

UNITED STATES COAST GUARD

# PRELIMINARY FINDINGS

## Port Access Route Study: In the Chukchi Sea, Bering Strait, and Bering Sea

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[Docket Number USCG-2014-0941  
and USCG-2010-0833]

Seventeenth Coast Guard District

23 December, 2016

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## **Purpose**

The United States Coast Guard's (USCG) Seventeenth Coast Guard District conducted a Port Access Route Study (PARS) of the Bering Sea, Bering Strait and Chukchi Sea to evaluate the applicability and the need for creation of new vessel routing measures. The overarching goal of the Port Access Route Study is to determine if ship routing measures can help reduce the risk of marine casualties and their impact on the environment, increase the efficiency and predictability of vessel traffic, and preserve the paramount right of navigation while continuing to allow for other reasonable waterway uses.

Increasing vessel traffic through the Bering Strait prompted the initiation of the Bering Strait PARS. The summer of 2007 set a record minimum for sea-ice cover in the Arctic and this increased interest in the Arctic and Sub-Arctic regions of the United States. Since then, international attention has focused on a changing Arctic climate and the potential for increased natural resource exploration as well as the possibility that shorter shipping routes could become more viable. The minimum summer sea-ice cover record was broken again in 2012, furthering interest in natural resource exploration in the Arctic, as well as commercial and recreational use of the Bering Strait as the main access route to or from Arctic waters.

This study also examined several aspects of the marine environment that could affect the safety of shipping activity. The Coast Guard placed considerable emphasis on potential impacts to existing waterway uses, in particular subsistence activity, research, and resource development both on and offshore. Because there are numerous stakeholders with interests in this region, the U.S. Coast Guard put significant effort towards ensuring interested parties had access to the PARS announcements and an opportunity to share their viewpoints through a workshop, numerous presentations and public meetings before developing recommendations for new vessel routing measures.

## Background and Overview

The Seventeenth Coast Guard District initiated the Port Access Route Study (PARS) for the Bering Strait and requested public comment on November 8, 2010 via Federal Register notice 75 FR 68568 (See also docket number USCG-2010-0833). At that time, the study area focused primarily on the Bering Strait itself, extending from a point in the Chukchi Sea approximately 100 nautical miles north of the Bering Strait to approximately 25 nautical miles south of St. Lawrence Island in the Bering Sea. As the study commenced, the Coast Guard did not propose specific vessel routing measures, but rather sought more general comments about whether a vessel routing measures were needed or advisable in the study area, and the identification of important factors to consider if routing measures were to be developed.

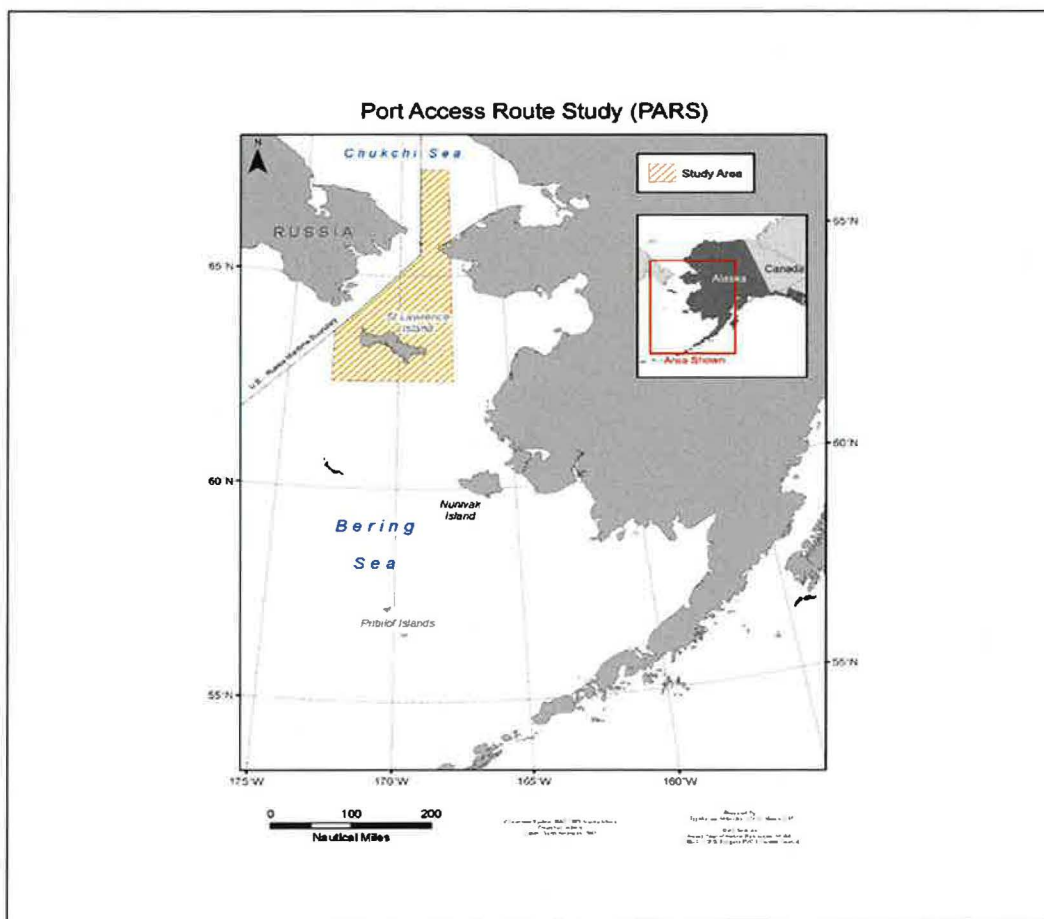


Figure 1: Initial Study Area from 2010:

The study area is bounded by the following geographic positions: 62°30' N, 173°00' W; 62°30' N, 167°30' W; 67°30' N, 167°30' W; 67°30' N, 168°58'37" W, thence following the maritime boundary line to position 63°40' N, 173°00' W, thence to the first position.

