

# The Arctic Circle: Development and Risk



*The USCGC Healy: America's Icebreaker Fleet*

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# Executive Summary

Climate change is gradually uncovering an Arctic which stands at the crossroads of development and risk. Natural and man-made change in the region will increasingly compel American attention. Policymakers will need to weigh the demands of commercial development against the unique obligations the U.S. owes to indigenous residents, and the fragile eco-system on which they depend. They will also need to manage an expanding security environment in which the U.S. lags seriously behind its nearest competitors.

Human access to Arctic resources is already improving. Vast natural resources lay virtually untouched by the world's five Arctic States; the U.S., Russia, Canada, Norway, and Denmark. Indeed, international boundaries have, until very recently, been only vaguely delineated on imprecise maps. Global energy demand and the melting icecap are changing this legacy of diplomatic indifference.

Formal negotiations are already underway in the context of the *U.N. Convention on the Law of the Sea (UNCLOS)* to allow the world's coastal nations to extend their sovereign economic claims. In the Arctic particularly, new territory means access to rich new resources. Yet despite support from Democratic and Republican Presidents alike, the U.S. has not ratified the UNCLOS and cannot stake its own claim to over 1.2 million square kilometers of additional territory. Presently, over 155 other nations have ratified the UNCLOS agreement, and some of these states, like the Russian Federation, have begun making expansive new territorial claims in the Arctic.

While the region's economic value to the U.S. is difficult to estimate, experts are optimistic about the Arctic's rich potential. Most of its recoverable hydrocarbon reserves are in the form of natural gas, though significant deposits of oil, coal, and other minerals also make the region extremely attractive to a broad range of commercial investment. Estimates exceeding \$1 trillion in "un-harvested" assets are common. These figures do not include monies earned from the Arctic's important commercial fishing industries and growing tourist trade. They also do not account for what will inevitably be the region's most important contribution to global commerce—the "Trans-Arctic" waterways. These routes promise to cut by half the distance goods travel around the world, significantly altering the flow of commercial maritime traffic over the next century.

U.S. capabilities in the Arctic lag far behind international competitors and do not reflect the country's global standing or regional responsibilities. Currently, the U.S. has a single, oceangoing diesel icebreaker for the region.<sup>1</sup> This makes the American fleet equivalent to Greenpeace, which also operates a single polar vessel. By comparison, Russia employs roughly 18 icebreakers, 7 of which possess exceptionally powerful, state-of-the-art nuclear powered engines. At least one of these has been armed. In the modern "Great Game" competition for Arctic resources, the U.S. stands at least a decade behind.

Reassessing American priorities in the region will be an important first step towards rebuilding its operational capabilities. Unfortunately, the impact of climate change is difficult to predict with any precision. What is certain is the rising demand for Arctic resources will continue to climb. Infrastructure, ship-building, and security improvements in the region will likely take a decade or more to mature. Realistic planning over the next several years will signal the US remains committed to defending its commercial and territorial interests in a region whose strategic significance will bloom in the next decade.

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<sup>1</sup> The USCG Healy is the only American ice breaker to operate full time in the Arctic. Two additional ships, the Polar Sea and the Polar Star, are either limited by funding to part-time operations or in caretaker status. Both are at the end of their design lives. The U.S. has an additional icebreaker operating only in the Antarctic, the Nathaniel B. Palmer.

# Arctic Overview

Though no strict definition of the term “*Arctic*” has been uniformly adopted, the region is believed to encompass a sixth of the world’s total land mass sprawling over 24 time zones. Accurate maps of the undersea region are sparse and generally inaccurate. Despite its relative size, the Arctic supports only four million permanent inhabitants. Conditions may be harsh, but the environment is changing in ways which have both positive and negative consequences for U.S. interests. Access to the region is improving, and this, along with global energy demand, is helping to drive states north in search of resources. Key national players are the five “coastal states—Russia, the U.S., Canada, Denmark (including Greenland and the Faroe islands), and Norway—plus Iceland, Sweden and Finland (the entire eight nations comprising the Arctic Council). Each has shown greater interest than the U.S. has toward the Arctic. Each also has more capability to support those growing interests.

