



U.S. Research Goals With an Accessible Arctic Ocean

Mead Treadwell

Chair, U.S. Arctic Research Commission

Senior Fellow, Institute of the North

Washington, DC – July 10, 2007



INSTITUTE OF THE
NORTH





U.S. Arctic Research Commission



Report on Goals and Objectives for Arctic Research
2007
for the U.S. Arctic Research Plan

Arctic shuttle
container link
from Alaska US
to Europe

AK-63



US ARCTIC RESEARCH COMMISSION



Mead Treadwell, Chair



Michele Longo Eder



Charles Vorosmarty



Susan Sugai



Duane Laible



Tom Royer



Vera Kingkeeguk Metcalf



U.S. Arctic Research Commission



Report on Goals and Objectives for Arctic Research
2007
for the U.S. Arctic Research Plan



Five Key Research Goals in USARC Recommendations

- **Environmental Change of the Arctic and Bering Seas**
- **Arctic Human Health**
- **Civil Infrastructure**
- **Natural Resource Assessment & Earth Science**
- **Indigenous Language, Identity and Culture**



Research Infrastructure

- **Arctic Observing Network (AON)**
- **Icebreakers**
- **Satellites**
- **Alaska Region Research Vessel (ARRV)**
- **Technologies**
- **Barrow Global Climate Change Research Facility**
- **Barrow and Bering Sea Cabled Observatory**
- **Alaskan Permafrost Observatory**
- **Unmanned Autonomous Vehicles**
- **International Review of Arctic Infrastructure**
- **Communications**



USARC and Arctic Policy

- Major supporter of Arctic Council's Marine Shipping Assessment
- Convened working group on Arctic Marine Transport research priorities
- Co-sponsor National Ice Center events
- Advocate for icebreakers (NRC report), AON, spill research, shipping regime study
- Helped establish Arctic Notices to Mariners



USARC ECUMENICAL BELIEF



- **The United States must maintain its global maritime capability—as a government AND as a Nation**



www.institutenorth.org

- Co-sponsored Cambridge 2003 conference
- Arctic Council Infrastructure Program secretariat (CITF) for SDWG
- Support Northern Forum NSR priority
- Joined NSR Non-Commercial Partnership
- Publish Top of the World Telegraph
- Organize IPY Arctic Energy Summit
- Organized Adak-Iceland shuttle study

