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14. ABSTRACT This paper proposes a method for establishing the permanent presence of the United States in the Arctic. The rapidly changing physical and strategic environment of the Arctic highlights the United States' lack of strategic and operational Arctic reach. Considering that Strategic power is exercised via Diplomatic, Information, Military and Economic instruments, the lack of Arctic operational reach highlights U.S. deficiencies in the Military instrument of strategic power in the Arctic domain. This in turn creates complementary shortfalls in the U.S.'s Diplomatic, Information, and Economic powers related to Arctic Strategic interests due to their entwined natures. First, by creating an Arctic Combatant Command, the US removes current operational ambiguity between USNORTHCOM and USEUCOM in the Arctic Area of Responsibility (AOR). Second, by training and reallocating ships to conduct Arctic deployments and train in navigable waters that mimic forecasted Arctic conditions, the US prepares to always operate in the Arctic. Lastly, the establishment of forward deployed bases ensures rapid and consistent permanent access to the expanded Global Commons and newly accessible resources. The establishment of a U.S. permanent presence in the Arctic positively impacts the global commons by encouraging free and open trade, peace, and stability to an increasingly contested and strategically advantageous region of the world. U.S. permanence in the Arctic also assures the Military instrument of strategic power is enabled via assured access to resources and national defense assets that can challenge military use of the Arctic against the U.S. and its allies, and provides enhanced options for peace and stability Diplomatically, protecting the Arctic and Arctic nations Informationally, and ensuring equal access to the Global Commons Economically.					
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ESTABLISHING THE PERMANENT PRESENCE OF THE UNITED STATES IN THE ARCTIC

Captain Jerome E. Levy Economic Geography and World Order
Submission

MAY 12, 2023

The rapidly changing physical and strategic environment of the Arctic highlights the United States' lack of strategic and operational Arctic reach. Considering that Strategic power is exercised via Diplomatic, Information, Military and Economic instruments, the lack of Arctic operational reach highlights U.S. deficiencies in the Military instrument of strategic power in the Arctic domain. This in turn creates complementary shortfalls in the U.S.'s Diplomatic, Information, and Economic powers related to Arctic Strategic interests due to their entwined natures. In particular, the U.S. lacks an Arctic focused Geographic Combatant Command (GCC) which limits U.S. strategic options, has no maritime forces capable of sustained Arctic operations, and lacks points of access for these forces in the form of basing and support. This lack of strategic reach in the Arctic puts U.S intermediate and long-term Arctic Diplomatic, Information, Military and Economic interests at risk given other global powers filling the vacuum created by the rapidly changing physical and strategic landscape of the Arctic. Both United States Northern Command (USNORTHCOM) and United States European Command (USEUCOM) missions clearly state that the People's Republic of China (PRC) will not remain a mere observer in the Arctic as it views itself as a "near-Arctic state" and is actively seeking to expand access for its Polar Silk Road Initiative, while Russia continues to expand its Northern Sea Route (NSR)¹. As potential for a seasonally ice-free Arctic in the next 20 to 30 years increases, the resultant influx of trans-Arctic shipping lanes would cut transit times by 1/3 between Europe and Asia from 30 days via the Suez Canal, to approximately 20 days². Additionally, the total value of Arctic subsoil resources exceeds \$30 trillion including \$20

¹ NORAD and USNORTHCOM Strategy Executive Summary and Wolters, SASC Hearing for USEUCOM.

² Melia, N. Geophysical Research letters. Estimates of transit time are based on greenhouse gas emissions' effect on ice melt and the resultant ice coverage throughout the year with transit occurring when there is less ice.

trillion of fuel reserves³. When compared to current global fuel reserves of \$52 trillion, the potential exploitation of natural resources in the Arctic becomes lucrative in addition to accessible which exacerbates the claims to Economic Exclusion Zones (EEZ) claimed by the U.S., Russia, Canada, Norway and Denmark⁴⁵. First, by creating an Arctic Combatant Command, the US removes current operational ambiguity between USNORTHCOM and USEUCOM in the Arctic Area of Responsibility (AOR). Second, by training and reallocating ships to conduct Arctic deployments and train in navigable waters that mimic forecasted Arctic conditions, the US prepares to always operate in the Arctic. Lastly, the establishment of forward deployed bases ensures rapid and consistent permanent access to the expanded Global Commons and newly accessible resources.

