Vessel Traffic in the Aleutians Subarea

Report to
Alaska Department of Environmental Conservation

April 29, 2005

Prepared by:
Nuka Research & Planning Group, LLC.
and
Cape International, Inc.

nuka Research & Planning Group, LLC.

P.O. Box 175
Seldovia, Alaska 99663
tel 907.234.7821
fax 509.278.4406
contact@nukaresearch.com

This report was prepared for the Alaska Department of Environmental Conservation in fulfillment of contract 18-8003-28-09.

Executive Summary

The bulk grain ship *M/V Selendang Ayu* oil spill at Unalaska Island in Alaska's Aleutian Islands has focused attention on the oil spill risks posed by vessels transiting the North Pacific great circle route from the west coast of North America to Asia. For vessels traveling to and from northern Pacific ports, the great circle route intersects the Aleutian Islands, creating an overlap of international vessel traffic with the local traffic near this remote island chain. The Aleutians are also home to the United State's largest and most valuable commercial fishing grounds and the Alaska Maritime National Wildlife Refuge.

This report considers the available data regarding vessel traffic within and through the Aleutians. In some cases, data is limited because foreign vessels transiting the area are not required to report to the US Coast Guard or the State of Alaska. However, the following information was drawn from the available data:

- Over 2,700 ship voyages occur through the Aleutians each year, which include:
  - As many as 1,600 voyages by container ships with a typical fuel capacity of 1.8 million gallons of persistent oil, and
  - As many as 30-40 voyages by tank ships that may carry as much as 800 million gallons of oil as cargo and fuel.

  Most of the remaining voyages are by freight ships, similar to the *Selendang Ayu*, with a typical fuel capacity of 400,000 gallons of persistent oil.
- About 400 port calls are made in Aleutian ports each year, which include:
  - About 150 calls by container ships with a typical fuel capacity of 1.8 million gallons of persistent oil,
  - About 110 calls by smaller ships, mostly fishing trampers, with a typical fuel capacity of 300,000 gallons of non-persistent oil, and
  - Sixteen calls are by cruise ships or the State marine ferry.

  The remaining local port calls are mostly by tugs towing barges.
- About 300 million gallons of non-persistent fuel oil is moved into and through the Aleutians as cargo for use in Alaska in about 130 voyages onboard tank barges and in a single tank ship;
- About 400 fishing vessels operate in the rich Aleutian fisheries that are valued in excess of 1.5 billion dollars. Fishing vessels typically have a fuel capacity of about 30,000 gallons and almost all carry non-persistent fuel;
- There are four ocean-going tugs resident in the Aleutians and over 100 tug voyages each year that transit the area with barges in tow;
- Forty-five (45) foreign vessel casualties (i.e., casualties that affected the sea-worthiness of the vessel), were reported in the Aleutians between 1991 and 2004. These reports to the Coast Guard included 16 loss of maneuverability incidents. We believe that foreign vessel casualties are probably under reported;

- Four hundred and fifteen (415) US vessel casualties which affected vessel seaworthiness were reported in the Aleutians between 1990 and 2005. US vessels reporting casualties were usually smaller than foreign vessels and primarily fishing vessels; and
- While most of the 400 port calls at Aleutian ports are by vessels that maintain State oil spill contingency plans and certificates of financial responsibility, the great majority of the 2,700 transits through the Aleutians are by vessels that have no State oil spill contingency plans and no State certificate of financial responsibility, because they are in innocent passage.

This report recommends areas for additional study including additional investigation into the root cause of casualties, further validation of the type and number of ships traveling through the area in innocent passage, further analysis of tank ships traveling through the area, and standard categorization of fishing vessels operating in the area based on relative risk.

The information presented in this report shows that a wide variety and large number of vessels transit the Aleutians. A major trans-oceanic shipping route passes through North American's largest fishing grounds in an area that is notorious for adverse marine weather.

Table of Contents

Executive Summary 3

Introduction 7

The Northern Great Circle Route of the North Pacific Ocean 8

Analysis of Vessel Traffic in the Aleutians Subarea 10

Vessel Type 10

Vessel Traffic Passing through the Aleutians Subarea 12

Vessel Traffic Calling in the Aleutians Subarea 15

Tanker and Tank Barge Vessel Traffic in the Aleutians Subarea . 18

Fishing Vessel Traffic in the Aleutians Subarea 22

Passenger Vessel Traffic in the Aleutians Subarea 25

Tug Traffic in the Aleutians Subarea 27

Vessel Accidents and Casualties in the Aleutians Subarea 30

Shipwrecks 30

US Flag Vessel Casualties 30

Foreign Flag Vessel Casualties 30

Vessel Contingency Plans in the Aleutians Subarea 35

Summary 36

Recommendations for Additional Study 39

References 41

Appendices 43

Appendix A – Vessels transiting Northern Pacific Great Circle Route (Unimak Pass) en route to or from Puget Sound. .. 44

Appendix B – Fact sheets on the major fisheries in the Aleutians Subarea. 45

Appendix C – Shipwrecks on or near Islands of the Alaska Maritime National Wildlife Refuge. 47

Appendix D – Information on selected casualties in the Aleutians Subarea. 50

List of Figures

Figure 1. North Pacific great circle route drawn on a gnomonic map projection where a great circle is a straight line. 8

Figure 2. Mercator projection map showing the Northern and Southern great circle routes across the North Pacific. 9

Figure 3. Range and median fuel capacity of various types of vessels that may call at Aleutian ports or transit Aleutians on trans-Pacific voyages. 12

Figure 4. Primary traffic routes of vessels on the Northern Pacific Great Circle Route traveling through the Aleutians Subarea. 13

Figure 5. Primary traffic routes of vessels calling at ports in the Aleutians Subarea 16

Figure 6. Port calls to Unalaska/Dutch Harbor by vessel type and month in 2004. 17

Figure 7. Primary traffic routes of non-persistent oil deliveries in the Aleutians Subarea 19

Figure 8. Primary fishing grounds in the Aleutians Subarea. 23

Figure 9. Estimated fishing vessel effort in the Aleutians Subarea by month in 2004. ... 25

Figure 10. Cruise ship and ferry routes in the Aleutians Subarea. 26

Figure 11. Tug boat routes in the Aleutians Subarea. 28

Figure 12. Vessel casualties in the Aleutians Subarea. 33

Figure 13. Combined vessel information for the Aleutians Subarea. 37

List of Tables

Table 1. Nontank Vessel profile by type, gross tonnage, and fuel capacity..... 11

Table 2. Estimated numbers of large vessel transits along the North Pacific Great Circle Route through the Aleutians Subarea in 2004..... 14

Table 3. Vessel port calls in Unalaska/Dutch Harbor by type and month in 2004. 17

Table 4. Estimated non-persistent fuel oil transfers and delivery transits to selected subareas. 20

Table 5. Vessel information from the 2004 Aleutians/Bering Sea groundfish fishing fleet. 24

Table 6. Passenger Vessels intending to operate in the Aleutian Subarea in 2005. 27

Table 7. Known tug traffic in the Aleutians Subarea by vessel, port, number of trips per year and horsepower 29

Table 8. Number and types of US vessel casualties affecting seaworthiness resported in the Aleutians Subarea between June 22, 1990 and March 16, 2005 31

Table 9. Foreign Vessel Casualties affecting seaworthiness reported to the US Coast Guard between September 12, 1991 and October 28, 2004 32

Table 10. Summary of vessels holding nontank vessel contingency plans for the Aleutians Subarea. 35

Vessel Traffic in the Aleutians Subarea

Report to Alaska Department of Environmental Conservation

April 29, 2005

Introduction

The recent oil spill from the freighter *Selendang Ayu* has focused attention on the oil spill risk posed by vessels operating within the productive fishing grounds and sensitive wildlife habitats of the Aleutian Islands. Gov. Murkowski, in his 2005 State of the State address,[1] called on the US Coast Guard to work with the State to assess the risk which international North Pacific shipping lanes pose to Alaska.

The *M/V Selendang Ayu* spill occurred near Unalaska Island, not far from the site of the *Kuroshima* freighter grounding and oil spill seven years prior. After the *Kuroshima* incident, the State of Alaska passed a law requiring nontank vessels greater than 400 gross tons that call on Alaska ports to file oil spill contingency plans with the state.[2] The federal government has also recently enacted a law that will require spill contingency plans for vessels calling at US ports by August 8, 2005.[3] However, the *Selendang Ayu* was engaged in *innocent passage*[4] through Alaska waters, while transiting the North Pacific great circle route from Seattle to China and was therefore exempt from these planning requirements[5]. Because the *Selendang* was adrift for approximately 40 hours[6] before eventually grounding on Unalaska Island, the incident has raised questions regarding whether enhanced response capability is needed to rescue vessels in distress as they travel in the vicinity of the Aleutian Islands. However, the issue of rescue tugs and other options are beyond the scope of this report.

[1] http://www.gov.state.ak.us/speeches.php?id=1497

[2] See AS 46.04.055. There are exceptions; for example "public vessels" are not required to carry a contingency plan.

[3] The Coast Guard and Marine Transportation Act of 2004 requires that nontank vessel response plans for vessels 400 gross tons or greater to be prepared and submitted to the Coast Guard no later than August 8, 2005. Section 701(c) of the Coast Guard and Marine Transportation Act of 2004 (Pub. L. 108-293) (2004 Act) Guidance for developing plans is available at www.uscg.mil/hq/g-m/nvic/.

[4] The Third United Nations Convention on Law of the Sea (UNCLOS III, also called simply the Law of the Sea or LOS) set the limit of territorial waters to 12 nautical miles (22.224 km), in which area the controlling nation-state is free to set laws, regulate any use, and use any resource. Non-military vessels were given the right of "innocent passage" through any territorial waters. Innocent passage is the right of all ships to engage in continuous and expeditious surface passage through the territorial sea and archipelagic waters of foreign coastal states in a manner not prejudicial to its peace, good order, or security. Passage includes stopping and anchoring, but only if incidental to ordinary navigation or necessary by force majeure or distress, or for the purpose of rendering assistance to persons, ships, or aircraft in danger.

[5] The M/V Selendang Ayu, whose last port-of-call was Seattle, did have a US Certificate of Financial Responsibility (COFR) and a spill contingency plan for Puget Sound.

[6] Investigation of the grounding has revealed that the crew did not notify the US Coast Guard that they were adrift until thirteen hours after the vessel had lost power and propulsion.

This report characterizes the type and amount of vessel traffic moving to, from, within and through the Aleutians Subarea.[7] Throughout this study, the Aleutians will have the same geographic definition of Aleutians Subarea. This report includes available data regarding:

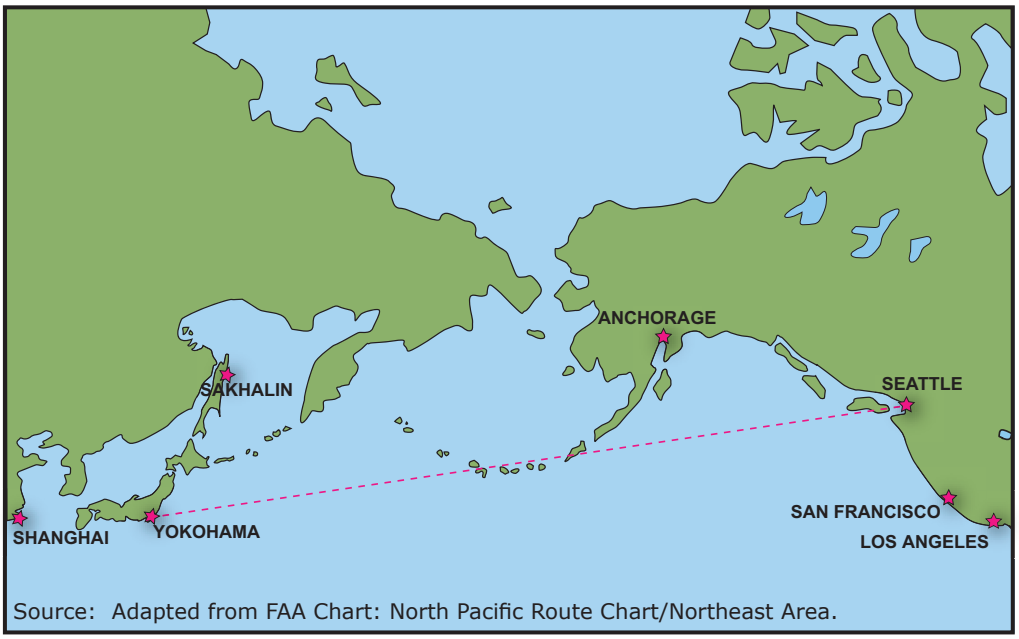
- The number, size, and type of vessels that transit the great circle route between the coastal ports of northwest North America and northern East Asian ports, and the general type and quantity of fuel oil that are transported.
- The number, type, and size of vessels calling at Aleutian ports.
- Type and quantity of oil transported to and through the Aleutians Subarea.
- Current tugboat traffic in the Aleutians.

The Northern Great Circle Route of the North Pacific Ocean

A great circle is the shortest distance between two points on a sphere. Vessels transiting an ocean between two continents may follow a great circle route because it is the shortest distance, or they may deviate from the great circle route where favorable weather and sea states allow for faster travel.

On many map projections a great circle route is not a straight line. Figure 1 shows a gnomonic map projection of the North Pacific where the great circle route is a straight line. As seen on this map a great circle route from Yokohama, Japan to Seattle passes through Unimak Pass and the Aleutian Islands.

Figure 1. North Pacific Great Circle Route drawn on a gnomonic map projection where a great circle is a straight line.



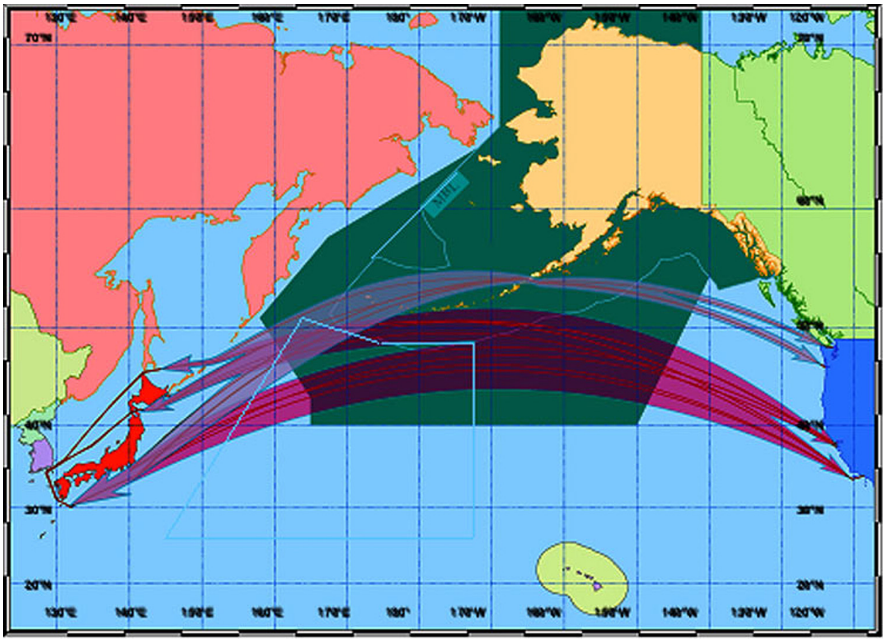
Source: Adapted from FAA Chart: North Pacific Route Chart/Northeast Area.

[7] The Aleutians Subarea as defined by the Alaska Federal/State Preparedness Plan for Response to Oil & Hazardous Substance Discharges/Releases (Unified Plan, Volume I) is the area encompassed by the boundaries of the Aleutians East Borough, the Aleutians West Coastal Resource Service Area, and the Pribilof Islands, including adjacent shorelines and state waters. Generally south of 57° 20' N and west of longitude 156° W.

Generally, this North Pacific great circle route is commonly used by vessels traveling to and from ports north of the Columbia River on the west coast of North America *en route* to Shanghai and ports north of Shanghai on the East Asia coast. The North Pacific great circle route intersects the Aleutian archipelago at both Unimak Pass and the western Aleutians.[8] This trade route crosses the transit lanes and fishing grounds of the largest fisheries in North America, which are valued in excess of 1.5 billion dollars.[9] The North Pacific great circle route also passes through the Alaska Maritime National Wildlife Refuge, which is home to 40 million seabirds and numerous marine mammals.[10]

There is also a more southern great circle route across the North Pacific, as seen in Figure 2.[11] This route passes south of the Aleutians and is generally used for voyages from the ports of the Far East to ports south of Portland, Oregon. However, shipmasters will sometimes use the northern route in the winter months to avoid storms in the North Pacific.

Figure 2. Mercator projection map showing the Northern and Southern great circle routes across the North Pacific.



Source: U.S. Coast Guard, Maritime Domain Awareness Center.

[8] Generally, west of longitude 178.5^0 W and Tanaga Island.
[9] The 2003 groundfish catch alone after primary processing was approximately $1.5 billion (F.O.B. Alaska). This does not include the value of the crab catch.
[10] http://alaskamaritime.fws.gov/index.htm
[11] Figure 2 is a Mercator projection, thus great circle routes appear as arches.

Analysis of Vessel Traffic in the Aleutians Subarea

For the purpose of this analysis, information on vessel traffic in the Aleutians Subarea was considered to estimate the annual numbers of vessel transits and the quantity of persistent and non-persistent oils onboard.

No single data set contains all of the information needed to develop a precise picture of the number, type, size, and fuel capacity for vessels transiting the Aleutians Subarea. Vessels transiting the area in innocent passage are not required to report to the US Coast Guard or the State of Alaska. Information gathered from the many sources used in this report is presented in various forms that are not always comparable. For example, the US Coast Guard and State of Alaska use dissimilar vessel classification schemes. In developing this analysis we compared, combined, and extrapolated information from similar, but not exact, datasets to provide the best possible estimates. These methods included:

- Using the Alaska Department of Environmental Conservation (ADEC) nontank vessel contingency plan database to characterize types of vessels for size and fuel capacity;
- Using a limited but accurate US Coast Guard vessel traffic study to produce annual estimates of vessel-transits through the Aleutians;
- Extrapolating information from a Puget Sound database to estimate the number and type of vessels passing through the Aleutians; and
- Correlating the National Marine Fisheries Service groundfish fishery observer's data base with the Alaska Commercial Fisheries Entry Commission's vessel database to estimate the size and fuel capacity of this fleet.

