The Deck Log

Newsletter
Master Mariners of Canada (MMC)
NL Division
April – June 2025

Any opinions, expressed in this newsletter, are those of the author and do not necessarily represent the views of the Master Mariners of Canada (MMC), NL Division. Editor: Glenn Fiander

In this edition: Up to page 10, the business of the division is covered. Pages 10 to 20, some maritime related articles. Starting on page 21, a paper written by 2 First Year Nautical Science students.

April 24th, 2025

The monthly meeting, for April, took place at the Crow's Nest (4 present) and also conducted by MS Teams (1 present). National Master, Captain Eben March, opened the meeting and welcomed all members present at the Crow's Nest and via MS Teams.

The agenda was adopted, as presented. The minutes from the previous meeting were adopted, without any changes.

Officer Reports

Treasurer, Captain Sean Quinlan was not present at the meeting, but forwarded the following information:

Reminder for members to pay their dues for 2025. if they have not done so.

Captain Quinlan is still working with the bank, regarding TD merchant solution pricing

Payment of dues, for 2025, has been lower than normal and the Treasurer is reminding all members to pay their dues.

Due Structure for the Year 2025

Class of Member	**Member Pays**
Full	$200
Senior and Associate	$120
Cadet	$20
Corporate	$350 - which provides 2 associate members or full members if they are command qualified $1200 - which provides 7 associate members or full members if they are command qualified $2000 - which provides 12 associate members or full members if they are command qualified

Payment can be made by the following methods:

Cash:
In person

Cheque:
Cheques can be forwarded to the following address:

Company of Master Mariner of Canada
Newfoundland Division
P.O. Box 814
St. John's, NL
A1B 3M9

EMT (email transfer):
EMT can be forwarded to the following address: mmcnltreasurer@gmail.com

Credit Card:
Contact Sean at the following address: mmcnltreasurer@gmail.com

April 24th, Monthly Meeting

National Master, Captain Eben March reported:

Great Lakes and Newfoundland and Labrador division have been working on national collaboration for mentorship.

Discussion held on holding a letter writing campaign to MPs after the election result. National is concerned about the situation of lower wages for Canadian seafarers working internationally and the loss of the overseas tax credit. These combined make it less popular for Canadians to work offshore and therefore more difficult to obtain International Sea time for Master Mariners certification. Divisions will discuss.

Standing Agenda Items - Nautical Skills Competition (NSC)

A meeting was held with Skills Canada and MMC NL div. to determine if there are any synergies to make the Nautical Skills competition a national competition.

New Business `

Battle of Atlantic Wreath Laying

The ceremony for the Battle of the Atlantic and 80th anniversary of the end of the Second World War is to be held on May 4th at the National War Memorial in St. John's. Captain Eben March will lay a wreath on behalf of the MMC NL Div.

May 4th, 2025

Each year, on the first Sunday in May, the Canadian naval community honours those who perished at sea during the Battle of the Atlantic. The Battle of the Atlantic Ceremony is held to remember the sacrifices of Royal Canadian Navy and Merchant Marine sailors as well as the Royal Canadian Air Force personnel taking convoys across the Atlantic Ocean in World War 2. This year marks the 80th anniversary of the end of that war. The ceremony was held at the Newfoundland National War Memorial in St. John's. Division member, Captain Ebenezer March, laid a wreath on behalf of the NL MMC division.

Captain Ebenezer March, wreath laying at the War Memorial

May 22nd, 2025

The monthly meeting, for May, took place at the Crow's Nest (6 present) and also conducted by MS Teams (3 present). Divisional Master, Captain Jim Parsons, opened the meeting and welcomed all members present at the Crow's Nest and via MS Teams.

The agenda was adopted, as presented. The minutes from the previous meeting were adopted, without any changes.

Officer Reports

Divisional Master, Captain Jim Parsons reported:

Captain Parsons gave an update on his trip to Germany for a NATO meeting. NATO is looking to develop a course on resilience. In a time of crisis NATO will need a lot of private industry assets to assist. There are a large number of these assets that do not understand how NATO works and how they would fit into the operation. NATO wants to develop an executive level course. Captain Parsons is hoping to bring one module of this training to the Marine Institute.

Captain Eben March represented the MMC in the Battle of the Atlantic ceremony at the National War Memorial.

Treasurer, Captain Sean Quinlan reported:

Captain Quinlan advised that there has been a big drop in membership from last year. Most of this drop is due to the reduction in Cadet membership. A discussion was held on how to increase cadet membership. Elizabeth Clouter suggested we have one of our meetings as cadet night and believes the cadets are looking for guidance/mentorship that our members could provide and this may positively influence them to join the MMC.

MMC NL division has $23,542.29 in the account as of May 21, 2025.

Membership dues paid:

	2025	2024	Difference
Full	22	33	-11
Associate	2	3	-1
Cadet	1	17	-16
Corporate	9	9	0
Honorary	3	3	0
Senior	2	3	-1
Lifetime	1	1	0

Captain Quinlan stated that he was heard back from the bank in his attempt to reduce the cost of TD merchant solution pricing. The new agreement will be as follows:

New three-year agreement (anytime cancellation with no penalty) would have a fee of $9.95 per month and 2.51% + $0.15 for each transaction. (down from $47.00 per month in the previous agreement). This will allow the MMC NL div. to keep the option to accept credit card processing with a much lower fee. Captain Quinlan will contact bank to confirm.

All members present agreed to have Jennifer Howell made an honorary member of the Master Mariners of Canada.

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May 22nd, Monthly Meeting

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Membership, Captain Richard Edwards reported:

Captain Edwards advised that he is getting a lot of spam emails as applicants to join the MMC. Captain Eben March also noted that there are a number of spam emails that are coming in through national as well.

A discussion was held on how to increase membership, particularly corporate membership. It was agreed that we don't do a good job in promoting the MMC and it is hard to articulate the benefits for a company or an individual to join the MMC. Captain March advised that the Maritimes Division has produced a value added letter that could be sent to companies or individuals outlining what the MMC does and the value of joining the organization.

Secretary, Captain Ray Dalton reported:

Captain Dalton advised that this will be the last meeting before the summer break. Our next meeting will be in September and we will need to determine which Thursday of the month we will hold our meetings.

Captain Dalton suggested that if any member of the executive was unable to attend the meeting, it would be appreciated if they could provide an update that could be presented at the meeting.

May 22nd, Monthly Meeting

National Update

Captain Eben March, National Master reported:

- International Federation of Shipmasters Associations (IFSMA)

This year the IFMSA AGM will be held at the Faroe Islands and Captain Marshall Dunbar (VP National and divisional master Maritimes) will be attending on behalf of MMC. Captain Dunbar will be presenting a paper on maritime autonomous surface ships (MASS).

Captain Parsons requested if we could also view the presentation. Captain March will determine if this can happen.

