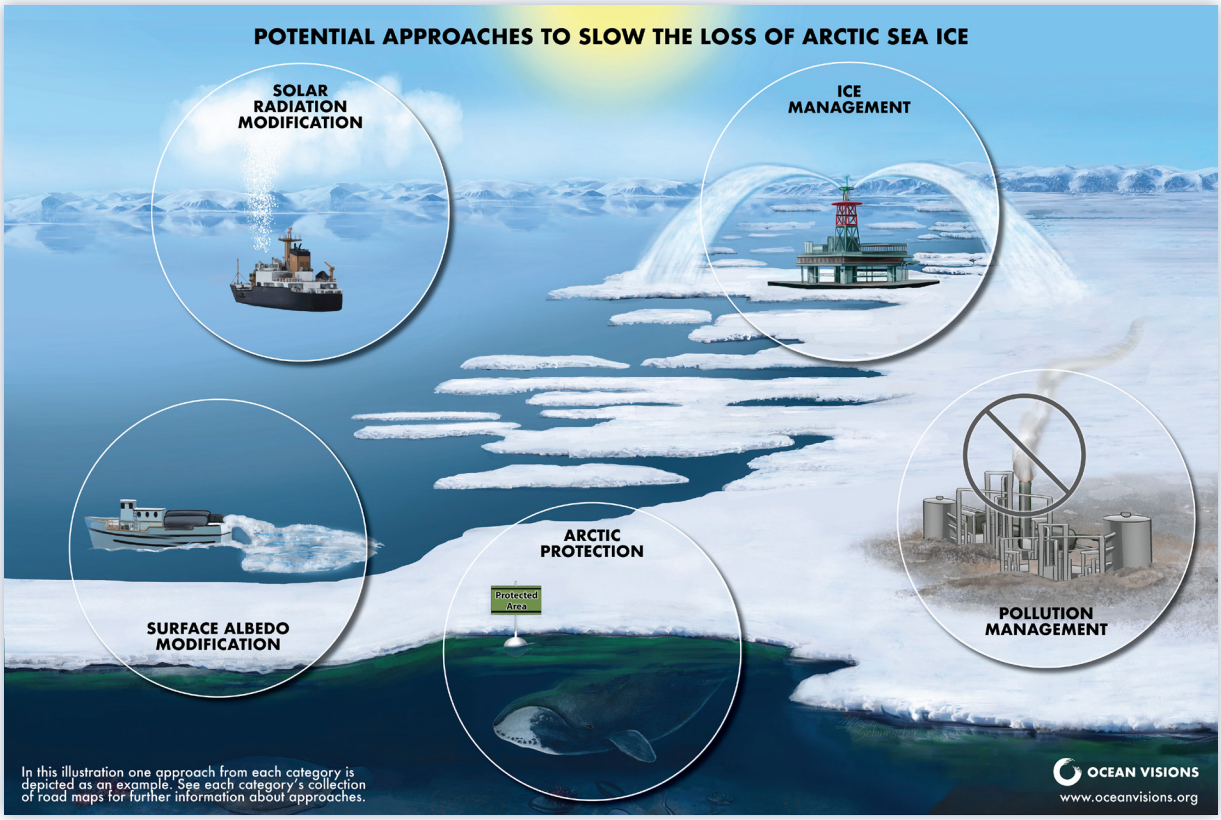
At this point, there is no guarantee that reducing emissions of greenhouse gases coupled with clean-up of legacy CO_2 pollution can happen in time to bring down the planet's temperature enough to avoid the further loss of Arctic sea ice and associated Arctic tipping points.

Because of the risks associated with that further loss, Ocean Visions—in partnership with an international, multidisciplinary team of experts spanning climate and earth science, governance, and Arctic issues—spent over a year identifying and assessing a range of potential approaches to slow or reverse Arctic sea ice loss.

This "road map" reviewed 21 potential approaches which can be grouped in five main categories: Arctic Protection; Pollution Management; Ice Management; Surface Albedo Modification; and Solar Radiation Modification. The map synthesizes the best available science on each technique and assesses each on parameters such as technology readiness level, potential impact on temperature and sea ice, scalability, costs, socio-ecological co-benefits and risks, and governance considerations, among others. The road map identifies existing knowledge gaps and **first-order priorities**—the most important next set of actions needed to further advance our understanding of each approach.

To move forward with responsible exploration of the most promising approaches, Ocean Visions is creating the Arctic Sea Ice Restoration Research Fund ("Fund").

The Fund will pool resources from donors to provide critical financial support necessary for the research needed to increase societal knowledge of these potential options. The Fund will operate with high transparency and robust governance, as laid out below. It will support only scientifically rigorous research that is conducted transparently, with information sharing, and a clear line of sight to related issues, such as governance, equity, risks, and justice.



Objectives of Arctic Sea Ice Restoration Research Fund

THE OBJECTIVES OF THE FUND ARE TO:

Support high-quality research, development, and demonstration (as appropriate) efforts on the highest potential approaches identified in the Ocean Visions Sea Ice Road map, especially those areas not supported by current public or philanthropic means of support.

Deepen collective understanding of these techniques and their potential benefits, risks, costs, applications, unintended consequences, and others.

Encourage multidisciplinary research teams that encompass ice and climate science, Arctic and ocean ecology, modeling, engineering, social sciences, and governance.

Create a credible space for inquiry and community review and discussion of results in this highly sensitive area of work.