Arctic Access Background

The Arctic has been traditionally limited to little or no access. Arctic access efforts historically peaked in the 1980's when the Soviet Union was investing heavily in its NSR⁶. However, the reduced summer sea ice is garnering interest from nations to expedite travel between the Atlantic and Pacific Oceans in lieu of using the Suez and Panama Canals. Current Arctic transits, as demonstrated in Figure 1a, occur along the Northwest Passage (NWP) through the M'Clure Strait and Amundsen Gulf, as well as the NSR which crosses through the Sannikov Strait and the Vilkitsky Strait. Globally, there isn't use of the Transpolar Sea Route (TSR) which cuts across the middle of the Arctic Ocean, Figure 1b, due to current ice sheet levels which make

³ Melnick, Vladimir. The potential economic impacts are based upon degrading permafrost which vary depending on the model used. Twelve possible cases were tested with different ground air temperature assumptions.

⁴ Oil and Gas journal, Xu, 2022. Global fuel reserves total \$52 trillion.

⁵ Fischetti, Scientific American. Russia submitted claims to the international commission claiming natural extensions of their continental shelf give them and additional 200,000 square kilometers of rights to Arctic seafloor.

⁶ Melia, N. Geophysical Research Letters. Melia Describes historical shipping trends in the Arctic.

it unnavigable by present-day vessels. However, by 2030 it is expected that Polar Class 6 (PC6) vessels will be able to use the TSR, and by mid-century (2045-2060) it is expected that there will be several more routes available to standard non ice hardened open water vessels including the TSR as shown in Figure 2⁷. With current ice levels, ice hardened vessels are required for access to most areas of the Arctic and the U.S. does not possess military or Law Enforcement ice-strengthened ships, outside of the USCG's two icebreakers, of which only one is in service. However, model forecasts indicate the strong likelihood of increased seasonal to year-round access over the next 25 to 75 years⁹. When open water vessels start to traverse the TSR, they will steam along the boundaries of both USNORTHCOM and USEUCOM within the Arctic, and through USINDOPACOM from the Northern Pacific to Kamchatka depicted in Figure 3. Due to the decreased transit times mentioned previously, open water vessels, especially those of PRC and Russia will have easier accessibility to Canadian and U.S. EEZs and Territorial Waters (TW) which requires U.S. permanent presence and ability to transit the Arctic to ensure U.S. and allied strategic interests are secured.

Many unknowns exist regarding forecasting Arctic Ice Melt seasonal trends and its economic impacts¹⁰. Several studies do provide insight to potential Ice Melt trends such as Arctic Amplification and Atlantification of the Arctic¹¹. Arctic Amplification is the phenomenon where the Arctic region is changing faster than global averages including rising ocean and air

⁷ Transportation, Canada. Polar Class ratings go from PC1 to PC7. PC1 have year-round access to polar waters. PC6 vessels have summer/autumn operation in medium first-year ice including old ice inclusions.

⁸ Melia, N. Geophysical Research Letters. The fastest available route projections used two different models from RCP2.6 and RCP8.5. While there are differences in the scale of availability in ice free conditions, both models point to greater availability to access to the TST by Open Water vessels, not just Polar Class Vessels.

⁹ Melia, N. Geophysical Research letters.

¹⁰ Alvarez, J. There are limited studies on Arctic changes impact to global economies. Many studies address the physical changes but do not address the economic.

¹¹ Timmermans, 2020. Provides description of Atlantification and Arctic Amplification as well as additional references to scientific studies on both phenomena.

temperatures, melting snow, ice, and permafrost¹². Observations since 1979 suggest that the Arctic has warmed four times faster than the rest of the globe¹³. Additionally, polar water masses are showing characteristics resembling water masses of the midlatitude Atlantic Ocean.

“Atlantification” of the Arctic is seen in Arctic waters with Atlantic-like conditions of reduced sea ice, weaker salinity stratification, and enhanced heat transfers¹⁴. Performing exercises in the Atlantic specifically, but also in the Pacific above 45 degrees North would allow U.S. assets, of which none are ice rated, to train in a variable environment where there is a transition from warmer and saltier waters (Atlantic Ocean with upper ocean exhibiting what is known as alpha-stratification) to the cooler fresher waters in the subarctic frontal zone in the North (this region exhibits beta-stratification but is starting to mimic the Atlantic)¹⁵.

Knowing the current trends of scientific and political characteristics in the Arctic allows the U.S. to train to how it may potentially need to fight as the presence of PRC, Russia and other nations influence in the Arctic increases. High North future potential fights may result from the scale up of forces in the Russian Pacific Fleet, escalatory nature of the PRC with its investments in Russian energy and its desire for economic footholds amongst Arctic nations to gain influence, and overall Russian and PRC expanded military access to U.S. and Canadian target sets through more available navigable waterways in the High North¹⁶. Without understanding the water properties and their effect on the global transit patterns, navigating, and maintaining

¹² Timmermans, 2020.

