Nunavut Research Institute

License Holder Reporting requirements

For research undertaken in the 2026 calendar year (commencing January 01, 2026 and ending December 31, 2026)

Project Title:

Real Ice - Field Research in Cambridge Bay, Canada.

Project Leader(s): Full name, affiliation, and contact information (address, phone number, email) of each project leader (principle investigator and co-investigators)

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Project Team: Full name, affiliation, and address (name of city/community and province/territory/state) of each member of the project team

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Abstract: A concise summary of what was done, found, and concluded to date, and how the results/information will be used. This summary must be translated into the appropriate dialect of Inuktut. Suggested length: 250-300 words. ***This section will be published in the NRI's annual compendium of licensed research and made available through the Isirvik research portal**

English

During the 2026 reporting period, the Arctic sea ice preservation project completed its 3rd winter field campaign and subsequent spring-to-summer melt monitoring in Cambridge Bay, Nunavut, operating on a 1 km² landfast ice site in partnership with the Ekaluktutiak Hunters & Trappers Organisation (EHTO). The campaign tested localised seawater flooding to accelerate winter ice growth and preserve ice cover.

Flooding operations were conducted between January 11 and March 15, 2026, utilising submersible electric pumps powered by batteries to saturate and freeze insulating snow into conductive snow-ice. Ice growth was accelerated by removing the insulating snow layer, allowing frigid air to cool the entire ice stack. By mid-May 2026, re-iced zones achieved a winter thickness of 204–212 cm, compared to 146–160 cm in untreated control areas, representing a net thickness gain of +44 to +66 cm (average 50cm). Satellite observations between May 15 and June 29, 2026 confirmed that the treated zones maintained enhanced surface brightness (albedo) and thicker ice cover as the surrounding untreated bay ice declined and broke up.

In March 2026, the peer-reviewed results of the prior year's research campaign (winter 2024/5) were published in Earth's Future, documenting ~32 cm of winter thickening and a 20% to 40% reduction in spring melt rates, alongside successful melt pond drainage via boreholes.

Future work will deploy the underwater drone in winter 2026/2027 to test automated operations, refine ice models, and continue collaborative ice thickening research co-designed with the community of Cambridge Bay.

Inuktitut:

ᑕᐃᑲᓂ 2026 ᐅᓂᒃᑳᓕᐅᕐᓇᐅᑎᓪᓗᒍ, ᐅᑭᐅᖅᑕᖅᑐᖅ ᑕᕆᐅᖓᑕ ᓯᑯᐊᓂᒃ ᐱᓕᕆᐊᖄᕐᓂᖅ ᐱᖓᔪᐊᑦ ᐅᑭᐅᒥ ᓄᓇᑐᐃᓐᓇᒥ ᐱᓕᕆᐊᖑᔪᑦ, ᐊᒻᒪᓗ ᑎᑭᐅᑭᓗᑎᒃ ᐅᐱᕐᖔᒥᑦ ᐊᐅᔾᔪᑦ ᐊᐅᑉᐸᓪᓕᐊᑎᓪᓗᒍ ᒥᐊᓂᕆᓂᖅ ᐃᖃᓗᒃᑑᑎᐊᕐᒥ, ᓄᓇᕗᑦ, ᐊᐅᓚᑦᑐᑦ 1 km² ᓯᑯᐊ ᐃᓂᖓᓂ ᐱᓇᓯᐊᖃᑎᒋᓪᓗᒋᑦ ᐃᖃᓗᒃᑑᑎᐊᖅ ᐆᒪᔪᕐᓂᐊᕐᑎᒃᑯᑦ (EHTO). ᐅᓇ ᐱᓕᕆᐊᖑᔪᖅ ᖃᐅᔨᓴᖅᑐᑎᒃ ᓄᓇᖓᓂ ᕿᕐᑯᐊᑦ ᐅᖑᓗᐊᓕᖃᑦᑕᖅᑐᑦ ᓯᑲᔭᖅᑎᑎᓕᖅᐸᑦᑐᑦ ᐅᑭᐅᒥ ᓯᑯᖃᕐᓂᖅᓴᐅᓪᓗᓂ ᐊᒻᒪᓗ ᓯᑰᑦ ᖄᖓ.