The Coast Guard received twenty-five public comments during the open comment period associated with the 2010 announcement. Nearly all of the comments that addressed vessel routing were supportive of the development of some form of vessel routing measures to protect the environment, wildlife, remote communities and subsistence activities. Some comments identified areas of particular concern for subsistence and environmental sensitivity in the immediate vicinity of the Diomed Islands, waters around King Island and the western tip of Saint Lawrence Island. Several comments noted that it was not possible to provide precise concerns and impacts until a specific route or measure was proposed.

The comments received in response to the 2010 announcement identified several important features desired in any routing measure. Regional stakeholders noted that subsistence activities were of paramount concern, and local areas used for subsistence activity needed protection from the potential impacts of shipping. Comments from both subsistence interests and maritime professionals cautioned the Coast Guard against adopting more restrictive Traffic Separation Schemes. Traffic Separation Schemes alter the obligations for some vessels engaged in collision avoidance maneuvers under the International Regulations for Prevention of Collisions at Sea (COLREGS). Under the COLREGS Navigation Rules (Rule 10), vessels less than 20 meters in length are not to impede the safe passage of power driven vessels following a traffic lane in a traffic separation scheme. Adopting a Traffic Separation Scheme in the Bering Strait could potentially limit the currently unrestricted access to marine areas where subsistence activities occur from smaller vessels. Professional mariners also noted that due to winter ice cover in the Bering Strait and Northern Bering Sea, routing measures that afforded the maximum flexibility for vessels to avoid ice were desirable. Several comments noted the lack of adequate charts and current hydrographic survey information as important concerns.

After reviewing the comments of the 2010 Federal Register Notice, the Coast Guard conducted a preliminary review to determine current commercial traffic patterns. Vessel Traffic history information generated from Automatic Information System (AIS) systems was sparse at this time, so instead the Coast Guard collected information from the State of Alaska Marine Pilot Organization that provided marine pilot services in the study area. Primarily this traffic consists of Handymax and Panamax class ore carriers that transit the Bering Strait and southern Chukchi Sea to or from the Red Dog Mine just north of Kivalina, Alaska. These vessels range from about 500 feet to 965 feet in length and carry between 35,000 and 65,000 tons of cargo. Waypoints collected from several vessels completing this transit yielded informative results and identified several concerns. Vessels were not following consistent tracks, and often approached close to areas of heightened concern for subsistence and environmental considerations such as the Diomed Islands, Saint Lawrence Island, and King Island. In some cases, especially near the eastern side of Saint Lawrence Island, commercial vessels transited near or over areas charted at less than 60 feet in depth where high confidence in the hydrographic survey information the charts are based on did not exist. Panamax class Ore Carriers can draft up to 39.5 feet. Once through the Bering Strait, most vessels opted for a track that passed well clear of the Cape Prince of Wales Shoal on their final approach to the Red Dog Mine instead of a more direct route that would shorten the transit. These vessel tracks are displayed on the following page.