¹³ Rantanen, Mika – The phenomenon known as Arctic amplification describes the rate at which the Arctic has been warming much faster than the rest of the world. In the Study, estimates suggest that the Arctic has warmed nearly four times faster than the globe since 1979.

¹⁴ Timmermans, 2020. Atlantification has numerous impacts and implications in the interface between the Arctic and Atlantic Ocean whereby the Arctic Ocean is beginning to exhibit the characteristics of the Atlantic Ocean at mid latitudes. Note that weaker stratification implies saltier surface water.

¹⁵ Timmermans, 2020. The Discussion of Atlantification expounds upon water masses and their characteristics/ differences at transitional zones typically around 45 degrees Northward. More scientifically geared discussions are also available from Roden in 1970 and 1991.

¹⁶ SASC, Wolters and SASC Aquilino both describe the escalatory actions by both the Russian and the PRC.

presence in the Arctic in 20 to 30 years safely cannot be assumed. Additionally, without establishing U.S. Operational and Strategic reach, which define the distance and duration across which a Joint Force can successfully employ its military capabilities, the U.S. will not have the ability to respond to any threats to world order and its strategic interests¹⁷. Creating the Arctic Combatant Command, building and training an Arctic U.S. fleet, and bolstering forward deployed Arctic bases are crucial in preparing the U.S. to maintain order, secure its strategic interests and maintain peace in the physical and strategic conditions that will manifest in a seasonally ice-free Arctic.

Creation of an Arctic Combatant Command - USARCTICOM

Due to the large area of the Arctic domain which is roughly equivalent to the Western Pacific AOR encompassing the East China, Philippine, and South China Seas, Bay of Bengal to Sri Lanka, including the Indonesian and Philippine archipelagos¹⁸, it is necessary to implement a new Geographic Combatant Command in the Unified Command Plan (UCP), United States Arctic Command (USARCTICOM), instead of simply a Task Force for two primary reasons: First, the posture as the twelfth unified combatant command would send a signal to the rest of the world that the United States takes the Arctic seriously and has a permanent command committed to ensuring US continued strategic access and control in the AOR. Second, it would enable greater yearly fiscal resource allocation through negotiations at the yearly Senate and House Armed Services Committees that would allow the command to grow in parallel to the increasing accessibility of the Arctic in the decades to come.

¹⁷ JP 3-0. Joint Publication provides definition of Tactical, Operational, and Strategic reach. Tactical reach in its simplest form is the ability to hit a target once, Operational reach hits the target multiple times, and Strategic reach enables the U.S. to hit a target any time it wants.

¹⁸ Barrett, USAF Arctic Strategy. The Arctic is defined as the area above 66 degrees North Latitude which is approximately 2.5 times the size of the continental U.S.

The ambiguity of “who is responsible” associated with the UCPs delineation of Arctic boundaries will increase as Arctic Sea Lines of Communication (SLOC) transition to cover the whole of the Arctic Area of Operations and the TSR availability expands. While shifting combatant lines would require mitigation, having unity of effort and purpose of high North initiatives from NORTHCOM, INDOPACOM and EUCOM under one command allows for seamless execution of many operations in theater at once, whilst ensuring the Arctic Strategic Corridor between the U.S. Homeland, the Pacific, and Europe are open and connected¹⁹. USARCTICOM would facilitate the ability to respond, coordinate and track movement of enemy and friendly forces in the Arctic by constantly monitoring the whole region since USARCTICOM would have responsibility for the whole area, vice a half as its currently split. Figure 4 demarcates a potential layout that would cover the Arctic including Greenland. All approaches into the Arctic are included, as well as all coasts that run along the Arctic. Additionally, the proposed demarcation includes part of the Northern Canadian Islands since there are Arctic routes that run through Amundsen Gulf.

The goal of USARCTICOM would be to consolidate Arctic activities into the purview of one command, which would then allow the Commander of USARCTICOM to provide unity of command, effort and resource management benefitting the Department of Defense, the rest of the Executive branch, and also across U.S. Federal and state governments. USARCTICOM would also enhance our allied interactions with similar benefits by having a singular touch point for nations to coordinate with. Additionally, the Commander of USARCTICOM testimonies before the Congressional Armed Services Committees each year would provide unity of focus on the status of the Arctic that captures the changing physical landscape, its effects on the stability of

¹⁹ SASC, Wolters. During the testimony GEN Wolters describes the strategic importance of the Arctic as a corridor between the different AOR's.

the region, and ultimately, a “reminder” is established that keeps the Arctic at the forefront of fiscal considerations while the forces and basing are established more permanently in the Arctic.