ᐃᕗᔭᑦᑐᑦ ᐱᓕᕆᐊᖑᓚᐅᖅᑐᑦ ᐊᕙᑖᓂᑦ ᔮᓄᐊᕆ 11 ᐊᒻᒪᓗ ᒫᓯ 15, 2026, ᐊᑐᖅᓯᓪᓗᑎᒃ ᐃᖅᑲᖓᓂ ᐅᐊᔭᔫᖅᑐᑦ ᒥᓪᓗᐊᕈᑎᑦ ᐃᖏᕐᕋᑎᑦᑎᓪᓗᑎᒃ ᐹᑕᕆᖏᑦᑎᒍᑦ ᐃᓴᑦᑎᓪᓗᒋᑦ ᐊᒻᒪᓗ ᖁᐊᖅᑎᓪᓗᒋᑦ ᐊᐳᑦ ᐊᖏᓗᐊᕐᓂᐊᖕᒋᒪᑦ ᐊᐳᓪ–ᓯᑯᓗ. ᓯᑯᖃᕐᑲᑦᑕᕐᓂᖓ ᐱᕚᓪᓕᖅᓯᒪᔪᖅ ᐲᔭᖅᑕᐅᓪᓗᑎᒃ ᐊᐳᑎᑳᓂᖓ ᖄᖓᓂ, ᑕᐃᒪᓗ ᖁᐊᖑᓂᖅᓴᖅ ᓂᓪᓕᑎᑦᑎᓂᐊᕐᒪᑦ ᑕᒪᐃᓐᓂᒃ ᓯᑯᐊᓂᒃ. ᒪᐃ ᕿᑎᐊᓂ 2026–ᒥ, ᓯᑯᖃᒃᑳᓂᖅᑐᑦ ᑭᓪᓕᖏᑦ ᐅᑭᐅᒥ ᐃᑭᐊᑎᒋᓚᐅᖅᑐᑦ 204-212 cm, ᐊᔾᔨᒋᖕᒋᑕᖓ 146-160 cm ᖃᓄᐃᓕᓯᒪᖕᒋᑦᑐᖏᑦ, ᐱᓯᒪᓂᖃᖅᑐᖅ ᑲᑎᓪᓗᒍ ᐃᑭᐊᓂᖓ ᐱᕚᓪᓕᖅᑐᖅ +44 ᑎᑭᓪᓗᒍ +66 cm (ᖃᓂᒋᔮᓂ 50 cm). ᖃᖓᑦᑕᖅᑎᑕᐅᓯᒪᔪᑎᒍᑦ ᑕᑯᔭᐅᓯᒪᔪᑦ ᐊᕙᑖᓂ ᒪᐃ 15 ᐊᒻᒪᓗ ᔫᓂ 29, 2026 ᓇᓗᓇᐃᑦᑎᐊᖅᓯᒪᔪᑦ ᑖᒃᑯᐊ ᐱᓕᕆᔭᐅᓯᒪᓂᖏᑦ ᑭᓪᓕᖏᑦ ᐱᐅᓛᓪᓕᖅᑐᑦ ᖃᖏᑦ ᖃᐅᒪᓂᖅᓴᐅᓪᓗᑎᒃ ᐊᒻᒪᓗ ᓯᑯᐊ ᐃᑭᐊᓂᖅᓴᐅᓪᓗᓂ ᐊᕙᑖᓂᑦ ᖃᓄᐃᓕᓯᒪᖕᒋᑦᑐᒥᑦ ᐃᖃᓗᒃᑑᑎᐊᖅ ᓯᑯᐊ ᔪᖑᐹᓪᓕᖅᓯᒪᓂᖓᑦ ᐊᒻᒪᓗ ᓯᕋᑎᓵᓕᓂᖅᓴᐅᓪᓗᓂ.

Inuktitut:

ᑕᐃᑲᓂ ᒫᑦᓯ 2026, ᐱᓇᓱᐊᕐᑲᑎᒌᑦ ᕿᒥᕐᕈᐊᓚᐅᖅᑐᑦ ᑐᑭᓯᓇᖅᓯᕙᓂᒃ ᓱᕗᓂᐊᓂ ᐊᕐᕌᒍᒥ ᖃᐅᔨᓴᖅᓯᓚᐅᖅᑎᓐᓇᒋᑦ (ᐅᑭᐅᖅ 2024/2025) ᓴᖅᑭᑎᑕᐅᓚᐅᖅᑐᑦ Earth's Future−ᒥ, ᑎᑎᕋᖅᑕᐅᓯᒪᕙᑦ ~32 cm ᐅᑭᐅᒃᑯᑦ ᐃᔾᕙᑎᒋᕙᖅ ᐊᒻᒪᓗ 20% ᑎᑭᓪᓗᒍ 40% ᒥᑭᓐᓂᖅᓴᐅᓪᓗᓂ ᐅᐱᙵᒃᑯᑦ ᐊᐅᓐᓂᖓᑕ ᓯᒃᑲᓂᖓ, ᐱᖃᑎᒋᓪᓗᒍ ᐊᐅᑦᑎᐊᖅᑐᓂ ᑕᓯᖅ ᐃᒪᐃᔭᖅᑐᓂᓗ ᑯᕕᕕᖏᑦᑎᒍᑦ ᑕᒪᐅᓇ ᓄᓇᐅᑉ ᐳᑐᐊᒍᑦ.
ᓱᕗᓂᒃᓴᑦᑎᓐᓂ ᐱᓕᕆᔾᒫᖅᑐᑦ ᐃᒫᓂ ᐊᖅᑲᐅᒪᓗᑎᒃ ᖁᓕᒥᒎᓕᖕᒍᐊᑦ ᐊᔾᔨᓕᐅᕈᑎᑦ ᐅᑭᐅᖓᓂ 2026/2027 ᖃᐅᔨᓴᕐᓗᑎᒃ, ᓇᓗᓇᐃᕐᑎᐊᕐᓗᒋᑦ ᓯᑯᑦ, ᐊᒻᒪᓗ ᐃᑲᔪᕐᓗᑎᒃ ᓯᑯ ᐃᔾᕙᖅᑎᑉᐸᓪᓕᐊᓂᖓᑕ ᖃᐅᔨᓴᖅᑕᐅᓂᖓ ᓴᓇᖃᑎᒋᓪᓗᒋᑦ ᓄᓇᓖᑦ ᐃᖃᓗᒃᑑᑦᑎᐊᕐᒥ.

