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The Arctic in Transition—A Call to Action

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The Arctic in Transition—A Call to Action

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I
THE ARCTIC IN TRANSITION - A CALL TO ACTION

The Arctic region is rapidly transforming. The floating ice mass that has thwarted large-scale development in the region for centuries may soon disappear for weeks or months every year.[2] People will stream into the area as the commercial sector exploits the Arctic's rich supplies of fossil fuels and other resources.[3] The risks to people and the environment are high. Arctic states are actively advancing their national interests to control resources and mitigate risks. In the face of competing national agendas, how can the

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[1]The views expressed in this academic research paper are those of the authors and do not reflect the official policy or position of Harvard University, the U.S. Government or the Department of Defense.

[2]Scott G. Borgerson, "The Great Game Moves North," *Foreign Affairs*, (Washington, DC: Council on Foreign Relations, March 25, 2009); available at http://www.foreignaffairs.com/articles/64905/scott-g-borgerson/the-great-game-moves-north.

[3]The U.S. Geological Survey projects that "70 percent of the mean undiscovered oil resources is estimated to occur in five provinces: Arctic Alaska, Amerasia Basin, East Greenland Rift Basins, East Barents Basins, and West Greenland–East Canada. More than 70 percent of the undiscovered natural gas is estimated to occur in three provinces, the West Siberian Basin, the East Barents Basins, and Arctic Alaska. It is further estimated that approximately 84 percent of the undiscovered oil and gas occurs offshore. The total mean undiscovered conventional oil and gas resources of the Arctic are estimated to be approximately 90 billion barrels of oil, 1,669 trillion cubic feet of natural gas, and 44 billion barrels of natural gas liquids." *U.S. Geological Survey Fact Sheet 2008-3049*, (Washington, DC: U.S. Department of Interior, 2008); available from http://pubs.usgs.gov/fs/2008/3049/fs2008-3049.pdf (accessed May 1, 2009). In addition it is generally accepted that valuable minerals like gold and platinum and untapped fishing stocks abound. For additional information: Scott G. Borgerson, "An Ice Cold War," *New York Times*, August 8, 2007; available from http://www.nytimes.com/2007/08/08/opinion/08borgerson.html?emc=eta1 (accessed May 1, 2009).

United States achieve its policy objectives[4] regarding sustainable economic development and environmental protection? ***The U.S. can partner with other Arctic stakeholders and leverage existing governance structures to expand international regulation and networking.*** This approach buys time for Arctic stakeholders to develop an integrated strategy and program appropriate resources.

In 2008, the Arctic Council[5] conducted a focused study of Arctic marine activity projected out to the year 2050. Figure 1 depicts four plausible scenarios developed for the assessment: Polar Lows, Arctic Race, Arctic Saga, and Polar Preserve.[6] Polar Lows is the prevailing quadrant. Minimal demand for the region's resources, due to relative inaccessibility, has meant minimal requirements for governance. However, as sea ice retreats, demand for resources increases exponentially. The region is speeding toward the worst case scenario (i.e., Arctic Race). An unchecked race is a zero-sum game, where sovereign nations and private enterprise outmaneuver each other at the expense of human safety and the environment. The operative question is will the United States and other Arctic nations work together to steer a new course into the more sustainable quadrant reflected in the Arctic Saga? If the U.S. is serious about sustainability, the Arctic Saga is the only reasonable destination.

We posit it is more advantageous for the United States to collaborate with international partners than to pursue a unilateral agenda. Unilateral action is

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[4]George W. Bush, *NSPD-66 / HSPD-25: Arctic Region Policy*, (Washington, DC: The White House, January 9, 2009); available from http://www.fas.org/irp/offdocs/nspd/nspd-66.htm (accessed April 22, 2009). The language of the new policy is characteristically vague, but adequately frames U.S. national interests. The directive opens with the acknowledgement: "The United States is an Arctic nation, with varied and compelling interests in that region." It also acknowledges a series of significant "developments" that informed the decision to realign national policy and pursue new direction, before laying out six policy objectives:

1) Meet national security and homeland security needs.
2) Protect the Arctic environment—conserve its biological resources.
3) Ensure natural resource management and economic development are sustainable.
4) Strengthen institutions for cooperation among Arctic nations.
5) Involve indigenous communities in decisions that affect them.
6) Enhance scientific monitoring and research.

[5]The Arctic Council is an intergovernmental forum, established by the Arctic nations in 1996. It provides a common round-table for promoting cooperation and coordination among the Arctic nations and indigenous peoples, with named area of interest in regional sustainable development and environmental protection. Member States include Canada, Denmark (Greenland), Finland, Iceland, Norway, Russian Federation, Sweden, and the United States. For additional information consult the Arctic Council website: "About the Arctic Council." *Arctic Council*. Tromsø, Norway: Arctic Council Secretariat, October 22, 2007; available from: http://arctic-council.org/article/about (accessed April 22, 2009).

[6]*The Future of Arctic Marine Navigation in Mid-Century—Scenario Narratives*, (San Francisco: Global Business Network, May 2008); available from http://arcticportal.org/uploads/sz/hm/szhmvPw3beAQMOJGoVxT9Q/GBN-AMSA-Scenario-Narratives-Report-FINAL-May08-v1May.pdf (accessed May 1, 2009).

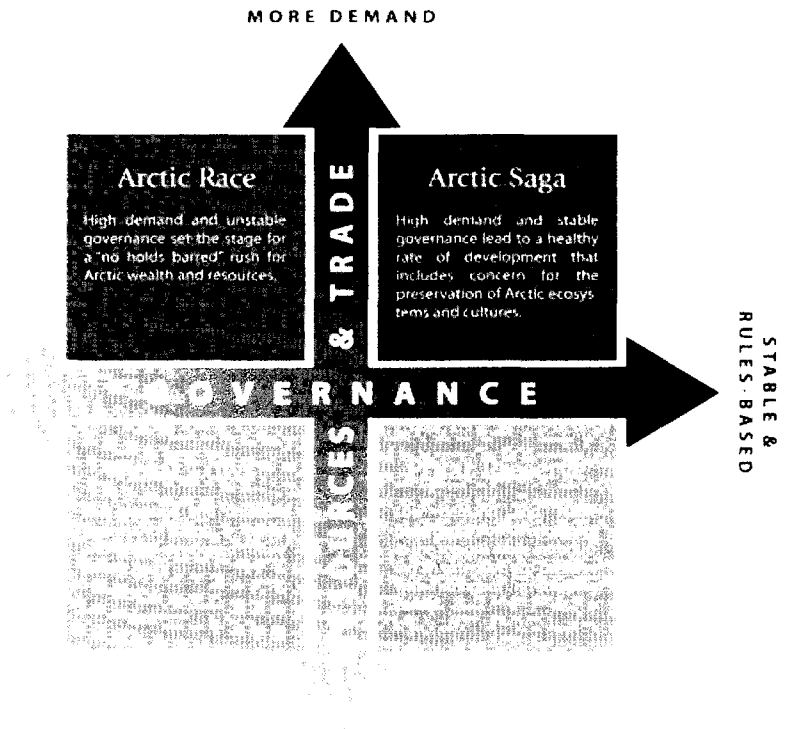

Figure 1. Future Scenarios (Source: GBN Global Business Network 2008).[7]

resource intensive and counterintuitive, if not counterproductive, in a global society. It is also impractical in the maritime domain, where freedom of the seas is the comity of nations, and national sovereignty holds limited authority. Even bilateral engagement, a strong American tradition, does not adequately address U.S. Arctic policy objectives. The United States cannot achieve its long-term national goals for sustained economic development and environmental viability in the Arctic without international cooperation and consensus.