Creation of USARCTICOM is a solution that can be implemented now while in the coming years the U.S. fleet of Arctic capable ships are constructed and prepared for deployment. By creating USARCTICOM, the U.S. will be able to continue to ensure continuous access to the strategic corridor the Arctic provides and maintain Arctic deterrence in the region which will ensure the changing dynamic nature of the Arctic does not lead to conflict.

Building and Training a Fleet for the Future Arctic Ocean

The U.S. needs to continue training with its allies who have experience in Arctic climates and start to build combatant ships that are ice capable because it does not currently have any ice rated combatant ships in its inventory²⁰. While USARCTICOM can be materialized expeditiously as delineated in Section 1, a fleet of forward deployed ships that are ice capable will take nominally 7-10 years to construct, commission and deploy. Ultimately, the U.S. can leverage its current High North assets, including aerial assets and Marine Expeditionary Forces (MEF) to increase its presence and ensure strategic access and oversight of the Arctic is not diminished.

The union of High North assets under USARCTICOM can be used in the interim to create a squadron similar in style to Destroyer Squadron 15 in Yokosuka, Japan whereby nine destroyers are constantly deployed individually or as a part of a Strike Group to conduct Freedom of Navigation Missions in the Arctic and its approaches where and when feasible. When the ice is too thick, they can continue training in areas north of the 45-degree latitude line to mimic the alpha and beta ocean stratification described previously, and water mass conditions

²⁰ Melia, 2016. Earliest forecasted times that open water vessels (non-ice reinforced) will be able to transit the TSR without ice protected hulls will be approximately 20-40 years.

they can expect in the future. Under USARCTICOM the lessons learned from deployments and training of the Arctic squadron can be consolidated to help define future Ice Hardening Combatant Requirements. Additionally, instead of cruisers, between now to mid-century, the Fleet should include four ice cutters that are able to navigate closer and closer to the TSR which would allow the U.S. to showcase its awareness and availability at traversing those progressively more available regions.

While the USCG has one WAGB Polar Icebreaker (in layup), one WAGB Icebreaker, and one WLBB Buoy Tender/icebreaker (used in the Great lakes), the number of ice breakers in U.S. inventory needs to increase²¹. Having two ice breakers is equivalent to having one considering layup and maintenance periods which is not enough. The U.S. should have at least four so that it can start to provide continuous presence in the Arctic, something it cannot currently perform. While the ice breakers could be manned by the USCG, long term they should retrain USN personnel to be able to then use those vessels to establish a further forward presence as was done prior to 1965. Under USARCTICOM, the integration of additional assets such as the LC-130H SKIBIRD Arctic support/tactical airlift platform, of which the U.S. Air Force has ten in inventory, will also be critical in U.S. forward presence by providing Aerial Lines of Communication (ALOC) for Arctic Operations of the Joint Force as well as Information, Surveillance and Reconnaissance (ISR) that could provide early warning of any threats to the U.S., and her allies.

In addition to naval and aerial platforms, preparation for the harsh environment that the Arctic climate presents is important. Exercises like the Norwegian led, multinational and multi-domain exercise COLD RESPONSE provide opportunities to validate amphibious landing

²¹ NWC Forces and Capabilities Handbook, JAN2020.

capabilities for MEFs with Royal Netherlands Marine Corps, Naval embarkation and boat patrols with Italian marines and sailors, and well as tactical casualty care and live fires with the UK²². Allocation of a MEF to USARCTICOM would enable a permanent expeditionary force to be available in the Arctic which can also collaborate with partner nations in response to increasing Arctic operational demands. Ultimately, integration of current aerial, expeditionary and naval assets under USARCTICOM, while the ice capable inventory is constructed, will need to train and be robustly reinforced. Additionally, they will require the basing infrastructure to use them to their fullest capacity in defending the U.S. Arctic interests and upholding U.S Strategic Access and control.

Arctic Access Bases

The U.S. needs to have forward deployed bases that are geographically within the Arctic so the U.S. can operate from an interior instead of exterior position which enables sustainment of forces and increases the U.S operational and strategic reach. There are two options which provide the ability to have a forward presence on both sides of the Arctic entrances (Pacific and Atlantic Ocean sides): The Canadian Nanisivik Naval base in Nunavut, Canada and Anchorage, AK which houses both Elmendorf AFB and Fort Richardson.