Inuinnaqtun:

Naunaiqhitivianit 2026-mi, Ukiuqtaqtumi taryum hikuanik hapummihinahuat havaaghait iniqhimaliqtaat pingahuat ukiungat maniraqmi havaanginnik, taimaalu upinngaghamit auyamut auktuqtumik munaqhiyut Iqaluktuuttiaqmi, Nunavunmi, havaghutik 1 km²-mik aktigiyumik hinaanit ikkalrungnilu hikulingnik ikayuqtiqaqhutik Iqaluktuuttiaqmi Anguniaqtit Naniriaqtuqtillu Katimayiit (EHTO). Havaanginnit qimilruivaktut taryuqmit imaukkautihimayut hikum qaanga hikutiqnaririamik aulapkaiyaamiklu hikum qaanga.
Imaukkautivaktut January 11-mit March 15-lu, 2026-mi, atuqhutik kivitaqtut alruyaqtuqtut pakpautit paatulituqtunik imaukkautiyaamik qiqipkaiyaamiklu aputimik qaningmut. Hiku hilighivalliayaamik aputaiyaqpagaat qaangat, niklammaaq anurimit niklaqhiivaghugu hikum qaanga. Qitqaruqtumi May 2026, hikuliuqtauhimayut ukiumi hilingnia 204-212 cm-nguyuq, ihumagiplugu 146-160 cm-nik ihuaqhautaittumit hikumi, ilittuqhitiuyuq hilighivaalliqnianik +44-mit +66 cm-mut (taimaalluaq 50 cm-mik). Qilangmiutanit tautukpaktut May 15-mit June 29-mut, 2026-mi qauhitihimayuq taimaa imaukkautihimayut qaummaqpaalliqhimayuq (albedo) hilighivaalliqhimayumiklu hikum qaanga taimaalu avataaniittut ihuaqhautaittut hiku haattuni ahiruqtiqpaghunilu.
March 2026-mi, ukiuqatigiingnit-ihivriuqtauhimayut naunaitkutait aippaanganianit qauyihaiyut havaanginnit (ukiuq 2024/2025) makpiraaliuqhimayut Earth's Future-mi, ilittuqhitiyumik taimaa ~32 cm-nik ukiumi hilighivaktuq taimaalu 20%-mik 40%-mut imaiqpalliayuq upinngaghami, taimaalu auktuqtut imaiyaqpaghutik hitinnuigut maniraqmi.
Hivunighami havaaghainit aullaqtittinahuat immap iluani tingmiyunnuanik ukiiumi 2026/2027-lu qimilrugiamik atauttikkuuqtunik aulapkaiyait, ihuaqhailugit hikum aajjikkutaliugait, havaqatiqatigihimmaaqlugit hiku hilighivallianiaqmut qauyihaiyait hanaqatihimayaannik Nunallaarmiullu Iqaluktuuttiaqmiunik.

Key messages: Concise, plain language summary of key take-away messages of work to date, findings and conclusions. Preferably 3-5 points, in bullet form.

Demonstrated increased thickness and rates of accretion in 2025/2026 Campaign: Winter 2025/2026 (T4) field results demonstrated an increase in ice accretion, with re-iced zones achieving a total winter thickness of 204–212 cm versus 146–160 cm in control zones, yielding a net gain of +44 to +66 cm (average 50cm). This compared favourably with the prior year's research, which resulted in a 30 cm net gain vs control areas.

Albedo Enhancement and Slower Spring Melt: Drone-based relative luminance analysis showed that flooded test areas were 20% to 40% brighter during the spring, which contributed to a reduction in thermal melt rates. Ice in flooded areas remained thicker for longer, remaining over 40 cm thick at the end of June when control areas were completely melted out.

Melt Pond Drainage Yielded Brighter Ice: Melt Pond Drainage performed on May 29 effectively drained localised melt ponds within days, raising bare ice surface luminance by 15% to 20% within a single week, proving to be an efficient mechanism for increased surface reflectivity.

Objectives: Project objectives, preferably in bullet form.

Maintain a collaborative, co-designed research model with local stakeholders, including the Ekaluktutiak Hunters and Trappers Organisation (EHTO) and community members from the Cambridge Bay Hamlet under the principles of Free, Prior, and Informed Consent (FPIC).

Test the feasibility and accretion rates of surface seawater flooding to thicken sea ice during the winter season.

Assess the chemical and thermodynamic evolution of flooded sea ice, including salt/brine migration and ice core salinity profiles.

Evaluate the effect of winter flooding on spring albedo (reflectivity) and the duration of sea ice cover compared to untreated controls.

Demonstrate the feasibility of spring melt pond drainage via borehole drilling to enhance surface brightness and delay melting.

Annual activities: A description of activities and methods carried out during the current reporting period. This section should answer the questions: What? Where? When? Who? How? Include dates team members conducted research at remote field sites or collected data (including interviews) in communities; append a map with locations and/or coordinates of remote field sites, if applicable.

During the 2026 calendar year reporting period (January 10 to December 31, 2026), research activities were carried out by a collaborative team comprising personnel from Real Ice, academic researchers from the University of Washington, Arizona State University and the University of Cambridge (Centre for Climate Repair), and local Inuit guides and co-researchers from the Ekaluktutiak Hunters & Trappers Organisation (EHTO).

Field operations took place on a 1 km² sea ice site near Cambridge Bay, Nunavut, located approximately 7 km southeast of the town at coordinates 69.1°N, 105°W. On-site winter pumping and ice-thickening activities occurred between January 11, 2026, and March 15, 2026, during which seawater was pumped from beneath the ice onto the surface using submersible pumps to saturate and freeze the insulating snowpack into conductive snow-ice. Melt Pond Drainage testing commenced in late May 2026, involving manually drilling boreholes to drain surface melt ponds.

