WEATHER, WATER, ICE, AND CLIMATE (WWIC)
WHAT ARE USERS EXPERIENCING?

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ABOUT THE PROJECT

Vessel operators in the Canadian Arctic rely on accurate weather, water, ice, and climate (WWIC) information to make safe navigational decisions, but it is currently unknown what services are being accessed and whether user needs are being fully met by available WWIC products. User engagement throughout the value-chain is crucial for developing meaningful WWIC products, but the user perspective often remains overlooked, creating a gap between what scientists understand as useful information and what users need for their decision-making. To address this gap, a mixed-methods survey using Qualtrics online software was established to target individuals who have experience using WWIC information while travelling onboard vessels of various sizes and types in the Canadian Arctic. Survey results are being shared with service providers in order to help stimulate the co-production of meaningful WWIC products to aid safer navigation.

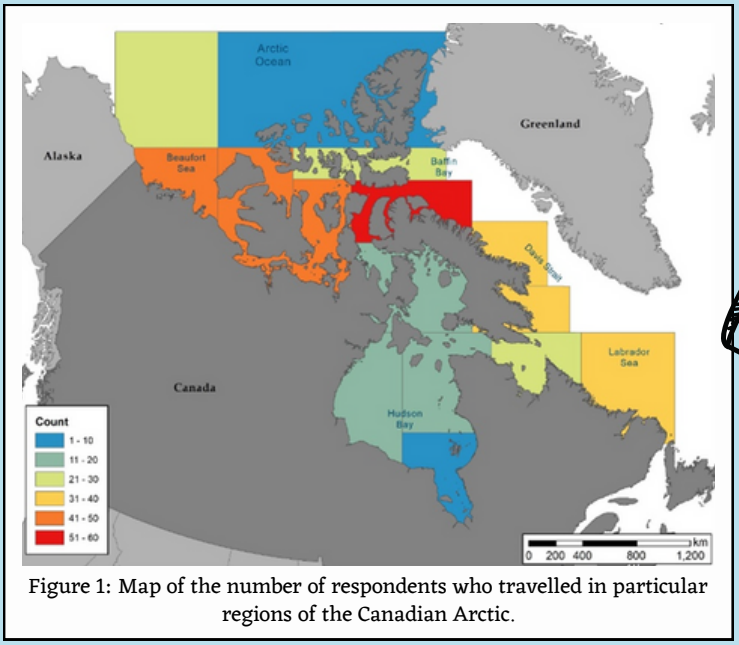

Figure 1: Map of the number of respondents who travelled in particular regions of the Canadian Arctic.

WHO COMPLETED THE SURVEY?

56 respondents representing a variety of (i) vessel types (e.g., pleasure craft, cargo ships), (ii) experience travelling in Arctic waters (61% had less than 1-year of experience), and (iii) roles on the vessels (57% were ship captains or skippers). The majority of respondents travelled in the Northwest Passage (NWP), Davis Strait, and the Labrador Sea (Figure 1).

OVERVIEW OF RESULTS

The majority of respondents stated that their WWIC information needs were being met “frequently” (61%), but also that their voyages could benefit from additional services (63%). Respondents noted locations where WWIC information was inaccessible and/or inaccurate (Figure 2).

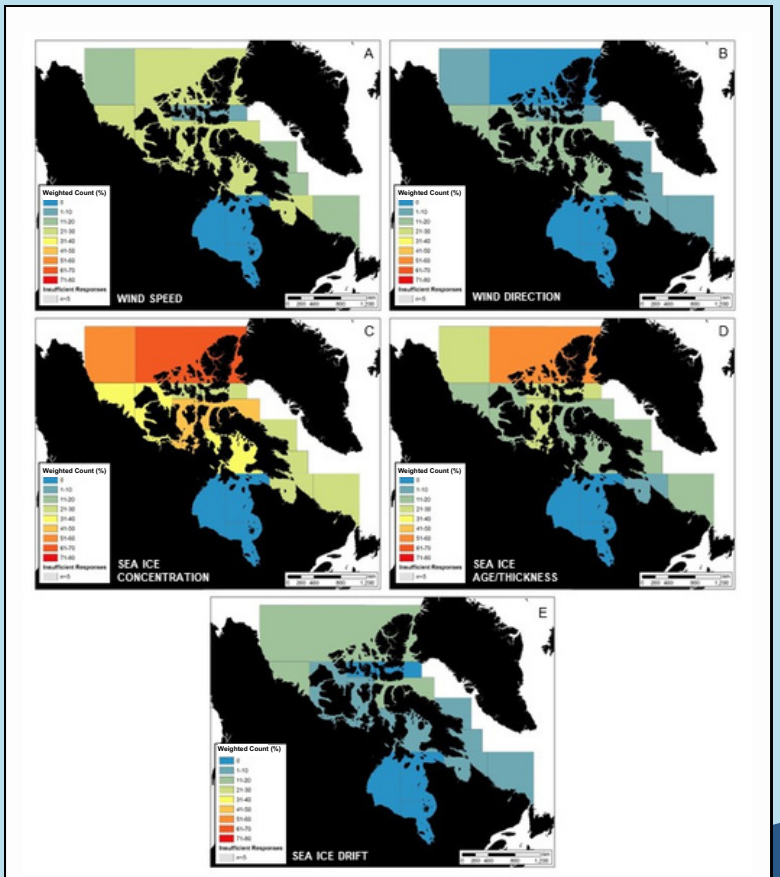

Figure 2: Count of where vessel operators said information was inaccessible, weighted for how many respondents travelled in each region, for factors including: wind speed (A), wind direction (B), sea ice concentration (C), sea ice age/thickness (D), and sea ice drift (E).