The United States can take a number of pragmatic steps to strengthen the rule of law and international collaboration in the region, without compromising national sovereignty and security. We recommend the following actions:

- Ratify the United Nations Convention on the Law of the Sea
- Designate the Arctic as a special environmental area

[7] *The Future of Arctic Marine Navigation in Mid-Century—Scenario Narratives.*

- Mandate Automated Identification System for all commercial vessels
- Mandate compulsory Automated Mutual-Assistance Vessel Rescue System registration
- Mandate uniform polar ship classification standards
- Mandate uniform commercial shipping requirements for ice-navigation training
- Mandate passenger ships sail in tandem in polar waters
- Develop an open and integrated Arctic observing network
- Develop Arctic coalition centers

Rule of law and uniform safety standards increase predictability and lower risks. Our recommendations will promote stability and ease tensions among Arctic stakeholders at reduced cost and expenditure of political capital. They are practical measures that will increase the transparency of human activity and provide a safer operating environment in the Arctic for all stakeholders. Unless the United States collaborates to leverage international governance structures to reduce risk, private industry is far less likely to invest the capital necessary to develop and sustain the Arctic. Long-term capital investment is critical for U.S. policy objectives and the mutual benefit of all stakeholders.

II
THE ARGUMENT FOR THE RULE OF LAW

Competing interests in the Arctic demand rule of law, but not additional international conventions or bilateral treaties. The legal framework is already in place, including the United Nations Convention on the Law of the Sea (UNCLOS), the International Convention for the Safety of Life at Sea (SOLAS), the International Convention for the Prevention of Pollution from Ships (MARPOL), the United Nations Framework Convention on Climate Change (UNFCCC), and the Montreal Protocol on Substances that Deplete the Ozone Layer. However, the United States and other nations are not adequately leveraging these tools to strengthen governance in a manner which will promote sustainable economic development and environmental protection in the changing Arctic.

UNCLOS and MARPOL are especially relevant to the Arctic and underpin U.S. national objectives in the region. Leveraging these two conventions before large-scale commercial activity is feasible will enhance collaborative governance and will steer a course toward regional sustainability. ***It is time for the United States to join UNCLOS and designate the Arctic as a special area under MARPOL.***

A. The Case for UNCLOS

UNCLOS applies the rule of law to the use of the world's oceans. Its primary functions are to authenticate maritime and continental shelf borders, protect the environment, and preserve freedom of navigation.[8] Much of UNCLOS is a restatement of existing international laws and codification of customary practices. To date, 157 countries have ratified the treaty, including all Arctic nations except the United States.[9]

Under UNCLOS, coastal nations have sovereign entitlement over the exploration and development of all mineral resources extending 200 nautical miles (nm) from their respective shorelines, commonly referred to as the exclusive economic zone (EEZ). Nations may exceed the 200-mile limit if they can prove their continental shelves extend further into the sea. Figure 2 illustrates the potential extended continental shelves (ECS) Arctic nations might claim under UNCLOS.

Littoral nations may exercise sovereignty over the mineral resources within the boundaries of the ECS, up to the further of two absolute limits: 350nm from the shoreline or 100nm beyond the 2,500 meter bathymetric depth line.[10] Given the shallow depth of the Arctic Ocean, the North American and Eurasian continental shelves generally extend well beyond 350nm before reaching the 2,500 meter sounding threshold,[11] raising the relative value and strategic importance of ECS entitlements in the Arctic.

The United States has more to gain under UNCLOS than any other nation. UNCLOS entitles the U.S. to more than 3 million square miles of EEZ based on its total coastline, including its territorial possessions. This exclusive zone is larger than any other country's entitlement.[12] Despite the obvious gains, every attempt to win Senate ratification has failed.

Failure to ratify UNCLOS reduces U.S. influence in the Arctic debate and leaves the United States vulnerable to decisions of other states that are party to the convention. As an UNCLOS member, the U.S. would have an active

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[8]*United Nations Convention on the Law of the Sea*, (New York: United Nations); available from http://www.un.org/Depts/los/convention_agreements/texts/unclos/closindx.htm (accessed May 2, 2009).

[9]*United Nations Convention on the Law of the Sea*; available from http://www.un.org/Depts/los/reference_files/chronological_lists_of_ratifications.htm (accessed May 1, 2009).

[10]*United Nations Convention on the Law of the Sea—Part VI: Continental Shelf (Article 76)*, (New York: The United Nations); available from http://www.un.org/Depts/los/convention_agreements/texts/unclos/closindx.htm (accessed January 9, 2009).

[11]Bart Mongoven, "The Law of the Sea: Climate Change in the Arctic and Washington," *STRATFOR Global Intelligence*, Austin: STRATFOR, March 29, 2007; available from http://www.stratfor.com/law_sea_climate_change_arctic_and_washington (accessed February 11, 2009).

[12]Don Kraus, "Time to Ratify the Law of the Sea," *Foreign Policy in Focus*, (Washington, DC: The Institute for Policy Studies, June 6, 2007); available fromhttp://www.fpif.org/fpiftxt/4286 (accessed February 22, 2009). The United States is entitled to more than three million square miles of exclusive economic zone, consistent with the 200 nautical mile provisions of UNCLOS Article 76—with potential for almost 300k additional square miles in bonus ECS supplements.

voice in the ECS and seabed claims of every nation. The United States is better served by being inside the convention, where it can influence interpretation of the covenants in its favor (e.g., rally support, defend against rival claims, sanction U.S. actions and military operations) and promote cooperation on other issues, such as environmental protection and commercial development.[13]

By ratifying the treaty, the U.S. reaffirms its commitment to the rule of law and sends a clear signal of renewed willingness to cooperate with other Arctic nations within international structures and norms. UNCLOS membership does not impede overarching national security objectives and will enable achieving other national objectives, consistent with the overall Arctic Policy Directive. Ratification costs nothing, but it will improve the global image of the United States as an international team player.

B. The Case for MARPOL

MARPOL sets international standards for pollutant discharges to prevent ocean pollution caused by commercial shipping and drilling platforms.[14] The United States has already ratified the convention and championed a number of subsequent amendments. While MARPOL applies to polar waters, there are no uniform standards tailored to the remote and fragile Arctic. Each Arctic nation has adopted additional national standards for regulating ship-sourced pollution, but lack of uniformity inhibits sustainable commercial development.

MARPOL can fill the gap. It empowers member states to designate select oceans and seas as "special areas" where additional protective measures can be used to sustain the areas in question. Such measures are uniformly recognized and enforced by the international maritime community. There is ample precedent. The IMO has designated special areas on twenty-one separate occasions, including the Mediterranean Sea, the wider Caribbean region, and the Antarctic.[15] Special area status will enable the international

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[13]Melissa Bert and Mark Schlakman, "Ratifying the Law of the Sea Convention," *Boston Globe*, (Boston: New York Times Co., March 16, 2009); available from: http://www.boston.com/bostonglobe/editorial_opinion/oped/articles/2009/03/16/ratifying_the_law_of_the_sea/ (accessed May 1, 2009).