This was followed by an intensive monitoring phase from mid-May to mid-July 2026, where the team conducted manual ice thickness and snow depth measurements, monitored the field site via drone flights and satellite, extracted ice cores for salinity profiling, and maintained Snow and Ice Mass Balance Array (SIMBA) thermistor chains to track ice growth and temperature profiles. Surface albedo and relative luminance were evaluated through daily aerial drone photography and albedo measurements taken along a 200m transect that covered re-iced and control areas. Sentinel-2 satellite imagery was used in addition to the drone surveys to assess melt-season persistence of the re-iced zones from mid-May to the end of June, 2026.

Additionally, community engagement and co-design consultations were held within the Cambridge Bay community to prepare for the 2026/7 winter season.

Results and Achievements: Findings and results to date of the above activities, highlighting any key research achievements (see guide below for formatting tips regarding tables and figures).

Below is a high-level overview of the major research findings completed and analysed during 2026.

Winter 2025/2026 Campaign Preliminary Results

Ice Accretion Gains: Preliminary measurements from the Winter 2025/2026 campaign indicate enhanced thickening efficacy. Thickened areas achieved winter thickness of 204 to 212 cm, compared to 146 to 160 cm in control areas. This represents a total net thickness gain of +44 to +66 cm (average 50cm), confirming that snow flooding increases surface ice thickness and improves the rate of congelation growth (growth at the bottom of the ice stack).

Increased Albedo: Initial analysis of the spring field site monitoring indicates increased albedo (reflectivity) of ~40% in the thickened ice areas vs controls. The areas were also visibly brighter from ground observations, aerial drone and satellite images.

Challenges/Obstacles: In this section, please comment on any challenges/obstacles (if any) that you experienced during this project year. If there were any actions to mitigate or resolve these challenges, please list them here. Were any concerns raised regarding the conduct of research team members or the impacts of the project?

Equipment Cold Vulnerability: Extreme winter temperatures caused damage and failures to several pieces of electronic equipment.

Mitigation: The team utilised a heated tent ('on-ice base') to house sensitive equipment and provide a heated workspace for the field team.

Wildlife Interference with Sensors: Wildlife (specifically Arctic foxes) interfered with the SIMBA temperature array installed during T3, causing physical damage and halting data recording in February 2025.

Mitigation: For subsequent deployments, the team utilised physical protective wire fencing housings around the thermistor strings and battery packs to deter wildlife.

Expected Project Completion Date: Provide month and year of expected completion date of the project.

Expected Project Completion Date: July 2027

Project website (if applicable): If your project has a presence on the internet, including a website and/or social media page, please provide the link and/or account handle.

Project Website: http://www.realice.eco

Citations: Please append a complete reference list if citations are used anywhere in the document.

Reference List

Blanchard-Wrigglesworth, E., Ceccolini, A., Smith, A., Woods, A., Sherwin, C., Borowski, K., et al. (2026). Artificial flooding leads to thicker and brighter Arctic sea ice. Earth's Future, 14, e2025EF007894. https://doi.org/10.1029/2025EF007894

Desch, S. J., Smith, N., Groppi, C., Vargas, P., Jackson, R., Kalyaan, A., et al. (2017). Arctic ice management. Earth's Future, 5(1), 107–127. https://doi.org/10.1002/2016ef000410

Howell, S. E., Laliberté, F., Kwok, R., Derksen, C., & King, J. (2016). Landfast ice thickness in the Canadian Arctic Archipelago from observations and models. The Cryosphere, 10(4), 1463–1475. https://doi.org/10.5194/tc-10-1463-2016

Pauling, A. G., & Bitz, C. M. (2021). Arctic sea ice response to flooding of the snow layer in future warming scenarios. Earth's Future, 9(10), e2021EF002136. https://doi.org/10.1029/2021ef002136

POLICY RELEVANCE

Does this research support policy development or decision-making in Nunavut? If yes, please describe.

Upholding Inuit Qaujimajatuqangit (IQ) and Local Co-Management

A foundational pillar of Nunavut's adaptation strategy is that climate work must blend modern science with traditional Inuit ecological knowledge.

Collaborative Design: Real Ice operates in strict partnership with the Ekaluktutiak Hunters & Trappers Organisation. Local leaders and knowledge holders co-design field operations to ensure scientific activities respect local hunting grounds and migratory paths.

Inuit-Led Monitoring: By hiring local Inuit to conduct ongoing field monitoring and data collection, the project keeps traditional land skills at the centre of the research.

Enhancing Harvester Safety and Travel Infrastructure
Nunavut's localised adaptation plans prioritise the safety of hunters navigating unpredictable, thinning sea ice.

Route Stabilisation: Real Ice's successful trials, which recently thickened ice by 50 centimetres over a localised area, provide a signal that this method could be used to stabilise unstable ice.

Familiar Infrastructure: The local community is already familiar with these methods, as the government notes that ice-thickening techniques are historically used locally to build ice roads and skating rinks. Successful application of this tech could eventually secure reliable winter ice roads to the Canadian mainland.

Advancing Concrete Climate Adaptation Actions
Northern climate policy often focuses on planning. Real Ice provides research into a tangible, physical adaptation measure.

Active Intervention: Real Ice's field campaigns add focus on direct, localised risk management. By creating thicker ice, the project could be used in the future to help protect the coastal ecosystem that communities rely upon for food security and transport.

Supporting Local Economic Benefit
Nunavut policies mandate that research in the territory should provide tangible economic returns to northern residents.

Community Reinvestment: Real Ice prioritises direct local spending by renting community facilities, paying honoraria to elders, and hiring local guides and equipment.