INSTITUTE OF THE NORTH

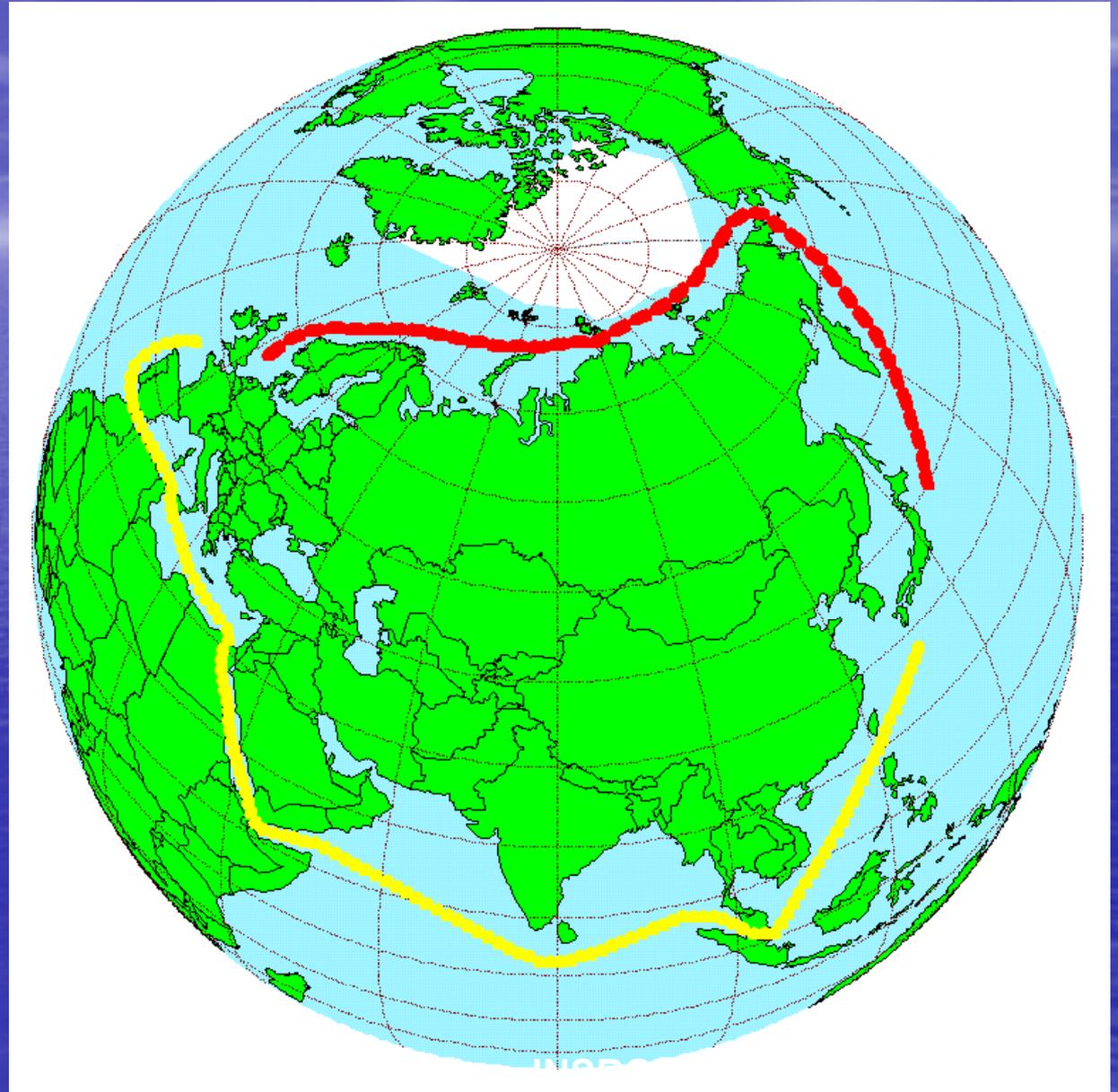
and a connected Arctic...

- **Governor Walter J. Hickel, Founder**
- **Ben Ellis, Managing Director**
- **The Institute of the North works to improve the infrastructure of aviation, telecommunications and marine links throughout the Arctic region under a grant from the U.S. Department of Transportation/Federal Aviation Administration.**
- **Shuttle study conducted for Adak with financial support by the State of Alaska.**
- **www.institutenorth.org**



Arctic Change:

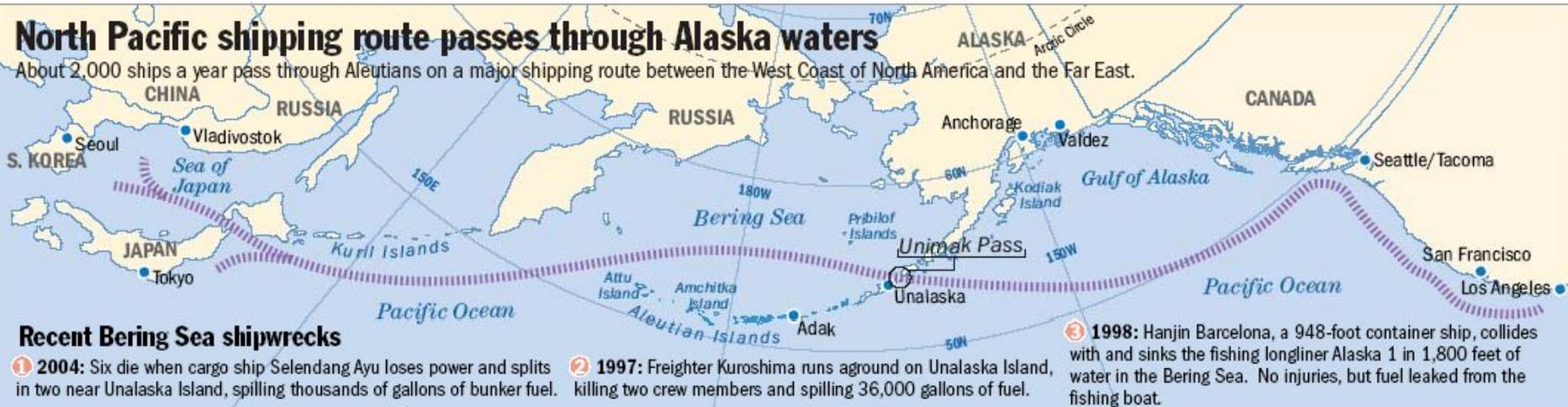
- Climate
- Technology
- Globalization



INSROP (1999)

North Pacific shipping route passes through Alaska waters

About 2,000 ships a year pass through Aleutians on a major shipping route between the West Coast of North America and the Far East.