- Canadian Marine Careers Foundation (CMCF) Report

The Canadian Marine Careers Foundation (CMCF) is a national non-profit working with over 50 industry, labour, education, and government partners to build a diverse and future ready workforce for Canada's marine sector. The CMCF has released the report of the Canadian Seafarers Pathway Study, a first of its kind comprehensive report revealing critical labour and skills shortages in the country's marine transportation sector. The study identifies a pressing need to attract and train new talent, with domestic vessel operators needing to hire 8,300 new workers to meet industry demand and replace retirees by 2029 —the equivalent of more than 30% of its current workforce. A link to the study is available here:

Press Release – Canadian Seafarers Pathway Study Reveals Urgent Marine Workforce Needs

- Liability Insurance through the Canadian Merchant Service Guild (GUILD)

Captain March has recently contacted by an individual who was giving a presentation at the GUILD AGM regarding licensing insurance and said he was going to get additional information and possibly have him give a presentation to our members at a future meeting.

Standing Agenda Items

Nautical Skills Competition (NSC)

A debrief was held at the Marine Institute to discuss the NSC. Captain Drew McNeil (NSC Treasurer) gave an update on financial status and the results of the survey were discussed. One of the comments from the survey was that the speeches during the gala were too long and could be shortened.

The incorporation of the Engineering students into the NSC was a success and they are hoping to have an additional exercise scenario next year.

Seafarer's Wellness Center

1. The Mission to Seafarers-Newfoundland and Labrador (working title) has received its articles of incorporation status.
2. Working on the charitable status with CRA.
    a. Note in the meantime, we can accept donations- and issue tax receipts under the parent organization Mission to Seafarers – Canada
3. The Committee developed and submitted proposals for funding grant with the International Sailors Society
4. We are working with the Argentia Port Authority on a location for a remote office for the Port/Placentia Bay
    a. Port Authority will donate a small building.
    b. We are setting up meetings with local churches and community groups to solicit interest for volunteers as well as sharing a taxi/shuttle service
5. Meetings with property owners for a St. John's HQ
    a. Basilica Annex building
    b. George Stret United Church building
    c. PF Collins
6. Planning underway for a donations campaign

Nautical Science Society

The society has decided to have a barbecue June 1st from 1800-2100, at the North Bank Lodge in Pippy Park.

They are hoping to get the MMC involved and see the members of the division there!

May 25th, 2025

On May 25th, division members received the following e-mail message:

"Good Day Everyone,

Please see attached "Tax Letter" for distribution to members with the goal of having them sent on to their members MP's.
House of Commons resumes Monday May 26th.

Goal is to have our MP's be more aware of our industry, level the economic playing field as to allow Canadian seafarers who want / need to work overseas compete with other international seafarers and to encourage / retain seafarers in our country.

Even though the letter does not mention the MMC, we do request that if you want to edit it please go ahead just send a copy to myself and National President Eben March.

Many Thanks

Marshall Dunbar
VandP Committee Chair
National Vice President.

The following is the "Tax Letter" mentioned above.

Dear [MP's Name],

I hope you are enjoying your new term in public office. I am writing to you as a citizen and advocate for Canadian seafarers regarding the need for a tax credit for Canadian maritime workers who work outside of Canada in excess of 6 months for a calendar year.

As you may know, other G7 nations and countries within the Canada-European Union Comprehensive Economic and Trade Agreement (CETA) have implemented similar provisions, recognizing the contributions that seafarers make to their economies and the global maritime industry. By granting a tax credit to Canadian seafarers, we not only align ourselves with progressive policies from our international counterparts but also enhance Canada's standing as a maritime nation.

Many Canadian seafarers work diligently abroad, gaining valuable experience and bringing back knowledge that can significantly benefit our own maritime industry. A tax credit would not only

acknowledge their hard work and commitment but would also incentivize more young individuals to consider a career in this vital field, which is critical for our national economy.

Furthermore, allowing Canadian seafarers to retain more of their earnings while working overseas would bolster the ability to bring funds back into Canada. This influx of money can stimulate local economies, support Canadian businesses, and promote growth within the industry. With a well-structured tax credit, Canadian seafarers would feel encouraged to explore international opportunities while still being recognized as valuable contributors to our nation.

As Canada strives to enhance its global visibility, a strong maritime presence is essential. Supporting our seafarers through a tax credit initiative would not only reinforce their importance but also demonstrate Canada's commitment to the maritime industry and its future.

I encourage you to advocate for this much-needed change on behalf of Canadian seafarers. Our country is home to talented individuals capable of making a significant impact globally, and it is imperative that we support them in their endeavors.

Thank you for your time and consideration. I look forward to your response and hope to see Canada take a step towards supporting our seafarers in this crucial area.

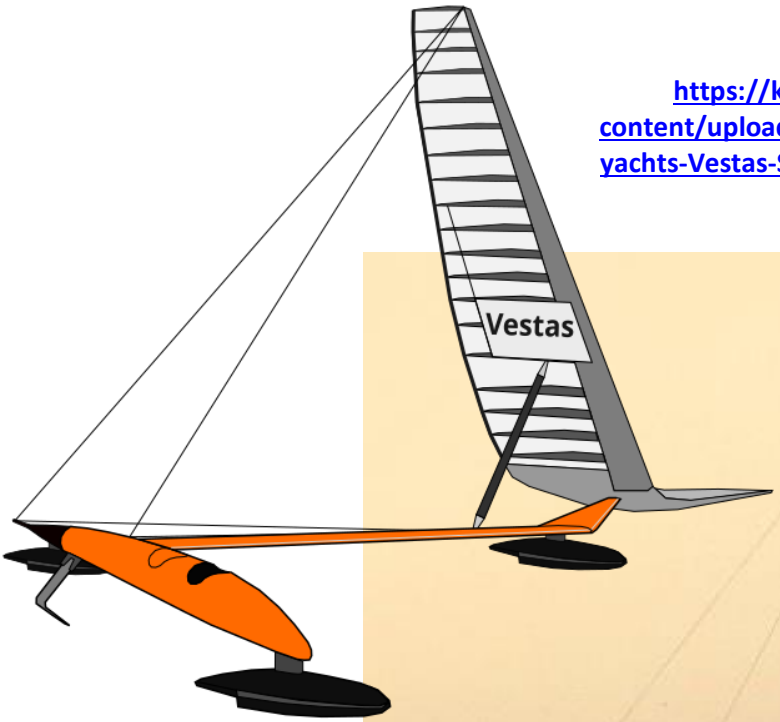
Sincerely,

Nautical Trivia

The July – Sept. 2024 edition, of the Deck Log (Link: https://www.mastermariners.ca/wp-content/uploads/2024/11/2024-3-The-Deck-Log-July-Sept.pdf), contained an article that had a trivia question asking: What is the world's fastest vessel? Apart from a jet powered boat, built to set the water speed record (275.98 knots), the fastest (for a number of vessel/hull types covered in the article) was 73 knots. A vessel type not covered was sailboats. Not a type that normally comes anywhere near the speeds of the vessels mentioned in the article. Turns out, that the sailboat should have been included. At least the *Vestas Sailrocket 2* should have been. See diagram and photo on next page.