## Bulk Carrier - Red Dog Mine Pre-AIS Track Lines

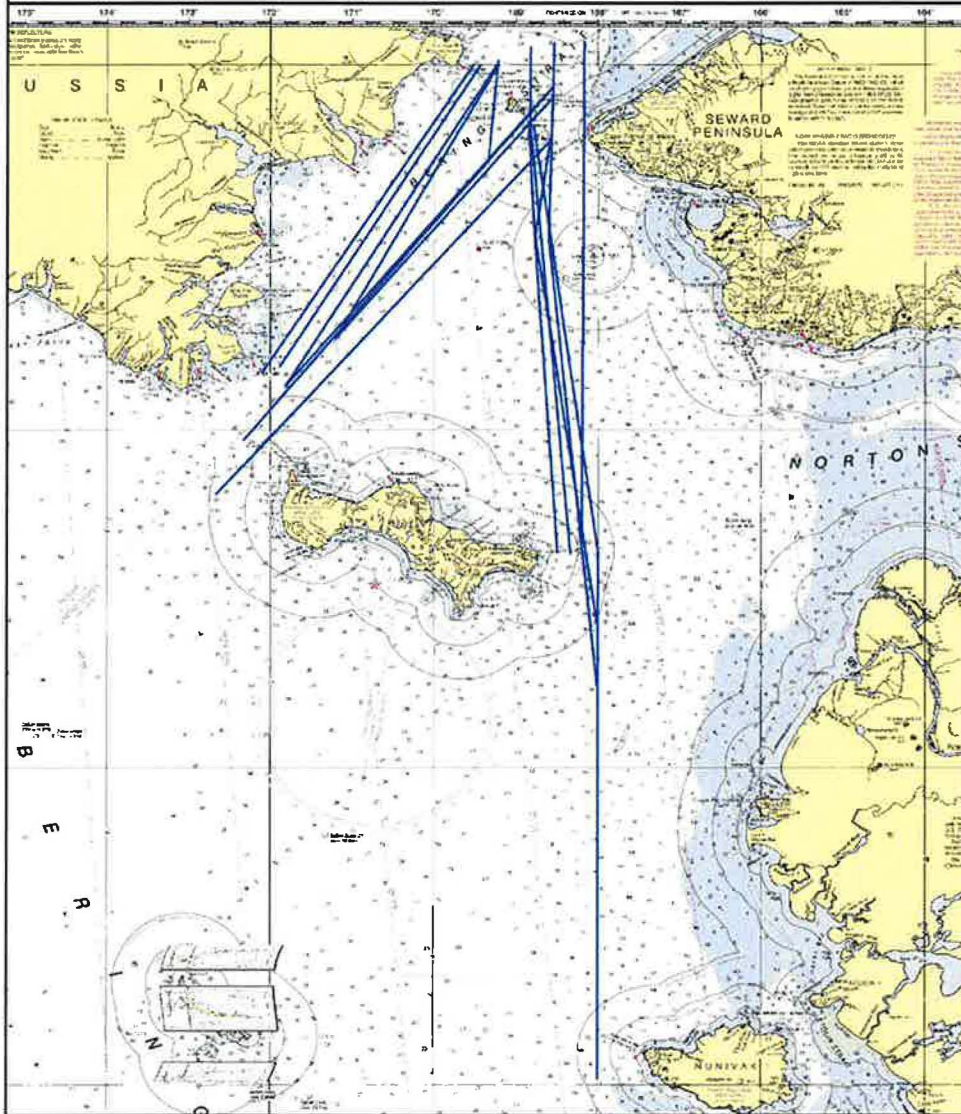


Figure 2: Historical track lines gathered from conversations with Alaska Marine Pilots.



Closer examination of the set of vessel tracks that pass by the eastern tip of Saint Lawrence Island indicated other areas of shoal water to the south of the initial PARS study area appeared to influence vessel behavior within the study area. Areas with charted depths of 10 fathoms or less (60 feet) are shaded in blue in the previous graphic. Assuming a vessel would choose to sail the most direct route, avoiding shallow areas to the west of Nunivak Island or the charted 7 fathom shoal to the north of Nunivak Island could put the ship on a course to cross another shallow area as it continued a transit to the north. Since the lack of adequate hydrographic survey information was already identified as a primary concern, and given that this concern existed both inside and outside of the initial study area, the Coast Guard determined that the best path forward would be to expand the geographic scope of the study area. The expanded study area included an area that allowed consideration of continuous routing measures extending between the Bering Strait and Unimak Pass, two international straits that act as choke points for vessels bound through the Bering Sea and Strait destined to or from US Arctic waters. On December 5, 2014 the Coast Guard released an updated PARS notice of study and request for comment in the Federal Register (79 FR 72157). This notice of study continuation included a diagram of the expanded study area as well as the Coast Guard's initial proposed routing measures for ships transiting through the Bering Sea and on to the Bering Strait.

The Coast Guard's initial proposed ship routing recommendations consisted of a four nautical mile wide two-way route extending from the northern limit of the existing Safety Fairway in Unimak Pass, north through the Bering Strait to the Chukchi Sea, with a westward extension spur on the north side of St. Lawrence Island. Principal reasons that a two-way route was proposed as the most appropriate ship routing measure were:

- (1) to provide adequate sea room for vessels executing collision avoidance measures,
- (2) to provide vessels a maximum amount of flexibility in avoiding ice when present, and
- (3) to avoid more prescriptive routing measures such as a Traffic Separation Scheme that would alter currently existing responsibilities between vessels for collision avoidance.

Further information on the methodology used to select the two-way route as the preferred routing measure is included in the design process section and in the appendices. The Coast Guard developed the proposed two-way route to meet the intent of the IMO's Maritime Safety Committee circular #1060. This is a guidance note on the preparation of proposals for ship routing measures, which states that "Routes should follow as closely as possible existing patterns of traffic flow, course alterations along the route should be as few as possible." Other key factors in developing the orientation of the route were:

- (1) to avoid previously designated areas of environmental sensitivity, such as Critical Habitat Areas.
- (2) to avoid areas with charted depths of less than 10 fathoms/60 feet.
- (3) to maintain an appropriate stand-off distance from shore or shoal water.

The Coast Guard also proposed precautionary areas 8 nautical miles in diameter at the terminus of the two-way routes and at the junction point. Based on continuing dialog with stakeholders and

comments received from the 2014 notice of study continuation, proposals were finalized for four additional Areas to be Avoided (ATBA's). While not shown on the following diagram, these are included as alternatives in this report. Detailed information on these proposed ATBA's is contained at the end of this report.