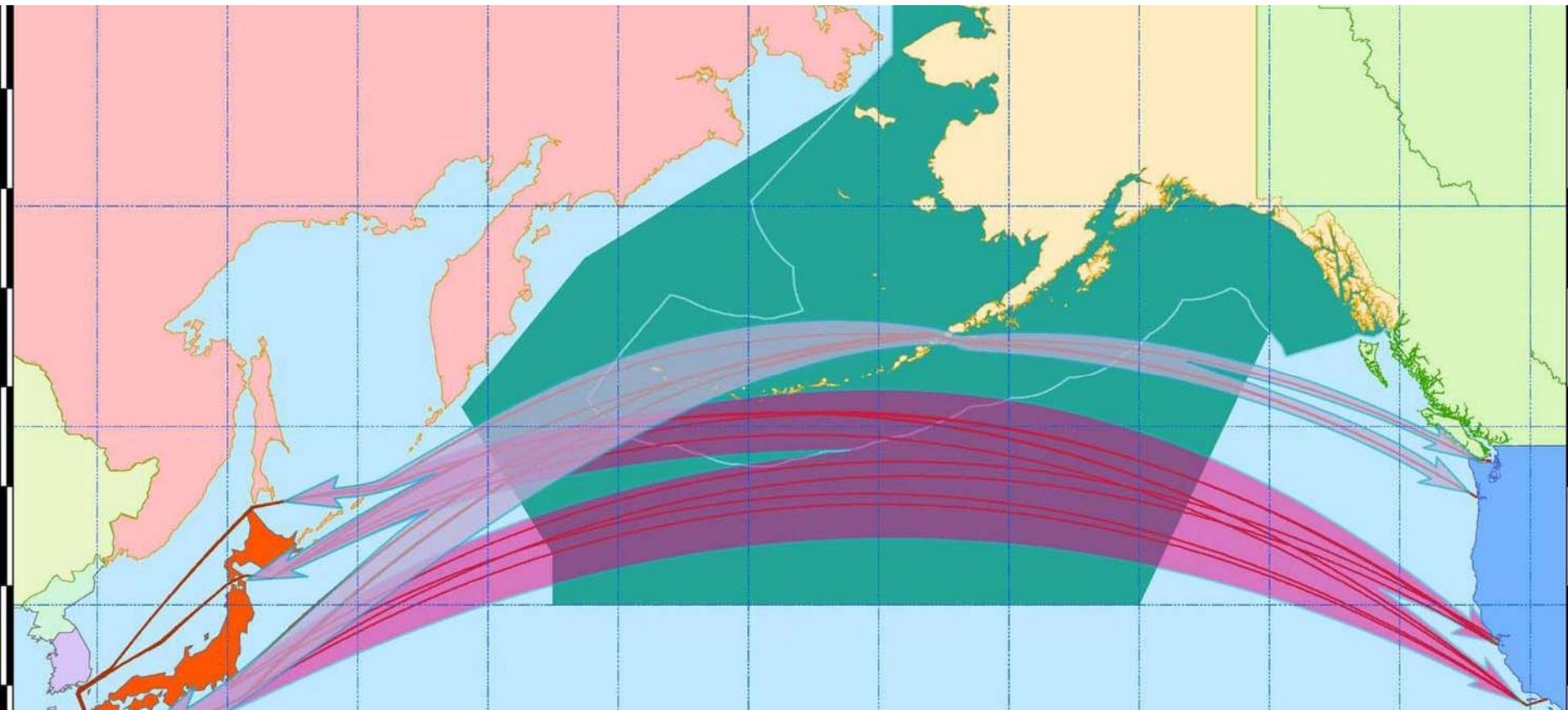
Recent Bering Sea shipwrecks

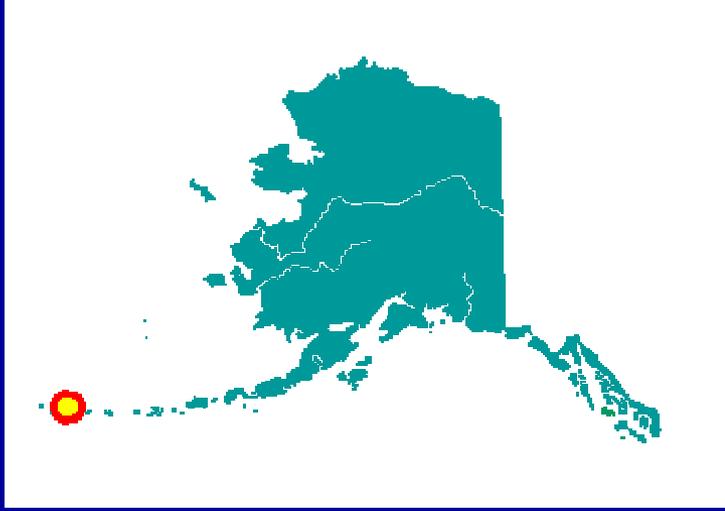
1 **2004:** Six die when cargo ship Selendang Ayu loses power and splits in two near Unalaska Island, spilling thousands of gallons of bunker fuel.

2 **1997:** Freighter Kuroshima runs aground on Unalaska Island, killing two crew members and spilling 36,000 gallons of fuel.

3 **1998:** Hanjin Barcelona, a 948-foot container ship, collides with and sinks the fishing longliner Alaska 1 in 1,800 feet of water in the Bering Sea. No injuries, but fuel leaked from the fishing boat.

CHARLES ATKINS / Anchorage Daily News





ADAK, Alaska

Photo from Arvid Fuchs Expedition
website, <http://www.arved-fuchs.de>



The vision

- Thinning Arctic ice and increasing technological capability may allow mankind to finally rely on trans-Arctic shipping for global commerce.
- A “shuttle” between Adak, a mid-Pacific port, and Iceland, a mid-Atlantic port, may be an appropriate realization of this opportunity.
- Dedicated icebreaking vessels would travel between ports which are near to regularly occurring trans-Atlantic and trans-Pacific service, allowing cargoes easy access between oceans in competition with Suez, Panama, and land bridges (Trans-Siberian, North American rail).

Arctic shuttle container link from Alaska US to Europe

AARC K - 63

Aker Arctic



Mach 2006
M. Arpiainen
R. Kiili

Goals of the investigation

- Undertake prefeasibility investigation of a container shipping program between Adak and an Icelandic port via the Arctic Ocean
- Focus first on technical feasibility, then markets and organizational issues
- Report to Adak on results
- Work with Adak to identify potential “twinning” partner in Iceland or other suitable port
- Provide scenario/information to Arctic shipping assessment and Arctic policy makers

Aker Arctic Study focus

- Aker studied two options: 750 and 5000 TEU vessels, with 815 and 5000 container capacities.
- Smaller vessel closely matches a new vessel, “Arctic Express,” owned by Norilsk Nickel, now in operation. Larger vessel would require longer route in deeper water but has greater efficiency.
- Both vessels employ “double acting” concept for ice and open water, with rotating “azipod” drive.
- Ice conditions were estimated for year-round operation on routes appropriate to vessel size.