Built for the purpose of achieving a sailing speed record, in 2012 it achieved 65.45 knots over a 500m course and 68.01 knots maximum. See a video at: **https://www.youtube.com/watch?v=DCPx8wQZ5KE.** The term "on a wing and a prayer" comes to mind. *Vestas Sailrocket 1* reached an unofficial 52.22 knots, before "crashing". See a video at: **https://www.youtube.com/watch?v=8Ow8QbXhZJU.**

For comparison, the Bluenose could reach 16 knots under full sail. Racing sailboats, that lift off the water on foils (hydrofoil sailboats) have reached 55 knots. Racing monohull sailboats, where the hull stays in contact with the water, have reached the upper 30 knot range.



Vestas Sailrocket 2 **Source:**
https://keyassets.timeincuk.net/inspirewp/live/wp-content/uploads/sites/21/2021/08/World%E2%80%99s-coolest-yachts-Vestas-Sailrocket-2-credit-Thierry-SerayDPPI-630x394.jpg

Vestas Sailrocket 2 **Source:**
https://en.wikipedia.org/wiki/Vestas_Sailrocket#/media/File:Vestas_Sailrocket_2,_sail boat,_esquisse.png

In the context of speed, the racing boats pictured on the next page are utilizing speed (and perhaps waves) to get airborne. At least for short periods of time.

They have pilots, engines, propellers and a means of steering (at least when on the water). All that's missing are wings to keep them airborne.

If they hit bow down, on landing, the very real possibility of becoming a submarine exists.

Depending on boat class, these boats have top speeds anywhere from 70 to 156 knots.

Offshore Power Boat Racing **Source:** https://www.offshoreonly.com/forums/attachments/opa-jersey-boyz/284676d1101958730-patchogue-l-i-race-boat-vehicle-info-fever1.jpg

Offshore Power Boat Racing **Source:**
https://www.pinterest.com/pin/209065607690279258/

In the News

Press Release – Canadian Seafarers Pathway Study

New Study Sheds Light on Urgent Workforce Gaps in Canada's Marine Sector

Ottawa, Ontario, May 21, 2025 – The Canadian Marine Careers Foundation (CMCF) announces today the release of the Canadian Seafarers Pathway Study, a first of its kind comprehensive report revealing critical labour and skills shortages in the country's marine transportation sector. The study identifies a pressing need to attract and train new talent, with domestic vessel operators needing to hire 8,300 new workers to meet industry demand and replace retirees by 2029 —the equivalent of more than 30% of its current workforce.

Without significant changes, Canada's marine training system will not be able to meet labour demands, and the study provides a roadmap of evidence-based recommendations designed to help guide the CMCF and the sector in developing and implementing strategies to ensure the marine sector's future viability.

"Canada's marine sector is vital to the national economy, not only for its direct contributions but also for the many industries and communities that rely on efficient marine transportation of passengers and cargo," says Julia Fields, Executive Director of the Canadian Marine Careers Foundation. "Ongoing labour shortages onboard Canadian vessels threaten the sector's future growth and sustainability, posing serious risks to supply chains and economic stability. Without immediate action, the marine sector's workforce challenges could have far-reaching consequences."

Conducted by R.A. Malatest & Associates, the study provides national and regional analysis of workforce trends, recruitment and retention challenges, and examines the capacity of marine training institutions to meet future labour requirements. The study focuses on marine occupations onboard Canada's domestic commercial and public sector vessels, such as cargo ships, ferries, tug and barges, tourism-related boats and Canadian Coast Guard vessels, but also occupations onshore that support vessel operations. It does not include port and terminal operations.

"Canada's marine industry is facing a critical seafarer shortage that cannot be solved by maritime education and training institutions alone," says Fabian Lambert, Chair of the Canadian Association of Maritime Training Institutes (CAMTI). "The Canadian Seafarers Pathway Study brings to light the cumulative factors affecting

sustainable supply and growth of the Canadian seafaring workforce, with meaningful strategic recommendations to meet future demand. We need a coordinated effort that includes greater government investment in marine education, more support for students, and meaningful commitments from industry to create inclusive and sustainable pathways for entry into the sector and career advancement. This Study presents a call to action to secure the future of our marine workforce."

Key Findings and Recommendations:

- **86% of employers report difficulty recruiting**, with over 3,600 seafaring positions unfilled in 2024. The overall sector job vacancy rate of 11% was more than three times higher than the national average for the transportation and warehouse sector.
- **More than 8,300 new workers will be needed in the next five years**; with more than half (56%) of those required for key marine positions onboard vessels such as navigation and engineering officers and ratings deck and engine crew. At current enrolment and graduation rates, marine training institutions **will only meet 40%** of the demand for those key marine positions.
- **Sector-coordinated initiatives are needed** to increase public awareness of marine careers and training pathways, including deepening connections with educators and youth and more targeted outreach to underrepresented groups and geographic locations. Initiatives should include experiential opportunities, debunking seafaring misperceptions and emphasizing the value of mariner expertise for multiple career pathways.
- **Some marine training institutions and programs currently operate below capacity, but even full enrollment and 100% graduation would not meet industry needs**. Federal and provincial governments should increase support for marine education, including enhancing student financial support to reduce barriers to entry, but also funding to help marine institutions increase capacity and expand remote, hybrid and intensive training delivery models.
- **Bottlenecks in obtaining sea-time experience (required for mariner certification by Transport Canada) must be addressed**. The federal government should work with marine stakeholders to develop pilot projects to increase opportunities for onboard training to gain practical experience while accounting for the necessary sea time.
- **Industry stakeholders—including professional/industry associations, employers, and unions — should increase funding** for scholarships, and bursaries for marine officer cadets, as well as allocate more resources to pathways that assist and incentivize marine officers and ratings seafarers to upskill and progress their careers
- **Employers should continue to build a more positive and inclusive onboard culture** through improving work-life balance and the onboard living experience. Employers should also be encouraged and supported to develop, implement, and

evaluate both top-down and bottom-up initiatives aimed at fostering inclusion and equity at work. This includes, for example, establishing employee resource groups, implementing anonymous feedback systems, dialogue groups or creating peer mentorship programs.

- **A clearer career progression pathway is needed for ratings (unlicensed) seafarers**, with more opportunities to advance and upskill. The study recommends the marine sector conduct a research project to evaluate the feasibility and process required to obtain Skilled Trades recognition for specific mariner positions.
- **Marine training programs must keep pace with technological change**. The federal government should work with marine stakeholders to develop and implement effective training to prepare the workforce for new technological developments on vessels. (i.e. related to decarbonization, digitalization, automation, safety).