Partnering with the Canadians in their construction of Nanisivik Arctic Base provides the U.S. opportunities to continue bilateral operations, integrate with a strategic ally in an area of which they hold expertise, and establish a presence on the outlet of the NWP which will experience greater density of transit as ice coverage subsides²³. While the scale would need to increase to accommodate much larger volumes of personnel, having a forward presence in

²² USEUCOM press release on exercise COLD RESPONSE. <https://www.eucom.mil/pressrelease/42016/exercise-cold-response-2022-concludes>

²³ CBC News, 2023. <https://www.cbc.ca/news/canada/north/nanisivik-naval-base-nunavut-2023-update-1.6717971>. Construction underway for small Naval refueling station set to be completed in 2024.

Nanisivik, on Baffin Island West of Baffin Bay could provide a strategic point from which to permanently monitor transiting vessels because it lies on the outlet of the M'Clure Strait as it meets Baffin Bay (Figure 1). Figure 5 shows the location of the planned Nanisivik Canadian Arctic naval facility. Additionally, current models forecasted out to mid-century suggest there will be an increase in transit through these bodies of water (Figure 2c and 2d), so having a base that sits alongside these routes is of critical importance. From a response standpoint, working with the Canadians to build Nanisivik would put our Arctic force in theater now. Additionally, the base allows transiting forces to be staged or replenished to and from Arctic Patrols. Building the infrastructure of the airfield would allow integration of USAF Arctic assets to maintain our ALOCs open, and potentially training sites for USMC forces from the MEF that is assigned to USARCTICOM. While Nanisivik provides many options for the next ten years, the infrastructure is not there and would need to be built up. For a shorter timeline, using what we have in Anchorage, Alaska would allow us to start to develop presence now.

Anchorage Alaska houses both Elmendorf AFB and Fort Richardson via Joint Base Elmendorf-Richardson. Using the Joint base ensures we have integration of Air Force and Army capabilities. While the USMC and USN used to house forces in Adak, Dutch Harbor, Kodiak, and Sitka, they no longer have any bases in Alaska. There are personnel stationed in Anchorage, so the real intent would be to build up the Forward Deployed Naval Force of non-ice rated combatants in Anchorage until ice rated combatant vessels and further forward basing becomes available. Anchorage is also outside of the winter ice zone, which provides closer access to high north training and patrol areas when navigable by open water vessels while ice capable combatants are built. Additionally, the USCG operates a robust patrol presence during the fisheries seasons which provides USN forces an opportunity to leverage USCG experience in

Arctic waters especially in transition periods early and late in the season when weather becomes unfavorable for navigation. The infrastructure at Joint Base Elmendorf-Richardson could start to accommodate a transition into the Arctic by expanding a port infrastructure in Anchorage Alaska to house USN assets. While Nanisivik will take time to build, Anchorage could already be sourced as a staging location for the buildup of USARCTICOM forces and its Headquarters while Nanisivik is grown in size and scale²⁴. USEUCOM already deploys assets into the NSR from time to time, and eventually, those vessels could shift homeport to Anchorage to conduct those same patrols. Additionally, as Nanisivik grows in scale, it could also become an eventual homeport. Although Nanisivik being a full-fledged homeport is a very long-term solution, a forward base of that scale is required by mid-century when the NWP is sourced routinely for Arctic transport mentioned previously.

Arctic Permanence versus Presence

Many could argue that USEUCOM and USNORTHCOM are leveraging bilateral operations by integrating with partners which are central to the success of the US's oversight of its interests in the Arctic. USEUCOM maintains a persistent North Atlantic and Arctic presence alongside UK, French, Norwegian, and Canadian counterparts²⁵. USNORTHCOM focused its efforts on working with Canadian counterparts within NORAD to conduct multi command "exercises like ARCTIC EDGE, ICEX, and NORTHERN EDGE" which provided lessons learned in conducting multi-domain operations in the high North²⁶. These examples provide the plethora of work the U.S. forces conduct yearly to ensure they are ready for demand signals in

²⁴ JBER Homepage. Joint Base Elmendorf Richardson was originally established in 1947 as a Unified Combatant Command with the title Alaskan Command.

²⁵ USEUCOM SASC Hearing March 2022, GEN Wolters explains the multilateral engagements in the Arctic when stating how we are preparing and continuing to stay relevant and ready in the Arctic.