[14]*International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL)*, (London: The International Maritime Organization); available from http://www.imo.org/Conventions/mainframe.asp?topic_id=258&doc_id=678 (accessed April 22, 2009).

[15]*International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL)—Annex I: Prevention of Pollution by Oil; Annex II: Control of Pollution by Noxious Liquid Substances; Annex V: Prevention of Pollution by Garbage from Ships; Annex VI: Prevention of Air Pollution from Ships*, (London: The International Maritime Organization); available from http://www.imo.org/Environment/mainframe.asp?topic_id=760 (accessed May 3, 2009).

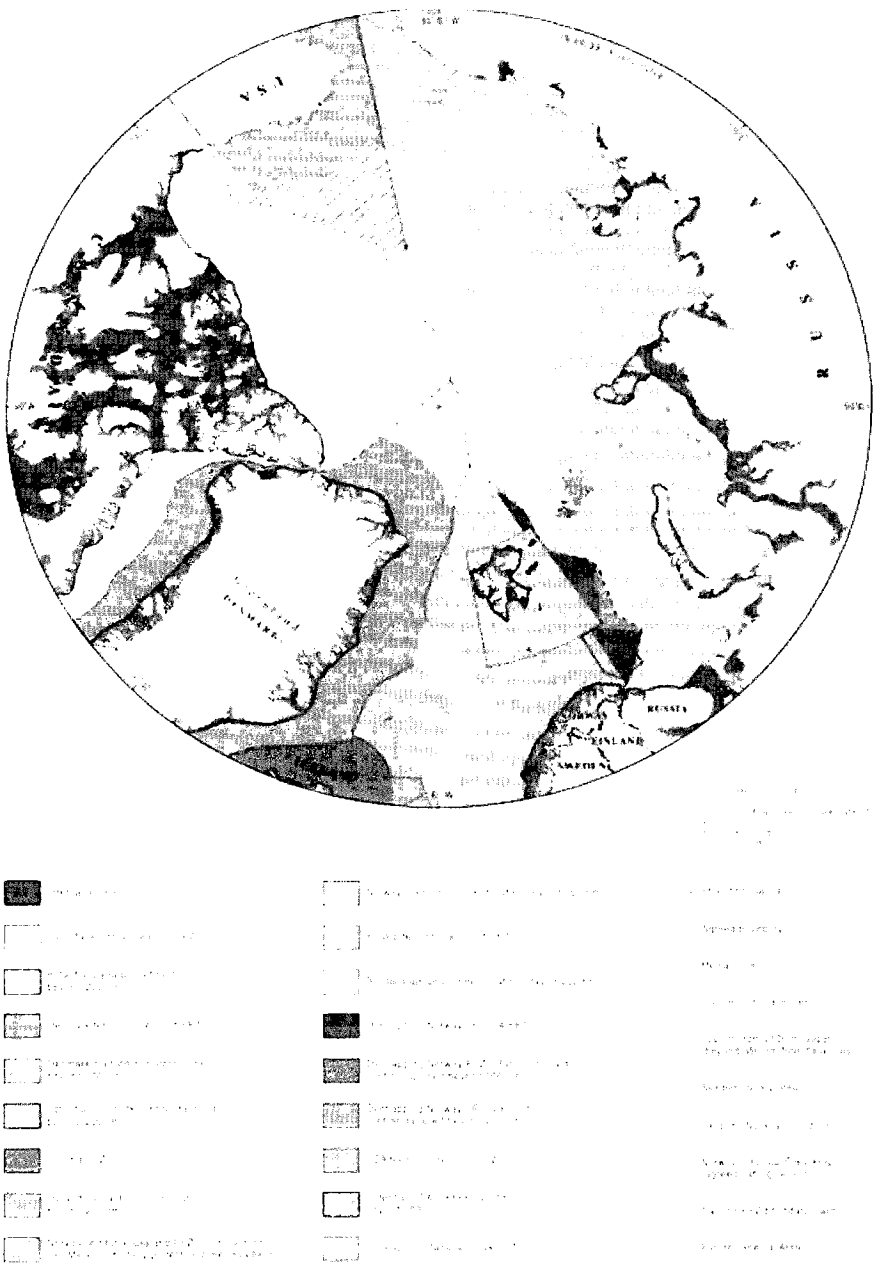

Figure 2. Extended Continental Shelves for Each Arctic Nation (Source: ScienceDaily)[16]

[16]"Arctic Map Plots New 'Gold Rush,'" *ScienceDaily*, (Chevy Chase, MD: ScienceDaily LLC, August 6, 2008); available from http://tinyurl.com/ddlg53 (accessed May 1, 2009).

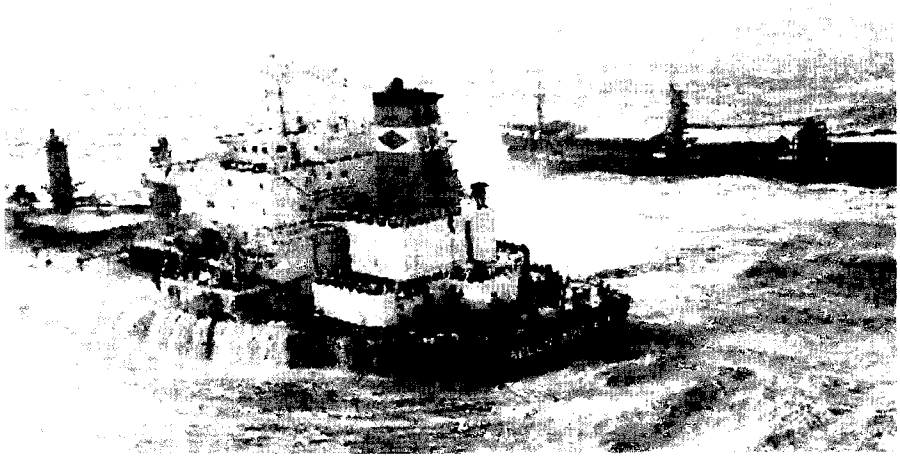

Figure 3. *Selendang Ayu* Founders (Source: U.S. Coast Guard)[17]

On December 8, 2004, the Malaysian freighter *Selendang Ayu* foundered in Unalaska Island's Skan Bay, a sensitive habitat for fish and crab. Six crew members perished in the frigid waters. More than 350,000 gallons of fuel oil and diesel spilled into the bay and washed ashore. Fortunately, the crew had transferred the fuel to internal tanks and turned off heaters, allowing the fuel to thicken. Their timely actions mitigated the immediate environmental impact. Nevertheless, the remains of more than 1,600 marine animals were recovered after the spill.[18]

community to adopt a regime of uniform pollution standards and protective safety measures tailored to the Arctic.

Commercial shipping and mining operations are critical to regional economic development and sustainability, but also pose the greatest threat to the environment. Offshore oil and gas extraction generates substantial amounts of waste with concomitant impacts on a vast range of Arctic marine wildlife and habitat—everything from clams and fish eggs on the seabed to whales in open water and polar bears on shore.[19] Accidental discharges and leeching

[17]"Spill Response and Restoration—*Selendang Ayu* Oil Spill," (Anchorage: U.S. Fish and Wildlife Service, December 8, 2004); available from http://alaska.fws.gov/fisheries/contaminants/spill/sa_index.htm (accessed May 1, 2009).