Vessel Type

With regard to vessel type, the most complete information is contained within the nontank vessel (NTV) oil spill contingency plans (C-Plan) required for vessels over 400 gross tons operating in Alaska state waters.[12] Many of the vessels on innocent passage through Unimak Pass do not have spill plans filed with the Alaska Department of Environmental Conservation (ADEC). While the 433-vessel ADEC database (summarized in Table 1 and Figure 3) applies to all nontank vessels operating in Alaska waters, it also provided the best available profile of vessels by type passing through or operating along the Aleutians. These data on vessel type are applied to subsequent analysis and discussion of vessel traffic.

[12] Alaska State waters generally extend 3 miles from the outermost shorelines and head-lands.

Table 1. Nontank Vessel profile by type, gross tonnage, and fuel capacity.[13]

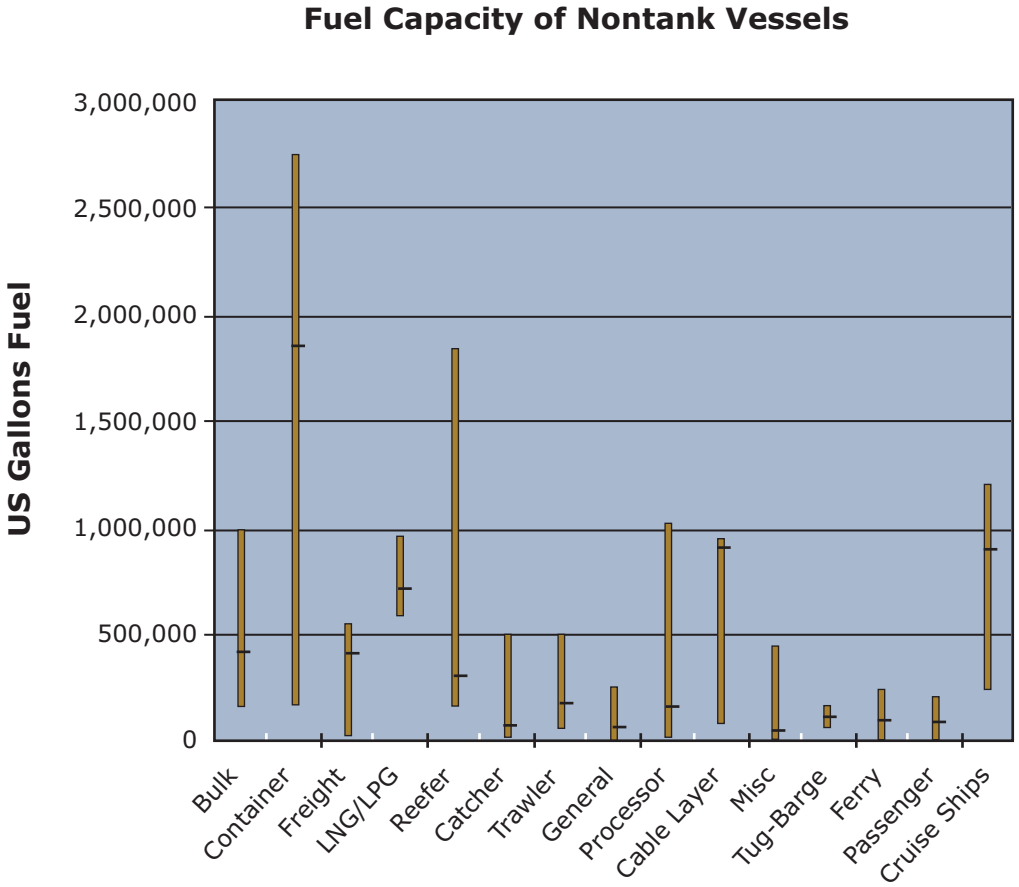
Vessel Type (number)	Gross Tonnage* Median (Range)	Fuel Capacity Gallons** Median (Range)	Comments
All Vessels (433)	12,669 (400 - 115,000)	345,240 (7,518 – 2,736,594)	
Cargo-Bulk Carrier (130)	17,904 (4,086 -43,181)	750,918 (134,190 - 970,704)	Virtually all carry persistent fuel oil.
Cargo-Container (28)	52,629 (455 - 65,792)	1,842,078 (182,028 - 2,736,594)	Virtually all carry persistent fuel oil.
Cargo-Freight (16)	17,527 (498 -35,825)	390,600 (45,276 – 528,738)	Most carry persistent fuel oil.
Cargo-LNG/LPG (9)	22,902 (17,846 - 66,174)	707,574 (597,198 – 939,918)	Virtually all carry persistent fuel oil.
Cargo-Reefer (81)	4,980 (2,829 - 13,876)	299,544 (176,778 – 1,820,280)	Most carry non-persistent fuel oil.
Fishing-Catcher (40)	773.5 (441 - 5,190)	66,066 (29,190 - 479,514)	Most carry non-persistent fuel oil.
Fishing-Trawler (22)	1,593 (549 - 7,419)	172,683 (69,804 - 487,830)	Most carry non-persistent fuel oil.
Fishing-General (16)	496 (405 - 983)	63,756 (25,284 - 236,124)	Most carry non-persistent fuel oil.
Fishing-Processor (17)	1,453 (499 - 17,845)	153,552 (35,154 - 1,008,000)	Most carry non-persistent fuel oil.
Cable Layer (4)	12,184 (9,418 - 13,201)	897,456 (96,012 - 931,644)	Persistent fuel oil.
Vessel-Misc (23)	614 (456 - 36,009)	35,616 (10,752 - 430,458)	Salvage, Log-Carriers (non-persistent fuel)
Tug-Barge Combo (5)	568 (484 - 949)	105,252 (70,014 - 142,086)	Non-persistent fuel.
Ferry-AMHS (8)	2,978 (1,280 - 12,635)	94,731 (13,860 - 220,416)	Non-persistent fuel.
Passenger vessels (6)	4,709 (403 - 6752)	87,150 (7,518 - 187,236)	Non-persistent fuel.
Cruise Ships (38)	65,595.5 (13,661 - 115,875)	887,313 (256,872 - 1,195,446)	Persistent fuel oil.

* Gross Tonnage or Gross Register Tonnage is the internal volume of a vessel plus the space on exposed cargo decks (with some exceptions, depending on the assessing body).

** One barrel equals 42 US gallons and one metric ton of fuel oil equals 264 US gallons.

[13] The State of Alaska requires that all operators of self-propelled nontank vessels (NTV) over 400 gross tons that operate in Alaska waters meet financial responsibility requirements and file contingency planning documents with the ADEC. Information available through that program identifies the types, sizes, and fuel capacities of nontank vessels that have filed contingency plans with the state. A data query completed on February 8, 2005 was analyzed to provide an overview of the nontank vessels operating in state waters. However, it is important to recognize that the nontank vessel contingency plan registration is a dynamic process, and the information collected through this database at any given time is only a snapshot. Innocent passage vessels transiting the northern Pacific great circle route are not required to file a contingency plan with the state if they do not intend to call on an Alaska port.

Figure 3. Range and median fuel capacity of various types of vessels that may call at Aleutian ports or transit Aleutians on trans-Pacific voyages.

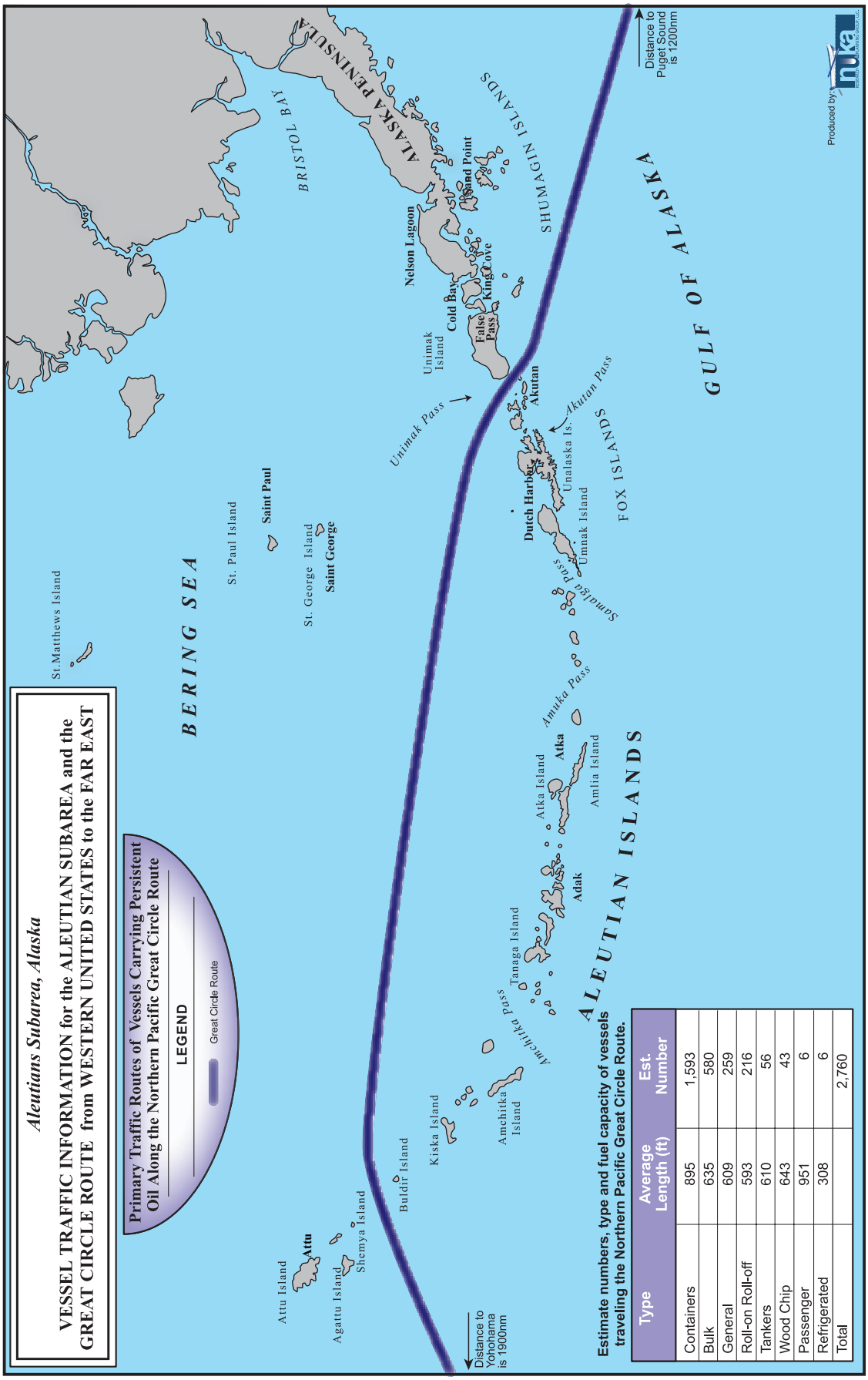


Source: Source: Alaska Department of Environmental Conservation, Nontank Vessel Database.
NOTE: See Table 1 for additional detail.

Vessel Traffic Passing through the Aleutians Subarea

Figure 4 shows the primary traffic routes of vessels on the Northern Pacific great circle route traveling through the Aleutians Subarea. Vessels on this route pass through the Aleutian Island chain twice – at Unimak Pass[14] and at passes west of Tanaga Island[15]. The US Coast Guard Maritime Domain Awareness Center counted the number of ship transits through Unimak Pass in the winter and summer of 2004. During the winter months, approximately 225 vessel transits per month are made through Unimak Pass. During the summer months, there are approximately 235 vessel transits per month through Unimak Pass. The Coast Guard did not classify these vessels by type or size, however it is understood that these are ships on trans-Pacific voyages and not fishing vessels. An estimated 2,760 large vessel-transits used Unimak Pass for trans-North Pacific voyages in 2004.[16]

[14] The mid-way point of Unimak Pass is approximately 70 nautical miles (by vessel) northeast of Dutch Harbor at latitude 54.2^{0}N, longitude 164.5^{0}W
[15] West of longitude 178.5^0 W.
[16] We used the average of the winter and summer counts to create this estimate.



Estimate numbers, type and fuel capacity of vessels traveling the Northern Pacific Great Circle Route.

Type	Average Length (ft)	Est. Number
Containers	895	1,593
Bulk	635	580
General	609	259
Roll-on Roll-off	593	216
Tankers	610	56
Wood Chip	643	43
Passenger	951	6
Refrigerated	308	6
Total		2,760

Figure 4. Primary traffic routes of vessels on the Northern Pacific Great Circle Route traveling through the Aleutians Subarea.

For the same months that the Coast Guard counted the transits, we obtained and analyzed data from the Puget Sound Marine Exchange for vessels arriving from and departing to northern ports of East Asia using the Northern Pacific great circle route (Figure 1).[17] In the winter months, 110 vessels per month used Unimak Pass when sailing between the Far East and Puget Sound. In the summer months, 114 vessels per month traveled through the Aleutians when sailing between the Far East and Puget Sound. Thus, vessels calling on or departing from Puget Sound represent approximately 48% of the traffic traveling through the Aleutians. We estimate that the remaining vessels transiting the Aleutians call at Alaska (~15/month), Oregon (~60/month)[18] and Vancouver, British Columbia (~50).[19]

Since Puget Sound vessels account for nearly half of the total transits, vessel data from Puget Sound may provide a reasonable general characterization of the types of vessels sailing through Unimak Pass on trans-Pacific voyages during 2004. Appendix A summarizes the information taken from the Puget Sound vessel database. This information was used to estimate types and number of vessels utilizing the great circle route through the Aleutians, as shown in Table 2.

Table 2. Estimated numbers of large vessel transits along the North Pacific Great Circle Route through the Aleutians Subarea in 2004.

Type	Estimated Number	Average Length (ft)
Containers*	1,593	895
Bulk	580	635
General	259	609
Roll-on Roll-off	216	593
Tankers**	56	610
Wood Chip	43	643
Passenger	6	951
Refrigerated	6	308
Total	2,760	

* The method used may overestimate the number of containerships. Puget Sound is a Load Center with a higher percentage of containerships than other northern west coast ports. (rearranged notes to coincide with table)

** The method used to derive these estimates probably resulted in an over estimate of the number of tankers. This is because tankers call on the refineries in Puget Sound, but there are no refineries in Vancouver or Portland.

Source: US Coast Guard Maritime Domain Awareness Center and Puget Sound Marine Exchange database.

[17] This was an indirect estimate. West and east ocean routes for vessels transiting between Seattle and Shanghai and all Asia ports north of Shanghai almost always use Unimak Pass. Thus, we estimated Unimak Pass traffic by identifying next and last ports of call for vessels in Seattle.

[18] Oregon handles ship traffic volume that is approximately 70% of the volume handled by Puget Sound. Some of this traffic is coming from or going to Puget Sound.

[19] Vancouver does not maintain records of next and last port of call vessels.

The Puget Sound Marine Exchange does not record the fuel capacity of vessels calling at Washington ports, only the quantity of fuel or bunkers received. On average, a vessel loaded 490,000 gallons of heavy, persistent fuel oil. This is more an indication of fuel consumption on trans-Pacific voyages than of fuel capacity. Vessels approved to operate in Alaska waters, whose contingency plans are filed with ADEC (see Table 1), are likely a better indicator of fuel capacity on ships transiting the Aleutians. Fuel capacity by vessel type for vessels transiting the Aleutians can be estimated from the ADEC NTV C-Plan database (see Table 1 and Figure 3). Given that 90% of the vessel transits between Puget Sound and East Asia via the Aleutians are freight ships, the fuel capacity for typical ships passing through the Aleutians on great circle voyages can be estimated as follows:

- As many as 1,600 container ships (60% of total) with a median fuel capacity of approximately 1.8 million gallons of persistent fuel oil each, and
- As many as 1,100 bulk, general freight, and other ships with a median fuel capacity of approximately 400,000 gallons of persistent fuel oil each.

Given the fuel consumption required to reach the Aleutians from points of departure, vessels traveling through the Aleutians will carry at least 100,000 to 200,000 gallons less fuel than maximum capacity.

Vessel Traffic Calling in the Aleutians Subarea

Figure 5 shows the primary traffic routes of vessels calling at ports in the Aleutians Subarea. Unalaska/Dutch Harbor is by far the largest port in the area; most port calls occur there. Other locations where port activities occur include:

- Adak,
- Akutan,
- Atka,
- Beaver Inlet, Unalaska Island,
- Gusty Bay, Tanaga Island,
- King Cove,
- Kiska,
- Makushin Bay, Unalaska Island,
- Saint George,
- Saint Paul, and
- Sand Point.

The US Coast Guard maintains records of vessels calling at Unalaska/Dutch Harbor. Table 3 contains port calls to Unalaska/Dutch Harbor by vessel type and month in 2004. The vast majority (94%) of port calls were made by three vessel types: container ships (38%), reefers[20] (29%), and tug/barges (27%). Figure 6 shows the distribution of the Unalaska/Dutch Harbor port call by month and vessel type. Calls peaked in July 2004 with 47 vessels calling at the port. The month with the least number of port calls was December when only 17 vessels called at the port.

[20] Mostly fishing trampers.