²⁶ USNORTHCOM SASC Hearing March 2021, GEN Vanherck provides examples of exercises preparing for operations in the Arctic.

the Arctic, but they do not address strategic presence since current assets return to their homeports at the conclusion of the exercises, outside of the Arctic AOR. Only performing exercises, no matter how multi-lateral or multi-domain do not address the need for a continuous permanent presence in the Arctic that is required in order to ensure continued U.S strategic access and control to the Arctic AOR as the waterways become more available and Russia and PRC have the ability to deliberately encroach on U.S interests using freedom of navigation in new trade routes, access to resources and the U.S. EEZ.

Ice basing could be used to suggest that in addition to force readiness, the U.S. can create forward basing on organic surfaces establishing seasonal operational reach²⁷. While currently useful, “Mobile” ice bases are not a realistic solution for sustained personnel recovery, equipment refueling, or strategic reach. The temporal nature of “mobile” facilities would enable tactical and maybe operational reach at best, but long term does not allow strategic reach into the Arctic because the bases are only available for short periods of time every year. Continuing to conduct these basing exercises allows the United States to track the changing Arctic, and more importantly, use current thick ice sheets to establish a forward presence when required, but the U.S. still needs a permanent forward basing infrastructure in the Arctic if it intends to keep Strategic control of the region which can be accomplished by working with the Canadians on Nanivisik and expanding the infrastructure at the Joint base in Anchorage.

Arctic Presence needs to become Arctic Permanence

The Arctic is changing faster than the global average which is resulting in ice melt, permafrost loss and an opening of global waterway transit pathways that will become lucrative to

²⁷ Submarine Force Atlantic Public Affairs - <https://www.navy.mil/Press-Office/News-Stories/Article/2970072/us-navy-concludes-icex-2022/> - Amplifying information on ICEx2022 where Ice Camp Queenfish, a temporary forward deployed base was built upon a sheet of ice located 160 nautical miles offshore.

global trade, accessibility to numerous mineral deposits in the Arctic subsoil, and the ability of nations to encroach on TW and EEZs of the U.S. and partner nations. US presence in the Arctic is temporal but needs to become permanent. By formalizing USARCTICOM through modification of the UCP, a single command has oversight of the Arctic region to ensure stability and access to the strategic corridors available in the Arctic remain open. Reallocating forces including High North ships, Planes and Expeditionary forces under USARCTICOM would allow the U.S. to use its current inventory to maintain presence in the Arctic while an ice-capable fleet is constructed which allows the overall Arctic Force to be continually ready for Arctic engagements. Constructing permanent bases that are in the vicinity of the Arctic AOR allow the U.S. to have a permanent foothold in the Arctic and would reduce time and space considerations while the Arctic Force is built. While there are many exercises and multi-lateral exchanges that occur in the Arctic, they establish presence, but not the needed permanence that will be required of the U.S. as the Arctic becomes more available to PRC, Russia, and the world. The establishment of a U.S. permanent presence in the Arctic positively impacts the global commons by encouraging free and open trade, peace, and stability to an increasingly contested and strategically advantageous region of the world. U.S. permanence in the Arctic assures the Military instrument of strategic power is enabled via assured access to resources and national defense assets that can challenge military use of the Arctic against the U.S. and its allies, and provides enhanced options for peace and stability Diplomatically, protecting the Arctic and Arctic nations Informationally, and ensuring equal access to the Global Commons Economically.

