

# First-ever assessment of pathways to slow Arctic sea ice loss identifies potential mitigation approaches

*Ocean Visions' digital road map designed to mobilize efforts to advance collective knowledge*

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EINPresswire.com/ -- The loss of Arctic summer sea ice is one of the most alarming indicators of climate change. As global temperatures rise due to increasing greenhouse gas concentrations in our atmosphere, the Arctic region has been warming three to four times faster than the global average. One of the most visible impacts has been a significant loss of summer sea ice each year,

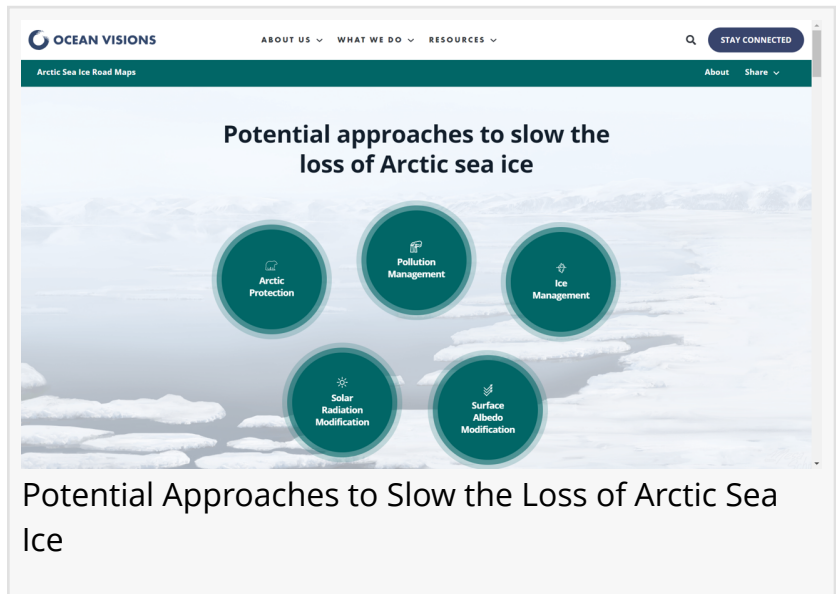
which results in more heat being trapped in the Arctic Ocean rather than reflecting back into space. This accelerated warming is causing profound impacts to the Arctic, its ecosystems and people, the ocean, and the global climate system. At current rates of loss, summer sea ice is expected to disappear as early as 2035.

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*Ocean Visions CEO Brad Ack*

“Given current and projected levels of greenhouse gas pollution, even in the best scenario of emissions reductions we risk levels of Arctic sea ice loss that will exacerbate changes in other parts of the Arctic, like permafrost, that could fuel even more warming,” said Ocean Visions Senior Program Officer Dr. Kerry Nickols. “This reality underscores the need to carefully and collaboratively investigate all potential options to slow further loss of Arctic sea ice while we continue to decarbonize.”



The UN General Assembly recently adopted a resolution proclaiming 2025-2034 as the Decade of

Action for Cryospheric Sciences. Some scientists and engineers have started to research pathways to try to slow down sea ice loss but much more effort and investment is needed. In this context, Ocean Visions – in partnership with an [international, multidisciplinary team of experts](#) spanning climate and earth science, governance, and Arctic issues – has published a [first-ever comprehensive assessment](#) of potential pathways to slow or reverse Arctic sea ice loss.

The Arctic Sea Ice [Road Map](#) reviews 21 different approaches in five main categories of action: Arctic Protection; Pollution Management; Ice Management; Surface Albedo Modification; and Solar Radiation Modification. The map synthesizes and summarizes the available information on all potential pathways, categorizes approaches by their application (regionally versus globally), their potential impact, reversibility, potential costs, and governance and justice considerations, and spotlights the highest priorities for additional research.

The road map reinforces the importance of accelerating and scaling up investment into must-have actions – including global greenhouse gas emissions reductions, especially methane, carbon dioxide removal, and reducing localized black carbon emissions caused by shipping and wildland fires.

However, recognizing that the current pace of progress in these areas will likely not be enough to prevent continuing loss of Arctic sea ice, the road map points to a number of additional pathways that merit investment in further research to fill knowledge gaps about impacts, risks, and feasibility.

The mapping process uncovered at least 15 approaches that could move to demonstration scale or beyond in the next ten years, a crucial window for action to prevent full loss of summer sea ice. Some of the approaches, such as methane abatement, are already mature, but require rapid and accelerated investment to scale. Others, such as ice thickening, are not yet mature and are prime targets for accelerated research and development to understand their potential.

The assessment found that about half of the approaches could have either Arctic-specific and/or global cooling effects. Some, such as stratospheric aerosol injection, could offer up to two degrees Celsius of Arctic cooling and over one degree Celsius of global cooling, depending on the deployment scenario. Many estimates are highly uncertain, and information on temperature impacts is so far non-existent for about half of the pathways. The mapping process also reviewed the evidence about the ease of reversibility and risk of termination shock for the approaches. For example, atmospheric methane removal was classified as an irreversible approach with a low risk of termination shock.

The various comparisons in the assessment show that each approach has potential strengths and weaknesses. For example, some of the forms of surface albedo modification concentrate their impacts at the local scale. Others, such as forms of solar radiation management, diffuse their impacts regionally or globally. The map offers some preliminary answers to questions about tradeoffs between the set of approaches and a course of action to answer the questions

that remain.

Importantly, across most of the approaches there are substantial knowledge gaps concerning governance and justice that must be front and center in any work to increase understanding and foster inclusive decision-making.

“The loss of Arctic sea ice is an inflection point in our collective work to maintain stability in our global climate system. Some of the options we highlight in the map are ‘no-regrets’ and should be scaled up vigorously, such as methane and black carbon abatement,” said Ocean Visions CEO Brad Ack. “Others, however, are much less well understood. Given the current and future risks to people and nature from loss of sea ice, it is both urgent that we redouble global efforts to phase out greenhouse gas emissions, and prudent that we increase our exploration at the same time of complementary ways to protect and restore Arctic sea ice.”

Shuchi Talati, Ph.D., of the Alliance for Just Deliberation on Solar Geoengineering, USA who served as an Advisor on the development of the road map added, "We are excited to see the fruition of deep research and consultations, culminating in this invaluable resource. A publicly accessible, comprehensive assessment of the pathways to slow Arctic sea ice loss and the gaps that remain will be invaluable to communities, governments, and scientists. I hope this information will help decision-makers around the world to understand the science, governance, and justice elements around these approaches and engage in thoughtful deliberation."

#### ABOUT OCEAN VISIONS

Ocean Visions is a non-profit organization that catalyzes innovation at the intersection of the ocean and climate crises. We facilitate multisector collaborations from within our Network and beyond, working with leading research institutions, the private sector, and public-interest organizations to fully explore and advance responsible and effective ocean-based climate solutions. In short, we work to stabilize the climate and restore ocean health. To learn more, visit [www.oceanvisions.org](http://www.oceanvisions.org) or follow @Ocean\_Visions on X.

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