WHAT WERE WWIC SERVICES USED FOR?

Users utilized services to access information about a variety of WWIC factors, but ranked five factors as being most important for making navigation decisions: wind speed, wind direction, sea ice concentration, sea ice drift, and sea ice thickness/age. Additionally, survey respondents identified issues accessing WWIC information (particularly due to internet accessibility) and that WWIC information was often inaccurate along the NWP (Figure 2). Figure 3 demonstrates the time scales and spatial resolutions at which the respondents said they need WWIC information. Regular updates and real-time information were identified as essential, though short-term forecasts (1 and 3-5 days, respectively) were just as important. There were no particular preferences regarding the spatial resolution for ice-related factors, though wind- and wave-related factors benefitted more from lower spatial resolutions (5+ kilometres). These points showcase the need for a variety of WWIC information which can help inform both short- and long-term route planning and navigation decision making.

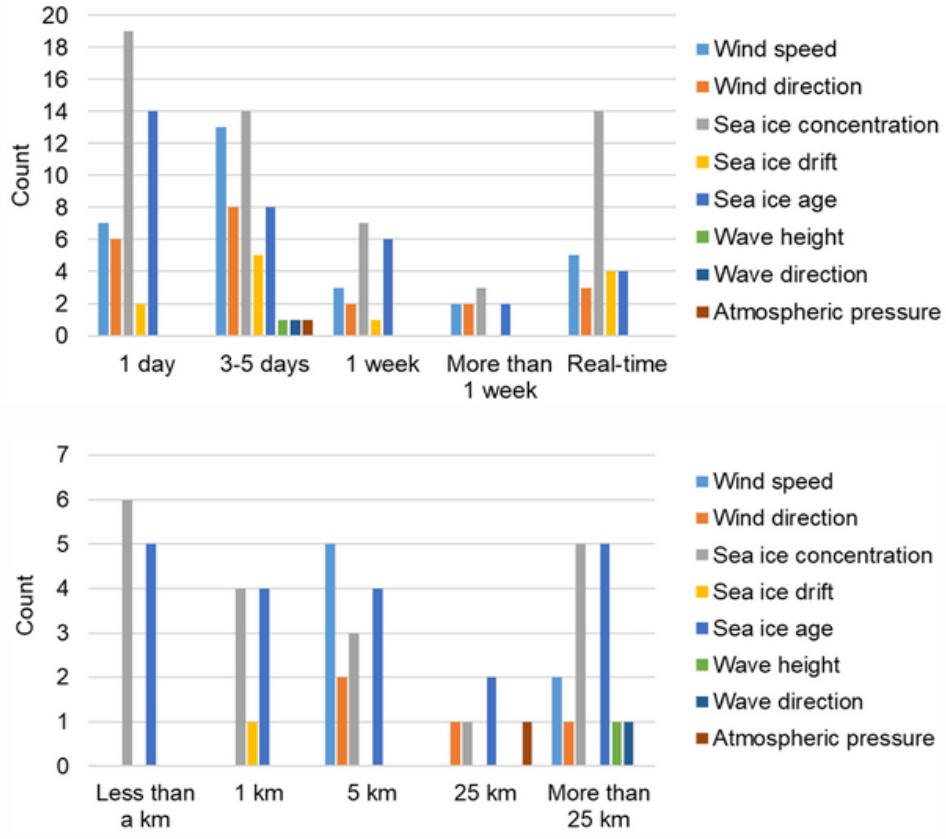

Figure 3: Information on what time scale (top) and spatial resolution (bottom) respondents need WWIC information for all eight factors.

RECOMMENDATIONS FOR IMPROVEMENT

Respondents provided recommendations to improve the accuracy, usability, and accessibility of WWIC information. Tables 1-3 (below) outline the key recommendations, most notably more frequent data updates, faster internet connectivity speed, or offering information in low-bandwidth formats.

Table 1: How could the accuracy of WWIC information be improved?

Improvement	Number of Participants
More frequent/real-time observations • Real-time reporting from vessels and aircraft	19
Technological improvements: • Better satellite coverage • Increased satellite passing frequency • Improved sensor capability	6
More accurate/detailed ice-charts	5
Understand local factors/consider local events	5
Integrate ground truthing of satellite-based data	2
Low-pressure systems undermine forecast reliability	2

Table 2: How could the usability of WWIC information be improved?

Improvement	Number of Participants
More frequent updates	7
Downloadable ice charts	1
Improve visual presentation	1
Simpler diagrams	1
Updates earlier and later in the season	1
Updates in more sub-regions	1
Have information for specific locations users are located within	1

Table 3: What issues with accessibility could be improved?

Improvement	Number of Participants
Faster connectivity speed	20
Receive information via other methods for those without internet (e.g., "simple" files, SSB radio)	13
More reliable / better satellite coverage	12
No internet connection	5
Improved signal strength	4
Lower cost options	3
Increased bandwidth to vessels	2

CONTACT INFORMATION

If you are interested in further information about the project or results, please contact Dr. Jean Holloway at jhollowa@uottawa.ca or Dr. Jackie Dawson at jackie.dawson@uottawa.ca.

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