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The Arctic Observing Network: Capturing and Understanding Arctic Change with Renewed Observations at the Davis Strait Gateway

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Marine Based Activities

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Period of operation: from 0001-01-01 to 0001-01-01

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The Davis Strait observatory is a long-term program, started in 2004, focused on documenting and understanding the exchange of freshwater and heat between the Arctic Ocean and the North Atlantic. Heat carried northward by the ocean can accelerate the melting of Greenland's glaciers, with large impacts on local ecosystems, on the equator-to-pole movement of heat in the global ocean, and on global sea level rise. Freshwater exiting the Arctic has impact on northern ecosystems and on the equator-to-pole movement of heat in the global ocean. Measurements of ocean temperature, salinity and currents, and of the sounds made by marine mammals, are collected by an line of 12 moorings (strings of science instruments suspended from a float that is anchored to the sea floor) at locations spanning Davis Strait. These moorings are serviced every other year using a research ship. During the mooring service cruise, we also collect measurements of temperature, salinity and chemical properties at multiple sites along lines that cross southern Baffin Bay, Davis Strait and the northern Labrador Sea. The original project operated from 2004-2017, while this new effort supports measurements from fall 2020 through at least fall 2024. All data are freely available for download at the US Arctic Observing Network archive (<https://arcticdata.io>) or by request to craiglee@uw.edu. Results from research using this data are published in open scientific journals. We have extensive experience working with subsistence hunting communities on the North Slope of Alaska to mitigate research impacts on local activity. The most important component of this effort has been frequent, open communication. We have achieved this through regular participation in Alaska Eskimo Whaling Commission meetings and community visits that include Townhall gatherings, informal science presentations and radio interviews. When actually at sea, we communicate through email and radio to identify and resolve any potential conflicts between subsistence and research activity. I envision working to develop a similar relationship here, and am seeking guidance on how best to proceed. To this end, I have reached out to Mr. Andrew Bresnahan, Senior Policy Advisor for the Qikiqtani Inuit Association, for guidance regarding potential impacts of our proposed work and on how to establish communication with the nearby communities.

▷ ΔΑΠΝΩ: N/A

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Post-Closure Phase: from to

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BI2 mooring location and CTD station	Marine Based Activities	Marine	N/A	N/A	Qikiqtarjuaq
BI4 mooring location and CTD station	Marine Based Activities	Marine	N/A	N/A	Qikiqtarjuaq
NL01 CTD station	Marine Based Activities	Marine	N/A	N/A	Qikiqtarjuaq
SML01 CTD station	Marine Based Activities	Marine	N/A	N/A	Qikiqtarjuaq

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Project transportation types

Transportation Type	ᠰᠡ᠋ᠭᠦ ᠨᠢᠯᠤᠳᠤᠶ᠋ᠣᠷ᠎ᠠ ᠵᠢᠪᠴᠢᠲᠤᠨ ᠸᠠᠩᠭᠤᠰᠤ	Length of Use
Water	RV Sanna	

Project accomodation types

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Λ⁵Δ^c Δ^aΓ⁴Δ^{5b} Δ^{5b}CDσD⁴Δ^{5b} Δ^cΔ^{5b}ΓDΠ^cΓ^c Δ^jCDΔ^c, Γ^cΔ⁴P^jΔ^c, Δ^{5b}Δ^{5b}CD^jΔ^{5b}, Δ^cΔ^{5b}Δ^c Δ⁴Δ^{5b}Δ^cΔ^{5b}

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mooring	2	50-100m	oceanographic moorings will be deployed at two locations off Cape Dyer, measuring salinity, temperature and ocean currents.
research ship	1	15 m to 90 m	Project will involve visits to these marine sites by a scientific research vessel in 2021, 2022, and 2024. In 2021, the vessel will be R/V Sanna, from Greenland. The vessels for 2022 and 2024 have not yet been determined.

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Information is not available						

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As with any marine shipping, ship-based scientific operations can produce short term behavioral impacts on marine mammals (changing the direction of their travel, avoiding an area where a ship is working). We mitigate these impact by suspending operations when marine mammals are observed in an area. Noise levels are those associated with routine ship operations. Overall impacts are very low given the short duration that the ship is operating in any area.