## Climatic Change, Arctic Transit Routes

Scientists agree the Arctic is warming faster than the rest of the planet. Prior to 1989, over 80% of the Arctic Ocean was covered by a durable ice sheet which thickened over the course of a decade or more. Current measurements indicate this ice cap has significantly retreated. Less than 10% of the deep, multi-year ice remains.

Arctic States have recognized the new waterway will be an opportunity to re-define their national boundaries and expand commercial areas of operation. Three potential Trans-Arctic routes are developing through formerly inaccessible regions. All of these paths exit through the Bering Strait, which acts as a gateway and strategic choke-point for ocean-going vessels transiting the region:

- *The Northern Sea Route*: Hugs Siberia in the Arctic Ocean
- *The Trans Polar Route*: Traverses the North Pole in a relatively straight line
- *Northwest Passage*: Navigates through contested Canadian international waterway

The shortest comparable routes—for instance, through the Panama or Suez Canals, or around the Cape of Good Hope- measure more than twice the distance of the longest Arctic route above.<sup>2</sup>

Despite the apparent ‘bluing’ of regions formerly covered in un-navigable ice flows, Arctic seas will likely remain too dangerous for conventional *container vessels* for decades to come (mid 21<sup>st</sup> century), and demand for these services will remain low. *Seasonal* transit through the Arctic by container vessels may become routine by 2050.

By contrast, evidence suggests the demand for other types of marine transport missions, such as *cruising and resupply*, has already begun to climb. Demand for these services will remain constrained by regional climatic differences, unpredictable shifting ice patterns, and seasonal and perennial weather variability.

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<sup>2</sup> Figure a

## Energy Resources

Experts believe there may be over a trillion dollars in hydrocarbon (oil and gas) resources in the Alaskan Arctic. These untapped assets account for 40% of the remaining U.S. reserves, and are believed to lie in concentrated areas offshore, beneath the Chuckchi, Beaufort, and Barents Seas.

While some estimates put the amount of recoverable oil reserves as high as 400 billion barrels, most of the Arctic's energy potential lies in vast storehouses of clean-burning natural gas. Transporting the estimated 100 trillion cubic feet of natural gas will likely require pipeline-based infrastructure, rather than double-hulled ocean-going vessels.

The region is also home to a significant amount of high quality coal and mineral deposits. Alaska is believed to hold as much as 1/10<sup>th</sup> of the planet's remaining coal reserves, and this fuel is of the cleanest, longest lasting variety.

“Harvesting” and transporting these resources will be a technical, expensive, and difficult task. Seasonal weather patterns, annual variability and extremes, and most importantly, a lack of (year-round) physical infrastructure- such as North/South pipelines- make any possibility of speedy production remote. Indeed, a dedicated program of large-scale hydrocarbon development is perhaps decades away.<sup>3</sup>

## Emerging Governance

While, technically, there exist only five Arctic States (U.S., Russia, Canada, Norway, and Denmark), three additional countries (Finland, Sweden, and Iceland) are typically included in deliberations about the region. They join others on significant international bodies addressing Arctic issues, such as:

- **The Arctic Council** (est. 1996): Consultative, intergovernmental forum on issues related to *sustainable development* and *environmental protection* issues.
- **The Conference of Parliamentarians of the Arctic Region** (est. 1993): Delegations appointed by parliaments hold *conferences and issue reports* on a variety of issues. The U.S. representative to this body is Senator Lisa Murkowski (R-AK).

The Organizations listed above are consultative bodies only, and do not represent legal international authorities. While a patchwork of international agreements govern the region, the most significant treaty, the *United Nations Convention on the Law of the Sea*, is one which the U.S. has not yet ratified.

## Extending U.S. Territory

The most important legal framework affecting the *sovereign jurisdiction* of Arctic States is the **United Nations Convention on the Law of the Sea (UNCLOS)**. Among other provisions, the treaty defines the coastal area (200 nautical miles) over which nations can exercise an exclusive right to all *natural resources*.