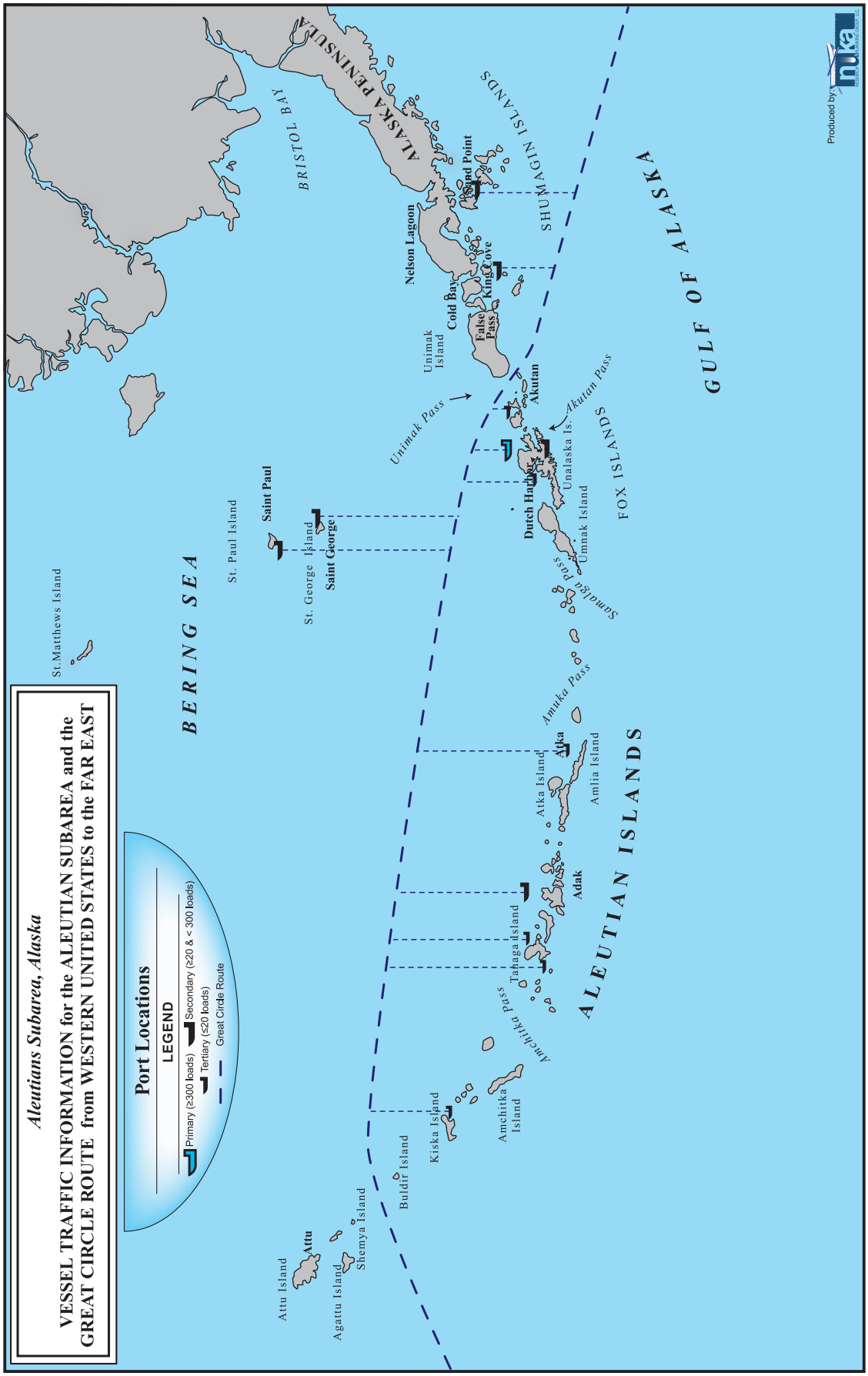


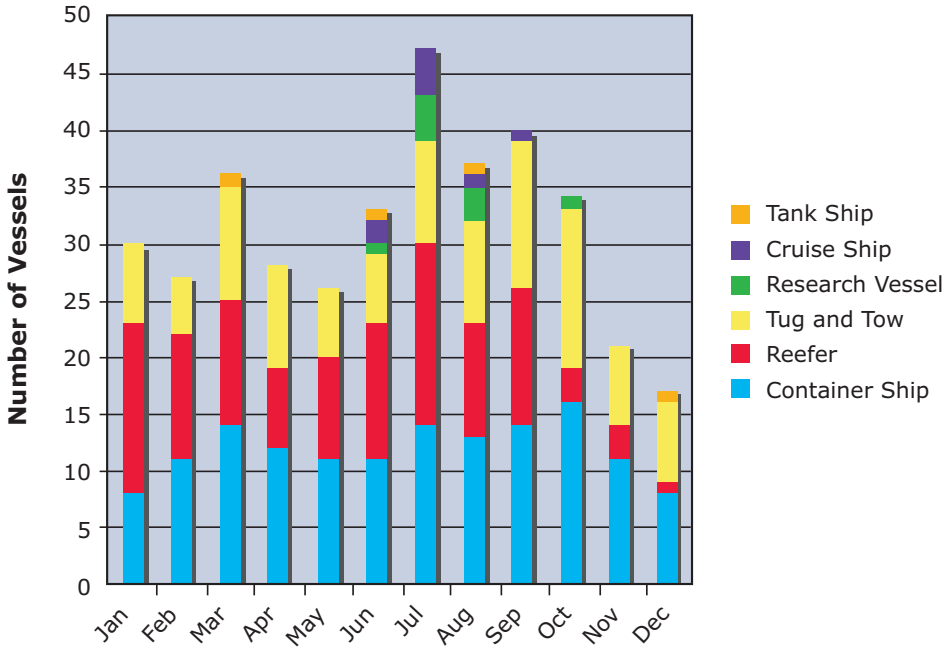
Figure 5. Primary traffic routes of vessels calling at ports in the Aleutians Subarea.

Table 3. Vessel port calls in Unalaska/Dutch Harbor by type and month in 2004.

Month	Vessel Type						
	Container Ship	Reefer	Tug & Tow	Research Vessel	Cruise Ship	Tank Ship	Total
January	8	15	7				30
February	11	11	5				27
March	14	11	10			1	36
April	12	7	9				28
May	11	9	6				26
June	11	12	6	1	2	1	33
July	14	16	9	4	4		47
August	13	10	9	3	1	1	37
September	14	12	13		1		40
October	16	3	14	1			34
November	11	3	7				21
December	8	1	7			1	17
Total	143	110	102	9	8	4	376

Source: US Coast Guard Ship Arrival Notification System (SANS) database.

Figure 6. Port calls to Unalaska/Dutch Harbor by vessel type and month in 2004.



Source: U.S. Coast Guard SANS database.

NOTE: Port call information does not include fishing vessels.

Data on vessel calls to the other Aleutian ports was not readily available, but some general information is known. No other port in the Aleutians receives container ships, so most of the calls to these ports are fishing trampers (reefer) and tug/barges. Fishing trampers and tug/barges that call at the other Aleutian ports usually call at Unalaska/Dutch Harbor too, so the 376 voyages represented in Table 3 represents almost all of the vessel traffic calling in the Aleutians Subarea.

The highest risks for environmental damage from oil spills are from vessels carrying persistent fuel.[21] As mentioned above, most vessels over 400 gross tons are required to have a State contingency plan. Table 1 and Figure 3 summarize information about vessels with State contingency plans. Using this information, the best estimate of fuel carried by large vessels calling at Aleutian ports in 2004 follows:

- 143 container ships with a typical fuel capacity of 1.8 million gallons of persistent fuel oil each, and
- 110 reefer ships with a typical fuel capacity of 300,000 gallons of persistent fuel oil each.

The only other ships that may use persistent fuel are the cruise ships and tank ships. These ships make few calls in the Aleutian Sub-area but carry relatively large volumes of persistent oil.

TANKER AND TANK BARGE VESSEL TRAFFIC IN THE ALEUTIANS SUBAREA

Tankers and tank barges towed by tugs do transit the Aleutians Subarea. Tugs and tank barges transport non-persistent oil into the Aleutians for fuel and heating oil. Non-persistent oil and persistent oil are also transported through the subarea to other destinations.

Non-persistent Oil Transported by Tank Vessels with State Contingency Plans

Figure 7 shows the routes by which fuel and heating oil is delivered to the communities of the Aleutian Islands and western Alaska by tank barges pulled by ocean-going tugs. The tugs and barges transit from refineries at Nikiski in Cook Inlet, Valdez in Prince William Sound, and Puget Sound to the various bulk fuel facilities throughout the Aleutians Subarea. Most deliveries to bulk fuel facilities in the Bristol Bay, Western Alaska, Northwest Arctic, and North Slope subareas also transit the Aleutians Subarea. Figure 7 also shows the route of the tanker that delivers fuel and heating oil to Adak and Dutch Harbor from the Far East.

[21] Fuels such as #6 bunker oil, bunker C, and IFO 380 have low dissipation and evaporation rates. They will remain on the surface of marine waters or along shorelines much longer than non-persistent fuel such as diesel, gasoline and aviation fuel. For example, Up to 90% of a diesel spill will evaporate or disperse into the water column within a couple of hours to a couple of days. By contrast, 70% of bunker C fuel oil will persist as floating or beached oil for a week or longer. Source: NOAA/Hazardous Materials and Response Assessment Division. http://response.restoration.noaa.gov/

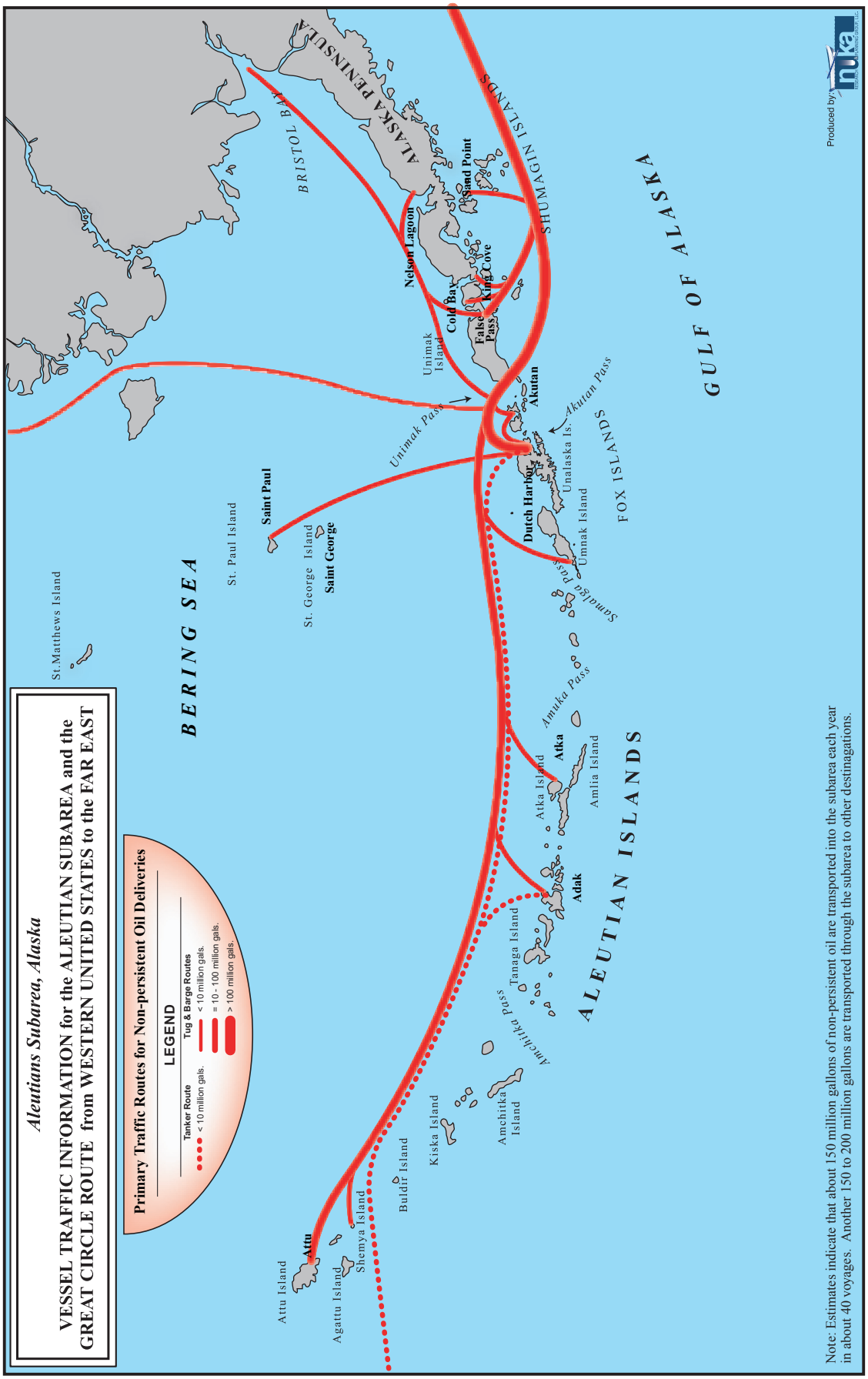


Figure 7. Primary traffic routes of non-persistent oil deliveries in the Aleutians Subarea.

Two documents provide information on the volume of oil delivered to or transported through the Aleutians Subarea:

- Study of Noncrude Tank Vessels and Barges completed in July 1991 by Arthur D. Little (A. D. Little) for the ADEC, and
- Agreement for Compliance for Tank Barge Transport of Non-persistent Oil in Alaska revised in 2003 by the Alaska Petroleum Distributors and Transporters (APDT).

The A. D. Little Study indicates that about 385 million gallons of non-persistent oil transits the region for delivery to the Aleutians and other Alaska locations. However, the report does not provide any data on the number of voyages.

The APDT Agreement also has information on the amount of non-persistent oil transported into and through the Aleutians Subarea. Table 4 summarizes the oil transfers and transits by subarea. Interpreting this table is difficult because of the ranges in volume, but using the median of the ranges yields an estimate of 300 million gallons of non-persistent oil per year delivered in 135 voyages to all of the subareas. Looking at just the Aleutians Subarea, the estimate is 150 million gallons of non-persistent oil delivered in 40 voyages.

Table 4. Estimated non-persistent fuel oil transfers and delivery transits to selected subareas.

Subarea	Million Gallons Transferred	Transits
Aleutians	100 to 200	40
Bristol Bay	50 to 100	45
Western Alaska	< 50	25
Northwest Arctic	< 50	20
North Slope	< 50	5

Source: Alaska Petroleum Distributors and Transporters, 2003, *Agreement for Compliance for Tank Barge Transport of Non-persistent Oil in Alaska*

Interviews with the two largest tank barge companies providing non-persistent oil products provide another source of information.[22] We asked them the size of their tank barges and the average number of trips that they make into the Aleutians Subarea each year. Together they estimated that they transport 36 to 43 barge loads of non-persistent oil through the subarea. Using the median of the capacity of their tank barges yields an estimate of 147 million gallons of non-persistent oil per year moved in about 41 voyages.

[22] Nuka Research, February 2005. Personal communications with Royal Harris, Crowley Marine Services, and Louis Audette, Seacoast Towing.

The port call data provide in Table 3 also indicates that four tanker calls were made to Dutch Harbor by a tank vessel. The *T/V Renda* is a 1.6 million gallon capacity tanker that is known to bring non-persistent oil to Adak and Dutch Harbor from the Far East. Other smaller tank vessels also have approved contingency plans for the Aleutians Subarea and may trade there in the future.[23]

Our conclusions from the sources listed above is that about 150 million gallons per year of non-persistent oil moves into the Aleutians Subarea to supply fuel and heating oil in about 40 to 50 voyages, and another 150 to 200 million gallons per year of non-persistent oil moves through the Aleutians Subarea to provide fuel for other Alaskan destinations. All of these oil movements are covered under State Oil Discharge Prevention and Contingency Plans.

Oil Transported through the Aleutian Subarea by Tank Vessels without State Contingency Plans

Determining the number of tankers and the volume and type of oil that transit the Aleutians Subarea in innocent passage is difficult, as there is no reporting requirement for this information. The US Department of Commerce oil export permit regulations prohibit tankers delivering and returning from delivery of Alaska North Slope Crude Oil from transiting the Aleutians Subarea.[24] However, oil imported or exported from Cook Inlet and the Pacific Northwest is not banned from the North Pacific great circle route.

Tesoro Alaska indicated that they discourage their spot chartered tank vessels bound to/from using the North Pacific great circle route, but they do not prohibit it. A Tesoro representative indicated that at least four of the vessels that called at their Cook Inlet refinery in 2004 traveled through the Aleutians. Two of these vessels were in ballast[25] and two were laden with cargo. One of the vessels carrying oil cargo contained persistent oil and the other carried non-persistent oil. The average cargo capacity of the four tankers traveling through the Aleutians to/from Tesoro's refinery was about 1.2 million gallons.[26]

Other tank vessels arrive in Cook Inlet from the Far East via the Aleutians. A member of the Southwest Alaska Pilots Association (SWAPA) reported that tank vessels carrying non-persistent oil cargo with a typical capacity of 1.2 to 1.8 million gallons regularly arrive in Cook Inlet, bound to Anchorage oil terminals from Far East destinations via the Aleutians.[27]

[23] Nuka Research. February 2005. Personal communication with Bob Flint, ADEC, SPAR, IPP, Marine Vessels Section.
[24] 15CFR754.2(j).
[25] Tankers in ballast do not have cargo onboard.
[26] Nuka Research. February 2005. Personal communication with John Kwietniak, Tesoro Alaska.
[27] Nuka Research, February 2005. Personal communications with Captain John Taylor, Southwest Alaska Pilots Association.

Data collected from the Puget Sound Marine Exchange (Appendix A) indicates that nine tankers arrived or departed on the North Pacific great circle route during a four-month period in 2004. This equates to 27 voyages per year. These voyages are most likely carrying refined products, including persistent fuel oil, from refineries in Puget Sound to Japan, Korea, China, and Russia. This is supported by the 1991 A. D. Little report[28], which indicates that as much as 815 million gallons of oil passes through the region en route to the Far East.[29]

Our conclusion from the limited sources listed above is that as much as 800 million gallons per year of persistent and non-persistent oil cargo moves through the Aleutians Subarea in innocent passage in about 30 to 40 tank ship voyages. While some of these tank vessels may have US Coast Guard Vessel Response Plans, none of them is required to have State of Alaska Oil Discharge Prevention and Contingency Plans.

The bunkering data from the Puget Sound Marine Exchange, presented in Appendix A, indicates that two tank vessels took on an average of 230,000 gallons of bunker fuel. However, we were not able to obtain any information on maximum fuel capacity of the tank vessels traveling through the Aleutians.

FISHING VESSEL TRAFFIC IN THE ALEUTIANS SUBAREA

Figure 8 shows the primary fishing grounds in the Aleutians Subarea. There are three categories of fisheries in the Aleutians Subarea: groundfish (pollock, cod, halibut, rockfish, Atka mackerel, and other flatfish), crab (king, tanner, snow) and finfish (salmon and herring). While salmon and herring are important fisheries in the Bristol Bay Subarea, they are a minor component of the Aleutians Subarea fisheries and are not considered for the purpose of this report. The groundfish and crab fisheries of the Aleutians Subarea are the biggest in North America in terms of value and poundage. The groundfish fishery occurs in two fishing areas: the Bering Sea/Aleutians (BSA) area and the Gulf of Alaska (GOA) area. Three major crab fisheries occur in the BSA area. Appendix B contains fact sheets on most of the major fisheries in the Aleutians Subarea.