Promote transparency around Arctic sea ice research via open data sharing to build broader public trust.

Governance of the Fund

The fund will be governed by Ocean Visions, a non-profit organization whose mission is to catalyze innovation at the intersection of the ocean and climate crises. Ocean Visions has a multisectoral Network of partners made up of leading research institutions, the private sector, and public-interest organizations, who work together to fully explore and advance responsible and effective ocean-based climate solutions. Ocean Visions is led by a CEO and governed by a Board of Directors who would have ultimate authority and fiduciary responsibility for the Fund. An Executive Management Team will be established inside Ocean Visions to lead the Fund.

Additionally, the Fund will have a multi-tiered governance structure that would prioritize integrity, inclusivity, and scientific excellence, ensuring that research is conducted responsibly. Key elements would include:

International Advisory Board

→ This Board will be composed of 7–11 experts from various geographies, cultures, and fields, including Arctic and climate science, ecology, engineering, environmental ethics, and public policy. The board would guide the strategic direction of the fund, evaluate, and help determine the most critical research priorities, and ensure the upholding of ethical standards.

Independent Review Committee

→ This multidisciplinary, multi-sectoral committee will assist in reviewing grant applications, with an eye to ensuring that funded research is the most effective path to answers and is consistent with the best available scientific knowledge and standards.

Stakeholder Forum

→ We will create an additional structure to enable engagement with diverse stakeholders such as NGOs, community representatives, and policymakers. This Forum will help to facilitate dialogue, transparency, and information flow. The Forum would be one framework to get feedback on directions and priorities and help to ensure engagement of the interested publics.

Funding Sources

The Fund will be sourced from a mix of contributions from foundations, family offices, government, international organizations, and private sector donations. No support will be accepted from any company engaged in oil and gas or any other fossil fuel operations. Clear guidelines will be established to prevent any conflicts of interest that could compromise research integrity or the credibility of the Fund itself.

Grant-Making Process

The Fund will operate via generation of requests for proposals (RFPs) targeted to specific high-potential research areas identified in the map, with funding rounds calibrated to the income of the Fund and the desire to move money quickly into the field.

The Fund will likely use a tiered grant-making system to support projects of varying scales and timelines:

Research and Development Grants

→ This tier would provide mid-level funding for early-stage research projects to quickly determine whether an approach can pass first principles reviews, and has the possibility of being technically, economically, and/or socially feasible at a scale that would make a difference. Also in this category are more comprehensive research and development projects that would include specific tests of technologies at smaller scales to develop evidence on their performance. These grants would be between $100,000 and $1,000,000, with a duration of one-three years.

Demonstration Grants

→ Larger funding opportunities (up to $3 million) would be made available for scaled field trials as appropriate, likely managed by multi-institutional, interdisciplinary research collaborations, and potentially with matching requirements as appropriate. These larger grants would be aimed at further developing the direct evidence needed for societal consideration of further use or abandonment of the tested approaches.

Application Process

Requests for Proposals

→ RFPs would be issued 1-2 times a year, focusing on priority research areas identified by the Advisory Board and dependent on Fund resources.

Initial Screening

→ Members of the Advisory Board and other recruited technical experts would conduct a preliminary review to ensure alignment with the fund's goals and criteria.

Expert Review

→ Applications that pass the initial screening would undergo a more rigorous review process by the Independent Review Committee, involving experts in climate science, social impact assessment, and engineering, among others.

Selection Criteria and Decision-Making

Each RFP will lay out in detail the purpose of the Funding Round and the specific details of what is sought. All proposals would be evaluated based on the parameters identified in the RFP. In addition, all funding rounds would include focus on the following criteria:

Scientific Merit

→ The quality and innovativeness of the research design and methodology, its likelihood of producing information that can clearly inform next steps, and its support by the best available science.

Interdisciplinary Approach

→ Research proposals would have to demonstrate a clear understanding of ecological, social, and ethical dimensions, with some plan to address them, alongside the technical details of the research.

Feasibility and Risk Assessment

→ All proposals would be evaluated for the risks the proposed research might pose to people and nature, and how they would mitigate those risks; the stage gates that field-based projects will use to continue or halt research, and the threshold triggers that would cause a research project to terminate.

Decision-Making Body

Final recommendations on awards would go from the Advisory Board to the Executive Management Team for final action. The decision-making process would prioritize transparency, with publicly accessible summaries of discussion points and rationales for all funding decisions.

Monitoring and Accountability

A robust monitoring and evaluation framework will be established to ensure that projects are completed on time and meet predetermined goals. This will include at a minimum:

Progress Reports

→ Biannual progress reports from grantees.

Site Visits and Audits

→ Periodic reviews by Fund representatives to validate data and progress.

Impact Assessments

→ Evaluation of completed projects for their scientific contributions and policy implications, using independent external reviewers; monitoring and evaluation of research projects against pre-listed stage gates and stop triggers.

Conclusion

The Arctic Sea Ice Restoration Research Fund will fill a void in the international arena on climate intervention research related to Arctic sea ice. At the moment, there is very little money available for this sort of research from traditional government or other science funding sources. By catalyzing and enabling rigorous and transparent research, fostering interdisciplinary collaboration, and engaging the public and stakeholders, the Fund will contribute to an informed and responsible exploration of Arctic Sea Ice restoration, and in doing so, fill a critical gap in the current global response to the climate crisis.

FOR FURTHER INFORMATION, contact Ocean Visions CEO Brad Ack: brad@oceanvisions.org