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<sup>3</sup> See Figure b

Under the terms of UNCLOS, the limit of this boundary—or, Exclusive Economic Zone (**EEZ**)—is subject to revision based on a coastal state’s measured *continental shelf*.<sup>4</sup> This potentially expands the **sovereign jurisdiction** of over 30 coastal states by significant margins, granting full economic authority over the new territory. (The EEZ does not authorize “denial of innocent passage,” but delineates a state’s *economic* rights only.)<sup>5</sup>

Over 155 nations have ratified the UNCLOS agreement, and a number of them have already submitted substantial new territorial claims. Australia, for example, has recently “grown” by 2.5 million square kilometers. The Russian Federation has submitted a claim which includes the North Pole, and extends 1.2 million square kilometers. Other states anticipate significant gains, as well.

- **As a UNCLOS signatory, the United States could claim over 1.2 million additional square kilometers of territory, an area roughly the size of Alaska.**

Though the U.S. adheres to all UNCLOS provisions and played a significant role in authoring a revised version of the treaty in 1994, *final ratification has been blocked*. Congressional opponents argue its framework risks compromising U.S. sovereignty by making international disputes subject to third-party arbitration. They also worry UNCLOS provisions could bind the U.S. to excessively strict international environmental and humanitarian regulations.

Advocates of the treaty—a clear majority—believe the agreement is fair-minded and would allow the U.S. to benefit from an arrangement it authored, honors, and has promoted.

## **The Biggest Challenge- Missing U.S. Arctic Policy**

The U.S. has neither a formal nor an informal “Arctic policy.” “There are three COCOM’s in charge,” said one high ranking military official, “I don’t know who’s in charge...I do know that in Alaska, we can’t get them to agree.” Many worry the nation’s relative indifference to its status as an Arctic State prevents the DoD from accurately assessing and responding to risks in the region.

Public attention recently focused on the Russian Federation’s symbolic move to stake its claim to the North Pole by planting a national flag on the deep sea floor. Some administration officials voiced concern this dramatic action created a false impression for American audiences of a lawless, chaotic “scramble” in the Arctic.<sup>6</sup> In fact, the international community has maintained a relatively collegial atmosphere of negotiation in the region based on an effective framework of bilateral and multilateral agreements.

In spite of the exaggerated coverage, many were pleased the Russian “media stunt” had reminded the U.S. it was an Arctic nation with an important stake in the region. “What’s our biggest challenge in the Arctic?” asked one senior military analyst, “The U.S. simply doesn’t understand we are an Arctic Nation. We’re a landowner in the Arctic with unique obligations, environmentally and strategically.”

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<sup>4</sup> See Figure 1a

<sup>5</sup> See Figure 1b

<sup>6</sup> See Figure 1c

# U.S. Strategic Climate

*“Having a safe, secure and reliable Arctic shipping regime is vital to the proper development of Arctic resources, especially now give the extent of Arctic ice retreat... We can have such a regime only through cooperation, not competition among Arctic Nations.”*

*-Assistant Secretary of State Daniel S. Sullivan*

Climate change in the Arctic brings with it new opportunities for American commercial interests. Current estimates project 25% of the world’s remaining reserves of oil and natural gas lie ‘trapped’ in the Arctic.<sup>7</sup> Three new waterways hold the potential to cut travel time and expenses for goods transiting the globe by more than half. Developing these resources while safeguarding existing human and animal habitations will be a challenge requiring a significant shift of national priorities.

## U.S. Priorities

The U.S. shares with other nations a mixture of traditional and non-traditional interests in the Arctic. According to various presentations given during NDU’s recent conference, these American priorities are:

### Security Interests

- Establish and safeguard sovereign territorial claims
- Monitor and maintain Arctic balance of power
- Protect coastlines from criminal activities
- Ensure freedom and safety of maritime commerce
- Prepare for timely search, rescue, and recovery operations

### Economic Interests

- Promote development of hydrocarbon and mineral deposits (manganese, copper, nickel, cobalt)<sup>8</sup>
- Prepare fishery management tools for species migration
- Resolve outstanding territorial disputes with neighbors
- Manage growing ecotourism

### Environmental Interests

- Mitigate effects of climate change on indigenous communities
- Protect fragile eco-system
- Promote scientific exploration

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<sup>7</sup> See Figure 2

<sup>8</sup> See Figure 3a

As a means protecting U.S. interests while robustly asserting American sovereign claims, policy-makers should consider the importance of re-establishing the country's leading role in international institutions, like UNCLOS, which govern and legitimize the use of Arctic resources. Fortunately, states have so far treated the sparsely populated Arctic as a virtual non-militarized zone, contributing to its common history of international cooperation and scientific exploration. Whether this collegial atmosphere continues remains an open question. However, even in the best-case scenarios, it seems unlikely the current U.S. icebreaker fleet will be capable of defending American security interests in the region over the course of the next decade.

