

Vessel Traffic in the Aleutians Subarea

Updated Report to
Alaska Department of Environmental Conservation



September 20, 2006

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 2004 bulk grain ship *M/V Selendang Ayu* oil spill at Unalaska Island in Alaska's Aleutian Islands 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 U.S. Coast Guard or the State of Alaska. However, the following information was drawn from the available data:

- Based on automated tracking data collected from October 2005 through June 2006, about 3,100 ships per year (8-9 vessels each day) pass through the Aleutians (primarily westbound) on great circle, innocent passage, trans-Pacific voyages, including:
 - Approximately 1,200 container ships (39% of total) per year with a median fuel capacity of 1.6 million gallons of persistent fuel oil;
 - As many as 1,300 bulk and general freight ships (41% of total) per year with a median fuel capacity of approximately 470,000 gallons of mostly persistent fuel oil,
 - About 265 motor vehicle carriers per year (8.5% of total) per year with an estimated average fuel capacity of 500,000 gallons of persistent fuel oil;
 - About 110 reefer (refrigerated) cargo ships (3.5% of total) per year with a median fuel oil capacity of 317,000 gallons of mostly persistent fuel oil.
 - 22 tankers per year (0.7%), transporting about 400 million gallons of refined oil.
 - The remaining 7.3% of the total is comprised of other vessel types with a variety of persistent and non-persistent fuel.
- About 400 port calls per year are made by freight ships to Aleutian ports which include:
 - 130 container ships per year with a typical fuel capacity of 1.6 million gallons of persistent fuel oil each;
 - 108 reefer (refrigerated) cargo ships with a typical fuel oil capacity of 317,000 gallons of primarily persistent fuel oil;
 - The remaining local port calls are mostly by tugs towing barges.
- Few passenger vessels operate or pass through the Aleutians. In 2006, four cruise ships (fuel capacity ranging from 170,000 – 560,000 gallons of persistent fuel oil) called at Dutch Harbor; two smaller passenger ships (range of 54,000 – 114,000 gallons of diesel fuel oil) made a total of seven port calls

at Dutch Harbor; and, the Alaska Marine Highway ferry Tustumena (67,000 gallons non-persistent fuel oil) made eleven round trips between Homer and Dutch Harbor.

- About 300 million gallons of non-persistent fuel oil is moved into and through the Aleutians as cargo for use by Aleutian and other Western Alaska communities and industry on about 130 voyages by 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-eight (48) casualties affecting seaworthiness of foreign vessels were reported in the Aleutians from 1991 through July 2006. These reports included 17 loss of maneuverability incidents. We believe that foreign vessel casualties are under reported;
- Four hundred and eighty-six (486) casualties on US vessels which affected vessel seaworthiness were reported in the Aleutians from 1990 through July 2006. US vessels reporting casualties were usually smaller than foreign vessels and primarily fishing vessels; and
- While most of the 400 vessels calling at Aleutian ports and the larger fishing vessels hold State oil spill contingency plans and certificates of financial responsibility, the great majority of the 3,100 annual great circle trans-Pacific 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 on innocent passage.
- Data sources we reviewed recorded 43 oil spills of note from vessels during a period from 1981 through July 2006. These spills totaled almost one million gallons. Sixty-two percent of the amount spilled was non-persistent oil and 38 percent was persistent oil. Twelve percent of the non-persistent spills were larger than 34,000 gallons, but these spills accounted for 66 percent of the volume of non-persistent oil spilled. Only 7 percent of the persistent oil spills were greater than 34,000 gallons, but these spills accounted for 99 percent of the volume of oil spilled.

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 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	8
Vessel Type and Fuel Oil Capacity.....	10
Trans-Pacific Vessel Traffic Passing through the Aleutians Subarea.....	12
Vessel Traffic Calling in the Aleutians Subarea.....	16
Tanker and Tank Barge Vessel Traffic in the Aleutians Subarea .	18
Fishing Vessel Traffic in the Aleutians Subarea	21
Passenger Vessel Traffic in the Aleutians Subarea	24
Tug Traffic in the Aleutians Subarea.....	26
Vessel Accidents and Casualties in the Aleutians Subarea	28
Shipwrecks	28
US Flag Vessel Casualties.....	28
Foreign Flag Vessel Casualties	30
Spills and Potential Spills	32
Summary	33
Recommendations for Additional Study	36
References	38
Appendices	40
Appendix A – Fact sheets on the major fisheries in the Aleutians Subarea.	42
Appendix B – Shipwrecks on or near Islands of the Alaska Maritime National Wildlife Refuge.....	50
Appendix C – Information on selected casualties in the Aleutians Subarea.	53

List of Figures

Figure 1.	North Pacific great circle route drawn on a gnomonic map projection where a great circle is a straight line.	9
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.....	10
Figure 4.	Primary traffic routes of vessels on the Northern Pacific great circle route traveling through the Aleutians Subarea.....	13
Figure 5.	Trans-Pacific vessel traffic through Unimak Pass by vessel type	14
Figure 6.	A "snapshot" of vessel traffic detected by the AIS receiver at Unimak Pass. ...	14
Figure 7.	Primary traffic routes of vessels calling at ports in the Aleutians Subarea	17
Figure 8.	Port calls to Unalaska/Dutch Harbor by vessel type and month in 2004.	18
Figure 9.	Primary traffic routes of non-persistent oil deliveries in the Aleutians Subarea	19
Figure 10.	Primary fishing grounds in the Aleutians Subarea.	22
Figure 11.	Estimated fishing vessel effort in the Aleutians Subarea by month in 2004. ...	24
Figure 12.	Cruise ship and ferry routes in the Aleutians Subarea.	25
Figure 13.	Tug boat routes in the Aleutians Subarea.	27
Figure 14.	Foreign vessel casualties in the Aleutians Subarea.	31
Figure 15.	Actual or potential vessel spills in the Aleutians Subarea.	34
Figure 16.	Combined vessel information for the Aleutians Subarea.	35

List of Tables

Table 1.	Nontank Vessel profile by type, gross tonnage, and fuel capacity.....	11
Table 2.	Vessels on trans-Pacific voyages using Unimak Pass	12
Table 3.	Vessel port calls in Unalaska/Dutch Harbor by type and month in 2004	16
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 Aleutians Subarea in 2005	26
Table 7.	Known tug traffic in the Aleutians Subarea by vessel, port, number of trips per year and horsepower	28
Table 8.	Number and types of US vessel casualties affecting seaworthiness reported in the Aleutians Subarea between June 22, 1990 and August 1, 2006	29
Table 9.	Foreign Vessel Casualties affecting seaworthiness reported to the US Coast Guard between September 12, 1991 and August 1, 2006	30

Vessel Traffic in the Aleutians Subarea

Updated Report to
Alaska Department of Environmental Conservation¹
September 20, 2006

Introduction

Several recent incidents involving freight vessels in transit near the Aleutian Islands have focused attention on the oil spill risk posed by vessels operating within the productive fishing grounds and sensitive wildlife habitats of Alaska's Aleutian chain. In December 2004, the *M/V Selendang Ayu* lost power, drifted aground, and broke apart near Unalaska Island, spilling an estimated 335,000 gallons of intermediate fuel oil and marine diesel oil. Approximately seven years earlier, another freighter, the *M/V Kuroshima*, ran aground at Unalaska Island and spilled approximately 40,000 gallons of Bunker C fuel oil. In July 2006, the car carrier *M/V Cougar Ace* capsized while transferring ballast approximately 200 nautical miles southwest of the Aleutians and was ultimately towed to an anchorage on Unalaska Island.

While the *Cougar Ace* incident did not result in a significant spill, it was the third major freight vessel casualty in the vicinity of the Aleutian Islands in less than a decade. 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 recently followed suit with a law requiring oil spill contingency plans for nontank vessels calling at US ports.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. The *Cougar Ace* was in international waters transiting the southern great circle route, well south of the Aleutians.⁵ These vessels were therefore exempt from State and federal oil spill planning requirements.⁶

1 This report was originally completed in April 2005. This revision (Updated Report, September 2006) updates the original report with new vessel traffic data. The 2005 version (Version 1) estimated trans-Pacific vessel traffic passing through the Aleutians indirectly. Version 2 uses direct data from the automated identification system (AIS) receiver established at Unimak Pass in October 2005. In addition, the non-tank vessel profiles (Table 1) has been improved by increasing the number of vessels analyzed from 433 to 1608.

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

3 Section 701(c) of the Coast Guard and Marine Transportation Act of 2004 (Pub. L. 108-293) (2004 Act) requires nontank vessel response plans for ships operating in US waters be prepared and submitted to the Coast Guard no later than one year after the date of enactment of the act (i.e., by August 8, 2005). Coast Guard regulations governing the content of the nontank vessel c-plans are still pending.

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 When the *Cougar Ace* did enter US/Alaska water, it did so as a distressed vessel, but voluntarily applied for and received a Nontank Vessel contingency plan from the State of Alaska.

6 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. Because the *Selendang Ayu* was adrift for approximately 40 hours 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, a detailed discussion of rescue tugs and other options are beyond the scope of this report.

At the time of the Selendang Ayu casualty, it was known that vessels passed through the Aleutians on trans-Pacific voyages between East Asia and North America ports. The number and type of vessels using this trade route was not known. This report characterizes the type and amount of vessel traffic moving to, from, within and through the Aleutians Subarea.⁷ This includes available data regarding:

- The number, size, and type of vessels that transit the great circle route between the coastal ports of North America and East Asia ports, and the general type and quantity of fuel oil capacity.
- The number, type, and size of vessels calling at Aleutian ports.
- Type and quantity of oil transported as cargo to and through the Aleutians Subarea.
- Current tugboat traffic in the Aleutians, particularly with regard to tugs that may be able to come to the aid of a stricken vessel.

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 2 shows this same route on a Mercator projection where, because the map is flat and the earth is curved, the route appears as a “great circle,” or more accurately, a semi-circle.

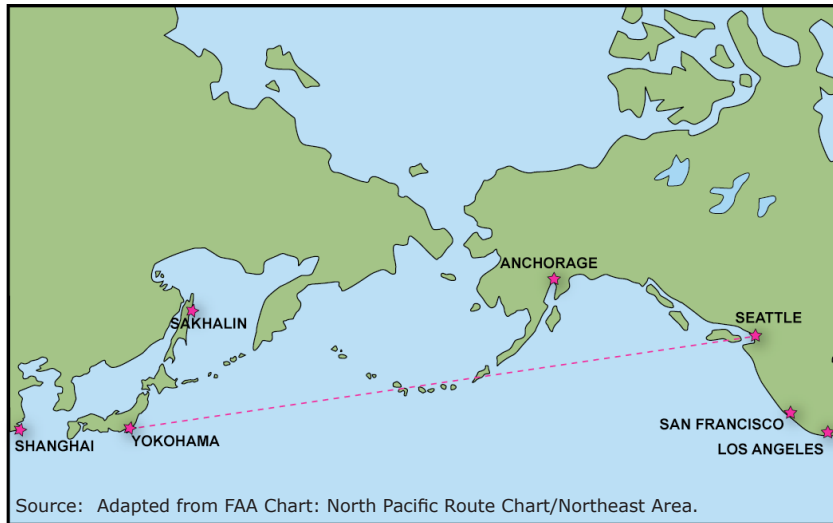
Analysis of Vessel Traffic in the Aleutians Subarea

For the purpose of this analysis, information on vessel traffic in the Aleutians Subarea was considered to identify the annual numbers of vessels carrying persistent and non-persistent oils as fuel or bunkers and to estimate the quantities of oil onboard.

No single data set contains all information needed to develop a precise picture of the number, type, size, and fuel capacity for vessels transiting the Aleutians. Vessels transiting the area in innocent passage are not required to report to the U.S. Coast Guard or the State of Alaska. Information gathered from the sources used in this report is presented in various forms that are not always comparable. For example, the U.S. Coast Guard and State of Alaska use dissimilar vessel

⁷ Throughout this study, the geographic definition of the Aleutians Subarea will apply to any references to the Aleutian Islands. The Aleutians Subarea as defined by the Alaska Federal/State Preparedness Plan for Response to Oil & Hazardous Substance Discharges/Releases (Unified Plan) 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.

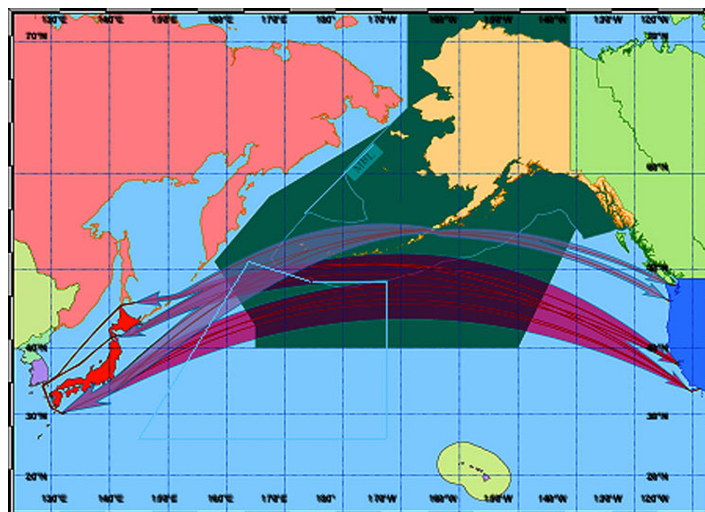
Figure 1. North Pacific great circle route drawn on a gnomonic map projection where a great circle is a straight line.



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 9 months⁸ of vessel tracking data from the ship automated identification system (AIS) receiver recently established at Scotch Cap, Unimak Pass;
- Calculating tanker cargo capacity for AIS reports and records available on Lloyd’s Register;

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 October 2005 through June 2006.