Additional Information

SECTION A1: Project Info

SECTION A2: Allweather Road

SECTION A3: Winter Road

SECTION B1: Project Info

SECTION B2: Exploration Activity

SECTION B3: Geosciences

SECTION B4: Drilling

SECTION B5: Stripping

SECTION B6: Underground Activity

SECTION B7: Waste Rock

SECTION B8: Stockpiles

SECTION B9: Mine Development

SECTION B10: Geology

SECTION B11: Mine

SECTION B12: Mill

SECTION C1: Pits

SECTION D1: Facility

SECTION D2: Facility Construction

SECTION D3: Facility Operation

SECTION D4: Vessel Use

SECTION E1: Offshore Survey

SECTION E2: Nearshore Survey

SECTION E3: Vessel Use

SECTION F1: Site Cleanup

SECTION G1: Well Authorization

SECTION G2: Onland Exploration

SECTION G3: Offshore Exploration

SECTION G4: Rig

SECTION H1: Vessel Use

In construction year (2021), we will use RV Sanna, a 32m research vessel operated by Greenland Institute of Natural Resources to deploy 2 small scientific moorings. In operations years (2022 and 2024), we will likely use RV Armstrong, a 72m research vessel operated by Woods Hole Oceanographic Institution to service moorings and conduct CTD (conductivity, temperature and depth) stations to measure ocean water properties at sites NL01-NL08 and SML01. RV Sanna has a crew of six. RV Armstrong has a crew of 30. In 2021, the Sanna cruise will depart Ilulissat, Greenland on 3 August and return to Sisimiut, Greenland on 6 August. Schedules for 2022 and 2024 are TBD though will also likely sail from and return to Greenland ports. There will be no intermediate port calls on any of the cruises. For 2021, Sanna will transit directly to the Cape Dyer area and return directly to Sisimiut. Once on station, total time to complete the mooring construction will be less than 12 hours. In 2022 and 2024, in addition to the operations in the settlement area, the project will include mooring operations across Davis Strait to the Greenland shelf and CTD stations throughout Davis Strait, southern Baffin Bay, and northern Labrador Sea. There are no additional regulatory requirements for those operations. Cruises are scheduled when all operational areas are ice free and no ice breaking is required. The moorings BI2 and BI4 and CTD stations NL01 - NL08 are within the Outer Land Fast Ice Zone, but other than occasional grounded icebergs, no ice will be present at those sites during our operational windows. There will be no discharges of any bilge, ballast, grey or black water, solid waste, oils or hazardous or toxic substances. Research vessels used in these operations comply with all local and international regulations relating to environmental controls, waste storage and discharge, including MARPOL Annexes I, IV and V, Canada's Vessel Pollution and Dangerous Chemicals Regulations (SOR/2012-69) and Canada Shipping Act, 2001. Research vessels used in these operations have detailed spill and emergency response plans per local and international regulations and industry best practices. Due to the very limited nature of the 2021 cruise, there will be no dedicated wildlife observers, though the Sanna bridge crew is very experienced in conducting marine mammal surveys. In 2022 and 2024 we will likely have dedicated observers as part of bird and marine mammal scientific survey operations. Our primary wildlife mitigation is to simply suspend operations when marine mammals are observed in an operating area.

SECTION H2: Disposal At Sea

N/A. No disposal or discharge during these operations.

SECTION I1: Municipal Development

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Given the very low frequency of visiting the area and short duration of the visits we expect no significant cumulative effects from these activities.

Impacts

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$$(P = \langle b \rangle \dot{a} p \cap \dot{r}^a \dot{q}^{fb})^c, N = \langle b \rangle \dot{b} \dot{r}^f \dot{r}^c \langle \dot{r}^a \dot{q}^{fb} \rangle^c \langle \dot{c} \dot{r}^f \dot{r}^{fb} \rangle^{fb} \langle \dot{r}^a \dot{q}^{fc} \rangle^c, M = \langle b \rangle \dot{b} \dot{r}^f \dot{r}^c \langle \dot{r}^a \dot{q}^{fb} \rangle^c \langle \dot{c} \dot{r}^f \dot{r}^{fb} \rangle^{fb} \langle \dot{r}^a \dot{q}^{fb} \rangle^c, U = \dot{b} \dot{r}^f \dot{r}^a \dot{q}^{fc} \dot{r}^{fb})$$

1	point	BI2 mooring location and CTD station
2	point	SML01 CTD station
3	point	NL01 CTD station
4	point	NL02 CTD station
5	point	NL03 CTD station
6	point	NL04 CTD station
7	point	NL05 CTD station
8	point	NL06 CTD station
9	point	NL07 CTD station
10	point	NL08 CTD station