## Operational Gaps

### Main Issues

A host of equipment-related and managerial problems plaguing U.S. Arctic operations can be expected to grow more acute over the coming decades. It seems likely that, if left unresolved, these gaps in American capabilities will begin limiting policy options at an accelerating rate.

#### Physical Problems

- U.S. icebreaking vessels are vastly outnumbered<sup>9</sup>
- Scarcity of experienced Arctic navigators
- Lack of reliable communication/navigation infrastructure
- Extreme uncertainties in weather prediction models
- Seasonal, inadequate theater infrastructure (roads, rail, pipeline)
- Unreliable extreme weather provisions (port of refuge; search and rescue; pollution response)

#### Managerial Problems

- Unclaimed 1.2 million square kilometers of U.S. territory
- Arctic "seam" exposes uncertainty in the UCP
  - (USPACOM/ USEUCOM/ USNORTHCOM)<sup>10</sup>
- Major Outstanding boundary disputes with neighbors
  - **U.S./Russia:** Maritime boundary in the Bering Sea
  - **U.S./Canada:** Maritime boundary in the Beaufort Sea
  - **U.S./Canada:** Dispute over ownership of the Northwest Passage<sup>11</sup>
- Question of which agency will handle multi-mission capacities; Dept. of the Interior, USCG, Dept. of Transportation, or the Navy?

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<sup>9</sup> See Figure 4

<sup>10</sup> See Figure 5

<sup>11</sup> Other Disputes include: **Canada/Denmark:** Boundary dispute in Lincoln Sea; **Canada/Denmark:** Hans Island; **Russia/Norway:** Boundary dispute in Barents Sea

These outstanding problems reflect a region fraught with geologic, climatic, technical, economic, and territorial uncertainties. Managing the risks associated with such a complex operating environment will require sustained attention and long-term investment.

## Icebreakers

The importance of improving the American icebreaker fleet cannot be overstated. The U.S. Navy is *not* poised to operate in the Arctic and has no plans of addressing the expanding missions distributed among the USCG and three separate COCOMs which meet at the Pole. Indeed, the Navy lacks any double-hulled surface vessels capable of operating in the region, which is not traditional blue water.<sup>12</sup>

America's only icebreaker operating full-time in the region, the USCG Healy, employs diesel technology and falls under the budgetary discretion of the National Science Foundation. By comparison, the 7 newest ships in the Russian fleet are far more powerfully designed. Fueled by nuclear reactors, each vessel is capable of breaking through ice nearly twice as thick as its diesel competitor and can operate for extended periods on the open seas. By any measurement, the Russian Federation's 18:1 numerical advantage over American icebreakers inadequately summarizes that country's overall maritime superiority.

## Arctic Balance of Power

The Arctic is not governed by the same legal and international restrictions that shape international behavior in the *Antarctic*. Consequently, for many years the U.S. removed weapon systems from icebreakers in the Antarctic and re-armed them when the vessels deployed to the Arctic. This practice was eventually discontinued in favor of the current policy, which prevents all USCG icebreakers from carrying weapons.

The U.S. posture reflects a legacy of international cooperation and peaceful dispute resolution in the region, but with the discovery of new Arctic resources, the atmosphere may be changing. Commenting on news that the Russian Federation had recently armed one of its icebreakers, a distinguished DoD officer noted, "It has become clear now that we need (U.S.) polar icebreakers to be re-armed with defensive weapons...for multi-mission capabilities." Among the issues that are front and center is the arming of USCG vessels that operate in the region. The U.S. is certainly not prepared for a militarized Arctic, and policymakers may soon be compelled to relook at their Arctic armament policies to avoid a chaotic shift in the global balance of power.