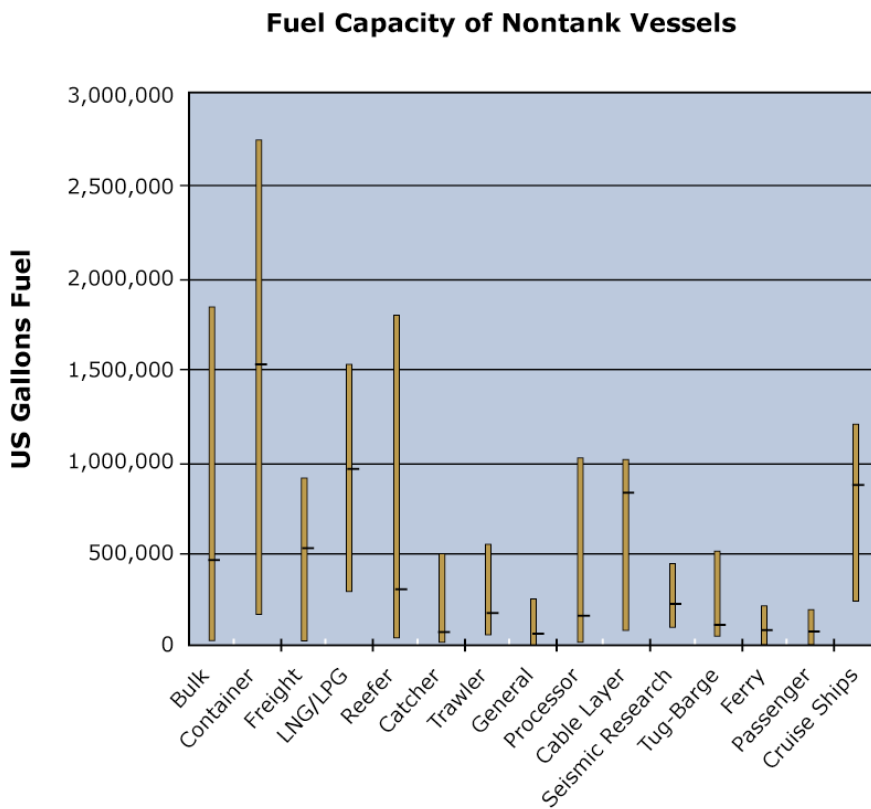
- Correlating the National Marine Fisheries Service groundfish fishery observer’s database with the Alaska Commercial Fisheries Entry Commission’s vessel database to estimate the size and fuel capacity of this fleet.

Vessel Type and Fuel Oil Capacity

With regard to vessel type and fuel oil capacity, the largest database is contained within the applications for nontank vessel (NTV) certificates of financial responsibility required for vessels at and over 400 gross tons operating in Alaska state waters.⁹ Although many of the vessels on innocent passage through Unimak Pass do not have spill plans filed with the Alaska Department of Environmental Conservation (ADEC), the 1608-vessel ADEC database, summarized in Table 1 and Figure 3, provides the best available profile of vessels by type.¹⁰ Information from this database is applied to subsequent analysis and discussion of vessel traffic.

Information regarding the type and quantity of fuel oil used by each vessel type is summarized in Table 1. For the purpose of this discussion, persistent fuel oils are heavy or intermediate fuel oils with specific gravities near 1.0. Non-persistent fuel oils are less dense and include marine diesel and #2 fuel oil.

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



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

⁹ Alaska State waters generally extend 3 miles from the outermost shorelines and headlands.

¹⁰ It should be noted that many of the 1608 vessels in the ADEC database have never sailed in Alaska waters but apply for certificates of financial responsibility with ADEC in case the need should arise.

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

Vessel Type (number)	Gross Tonnage* Median (Range)	Fuel Capacity Gallons** IFO and Diesel Median (Range)	Comments
All Vessels (1608)			
Cargo-Bulk Carrier (967)	19,900 (683 - 92,570)	467,300 (27,000 - 1,836,700)	Nearly all use persistent fuel oil.
Cargo-Container (100)	34,230 (455 - 65,792)	1,574,750 (113,000 - 2,736,600)	Nearly all use persistent fuel oil.
Cargo-Freight (85)	25,930 (496 - 38,749)	593,000 (39,000 - 956,500)	Most use persistent fuel oil.
Cargo-LNG/LPG (78)	25,300 (6711 - 66,174)	911,550 (275,180 - 1,511,160)	Nearly all use persistent fuel oil.
Cargo-Reefer (172)	5,300 (487 - 13,876)	317,080 (20,370 - 1,784,200)	Most use persistent fuel oil.
Fishing-Catcher (46)	652 (441 - 5,190)	63,590 (26,670 - 479,514)	Virtually all use persistent fuel oil.
Fishing-Factory Trawler (23)	1,593 (496 - 7,765)	173,880 (60,310 - 580,310)	All but one use non-persistent fuel oil.
Fishing-General (25)	497 (405 - 1,823)	61,320 (25,284 - 243,680)	Non-persistent fuel oil.
Fishing-Processor (27)	2,200 (499 - 17,845)	152,712 (35,154 - 1,008,000)	All but one use non-persistent fuel oil.
Cable Layer (12)	10,540 (5,750 - 13,201)	727,270 (96,012 - 1,050,700)	Most use non-persistent fuel oil.
Seismic Research (3)	3,586 (926 - 3,779)	276,650 (179,510 - 414,370)	Non-persistent fuel.
Tug-Barge Combo (18)	680 (454 - 4,391)	95,280 (54,600 - 527,440)	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).

** Conversions used for this report include:

One tonne (metric) crude oil = 7.30 barrels = 306.6 gallons;

One tonne (metric) diesel = 7.29 barrels = 306 gallons;

One tonne (metric) intermediate fuel oil (IFO) = 6.60 barrels = 277 gallons

¹¹ Includes vessels that have applied for a State of Alaska Certificate of Financial Responsibility as of July 30, 2006. Only a portion of the vessels that have applied for an Alaska COFR have called at Alaska ports. Vessels providing incomplete information of fuel oil capacity were deleted from this data set. This data does not include 54 COFRs that listed vessel type as 'misc'.

Trans-Pacific 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 – once at Unimak Pass¹² and once at a point west of Tanaga Island.¹³ Analysis of nine months of data (October 1, 2005 through June 30, 2006) from the recently installed automated identification system (AIS) at Scotch Cap, Unimak Pass¹⁴ reveals that 2,336 vessels, or on average, eight or nine deep draft vessels a day (or an estimated 3,100 vessels per year) used Unimak Pass for trans-North Pacific voyages.¹⁵ AIS data information for each vessel detected provided the vessel name, vessel type, next and last port and call-sign. Therefore, we were able to characterize the type of shipping along this trans-Pacific route. This characterization is presented in Table 2 and Figure 5.

Table 2. Vessels on trans-Pacific voyages using Unimak Pass.¹⁶

Vessels on trans-Pacific Voyages Using Unimak Pass	Actual Data October 2005 to June 2006*	Annual Estimated Passages**
Barge Carrier	1	1
Bulk Carriers	825	1,100
Chemical Tanker	50	67
Container Ships	916	1,221
Crude Oil Tankers	5	7
Fishing Vessels	48	64
General Cargo Ships	95	127
LNG Tanker	44	59
Motor Vehicle Carrier	168	224
NH3 Carrier	5	7
OBO	1	1
Passenger Ship	3	4
Product Tanker	11	15
Reefer Cargo Ships	83	111
RORO	31	41
Towing Vessels	6	8
Wood Chip Carrier	27	36
Other	17	23
	2,336	3,115
Consolidated/Grouped		
Oil, Chemical, Gas, Product Carriers	115	153
Container Ships	916	1,221
Motor Vehicle Carrier/RORO	199	265
Reefer Cargo Ships	83	111
Bulk Carriers	853	1,137
General Cargo Ships	95	127
All Other	75	100
	2,336	3,115

NOTES:

* Data source Scotch Cap (Unimak Pass) AIS receiver, provided by Marine Exchange of Alaska.

** Annual estimates were computed by expanding the 9 months of actual data to 12 months. This was done by dividing the actual number by 0.75 and rounding to the nearest whole number.

12 The mid-way point of Unimak Pass is approximately 70 nautical miles (by vessel) northeast of Dutch Harbor at latitude 54.2°N, longitude 164.5°W

13 West of longitude 178.5° W.

14 First operational in October 2005, the automated identification system (AIS) receiver installed at Scotch Cap provided raw data on vessels passing through or near Unimak Pass from October 2005 through June 2006. This data has been analyzed and summarized for this report.

15 Assuming that the nine months of AIS data is accurate for the entire year. The current AIS data query for Unimak Pass only counts the most recent vessel transit if the vessel transits Unimak Pass twice or more within a 15-day period. Thus, AIS may underestimate the number of vessels trading between Alaska and Asia. We have attempted to correct this by reviewing actual Alaska port calls and revising ship-specific Unimak Pass transits accordingly.

16 Assuming that the nine months of AIS data is accurate for the entire year. The current AIS data query for Unimak Pass only counts the most recent vessel transit if the vessel transits Unimak Pass twice or more within a 15-day period. Thus, AIS may underestimate the number of vessels trading between Alaska and Asia. We have attempted to correct this by reviewing actual Alaska port calls and revising ship-specific Unimak Pass transits accordingly.

Figure 4. Primary traffic routes of vessels on the Northern Pacific great circle route traveling through the Aleutians Subarea.

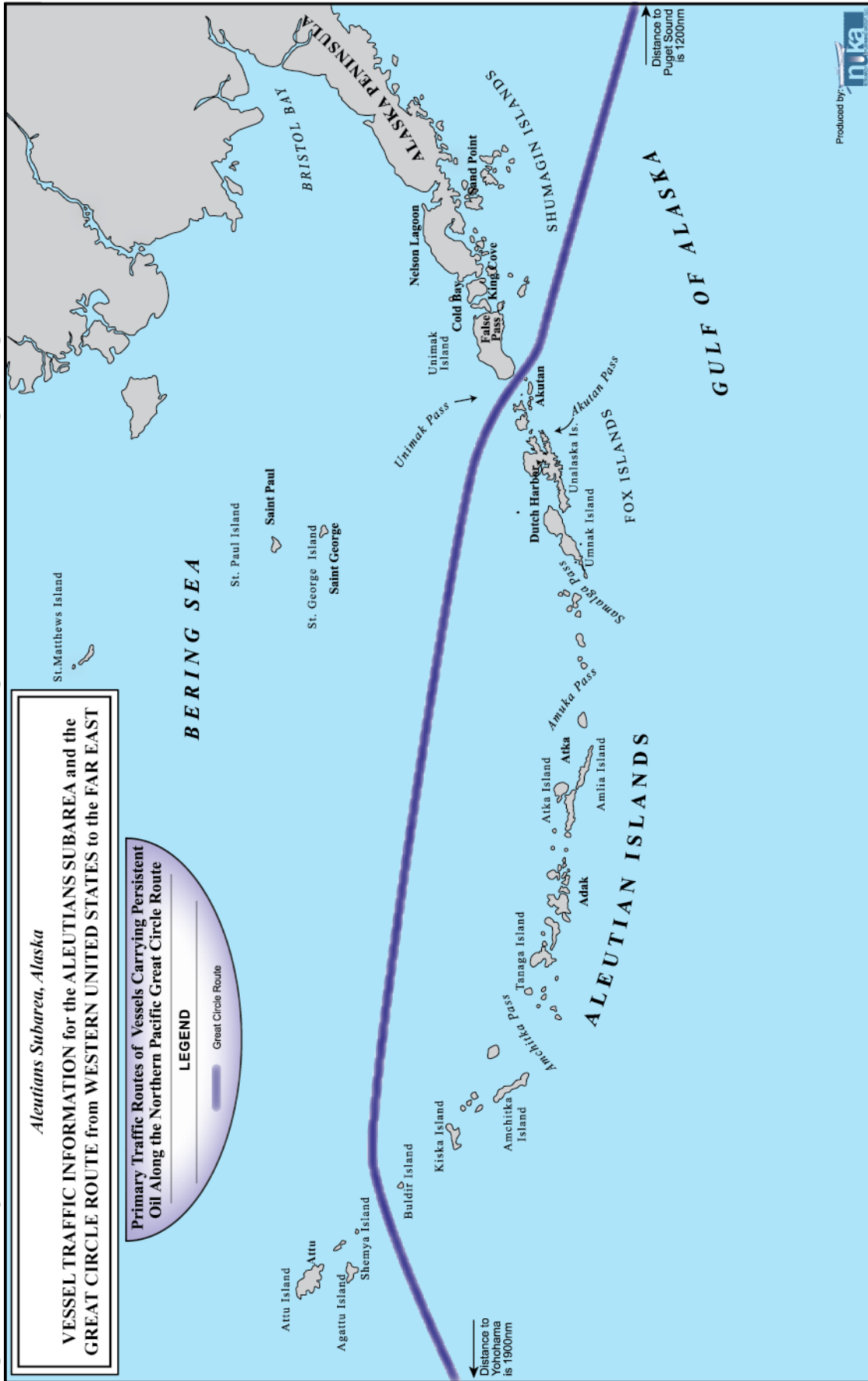
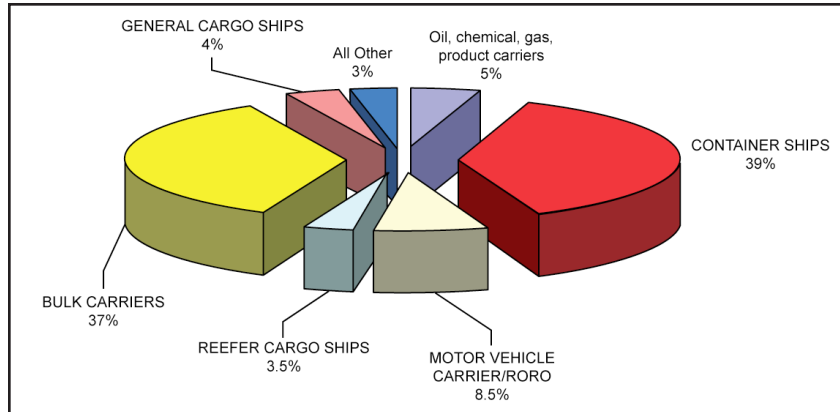
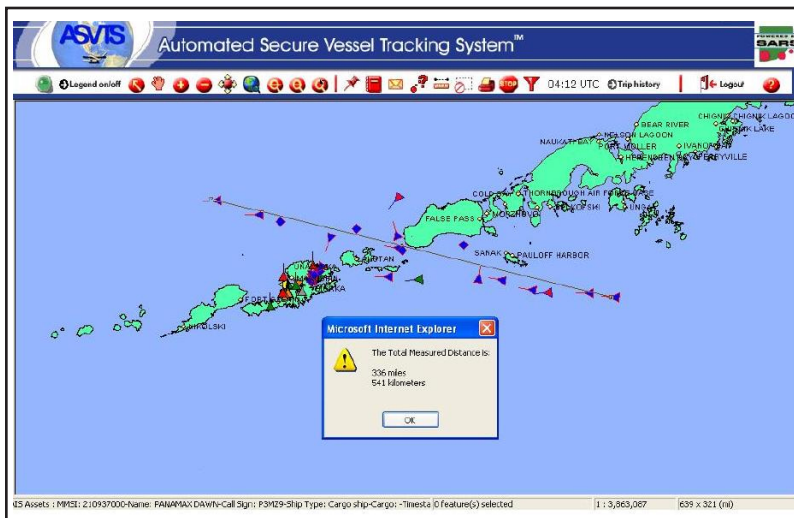


Figure 5. Trans-Pacific vessel traffic through Unimak Pass by vessel type.