Long-Term Vision: The project's ultimate goal is to transition the operation of this technology directly to Indigenous communities, framing ice restoration as a form of local ecosystem conservation and community employment.

RESEARCH OUTCOMES: BENEFITS

Community engagement: Briefly list and describe any community consultation, engagement, collaboration and outreach activities that you have undertaken for the project; describe the role(s) that community members and/or specific organizations have played in research co-design and activities.

Real Ice's presence in Cambridge Bay is built upon a foundation of continuous co-development, mutual respect, and reciprocal relationship-building. During the 2026 reporting period, the project team prioritised consistent, transparent communication with the community, including Elders, the EHTO and the local leadership of the Cambridge Bay Hamlet Council, including the Mayor and Deputy Mayor. These sessions provided an open forum for project updates and discussions on our research activities.

To ensure our work on the ice is guided directly by the holders of traditional ecological knowledge, we maintained close, constant, active engagement with the Ekaluktutiak Hunters & Trappers Organisation (EHTO) during the research season. In addition, new relationships were formed with members of the board of the Kitikmeot Inuit Association (KIA).

This collaboration guided our field site selection, operational planning, and the co-design of our monitoring parameters, ensuring that regional Inuit priorities and the principles of Free, Prior, and Informed Consent (FPIC) remain at the centre of all operations.

Recognising that meaningful partnerships are built both on and off the ice, we collaborated at the start of the season in the design and build of custom Qamutiq (sleds) for daily use in transporting pumps and batteries to the field site. In addition, we collaborated on a restaurant pop-up with the Kuugaq Cafe, offering a warm, inviting space for project researchers, Elders, Hamlet representatives, and community members to share meals in an informal setting. Over 250 members of the community attended the event over the course of the week, 9- 15 Feb 2026.

Youth engagement: Briefly list and describe any outreach, school or classroom activities that you have undertaken for the project; describe the role(s) that youth have played in your research activities.

Given staff shortages at the High School, engagement was limited during the 2025/6 winter and spring season; however, for 2026/7, the Real Ice team is planning to showcase our newly developed autonomous underwater ice-thickening drone prototype V2 with the school by hosting students at the research site regularly during winter testing. This will allow students a hands-on look at cutting-edge robotics, acoustic communication systems, and green technology.

Training and Employment:

How many Nunavummiut received training from team members? Please describe training and/or compensation provided.

Five Nunavummiut worked alongside the team as co-researchers and field guides during the 2026 field season. Following the pumping phase, the scientific team provided technical training on conducting sea ice and snow thickness measurements, and on the use of albedo measurement equipment. Local co-researchers then carried out paid measurement work using those techniques. International scientists and engineers providing training on new techniques such as using albedo measurement equipment. The project generated direct paid work for our co-researchers and additional business for local travel and supplies businesses, including lodging, hardware supplies, and vehicle rentals (trucks, snowmobiles, and ATVs), representing over C$350,000 spent locally in Cambridge Bay from January to July 2026.

How many team members received training from Nunavummiut? Please describe training received and/or what knowledge sharing and/or skills exchange took place.

Reciprocal knowledge sharing occurred, with all of our local guides providing critical traditional knowledge regarding safe sea ice travel, local weather patterns, and operational conditions in extreme environments to all of our team members.

How many Nunavummiut received employment? Please describe employment type and length, role(s) and responsibilities, and compensation provided.

No Nunavut residents were employed however Nunavut residents were part of the research project and compensated through honoraria.

How many Nunavummiut received honoraria as research participants? Please describe method of participation (interview, observation, sample, survey, etc.), including compensation provided.

Five Nunavummiut received honoraria during the 2026 reporting period. All five served as co-researchers and field guides. Participation was direct and hands-on throughout the field season. They conducted field research alongside the Real Ice team members, collected samples, and carried out sea ice and snow thickness measurements. This measurement work underpins the data reported in our peer-reviewed publication. They also provided guiding, navigation, and safety support across all field operations.

Method of participation:

Field work at the research site including pumping operations

Sea ice and snow thickness measurement, supporting the dataset behind our peer-reviewed publication

On-ice guiding, navigation, and operational safety support

Honoraria provided, in Canadian dollars:

Brandon Langan, co-researcher and guide: $52,000

Kyle Weese, co-researcher and guide: $52,000

David Kavanna, co-researcher and guide: $13,500

Roland Emingak, co-researcher and guide: $7,200

Dennis Kaomayok, co-researcher and guide: $7,200

Please explain how the project directly benefited Nunavut organizations and/or businesses (e.g., through contract services, local purchases, equipment donations, etc.)

Real Ice procured locally by design. Every service the season required was contracted in Cambridge Bay wherever a local supplier existed, rather than shipped or sourced from the south. The benefit to Nunavut businesses was recurring revenue across a multi-month season, not a single order.

Rental operators supplied trucks and snowmobiles on repeat contracts across the full field period
Local retailers and the hardware store supplied food, equipment and general purchases throughout the season
The fuel depot supplied fuel for daily field operations
Hotels were booked for visitors to the research programme
Hospitality gained winter-period revenue through a restaurant pop-up paid for over one week
Freight and logistics companies were contracted to move project cargo
CHARS received accommodation revenue, directing spend to a Nunavut research institution
Local residents were engaged as guides and co-researchers on paid contracts, placing skilled work in the community

The pattern matters more than any single transaction. Sustained demand across the season gave local operators predictable business, and guiding contracts built paid research experience among residents. We intend to maintain and grow this procurement approach in future field seasons.