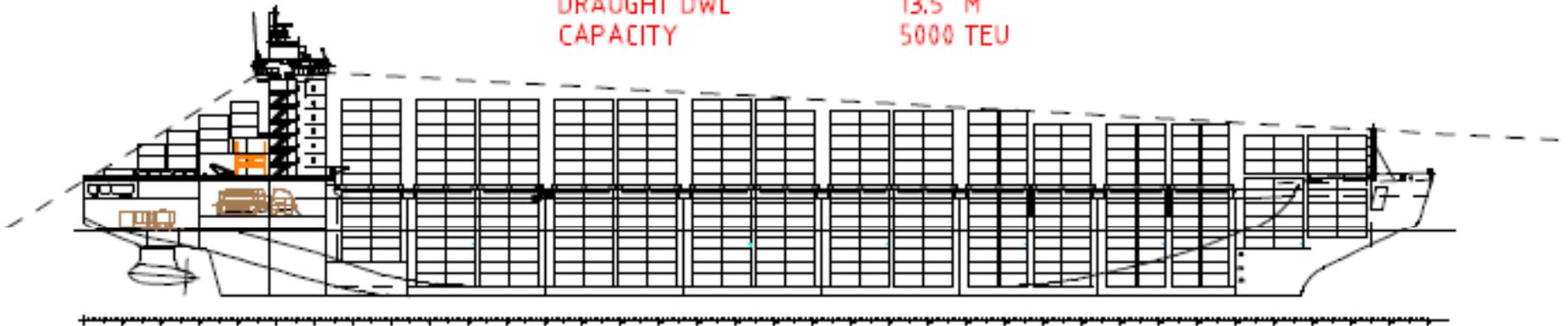
Port requirements

- For the 750 TEU vessel, three cranes are foreseen to allow 24 hour turnaround at each port, plus storage for inbound/outbound containers. Vessel length: 169 meters; draft, 9 meters.
- For the 5000 TEU vessel, 8 cranes are required for a 48 hour turnaround time, with 10,000 container storage. Vessel length: 281 meters; draft 13.5 meters.

Aker Arctic



LENGTH OA	281.3 M
LENGTH DWL	269.3 M
BEAM	34.6 M
DEPTH	21.3 M
DRAUGHT DWL	13.5 M
CAPACITY	5000 TEU



INSTITUTE OF THE
NORTH



Shipping routes and timing

- Using assumptions for ice conditions, three routes were studied.
- The 5000 TEU vessel depth requires voyaging north of Novaya Zemlya, 4963 miles Iceland to Adak.
- The 750 TEU vessel may take a longer, but less ice-heavy route inshore, either 5089 miles or 5225 miles.

Estimated vessel voyage times

- One way sailing time for the 5000 TEU vessel estimates range from 261 hours in September/October time frames to high of 648 hours in April; i.e. 11 days minimum at a speed of 19 knots. No icebreaker assist is needed.
- For the 750 TEU vessel, with some icebreaker assist during January to July, speed is reduced to 17 knots and minimum time ranges from 300 hours (12.5 days) to 756 hours.
- Average winter times above could more than double during severe winters.