AIS data also reveals that the North Pacific great circle route through Unimak Pass is used primarily by vessels traveling west from North America to ports on the East Asia coast (See Figure 6). Moreover, vessels departing from southwest ports in North America often use Unimak Pass. AIS data shows that 17% of the vessels transiting Unimak Pass were sailing from California.

Figure 6: A 'snapshot' of vessel traffic detected by the AIS receiver at Unimak Pass. Note that most vessels are heading west.



There is also a more southern great circle route across the North Pacific, as seen in Figure 2. This route passes south of the Aleutians and is generally used for voyages from East Asia to North America. Thus, deep draft commercial ships on trans-Pacific voyages generally follow a counterclockwise trade route from North America through the Aleutians to Asia, then back to North America along routes south of the Aleutians. These trade routes take advantage of the counterclockwise ocean currents in the North Pacific. As a note of interest, the *Selendang Ayu* had just cleared Unimak Pass enroute to Dalian, China from Seattle when it lost power, eventually blowing aground and breaking up. The *Cougar Ace* was enroute to Vancouver from Tokyo on the southern great circle route outside of US/Alaska waters when the motor vehicle carrier suffered a catastrophic loss of stability.

The data obtained from AIS does not provide the fuel capacity of the vessels transiting Unimak Pass, nor does Lloyd's Register. We believe the best indicator of fuel capacity by vessel type can be estimated from the ADEC database of 1608 vessels that have received an Alaska Certificate of Financial Responsibility (See Table 1). Using the AIS data from Unimak Pass collected over nine months and the information on fuel oil capacity by ship type from the ADEC database, the profile for 92% of the ocean-going vessels on international trade passing through the Aleutians on great circle voyages can be characterized as follows:

- Approximately 1,200 container ships (39% of total) per year with a median fuel capacity of 1.6 million gallons of persistent fuel oil;
- As many as 1,300 bulk and general freight ships (41% of total) with a median fuel capacity of approximately 470,000 gallons of mostly persistent fuel oil,
- About 265 motor vehicle carriers per year (8.5% of total) with an estimated average fuel capacity of 500,000 gallons of persistent fuel oil¹⁷;
- About 110 reefer (refrigerated) cargo ships (3.5% of total) with a median fuel oil capacity of 317,000 gallons of mostly persistent fuel oil.

Given the fuel consumption required to reach the Aleutians from an East Asia or North America port, vessels traveling through the Aleutians will carry at least 100,000 to 200,000 gallons less fuel than maximum capacity.¹⁸

The remaining 8% of the vessels transiting Unimak Pass consist of tank vessels, passenger ships, towing vessels, and other miscellaneous ships. These vessels include 20 to 22 tankers per year, transporting about 400 million gallons of oil.

The North Pacific great circle route intersects the Aleutian archipelago at both Unimak Pass and the western Aleutians.¹⁹ 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.²⁰ 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.²¹

17 The ADEC database does not list motor vehicle carriers as a ship type. We assume these vessels have a fuel oil capacity within the range of bulk and freight carriers. As a point of interest, the motor vehicle carrier Cougar Ace was reported to be carrying 34,000 gallons of diesel and 120,000 gallons of heavy fuel oil (154,000 gallons total) at the time of its casualty south of the Aleutians on July 23, 2006.

18 An earlier analysis conducted in 2005 before the Unimak Pass AIS was installed estimated trans-Pacific transits through the Aleutians indirectly using data provided by the Puget Sound Marine Exchange that indicated the number, type and last port call of ships entering Washington. That analysis has been removed from this updated report. However, the Puget Sound Marine Exchange provided information regarding the quantity of fuel or bunkers received. On average, a vessel loaded 490,000 gallons of heavy, persistent fuel oil which we believe is an indication of fuel consumption on trans-Pacific voyages.

19 Generally, ships pass through the Aleutian Chain at Unimak Pass and at a point west of longitude 178.5° W and Tanaga Island.

20 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.

21 <http://alaskamaritime.fws.gov/index.htm>.

Vessel Traffic Calling in the Aleutians Subarea

Figure 7 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,
- Sand Point, and
- Tanaga.

The U.S. 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 (not counting fishing trawlers, catchers and processors) were made by three vessel types: container ships (38%), reefers (29%), and tug/barges (27%). Figure 8 shows the distribution of the Unalaska/Dutch Harbor port calls by month and vessel type. During both 2004 and 2005, calls peaked in July 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 (Table 3).²²

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

Month	Vessel Type						Total
	Container Ship	Reefer/Bulk	Tug & Tow	Research Vessel	Cruise Ship	Tank Ship	
Jan	8	15	7				30
Feb	11	11	5				27
Mar	14	11	10			1	36
Apr	12	7	9				28
May	11	9	6				26
Jun	11	12	6	1	2	1	33
Jul	14	16	9	4	4		47
Aug	13	10	9	3	1	1	37
Sep	14	12	13		1		40
Oct	16	3	14	1			34
Nov	11	3	7				21
Dec	8	1	7			1	17
Total	143	110	102	9	8	4	376

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 shown in Table 3 represent almost all of the vessel traffic calling in the Aleutians Subarea.

²² While updating this report in July 2006 we examined all US Coast Guard notice of arrival information for Dutch Harbor and Unalaska from January 1, 2005 to July 15, 2006 and found port calls to be consistent with 2004.

Figure 7. Primary traffic routes of vessels calling at ports in the Aleutians Subarea.

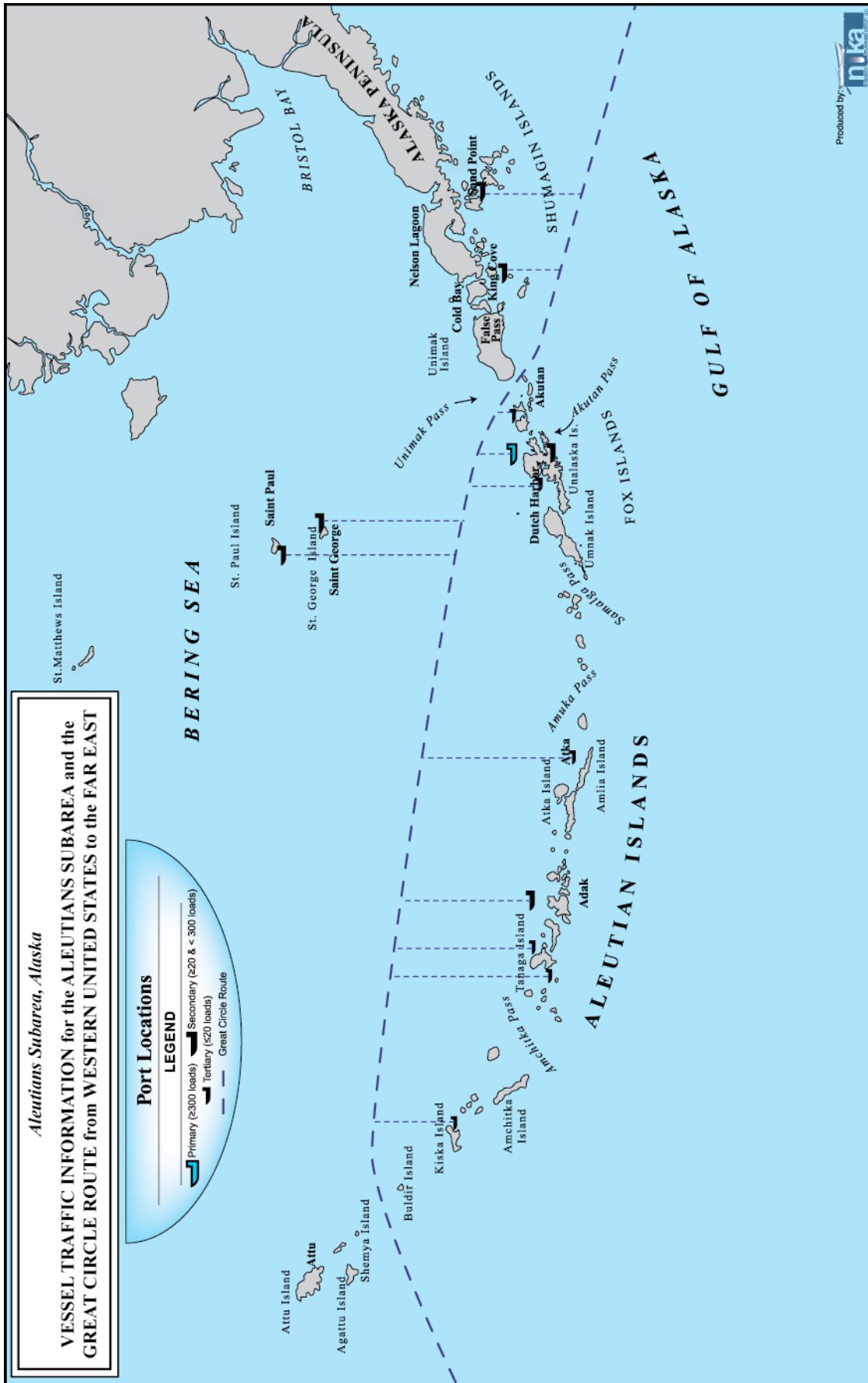
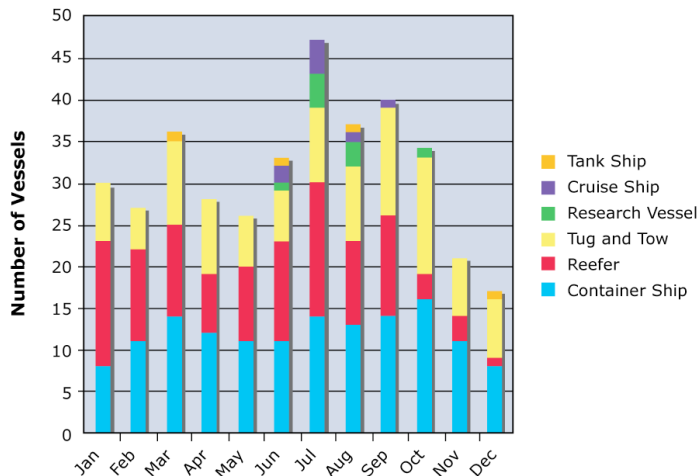


Figure 8. Port calls to Unalaska/Dutch Harbor by vessel type and month in 2004.



Source: U.S. Coast Guard SANS database.

NOTE: Port call information does not include fishing vessels.

The highest risks for environmental damage from oil spills are from vessels carrying persistent fuel.²³ Most vessels over 400 gross tons that call in Alaska are required to have a State contingency plan and a COFR. Table 1 and Figure 3 summarize information about vessels registered to trade in Alaska. Using this information, the estimate of fuel capacity for large vessels calling at Aleutian ports in 2004, 2005 and the first half of 2006 is:

- 130 container ships per year with a typical fuel capacity of 1.6 million gallons of persistent fuel oil each, and
- 108 reefer (refrigerated) cargo ships with a typical fuel oil capacity of 317,000 gallons of mostly persistent fuel oil.

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

TANKER AND TANK BARGE VESSEL TRAFFIC IN THE ALEUTIANS SUBAREA

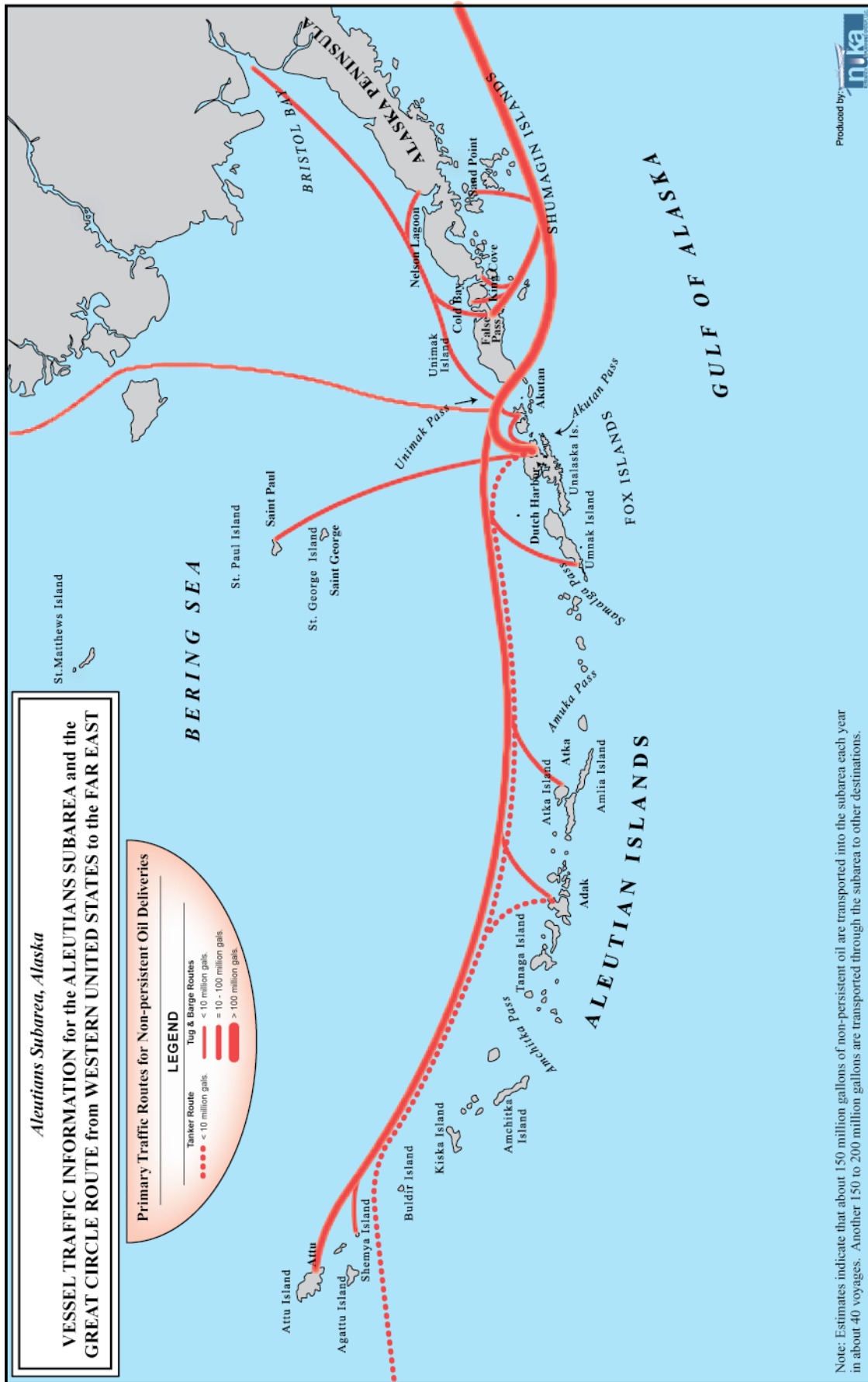
Tankers and tank barges towed by tugs do transit the Aleutians Subarea. Tugs and tank barges transport non-persistent oil into the subarea for fuel and heating oil. Non-persistent oil and persistent oil are transported through the subarea to other destinations.