In order to determine the number, size, and fuel capacity of vessels participating in the groundfish fisheries, data was acquired from the 2004 National marine Fishery Service (NMFS) groundfish observer database and the State of Alaska Commercial Fisheries Entry Commission's vessel database. Each entry in the groundfish observer database is an observer week; the observer was aboard a specific vessel in a particular fishery for

[28] It must be noted that the A. D. Little report is 13 years old; tanker traffic and oil movement patterns may have changed since this report was written. Still, the A. D. Little report is the most recent information available on the volume of oil moving through the Aleutians onboard tankers transiting the North Pacific great circle route.
[29] It is worth noting that ships are not fueled (bunkered) anywhere in Alaska.

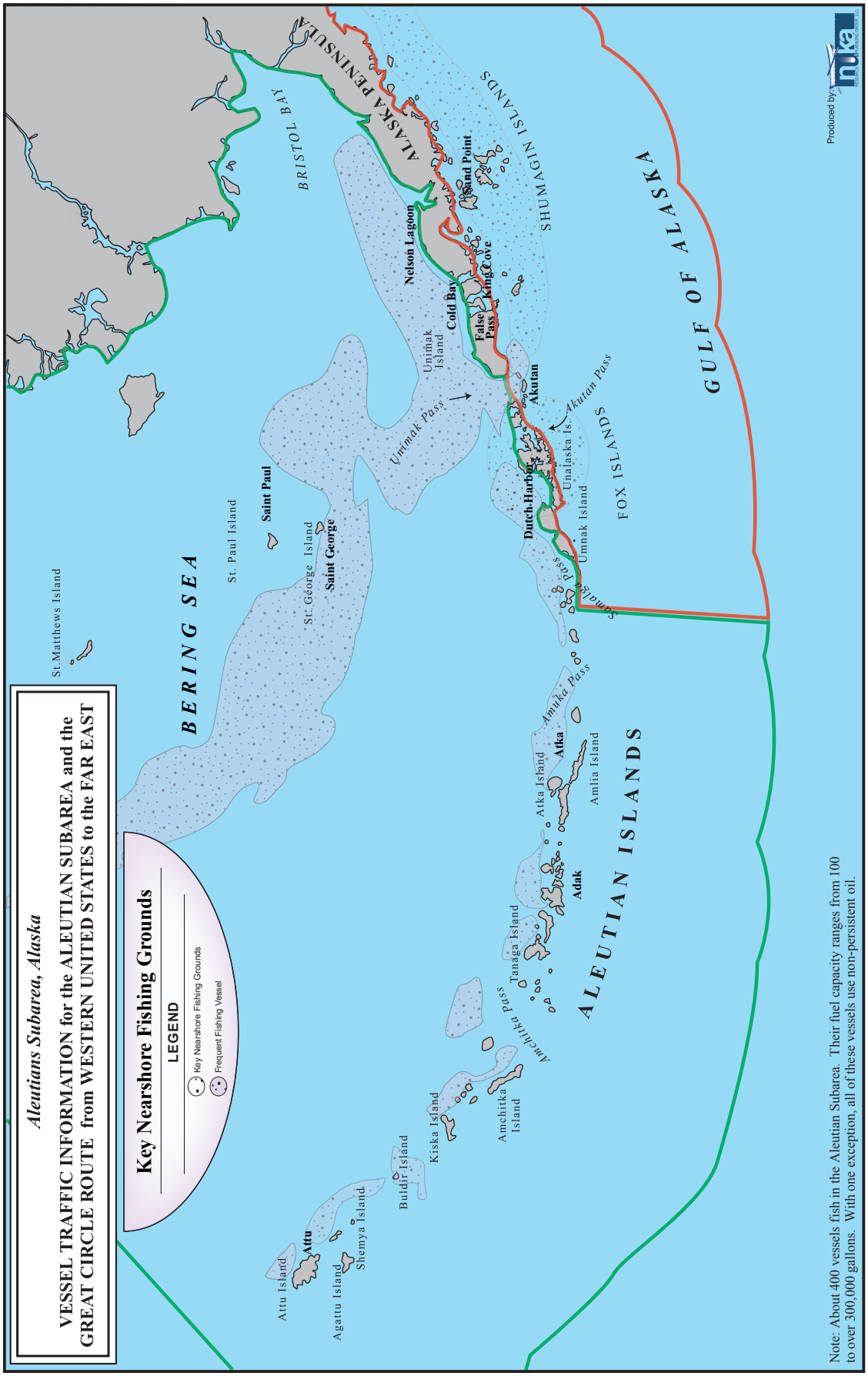


Figure 8. Primary fishing grounds in the Aleutians Subarea.

at least a portion of a given week. All of the large vessels (>125 feet) participating in a groundfish fishery are observed. Thirty percent of the small vessels (60 to 125 feet) participating in a groundfish fishery are observed. No vessels less than 60 feet are observed.

Two hundred seventy-seven (277) different vessels participated in the fisheries in the BSA/GOA districts in 2004. Over 3,000 vessel weeks of effort were observed during the year. Given that many of the vessels are only observed 30% of the time, the actual effort is in excess of 6,000 vessel weeks. The effort data indicate that:

- 50% of the effort goes toward the Pacific cod fisheries,
- 30% of the effort goes toward pollock fisheries, and
- 20% of the effort goes to all other groundfish fisheries combined.

The total value of the pollock and cod fisheries is about 1.5 billion dollars annually.[30]

Table 5 gives information on the groundfish fishing fleet by length, tonnage and median fuel capacity. The median fuel capacity for the groundfish fleet is 30,000 gallons. All but one of these vessels uses non-persistent fuel. A query of the ADEC nontank vessel database indicates that 72 fishing vessels hold a Nontank Vessel Oil Discharge Prevention and Contingency Plan.[31]

Table 5. Vessel information from the 2004 Aleutians/Bering Sea groundfish fishing fleet.

Length Category (feet)	Number of Vessels	Average Gross Tonnage	Median Fuel Capacity (gallons)	Fuel Type
<75	38	70	5,000	Diesel
75 - 124	149	189	20,000	Diesel
125 - 174	52	400	55,000	Diesel
175 - 224	19	943	72,000	Diesel
225 - 274	9	2,407	175,000	Diesel
275 - 324	7	3,000	204,000	Diesel
325 - 374	7	4,475	415,341	Diesel
>375	1	unknown	100,000	IFO
Total	277			

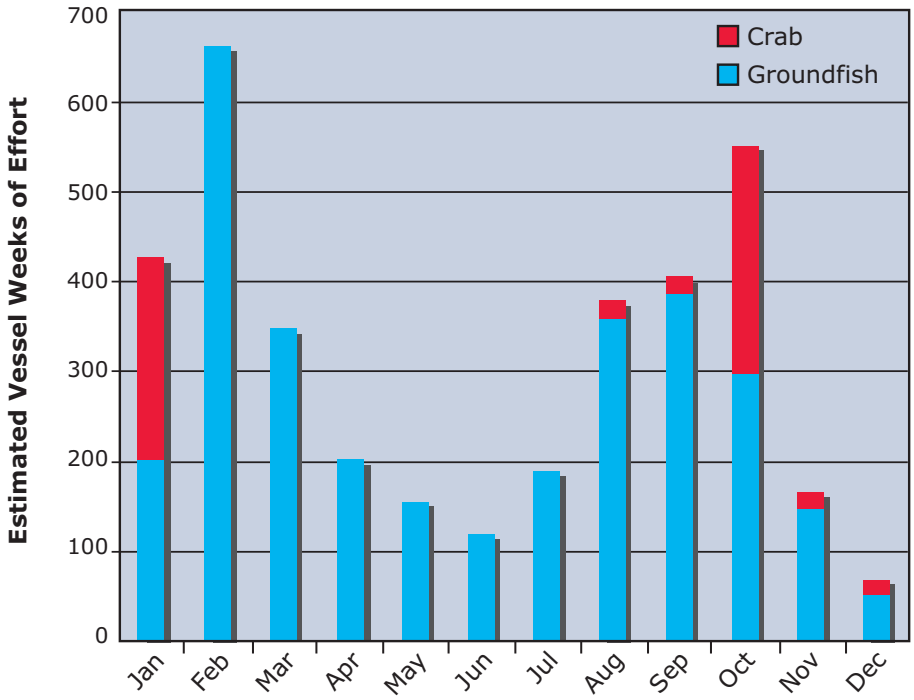
Source: National Marine Fishery Service observer database and the State Limited Entry Commission fishing vessel database.

[30] Hiatt, T. et. al. 2004.
[31] Gross tonnage data was not available for 15 of the vessels in the database.

In addition to the groundfish fishing fleet, the crab fishing fleet includes approximately 120 additional fishing vessels. Specific information on these vessels was not available at the time of this report, but they are known to use diesel fuel exclusively. These vessels typically range in length from 75 to 174 feet.

Figure 9 uses information from the NMFS groundfish observers database and the Alaska Department of Fish and Game (ADFG) crab vessel registration database to estimate the fishing effort by month during 2004. This figure reveals that fishing efforts peak with about 650 vessel weeks in February during the peak of the pollock "A" and Pacific cod seasons. Another peak of about 550 vessel weeks occurs during October when the King Crab fishery coincides with the pollock "B" season.

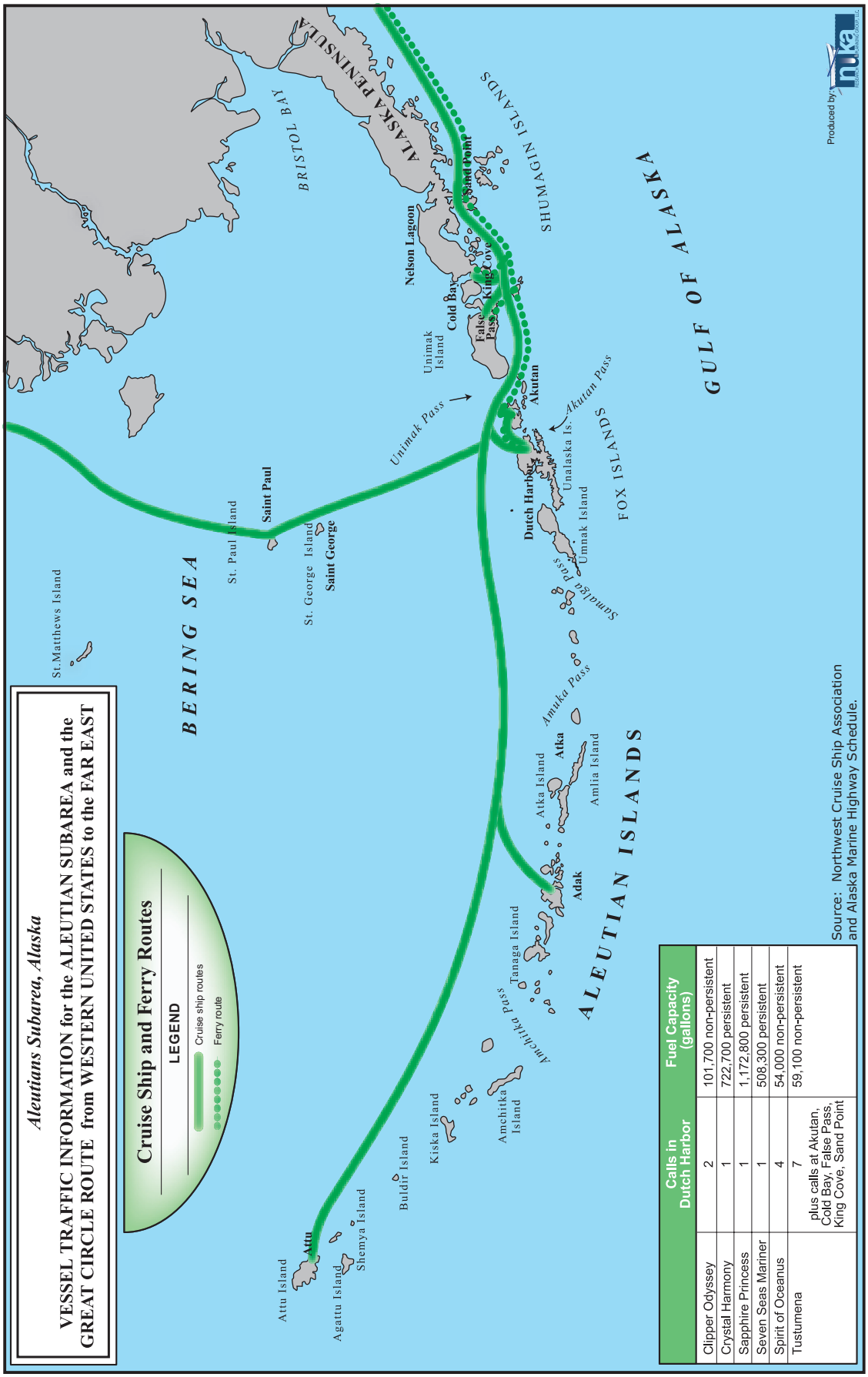
Figure 9. Estimated fishing vessel effort in the Aleutians Subarea by month in 2004.



Source: National Marine Fishing Service groundfish fishing vessel observer data and Alaska Department of Fish and Game crab vessel registration and season data.

PASSENGER VESSEL TRAFFIC IN THE ALEUTIANS SUBAREA

Figure 10 shows the routes of cruise ships and the Alaska Marine Highway ferry in the Aleutians Subarea. Table 6 shows which passenger vessels intend to operate in the Aleutians Subarea in 2005.



	Calls in Dutch Harbor	Fuel Capacity (gallons)
Clipper Odyssey	2	101,700 non-persistent
Crystal Harmony	1	722,700 persistent
Sapphire Princess	1	1,172,800 persistent
Seven Seas Mariner	1	508,300 persistent
Spirit of Oceanus	4	54,000 non-persistent
Tustumena	7 plus calls at Akutan, Cold Bay, False Pass, King Cove, Sand Point	59,100 non-persistent

Figure 10. Cruise ship and ferry routes in the Aleutians Subarea.

Table 6. Passenger Vessels intending to operate in the Aleutian Subarea in 2005.

Vessel Name	# of Transits	Fuel Capacity
Clipper Odyssey	2	101,700 gal. non-persistent fuel capacity,
Crystal Harmony	1	722,700 gal. persistent fuel capacity,
Sapphire Princess	1	1,172,800 gal. persistent fuel capacity,
Seven Seas Mariner	1	508,300 gal. persistent fuel capacity,
Spirit of Oceanus	4	54,000 gal. non-persistent fuel capacity,[32]
Tustumena	7	59,100 gal. non-persistent fuel capacity.[33]

The large cruise ships (Crystal Harmony, Sapphire Princess, and Seven Seas Mariner) will call at Dutch Harbor on their "positioning voyage"[34] to Alaska. One to three large cruise ships per year are expected to visit the Aleutians during "positioning voyages". The small cruise ships (Clipper Odyssey and Spirit of Oceanus) make limited voyages to the Aleutians on a regular schedule. The cruise industry does not anticipate significant growth in the Aleutian market.

The Tustumena is an Alaska Marine Highway vessel that makes voyages from Homer to Dutch Harbor between April and November. During this timeframe, the Tustumena makes monthly voyages through the Eastern Aleutians stopping at Dutch Harbor, Akutan, Cold Bay, False Pass, King Cove, and Sand Point.

Overall, passenger vessels are a minor component of the vessel traffic in the Aleutians Subarea. Only 3 large cruise ships will make one port call each in the Aleutians Subarea but, as noted, they carry relatively large volumes of persistent fuel oil.

TUG TRAFFIC IN THE ALEUTIANS SUBAREA

Table 1 indicates that the typical fuel capacity of an ocean going tug is about 100,000 gallons of non-persistent oil. Table 3 shows that 102 port calls were made at Dutch Harbor/Unalaska in 2004. Figure 11 shows the known locations and routes of tugs in the Aleutians Subarea. Dutch Harbor is the only location in the Aleutians Subarea where tugs are resident. Other tugs transit the subarea in trade with freight or tank barges. The major tug and barge operators in the Aleutians Subarea were contacted for this study. Table 7 contains a listing of tugs that were found to trade in the Aleutians Subarea.

[32] Northwest Cruise Ship Association.
[33] Source: Alaska Marine Highway Schedule.
[34] A positioning voyage moves a cruise ship from one seasonal operating area to another.