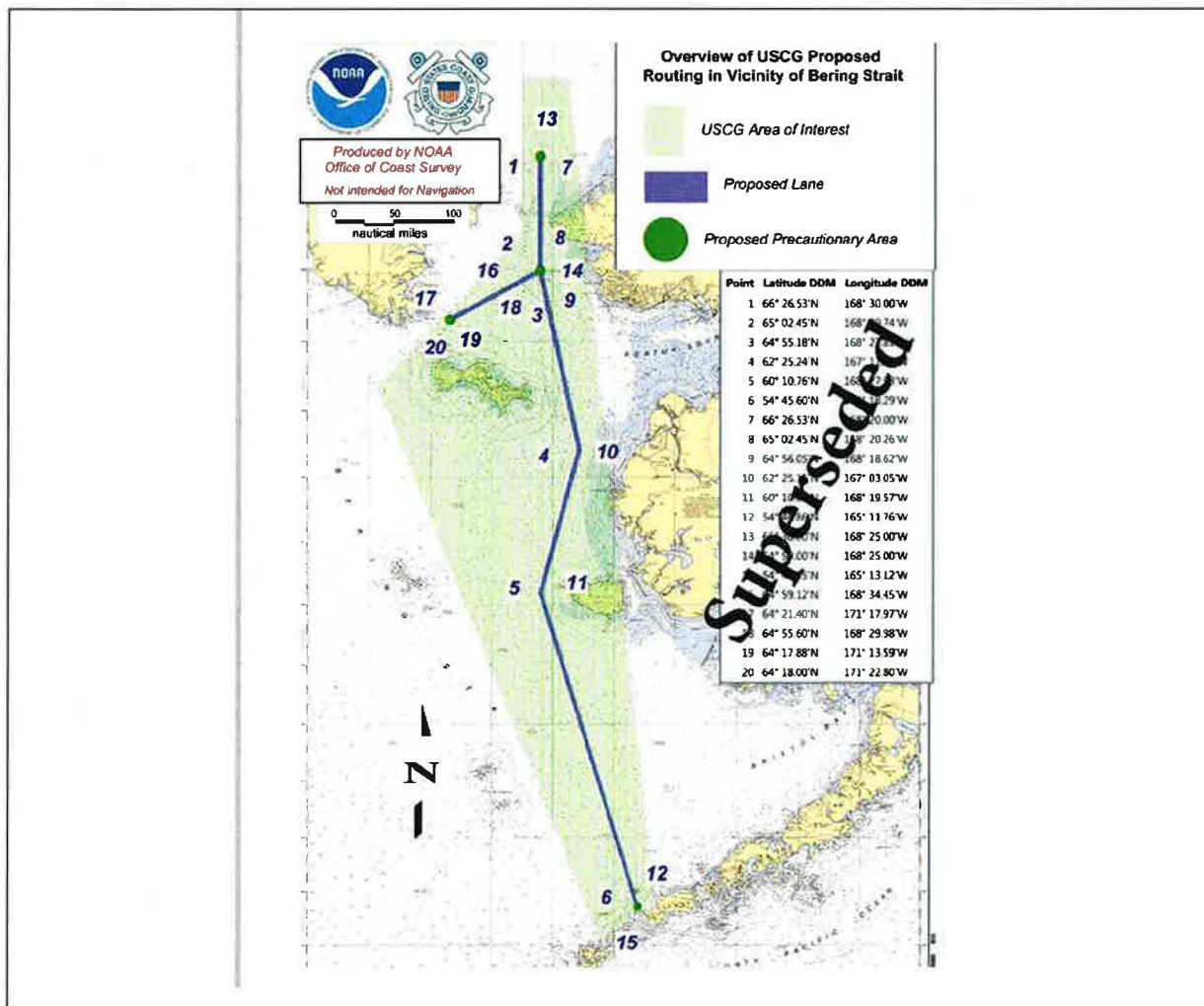
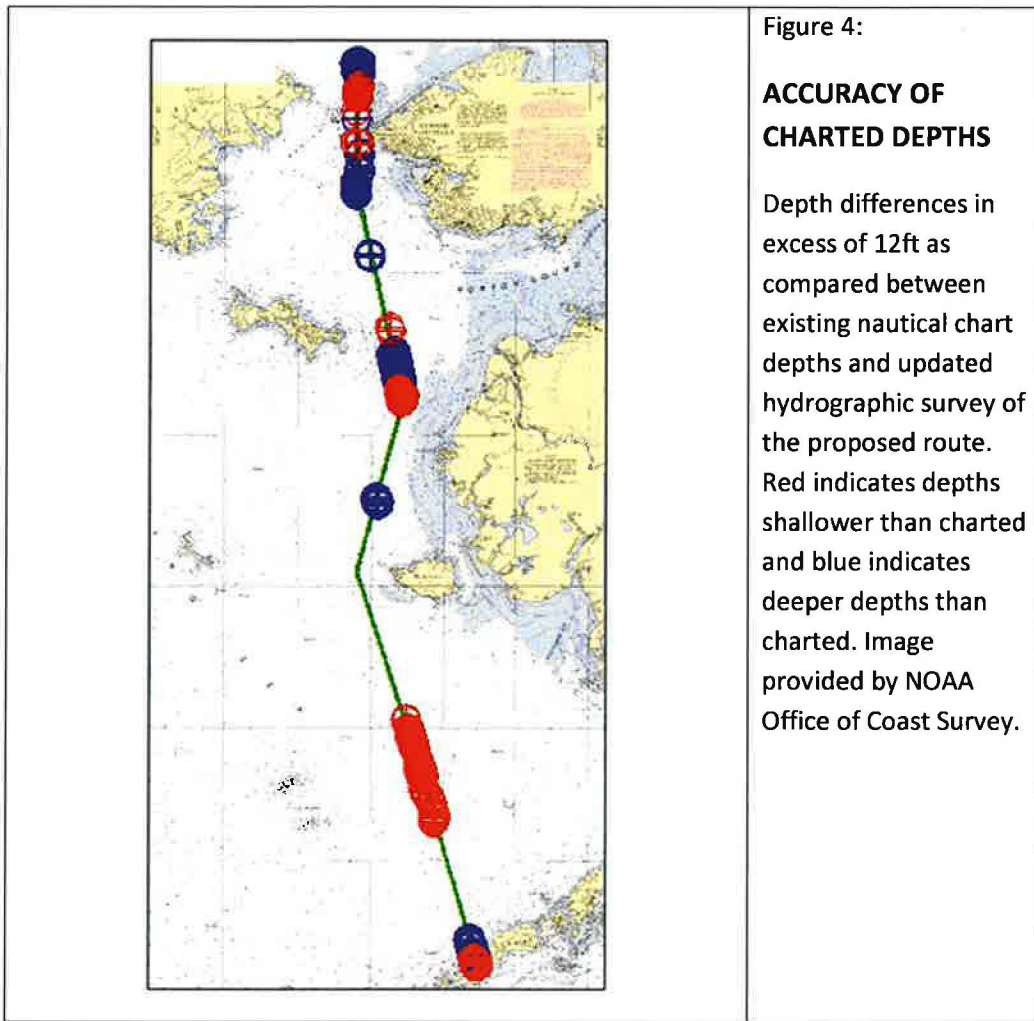


Figure 3: Study Area 2014 and Proposed Routing Measures

The expanded study area is described as an area bounded by a line connecting the following geographic positions: 67°30' N, 168°58'37" W; 67°30' N, 167°30' W; 54°50' N, 164°40' W; 54°03' N, 166°25' W, 63°20' N, 173°43' W, thence following the Russian Federation/ United States maritime boundary line to the first geographical position.