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

Figure 9 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

²³ 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 several hours to several 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 9. Primary traffic routes of non-persistent oil deliveries in the Aleutians Subarea.



Note: Estimates indicate that about 150 million gallons of non-persistent oil are transported into the subarea each year in about 40 voyages. Another 150 to 200 million gallons are transported through the subarea to other destinations.

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 9 also shows the route of the tanker that delivers fuel and heating oil to Adak and Dutch Harbor from Russia.

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 either stays in the region or passes through to other Alaskan destinations. 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, 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

Interviews with the two largest tank barge companies providing non-persistent oil products provide another source of information.²⁴ The companies were asked about 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. Taking the median of the ranges would yield an estimate of 147 million gallons of non-persistent oil per year moved in about 41 voyages.

²⁴ Nuka Research, February 2005. Personal communications with Royal Harris, Crowley Marine Services, and Louis Audette, Seacoast Towing.

The port call data provided in Table 3 also indicates that four tanker calls were made to Dutch Harbor by a tank vessel in 2004. Coast Guard records for January 2005 through July 15, 2006 show this tanker making seven calls at Dutch Harbor. 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 Sakhalin Islands in Russia. Other smaller tank vessels also have approved contingency plans for the Aleutians Subarea and may trade there in the future.²⁵

About 150 million gallons per year of non-persistent oil moves into the Aleutians Subarea for 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 western Alaskan destinations. All of these oil movements are covered under State Oil Discharge Prevention and Contingency Plans.

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

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.²⁶ However, oil imported or exported from Cook Inlet is not banned from the North Pacific great circle route. Tesoro Alaska indicated that they discourage their chartered tank vessels from using the North Pacific great circle route, but they do not prohibit it.²⁷ In fact, the AIS receiver at Unimak Pass detected no tank ships coming from Cook Inlet.

From October 2005 through June 2006 the Unimak Pass AIS receiver detected five tankers (classified as crude oil carriers) and eight product tanker transits. All but one were proceeding west from North America. At least one of the crude oil tankers was in "ballast" and thus did not have oil cargo aboard. We assume that the crude oil tankers, based on destination and origin, were carrying heavy residual refined product and that the product tankers were carrying lighter refined products. If this traffic pattern is typical for the entire year, then approximately 15 refined product tankers pass through the Aleutians on great circle voyages annually, transporting about 180 million gallons of non-persistent oil products. Also there are approximately 7 crude oil tankers passing through the Aleutians on great circle voyages annually, transporting about 225 million gallons of persistent oil products. However, this analysis does not take into consideration that some of the tankers may be in ballast.

FISHING VESSEL TRAFFIC IN THE ALEUTIANS SUBAREA

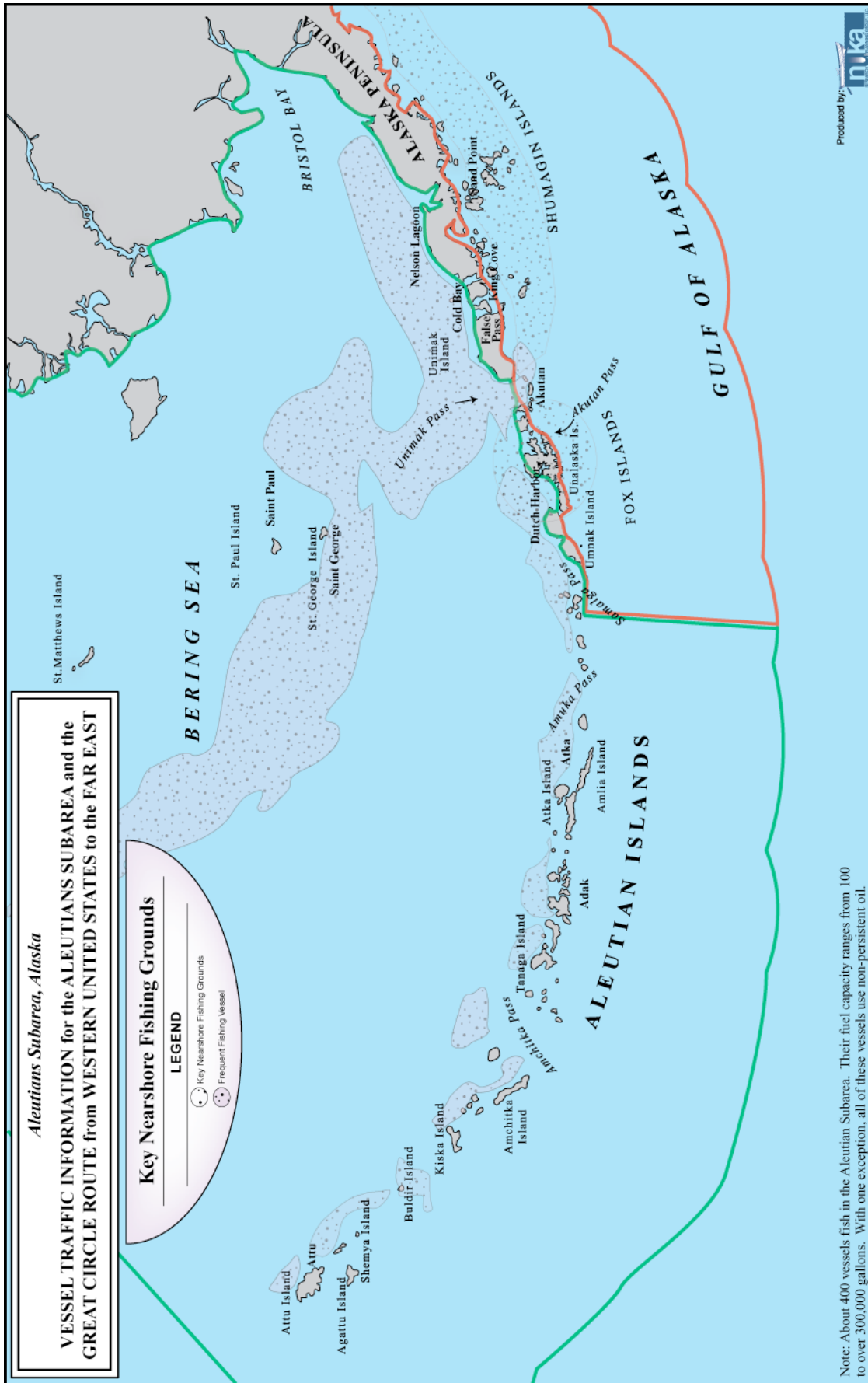
Figure 10 shows the primary fishing grounds in the Aleutians Subarea.

25 Nuka Research. February 2005. Personal communication with Bob Flint, ADEC, SPAR, IPP, Marine Vessels Section.

26 15 CFR 754.2(j).

27 Nuka Research. February 2005. Personal communication with Bob Flint, ADEC, SPAR, IPP, Marine Vessels Section.

Figure 10. 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. The major crab fisheries occur in the BSA area. Appendix A 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 NMFS groundfish observer database and the 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 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.²⁸

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 vessel tonnage in the database revealed 61 (22%) of the groundfish fleet are greater than 400 gross tons and are required to hold a Nontank Vessel Oil Discharge Prevention and Contingency Plan with the ADEC.²⁹

²⁸ Hiatt, T. et. al. 2004.

²⁹ Gross tonnage data was not available for 15 of the vessels in the database.

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

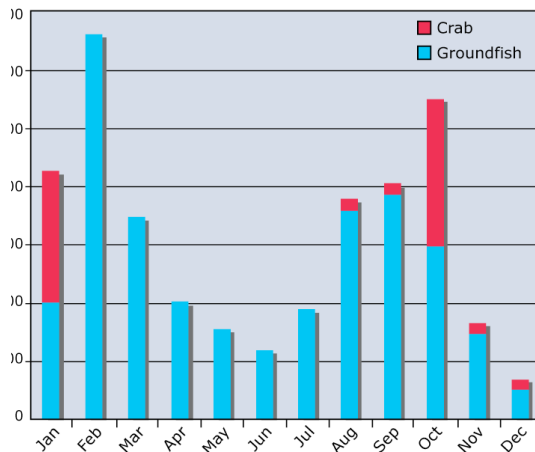
Length Category (feet)	Number of Vessels	Average Gross Tonnage	Median Fuel Capacity (gallons)	Fuel Type
<75	38	70	5,000	Diesel
75 - 124	149	189	20,000	Diesel
125 - 174	52	400	55,000	Diesel
175 - 224	19	943	72,000	Diesel
225 - 274	9	2,407	175,000	Diesel
275 - 324	7	3,000	204,000	Diesel
325 - 374	7	4,475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

Source: National Marine Fisheries Service observer database and the State Limited Entry Commission fishing vessel 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 11 uses information from the NMFS groundfish observers database and the 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 11. Estimated fishing vessel effort in the Aleutians Subarea by month in 2004.



Source: National Marine Fisheries 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 12 shows the routes of cruise ships and the Alaska Marine Highway ferry in the Aleutians Subarea. Table 6 shows which passenger vessels operated in the Aleutians Subarea in 2005.

Figure 12. Cruise ship and ferry routes in the Aleutians Subarea.

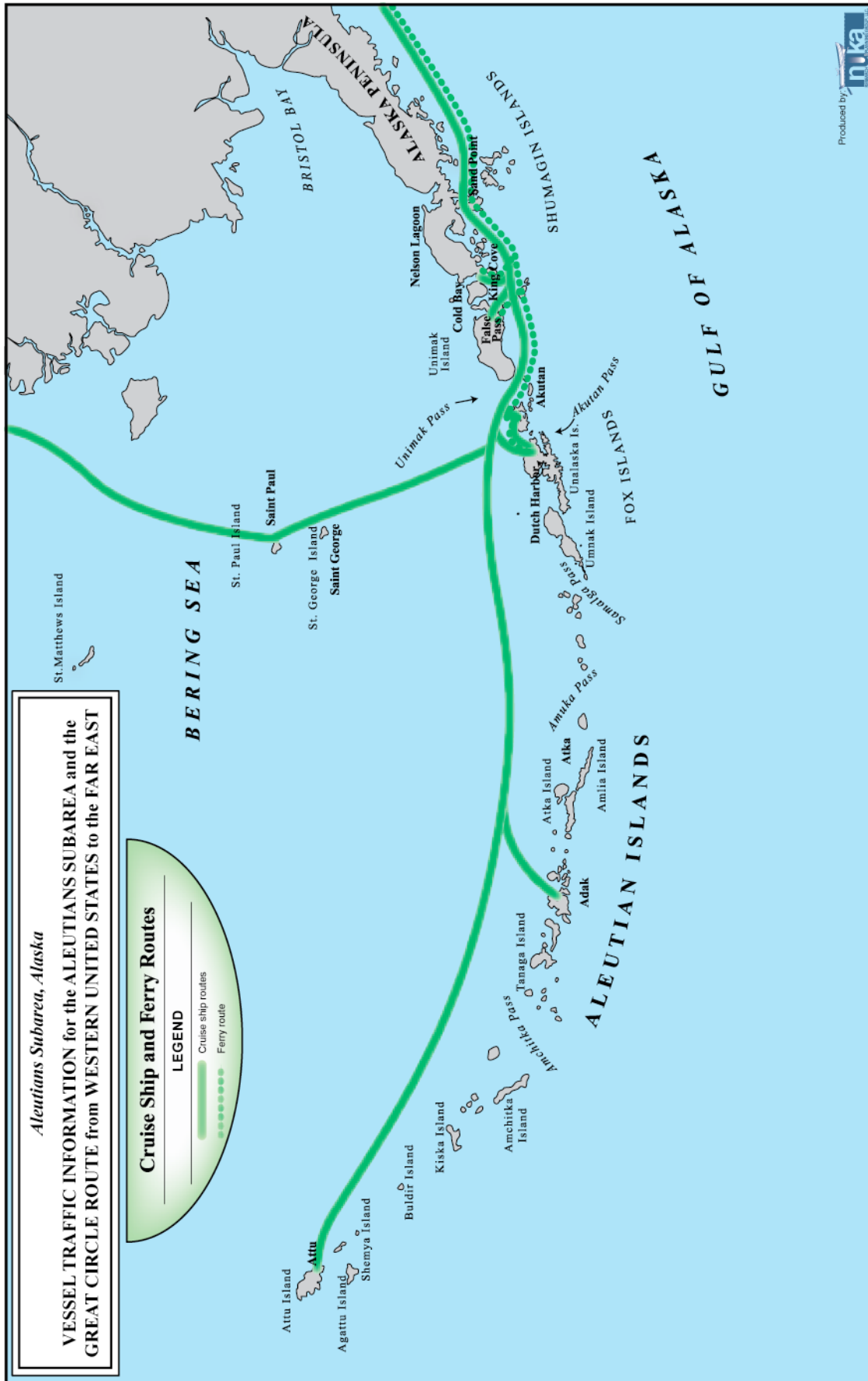


Table 6. Passenger Vessels intending to operate in the Aleutians Subarea in 2005.