[18]Mark Thiessen, "Alaska Gets Nearly $850,000 *Selendang Ayu* Penalty," *Seattle Post-Intelligencer*, (Seattle: Hearst Seattle Media, LLC, April 27, 2009); available from http://www.seattlepi.com/local/6420ap_ak_selendang_ayu.html (accessed May 1, 2009).

[19]Charles H. Peterson, Stanley D. Rice, Jeffrey W. Short, Daniel Esler, James L. Bodkin, Linda E. Ballachey, and David B. Irons, "Long-Term Ecosystem Response to the Exxon Valdez Oil Spill," Science December 19, 2003 302: 2082-2086; available from http://www.sciencemag.org/cgi/content/full/sci;302/5653/2082 (accessed April 22, 2009).

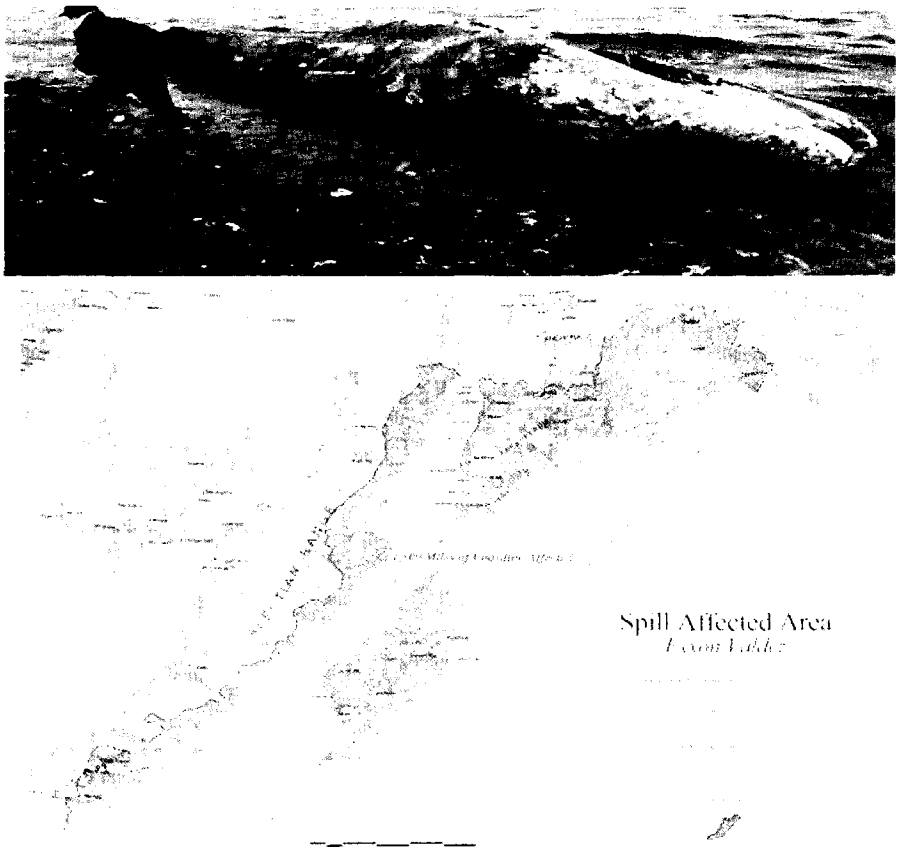

Figure 4. Habitat Destruction (Source: *John Gaps III / AP—top);*[20] Spill Affected Area (Source: *Ecostrust)*[21]

On March 24, 1989, the oil tanker *Exxon Valdez* ran aground in Prince Williams Sound in the vicinity of Valdez, Alaska, spilling 10.8 million gallons of oil and killing thousands of marine animals. Generally accepted estimates include 250,000 to as many as 500,000 seabirds, thousands of otters, hundreds of seals, and at least 250 bald eagles and 22 whales—as well as total decimation to countless marine crustaceans and billions of herring and salmon eggs from Prince William Sound to Kodiak Island. Few visual indicators were in evidence just a year after the historic spill, but the destructive effects persist today.[22]

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[20]John Gaps, III, "Exxon Valdez Oil Spill Whale," AP Images (New York: Associated Press, April 9, 1989); available from http://tinyurl.com/ca47nf (accessed May 1, 2009).

[21]"Exxon Valdez Spill," *Conservation CIS Center* (Portland: Ecotrust, undated) available from http://www.ecsonwaldes.com/EXXON_VALDEZ/ExxonValdez_spill.jpg (accessed May 2, 2009).

[22]"Final Environmental Impact Statement For Office of Ocean and Coastal Resource Management Approval of Amendments to the State of Alaska's Coastal Management Program," (Silver Spring, MD: National Oceanic and Atmospheric Administration, undated); available from http://coastalmanagement.noaa.gov/assessments/docs/akfeis.doc (accessed May 1, 2009).

routinely occur in conjunction with oil and gas operations. The range of spill sizes varies widely from hundreds to thousands of gallons. Figures 3 and 4 illustrate the dangers and consequences of commercial activities in the remote but fragile polar environment.

The grounding of the freighter *Selendang Ayu* (Figure 3) was an uninviting reminder of the environmental devastation caused when the oil tanker *Exxon Valdez* (Figure 4) foundered in 1989. Fully twenty years after the *Exxon Valdez* ran aground, more than 1,500 miles of Alaskan coastline still has not fully recovered. Contaminated sediments continue to plague the food chain in Prince William Sound, the site of the accident, and also along the shoreline—extending almost 500 miles southwest along the Alaskan Peninsula, including the Kodiak Island archipelago.[23] Mortality rates for a variety of diverse species also continued to climb for several years after the oil spill, attributable in large part to the toxic mollusks and crustaceans these animals regularly consumed as part of an otherwise healthy diet. These food staples were substantially contaminated by "surprisingly large" concentrations of residual oil.[24]

Science and industry had previously assumed oil spills would have relatively short-term impacts on marine and coastal ecosystems, given the extensive and resource-intensive clean-up measures taken after the *Exxon Valdez* foundered. This assumption has proven to be a myopic and costly mistake. Chronic exposure to persistent and toxic subsurface oil, even at sublethal levels, continues to adversely affect wildlife in the Alaskan coastal ecosystem.[25] Although the immediate effects of the *Selendang Ayu* oil spill were far less extensive than the *Exxon Valdez*, scientists may not know the full environmental impact for many years to come.

Both of these accidents occurred below the Arctic Circle, in more readily accessible and frequently travelled waters. In the aftermath of Hurricane

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[23]Peterson et al., 2082-2086.

[24]A recent study conducted by the U.S. National Oceanographic and Atmospheric Administration (NOAA) determined that more than 26 thousand gallons of oil remain in the sandy soil of the contaminated shoreline—declining at a rate of less than 4% per year. The populations in many types of marine life, most notably among fish species, have significantly declined. Ewan MacAskill, "18 Years on, Exxon Valdez Oil Still Pours into Alaskan Waters," *Guardian.co.uk*, (London: Guardian News and Media Limited, February 2, 2007); available at http://www.guardian.co.uk/business/2007/feb/02/oil.pollution (accessed May 1, 2009).