For more information about the Canadian Seafarers Pathway Study:

- Summary Report
- Media Backgrounder
- Full Study
- Labour Market Data

The full study can be found at: Canadian Seafarers Pathway Study – Full Labour Market Report

Note About the Study Funders:
This study was sponsored by a consortium of marine stakeholders including the CMCF, the Chamber of Marine Commerce, the Council of Marine Carriers, the Laurentian Pilotage Authority, the Master Mariners of Canada, British Columbia Coast Pilots, BC Ferries, Vancouver Fraser Port Authority, and members of the Western Marine Community Coalition. Grant funding was also provided by the Lloyds Register Foundation.

Contact
Anna Hogarth
Communications Manager, CMCF
ahogarth@imagine-marine.ca | 438-356-6299

Here we have a study indicating a current shortage of mariners & a projected future shortage. To quote from the above: "Ongoing labour shortages onboard Canadian vessels threaten the sector's future growth and sustainability, posing serious risks to supply chains and economic stability. Without immediate action, the marine sector's workforce challenges could have far-reaching consequences."

WHAT HAPPENS NOW?

The study has been released and we don't really know if those who might take action, on the findings, will do so.

Some **questions**/comments**:**

Is this going to be yet another study, from a long list, on a variety of subjects, that gets no action and simply gathers dust on a shelf? Or these days, takes up space on a hard drive.

Let's go the other way and assume that action will be taken. **Who would initiate such action?** There are a number of potential stakeholders here. Let's take them one at a time and in no particular order.

Federal/provincial governments. The outlined issues relate to thousands of jobs/potential jobs for seafarers. The majority having high paying/relatively high paying jobs and, in addition to the tax revenue, support the local economy wherever they live in Canada. It relates to the supply of seafarers, for essential federal & provincial ferry services. It relates to the supply of seafarers, for vessels that carry goods within Canada. It relates to the supply of seafarers, to operate Coast Guard vessels. The list goes on.

The federal government could put in place measures to promote marine careers. There could be training incentives to help seafarers train for marine careers. There could be tax breaks for companies, to assist with the training of new seafarers. There could be assistance for those who train mariners, to ensure that there is capacity in place to train the number of Canadian mariners required. The list goes on.

The federal government had already taken action to address seafarer shortages, prior to this study being carried out. In the last number of years, through reciprocal agreements with a number of countries, Canada now permits foreign seafarers to work on domestic vessels operating in Canadian waters. The premiss being that the ships have to move and, if there are not enough Canadian seafarers to man them, the personnel have to come from somewhere. The non-Canadian seafarers are not required to immigrate to/live in Canada. I'm unsure as to the income tax implications. Neither am I sure as to the pay, leave entitlement, medical/pension benefits as compared to the Canadian mariners that they may be working alongside.

Government has been known, as it should, to take action when Canadian jobs/a particular industry/the economy are facing challenges. Current examples can be found in the context of the current US tariff situation. In the context of shipping, there have been articles in the Jan.-Mar. 2022, July – Sept. 2022, Oct. – Dec.2022, Apr. – Sept. 2023, Jan.- Mar. 2024, Apr. – June 2024 & Oct. – Dec. 2024 editions of this newsletter, relating to the high cost of building ships under the National Shipbuilding Strategy (NSS). All editions available at: https://www.mastermariners.ca/divisions/newfoundland-division/deck-log/. The aforementioned articles noting the much higher cost to build ships (under the NSS) in Canada, as opposed to lower costs for similar vessels being built in other jurisdictions. At least, in part, the Canadian government justifying the higher cost in the name of Canadian jobs and benefits to the Canadian economy.

Canadian jobs and benefits to the Canadian economy are also mentioned in the study. **In that context, why would government not take action regarding this aspect of the marine industry, like they have done for shipbuilding?** Perhaps government will take action on the findings of the study. **However, if they don't, why**

might that be? Perhaps this is not high on the priority list for government. Especially as they have already taken action to ensure that ships have the personnel needed to sail. The aforementioned arrangements that permit use of foreign seafarers. Should government choose not to take action, other stakeholders may have to lobby government to reconsider. **Who might that be?**

Canadian citizens depend on Canadian mariners/ Canadian ships for the goods and services that they use each day. Many aspects of Canadian business depend Canadian mariners/ Canadian ships for the goods and services required to operate. However, the majority of citizens/the business community are unlikely to make the report findings an issue. Especially if the flow of goods and services remains uninterrupted. Again, government has acted to keep the ships moving via the aforementioned arrangements that permit use of foreign seafarers.

Canadian vessel operators are stakeholders in this. They will likely (hopefully) continue to employ the Canadian seafarers that are available. Those who currently have initiatives to train new employee will hopefully continue to do so. Perhaps even expanding those initiatives. Those who have no training initiatives in place (and assuming no action taken on the study findings) will most likely go the foreign seafarer route.

Assuming that the funders of the study (see page 15) have made the findings known to all stakeholders, I ask again, what happens now? Will this be a one time presentation of the issues found and no follow up after that?

My own opinion, if there is no continued follow up on the issues found, there will be no meaningful action taken.

Does anyone reading this know of any action taken on the findings of the "Canadian Seafarers Pathway Study"? Please e-mail anything that you would wish to have published to: glenn.fiander@mi.mun.ca

I will continue to ask this question, in each edition of this newsletter. Hopefully I won't have to ask the question too many times. Assuming no meaningful action is taken, in my own very small way, I will attempt to keep the findings from being forgotten/ignored. Sadly, more than one voice will be required. The potential impacts on the future of Canadian seafaring, make this too important to ignore.

Two Vessels Run Aground

The first grounding taking place in a Norwegian Fjord. A container ship, traveling at about 16 knots, coming within meters of colliding with a cabin located near the shoreline. The cabin owners slept through the incident. At least up to the point where the vessel contacted bottom, so did the 2nd officer on the container ship.

After investigation, the Norwegian authorities confirmed that the Bridge Navigation Watch Alarm System was switched off before the vessel grounded. The investigation indicated that if the alarm had been turned on, the accident might never have happened. The system being designed to prevent this type of accident. The 2nd officer, who was been charged with negligent navigation, admitted to falling asleep on watch. He was alone on the bridge, at the time of the grounding. The AIS track shows the vessel failed to change course in the fjord and proceeded straight before it came to rest on the lawn of the shoreside home.