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,*
Tustumena	11	67,000 gal. non-persistent fuel capacity.**

*Northwest Cruise Ship Association. **Alaska Marine Highway System.

In 2005 and 2006, four large cruise ships called at Dutch Harbor during their 'positioning voyages'³⁰ each year. The small cruise ship Clipper Odyssey made one cruise to the Aleutians and the Spirit of Oceanus made six Aleutian voyages in 2006. 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 each year from May through September. In 2006, during these months, the Tustumena made eleven round trips through the Eastern Aleutians stopping at Dutch Harbor, Akutan, Cold Bay, False Pass, King Cove, Sand Point, Chignik, Port Lions, and Kodiak.

Overall, passenger vessels are a minor component of the vessel traffic in the Aleutians Subarea. Only 3 to 4 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 13 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.

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 200 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.

³⁰ A positioning voyage moves a cruise ship from one seasonal operating area to another.

Figure 13. Tug boat routes in the Aleutians Subarea.

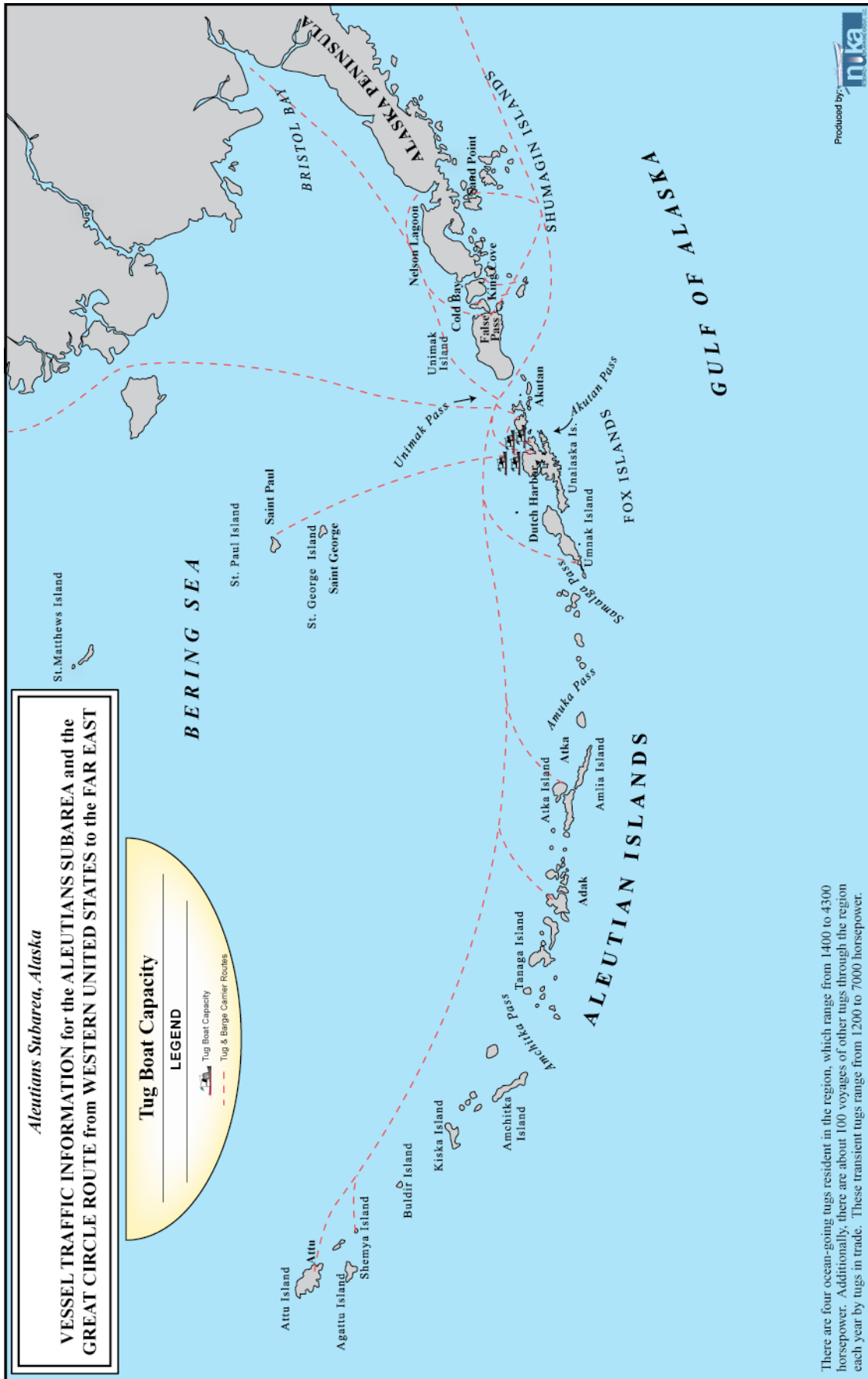


Table 7. Known tug traffic in the Aleutians Subarea by vessel, port, number of trips per year and horsepower.

Vessel Name	Resident/Transient	Estimated trips per year	Length (ft)	Horsepower
Fidalgo ¹ (Seacoast)	R – Based in Unalaska		75	1400
Gyrfalcon (Olympic T&B)	R – Unalaska		105	4000
James Dunlap (Dunlap)	R – Unalaska		100	4300
Saratoga ² (Dunlap)	R – Unalaska		65	750
Noatak (Delta Western, managed by SeaCoast)	R - Unalaska		70	800
Drew Foss (Samson)	T	10	120	3000
Gale Wind ¹ (Contracted to Northland by Anderson Tug and Barge)	T	25	90	2900
Hercules (Northland)	T	15	80	1800
Invader Class (Crowley)	T	12	136	10000
Jene Dunlap (Contracted to Northland by Dunlap)	T	12	120	3400
Pacific Raven (Seacoast)	T	8	110	3000
Manfred (Contracted to Northland by Dunlap)	T	2	138	4000
Mike O’Leary (Contracted to Northland by Dunlap)	T	8	~100	2400
Paragon (Seacoast)	T	26	110	3000
Polar Ranger (Contracted to Northland by Dunlap)	T	12	~100	5000
Redoubt (Cook Inlet Marine)	T	12	75	1250
Samson Mariner (Samson)	T	25	90	3000
Sea Viking (Contracted to Northland by Crowley)	T	8	~100	5000
Seneca (Crowley)	T	6	120	2000
Sidney Foss (Samson)	T	10	120	3000
Snohomish (Contracted to Northland by Dunlap)	T	4	110	3400
Victory Class (Crowley)	T	by contract	150	10000

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.

Vessel Accidents/Casualties and Oil Spills in the Aleutians Subarea

Shipwrecks

Appendix B 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.³¹ Casualties include: groundings; loss of main propulsion; primary steering or reduction in maneuverability;

³¹ 46 CFR 4.05-1

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 14,700 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 August 1, 2006.

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 5,922. Table 8 summarizes 486 of those casualties (8.2% of the total Alaska reports) which occurred in the Aleutians Subarea.³² About 90% of the US vessel casualties in the Aleutians were commercial fishing vessels.

Table 8. Number and types of US vessel casualties affecting seaworthiness reported in the Aleutians Subarea between June 22, 1990 and August 1, 2006.

Accident or Event in Aleutians Subarea	Number	Comments
Abandonment	5	One vessel sustained 2 million dollars damage.
Allision (collision with fixed structure)	11	
Capsizing	2	Fishing vessels
Collision between vessels	31	Two involved oil barges under tow.
Explosion	2	Fishing vessels
Fire	72	Fire and spill from F/V All Alaskan resulted in 25 million dollars damage. 35 fires involved damage in excess of \$25,000 with 6 of those in excess of 5 million dollars.
Flooding	41	12 resulted in more than \$25,000 damage.
Grounding	76	14 resulted in more than \$25,000 damage.
Loss of Electric Power	22	
Loss of Stability	1	
Material Failure	44	10 resulted in more than \$25,000 damage.
Sinking	22	Two vessels presumed lost.
Loss of Maneuverability	157	20 resulted in more than \$25,000 damage.
Total, Aleutians Subarea	486	
Total, Alaska waters	5,922	

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

³² These investigations were not recorded by subarea, but by latitude and longitude.

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 August 1, 2006, the US Coast Guard MISLE database contained 381 investigations of foreign vessel casualties³³ in Alaska.

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 affect the overall safe navigation of the vessel, and reduced total number of applicable Alaska reports to 209. 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 209 casualties affecting seaworthiness of foreign vessels while operating in Alaskan waters, Table 9 summarizes the 48 casualties reported in the Aleutians³⁴ (23% of the 209 total Alaska foreign vessel casualty reports). The spatial distribution of these casualties are presented in Figure 14 and detailed in Appendix C.

Table 9. Foreign Vessel Casualties Affecting Seaworthiness Reported to the US Coast Guard between September 12, 1991 and August 1, 2006.

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	3	
Flooding	1	
Grounding	9	Two groundings resulted in an oil spill. One grounding reported flooding and an oil spill.
Loss of Maneuverability	17	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 or the M/V Cougar Ace in 2006.
Material Failure	3	One vessel sank and spilled oil, likely due to hull failure or deterioration of through-hull fittings
Total, Aleutians Subarea	48	
Total, Alaska waters	209	

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

³³ There were 480 vessel casualty records created. Ninety entries involved additional investigations of one of the 381 incidents reported (ex. spill, loss of maneuverability, and grounding for one casualty).

³⁴ These investigations were not recorded by subarea, but by latitude and longitude, generally south of 57° 20' N and west of longitude 156° W.

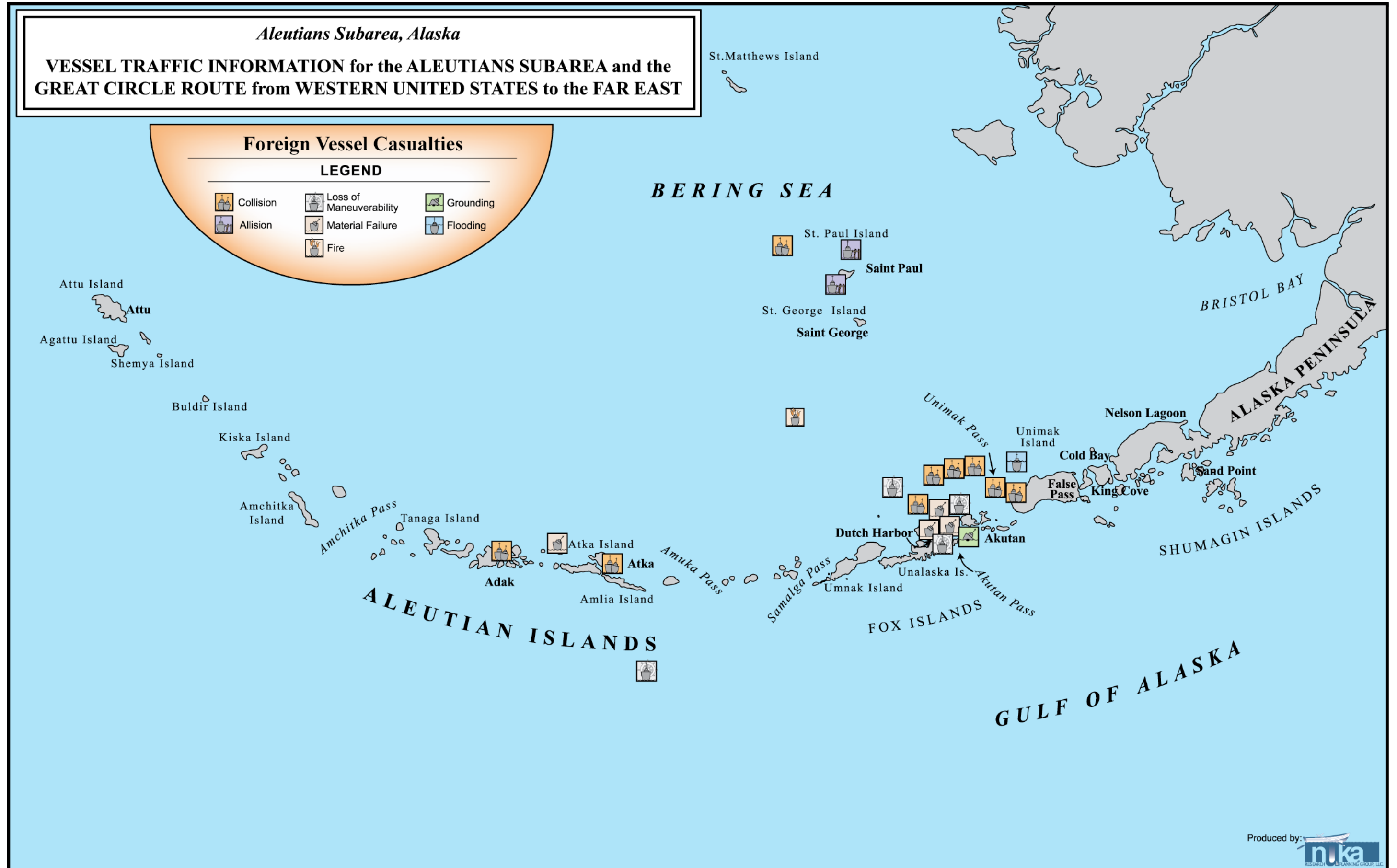


Figure 14. Foreign vessel casualties in the Aleutians Subarea.

Loss of maneuverability was the first-event in 17 (35%) of the 48 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-state³⁵ and classification society.³⁶ 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.

Spills and Potential Spills

Oil spills into Alaska waters must be reported to the US Coast Guard and the ADEC. ADEC's spills database goes back to 1995 and includes information about the potential spill size as well as the amount actually released. The NOAA Scientific Support Coordinator for the Alaska Region compiled a dataset of spills in the Aleutians going back to 1981. These data sources were used to produce Figure 15, which contains a map and list of marine vessel spills or potential spills that exceeded 1,000 gallons.