[25]Peterson et al 2082-2086. Researchers also attributed the higher mortality rates to chronic ingestion of petro-toxins from cleaning and grooming fur and feathers that came into direct contact with residual oil contaminants while the unsuspecting animals foraged for their food. Repeated samplings of eelgrass shallows, mollusk beds, and other sediments lead researchers to conclude it will take at least 10 more years to normalize. To corroborate further, a recent study conducted by the U.S. National Oceanographic and Atmospheric Administration (NOAA) determined that more than 26 thousand gallons of oil remain in the sandy soil of the contaminated shoreline—declining at a rate of less than 4% per year.

Katrina, it is clear that getting emergency response crews on site in a timely manner—even in temperate, densely populated climates—is a difficult challenge when time is critical. The Arctic is a worse case scenario for three reasons:

- The area is remote and isolated from monitoring and response infrastructure
- The environment is more harsh and demanding on people and equipment
- Indigenous peoples are far more reliant on marine life and habitat for subsistence

The fragile Arctic environment combined with the inherent risks of commercial shipping and drilling demand the international community adopt an expanded regulatory regime. The regime must provide a more formal protocol to mitigate risk. It must also prevent accidents and provide timely and adequate response when accidents do occur. As human activity increases and more ships operate in the Arctic region, particularly oil tankers, the likelihood of incidents like the *Exxon Valdez* and *Selendang Ayu* will increase.

The United States and other Arctic nations must leverage MARPOL to reduce the risk associated with shipping, before commercial exploration and economic development expand any further. It makes sense to designate the Arctic as a special area in order to prevent accidents before they occur or mitigate their effects after the fact.

III
THE ARGUMENT FOR IMO REGULATION

If UNCLOS and MARPOL provide the overarching legal framework for collaborative governance in the Arctic, then the International Maritime Organization (IMO) can provide enforceable guidelines for a safer operational environment. The IMO, chartered by the United Nations, has a global mandate to develop and enforce international shipping safety. It is a consensus-based vehicle of governance that has enjoyed extraordinary success in enacting universally adopted international regulations.[26] As an active IMO member, the United States has effectively used IMO regulation to strengthen port security, but has not fully leveraged IMO potential to address

[26]"IMO 60 Years," (London: International Maritime Organization, 2008); available from http://www.imo.org/ (accessed May 1, 2009). More recently, the IMO passed the International Ship and Port Facility Security Code in the wake of the 9/11 terrorist attacks. This highly effective code requires governments, shipping companies, shipboard personnel, and port/facility personnel to "detect security threats and take preventative measures against security incidents affecting ships or port facilities used in international trade." "Maritime Security Measures Take Shape at IMO," Intersessional Working Group on Maritime Security: 9-13 September 2002, available from http://www.imo.org/ (accessed May 1, 2009).

unique risks in polar waters. ***Mandatory IMO guidelines tailored to the Arctic will achieve far greater levels of protection for life and environment in the region, specifically:***

- Mandate Automated Identification System for all commercial vessels
- Mandate compulsory Automated Mutual-Assistance Vessel Rescue System registration
- Mandate uniform polar ship classification standards
- Mandate uniform commercial shipping requirements for ice-navigation training
- Mandate passenger ships sail in tandem in polar waters

A. Background

The international community has paid very little attention to Arctic safety from the perspective of preventing accidents. Although the IMO has developed a series of voluntary training and navigation guidelines specific to ice-covered waters, none is mandatory at this point. For example, current IMO guidelines encourage all ships operating in ice-covered waters to have at least one certified ice navigator on board while in transit. However, there is no uniform international standard and compliance is entirely voluntary. One Arctic disaster is all it will take to quash the future of the Arctic shipping and tourism industries.

The expansion of maritime activity in the Arctic introduces dramatic new safety risks. Andrew Garlington, a U.S. Navy Commander and maritime security policy expert, cautions: "When you hear ice-free waters in the Arctic, that doesn't mean it's free of all ice. That just means it's less than 10% coverage. It's still a very dangerous and dynamic environment up there."[27]

Commercial shipping supports virtually every human activity in the Arctic. Tourism represents only a fraction of the industry, but readily illustrates the explosive growth of polar shipping operations. The U.S. Coast Guard recorded more than 3,000 cruise visitors to Alaska's northern coasts during 2008, and approximately 150,000 passengers on more than 70 cruise ships sailing around Greenland. Coast Guard officials also noted more than 1.7 million people sail from Vancouver and Seattle to Alaskan ports and back on an annual basis.[28] Admiral Henrik Kudsk of Denmark's Greenland Command warns:

[27]Renee Schoof, "Shippers, Oil Companies Gauge Benefits of Less Arctic Ice," *Anchorage Daily News*, November 26, 2008; available from http://www.adn.com/news/alaska/story/603373.html (accessed April 20, 2009).

[28]"Arctic Countries Unprepared for Cruise Ship Accidents: Officials," *CBCnews.ca* (Toronto: CBC, June 3, 2008); available from http://www.cbc.ca/consumer/story/2008/06/03/arctic-cruise.html (accessed May 1, 2009).

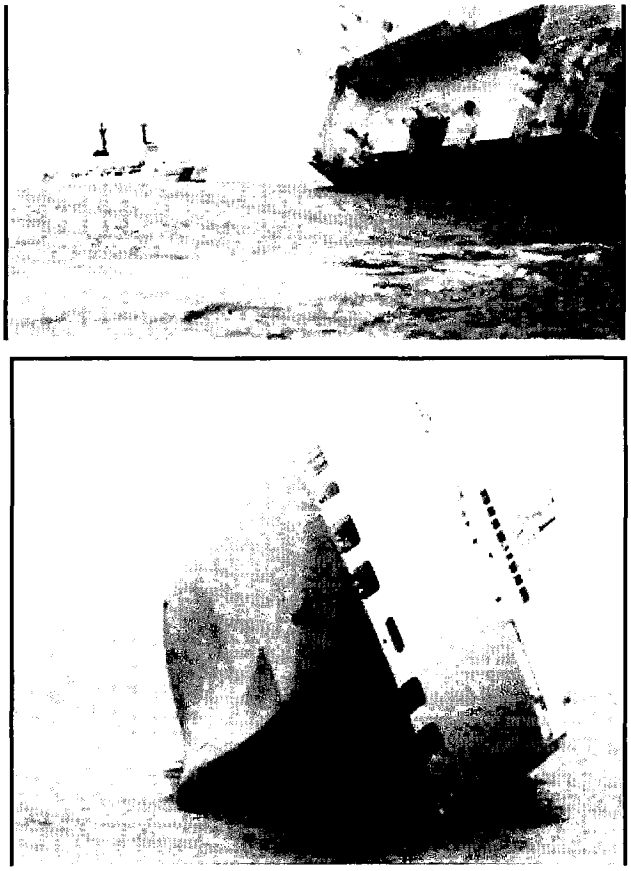

Figure 5. *Cougar Ace* Disabled in Polar Waters (Source: U.S. Coast Guard/Associated Press)[29]

On July 23, 2006, the deep sea car carrier *Cougar Ace* was sailing south of Alaska's Aleutian Islands en route to British Columbia. During ballast transfer operations, the ship lost stability and listed 80 degrees to its side, while carrying a cargo of 4,812 vehicles. It took a U.S. Coast Guard cutter nearly 24 hours to travel 700 miles to arrive on site. With assistance of the Alaska Air National Guard, all 23 crewmembers were rescued.[30]

"The number of cruise ships visiting the North keeps going up. I fear it is only a question of time before we have an accident on our hands."[31]

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[29]"Cougar-Ace Listing for Release," *U.S. Coast Guard Visual Information Gallery* (Washington, DC: U.S. Department of Homeland Security, July 26, 2006); available at http://cgvi.uscg.mil/media/main.php (accessed May 1, 2009).