APPENDIX OF FIGURES

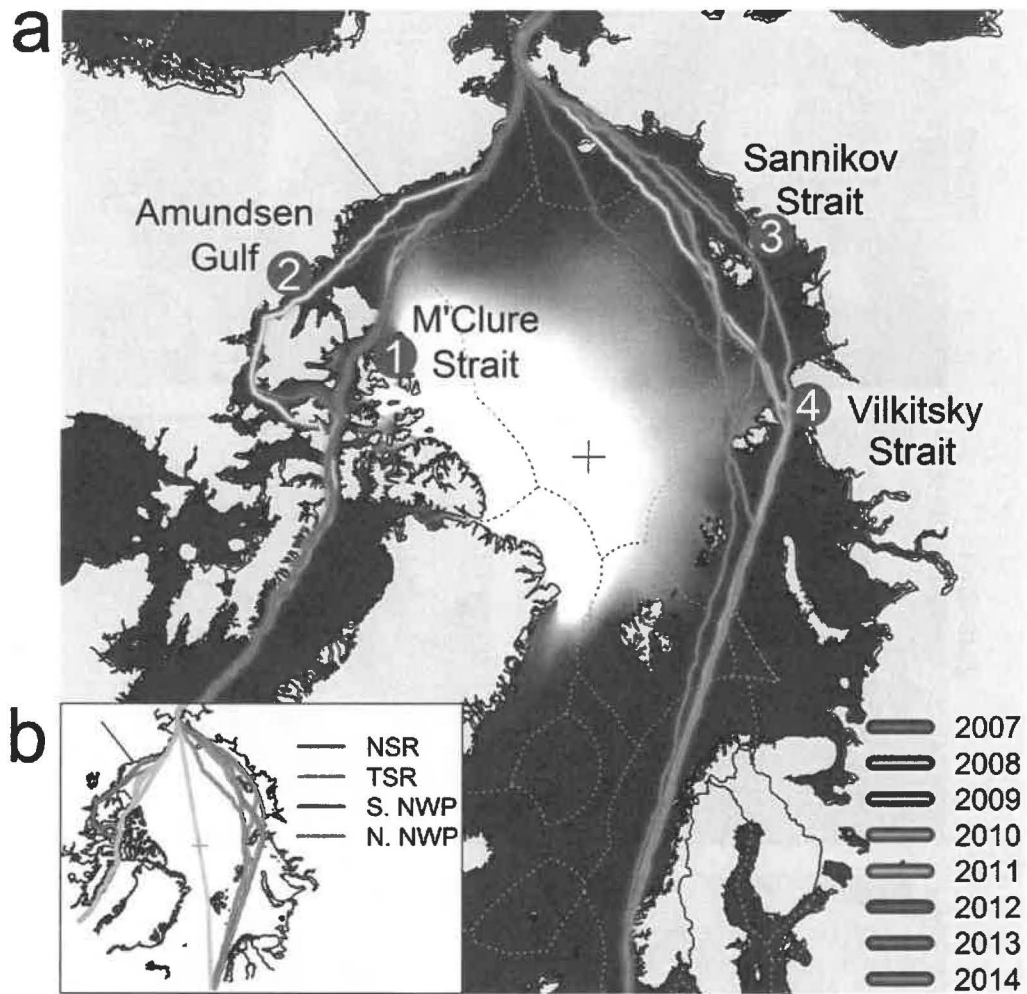


Figure 1 – (a) Hypothetical open water routes in September Sea ice for the 2001-2014 years. Note that the M'Clure Strait is the shortest North American route. (b) Depicts the main transit options. The TSR is the route that will be much more available by mid-century (Melia, 2016)