Forty-three spill events were identified and plotted. The actual amount of oil reported spilled from marine vessels was 972,343 gallons, of which 371,852 gallons was persistent oil (38%) and 600,491 was non-persistent oil (62%). Fifty percent of non-persistent oil spills were less than 3,000 gallons, yet these spills accounted for less than one percent of the total volume of non-persistent oil spilled. Twelve percent of the non-persistent spills were larger than 34,000 gallons, but these spills accounted for 66 percent of the volume of non-persistent oil spilled. Ninety-three percent of the persistent oil spills were less than 3,000 gallons, but these spills accounted for only one percent of the total persistent oil spilled. Only 7 percent of the persistent oil spills were greater than 34,000 gallons, but these spills accounted for 99 percent of the volume of persistent oil spilled.³⁷

The potential oil that might have been spilled from the 43 spill events was 5.7 million gallons, of which 2.3 million was persistent and 3.4 million was non-persistent.

35 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.

36 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.

37 The 34,000 gallon cut-point was chosen arbitrarily, based on the distribution of the spill sizes.

Summary

Vessel tracking data provided by the automated identification system (AIS) receiver at Scotch Cap, Unimak Pass has allowed us to significantly revise and improve the original Aleutians Vessel Traffic Study published in April 2005. In addition we have increased our confidence in vessel profiles by type (container, bulk cargo, etc.) by expanding the number of vessels used to develop this profile. However, this is not an exact vessel traffic study and our estimations have some limitations. No single data set contains all the current information needed regarding number, type, size, and fuel capacity or casualty history for vessels transiting the Aleutians Subarea. Information gathered from the many sources used in this report is presented in various forms that are not always comparable. For example, the U.S. 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 limitations, it is possible to make some summary statements about Aleutian vessel traffic.

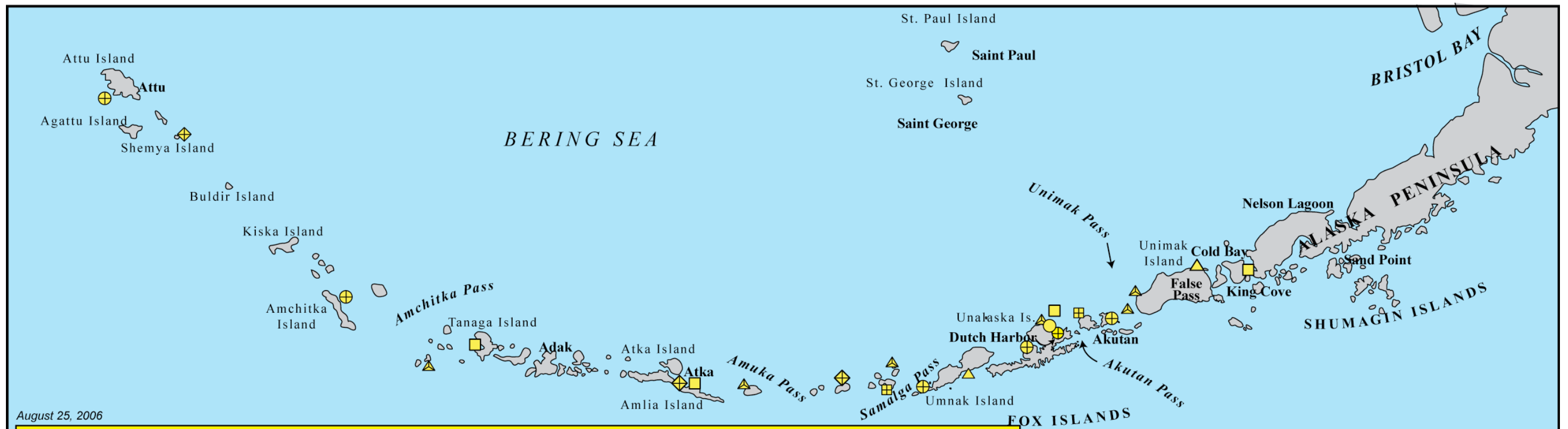
Figure 16 shows a combination of many vessel traffic elements presented in the other figures. Clearly, a wide variety and large number of vessels transit the Aleutians Subarea. We estimate that over 3,100 ships pass through the Aleutians each year on trans-Pacific voyages. Over a third of these transits are by container ships with a typical fuel capacity of 1.6 million gallons of fuel oil. Over 40% are bulk and general freight ships with a median fuel capacity of 470,000 gallons or a capacity similar to the amount of fuel carried by the Selendang Ayu when it broke apart in December 2004. The predominant fuel type in these large vessels is persistent fuel oil, which represents a significant environmental threat if spilled. Few tank ships sail through the area, about 20 voyages a year, and some are in ballast.

About 400 Aleutian port calls are made by ships. About 130 of these port calls are container ships with a typical fuel capacity of 1.6 million gallons of persistent fuel oil. About 110 port calls are made by refrigerated (reefer) ships with a typical fuel capacity of about 320,000 gallons of mostly persistent fuel oil. 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 about 30,000 gallons and almost all carry non-persistent fuel.

There are four ocean-going tugs resident in the Aleutians and almost 200 tug voyages each year that transit the area with barges in tow.



August 25, 2006

ALEUTIANS SUBAREA, ALASKA – Actual or Potential Vessel Spills (1,000 gallons or more) from 1981-2006

Spill Date	Spill Name	Type	Quantity in Gals.	Potential in Gals.	Spill Date	Spill Name	Type	Quantity in Gals.	Potential in Gals.
3/00/1981	Attu Island - M/V Dae Rim	Diesel	110,000	110,000	7/00/1994	Unimak Pass - F/V All Alaskan	Diesel	10,000	136,000
1/00/1986	Island of Four Mtns. - M/V Global Sunshine	Fuel Oil #5		300,000			Lube Oil		10,000
01/00/1987	Unimak Island - M/V Tempest	Fuel Oil #6					Hydraulic Oil		440
5/00/1987	Uliaga Is - F/V Tae Wong	Diesel	105,000	105,000			Gasoline		110
3/00/1987	Ulak Island - F/V Birgit	Diesel	12,000	18,000	01/00/1995	Eider Pt., Unalaska Is. - F/V Komsomolskaya	Diesel		>100,000
2/00/1988	Yunalaska Island - F/V Captain Billy	Diesel	16,000	16,000	7/22/1995	Seguam Island - F/V Northern Wind	Diesel	20- 25,000	60,000
12/00/1988	Shemya Island - F/V Opty	Diesel	15,000	16,000	06/00/1996	Yunaska Island - F/V Provider	Diesel		12,700
		Hydraulic Oil	1,000	1,000	10/24/1996	Tanaga Island - F/V Rebecca B.	Diesel	1,000	1,500
		Lube Oil	400	400	12/00/1996	70 mi. S of Atka & Amilia Is. - M/V Baneasa	Diesel		176,400
12/00/1988	Akun Island - M/V Aoyagi Maru	Diesel	32,000	32,000			Bunker C		33,600
		Bunker C		78,000	2/00/1997	Akun Island - F/V Lisa Jo	Diesel	1,200	1,200
		Lube Oil		3,250	11/26/1997	Unalaska/Summer Bay - M/V Kuroshima	Bunker	47,000	116,000
11/00/1988	Atka Island - F/V City of Seattle	Diesel	12,000	12,000	02/00/1998	90 mi. SW of Adak Is. - M/V Hekabe	Bunker C		430,000
2/1/1988	Nikolski - F/V Alaska Star	Diesel	36,000	36,000			Diesel		100,000
2/00/1989	Dutch Harbor - M/V Swallow	Diesel	30,000	30,000			Lube Oil		26,815
		Bunker C	<1,000	65,000	02/00/1999	Dutch Harbor - M/V Hekifu	Diesel		20,580
		Lube Oil		3,000			Bunker C		117,600
10/00/1989	Chuginadak Island - F/V Polar Command	Diesel	5,000	42,000			Lube Oil		5,292
		Lube Oil		1,100	5/0/1999	Cold Bay - M/V Redfin	Diesel	75	100,000
1/00/1989	Unalaska Island - M/V Chil Bo San	Diesel	61,000	65,000	5/8/1999	Unamak Island - F/V Controller Bay	Diesel	6,500	6,500
		Lube Oil	500	4,565			Hydraulic Fluid	600	600
1/00/1989	Amchitka Island - T/B Foss 256	Diesel	84,000	1,800,000			Lube Oil	250	250
4/00/1991	Captain's Bay, Unalaska Island - M/V PWS	Diesel		135,000	02/00/2000	Unimak Island - F/V American Star	Diesel		25,500
8/00/1991	Offshore Dutch Harbor - M/V Sea Jade	Diesel		45,435			Lube Oil		1,000
		IFO		276,500	5/11/2001	Cold Bay - F/V Kristen	Diesel	3,000	
8/00/1991	Atka Island - F/V Greenhope	Diesel	3,000		12/8/2004	Unalaska Island - M/V Selendang Ayu	IFO	321,052	446,280
2/00/1991	Unalaska, Reese Bay - F/V Skagit Eagle	Diesel	10,000	18,000			Diesel	14,680	31,573
		Hydraulic Oil		400	2/22/2005	M/V Bowfin	Diesel	15	5,000
		Lube Oil		200	2/05/2006	Dutch Harbor - M/V Lilli Ann	Diesel	20	45,000
10/00/1991	Simeonof Island - M/V Hyundai #12	IFO-180		174,000	2/23/2006	Unalaska Island - F/V Northern Dawn	Diesel	1,000	1,200
		Diesel		21,000	3/31/2006	M/V Blue North	Diesel		33,000
11/00/1991	Unimak Island - F/V Sunset Bay	Diesel		30,000	4/25/2006	False Pass - F/V Western Dawn	Diesel	1	1,300
3/00/1992	Captain's Bay, Unalaska Island - M/V Venture Luna	IFO	<50	7,000	7/23/2006	South of Atka Island - M/V Cougar Ace	Diesel		34,182
4/00/1993	Umnak Is - F/V Phoenix	Diesel	7,000	7,000			IFO		142,184

PACIFIC OCEAN

RISK SYMBOLS
Aleutian Subarea Spills & Potential Spills greater than 1,000 gallons from 1981-2006

- ⊕ - unknown spill size
- - 1,000 - 2,999 gals.
- ⊞ - 3,000 - 5,999 gals.
- ▲ - 6,000 - 8,999 gals.
- △ - 9,000 - 11,999 gals.
- ◇ - 12,000 - 14,999 gals.
- ⊕ - 15,000 - 17,999 gals.
- - 18,000 - 33,999 gals.
- ⊕ - 34,000 gals. or more

Produced by: nuka RESEARCH & PLANNING GROUP, LLC. contact@nukaresearch.com

Reference – Iwamoto, Larry. Alaska Department of Environmental Conservation Spill Data, Excel spreadsheet.
Reference – Whitney, John. 2000 The Aleutian Islands and Lower Alaska Peninsula: Oceanographic Conditions and NOAA's Oil Spill Response History during 1981-1999. HAZMAT Report 2000-3.

Figure 15. Actual or portential vessel spills in the Aleutians Subarea.

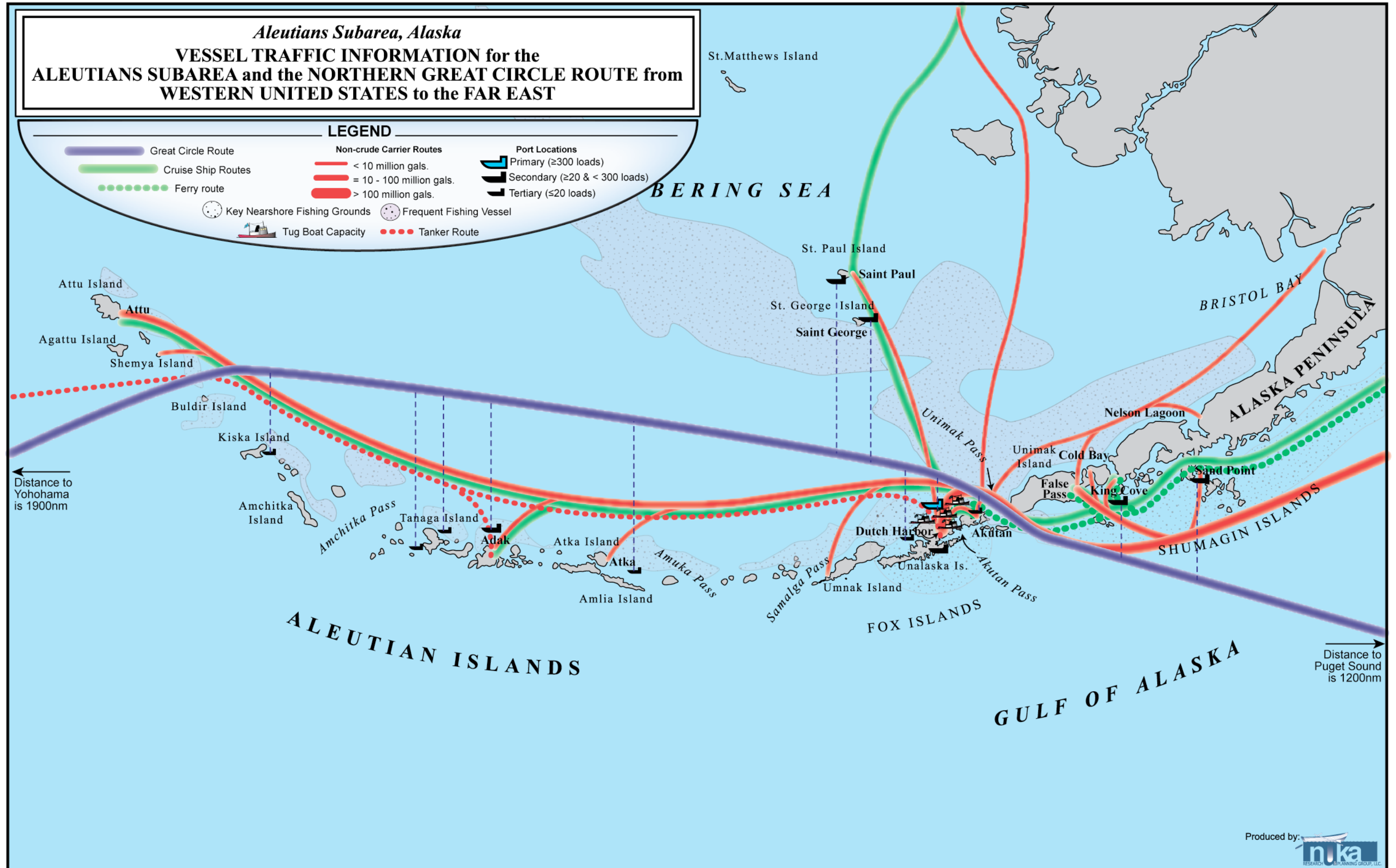


Figure 16. Combined vessel information for the Aleutians Subarea.