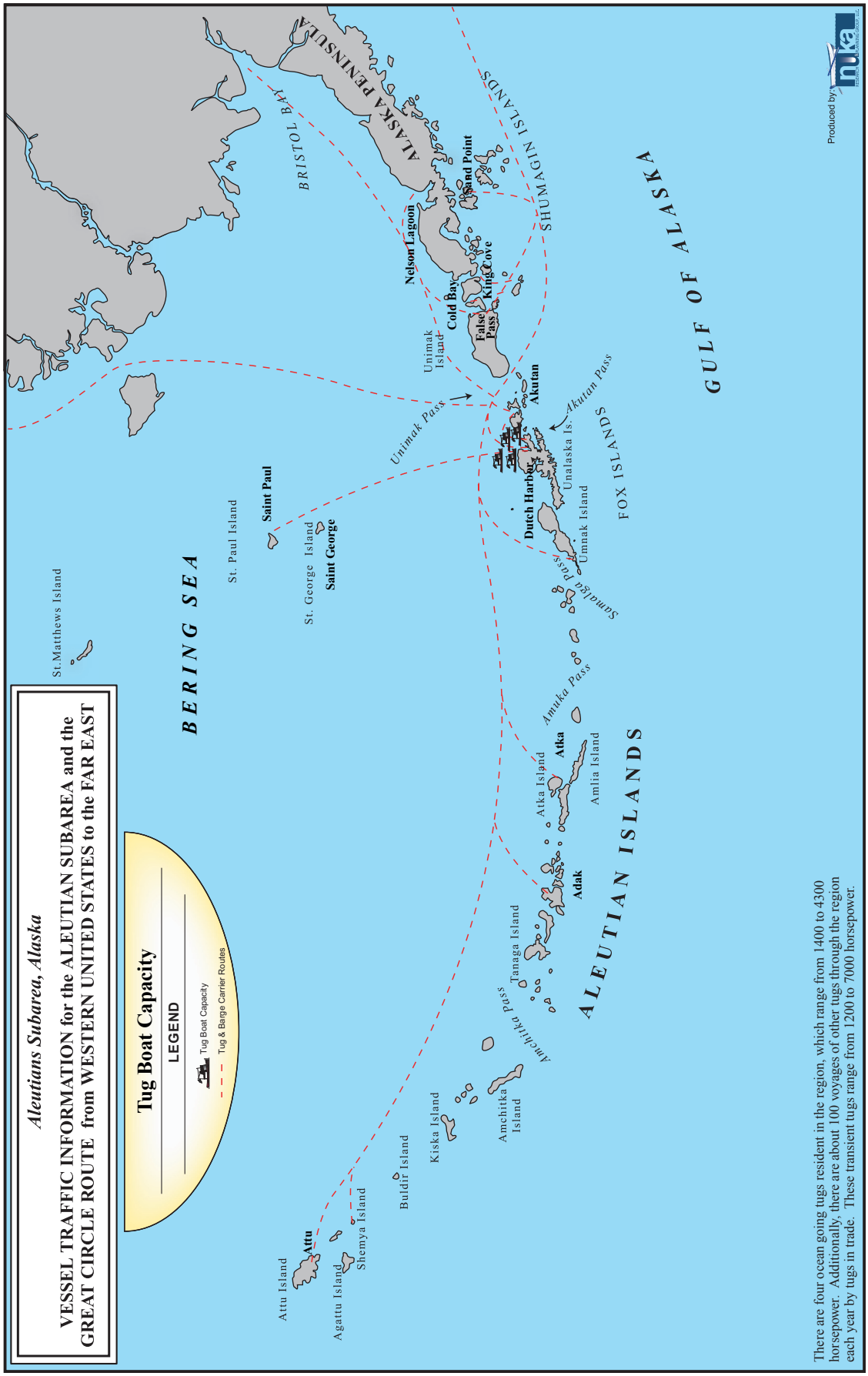


Figure 11. Tug boat routes in the Aleutians Subarea.

Table 7. Known tug traffic in the Aleutians Subarea by vessel, port, number of trips per year and horsepower.

Vessel Name	Resident/Transient	Estimated trips per year	Length (ft)	Horsepower
Fidalgo[1] (Seacoast)	R – Based from Unalaska		75	1400
Gale Wind[1] (Northland)	R – Based from Unalaska		90	2800
Gyrfalcon (Olympic T&B)	R – Unalaska		105	4000
James Dunlap (Dunlap)	R – Unalaska		100	4300
Saratoga[2] (Dunlap)	R – Unalaska		65	750
Whidbey[2] (Dunlap)	R – Unalaska		42	700
Parago (Seacoast)	T	26	110	3000
Redoubt (Cook Inlet Marine)	T	25	75	1250
Drew Foss (Samson)	T	10	120	3000
Invader Class (Crowley)	T	10	137	7000
Samson Mariner (Samson)	T	10	90	3200
Sidney Foss (Samson)	T	10	190	3000
various tugs (Northland)	T	9	~100	~4000
John Brix (Seacoast)	T	8	140	4000
Snohomish (Dunlap)	T	6	110	3400
Manfred (Dunlap)	T	5	138	4000
Jene Dunlap (Dunlap)	T	4	120	3400
St Michael[3] (Yutana)	T	2	65	1200

Source: Nuka Research personal interviews, 2005.

Notes: 1 These tugs are home ported in Dutch Harbor but trade throughout the subarea.
2 These tugs are limited to ship-assist duties in Unalaska Bay.
3 This coastal tug transits through the area once in the spring and once in the fall to over-winter a barge in Seward.

There are four resident tugs in the region with sufficient horsepower and sea-keeping ability to potentially respond as a rescue/assist tug for a ship in distress. Additionally, there are about 100 voyages of other tugs through the region each year by tugs in trade. These transient tugs range from 1,200 to 7,000 horsepower. Many of the tug operators we interviewed, stressed that tugs in trade usually have a barge in tow, which hampers their ability to respond to calls for emergency assistance.

Vessel Accidents and Casualties in the Aleutians Subarea

Shipwrecks

Appendix C contains information gathered by the US Fish and Wildlife Service on locations of most of the known shipwrecks along the Aleutian chain since 1960.

US Flag Vessel Casualties

A vessel casualty must be reported to the US Coast Guard if it occurs upon the navigable waters of the US, its territories or possessions; or whenever and wherever a casualty involves a US vessel. Public vessels and recreational vessels are exempt from these reporting requirements.[35] Casualties include: groundings; loss of main propulsion; primary steering or reduction in maneuverability; occurrences that reduce seaworthiness (fire, flooding, damage to or loss of fire extinguishing, lifesaving or bilge pumping systems); loss of life; injuries requiring professional medical treatment; vessel damage exceeding $25,000; and spills of oil and hazardous material.

Typically, accidents, fatalities, injuries and other casualties are reported on Coast Guard standard form CG-2692 and entered into the Marine Information for Safety and Law Enforcement (MISLE) database. Approximately 13,300 accident and spill reports from US vessels operating in or near Alaska territorial waters were entered into the Coast Guard MISLE database, between June 22, 1990 and March 16, 2005.

For this study, we focused only on casualties affecting the seaworthiness of the vessel. Casualties were grouped by "first event". For example, if a vessel lost steering, resulting in grounding, flooding, and damage to the environment by oil spill, the casualty was classed as a loss of maneuverability. We excluded first-event oil spills and personnel casualties that did not affect the overall safe navigation of the vessel, and thus reduced total number of applicable reports to 5,549. Table 8 summarizes 415 of those casualties (7.5% of the total Alaska reports) which occurred in the Aleutian Subarea.[36]

Foreign Flag Vessel Casualties

Foreign vessel casualties are of interest because they generally involve larger ships with the potential for significant environmental or economic damage. Between September 12, 1991 and October 28, 2004, the US Coast Guard MISLE database contained 345 investigations of foreign vessel casualties[37] in Alaska.

[35] 46CFR4.05-1
[36] These investigations were not recorded by subarea, but by latitude and longitude.
[37] There were 426 vessel casualty records created. Eighty-one entries involved additional investigations of one the 345 incidents reported (ex. spill, loss of maneuverability, and grounding for one casualty).

Table 8. Number and types of US vessel casualties affecting seaworthiness reported in the Aleutians Subarea between June 22, 1990 and March 16, 2005.

Accident or Event in Aleutian Subarea	Number	Comments
Abandonment	5	One vessel sustained 2 million dollars damage.
Allision (collision with fixed structure)	11	
Capsizing	1	Fishing vessel
Collision between vessels	29	Two involved oil barges under tow.
Explosion	1	F/V Gladiator (03/15/2002)
Fire	65	Fire and spill from F/V All Alaskan resulted in 25 million dollars damage. 34 fires involved damage in excess of $25,000 with 6 of those in excess of 5 million dollars.
Flooding	37	12 resulted in more than $25,000 damage.
Grounding	66	13 resulted in more than $25,000 damage.
Loss of Electric Power	21	
Loss of Stability	1	
Material Failure	35	10 resulted in more than $25,000 damage.
Sinking	19	Two vessels presumed lost.
Loss of Maneuverability	124	20 resulted in more than $25,000 damage.
Total, Aleutians Subarea	415	
Total, Alaska waters	5,549	

Source: U.S. Coast Guard, Marine Information for Safety and Law Enforcement (MISLE) database.

As with US flag vessels, we focused only on casualties affecting the seaworthiness of the vessel. Casualties were again grouped by "first event". We excluded first-event spills and personnel casualties that did not effect the overall safe navigation of the vessel, and reduced total number of applicable reports to 186. The incidents were separated into seven casualty groups:

- Fire
- Grounding
- Flooding, sinking
- Material Failure (subsequent structural damage to hull or through-hull fittings)
- Collision
- Allision (Collision with a fixed object: dock, pier, dolphin, etc.)
- Loss of Maneuverability

Of the 186 casualties affecting seaworthiness of foreign vessels while operating in Alaska, Table 9 summarizes the 45 casualties reported in the Aleutians[38] (24% of the 186 total Alaska foreign vessel casualty reports). The spatial distribution of these casualties are presented in Figure 12 and detailed in Appendix D.

[38] These investigations were not recorded by subarea, but by latitude and longitude, generally south of 57° 20' N and west of longitude 156° W.

Table 9. Foreign Vessel Casualties Affecting Seaworthiness Reported to the US Coast Guard between September 12, 1991 and October 28, 2004.

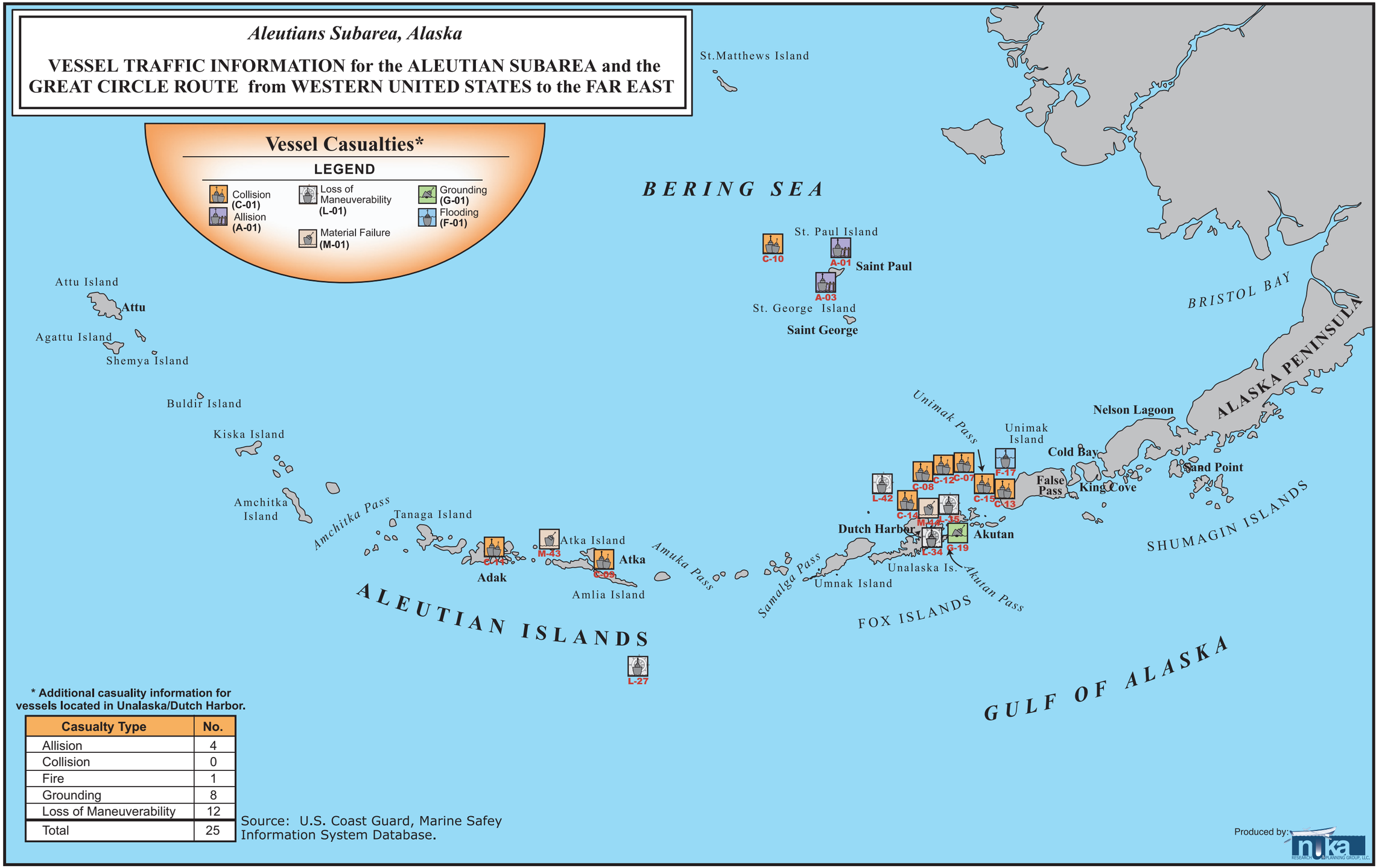
Initial Event	Number of Vessels	Secondary Events
Allisions (collision with fixed structure)	6	One vessel experienced subsequent flooding and material failure
Collisions between vessels	9	Two vessels had subsequent spills. One vessel reported subsequent material failure
Fire	2	
Flooding	1	
Grounding	9	Two groundings resulted in an oil spill. One grounding reported flooding and an oil spill.
Loss of Maneuverability	16	One reported an allision due to loss of steering, One vessel (Kuroshima) suffered subsequent grounding, fatality, oil spill. This data does not capture the loss of the M/V Selendang Ayu in December 2004.
Material Failure	2	One vessel sank and spilled oil, likely due to hull failure or deterioration of through-hull fittings
Total, Aleutians Subarea	45	
Total, Alaska waters	186	

Source: U.S. Coast Guard, Marine Safety Information System database.

Loss of maneuverability was the first-event in 16 (36%) of the 45 foreign vessel casualties reported in the Aleutians Subarea.

The data in Table 9 certainly under-reports the actual number of foreign vessel casualties for the waters of the Aleutians Subarea. Foreign vessel casualties are not required to be reported to the Coast Guard unless the vessel is in the territorial waters of the US. Most vessels report casualties to their flag-state[39] and classification society.[40] However, this information is difficult to obtain for incidents outside of US territorial waters. Finally, loss of maneuverability, due to short-duration mechanical or electrical problems on vessels, is likely not reported to any outside agency. Loss of maneuverability is of interest in this study. Both the *Kuroshima* and *Selendang Ayu* groundings were caused by loss of maneuverability.

[39] Flag-state is the country in which the vessel is registered, commonly referred to as the home port. In International Maritime Organization (IMO) Conventions, the flag State is sometimes referred to as the "Administration". When a Government accepts an IMO Convention for safety, security or environmental protection, it agrees to make it part of its own national law and to enforce it just like any other law.
[40] All ships must be surveyed in order to be issued certificates which establish their seaworthiness, This is the responsibility of the flag State of the vessel. However, the Flag State ("Administration") may "entrust the inspections and surveys either to surveyors nominated for the purpose or to organizations recognized by it" (SOLAS Chapter 1, regulation 6). In practice these "recognized organizations" are often the classification societies.



* Additional casualty information for vessels located in Unalaska/Dutch Harbor.

Casualty Type	No.
Allision	4
Collision	0
Fire	1
Grounding	8
Loss of Maneuverability	12
Total	25

Source: U.S. Coast Guard, Marine Safey Information System Database.

Figure 12. Vessel casualties in the Aleutians Subarea.

Vessel Contingency Plans in the Aleutians Subarea

The State of Alaska requires that all operators of self-propelled nontank vessels (NTV) over 400 gross tons that operate in Alaska waters must meet financial responsibility requirements and file contingency planning documents with the ADEC.[41]

Information available through that program identifies the types, sizes, and fuel capacities of nontank vessels that have filed contingency plans with the state. A data query completed on April 21, 2005 was analyzed to provide an overview of the nontank vessels operating in state waters. However, it is important to recognize that the nontank vessel contingency plan registration is a dynamic process, and the information collected through this database at any given time is only a snapshot. This database excludes innocent passage vessels transiting the northern Pacific great circle route, since they are not required to file a contingency plan with the State if they do not intend to call on an Alaskan port.

Table 10 summarizes the numbers of nontank vessels with approved contingency plans for the Aleutians Subarea by type and fuel volume. The fuel categories are the standard categories established by ADEC for Financial Responsibility and adopted by the ADEC Industry Preparedness Program for nontank vessels. One hundred and eighty two (80%) of the 213 vessels with contingency plans have a fuel capacity of less than 630,000 gallons.

Table 10. Summary of vessels holding nontank vessel contingency plans for the Aleutians Subarea.

Vessel Type	Fuel Class			Total
	A*	B**	C***	
Cargo - Bulk	33	4		37
Cargo - Container	1	10	18	29
Cargo - Freight	4			4
Cargo - LNG/LPG	1	3		4
Cargo - Reefer	27	2	3	32
Fishing - Catcher	42			42
Fishing - Factory Trawler	22			22
Fishing - General	15			15
Fishing - Processor	15	1		16
Miscellaneous	3			3
Passenger	5	2		7
Cable	1			1
Tugs	1			1
TOTAL	170	22	21	213

* Fuel Class A = fuel capacity is < 630,000 gallons
** Fuel Class B = fuel capacity is from 630,000 to 1,260,000 gallons
*** Fuel Class C = fuel capacity is > 1,260,000 gallons

[41] This requirement is at AS 46.04.055. However, there are exceptions; for example "public vessels" are not required to carry a contingency plan.

Summary

The data gathered for this report has significant limitations. No single data set contains current information about the number, type, size, and fuel capacity for vessels transiting the Aleutians Subarea. Vessels transiting the area in innocent passage are not required to report to the US Coast Guard or the State of Alaska. Information gathered from the many sources used in this report is presented in various forms that are not always comparable. For example, the US Coast Guard and State of Alaska use dissimilar vessel classification schemes. In some cases, similar (but not exact) datasets were compared or combined in order to provide the best possible estimates. Despite these incongruities, it is possible to make some broad summary statements about Aleutian vessel traffic.

Figure 13 shows a combination of many vessel traffic elements presented in the other figures. Clearly, a wide variety and large number of vessels transit the Aleutians Subarea. We estimate that over 2,700 ship-transits occur in the Aleutians each year. Up to half or more of these transits are container ships with a typical fuel capacity of 1.8 million gallons. Most of the remainder of the ships have a typical fuel capacity of about 400,000 gallons. The predominant fuel type in these large vessels is persistent fuel oil, which represents a significant environmental threat if spilled. Approximately 30-40 tank ships transit through the area and little is know about the type and amount of cargo they carry. The best available information indicates that they may carry an annual total of up to 800 million gallons of oil.

About 400 port calls are made in the Aleutians Subarea. About 150 of these port calls are container ships with a typical fuel capacity of 1.8 million gallons of persistent fuel oil. About 110 are smaller ships, such as fish trampers, with a typical fuel capacity of about 300,000 gallons. The remaining port calls are mostly tugs towing barges. Passenger vessels represent a very small component of the Aleutian vessel traffic.