[30]"23 are Rescued as Cargo Ship Takes Water," *Seattle Post-Intelligencer*, (Seattle: Hearst Seattle Media, LLC, Tuesday, July 25, 2006); available from http://www.seattlepi.com/local/278726_ship25.html (accessed May 1, 2009).

[31]"Danish Admiral Echoes Canadian Calls to Toughen Arctic Shipping Rules," *CBCnews.ca* (Toronto: CBC, August 13, 2008); available from http://www.cbc.ca/canada/north/story/2008/08/13/arctic-shipping.html (accessed May 1, 2009).

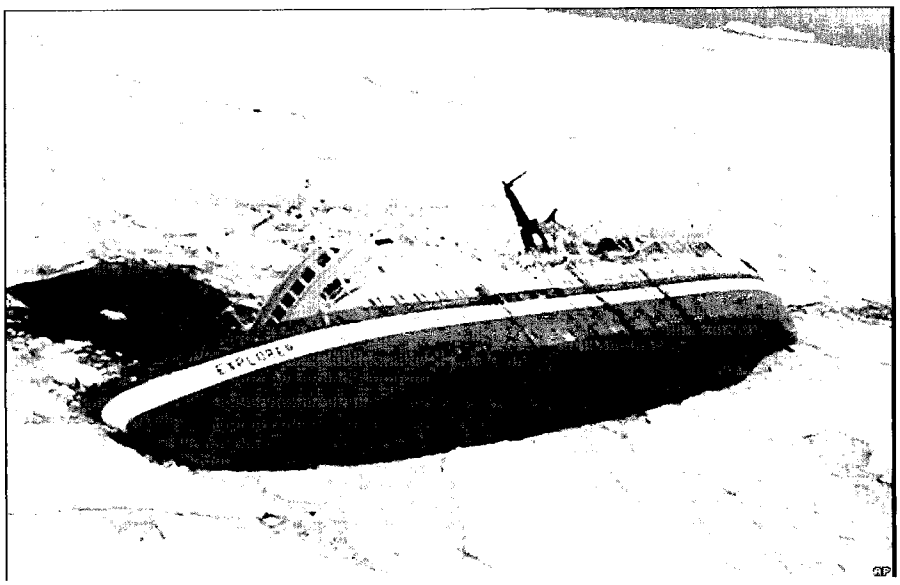

Figure 6. *Explorer* Sinking (Source: MailOnline)[32]

On November 23, 2007, the cruise ship *Explorer,* the first ship built specifically to ferry tourists to the Arctic and Antarctic, became the first commercial passenger ship to sink in polar waters. It sank within hours after developing a fist-size leak after hitting an iceberg. This particular cruise was in the Antarctic, but the *Explorer* was no stranger to the Arctic. The 100 passengers and crew took to lifeboats and were safely rescued by the *Nordnorge*, a Norwegian cruise ship sailing in tandem with the *Explorer*.[33]

The sagas of the *Cougar Ace* and the *Explorer*—profiled in Figures 5 and 6—graphically reinforce why additional IMO regulations are necessary for ship safety and Arctic sustainability.

B. The Case for the Automated Identification System (AIS)

Deploying AIS on all commercial vessels operating in polar waters is in the best interest of all stakeholders. AIS is a shipboard broadcast system that acts like a transponder and operates in the very high frequency maritime

[32]"Explorer Sinking," *Mail Online*, (London: Associated Newspapers Ltd, November 25, 2007); available from http://www.dailymail.co.uk/news/article-495918/Titanic-terror-Britons-saved-Antarctic-rescue-cruise-ship-struck-iceberg.html (accessed May 1, 2009).

[33]David Williams and Neil Sears, "'Titanic' Terror of Britons Saved in Antarctic Rescue after Cruise Ship Struck Iceberg," *Mail Online*, (London: Associated Newspapers Ltd, November 25, 2007); available from http://www.dailymail.co.uk/news/article-495918/Titanic-terror-Britons-saved-Antarctic-rescue-cruise-ship-struck-iceberg.html (accessed May 1, 2009).

band. It automatically identifies each ship by type, position, course, speed, navigational status, and other safety-related information tags. It is capable of receiving and transmitting "over 4,500 reports per minute (with) updates as often as every two seconds."[34]

AIS information can be overlaid on electronic charts to improve situational awareness and enhance the common operating picture. The technology enables vessels to be seen by other ships in order to avoid collisions and be readily located when in distress. Vessel traffic services use AIS data to direct shipping traffic in major ports. Emergency response providers use the data to determine which response boats, aircraft, skimmers, and people are available when a ship is foundering or in distress.[35] National governments rely on AIS to track vessels operating near their respective coastlines.

AIS is a critical safety and management tool, but is currently not mandatory for every class of commercial vessels. The IMO requires onboard AIS for all cargo ships of 500 gross tons or more, all cargo ships of more than 300 gross tons during international voyages, and all passenger ships, regardless of size.[36] The IMO mandated AIS carriage for these ship classifications with full consent of its membership. Governments and industry clearly recognized the important benefits of AIS in making the world's oceans safer and more secure. Given the greater dangers inherent in Arctic shipping—and the virtual absence of emergency response infrastructure in the region—it is vital that AIS be required on all commercial vessels, regardless of size, operating in polar waters.

C. The Case for the Automated Mutual-assistance Vessel Rescue (AMVER) System

AMVER is a voluntary, worldwide, computer-assisted ship reporting system that search and rescue authorities use to coordinate emergency assistance for distressed ships. At the present time, ***AMVER is the only established program with the potential to bridge the prevailing gap in emergency response coverage in the Arctic***. The U.S. Coast Guard is the AMVER program manager for the global commercial shipping industry. Approximately 18,000 ships from 140 nations currently participate in the

[34]"Universal Shipborne Automatic Identification System (AIS) Transponder," *U.S. Coast Guard*, (Washington, DC: Department of Homeland Security, October 4, 2002); available from http://www.navcen.uscg.gov/marcomms/ais.htm (accessed May 1, 2009).

[35]"Universal Shipborne Automatic Identification System (AIS) Transponder."

[36]"AIS Transponders," *International Maritime Organization*, (London: International Maritime Organization, 2002); available from http://www.imo.org/Safety/mainframe.asp?topic_id=754 (accessed May 1, 2009).

program.[37] Registered ships submit their respective sail plans to the Coast Guard before setting sail and send continuous position reports while at sea, using AIS.

The Coast Guard plots and tracks more than 3,300 AMVER ships on a daily basis.[38] When vessels require emergency assistance at sea, AMVER-participating ships respond and assist when Coast Guard vessels or other search and rescue professionals are not in the immediate area. Since AMVER provides real-time information on the positions and characteristics of vessels, rescue coordinators can identify ships operating in the general vicinity of distressed vessels and divert the best-suited ship(s) to respond.[39]

The AMVER program is a proven winner that has saved more than 2,000 lives since 1990.[40] The ship that rescued the passengers and crew of the *Explorer* is an AMVER volunteer. The program increases operational search and rescue capacity at virtually no additional cost to government agencies.