Four hundred and eighty-six (486) casualties affecting seaworthiness of US vessels were reported in the Aleutians from 1990 through July 2006. US vessels reporting casualties were usually smaller than foreign vessels and primarily fishing vessels.

Forty-eight (48) casualties affecting seaworthiness of foreign vessels were reported in the Aleutians from 1991 through July 2006. These reports included 17 loss of maneuverability incidents. We believe that foreign vessel casualties are under reported.

Data was assembled from 43 oil spill events that occurred between 1981 and 2006. These spills totaled almost one million gallons. Sixty-two percent of the amount spilled was non-persistent oil and 38 percent was persistent oil.

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 3,100 vessels transiting 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 unlike diesel fuel, will persist as floating or beached oil for days to months.

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;
- Categorize the fishing vessels operating in the Aleutians by relative risk. For example, fish processors are typically large, relatively under-powered, and operate for long periods close to shorelines.

This page left intentionally blank.

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). <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.

Whitney, J. The Aleutian Islands and Lower Alaska Peninsula: Oceanographic Conditions and NOAA's Oil Spill Response History during 1981-1999. HAZMAT Report 2000-3. September 2000.

Appendices

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

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

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

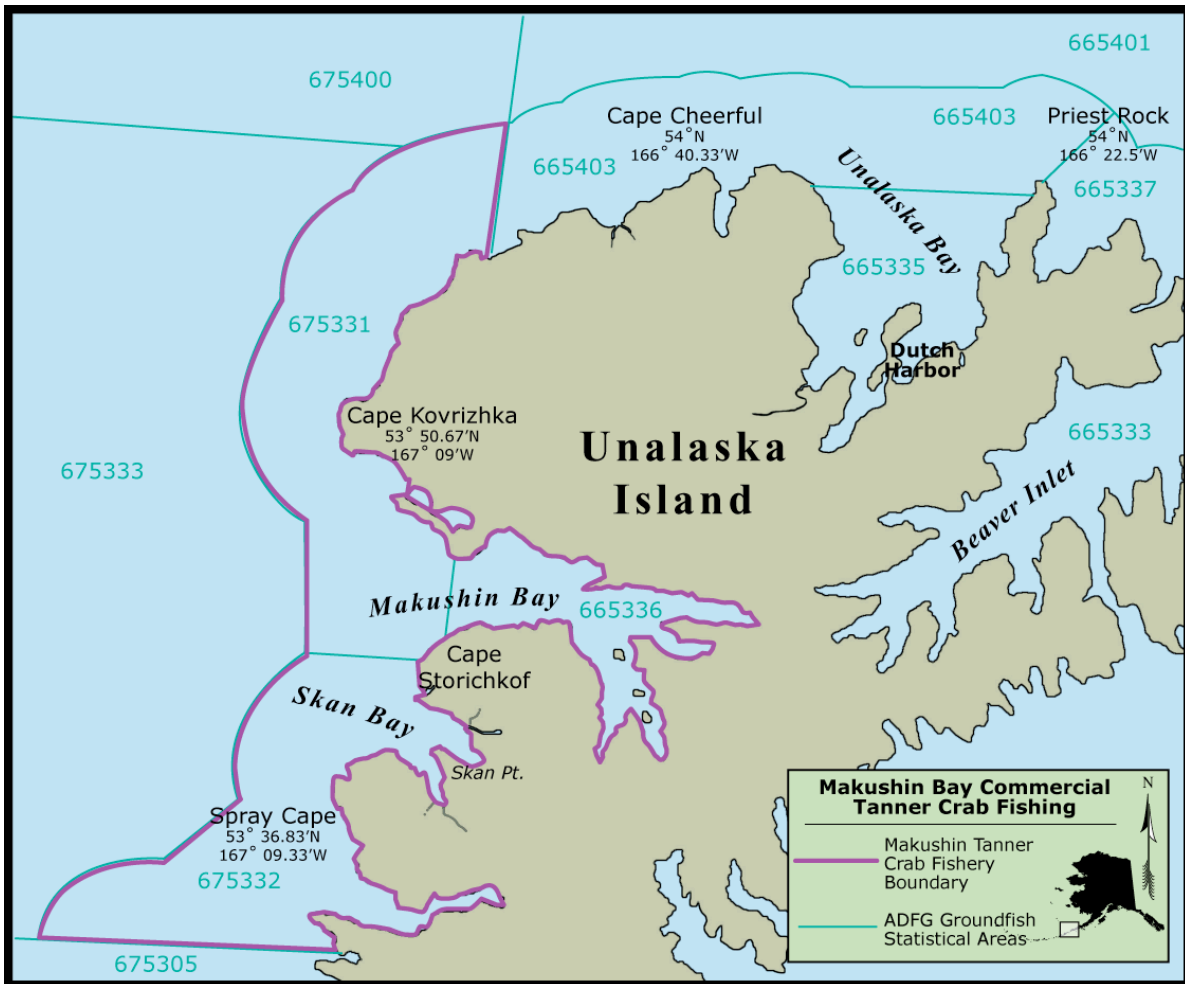
This page left intentionally blank.

Appendix A – 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.

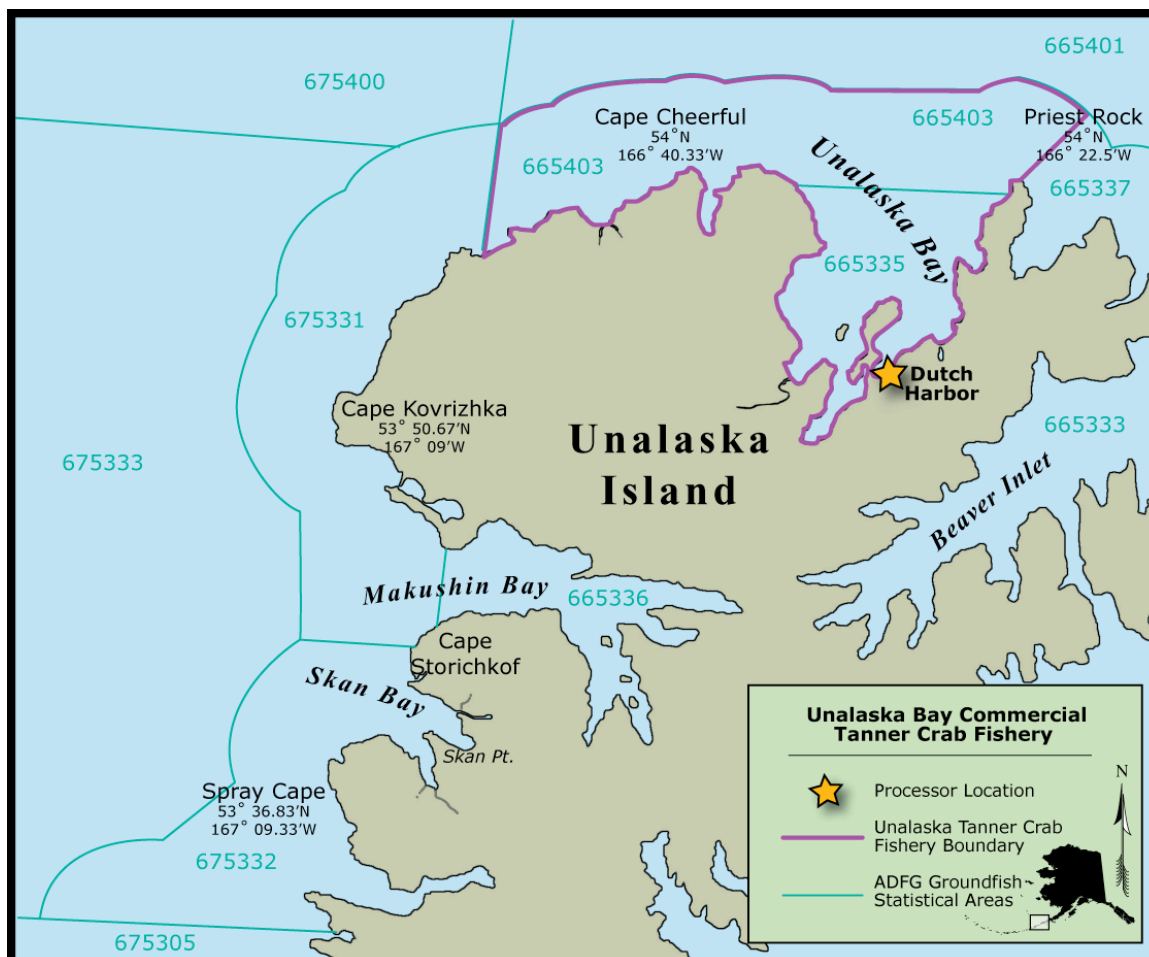
Makushin Tanner Crab Fishery



Fish Species	Tanner Crab {Chionoecetes bairdi}	Location of Fishery	Makushin ADFG statistical area 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	Quota was reached 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

For more information contact ADFG Commercial Fisheries Area Management Biologist, Forrest Bowers (907) 581-1239.

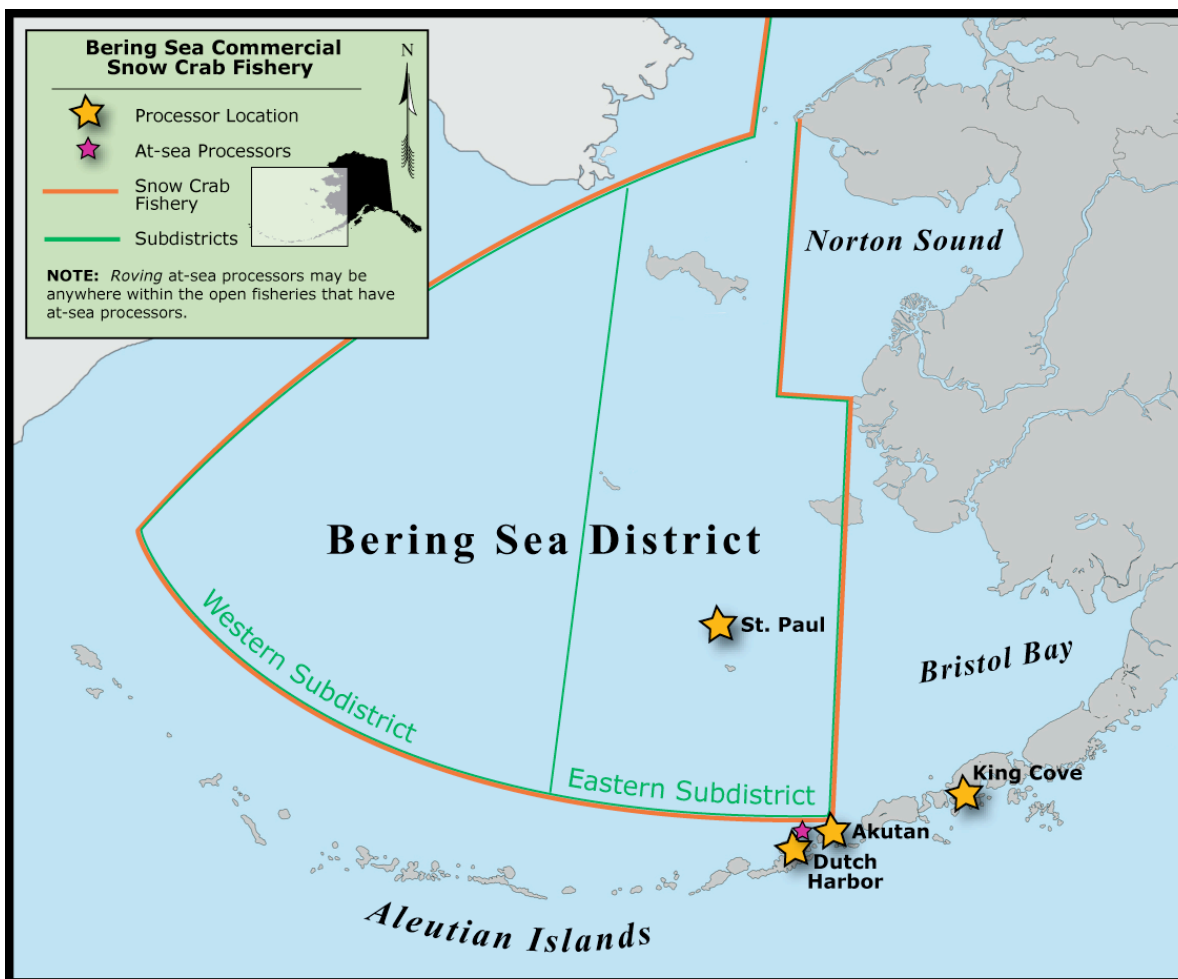
Unalaska Tanner Crab Fishery



Fish Species	Tanner Crab { <i>Chionoecetes bairdi</i> }	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).		

For more information contact ADFG Commercial Fisheries Area Management Biologist, Forrest Bowers (907) 581-1239.