About 300 million gallons of non-persistent fuel oil is moved into and through the Aleutians as cargo for use in Alaska in about 130 voyages onboard tank barges and in a single tank ship.

About 400 fishing vessels operate in the rich Aleutian fisheries that are valued in excess of 1.5 billion dollars. Fishing vessels typically have a fuel capacity of about 30,000 gallons and almost all carry non-persistent fuel.

There are four ocean-going tugs resident in the Aleutians and over 100 tug voyages each year that transit the area with barges in tow.

Four hundred and fifteen (415) casualties affecting seaworthiness of US vessels were reported in the Aleutians between 1990 and 2005. US vessels reporting casualties were usually smaller than foreign vessels and primarily fishing vessels.

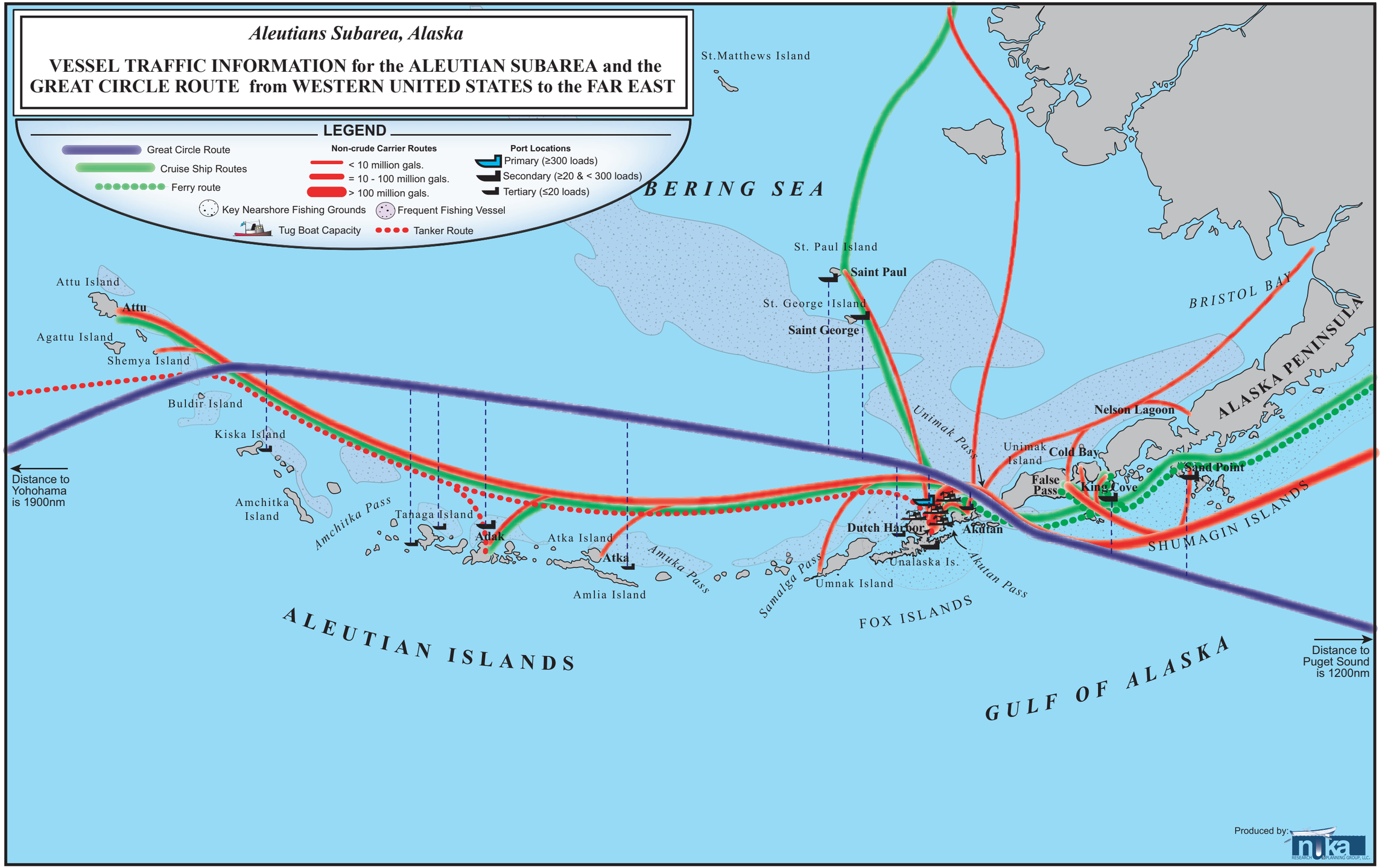


Figure 13. Combined vessel information for the Aleutians Subarea.

Forty-five (45) casualties affecting seaworthiness of foreign vessels were reported in the Aleutians between 1991 and 2004. These reports included 16 loss of maneuverability incidents. We believe that foreign vessel casualties are under reported.

Most of the 400 vessels calling at Aleutians ports and many of the larger fishing vessels hold State oil spill contingency plans and certificates of financial responsibility. However, the great majority of the vessels involved in the 2,700 vessel-transits thru the Aleutians have no State oil spill contingency plans and no State certificate of financial responsibility, because they are traveling in innocent passage. Most of these unregulated vessels carry persistent fuel oil, which, when spilled, will persist as floating or beached oil for days to months (as compared to non-persistent oil such as diesel fuel which dissipates more readily).

Recommendations for Additional Study

After reviewing the information available on marine vessels transiting the Aleutians, we have the following recommendations for additional investigation:

- Conduct a more detailed review of Coast Guard casualty reports, particularly foreign vessel reports, to determine the underlying root-cause of accidents. Particular attention should be given to incidents involving loss of maneuverability and whether timely communication and intervention could prevent vessel groundings;
- Validate estimates for types and number of vessels using Unimak Pass through the Automated Identification System (AIS) or other means; and
- Further investigate the number, size, age, and cargo type of tank ships traveling through the area.
- Categorize the fishing vessels operating in the Aleutians by relative risk. For example, fish processing vessels are typically large, carry a large amount of fuel, are relatively under-powered, and operate for long periods close to shorelines.

References

A.D. Little. July 1991. Study of Noncrude Tank Vessels and Barges, report prepared for Alaska Department of Environmental Conservation.

Alaska Commercial Fisheries Entry Commission. 2005. Commercial Vessel Database. <http://www.cfec.state.ak.us/PublicVessels/PublicVesselSum.jsp>

Alaska Department of Environmental Conservation, Division of Spill Prevention and Response, Industry Preparedness Program. 2005. Certificate of Financial Responsibility (COFR) Database.

Alaska Department of Environmental Conservation, Division of Spill Prevention and Response, Industry Preparedness Program. 2005. Nontank Vessel Database.

Alaska Petroleum Distributors and Transporters, Industry Preparedness and Planning Work Group. Revised 2003. Agreement for Compliance for Tank Barge Transport of Non-persistent Oil in Alaska.

Alaska Regional Response Team. 1999. Alaska Federal/State Preparedness Plan for Response to Oil & Hazardous Substance Discharges/Releases (Unified Plan, Volume I). http://www.akrrt.org/plans.htm

Alaska Regional Response Team. 1999. Aleutians Subarea Contingency Plan for Oil & Hazardous Substance Discharges/Releases, A Subarea Plan of the Unified Plan for the State of Alaska. http://www.akrrt.org/plans.htm

Hiatt, T. et. al. 2004. Stock Assessment and Fishery Evaluation Report for the Groundfish Fisheries of the Gulf of Alaska and Bering Sea/Aleutian Island Area: Economic Status of Groundfish Fisheries Off Alaska, 2003. Economic and Social Sciences Research Program Resource Ecology and Fisheries Management Division Alaska Fisheries Science Center National Marine Fisheries Service National Oceanic and Atmospheric Administration 7600 Sand Point Way N.E. Seattle, Washington 98115-6349.
<http://www.afsc.noaa.gov/refm/docs/2004/economic.pdf>

Nuka Research and Planning Group. 2005. An Overview of the Major Commercial Fisheries in the Unalaska Area that may be Impacted by the *M/V Selendang Ayu* Oil Spill Report to Fisheries Work Group. Report for Alaska Department of Environmental Conservation.

Pacific States/British Columbia Oil Spill Task Force. July 2002. Final Project Report and Recommendations - West Coast Offshore Vessel Traffic Risk Management Project. <http://www.oilspilltaskforce.org/wcovtrm_report.htm>

Task Force on Motorized Oil Transport. December 15, 2000. Final Report to Alaska Department of Environmental Conservation.
<http://www.mxak.org/regulations/nontank/nontankfinal/75mas.pdf>

US Coast Guard. 2005. Marine Information for Safety and Law Enforcement (MISLE) Database.

US Coast Guard, National Vessel Movement Center. 2005. Ship Arrival Notification System (SANS) Database.

US Department of Commerce, National Marine Fisheries Service. 2004. Bering Sea/Aleutians Groundfish Vessel Observer Database.

Appendices

Appendix A - Vessels transiting Northern Pacific Great Circle Route (Unimak Pass) en route to or from Puget Sound.

Appendix B – Fact sheets on the major fisheries in the Aleutians Subarea.

Appendix C - Shipwrecks on or near Islands of the Alaska Maritime National Wildlife Refuge.

Appendix D – Information on selected foreign vessel casualties in the Aleutians.

Appendix A - Vessels transiting Northern Pacific Great Circle Route (Unimak Pass) en route to or from Puget Sound. [1]

Vessel Type[2]	% of Total (number examined over 4 month period in 2004)	Average length (range)	Average gross tonnage (range)	Average Bunker Fuel Received (number)
All	100% (447)	794 ft (283-1157)	43,350 (2528-115,875)	489,282 gal. (137)
Containers	57.7% (258)	895 ft (538-1157)	53,273 (15,864-91,560)	639,853 gal. (86)
Bulk	21.1% (94)	635 ft (351-750)	27,478 (9978-41,191)	226,628 gal. (32)
General freight	9.4% (42)	609 ft (283.5-656)	24,262 (2528-32551)	173,358 gal. (3)
Vehicles & RO-RO	7.8% (35)	593 ft (387-656)	39,400 (8649-57789)	218,622 gal. (5)
Tankers	2.0% (9)	610 ft (491-814)	32,018 (10,795-57680)	230,938 gal. (2)
Wood chip	1.6% (7)	643 ft (639-656)	35,054 (30,677-40,324)	310,997 gal. (1)
Passenger	0.2% (1)	951 ft	115,875	307,918 gal. (1)
Refrigerated	0.2% (1)	308 ft	2829	76,979 gal. (1)

Source: Puget Sound Marine Exchange

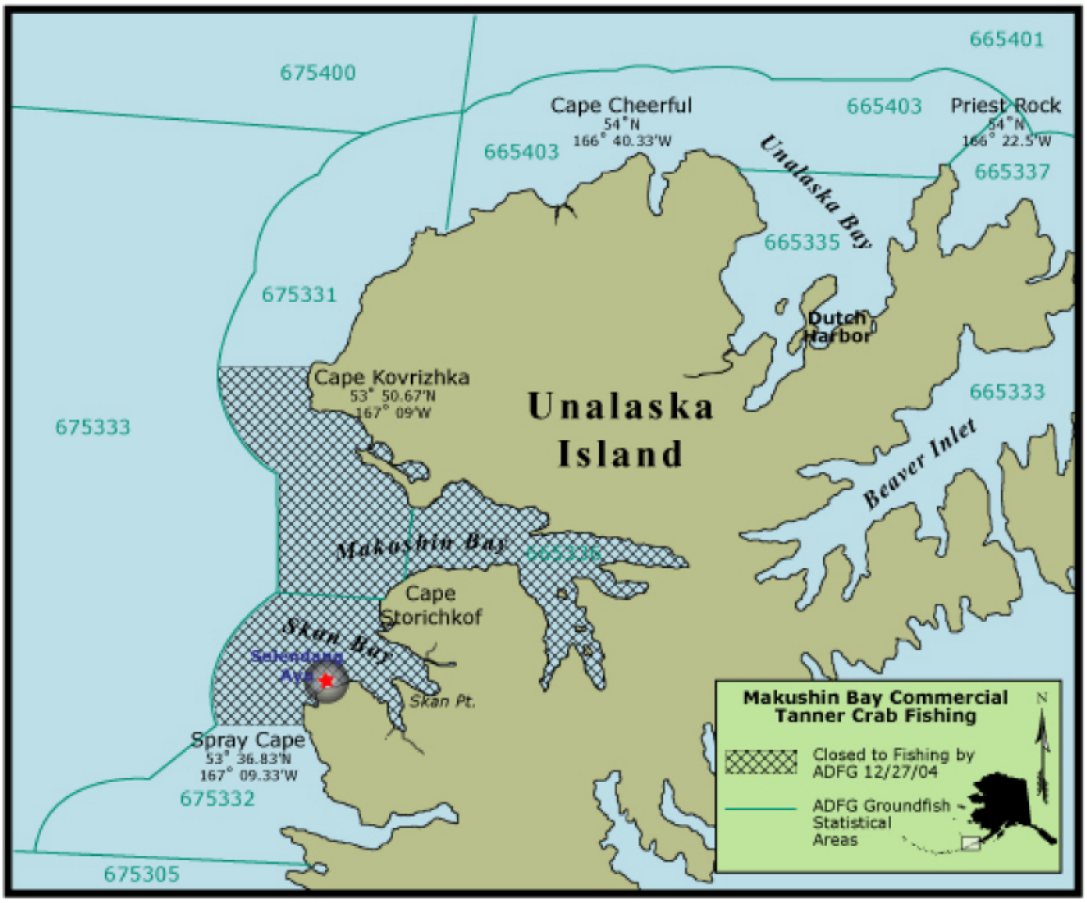
[1] This was an indirect estimate. West and East ocean routes for vessels transiting between Seattle and Shanghai; all other Far East ports north of Shanghai use Unimak Pass. We estimated Unimak Pass traffic by identifying next and last ports of call for vessels in Seattle.
[2] Note that the vessel categories used by the US Coast Guard and Puget Sound Marine Exchange differ from the categories used by the State of Alaska as presented in Table 1.

Appendix B – Fact sheets on the major fisheries in the Aleutians Subarea.

Source: Nuka Research and Planning Group. 2005. An Overview of the Major Commercial Fisheries in the Unalaska Area that may be Impacted by the M/V Selendang Ayu Oil Spill Report to Fisheries Work Group

This page left intentionally blank.

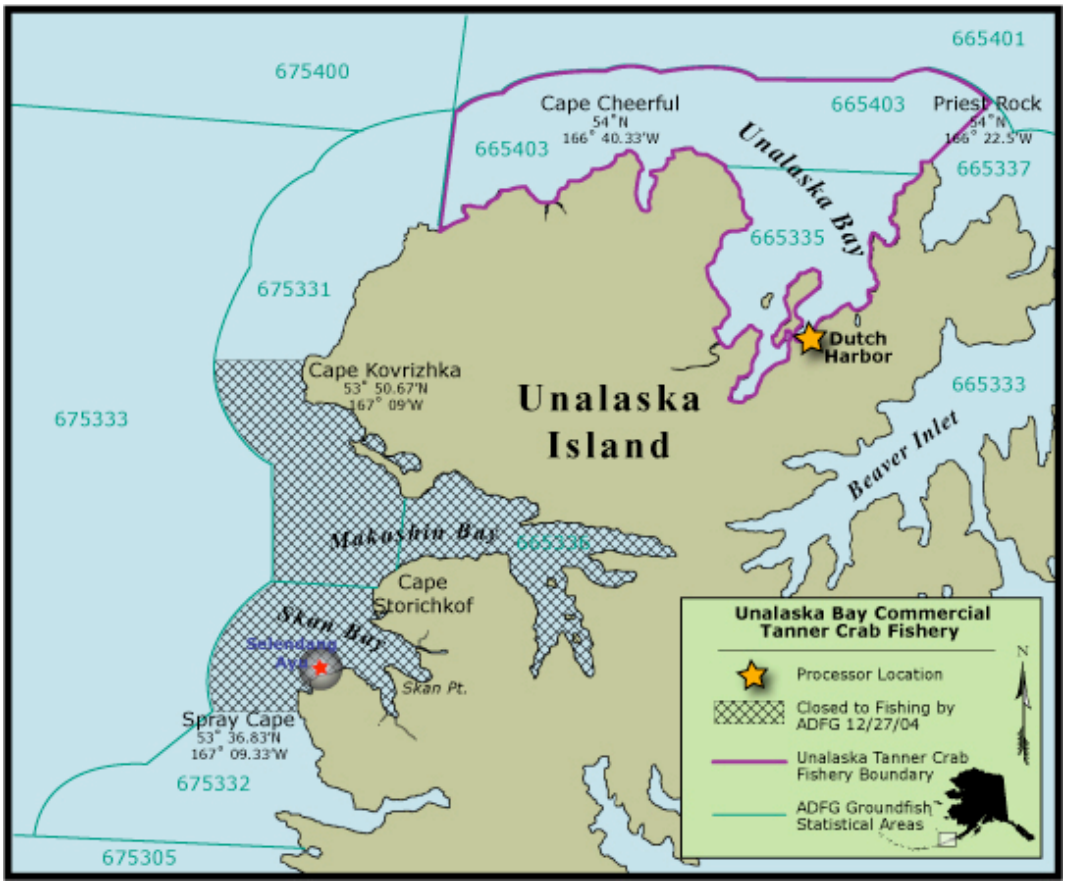
Makushin Tanner Crab Fishery



Fish Species	Tanner Crab {Chionoecetes bairdi}	***Location of Fishery***	Makushin ADFG statistical areas 675332, 675331, 665336
Harvest Level	Quota 171,453 lbs	***Number of Vessels***	55 (final)
Registration Deadline	12/27/04	***Sea water Circulation***	Yes – sea water is continuously circulated through live tanks
Open Date	January 15, 2005 - Noon	***Management Agency***	Alaska Department of Fish and Game (ADFG)
Close date	At quota, no later than 3/31/05	***Gear Type***	Crab Pots
Processors	Shore-based only - Dutch Harbor/Unalaska	***Transit Route***	Nearshore transit northeast around Unalaska Island to Unalaska Bay
2005 Fishery Status	Closed until further notice – 12/27/04		

For more information contact ADFG Commercial Fisheries Area Management Biologist, Forrest Bowers (907) 581-1239,or visit
http://www.state.ak.us/dec/spar/perp/response/sum_fy05/041207201/041207201_closure.pdf