Given the lack of emergency response infrastructure, it is imperative that AMVER enrollment be required for all commercial vessels operating in the Arctic. Whether a merchant vessel ultimately responds in an incident will be for the shipmaster to decide, but mandating registration will significantly expand the network of AMVER vessels and will be a major step toward mitigating risk in the Arctic. It will also provide operational time and space for Arctic nations and commercial enterprise to develop sustainable emergency response capacity.

D. The Case for Uniform Polar Ship Construction Standards

Ships operating in polar seas must be built to international construction standards, specifically designed to withstand ice-covered waters. A uniform set of polar class descriptions is vital to the success of the commercial shipping industry and its insurance partners. A uniform set of construction standards eliminates the need to interpret competing classification systems that are used by government and industry.

The IMO has developed and deployed voluntary ice classification guidelines for safe operation and environmental protection in polar seas. These guidelines are currently under review by commercial and government stake-

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[37]Ben Strong, "AMVER Fact Sheet," *AMVER.com* (Washington, DC: U.S. Department of Homeland Security, January 7, 2009); available from http://www.amver.com/facts/FactSheet.pdf (accessed May 1, 2009).

[38]Id.

[39]"Welcome to AMVER."

[40]Ben Strong, supra.

holders.[41] Once review is completed and consensus established, the IMO must take swift action to mandate uniform polar classification and construction standards for all commercial vessels—before the Arctic is peppered with unsafe cruise and transport ships.

E. The Case for Uniform Ice Navigation Training Standards

Crews sailing in the Arctic must be trained to international certification standards. Current IMO guidelines are not compulsory and do not clearly identify specific curriculum requirements for ice navigation training and certification programs. Proficiency does not come quickly. It requires multiple seasons of sailing in treacherous Arctic conditions to hone individual and crew proficiency.[42] Standardized certification programs are a reliable way to develop and ensure professional competency in the commercial shipping and cruise-ship industries.

Requirements for uniform training standards could be easily overlooked, or conveniently dismissed, in a resource constrained environment. Such recklessness could result in grave consequences in the Arctic. The IMO, in partnership with industry and government officials, must develop and mandate a uniform code of ice navigation training and certification requirements. These standards are part of a comprehensive risk management program for shipping operations in the Arctic and must be applicable to all ship crews sailing in polar waters.

F. The Case for Passenger Ships Sailing in Tandem

The IMO must mandate that passenger ships sail in tandem as a general safety precaution when navigating in polar waters—where hundreds or thousands of lives may be at risk. Submersion in polar waters can take

[41]Øystein Jensen, *The IMO Guidelines for Ships Operating in Arctic Ice-covered Waters*, pp. v – vi, (Lysaker: Fridtjof Nansen Institute, February, 2007); available from http://www.fni.no/doc&pdf/FNI-R0207.pdf (accessed May 1, 2009).

[42]Martin Crawford-Brunt, District Atlantic Manager at Det Norske Veritas (DNV), makes a convincing argument for an international mandate for ice crew training. The DNV is currently teaming with the Icebreaking Center of Excellence in Finland to develop an ice navigation training and certification program to manage risk by preventing accidents in the Arctic caused by human error. Their mutual aspiration is to ensure their disciplined program becomes the international model and IMO standard to guarantee consistency and proficiency for hiring crews and individual mariners to work on all ships operating in the Arctic. Although we are not explicitly endorsing the DNV model, we readily recognize it may be an appropriate starting point for developing a uniform curriculum for international use. Martin Crawford-Brunt, personal interview, December 10, 2009.

human life within fifteen minutes.[43] The ill-fated voyage of the *Explorer* provides compelling rationale. If the *Nordnorge* had not been sailing in tandem with the *Explorer*, the results would have been more disastrous—loss of life was certain.

IV
THE ARGUMENT FOR INTERNATIONAL NETWORKING

If UNCLOS, MARPOL, and IMO guidelines provide the framework for Arctic governance, increasing domain awareness will enable policy makers to mitigate the risks of human activity in the region. Domain awareness is a broad understanding of the wide range of variables that intersect in the Arctic and influence regional security, safety, economy, and environment. It implies information transparency and sharing across borders. Today's technology makes this possible, but international politics make it uncertain. ***The United States and other Arctic nations must actively integrate existing networks and expand operational capacity to monitor and enforce the rule of law***. Creating a culture of open collaboration among Arctic stakeholders is vital to the region's economic development and sustainability. Open collaboration will inform policy decisions to benefit international stakeholders at all levels of government, business enterprise, and public activity—including indigenous peoples.

A. The Case for an Integrated Arctic Observing Network

An integrated Arctic observing network is a practical vehicle for assimilating data and sharing information. It underwrites the ability to increase domain awareness and provides a transparent, common operating picture for all Arctic stakeholders. The concept has traction in the academic and scientific communities. However, what exists today is an informal network of fragmented stovepipes that are neither integrated nor transparent. Our research indicates data collection activities are generally effective in gathering critical information, but less effective integrating the data and sharing it among Arctic stakeholders. This dichotomy results in information gaps, as well as duplication of effort and resources.

An integrated and multidisciplinary observing network, drawn from all open sources, would improve understanding of systemic changes in the

[43] "Hypothermia Safety," *Compass*, (Raleigh: United States Power Squadrons, January 23, 2007); available from http://www.usps.org/national/ensign/uspscompass/compassarchive/compassv1n1/hypothermia.htm (accessed on May 1, 2009).

Arctic and enhance the ability to predict and respond to future changes. The data derived from this network can be used to inform a wide range of programs and activities. These include decision-support tools, emergency response operations, additional research studies, and environmental assessments that could shape future strategic policy decisions.

For example, much of the infrastructure to monitor AIS exists or is being put into place in the Arctic. Norway has full AIS coverage of its entire national shoreline and is funding a low-cost AIS satellite prototype expected to be deployed by 2010. Canada awarded a contract for a similar system, likewise scheduled for launch in 2010.[44] The United States is also planning to put AIS receivers on satellites.[45] It is reasonable to assume the Russians are doing the same. It is a waste of national resources for each country to purchase and operate separate satellite systems to monitor the same information. International collaboration to combine AIS assets into one integrated system and provide a common operating picture makes economic sense.

While the concern for individual privacy and commercial rivalry is understandable, we strongly recommend streaming AIS data from all ships operating in the Arctic in real-time on the worldwide web—for everyone's use, including watchdog organizations and the public at large. This transparency reveals the mosaic of human activity in the Arctic and provides a primary building block for analyzing patterns, trends, and impacts of shipping on diverse sectors—from monitoring whale migration, to planning for economic development and ensuring national security. When a ship's voyage should not be displayed in real-time because of security considerations, the information should be made available soon after the voyage ends to ensure data capture for future research and trend analysis.