OPTIONAL: Nunavut Team Members, hires, and/or trainees (excluding research participants e.g., interviewees)

The NRI is creating an inventory of Nunavummiut who are skilled and/or interested in research. The information provided below will not be shared publicly but will support long-term capacity sharing by connecting local and visiting researchers with research talent in each community.

Name	Expertise/skills	Training/interest areas	Contact Info	Community
Brandon Langan	Co-design Co-research Construction Guiding	Expedition Researcher / Measurements	brandonklengenberg@gmail.com	Cambridge Bay
Kyle Weese	Co-design Co-research Construction Guiding	Expedition Researcher / Measurements	kylw0123@gmail.com	Cambridge Bay
Roland Emingak	Co-research Guiding	Expedition Researcher	N/A	Cambridge Bay
Dennis Kaomayok	Co-research Guiding	Expedition Researcher	N/A	Cambridge Bay
David Kavanna	Co-research Guiding	Expedition Researcher	N/A	Cambridge Bay

Academic Mobility

If you are affiliated with an academic institution, please answer the following question: For which Level of Project(s) will the data be used? (Check all that may apply)

- ☑ Research
- ☑ Post-Doctoral Research
- ☐ PhD Thesis
- ☐ Masters (Major Research Paper)
- ☐ Masters (Thesis)
- ☐ Graduate Course Project
- ☐ Staff/Administration Research
- ☐ Undergraduate Honours Thesis

Other•

BUDGET

Please complete the table below to detail your projected and actual research expenditures during the reporting period.

Category	Planned/Approved Expenditure	Actual Expenditure
Travel and Accommodation	C$351,900	C$351,900
Equipment, Materials and Supplies	C$468,600	C$468,600
Salaries/Wages for Nunavut residents	N/A	N/A
Salaries/Wages for non-Nunavut resident researchers	C$544,000	C$544,000
Professional Fees and services in Nunavut	C$131,900	C$131,900
Professional Fees and Services outside of Nunavut	N/A	N/A
TOTAL EXPENDITURES	C$1,496,400	C$1,496,400

List the total $ amount of funding from each funding source for your full research program, including in-kind support

UK Govt - Advanced Research & Invention Agency (ARIA) - £889,000 / C$1,675,000

RESEARCH OUTPUTS / REPORTING TOOLS

What research outputs were generated? Please list below and append copies of each. Specify which outputs (if any) may be made public on the NRI research licensing database.

Work is in progress. Analysis of outcomes is ongoing and an academic paper is in preparation. Following review, publication is expected in 2027.

Have peer-reviewed manuscripts been published as a result of your project? If Yes,

complete the following table:

Full citation	Publicly accessible/ free to access (Y/N)	Link (if available) and DOI (if available)
Blanchard-Wrigglesworth, E., et al. (2026). Artificial Flooding Leads to Thicker and Brighter Arctic Sea Ice. Earth's Future, 14, e2025EF007894.	Yes	https://doi.org/10.1029/2025EF007894

If No, do you intend to submit a manuscript (or manuscripts) for peer reviewed publication?

Were non-peer reviewed materials produced to either communicate or synthesize results to the public? Examples of these materials include (but are not limited to): websites, reports, brochures, podcasts, webinars, presentations, non-peer reviewed publications, etc.

If Yes, complete the following table:

Title	Description of Materials	Link (if available)	DOI (if available)
Real Ice T4 Winter 2025/2026 Summary	Public-facing summary describing developments and initial Winter 2026 results.	http://www.realice.eco	N/A

Did your project develop a communications plan? Please describe communications/reporting tools used, and list the target audience for each and/or who requested which.

In-person engagement: In-person meetings, presentations, and briefing documents for groups such as the Ekaluktutiak Hunters and Trappers Organisation (EHTO), Cambridge Bay Mayor's office, Heritage Society, Cambridge Bay Council, Kitikmeot Inuit Association, Kitikmeot Chambers of Commerce, and Nunavut Department of Fisheries and Oceans.

How were Nunavummiut credited and/or acknowledged in all project outputs, such as co-authorship, participant biographies, article acknowledgements, etc.

Nunavummiut co-researchers are named as co-authors on our peer-reviewed publication, not listed in acknowledgements. Local knowledge holders contributed directly to field design, measurement, and interpretation, and the authorship reflects that contribution.

Named local co-researchers on Blanchard-Wrigglesworth, E., et al. (2026), Artificial Flooding Leads to Thicker and Brighter Arctic Sea Ice, Earth's Future:

Brandon Langan
Brent Nakashook
Brian Kavanna
David Kavanna
Roland Emingak


Earth's Future

Research Article | Open Access

Artificial Flooding Leads to Thicker and Brighter Arctic Sea Ice

Edward Blanchard-Wrigglesworth, Andrea Ceccolini, Andrew Smith, Andrew Woods, Cian Sherwin, Konrad Borowski, Pascal Martin-Daguet, Simon Woods, Tom Clipston, Tommaso Di Giacchino, Molly Wieringa, Jacob Pantling, Kate Oglethorpe, Shaun Fitzgerald, Steven Desch, Hilairy Hartnett, Brendan Kelly, Alison Tan, Bernard Steffin, Isaac Eskind, Brandon Langan, Brent Nakashook, Brian Kavanna, Brodie Larocque, David Kavanna, Roland Emingak, Cecilia M. Bitz ... See fewer authors

First published: 22 May 2026 | https://doi.org/10.1029/2025EF007894 | VIEW METRICS

DATA AND INTELLECTUAL PROPERTY

Did you enter into a research agreement, data-sharing agreement and/or intellectual property rights agreement with a community and/or designated Inuit organization (DIO)? If yes, please explain.