Unalaska Tanner Crab Fishery

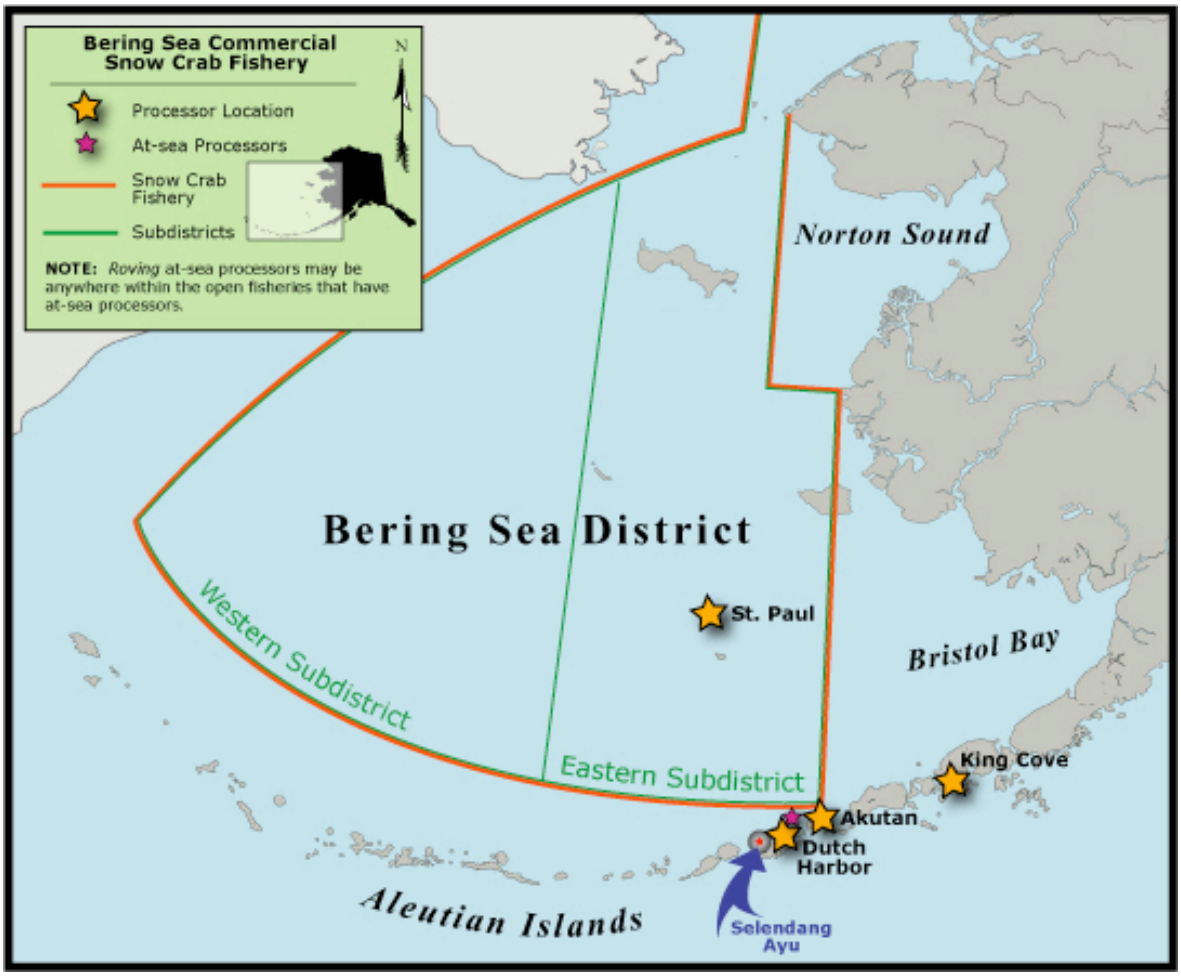


Fish Species	Tanner Crab {Chionoecetes bairdi}	***Location of Fishery***	Unalaska Bay – ADFG statistical area 665335, 665403.
Harvest Level	Quota 35,304 lbs	***Number of Vessels***	55 (includes Makushin area Tanner Crab fishery)
Registration Deadline	12/27/04	***Sea water Circulation***	Live hold tanks in most vessels. A few use dry holds because of proximity to processors.
Open Date	January 15, 2005 - Noon	***Management Agency***	Alaska Department of Fish and Game (ADFG)
Close date	Quota was reached 1/18/05	***Gear Type***	Crab pots
Processors	Shore-based only - Dutch Harbor/Unalaska	***Transit Route***	All of Unalaska Bay may be transited.
Other	Vessel size limited 58 feet (from Cape Cheerful to Priest Rock).	***2005 Fishery Status***	Unaffected by Selendang Ayu fishery closures

For more information contact ADFG Commercial Fisheries Area Management Biologist, Forrest Bowers (907) 581-1239or visit http://www.cf.adfg.state.ak.us/region4/news/2004/nr1104a04.pdf

Rev. 4/29/2005

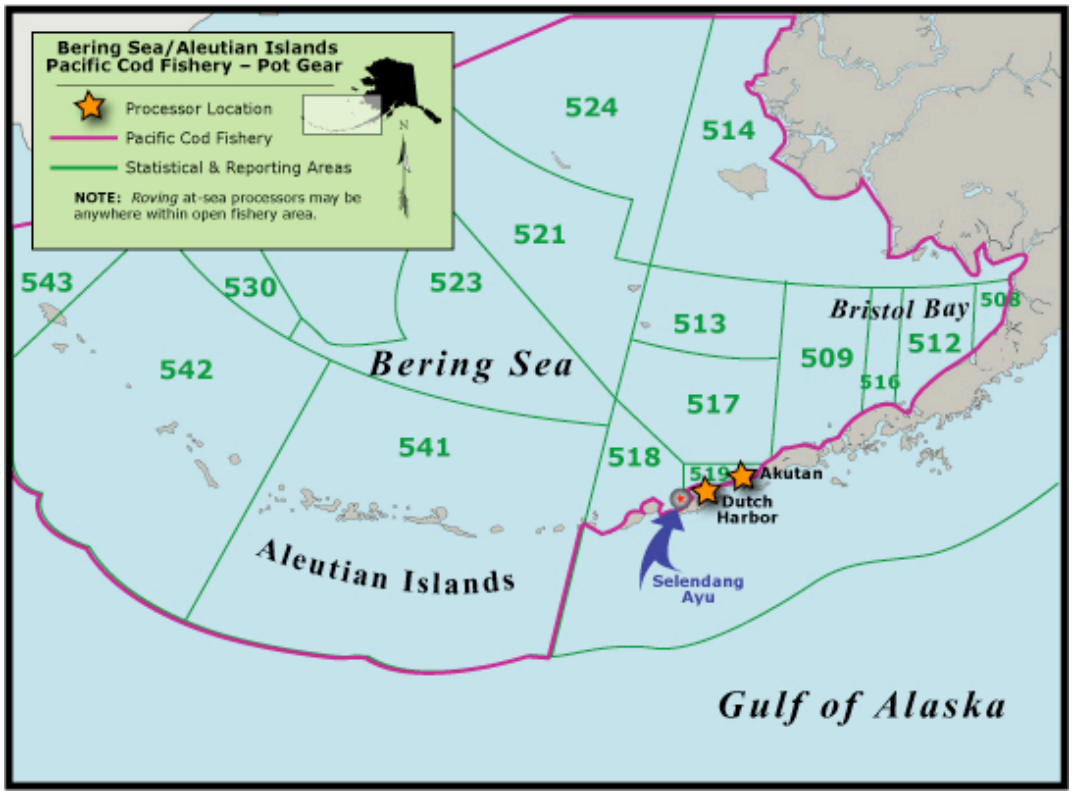
Bering Sea Snow Crab Fishery



Fish Species	*Chionoecetes opilio*	***Location of Fishery***	Bering Sea District west of 166° W longitude
Harvest Level	20.9 million pounds	***Number of Vessels***	171
Registration	12/27/04	***Sea water Circulation***	Yes, live hold
Open Date	1/15/05	***Management Agency***	ADFG
Close date	1/20/05 (quota met)	***Gear Type***	Crab pots
Shore-Based Processors	Unalaska, Akutan, King Cove, Kodiak & St. Paul	***At-sea Processors***	Catcher-processors and at-sea processors; some anchor in Unalaska bay.
2005 Fishery Status	Unaffected by Selendang Ayu closures. Processing completed in Unalaska 2/6/05.		

For more information contact ADFG Commercial Fisheries Area Management Biologist, Forrest Bowers (907) 581-1239 or visit http://www.cf.adfg.state.ak.us/region4/news/2004/nr091604.pdf.

Bering Sea/Aleutians Pacific Cod Fishery – Pot Gear

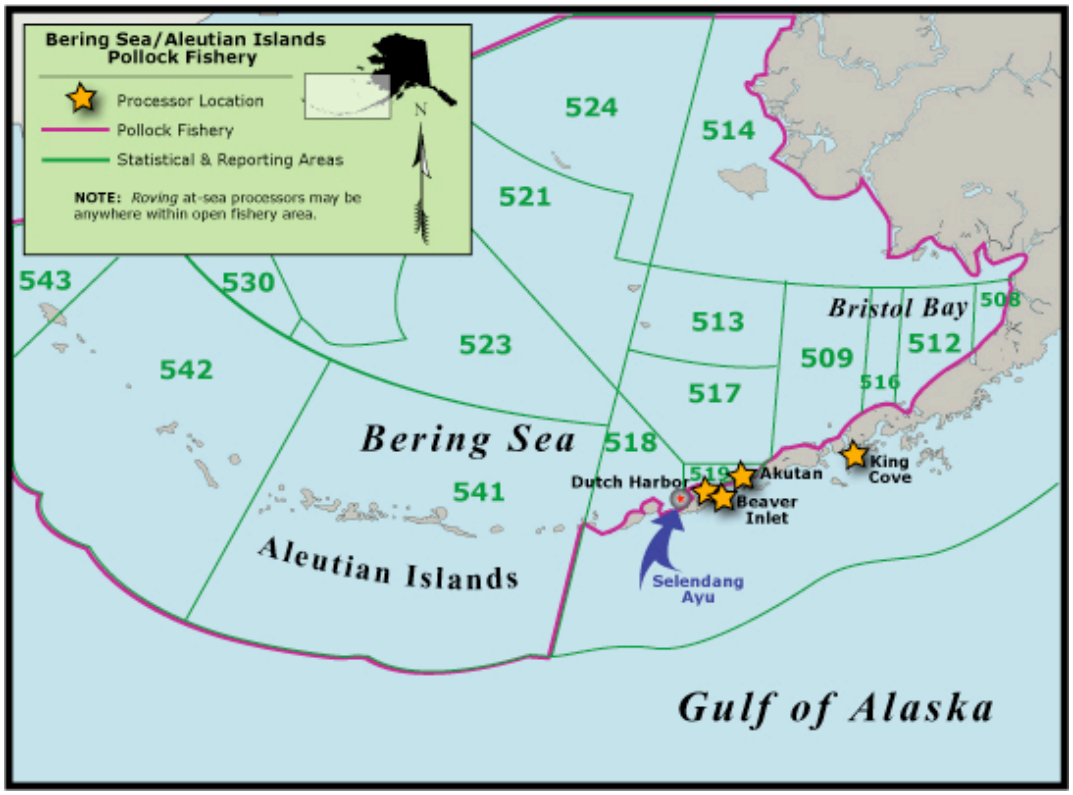


Fish Species	*Gadus macrocephalus*	***Location of Fishery***	Bering Sea/Aleutian Islands, including Bogoslof exemption area
Harvest Level	2005 TAC is 206,000 mt (quota is shared with trawl fleet)	***Number of Vessels***	35-50
Registration	Federal permit required http://www.fakr.noaa.gov/ram/ffpfpp.htm	***Sea water Circulation***	RSW. Some boats use ice in hold instead of seawater.
Open Date	1/1/05 but fishing doesn't usually start in earnest until close of snow crab	***Management Agency***	NMFS
Close date	Closed in phases from 2/12/05 – 3/10/05 based on gear/vessel specifications	***Gear Type***	Pot, hook & line, trawl
Processors	Dutch Harbor, Akutan and at-sea	***Transit Route***	Dutch Harbor east to fishing grounds.
2005 Fishery Status	Closures to inshore waters - Skan & Makushin Bays by ADFG 12/27/04		

For more information contact NMFS Alaska Groundfish Management - Andy Smoker, (907) 586-7210 or Rance Morrison (907) 581-2062, or visit http://www.fakr.noaa.gov/sustainablefisheries/default.htm.

Rev. 4/29/2005

Bering Sea/Aleutian Islands Pollock Fishery "A Season"

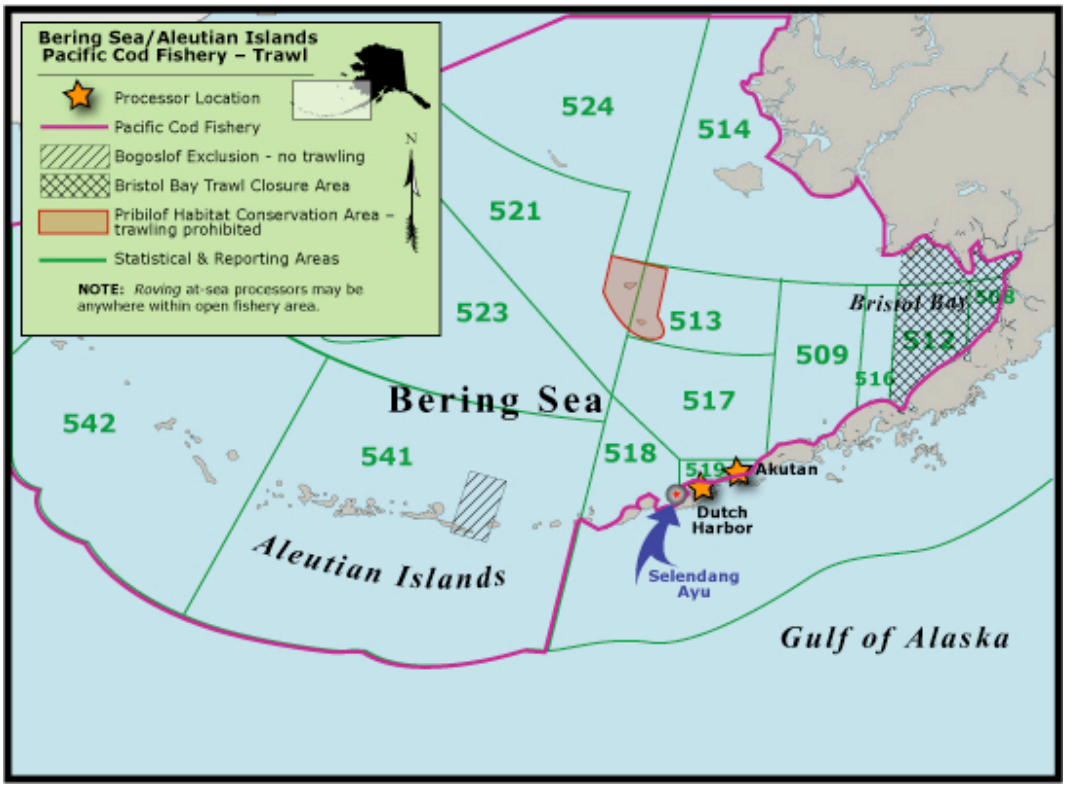


Fish Species	*Theragra chalcogramma*	***Location of Fishery***	EBS & AI. Fishing is concentrated north & west of Unimak Island
Harvest Level	EBS -1,478,500 mt AI – 19,000 mt Bogoslof – 10 mt Quota split between A & B seasons	***Number of Vessels***	Approx. 60 catcher vessels, 20 factory vessels & 3 mother ships; quota is divided 50% catcher, 40% catcher/processor & 10% mothership
Registration	Federal permit required http://www.fakr.noaa.gov/ram/ffpfpp.htm	***Sea water Circulation***	Refrigerated Sea Water (RSW), no live hold
Open Date	1/20/05	***Management Agency***	NMFS
Close date	3/25/05	***Gear Type***	Trawl
Shore-based Processors	Dutch Harbor, King Cove, Akutan, Beaver Inlet; shore-based fleet comes ashore every 2 days or so	***At-sea or catcher-processors***	Catcher-processors, floating processors & mother ships
Other	Sea Lion conservation areas (SCA) affect catch limits in some areas.	***2005 Fishery Status***	Closures to inshore waters - Skan & Makushin Bays by ADFG 12/27/04

For more information contact NMFS Alaska Groundfish Management - Andy Smoker, (907) 586-7210 or Rance Morrison (907) 581-2062, or visit http://www.fakr.noaa.gov/sustainablefisheries/default.htm.

Rev. 4/29/2005

Bering Sea/Aleutian Islands Pacific Cod Fishery - Trawl



Fish Species	*Gadus macrocephalus*	***Location of Fishery***	Bering Sea/Aleutian Islands – fishery concentrated east of Unalaska
Harvest Level	2005 TAC is 206,000 mt (quota is shared with pot/line fishery)	***Number of Vessels***	10-20
Registration	Federal permit required http://www.fakr.noaa.gov/ram/ffpfpp.htm	***Sea water Circulation***	RSW
Open Date	A Season - 1/20/05 B Season – 9/1/2005	***Management Agency***	NMFS
Close date	A Season closed 3/13, then re-opened 3/29 with 2,400 mt remaining in quota for first seasonal allowance	***Gear Type***	trawl
Processors	Primarily at-sea, catcher-processors	***2005 Fishery Status***	Closures to inshore waters - Skan & Makushin Bays by ADFG 12/27/04

For more information contact NMFS Alaska Groundfish Management - Andy Smoker, (907) 586-7210 or Rance Morrison (907) 581-2062, or visit http://www.fakr.noaa.gov/sustainablefisheries/default.htm.

Rev. 4/29/2005

Appendix C - Shipwrecks on or near Islands of the Alaska Maritime National Wildlife Refuge (AMNWR)

Source: http://alaskamaritime.fws.gov/

Over 180 known wrecks and groundings on or adjacent to the AMNWR refuge from the 1700's through 2004. The most recent wrecks and groundings (1960-2004) are listed below, organized by island. This is an unofficial list researched by the chief engineer on the **AMNWR** research vessel M/V Tiglax and maintained on an unofficial web-site[1] by persons interested in promoting and preserving the AMNWR. The authors note that it is not all inclusive and it is a work in progress with an emphasis on wrecks that have left some physical evidence on the refuge. (MMS) indicates Minerals Management Service was used as the data source.