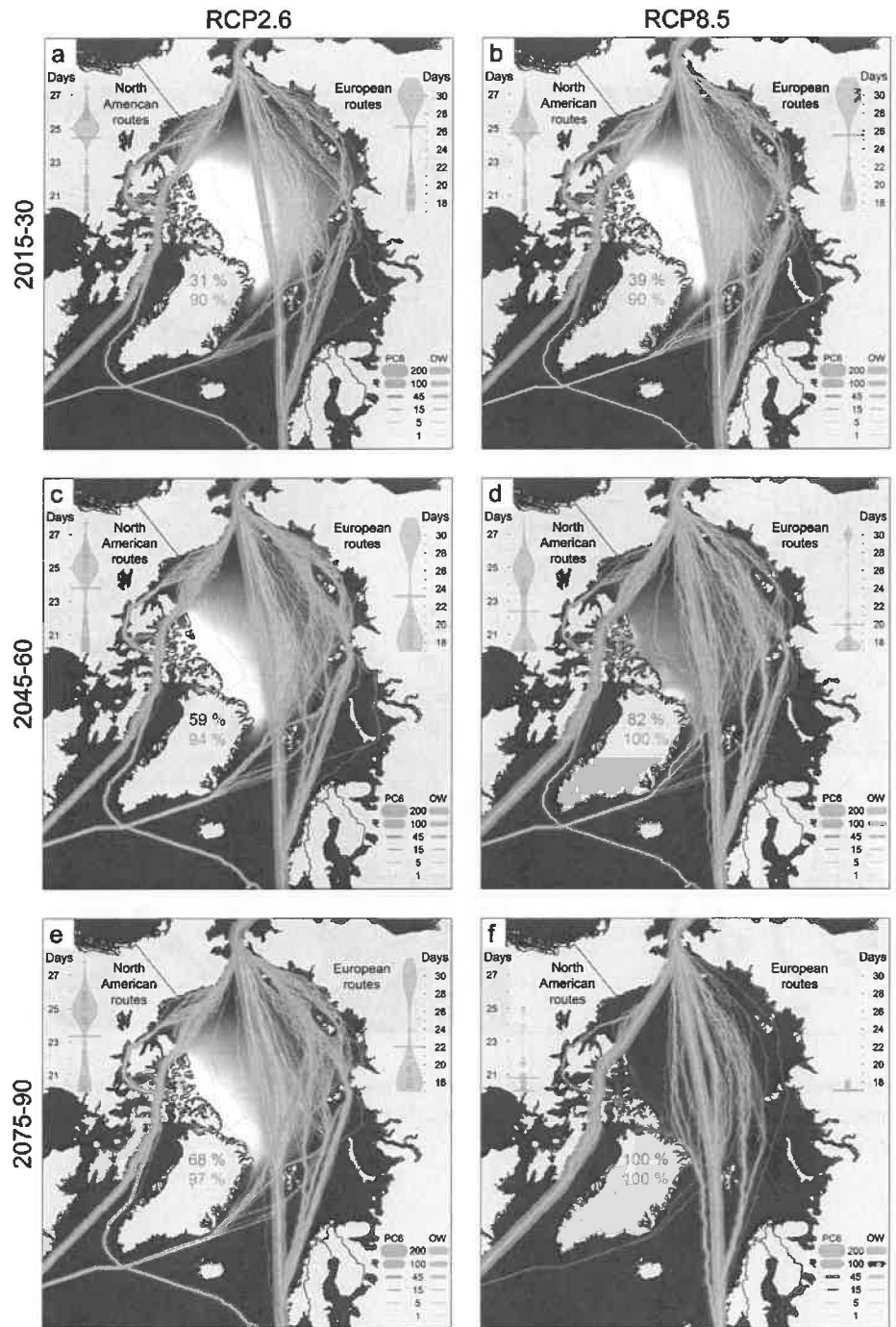


Figure 2 – Fastest available September trans-Arctic routes using forecasted models for RCP 2.6 (a, c, and e) and RCP 8.5 (b, d, and f). Line weights indicate the number of transits using the same route. Cyan lines represent open water vessels and pink lines represent PC6 vessels (Melia, 2016).



Figure 3 – Red contours represent USNORTHCOM and USEUCOM as they currently stand (Carlson, USNORTHCOM).

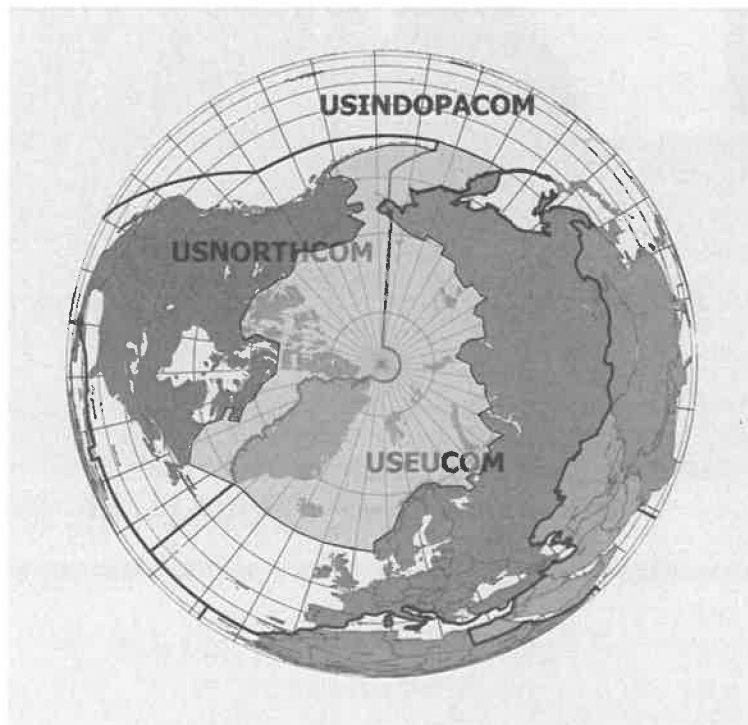


Figure 4 – Proposed region to demarcate USARCTICOM which encompasses the Arctic and its approaches, as well as the heavily transited region of the Queen Elizabeth Islands. The proposed area is highlighted in Yellow.



Figure 5 – The proposed location of the 2024 Nanisivik Naval base and refueling station (CBC News, 2023).

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