Transport capacity

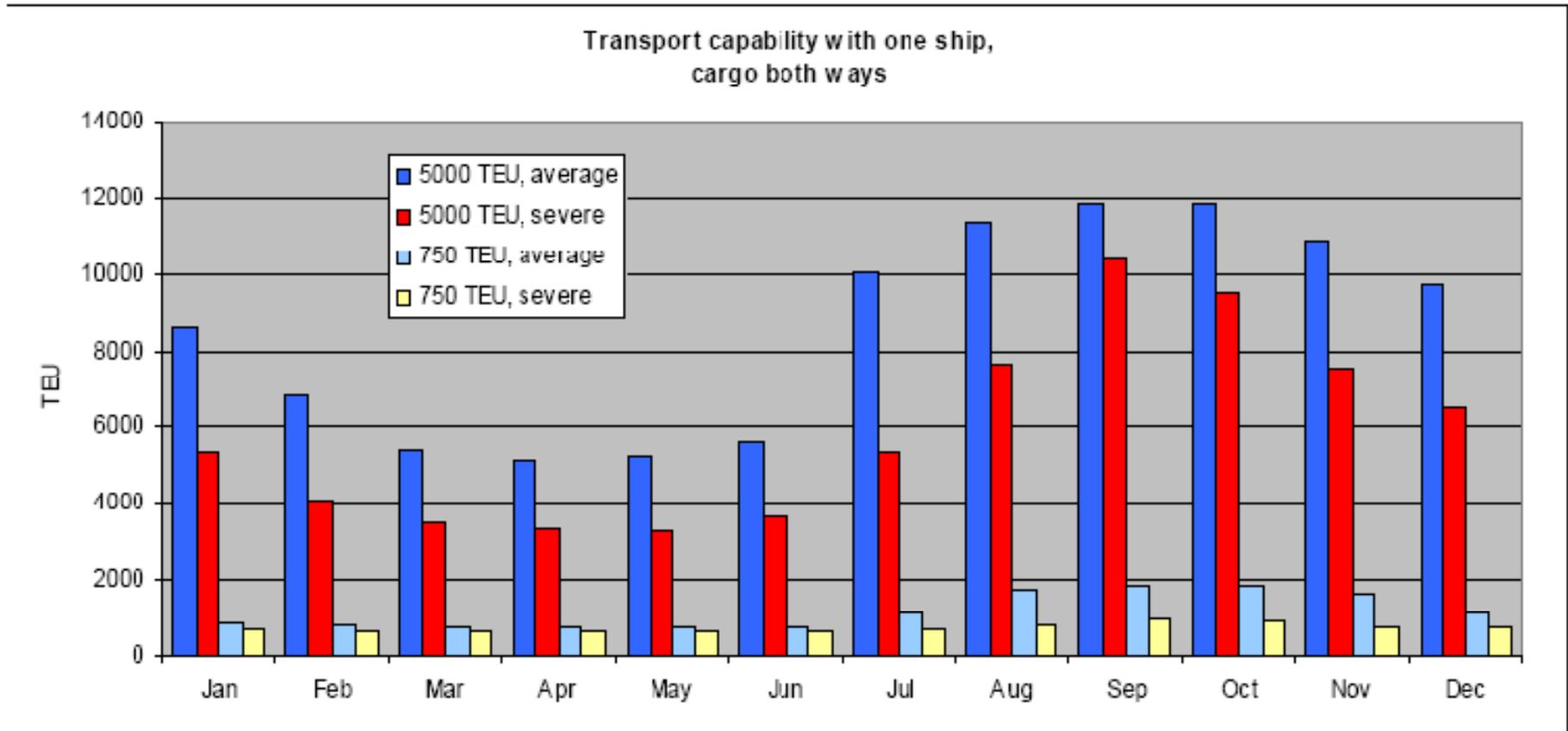


Figure 7. Transport capacity for both vessels on average and severe winter.

Costs of service

- Compared to today's tariff of \$1500 per container for the southern route through Suez, Iceland-Adak service, costs per container for the Arctic shuttle are estimated as follows:
- For the 5000 TEU vessel, \$354 per container escalating to \$526 in a severe winter.
- For the 750 TEU vessel, \$1244 per container escalating to \$1887 in a severe winter.

Sensitivity

- Costs were estimated for decreasing the voyage, i.e. ending in Murmansk; and increasing the voyage, i.e. ending in Rotterdam.
- Costs not estimated in the study are the “fairway/icebreaker” cost which might be charged by the Russian Northern Sea Route authority, harbor or terminal cost, and the feeder leg cost to bring containers to and from the Adak and Icelandic hubs.
- Capital costs of the smaller ship were estimated at \$100 million; the larger ship, \$195 million.

What else should we know?

- Costs of the voyage not included in this study, including insurance, icebreaker and port costs, safety and environmental infrastructure
- Feeder economics and potential partners in each ocean
- Demand for the shuttle service

Conclusions so far...

- For a \$200 million capital cost vessel, and unknown port costs, Arctic shipping through Adak appears competitive with current world costs and tariffs on longer routes.
- Reliability also appears stronger with a larger ship.
- Benefits to Alaska, as a port of trans-shipment, are yet to be quantified, but with 102,000 transshipped cargoes per year to begin, plus fueling, trans-Arctic shipping may be a sustainable economic activity for Adak.



www.arctic.gov

www.institutenorth.org

INSTITUTE OF THE
NORTH