Adak Is., 2000, April 20th, American F/V *Starigavan* grounded at Sweeper Cove. Vessel was re-floated by Magone Marine Services and taken to Dutch Harbor for further repairs. (ADEC Div. of Spill Prevention and Response)

***Afognak Is**., 2003, *Genei Maru #7*, the "Ghost Ship" grounded on Afognak after drifting at sea, crewless, for five months. Her crew abandoned her as they believed she was sinking. The refuge responded to the grounding but no rats were onboard.

Akun Is., 1964, Feb. 10th, oil screw *Cape Spencer* stranded on the S. shore of Akun Bay. (MMS)

Akun Is., 1988, Dec. 10th, 288'Japanese reefer freighter *Aoyagi Maru* lost power in a storm and grounded on a reef at Lost Harbor while involved with a frozen fish transfer with *Bering Trader*; 19 rescued by CG and the tug *Lori Ann.* 52,000 gallons of bunker C fuel leaked from the wreck, and the remaining 32,000 gallons on board were burned by the CG. (MMS)

Akun Is., 1990, Aug. 17th, 32' F/V *White Night* took on water and was towed ashore by F/V *Neunik*; 3 saved. (MMS)

Amaknak Is., 1980, Dec., 80'steel limit seiner *Dauntless* wrecked at Ulakta Head while on maiden voyage. At the time it was the largest limit seiner yet built.

Amaknak Is., 1989, Feb. 27th, 307' Japanese freighter *Swallow* grounded at Ulakta Head, later re-floated.

Amaknak Is., 1999, Feb. 20th, Liberian M/V *Hekifu* driven ashore at Rocky Point (near the APL dock) by 110 knot gust while at anchor. Vessel was pulled off by M/V *Redeemer* and taken to Magone Marine Services for temporary repairs. (ADEC Division of Spill Prevention and Response)

Amaknak Is., 2000, Sept. 11th, 99', 173 GT American tractor tug *Millennium Star* grounded at Ulakta Head due to human error/fatigue. Vessel was re-floated by Magone Marine Services and taken to their facility in Dutch Harbor for temporary repairs and fuel removal. It was towed to the lower 48 for permanent repairs. The tug was virtually new, having been placed in service on July 25, 2000. (ADEC Div. of Spill Prevention and Response)

Atka Is., 1984, steel US F/V *American Beauty* wrecked on the north side, salvaged in 1989 by Magone Marine. (Dan Magone)

Atka Is., 1989 or 1990, 92' steel US F/V *City of Seattle* wrecked just north of the western tip. As of 1999, vessel is fairly intact.

Attu Is., 1981, Mar. 5th, 291' 1500 ton Korean M/V *Dae Rim* wrecked ½ mile east of Cape Wrangell on the north side. The vessel had previously suffered a collision with a Soviet vessel, had caught fire, and been abandoned by its crew 90 miles west of Attu. Twenty-four of the crew of twenty-six died after abandoning ship. The *Dae Rim*, still afloat, was taken under tow by another Soviet vessel, the towline was subsequently lost or cut loose, and *Dae Rim* drifted ashore. A US Navy EOD team, using the USCG cutter *Boutwell* as a platform for operations, set high explosives on the wreck's fuel tanks to vent them and burn off about 110,000 gallons of fuel oil. All but two tanks were ruptured and burned by the explosive charges, with the *Boutwell* firing its guns to vent the remaining two. (US Fish & Wildlife Service memorandum 6/2/81, Anchorage Daily News 3/26/84).

Baby Is., 2004, the cruise ship *Clipper Odyssey* went aground. All passengers were safely evacuated to Dutch Harbor and the ship re-floated and taken to Dutch for repairs. The refuge responded but no rats were aboard. A small amount of fuel, probably less than 200 gallons, spilled.

***Chirikof Is**., 2002, the barge *M/V Flying D* grounded while attempting to load cattle as part of an effort to remove feral cattle from the island to restore its wildlife values. The refuge responded. No rats were aboard and it was re-floated with some difficulty.

***Chowiet Is.,** between approx. 1978 and 1980, Scott Hatch of USFWS found the wreck of a steel fishing vessel in the NW cove, and saw it disintegrate over the course of about five years. It was around 80' in length, had a bright blue hull, was bow on to the beach with the stern sunk, and had already been stripped of wheelhouse electronics the first time Hatch saw it.

Chuginadak, 1989, Oct. 15th, 122' F/V *Polar Command* wrecked, crew of 26 saved. (MMS) Vessel was formerly named *Baroid Rocket.* (USCG Merch. Vessels of the US, 1981)

***Elizabeth Is.,** 1999, Dec. 1st, American freight barge *Homebar 1* broke free of the towing vessel *Polar Bear* and grounded on the NW tip of the island. Vessel became a total loss and was eventually removed by Magone Marine Services. (ADEC Div. of Spill Prevention and Response)

Igitkin Is., 1980, American F/V *Devil Sea*, steel hull, official #541888, 33 gross tons and 45' length, 225 HP, hailing port Seattle, wrecked. (USCG Merchant Vessels of the United States, 1981.)

Rat Is., 1969, Feb. 1st, 134' Japanese F/V *Fukuyoski Maru # 15* in a sinking condition was intentionally run aground in a shallow sandy cove on the Pacific side, about a mile from the western end of the island.

St. George Is., 1994, Feb.1st, 97' American F/V *Belair* grounded on a seal rookery on S.side of St.George Is., crew of 6 lifted by a CG helicopter from the cutter *Rush.* (MMS)

St George Is., 1996, Feb. 29th', 154' F/V *All American* grounded on the N. side and broke up; 16,000 gallons of fuel lifted off vessel by helicopter. (MMS).

St. Matthew Is., 1989, Nov. 15th, 485', 8105 ton Greek ship *Milos Reefer* wrecked and broke in two.

St. Matthew Is., 2002, cruise ship *Clipper Odyssey* went aground. The ship was re-floated by filling the swimming pool, lifting the bow.

St. Paul Is., 1979, Nov. 8th, 327' Japanese trawler/factory ship *Ryuyo Maru No. 2* stranded on the NE shore of Village Cove while attempting to transfer a US Fisheries agent ashore, spilling an estimated 40,000 gallons of oil. The vessel was blown up by a US Navy Explosive Ordnance Detachment from Adak, AK on 11/22/79, although it had been broken up considerably by seas almost immediately after it grounded. (Cold Weather Response F/V *Ryuyo Maru No. 2* , St Paul, Pribilof Islands, Alaska, Lt. G.A. Reiter, US Coast Guard Pacific Strike Team, NSF)

St Paul Is., 1987, March 20th, 340' American fish processor *All Alaskan* grounded at St. Paul Is., crew rescued, ship and cargo became a total loss. Wreck was later cut up and removed.

St. Paul Is., 1987, March 21st, 80' steel F/V *Ocean Clipper* wrecked on S. side of St. Paul Is. when anchor dragged during storm, crew of six made it to a nearby reef in raft, were taken to St. Paul by USCG cutter *Midgett.* Vessel is largely intact.

St. Paul Is., 1989, Mar. 26th, 157' steel F/V *Terminator* wrecked on St. Paul after a steering failure, crew of seven rescued, vessel was a total loss. Magone Diving and Salvage later removed the wreckage.

St. Paul Is., 1990, Mar. 15th, 92' steel F/V *Alaskan Monarch* grounded just outside of the harbor after suffering a steering failure in heavy ice, crew rescued, vessel became a total loss. Magone Diving and Salvage later removed the wreckage.

St. Paul Is., 1994, Feb 22nd, 117' steel F/V *Chevak* grounded near Reef Pt., St Paul Is., 7 crew rescued by a launch from USCG cutter *Hamilton*. (MMS)

St. Paul Is., 1996, *M/V Citrus* collided with another vessel while loading cargo offshore. Fuel spilled from the *Citrus* killed king eiders and other wintering birds.

Seguam Is., 1989, Aug. 10th, 32' F/V *Kamakaze* wrecked. (MMS)

Shemya Is., 1988, Dec. 6th, 139' steel F/V *Opty* wrecked near the dock at Alcan Harbor. (USFWS internal memo) As of 8/2/01, wreck is largely intact.

Sozavarika Is., 1983 or 1984, 82' steel F/V *Jupiter* drifted ashore after parting its moorings at King Cove. As of 1999, vessel is very intact.

Ulak (Delarofs), 1964, Dec. 1st, 521' Liberian steamship *San Patrick* wrecked on Ulak Is. and broke up quickly with loss of its entire crew of 32.

Ulak (Delarofs), 1987, March 8th, steel 123' F/V *Birgit N.* grounded at Patton Cove, Ulak Is., crew rescued, vessel became a total loss.

Uliaga Is., 1987, May 6th, 227' South Korean fish processor *Tae Woong # 603*, grounded at Uliaga Is., crew of 49 rescued, vessel became a total loss. Fuel tanks holding about 100,000

gallons of diesel oil were explosively vented and burned on May 14th by a team from Underwater Construction and Aleutian Explosives, supervised by NOAA and Alaska DEC. (Aleutian Eagle, 5/21/87) As of 8/11/01, wreckage of the vessel is scattered over approx. 1 mile of the beach.

Umnak Is., 1982, Oct. 15th, F/V *Equinox* grounded at Cape Tenak; engines died. (MMS) May have been VIN 506461, 199 gross tons, and 119.7' steel hull, built in New Orleans in 1966. The official # was active in 1981 but no longer exists. Possibly this was the vessel that Bill Ermeloff of Nikolski thought was intentionally grounded in a sinking condition on the N. side of Nikolski Bay.

Umnak Is., 1988, Feb. 21st, 137' long liner *Alaska Star* stranded at Nikolski Bay. (MMS)

Unalaska Is., 1989, Jan 11th, 275' Korean F/V *Chil Bo San #6* grounded; 54 crewmembers rescued. (MMS) Diesel fuel spilled (DEC). Ship was rat infested but Unalaska Island has had rats since whaling days.

Unalaska Is., 1997, Nov. 26th, 367', 4160 gross ton Japanese freighter *Kuroshima* stranded at Summers Bay after dragging anchor in a storm. Approx. 39,000 gallons of heavy fuel oil spilled from breached tanks. Vessel re-floated by Magone Marine in Sept. 1998 after a protracted unsuccessful salvage effort by other salvage companies.

Unalaska Is., 2001, Jan. 23rd, American F/V *Miss Marie* deliberately grounded in Makushin Bay after the vessel began flooding through the sea valve. Vessel was patched and recovered by Magone Marine Services. (ADEC Div. of Spill Prevention and Response)

Unalaska Is., 2004, The 738 foot freighter the *Selendang Ayu* went aground and broke up on the refuge at between Skan Bay and Spray Point spilling an unknown quantity of the 424,000 gallons of intermediate fuel oil on board and its load of soybeans. Six ship crewmen died in the rescue.

Unalga Is., 1980, Nov. 26th, 90'steel F/V *Mary Jane* wrecked.

Unalga Is., 1991, US F/V *Pegasus* wrecked, salvaged by Magone Marine Services in the same year. (Dan Magone)

Unimak Is., 1965, Nov. 26th, 7252 ton Alaska Steamship Lines *SS Oduna* wrecked at Cape Pankof, Unimak Is., no loss of life, 200,000 lbs. of frozen crab and other cargo salvaged, ship became a total loss.

Unimak Is., 1966, Dec. 15th, American *F/V Shelikof* grounded at Cape Lazaref, Unimak Is, crew rescued, vessel pounded to pieces by seas.

Unimak Is., 1971, Nov. 7th, 80' F/V *Lynda* stranded near Cape Mordvinof. (MMS)

Unimak Is., 1985, Dec. 6th, 75' F/V *Pacific Voyager* struck a rock at Cape Pankof and broke up. (MMS)

Unimak Is., 1988, Sept., steel landing craft *Retriever* stranded 1.5 mi. W of Cape Lazaref near Rock Island. Attempts to re-float it were unsuccessful. (Billy Pepper)

Unimak Is., 1999, May 8th, American F/V *Controller Bay* grounded between Oksenof Pt. and Cape Mordivinof due to human error/fatigue. Crew escaped, vessel broke up quickly and became a total loss. (Dan Magone, Magone Marine Services, ADEC Division of Spill Prevention and Response)

Unimak Is., 2000, Feb. 11th, 139' F/V *American Star* drifted ashore between Cape Lazaref and Cape Aksit after catching fire and being abandoned by the crew. Vessel was later re-floated; the salvage was documented in a Discovery Channel film. In May of 2002 the hull of *American Star* was stripped of machinery, taken offshore, and intentionally sunk in deep water due to the lack of a buyer.

* Note: These locations are not in the Aleutians Subarea.

[1] http://www.amnwr.com/ShipwreckList.htm

Appendix D – Information on selected foreign vessel casualties in the Aleutians.

NOTE: Light blue shaded rows are events that occurred in Unalaska Bay/Dutch Harbor and are not depicted on the map due to space constraints.

Icon	Incident Date	Involved Vessel Name	Initial Event	Secondary Events	Involved Vessel Service	Gross Tonnage	Length (ft.)	Vessel Age
A01	2/16/96	CITRUS	Allision	Flooding, Material Failure, Spill	Freight Ship	3493.0	92.1	25
A02	9/7/02	JACHA	Allision		Freight Ship	3264.0	281.4	20
A03	1/25/96	MARLIN	Allision		Freight Ship	492.0		61
A04	9/7/02	NO 1 POHAH	Allision		Freight Ship	4261.0	377.0	17
A05	10/28/04	SOHOH	Allision		Freight Ship	4504.0	396.2	6
A06	4/5/01	THORFRID	Allision		Freight Ship	5122.0	111.0	23
C07	3/3/03	ARKONA TRADER	Collision		Freight Ship	23809.0	617.2	7
C08	2/11/98	HANJIN BARCELONA	Collision	Material Failure	Freight Ship	51754.0	949.8	13
C09	1/31/00	KHANA	Collision	Spill	Freight Ship	3475.0	311.6	17
C10	12/21/92	MARLIN	Collision		Freight Ship	492.0		61
C11	11/3/99	MONONOK	Collision		Freight Ship	4392.0	395.9	16
C12	4/8/93	OCEANIC SUCCESS	Collision		Freight Ship	23275.0	590.6	14
C13	1/29/00	SAMMI AURORA	Collision		Freight Ship	15015.0	559.7	27
C14	2/6/99	SAVANNAH	Collision		Freight Ship	3253.0	85.1	23
C15	8/28/93	SINGAPORE FONTAINE	Collision		Freight Ship	3260.0	85.7	23
Fi16	10/25/92	SOTRUDNICHESTVO	Fire		CFV	7805.0	309.0	15
F17	10/20/04	ARCTIC	Flooding		Freight Ship	0.0	0.0	
G18	10/1/96	BANYO	Grounding		Freight Ship	5757.0	408.4	19
G19	7/31/04	CLIPPER ODYSSEY	Grounding	Flooding, Spill	Passenger	5218.0	301.8	16
G20	3/3/01	DALNEGORSK	Grounding		Freight Ship	5286.0	377.0	15
G21	4/1/92	HAKKO FONTAINE	Grounding		Freight Ship	3261.0	85.7	23
G22	2/19/99	HEKIFU	Grounding	Material Failure, Spill	Freight Ship	3401.0	309.9	18
G23	1/17/95	KOMSOMOLSKAYA SMENA	Grounding		Freight Ship	2673.0	312.5	22
G24	3/17/92	SKYLARK	Grounding	Spill	Freight Ship	3172.0	87.5	23
G25	2/2/00	SUAH	Grounding		Freight Ship	2958.0	78.6	21
G26	3/21/92	VENTURE LUNA	Grounding		Freight Ship	1246.0	0.0	
L27	12/24/96	BANEASA	Loss of Maneuverability	Spill	Freight Ship	40955.0	833.0	21
L28	3/14/99	DHARA	Loss of Maneuverability		Freight Ship	1599.0	78.0	22
L29	1/31/00	DHARA	Loss of Maneuverability		Freight Ship	1599.0	78.0	22

Icon	Incident Date	Involved Vessel Name	Initial Event	Secondary Events	Involved Vessel Service	Gross Tonnage	Length (ft.)	Vessel Age
L30	5/24/96	EVER WINNER	Loss of Maneuverability		Freight Ship	2340.0	80.9	22
L31	5/19/96	EVER WINNER	Loss of Maneuverability		Freight Ship	2340.0	80.9	22
L32	4/9/98	HOKUSHIN MARU	Loss of Maneuverability	Allision	Freight Ship	491.0	70.8	21
L33	5/15/96	KOMSOMOLSKAYA SMENA	Loss of Maneuverability		Freight Ship	2673.0	312.5	22
L34	11/27/97	KUROSHIMA	Loss of Maneuverability	Grounding, Flooding, Fatalities, Material Failure, Spill	Freight Ship	4160.0	367.5	18
L35	2/18/99	MABAH	Loss of Maneuverability		Freight Ship	4457.0	396.0	10
L36	1/13/99	OHYOH	Loss of Maneuverability		Freight Ship	4790.0	387.0	19
L37	3/7/96	PRESIDENT F.D. ROOSEVELT	Loss of Maneuverability		Freight Ship	36195.0	814.2	25
L38	3/7/94	PRESIDENT KENNEDY	Loss of Maneuverability		Freight Ship	50205.0	867.4	17
L39	8/21/97	TAISEI NO. 98	Loss of Maneuverability		Freight Ship	10670.0	144.0	29
L40	3/11/99	TAISETSU	Loss of Maneuverability		Freight Ship	3281.0	92.2	19
L41	9/26/01	TORAH	Loss of Maneuverability		Freight Ship	4212.0	355.8	17
L42	2/19/95	ZERVOS	Loss of Maneuverability		Freight Ship	9095.0	489.9	24
M43	11/3/99	OCEAN TEMPEST	Material Failure		CFV	185.0	143.6	38
M44	10/24/96	PRINCE GEORGE	Material Failure	Sinking, Spill	Unclassified	5825.0	106.7	57

Source: U.S. Coast Guard, Marine Information for Safety and Law Enforcement database.

nuka
RESEARCH & PLANNING GROUP, LLC.