## Considerations

Climate change is gradually uncovering an American Arctic which stands at the crossroads of development and disaster. Rising sea levels and permafrost degradation have damaged poor, subsistent coastal communities, and accelerating environmental changes promise to worsen their condition. In many ways, the region resembles a third world frontier, where travel is difficult and the opportunity of rescue can be unpredictable.

At the same time, the Arctic holds great potential for commercial industries poised to invest billions in extremely technical transport and development schemes. U.S. businesses will inevitably rely on DoD infrastructure and security improvements as a prerequisite for their success.

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<sup>12</sup> See Figure 3b

Based on discussions at NDU's recent conference, the U.S. should consider several new instruments, policies, and initiatives.

## **Instruments**

- Enlarged fleet of Icebreakers
- Ice pilotage training programs
- Polar orbiting satellites
- Improved weather, ice forecasting
- Comprehensive Arctic hydrographic data
- Provision of short range (fixed, seasonal floating) aids
- Designated maritime traffic separation scheme

## **Policies**

- Refined UCP plan for likely Arctic scenarios
- U.N. Convention on the Law of the Sea (UNCLOS) ratification
- Submission of American claim to expanded territories
- Prompt resolution of outstanding maritime border disputes
- Fishery plan for species migration

## **Initiatives**

- ***U.S.-led Convention on Arctic Armaments:*** The U.S. might take the lead in regulating the appropriate weaponry and rules of engagement in the Arctic.
- ***Consideration of an USARCOM (Arctic Component Command):*** The importance of delineating clear areas of responsibility will be paramount for managing disasters. The U.S. should consider a unified command to simplify the decision-making process.
- ***Plan for Arctic Interagency Exercises:*** American planning for Arctic emergency and security response scenarios has not yet fully matured. The U.S. should consider joint exercises which feature scenarios such as: a sinking Russian nuclear icebreaker calls for help; an U.S. confrontation with international smuggler/poacher/pirates; terrorist attacks against oil rigs; international response to large-scale pollution response.

It seems likely conditions will grow more difficult in the Arctic over the short-term, whatever course the U.S. adopts. The timeline for human development in the region may be measured in decades, not years.

# Options for Policy-Makers

Though the Arctic is poised for rapid, accelerating economic growth, the U.S. has so far excluded itself from an emerging international framework designed to manage the anticipated changes. We judge it extremely likely that policy initiatives taken during the next 5-10 years will disproportionately influence U.S. strategic posture in the Arctic over the next half century.

Bearing this in mind, we offer three possible options for the consideration of policymakers:

## Option 1: Retain Current Levels (Status Quo)

*Risks: High*

There is a tangible sense among many experts that America's Arctic policy is adrift and unable to keep pace with events in the region. Many of these limitations have been outlined in the review above, and include essential capabilities like scientific exploration and search and rescue. The most troubling aspects fall into three general categories:

- Expanding Arctic Mission Area
- Insufficient Arctic Infrastructure
- Unsatisfied Arctic Diplomatic Agreements

These mounting problems make it likely the DoD will be pressured to formalize its present policies in the Arctic. To answer anticipated criticism, the DoD should consider commissioning a comprehensive study comparing U.S. interagency capabilities with anticipated needs throughout the region. While waiting on the outcome of this report, the DoD should also consider hosting a series of interagency training exercises which test Arctic exigency scenarios and familiarize the public with American interests in the region.

## Option 2: Limited Enhancement

*Risk Assessment: Medium*

As a great power and an Arctic state, the U.S. bears a unique responsibility for securing its own interests in the region while promoting a stable security environment. The following steps would help balance international obligations while preparing the way for increased economic activity.

- Ratify UNCLOS
- Articulate an Arctic Strategy which positively defines U.S. interests and priorities
- Arm the USCGC Healy for defensive purposes
- Create an Arctic Combatant Command able to manage and lobby for DoD assets in the region
- Initiate a DoD working group to assess the feasibility of improving U.S. Navy Arctic operations
- Act to resolve border disputes with the Russian Federation and Canada on a bilateral basis
- Develop plan to safeguard the Bering Strait (the future Trans-Arctic gateway for shipping)

- Review plans for establishing a base on Little Diomedede Island or improving Kivalina Lagoon (near Red Dog Mine)

As the region grows more accessible to human traffic and subject to unpredictable climatic events over the next decade, short-term exigencies will likely handicap the opportunity for planning, investment, and international negotiation.