Container Ship Runs Aground & Nearly Collides with Cabin: Source: https://gcaptain.com/container-ship-runs-aground-just-meters-from-seaside-cabin-near-trondheim-norway/?subscriber=true&goal=0_f50174ef03-38e8cb03c2-139902913&mc_cid=38e8cb03c2&mc_eid=8fb15eb136

Container Ship *NCL Salten* Nearly Collides with Cabin: Source: https://www.maritime-executive.com/article/baltic-feeder-ship-runs-aground-feet-from-norwegian-s-bedroom?utm_source=mail_from_08/05/2025&utm_medium=email&utm_term=Glenn.Fiander@mi.mun.ca&utm_campaign=2025-05-23%20-%20Baltic%20Feeder%20Ship%20Goes%20Aground%20Just%20Feet%20From%20a%20House,%20UK%20Hands%20Sovereignty%20Over%20Chagos%20Islands%20to%20Mauritius

The second grounding took place on the Mississippi River. On July 29th, 2023, a towboat went aground and sustained hull damage because the pilot left the helm for five minutes, according to the NTSB. Adding to a long line of human-error casualties on the Mississippi, where there is little room for error given the close quarters, strong currents and hidden shoals.

The towboat *City of Louisville* was under way on the Mississippi pushing a tow of 11 empty hopper barges. The overall length of the tow was nearly 740 feet long. The pilot - a 24-year veteran of the towing industry - took over the watch at 1100 hours, and the tow proceeded upriver at a leisurely speed of about four knots.

At about 1442, the pilot got up and walked over to the port side of the wheelhouse, where he "relieved himself into a bag" (as per wording in NTSB report) while looking out the port side window. Once done, he threw the bag overboard and returned to the helm, arriving back at his position at about 1447, he told investigators.

During the five minutes he was away from the controls, *City of Louisville* missed a turn and began passing west of her intended trackline. By 1447, the towboat was 95 yards too far to the west and headed about 10 degrees to port of the intended course.

The pilot put the rudders hard over to starboard, and the head of the tow began to swing. At the same time, the stern swung to port, further towards the west. The towboat grounded on a rocky shoal at a position about 150 yards to the west of the intended trackline.

Towboat *City of Louisville*: Source: https://maritime-executive.com/article/ntsb-mississippi-towboat-grounded-when-pilot-took-a-bathroom-break?utm_source=mail_from_08/05/2025&utm_medium=email&utm_term=Glenn.Fiander@mi.mun.ca&utm_campaign=2025-05-25%20-%20The%20Maritime%20Executive%27s%20Most-Read%20Stories%20of%20the%20Week

The hull of the towboat was breached in the grounding, and the engine room began to flood. The tow remained intact, but the towboat settled further in the water, and the crew could not move it off the rocks.

City of Louisville was refloated and towed off for repairs and inspections found that large sections of the bottom plating were badly damaged. The vessel was later resold, then scrapped.

According to NTSB, *City of Louisville* had a pilothouse alerter system that was designed to set off an alarm if the pilot did not move the rudder controls for a set period of time, adjustable between about 1.5 minutes and 10 minutes. NTSB only learned of the casualty seven weeks after the fact, and when agency inspectors finally arrived, they found that the power adapter for the alerter system was missing.

The last recorded check of the alerter occurred in January 2023, and the pilot told investigators that he was not aware that it existed. He had never heard it go off. NTSB could not determine whether the system was working at the time of the casualty, nor what time interval it may have been set for.

"A pilothouse alerter, when used as intended, is an effective tool that can help ensure a towing vessel operator remains awake and vigilant while on duty," NTSB advised. "Established procedures for the operation and use of the system should be outlined in the company safety management system and should include the time interval for reset of the alerter system."

The full NTSB report can be found at:
https://www.ntsb.gov/investigations/AccidentReports/Reports/MIR2519.pdf

One feel asleep and one had to use the washroom. Had there been a second person on the bridge, would either have the groundings have happened? Possibly but the regulators, who made the rules that permit a situation where one person could be alone on the bridge, obviously foresaw such incidents. There were requirements for alarms on both vessels. However, in both cases, the technology had either been deactivated or was not functional.

In the container ship incident, Norwegian investigators examined whether bridge manning requirements were met and if working and rest hour regulations were followed. Whatever the ultimate reasons for that incident, it does illustrate the potential dangers of having a vessel underway with only one crewmember on the bridge.

In the towboat incident, it seems that having the bridge manned by only one crewmember is normal practice. Some research indicates that (at least some towboats) are equipped with toilets on the bridge. While such incidents are certainly not funny, this video link shows a somewhat humorous demonstration of the process of using the toilet when you are the sole watchstander on one of these towboats and operating in confined waters.

https://www.youtube.com/watch?v=U8t0bReSN08

The *City of Louisville* either didn't have a toilet (a bag was used) or it was out of order. Unsure the consequences faced by the pilot of the towboat, as a result of the grounding. It is truly sad that mariners are often placed in such situations, that are out of their control. That is unless they say no and face the consequences or choose not to continue working there. Routes that may not be an option for every mariner to undertake.

We know who usually gets the blame, regardless of what is the root cause of the situation. In this case having only one watchstander and having no arrangements in place for someone to take his place when he had to use the washroom. The NTSB report identified the pilot's absence from the helm as the primary cause of the grounding. The report also noted the missing power supply for the pilothouse alert system, which would have warned of course deviations. No mention of vessel manning. The NTSB report itself does not impose fines or penalties. However, the report's findings could lead to regulatory actions or civil lawsuits from affected parties. The grounding caused an estimated $2 million in damage and a release of gear oil into the river.

The NTSB didn't say this but it seems the primary cause of the grounding was that the pilot needed to use the washroom but there were no arrangements in place for him to safely do so.

Have you written any articles or papers that you feel might be of interest to those who read the Deck Log? Do you know the authors of any articles or papers that might be of interest to those who read the Deck Log? Space is being made available here, and in future newsletters, for those who may wish to have those articles or papers published/republished.
Please forward any submissions to glenn.fiander@mi.mun.ca, for consideration. If you are not the author, please have the author provide consent to publish. Any submissions will be published, as received, without any editing. The editor reserves the right to not publish any submissions that may be deemed inappropriate. Such decisions would be made in consultation with the members of MMC NL Division.

For this edition, we have a paper written by David March and Jack Moulton. Both are 1st year Nautical Science students at the Marine Institute. The paper was written as a requirement for their Term 2 Communications 1205 Course. Thanks to David and Jack, for submitting her paper for publication in the Deck Log.

See the paper, starting on the next page.