The coordinates initially proposed for the route were based on mercator projections from a set of centerline coordinates. Further investigation revealed that, since the legs of the proposed route are rather long, the curvature of the earth was a factor that needed consideration. Vessels choosing to sail a great circle course will not follow the same track as a vessel choosing to sail a rhumb line course. In the case of the 350 nautical mile long southern leg of the proposed route, this difference can be as much as two nautical miles and creates a potential navigation hazard. Because of this difference, the Coast Guard adjusted the final coordinates for the route to include additional waypoints, which will help to avoid confusion and improve overall route safety. Appendix (F) contains a more thorough discussion on map projections and the need for including these additional waypoints as part of the proposal.

With the exception of a small, recently surveyed area of the Bering Strait, much of the proposed route had not been surveyed to modern standards. Approximately 2/3 of the proposed route passed through waters with "Low Confidence" hydrographic survey data and the other 1/3 of the route passed through waters identified as "Unassessed." In 2014 and 2015, work began to obtain modern multi-beam hydrographic survey data along the proposed route. NOAA's Office of Coast Survey ships completed the majority this work. By early 2016, post-processing of this hydrographic survey data allowed NOAA to confirm with some degree of confidence that the proposed route was free of hazards and shoals to a depth of at least 60 feet. NOAA identified numerous locations with inaccurate charted depths. The chart below depicts areas where charted depths were inaccurate by 12 feet or more. Despite being well offshore, depths in the eastern Bering Sea and Bering Strait are quite shallow. Water depths along a significant portion of the proposed route between Nunivak and King Islands range between 12 and 20 fathoms. In this area, these 12 foot discrepancies represent charted soundings that are inaccurate by 10 to 15% or more. As of the date of the release of this study, these newly acquired soundings do not yet appear on nautical charts, however, this is expected to occur well before any routing measures are finalized. See Appendix (B) for additional information on hydrographic data quality.



Following the announcement of the PARS continuation and request for comment, the Coast Guard conducted three public meetings. These meetings were noticed in the Federal Register on February 25, 2015 (80 FR 10137) and held in Juneau, Anchorage and Nome, Alaska prior to the deadline for public comments.

The public comment period for the PARS closed on August 18, 2015 with the Coast Guard receiving comment submissions from twenty-nine different entities. All comment submissions as well as the PARS notices are publicly viewable under docket number "USCG-2014-0941" on the [www.regulations.gov](http://www.regulations.gov) website. The twenty-nine submissions contained over three hundred unique comments spanning a wide array of topics and concerns. Appendix (A) contains a summarized list of comments, sorted by category.

Following the close of the final public comment period, the Coast Guard undertook a detailed review of current and possible future trends in maritime traffic patterns, vessel casualty history, and significant environmental and cultural sensitivities to develop final recommendations on routing

measures. Detailed information on these topics is included in Appendices C through E, but a general overview of trends in maritime traffic and the most important considerations identified are provided below.