### **Option 3: Enhanced Engagement**

*Risks: Low*

A decision for “enhanced engagement” indicates policy-makers will begin formulating short and long priorities for investing in the region’s physical, economic, and security infrastructure. These include:

#### **Short Term**

- Ratify *UNCLOS*
- Submit U.S. claims for extended territorial boundary
- Conduct a comprehensive DoD review of Arctic exigency plans
- Establish an interagency working group on Arctic scenarios

#### **Long Term**

- Improve, upgrade, and expand American icebreaker fleet (but begin process now)
- Review feasibility of a new Arctic COCOM
- Act to resolve border disputes with Russia and Canada
- Begin fundraising campaign for U.S. infrastructure improvements which will also serve Arctic clients; i.e. improved “ports of refuge,” navigation and communication satellites, search and rescue operations, cartographical measurements, etc...
- Arctic armaments treaty which restricts weapons in the region

The U.S. will have to improve its strategic posture in order secure a leadership role in the Arctic during the next decade. Preparations for a thawing Arctic will take some time, and the window for effective action is closing. The construction of a single icebreaker, for example, typically takes more than a decade to design, approve, and complete. Establishing U.S. claims to an extended continental shelf will likely be take many years, as well. Other nations have already taken positive steps to prepare for the future, while the U.S. lags behind.

### **Conclusion**

A successful U.S. Arctic policy is one which articulates American priorities and promotes the peaceful, balanced exploitation of the region’s rich resources. Fortunately, competition in the region is neither as fierce nor lawless as media accounts have depicted. As the Arctic grows more accessible to commercial interests, collegiality may wane. Unforeseen disasters, security breeches, or climatic events may permanently alter the political equation. An American position which can appeal to an international framework for managing and diffusing these new stresses backed by an increased national capacity for promoting and defending our interests is needed.