Investigating Arctic Expansion and Arctic Trade Routes

Submitted by: **David March** and **Jack Moulton** - T2 Nautical Science

Submitted to: Elizabeth Clouter for Communications 1205

1.0 Introduction

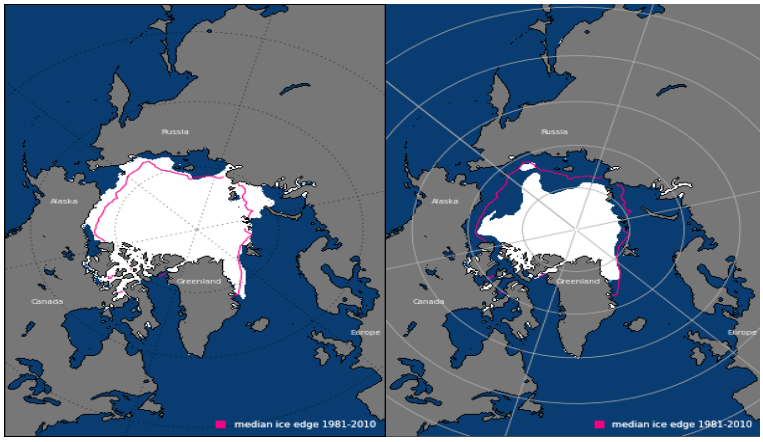
1.1 Purpose

This report investigates Arctic expansion and the opening of Arctic trade routes due to climate change. It focuses on Arctic shipping concerns, environmental impact, and geopolitical concerns associated with Arctic expansion. It provides recommendations on how to most effectively and safely trade in the Arctic.

1.2 Background

Arctic sea ice satellite images show to have hit a new low since the 1970's due to climate change. The end of summer extent fell from seven million square kilometres in the 1980's to four and a half million square kilometres in the 2010's (Poynting & Rivault, 2025). While many environmentalists see Arctic ice melt as a bad part of climate change, some will see it as an opportunity for shortened trade routes. Trade from Europe to Asia would usually take the Suez Canal and take 30 days, whereas New York to Asia would take 25 days via the Panama Canal. If Europe-Asia trade took the Northern Sea Route, the trip would only take 18 days and U.S.-Asia trip through the Northwest Passage would take 21 days (LePan, 2020). However, for hundreds of years these have been inaccessible due to the abundance of ice in the Arctic. However, as climate change continues, the recession in Arctic ice will continue as the University Corporation for Atmospheric Research (2022) depicts this in Figure 1A and 1B below.

Figure 1A Figure 1B



Arctic ice in September 1985 Arctic ice in September 2022

Note. Reprinted from "Compare Maps of Arctic Sea Ice Extent Side-by-Side" 2022. https://scied.ucar.edu/interactive/sea-ice-extent-maps-compare-arctic

As depicted in 1985, seven million square kilometres of ice covered the Arctic, but in 2022, ice covered only four and a half million square kilometres. Now ice is not covering northern Canada and Russia where two of the main trade routes through the Arctic are found, the Northwest passage through Canada's Arctic Archipelago and the Northeast passage along Russia's northern coast.

With the Arctic ice continuing to melt due to the increasing vulnerability caused by the naturally warming summer sunshine, researchers say the unusually frequent summer sunshine is having a bigger impact on the Arctic ice melting in the recent years because the decrease of what ice is currently present. This is decreasing the ice's ability to reradiate the sun's rays back into space. With the absence of clouds being the first barrier of reflection, and what clouds are present are keeping the sunlight on the ice. The past summer the Arctic ice had melted a minimum of 1.6 million square miles. This is a decrease in current ice by 43% from 1979, when the last accurate satellite images were taken of the Arctic (United Press International, 2011).

In 2022, Lindsey and Scott found the 6 million square miles the Arctic Ocean covers around the Earth's north pole is covered year-round with sea ice. The ice is the thickest and most pronounced in March and is the thinnest in September. September 2022 has tied the year 2010 as the eleventh lowest concentration of Arctic ice. The smallest daily ice density was on September 18 where the icepack had the least amount for the summer at 1.8 million square miles. While challenges remain concerning safety of shipping through the Arctic Kimbell (2022) of Brown University suggests that in the year 2065 or sooner the Arctic could become so navigable that trade routes will not only become a thought but a reality. This has been corroborated by studies conducted by Brown University and other University counterparts. These studies show Arctic trade routes and Arctic

expansion changing from a far-off thought to a quickly approaching reality. Projections show that trying to stop this melt is a noble thought but at the current rate of global climate emissions, stopping this is very unlikely.

1.3 Scope

Ms. Clouter requested that this investigation on Arctic Expansion be completed by March 2025. The investigation looks at the Shipping Industry Challenges, the Environmental Impact, and the Geopolitical Concerns, considering the gap of what is done currently with the Arctic, to what must be done in the future so that the Arctic is still preserved while also accounting for upgrades necessary to withstand the increase in vessel traffic. With limited internet knowledge on certain subject areas, a reliance on primary sources was necessary for information.

Research revealed that the Arctic is the next biggest trade route that allows the shipping industry to cut down on shipping times and therefore also saving in costs. This report will focus on the shipping strategy and the industry development necessary for the increased traffic in Arctic waters. The marine environment was raised as an area of interest because of the current marine life and the pollution that is be caused by the vessels travelling through. With these waters becoming more accessible, the possible increase of pollution and possible harm to habitats are a concern. Also, the increased interest in trade routes from multiple countries raise geopolitical and legal concerns. This is also the leading factor into the possibility of increased military presence throughout the Arctic.

1.4 Methodology

Secondary research is the main basis of information gathered for this gap analysis. The websites of environmental companies, and data analysis companies were used to gather current information and conditions about the Arctic. These sources were found throughout the Queen Elizabeth II library's online platform, as well as general internet searches. The information found on the Arctic Portal's website gave us insight to the current infrastructure up in the arctic. With email contact with Alec Matthews, a captain with Coastal Shipping limited, we obtained insight on what current seafarers experience while up in the cold Arctic waters. Captain Dr. J. Parsons informed us on why more people are looking for ways to travel through the Arctic and also mentioned the problems and situations that the seafaring organisations will have to overcome to make their travels fast and efficient, while also being considerate towards all the small communities that are currently up in the Arctic. Find a full reference list for all information included and used during the completion of this gap analysis at the end of report.

2.0 Arctic Shipping Challenges

Even as Arctic Navigation becomes a greater possibility in the future due to climate change there are, however, challenges that present themselves when it comes to safely navigating the unknown waters of the Arctic.

Captain Dr. Parsons (personal communication, March 6, 2025) highlighted the Challenges about Arctic shipping listed below:

- Lack of constant satellite communication and internet in Arctic waters.
- Risk of unexperienced crews in Arctic could cause incidents if not trained properly.
- Need to winterize ships to safely navigate in Arctic waters.
- Lack of exact and reliable charts in the Region.
- Infrastructure needs such as coast guard stations, bunkering facilities, and docks.
- Lack of defined shipping corridors.
- Need for better ship design.