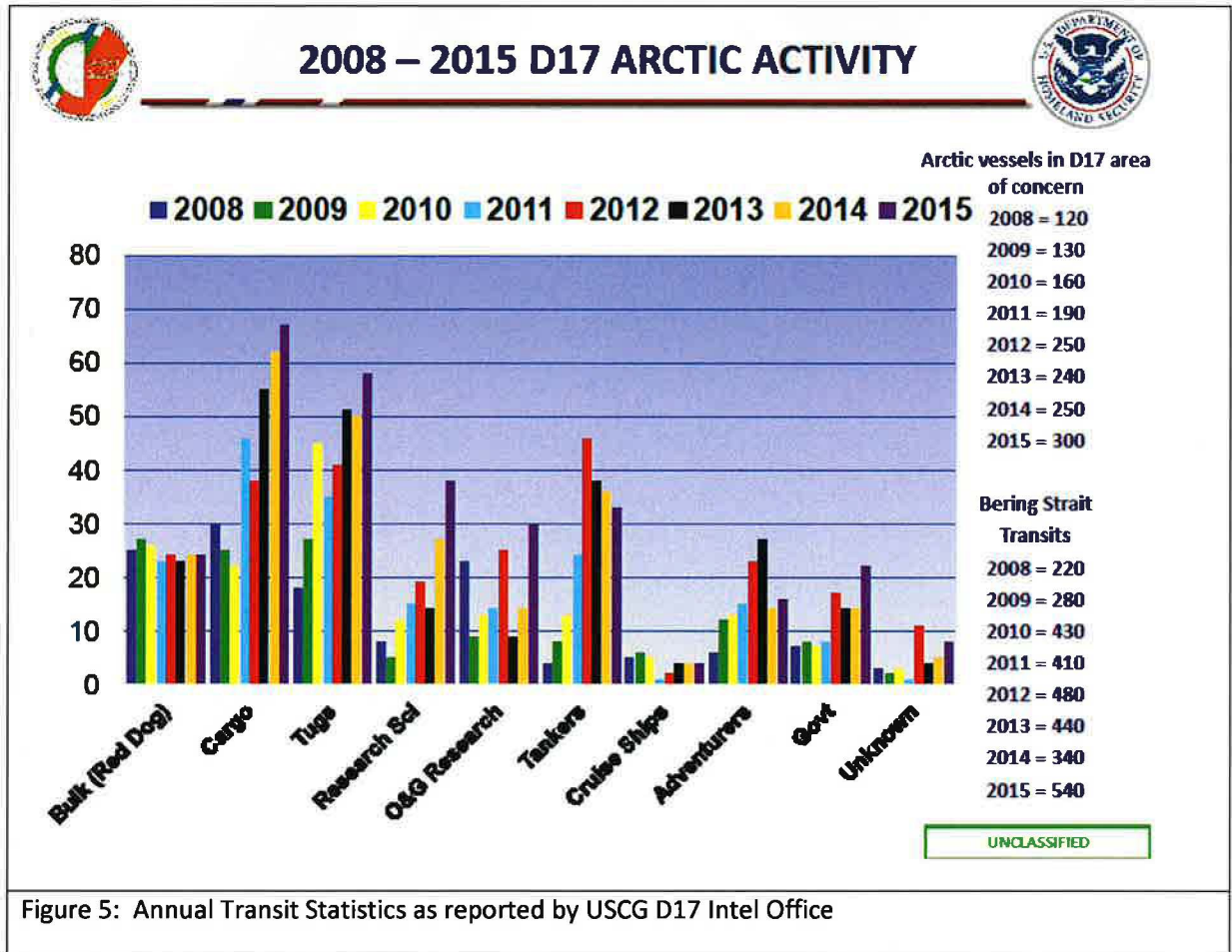


Figure 5: Annual Transit Statistics as reported by USCG D17 Intel Office

The Coast Guard has been keeping track of vessel transits through the Bering Strait since 2008 and has used this annual transit count as a general indicator activity in the Arctic. The number of transits through the Bering Strait is relatively low, ranging between a low of 220 in 2008, and a high of 540 in 2015. The general trend is towards increasing maritime activity. The peaks in Bering Strait transit data shown in 2012 and 2015 are partly attributable to active oil and gas exploration in the Beaufort and Chukchi Sea occurring during those years. The preceding graph breaks down shipping activity by year and vessel type. The “D17 Arctic area of concern” is defined as an area north of the Bering Strait to the North Pole, east into the Canadian Arctic to Banks Island and west into Russia past the Russian port of Pevek.

Given the low number of vessels currently operating in vicinity of the study area, vessel casualty information was reviewed for a much larger area so general marine casualty trends effecting western Alaska might be identified. The Coast Guard reviewed all reported marine casualties which occurred in

the area north of 50 degrees latitude and west of 155 degrees west longitude and which were under United States jurisdiction. Information on these marine casualties was retrieved from the Coast Guard's Maritime Information System and Law Enforcement database for a period spanning 2005 to 2016. This data was filtered to omit reportable casualties on fishing vessels and reported personal injuries since they were not germane to vessel routing. Appendix E contains a complete list of reported marine casualties and a more in depth analysis on marine casualties.

The review of all western Alaska casualties showed that the primary trends in vessel casualties were groundings (26%) and instances where vessels completely lost maneuverability (19%). Collisions occurred far less frequently and represented only 5% of the reported casualties. A great number of the reported marine casualties in this area involved vessels that are not likely to use routing measures. However, a more thorough review of the select few casualties that did involve vessels likely to follow proposed routing measures indicated that adopting routing measures should assist in reducing risk from all three of these primary casualty sources.

In summary, the Coast Guard's Bering Strait Port Access Route Study identified a total of seven alternative routing measure proposals that have merit and should be forwarded to the International Maritime Organization for review and approval. This includes four areas to be avoided in the vicinity of the Diomed Islands, Saint Lawrence Island, King Island, and Nunivak Island. The Coast Guard has also identified three variations of a four nautical mile wide, two-way route, each of which was found to have merit for consideration and adoption. Details on each of these seven routing measure alternatives are provided at the end of this report.

## **Authority and Responsibility**

### ***Domestic Authority***

The authority to conduct waterway studies, known as Port Access Route Studies (PARS), and implement vessel routing measures is granted to the Coast Guard under the Ports and Waterways Safety Act (PWSA) (33 U.S.C. 1223).

The PWSA authorizes the Secretary of the Department in which the Coast Guard resides, “to designate necessary fairways and traffic separation schemes (TSSs) for vessels operating in the territorial sea of the United States and in high seas approaches, outside the territorial sea, to such ports or places. Such a designation shall recognize, within the designated area, the paramount right of navigation over all other uses.”

Prior to making a designation under the PWSA the Coast Guard is required to conduct a study of potential traffic density and the need for safe access routes for vessels before establishing or adjusting fairways or TSSs. Through the study process, the Coast Guard must coordinate with Federal, State, and foreign state agencies (as appropriate), federally recognized Tribes and Tribal organizations, and consider the views of maritime community representatives, environmental groups, and other interested stakeholders. A primary purpose of this coordination is, to the extent practicable, to reconcile the need for safe access routes with other reasonable waterway uses.

### ***International Responsibilities***

As a member state to the International Maritime Organization (IMO) and a Contracting Government to the articles of the International Convention for the Safety of Life at Sea (SOLAS), 1974, the United States has an obligation to adhere to the established standards for creation of routing systems. These are laid out in the IMO publication, Ships’ Routeing, which sets forth the General Provisions on Ships’ Routeing (res A.572(14)).

The International Maritime Organization (IMO) is the recognized international body for developing ship routing guidelines and criteria at the international level. The IMO’s stated purpose of ships routing is to, “...improve the safety of navigation in converging areas and in areas where the density of traffic is great or where freedom of movement of shipping is inhibited by restricted sea-room, the existence of obstructions to navigation, limited depths or unfavorable meteorological conditions. Ships’ routeing may also be used for the purpose of preventing or reducing the risk of pollution or other damage to the marine environment caused by ships colliding or grounding or anchoring in or near environmentally sensitive areas.” Because the findings of the Coast Guard’s PARS may ultimately result in proposals for new routing measures, the Coast Guard used Ships Routeing as a reference and resource during the study.

## Definitions

*Area to be avoided (ATBA):* A routing measure comprising an area within defined limits in which either navigation is particularly hazardous or it is exceptionally important to avoid casualties and which should be avoided by all ships, or certain classes of ships.