Figure a



Figure b

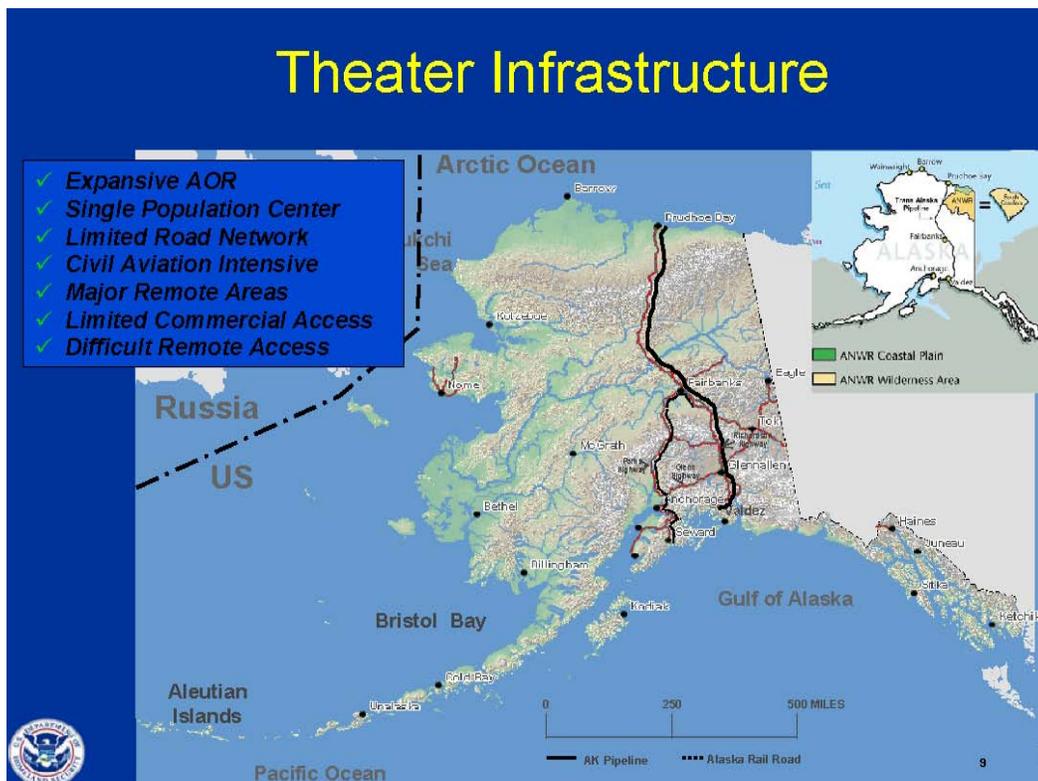


Figure 1a

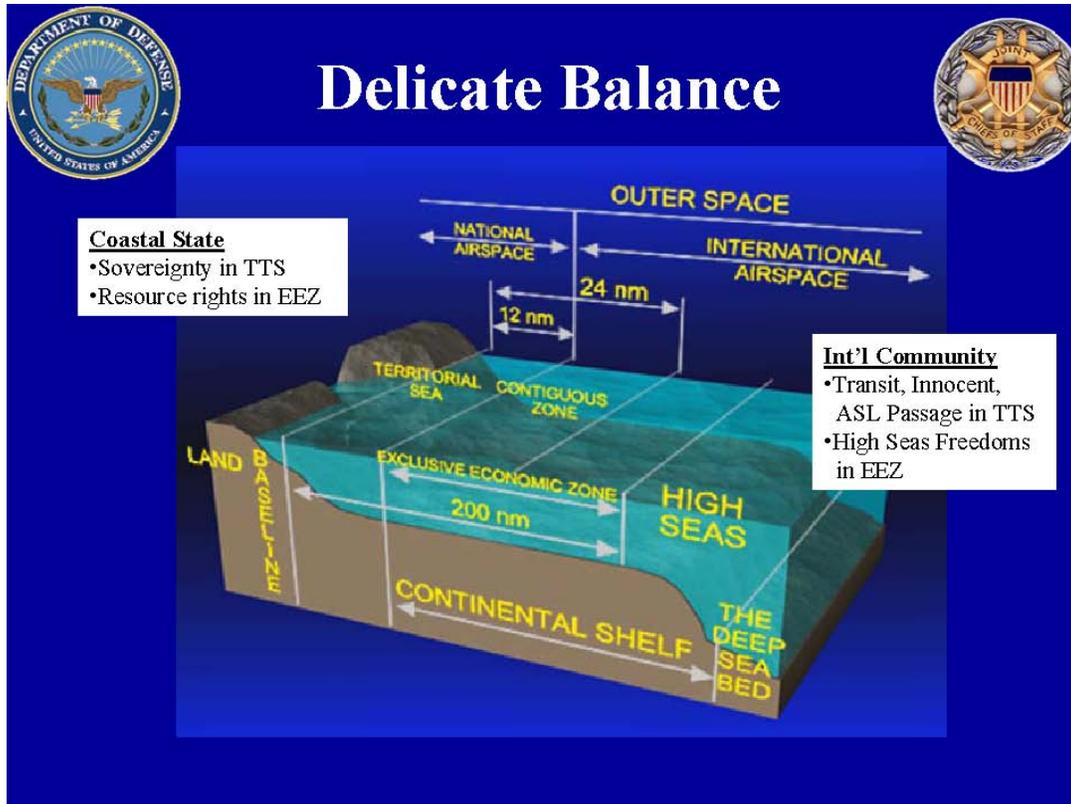


Figure 1b

**National Security/  
Defense Benefits**

- Convention extremely favorable to U.S.
  - Limits breadth of territorial sea (Art. 3)
  - Innocent passage (Art. 19-23, 45)
  - **Transit passage** (Art. 37-44)
  - Archipelagic sea lanes passage (Art. 52-54)
  - **Freedom of navigation and overflight in EEZs** (Art. 58, 87)
  - Sovereign immunity of warships & public vessels (Art. 29-32, 95, 96, 236)
  - Right of approach and visit (Art. 110)
  - Laying submarine cables (Art. 79, 87)
  - Legitimate coastal state authority in territorial sea and contiguous zones (Art. 2, 24-25, 27-28, 33)