2.1 Arctic Shipping Concerns

In 2025 the Canadian Armed Forces (CAF) launched a trio of satellites into the high Arctic to create better connection and surveillance for Canada's defence. The satellites will provide immediate images of Arctic waters that the CAF will use to track traffic in Canadian waters and have direct reports in blockages. While these satellites are only useful for military purposes, they could be extremely useful for shipping companies if Arctic shipping becomes a reality because it could help direct traffic through the best route and keep ships out of dangerous waters. The European Space Agency (n.d.) said the Iridium satellite constellation provides communications to the Arctic; however, they have recorded instances where communication has been interrupted for several minutes; with long interruptions in communication ships could miss mayday calls, or ships in distress may only have several minutes to communicate their distress and their call may be missed

In 2017 the International Maritime Organization (IMO) adopted the Polar Code which set out to regulate as the IMO stated, "ship design, construction, and equipment; operational and training concerns; search and rescue; and, equally important, the protection of the unique environment and eco-systems of the polar regions" (para 3). Countries did adopt this code; however, Argentina, along with co-sponsors Canada, Chile, Georgia, Malaysia, Philippines, South Africa and Türkiye have put forward 14 recommendations to the IMO on how polar code training could be improved to make sure Polar Code training is as effective as it can be so there are experienced crews in Arctic waters that fully understand the implications if accident should occur (Safety4Sea, 2025). Training in all countries should be standardized to guarantee all vessels in the region are shipping safely.

Nautical charts are one of the best tools for mariners to navigate safely. Most of the world's navigable oceans are surveyed regularly, and mariners get the latest information through the annual and monthly notice to mariners through their home countries' coast guard. However, the isolated nature of the Arctic and almost constant ice cover has made it difficult to survey the region properly. The National Oceanic and Atmospheric Administration [NOAA] (n.d.) states that most Arctic charts were surveyed with imprecise technology in the

1800s and 1900s. This lack of accurate up to date charts could be a serious problem for mariners as water depths or hazards to navigation could have changed and they would not know. Without updated charts the risk to safety of life, environment, and cargo increases. Without updated charts the risk to safety of life, environment, and cargo increases. The Government of Canada (2023) shared that icebreaking vessels in the Canadian Arctic have been making strides to help with this problem as well the Royal Canadian Navy has assisted; these ships attach devices that record depth of water on their track and this recorded data is sent to the Canadian Hydrographic Service to help update charts. Despite these strides in the right direction, it has its limitations of only being useful in places that ships already know to be navigable; furthermore, due to low vessel traffic these surveys still are not sufficient for safe navigation.

Another concern with Arctic shipping is that multiple trade routes can be used which poses the challenge of keeping every single passage open during the shipping season which would cost exponential amounts of money and coordination to achieve. Pictures below in Figure 2 depict most trade routes available now.

Note reprinted from "The Polar Silk Road" (2023) https://www.statista.com/chart/30201/major-maritime-routes-opening-up-in-the-arctic/

Over 15 trade routes are available now which means extra navigation aids as well as extra infrastructure. Chen et al (2023) suggests multi-objective path optimization algorithm that would help streamline navigation routes. Condensing 15 routes into fewer routes such that there could be more infrastructure and navigation aids on those routes without spending exorbitant amounts of money. If decreasing routes were to happen, however, there is no guarantee that these routes would not be blocked by ice or other hazards in the future as the Arctic is an unforgiving environment.

2.2 Infrastructure Development

As noted, with shipping traffic increasing throughout the Arctic, the need for more infrastructure is needed. The current ports for ships traversing this region are in Norway, Iceland, and Alaska where shipping is more concentrated and the need for ports is required. Ports in the region that are further apart are being made bigger so they can get through the Arctic without making any stops to bunker, or to resupply provisions. Right now, the shipping hub in Murmansk is statistically the biggest and is a non-freezing port so can accommodate various ship types. Talks are being made by Russia to expand its Arctic shipping ports and hubs along the coast to increase the amount of vessel traffic (Arctic Portal, 2024).

Feller (2023) suggests that lack of infrastructure and ports cause higher risk rates. Infrastructure needed for the Arctic would be different than what we need down lower in elevation. For the infrastructure to make sense and serve its purpose for the vessels it would have to be placed in a high traffic area that is accessible by all vessels that travel the routes. With the everchanging conditions in the Arctic and ice, the infrastructure placed in what people might think is a high traffic area could be open and accessible for a certain amount of time, but then it could also be blocked off and keep vessels from entering or leaving when they need to. The lack of current infrastructure, the uncertainty of request times for aid, and the lack of shareable information are the main concerns of everyone who travel through the routes and who call the arctic their workplace. The need for more infrastructure is present, but problems with accessing the companies and organisations with the necessary amount of information nevertheless exist.

For Arctic expansion to benefit everyone, the need for international cooperation is key. Too many unknown variables are present for just one country or company to take over and get all the answers; it is going to take companies from different countries working together and having different perspectives to make this benefit all who are looking at travelling through the Arctic (Arctic Portal, 2024).

With all the information given about the current Arctic infrastructure, the main question that persists is where the infrastructure will be placed so that it can be useful and accessible by everyone. Infrastructure must be accessible, serve its purpose, and withstand the changing weather of the north. One possible solution to this problem is to put the infrastructure in places where the traffic has been the heaviest the past years; instead of making 15 channels, make fewer channels that pass through these areas so the vessels will always have access to these new hubs and infrastructure. A second solution is that the infrastructure is built to be mobile so that the authorities can move it to where the ice is less if the current location is for seen to be blocked off by moving ice.

2.3 Shipbuilding Strategies

The harsh environment of the Arctic means that ships need to be designed to withstand the ice regime of Arctic travel. Captain Drodge (2024) in an interview with VOCM stated the need for a national ship building strategy to evolve icebreaking capabilities in the Arctic. The Canadian Coast Guard (CCG) has recently awarded a contract to Seaspan Vancouver to construct a new heavy icebreaker (Wat, 2024). This icebreaker design will allow the CCG to work in the Arctic year-round. While this vessel will be primary be a research and search and rescue ship there is an opportunity for more of these ships to be constructed to help elevate ice build-up in major trade routes should they become a reality. Commercial ships trading in the Arctic will inevitably have to be ice classed by a classification society to safely navigate the Arctic even if ice cover is reduced. Ice classed ships have reenforced hulls, increased power, and icebreaking bows (Ice Classes of Cargo Ships: Navigating Polar Waters with Confidence, 2025). Keeping ships fuel from gelling would require extra upgrades. Upgrading ships to survive in the Arctic would increase the cost for companies to build ships. A cost benefit analysis is needed to decide whether shipping through the Arctic is worth the cost.

3.0 Environmental Impact

Arctic shipping would cut back travel time for major countries to transport their goods; however, the Arctic is home to many diverse species that have been relatively exempted from direct contact with ships. Shipping can only be achieved in this region if the utmost care is taken towards pollution control and marine life.