*Deep-water route:* A route within defined limits which has been accurately surveyed for clearance of sea bottom and submerged obstacles as indicated on the chart.

*Inshore traffic zone:* A routing measure comprising a designated area between the landward boundary of a traffic separation scheme and the adjacent coast, to be used in accordance with the provisions of Rule 10(d), as amended, of the International Regulations for Preventing Collisions at Sea, 1972 (Collision Regulations).

*Mandatory routeing system:* A routeing system adopted by the Organization, in accordance with the requirements of regulation V/10 of the International Convention for Safety of Life at Sea 1974, for mandatory use by all ships, certain categories of ships or ships carrying certain cargoes.

*Precautionary area:* A routing measure comprising an area within defined limits where ships must navigate with particular caution and within which the direction of traffic flow may be recommended.

*Recommended route:* A route of undefined width, for the convenience of ships in transit, which is often marked by centerline buoys.

*Recommended track:* A route which has been specially examined to ensure so far as possible that it is free of dangers and along which vessels are advised to navigate.

*Regulated Navigation Area (RNA):* A water area within a defined boundary for which regulations for vessels navigating within the area have been established under 33 CFR part 165.

*Roundabout:* A routing measure comprising a separation point or circular separation zone and a circular traffic lane within defined limits. Traffic within the roundabout is separated by moving in a counterclockwise direction around the separation point or zone.

*Routeing System:* Any system of one or more routes or routeing measures aimed at reducing the risk of casualties; it includes traffic separation schemes, two-way routes, recommended tracks, areas to be avoided, no anchoring areas, inshore traffic zones, roundabouts, precautionary areas and deep-water routes.

*Separation zone or separation line:* A zone or line separating the traffic lanes in which ships are proceeding in opposite or nearly opposite directions; or separating a traffic lane from the adjacent sea area; or separating traffic lanes designated for particular classes of ship proceeding in the same direction.

*Traffic lane:* An area within defined limits in which one-way traffic is established. Natural obstacles, including those forming separation zones, may constitute a boundary.



***Traffic Separation Scheme (TSS):*** A routing measure aimed at the separation of opposing streams of traffic by appropriate means and by the establishment of traffic lanes.

***Two-way route:*** A route within defined limits inside which two-way traffic is established, aimed at providing safe passage of ships through waters where navigation is difficult or dangerous.