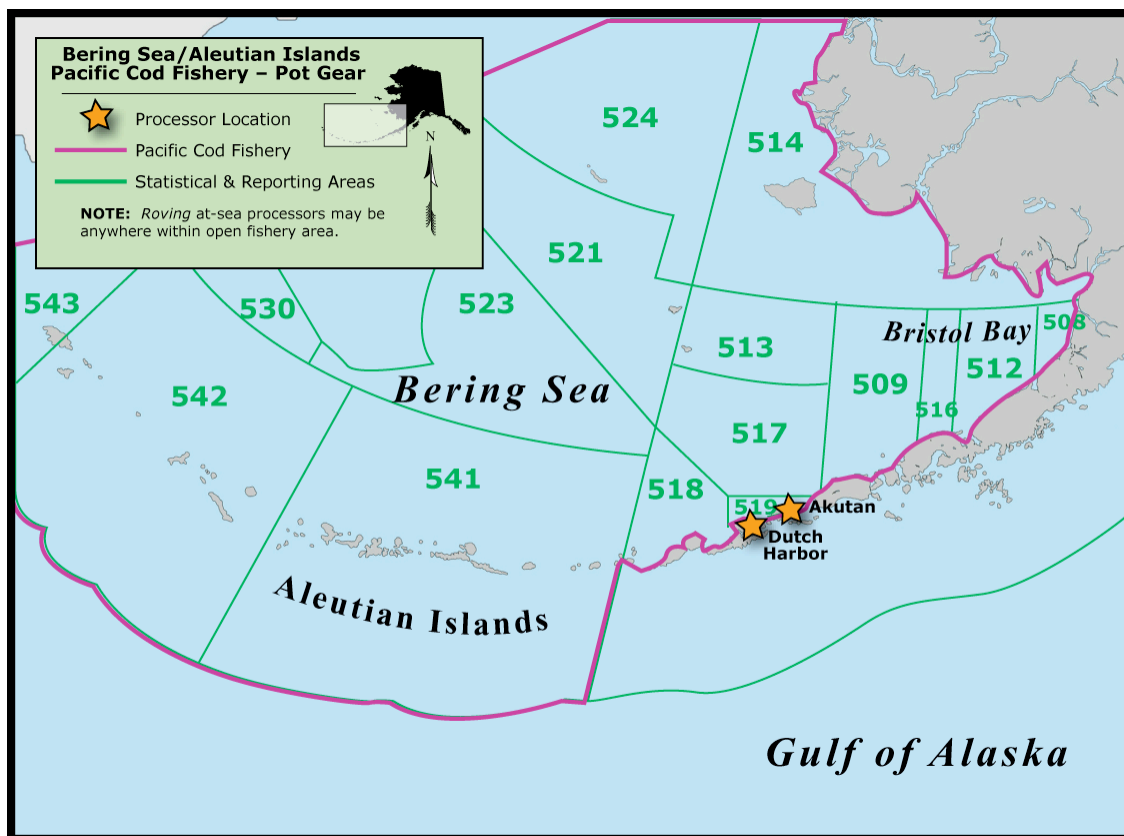
Bering Sea Snow Crab Fishery



Fish Species	<i>Chionoecetes opilio</i>	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.

For more information contact ADFG Commercial Fisheries Area Management Biologist, Forrest Bowers (907) 581-1239.

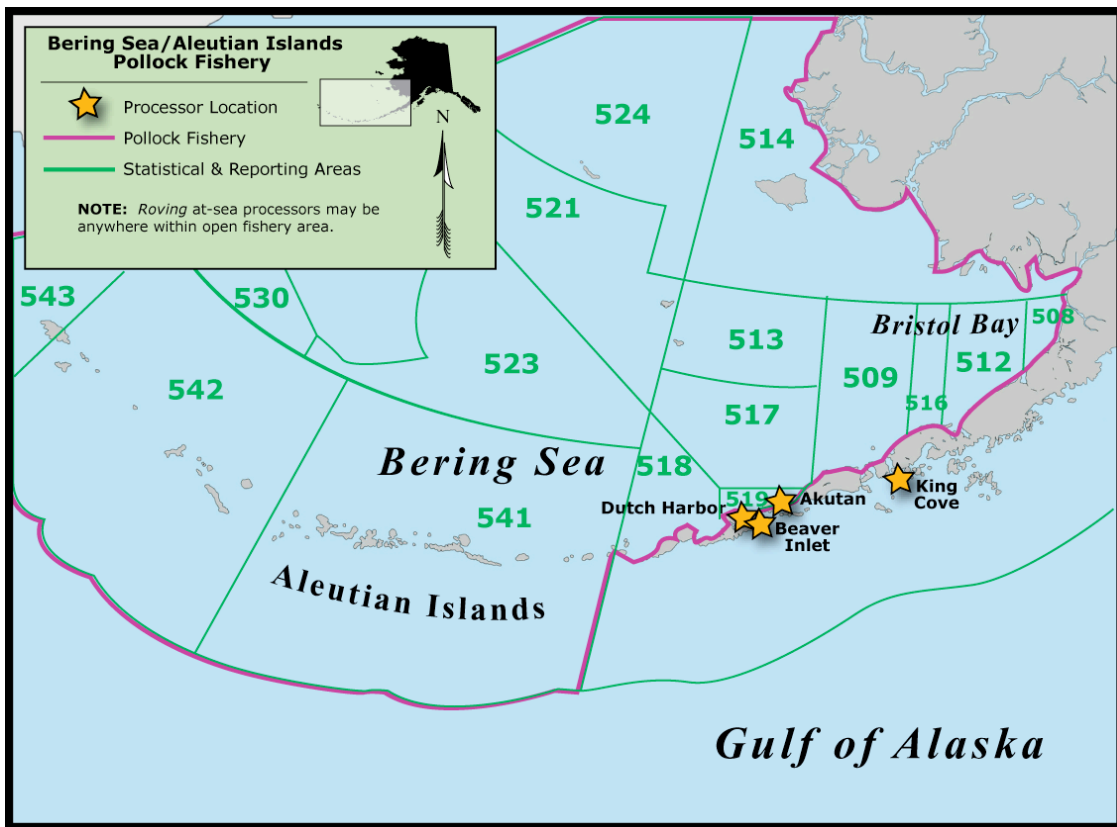
Bering Sea/Aleutians Pacific Cod Fishery – Pot Gear



Fish Species	<i>Gadus macrocephalus</i>	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/rm/ffpfp.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.

For more information contact NMFS Alaska Groundfish Management - Andy Smoker, (907) 586-7210 or Rance Morrison (907) 581-2062.

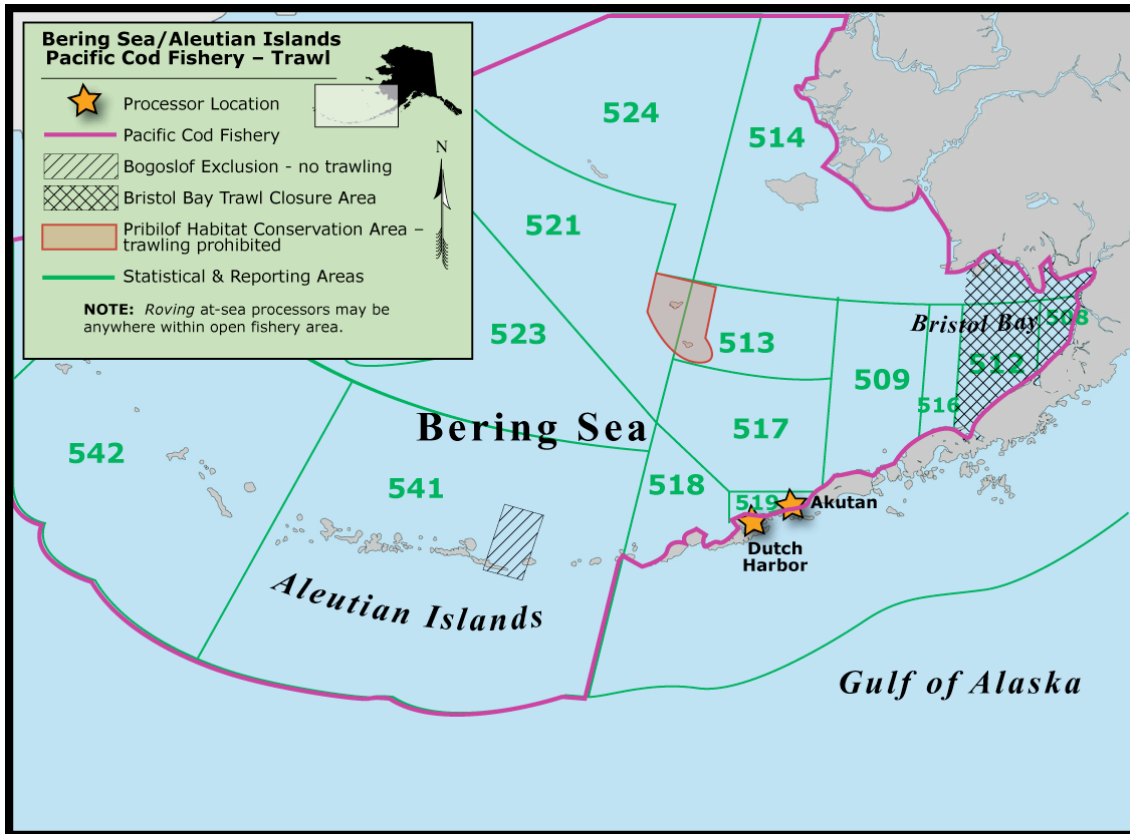
Bering Sea/Aleutian Islands Pollock Fishery “A Season”



Fish Species	<i>Theragra chalcogramma</i>	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/rm/ffofpp.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.		

For more information contact NMFS Alaska Groundfish Management - Andy Smoker, (907) 586-7210 or Rance Morrison (907) 581-2062.

Bering Sea/Aleutian Islands Pacific Cod Fishery - Trawl



Fish Species	<i>Gadus macrocephalus</i>	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/rm/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		

For more information contact NMFS Alaska Groundfish Management - Andy Smoker, (907) 586-7210 or Rance Morrison (907) 581-2062.

Appendix B - 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-site¹ 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 Mordvinof 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 C – Information on selected foreign vessel casualties in the Aleutians.

Incident Date	Involved Vessel Name	Initial Event	Secondary Events	Involved Vessel Service	Gross Tonnage	Length (ft.)	Vessel Age
2/16/96	CITRUS	Allision	Flooding, Material Failure, Spill	Freight Ship	3493.0	92.1	25
9/7/02	JACHA	Allision		Freight Ship	3264.0	281.4	20
1/25/96	MARLIN	Allision		Freight Ship	492.0		61
9/7/02	NO 1 POHAH	Allision		Freight Ship	4261.0	377.0	17
10/28/04	SOHOH	Allision		Freight Ship	4504.0	396.2	6
4/5/01	THORFRID	Allision		Freight Ship	5122.0	111.0	23
3/3/03	ARKONA TRADER	Collision		Freight Ship	23809.0	617.2	7
2/11/98	HANJIN BARCELONA	Collision	Material Failure	Freight Ship	51754.0	949.8	13
1/31/00	KHANA	Collision	Spill	Freight Ship	3475.0	311.6	17
12/21/92	MARLIN	Collision		Freight Ship	492.0		61
11/3/99	MONONOK	Collision		Freight Ship	4392.0	395.9	16
4/8/93	OCEANIC SUCCESS	Collision		Freight Ship	23275.0	590.6	14
1/29/00	SAMMI AURORA	Collision		Freight Ship	15015.0	559.7	27
2/6/99	SAVANNAH	Collision		Freight Ship	3253.0	85.1	23
8/28/93	SINGAPORE FONTAINE	Collision		Freight Ship	3260.0	85.7	23
10/25/92	SOTRUDNICHESTVO	Fire		CFV	7805.0	309.0	15
4/08/05	STAR EAGLE	Fire	Initial - contained	Freight Ship	24479.0	589.3	25
10/20/04	ARCTIC	Flooding		Freight Ship	0.0	0.0	
10/1/96	BANYO	Grounding		Freight Ship	5757.0	408.4	19
7/31/04	CLIPPER ODYSSEY	Grounding	Flooding, Spill	Passenger	5218.0	301.8	16
3/3/01	DALNEGORSK	Grounding		Freight Ship	5286.0	377.0	15
4/1/92	HAKKO FONTAINE	Grounding		Freight Ship	3261.0	85.7	23
2/19/99	HEKIFU	Grounding	Material Failure, Spill	Freight Ship	3401.0	309.9	18
1/17/95	KOMSOMOLSKAYA SMENA	Grounding		Freight Ship	2673.0	312.5	22
3/17/92	SKYLARK	Grounding	Spill	Freight Ship	3172.0	87.5	23
2/2/00	SUAH	Grounding		Freight Ship	2958.0	78.6	21
3/21/92	VENTURE LUNA	Grounding		Freight Ship	1246.0	0.0	
12/24/96	BANEASA	Loss of Maneuverability	Spill	Freight Ship	40955.0	833.0	21
3/14/99	DHARA	Loss of Maneuverability		Freight Ship	1599.0	78.0	22
1/31/00	DHARA	Loss of Maneuverability		Freight Ship	1599.0	78.0	22

Incident Date	Involved Vessel Name	Initial Event	Secondary Events	Involved Vessel Service	Gross Tonnage	Length (ft.)	Vessel Age
5/24/96	EVER WINNER	Loss of Maneuverability		Freight Ship	2340.0	80.9	22
5/19/96	EVER WINNER	Loss of Maneuverability		Freight Ship	2340.0	80.9	22
4/9/98	HOKUSHIN MARU	Loss of Maneuverability	Allision	Freight Ship	491.0	70.8	21
5/15/96	KOMSOMOLSKAYA SMENA	Loss of Maneuverability		Freight Ship	2673.0	312.5	22
11/27/97	KUROSHIMA	Loss of Maneuverability	Grounding, Flooding, Fatality, Material Failure, Spill	Freight Ship	4160.0	367.5	18
2/18/99	MABAH	Loss of Maneuverability		Freight Ship	4457.0	396.0	10
1/13/99	OHYOH	Loss of Maneuverability		Freight Ship	4790.0	387.0	19
3/7/96	PRESIDENT F.D. ROOSEVELT	Loss of Maneuverability		Freight Ship	36195.0	814.2	25
3/7/94	PRESIDENT KENNEDY	Loss of Maneuverability		Freight Ship	50205.0	867.4	17
8/21/97	TAISEI NO. 98	Loss of Maneuverability		Freight Ship	10670.0	144.0	29
3/11/99	TAISETSU	Loss of Maneuverability		Freight Ship	3281.0	92.2	19
9/26/01	TORAH	Loss of Maneuverability		Freight Ship	4212.0	355.8	17
2/19/95	ZERVOS	Loss of Maneuverability		Freight Ship	9095.0	489.9	24
1/28/05	DINOK	Material Failure	Vessel	Freight Ship	4392.0	392.3	17
11/3/99	OCEAN TEMPEST	Material Failure		CFV	185.0	143.6	38
10/24/96	PRINCE GEORGE	Material Failure	Sinking, Spill	Unclassified	5825.0	106.7	57
6/9/06	SARONIC PRIDE	Material Failure		Freight	4964.0	124.7	20

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