3.1 Pollution Control

On November 2, 1973, the IMO adopted the International Convention for the Prevention of Pollution from Ships (MARPOL) which set regulations on ship pollution of marine environments. Pollutants included in this convention include oil, sewage, garbage, harmful substances, and air pollution. Risk of pollution in the Arctic increases due to the navigation concerns listed above. If an accident should occur the infrastructure for an effective clean-up through local coast guard stations is simply not available. Capt. A. Matthews (personal communication, March 3, 2025) said that in his 14 seasons in the Arctic, lack of aids from CCG have required companies to invest in equipment for pollution control. An incident that occurred in Arctic waters that could have caused considerable damage was the grounding of the *Akademik Loffe* on 24 August 2018. The vessel was sailing in a poorly charted area, and due to poor bridge management, the vessel ran aground causing damage to ballast and fuel tanks with 80.51L of fuel leaking into the delicate marine environment. The ensuing report from the Transportation Safety Board (2021) highlighted the damage this incident could have caused to the environment and the difficulty of a CCG response.

3.2 Marine Life

With more ships passing through the Arctic, the chance of interaction with marine life is increasing. The possible interaction with ships could cause several problems for the marine life up under the Arctic ice. The sound from the vessels passing through can cause communication problems for the whales that use noise; the noises from the ships could cause the animals to mistake the ships for other animals. Different marine life has different tolerances to noise; the vessels could exceed the tolerance of certain marine life which can cause discomfort for them (Niemi et al, 2024). Besides the most known species of Arctic marine life like polar bears, narwhals, and walrus, the Arctic is home to 21,000 different species. All these animals and living organisms are experiencing the same effects; the ice melting due to climate change and the increased shipping activity are putting these habitats in jeopardy. These animals have been used to a lifestyle which is very limited in human interaction, but with the opening of the ice and the shipping season becoming longer, the chance is growing exceptionally (Arctic Council, n.d.).

Marine animals usually turn away from unknown vibrations and noises, but this isn't always the case. Whales and marine life sometimes encounter passing vessels and move towards the vibrations of the vessel, which can cause a strike. The chance of an oil spill is always a concern with marine life. With the Arctic being remote, the chances of getting quick help are not likely. If a ship were to have an oil or fuel spill and a whale or animal were to swim through it, the damage would be extensive because there is not any help for the vessel or animal in a timely manner (Government of Canada, 2024). From all the information found, the safety of Arctic marine life and their habitats will have to be one of the major areas to consider when the arctic shipping lanes and business expands with the future. These animals have been up living under the ice without human or ship interaction for years. When we decide to take our ships and vessels through these waters the vigilance to take care and safety seriously will be a big part to make sure we don't end up having constant ship strikes or oil spills which can have a negative impact.

4.0 Geopolitical Concerns

As the Arctic becomes the focal point of geopolitics due to climate change, natural resources, and strategic military positioning. As Arctic ice recedes and new shipping routes and natural resources get exposed, international competition can only increase. If another trade route such as the Suez or Panama Canals become unavailable due to blockages or conflicts non-Arctic countries could look north to ship their goods. This section will cover international and legal concerns and Indigenous community involvement.

4.1 Geopolitical and Legal Concerns

The key players in the Arctic include the United States, Canada, Russia, Norway, Finland, Denmark, and China. While China is not an Arctic nation, the prospect of trade routes could be enticing to one of the

world's biggest economies. In the last decade China invested 90 billion dollars in Russian energy projects in the Arctic (Brimmer, 2023). While the Arctic has still been relatively peaceful in the past due to the lack of navigable waters an increase in military presence in the region shows a warming in tensions for the Arctic. In 2025 Prime Minister Carney of Canada announced a six-billion-dollar plan to improve security and defence of Canada's Arctic waters. With Finland and Sweden having now joined NATO, Russia is certain to try and show force in the Arctic (Boulegue, 2024). All of this leads to more questions about the future such as who will run trade routes, who owns Arctic trade routes, and who will profit off these trade routes. Right now, there is a framework for international cooperation in the Arctic through the Arctic Council. This council consists of Canada, Russia, The United States, Denmark, Finland, Iceland, Norway, and Sweden. The Arctic Council cooperate on Arctic environmental issues and making recommendations on how best to work together but this is not a binding organization that can create international laws.

4.2 Indigenous Community Involvement

Downing (2019) suggests that an increase in Arctic shipping could have both positive and negative impacts on indigenous communities however if done right it could provide opportunities for community growth. With the number of ships increasing and the lack of experience the need for pilots and people who know how to navigate the waters will be needed. The people who lived up in the ice for their whole life and who have navigated these waters would be the first people the shipping industry would look for because of their local knowledge of the area.

With the inclusion of the Arctic's indigenous people who live up in the arctic, cultural complications could also be present as their lifestyle is so integrated with fishing, hunting, and herding. With the increasing of vessel traffic, this could lead to the complication of their routes that they've used year after year for these trips (Arctic Ice Project, n.d.). These trips could cause problems when involving them with future work with the expanding shipping industry. As these trips could mean more than a job would. It could cause complications to wildlife hunting suggests (Abssi, n.d.). The communication between the indigenous communities and the shipping companies would have to be clear and straight to the point when it comes to the future of their lives and the future of arctic shipping. This is one area that would have to be held in many sittings with lots of negotiations so that both sides are satisfied.

5.0 Conclusion

Through research and personal communications, it has become apparent that the arctic is the main topic of expansion and evolution for the shipping industry. For this to be efficient and sustainably managed for the shipping companies, they need to have a well-thought-out plan of how to tackle the ice and the new challenges

that the arctic could have for them. The current Arctic communities would have more frequent contact and interaction with the ships going to their communities, or with ships passing through. The already existing councils that are focused on the arctic and its expansion need to have more conversations trying to find a way that the shipping industry profits from the new region; they will also have to talk with Arctic community and indigenous leaders, so their culture and cultural events are heard about and taken into account. With the Arctic being a relatively new area for expansion, the major councils will need to work with the minor councils and the people who are in the arctic to make sure that the arctic is still protected and not shadowed by the evolving shipping routes and lanes.

6.0 Recommendations

Based on the preceding information, the following practical solutions to help navigate the Arctic safely and efficiently are recommended:

1. Increase satellite connectivity in Arctic regions.
2. Ensure crews are trained properly pursuing the polar code.
3. Ensure ships are properly equipped for Arctic navigation through strengthened ship design, ice radars, powerful search lights, etc.
4. Survey Arctic waters to ensure exact charts.
5. Decide on preferred trade routes to cut costs when building infrastructure.
6. Build infrastructure such as Coast Guard stations, bunkering facilities, and docks to aid in safety and search and rescue operations.
7. Create strict environmental regulations to help protect the delicate Arctic ecosystem.
8. Increase international cooperation through organizations such as the UN, Arctic Council, and IMO to ensure peace in the region.
9. Involve Indigenous communities in activities in the Arctic.

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