Do intellectual property rights apply to your research? If yes, please explain.

Who owns the data? Has the raw data been shared with the appropriate community and/or DIO? If yes, how? How is data security and storage handled by community-based co-owners?

Where is the data stored and will the data be destroyed within a set timeframe?

Is the data trackable and/or available in a public data repository? If yes, please provide the appropriate information and/or link to ensure the findability and accessibility of the data.

Please append a copy of your data management plan

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CLIMATE CHANGE

Is your research about climate change (causes, impacts, mitigation, adaptation, etc.)? If yes, explain.

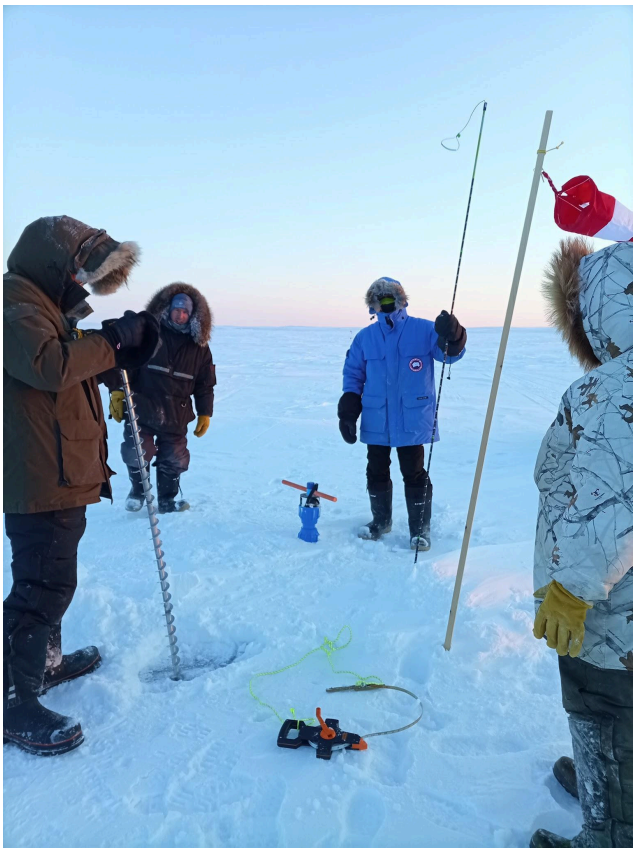
Yes, this research is explicitly focused on climate change mitigation. Arctic sea ice decline is a direct, catastrophic consequence of anthropogenic climate warming. This project is a research campaign to test and validate an active, discrete adaptation and mitigation methodology. If successful, this approach could be used to buy critical time for global decarbonization while helping to preserve vital sea ice ecosystems for Arctic communities.

PHOTOGRAPHS

If possible, please provide high-resolution photos of licensed research activities that NRI may use in communication materials, organizational reporting, and other promotional purposes. Please also complete the table below for each photo provided and submit to NRI along with all required NRI photo release forms. The photographer/owner will be credited in all uses of the photograph(s).

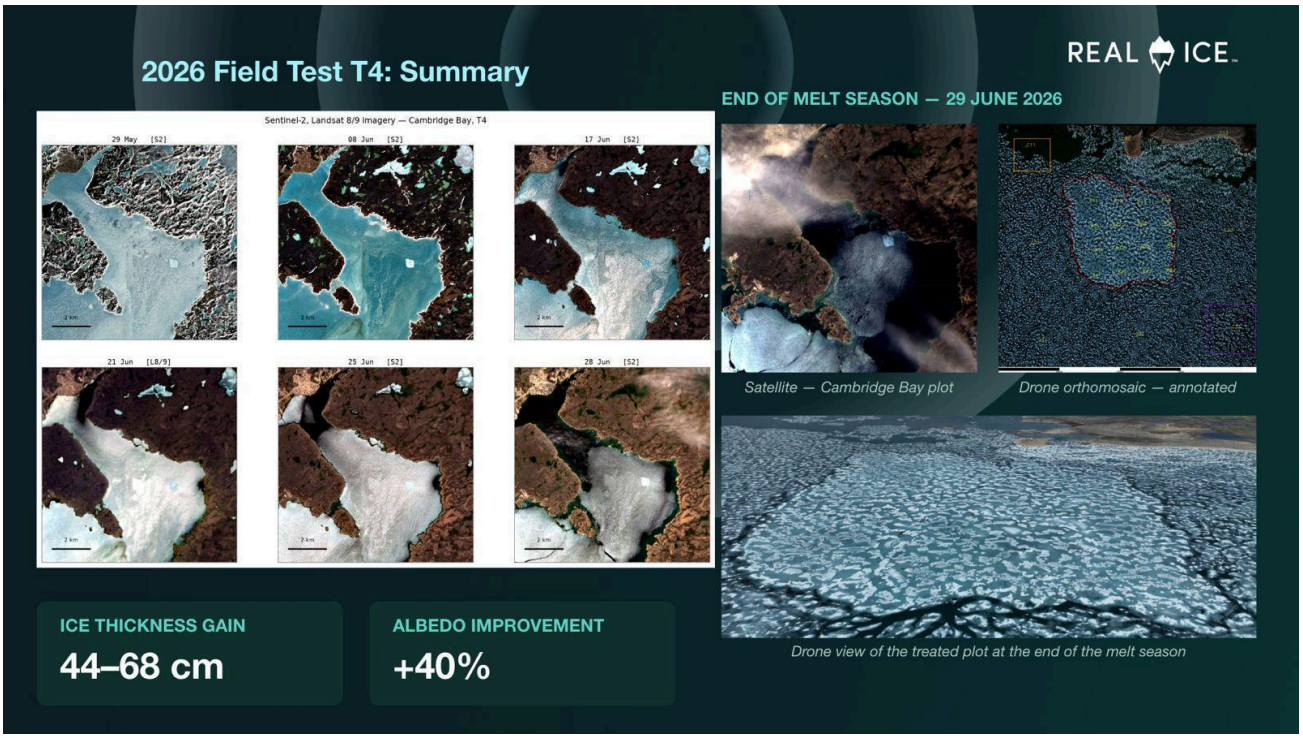
File Name	Location	Description	Subjects	Photographer /Owner	Date
IMG_20260119_114253_546 (1).jpg	Cambridge Bay	Photo of team taking measurements	David Kavanna, Kyle Weese, Roland Emingak & Real Ice team	Real Ice	19/01/26
20260123_105133.jpg	Cambridge Bay	The team is checking pumps during operations	Real Ice team member	Real Ice	23/01/26
20260116_111751.jpg	Cambridge Bay	Pump in operation	N/A	Real Ice	16/01/26
20260120_102236.jpg	Cambridge Bay	Photo of team taking measurements	David Kavanna & Real Ice team	Real Ice	20/01/26