Figure 1c



Figure 2

## Arctic Energy Resource Estimates

- Overall, Arctic is believed to account for between 25% of the world's remaining reserves of oil and natural gas
- U.S. Arctic oil and gas resources account for 40% of the nation's remaining reserves.
- 60% to 70% of U.S. Arctic reserves are offshore, concentrated largely beneath the Chukchi and Beaufort Seas
- Alaska OCS = 55 billion barrels of oil and 280 trillion cubic feet of natural gas



Year 2006 National Assessment - Alaska Outer Continental Shelf  
RISKED, UNDISCOVERED, TECHNICALLY RECOVERABLE OIL AND GAS

AREA	OIL AND COND (BBO)			GAS (TCFG)			BOE (BBOE)			MP/c (Geol)
	F95	MEAN	F05	F95	MEAN	F05	F95	MEAN	F05	
ALASKA OFFSHORE	8.66	26.61	55.14	48.28	132.06	279.62	17.25	50.11	104.89	1.00



MMS 2006 Resource Assessment: <http://www.mms.gov/alaska/re/reports/2006Asmt/overview.htm>

Figure 3a

## How Much Are the Resources Worth?

**At least \$1 trillion in resources**

**Hydrocarbons (Oil & Gas)**

- Estimated 10 Billion Barrels
- 750,000 square kilometers where sediment thickness exceeds 1 km

**Manganese Nodules and Crusts**

- Highest concentration of manganese nodules and at the highest average grades
- Manganese: 182 million tons
- Copper: 9 million tons
- Nickel: 12 million tons
- Cobalt: 5,000 tons



Jack #2 Well in the Gulf of Mexico  
Drilled in record 7,000 feet of water  
AP Photo/Devon Energy Corporation

Reference: Global Non-Living Resources on the Extended Continental Shelf: Prospects at the Year 2000  
Values based on June 2000 prices.

Figure 3b



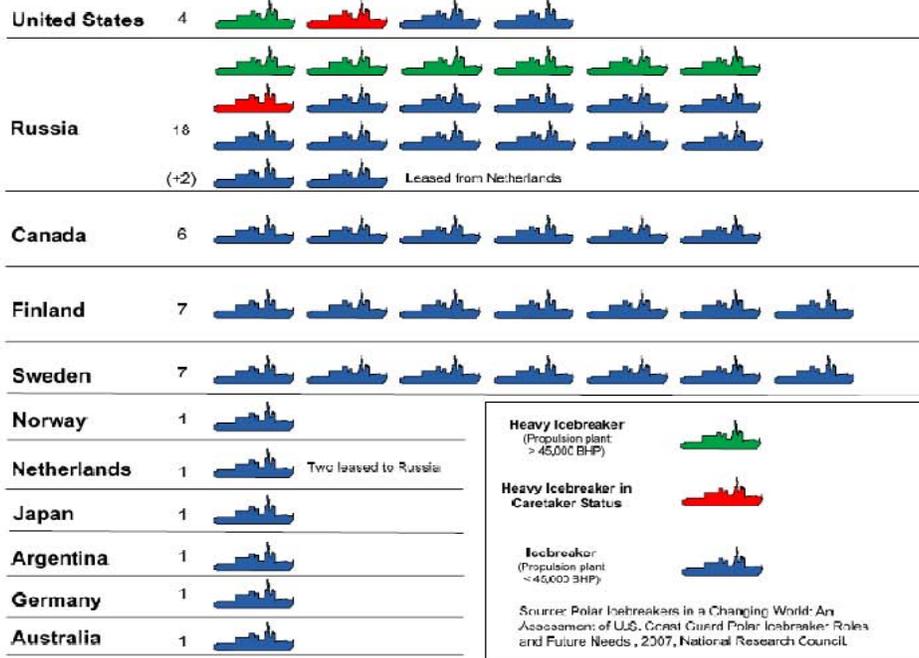
Figure 4



# World Icebreakers Fleets



National Research Council Tally of Polar and Baltic Icebreakers with over 10,000 BHP



1

Figure 5