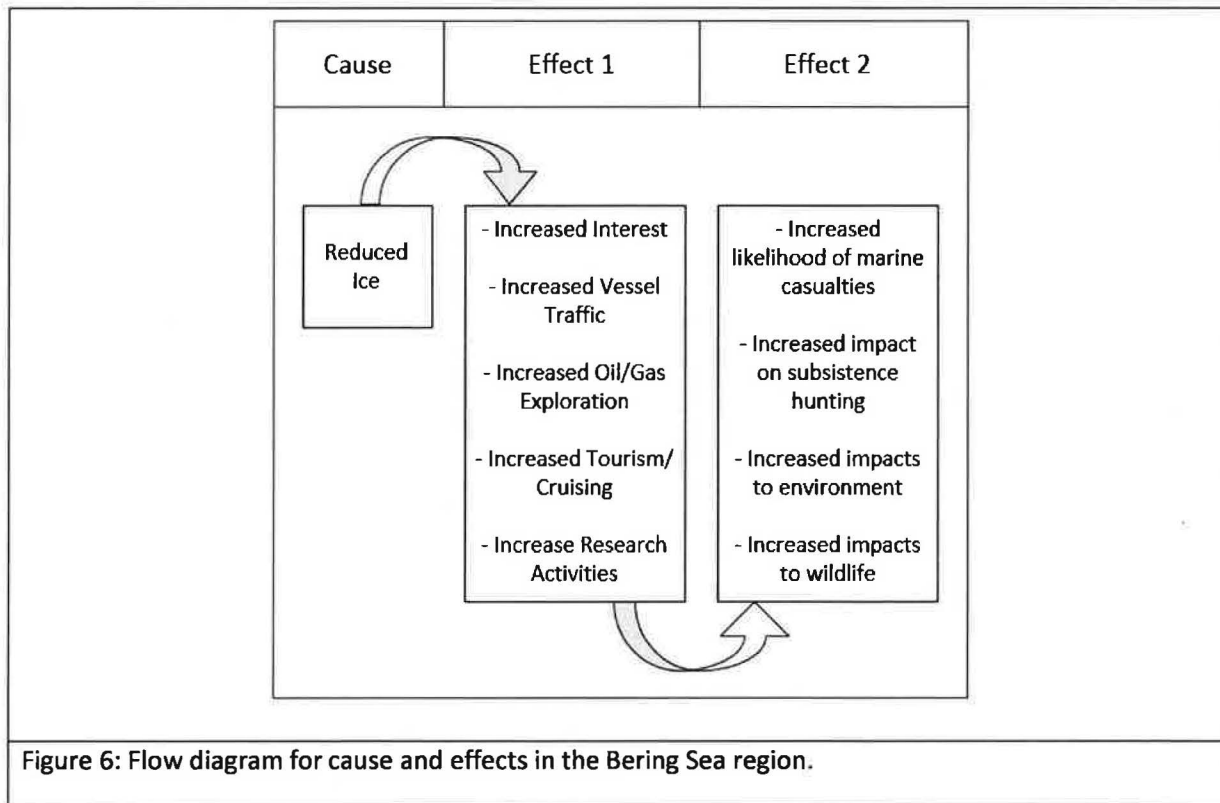
## **Acronyms**

ATBA	Area to be Avoided
AIS	Automatic Identification System
CATZOC	Category of Zone of Confidence (for hydrographic survey information)
CFR	Code of Federal Regulations
CMSP	Coastal and Marine Spatial Planning
COLREGS	International Regulations for Preventing Collisions at Sea, 1972
EEZ	Exclusive Economic Zone
EIS	Environmental Impact Statement
FAQ	Frequently Asked Questions
FR	Federal Register
GIS	Geographic Information System
IMO	International Maritime Organization
MOA	Memorandum of Agreement
MTS	Marine Transportation System
NAVCEN	Coast Guard Navigation Center
NEPA	National Environmental Policy Act
NM	Nautical Mile
NOAA	National Oceanic and Atmospheric Administration
NPRW	North Pacific Right Whale
OCS	Outer Continental Shelf
PARS	Port Access Route Study
PWSA	Ports and Waterways Safety Act
RNA	Regulated Navigation Area
TSS	Traffic Separation Scheme
USCG	United States Coast Guard
USC	United States Code

## Design Process

Following the close of the PARS' first public comment period in 2011 it became clear that there was sufficient interest from the public for the Coast Guard to develop and propose some form of vessel routing system for further public comment and consideration. The received comments cited protection of the Sub-Arctic and Arctic marine environment, wildlife and subsistence hunting activities from large vessels transiting the Bering Sea and Bering Strait area on their way to and from the Arctic as the basis for wanting a vessel routing system. After reviewing the first round of public comments and in looking at the waterway, the initial step taken by the Coast Guard was an assessment of the various types of ship routing measures made to determine which would be the most appropriate and effective.

Over the preceding decade the Coast Guard has observed and responded to a steady increase in interest in Arctic activities and attributes this increased interest to a climatic trend towards less ice in the Arctic Ocean and Chukchi Sea. This increased interest has manifest itself as increased cargo traffic, increased passenger vessel traffic, increased adventure tourism traffic, increased oil and gas exploration, and increased research and scientific activities. This upward trend in vessel traffic brings with it an increased likelihood of maritime casualties such as sinkings, groundings, collisions, oil discharges and hazardous material releases, which in turn threatens the maritime environment, which is home to many endangered species and remote communities that rely heavily on subsistence activities for food. The following diagram visually depicts the cause and effect sequence identified by the Coast Guard and validated by a review of the initial round of public comments received.



Since 2007, one of the ways the Coast Guard has responded to increased interest and activity in the Arctic region has been managing annual deployments of personnel, cutters, helicopters, and logistic resources above the Arctic Circle to respond to increasing demand on Coast Guard services. This operational activity has also afforded the opportunity to engage in more outreach with tribes and stakeholders in the maritime community.

To identify optimal ship routing measures, the Coast Guard first referenced the IMO publication, Ships Routing, which is the international standard for designing and implementing vessel routing systems in international waters. The resulting list of criteria a suitable vessel routing system should exhibit in the area chosen for this study includes, to the extent possible; one that will follow existing traffic patterns, minimize course alterations, minimize overall route length, maximize distance from shore, avoid environmentally sensitive areas, avoid the presence of subsistence activities, avoid the key areas of fishing activities and consider the adequacy of hydrographic surveys and nautical charting.

When the Coast Guard began to look at the vessel routing systems available it became clear that only a few were viable options for addressing the threats and challenges facing the study area. The routing options that seemed most viable were: Two-way route, Traffic Separation Scheme (TSS), Deep Draft Route, Recommended Route, Recommended Track, and Areas to be Avoided (ATBA's). Of these six options, all but ATBA were essentially similar types of measure that offer vessel traffic a specific navigational track or corridor. The Coast Guard chose to recommend the two-way route for further public consideration because it afforded the best balance. A two-way route is appropriate for domestic and international waters, allows for bi-directional traffic, has a defined width, does not impede fishing activities, and is suitable for all vessel types and sizes. One primary advantage of the two-way route over a recommended track or route, or a deep draft route, is that the two-way route has clearly delineated boundaries. This helps make it more clear to the navigator where recent hydrographic survey data has been gathered. The edges of the two-way route, which will be displayed on charts or electronic chart display systems also help other vessels, such as fishing vessels, understand where they are likely to encounter other vessel activity.

The two-way route is a slightly better choice than a Traffic Separation Scheme (TSS) for two reasons. First, since some areas are prone to ice, the two-way route affords more navigational sea room than a Traffic Separation Scheme would for vessels that need to avoid ice but remain within a properly surveyed navigation corridor. Second, a two-way route does not alter the responsibilities for collision avoidance that currently exist under COLREGS Rule 10. Implementation of a Traffic Separation Scheme would mean that most vessels engaged in fishing or subsistence activities would need to keep clear of other larger vessels following the Traffic Separation Scheme. Public Comment received on the topic was overwhelmingly against the Coast Guard installing any routing measure that would limit access to areas used for either commercial fishing or subsistence activities. The following table shows the relative advantages of all routing measures that were considered.

	Two Way Route	TSS	Deep Draft Route	Recommended Route	Recommended Track	ATBA
Match Existing Traffic Patterns	2	2	2	2	2	2
Minimize Course Alterations	2	2	2	2	2	3
Minimize Overall Route Length	2	2	2	2	2	2
Maximize Distance From Shore	3	3	3	3	3	3
Avoid Environmental Areas	3	3	3	3	3	3
Avoid Subsistence Areas	3	3	3	3	3	3
Avoid Commercial Fishing impacts	3	1	3	3	3	3
Consider Hydrographic Quality	3	3	1	1	1	2
<b>Sum</b>	<b>21</b>	<b>19</b>	<b>19</b>	<b>19</b>	<b>19</b>	<b>21</b>

Not Applicable	0
Poor Suitability	1
Suitable	2
Good Suitability	3

Figure 7: Evaluation of routing measures considered for Bering Sea Port Access Route Study.