Photos chosen to share with NRI;



APPENDIX: Real Ice - Cambridge Bay partnership evidenced

A. Letter of Support Hamlet
B. Letter of Support Nunavut Climate Change Secretariat
C. Guardian article
D. Nunstiaq News article
E. Iqaluit Radio
F. T4 1-pager
G. Results images (Summary and ice evolution)



Satellite and drone images of Cambridge Bay showing the field test site (distinctly brighter for most of the melt season) together with drone images of the melt area as it moved into the bay on the current. At the end of the melt season, the thickened ice was still> 40 cm thicker than the surrounding melting ice.

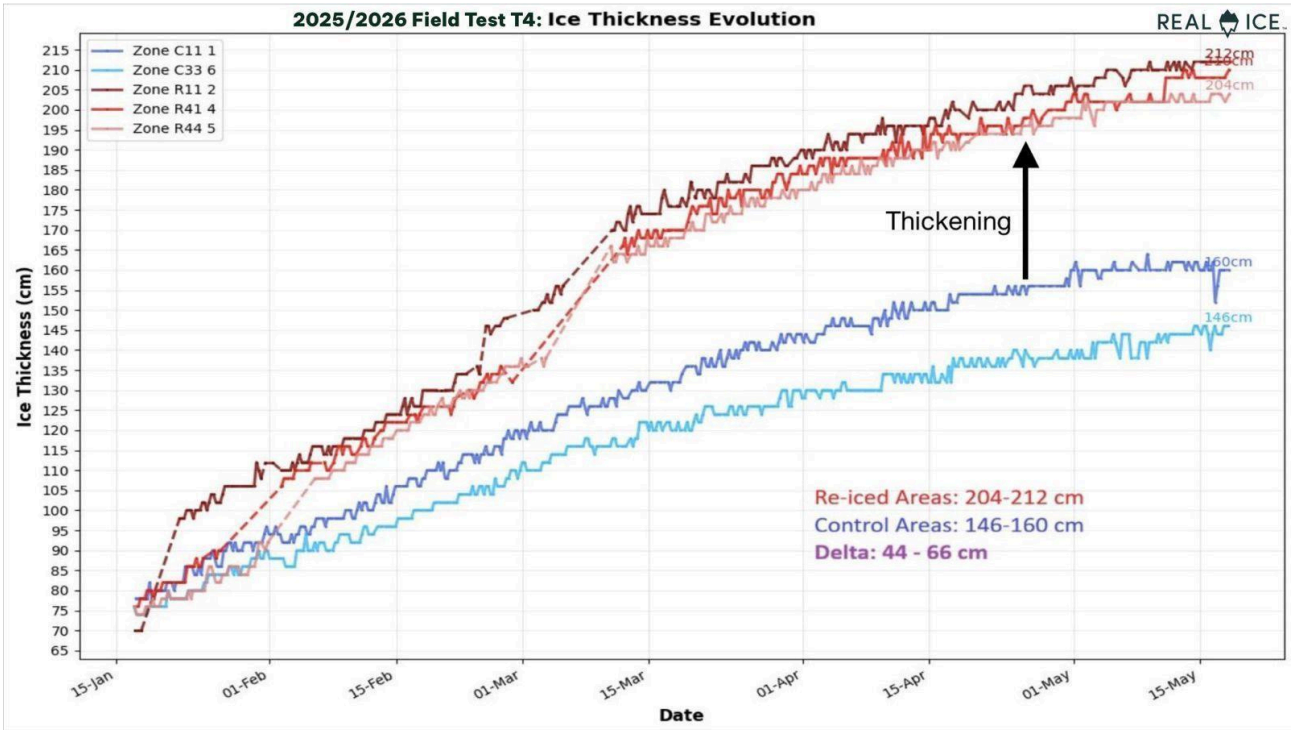


Chart showing the data from the thermistor chains embedded in the sea ice in the test area in both control (blue lines) and thickened areas (red lines). Data are from 15-Jan to the end of May 2026.