B. The Case for Arctic Coalition Centers

As the observing network expands and matures, a logical outgrowth might be to ***create a formal network and stand up one or more Arctic coalition centers***. These centers could manage three interrelated functions:

- Data collection, integration, and dissemination
- Observation of human activity and natural phenomena
- All-hazard emergency response and consequence management

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[44] "Norwegian AIS Satellite," *Kongsberg*, (Kongsberg: Kongsberg Maritime AS, June 25, 2007); available from http://www.km.kongsberg.com/ks/web/nokbg0238.nsf/AllWeb/5ABD16FBCA2A3F12C125730500430A00?OpenDocument (accessed May 1, 2009).

[45] "Satellite AIS from USCG," *Digital Ship*, (London: Digital Ship Ltd, April 2007) 26; available from http://www.uscg.mil/acquisition/NAIS/documents/Article1-APR07.pdf (accessed May 1, 2009).

The North Pacific Coast Guard Forum and the U.S. Joint-Interagency Task Force South are successful models of international cooperation. Although neither model is a perfect template, together they illustrate how the Arctic nations could develop operational coalition centers.

The Japan Coast Guard established the North Pacific Coast Guard Forum (NPCGF) in 2000 to foster multilateral cooperation on a number of common concerns. Agencies from Canada, China, Japan, Korea, Russia, and the United States have actively engaged in the NPCGF to cooperate on issues related to national security, law enforcement, and environmental protection. NPCGF has been successful exchanging and documenting best business practices, using a web-based information exchange system that also facilitates joint exercises and operations targeting piracy, drug trafficking, and illegal immigration.[46] NPCGF is not a bricks and mortar organization, but it effectively illustrates an intermediate-level, operational cooperative among willing international partners—a progressive step in the evolution of the Arctic coalition centers we envision.

In contrast, the Joint Interagency Task Force South (JIATF-South) is a far more robust and capable collaborative effort. Now based in Key West, Florida and hardened with multiple brick and mortar headquarters facilities around the Caribbean basin, JIATF-South was originally formed to counter illegal drug trafficking from Latin America. Today the command has more than 500 assigned personnel who conduct law enforcement and intelligence operations in partnership with more than a dozen nations. JIATF-South actively monitors the entire Caribbean and both coasts of South and Central America, as well as the U.S.-Mexican border, in order to promote security and defeat illicit drug trafficking.[47] Although JIATF-South is a more mature model for comparison purposes, it does not incorporate the non-government stakeholders we see as potential partners in Arctic coalition centers (e.g., indigenous peoples and representatives from the private and non-profit sectors, including public media).

Coalition centers would be relatively expensive propositions to establish and sustain. They require significant political capital as well as programmatic planning, budgeting, and execution to become reality. In the interim, the United States can offset direct costs by co-opting international partners from the Arctic nations and stakeholders from private industry and non-profit organizations. All Arctic stakeholders are potential coalition partners—

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[46]Thomas B. Fargo, "Remarks to the North Pacific Coast Guard Agencies Forum," North Pacific Coast Guard Agencies Forum, Royal Hawaiian Hotel, Honolulu, July 18, 2002; available from http://www.pacom.mil/speeches/sst2002/020718npcga.htm (accessed May 5, 2009).

[47]James Jay Carafano, "A Better Way to Fight Terrorism," *Foxnews.com*, May 18, 2005, available from http://www.foxnews.com/story/0,2933,156732,00.html (accessed on May 5, 2009).

incentivized to leverage their own resources in order to share the products and services of the coalition centers.

Arctic stakeholders could incrementally resource expansion of the existing observing network into more robust operations centers, progressively representative of the end-state Arctic coalition center. Our earlier discussion of the NPCGF and JIATF-South help illustrate the idea of incremental funding and iterative development. Maturation of the Arctic observing network into operational nodes and ultimately into an Arctic coalition center, or series of centers, is roughly analogous to taking the NPCGF model to the operational level of JIATF-South.

V
TRANSITION IS NOT A ZERO-SUM GAME

The adage "a rising tide lifts all boats" is particularly apt in the Arctic. While American foreign policy has historically been a zero-sum game in select parts of the world, such an approach would be counterproductive in the Arctic. Virtually every aspect of operating in the vast, unforgiving region requires a tremendous logistics tail to mitigate risk. It is unrealistic for the United States, or other Arctic stakeholders, to resource response capabilities to sustain a safe and commercially viable operating environment without international collaboration. U.S. Arctic policy recognizes this reality. The Arctic should not become a place for territorial battles or environmental and cultural destruction. Time is of the essence.

Energy and mining companies are investing billions of dollars in exploration and drilling rights. The United States Minerals Management Service (USMMS) estimates the Alaska outer continental shelf alone contains 26 billion barrels of oil and 132 trillion cubic feet of natural gas.[48] Alaskan mines produced a record $3.4 billion in 2007, representing an 18 percent increase from 2006.[49] The European Union is aggressively developing Arctic commercial shipping, and China has dispatched three Arctic expeditions in five years to collect data samples.[50]

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[48] *Report to Congress: Comprehensive Inventory of U.S. OCS Oil and Natural Gas Resources Energy Policy Act of 2005 – Section 35*, (Washington, DC: U.S. Department of the Interior, February 2006) vii; available from http://www.mms.gov/PDFs/2005EPAct/InventoryRTC.pdf (accessed May 1, 2009).

[49] "'Record-breaking Year' for Alaska Mining," *World Gold Council*, (London: CFP Group, November 12, 2008); available from http://www.gold.org/news/2008/11/12/story/10651/record_breaking_year_for_alaska_mining (accessed May 1, 2009).

[50] Alec Crawford, Arthur Hanson and David Runnalls, *Arctic Sovereignty and Security in a Climate-changing World*, (Winnipeg: International Institute for Sustainable Development, November 2008) 6; available from http://www.iisd.org/pdf/2008/arctic_sovereignty.pdf (accessed May 1, 2009).

The United States has pursued an ad hoc approach to the region through bilateral and multilateral meetings with almost no substantive commitment on any level. Arctic governance is presently a patchwork of voluntary guidelines and unilateral agendas lacking strategic vision and global resolve. The private sector demands the predictability of a uniform regulatory regime before it will risk large-scale capital investment. It is up to U.S. policy makers to overcome an historical reluctance to embrace international institutions that could impede freedom of American action in the Arctic.

We recommend a strong U.S. commitment to UNCLOS and the IMO in order to develop mandatory regulations specific to the Arctic. These include designation of the Arctic as a special environmental area; compulsory AIS carriage for all commercial vessels operating in the region; compulsory AMVER registration; uniform construction standards for ice-class vessels; uniform training certification for mariners; and tandem-sailing for passenger ships. They will create a safer operating environment that will enable sustained economic development and environmental protection.

The United States and partner nations must integrate their networks to expand their collective operational capacity in the Arctic. A culture of open collaboration is critical to the region's economic development and sustainability. Open collaboration will inform policy decisions to the mutual benefit of all stakeholders and could lead to a formal network of coalition centers that monitor and enforce the rule of law in the Arctic.

Our recommendations are in no way exhaustive, but they are cost effective measures that enable sustainable economic development and environmental protection. While these may not be traditional national security measures, they will strengthen global partnerships and promote international stability, thereby reducing the likelihood of conflict. They also mitigate free-for-all resource exploitation and provide breathing space to develop an international strategy and program appropriate resources. It is imperative that the U.S. partners with other nations to embrace the Arctic as a global commons. ***If the United States leverages international institutions, the melting sea ice can lift all boats.***

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