Final Report

Analysis of U.S. Coast Guard Accident Data

A Document Prepared In Fulfillment of Milestone Number 1
of the U.S. Army Corps of Engineers' R&D Work Unit Entitled

Impacts of Navigation Trends on Channel Usage and Design

by
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U.S. Naval Academy
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Prepared for

Institute for Water Resources
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EXECUTIVE SUMMARY

This report describes an analysis of U.S. Coast Guard accident data performed in support of the Institute for Water Resources (IWR) study entitled, "Impacts of Navigation Trends on Channel Usage and Design." The IWR study is comprised of three interrelated components: (1) a safety performance review, (2) a channel design and maintenance assessment, and (3) a shipping trends analysis. This USCG accident data analysis was performed in order to provide information for the safety performance review component of the IWR study.

USCG accident data files were obtained and analyzed in order to assist in the safety performance review portion of the study, specifically identifying those ports whose incidents may be associated with the design and/or maintenance of their deep-draft navigation channels. The accident data statistics were therefore interpreted and analyzed with this emphasis in mind.

Data from all domestic USCG units from 1992 until 1998 are included in the analysis. Discussions of incident types, vessel types and causal factors are included. The incident types of particular interest to this study include allisions, collisions and groundings. The vessel types of most interest to this study were freight and tank ships, since they typically possess deep drafts.

It was found that the New Orleans, Houston, Miami, New York and Galveston USCG units had the highest numbers of allisions, collisions and groundings over the time period studied. However, when the accident data was normalized, the results were quite different. The units with the highest accident rates (i.e. accidents per 100 transits) were Buffalo, Galveston, Anchorage, New Orleans and San Diego when using only deep-draft transits on deep-draft waterways for data normalization. Anchorage, Duluth, Jacksonville, Tampa and Cleveland had the highest accident rates when using all vessel transits on deep-draft waterways.

Additional selected notes on accidents in specific locations within USCG units are provided in an appendix.

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ACKNOWLEDGMENTS

The authors would like to acknowledge the assistance of the U.S. Coast Guard Marine Safety Center and Office of Investigations and Analysis, especially Mr. Tom Waters, Mr. Harold Krevait and Mr. Ken Olsen. The assistance of ENS Steve Beede, USN, and Midshipman 1/C Mary Godfrey of the U.S. Naval Academy with data manipulation is also acknowledged. We also thank Dr. Wayne K. Talley, Frederick W. Beazley Professor of Economics at Old Dominion University for providing review comments on this document.

Finally, the authors also greatly appreciate the efforts of Ms. Jacqueline Schultz of Webb Institute for her assistance with the preparation of the final report.

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ABBREVIATIONS AND ACRONYMS

ACG, ACGs	Allisions[1], Collisions and Groundings
CASMAIN	USCG database of vessel and personnel casualty incidents
IWR	Institute for Water Resources, Water Resources Support Center, U.S. Army Corps of Engineers
MARAD	Maritime Administration (branch of the U.S. Department of Transportation)
MINMod	Marine Investigation Module
MSIS	Marine Safety Information System, a database including marine casualty, personnel injury/death and pollution incidents as well as vessel and facility identification information.
MSMS	Marine Safety Management System, a database management system for accessing and querying USCG information
NDC	Navigation Data Center, Water Resources Support Center, U.S. Army Corps of Engineers
PIRS	Pollution Incident Reporting System
Pre-MINMod	Preliminary Marine Investigation Module
USCG	United States Coast Guard (branch of the U.S. Department of Transportation)

[1]An allision is defined as an impact between a vessel and a structure (e.g. a ship with bridge), whereas a collision is defined as an impact between two vessels (e.g. ship with ship).

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INTRODUCTION AND BACKGROUND

Approximately 95 percent of all U.S. foreign trade is carried by marine vessels and passes through U.S. ports[2]. The trend in the design of the vessels that carry this cargo – tankers, freighters and containerships – has been toward larger and faster ships which has continually challenged U.S. ports' ability to accommodate these vessels. It is well known that port turn-around time is a major factor in the economics of shipping operations, and the factors required to facilitate speed and efficiency within a port's navigation channels are quite complex.

Brief Description of IWR Study

This trend toward larger and faster vessels, along with the recent introduction of what are referred to as "mega-containerships," has spurred a study by the Institute for Water Resources (IWR) entitled "Impacts of Navigation Trends on Channel Usage and Design." The goal of the study is to assist in improving the design and maintenance of navigation channels in order to achieve economic efficiency, reliability, and safety of shipping operations. Specifically, the study aims to investigate how changes occurring in the international shipping industry may impact the Army Corps of Engineers' design and maintenance of its channels. The study is also concerned with how navigation trends on channel usage may contribute to safety, piloting, and maintenance problems. The study includes three interrelated components: (1) a safety performance review, (2) a channel design and maintenance assessment, and (3) a shipping trends analysis. Essentially, information is being compiled on past, present and future safety issues as well as present navigation channel design and maintenance practices. These pieces of information will be combined with shipping data in order to achieve the goals of the study.

Purpose of USCG Accident Data Analysis

The purpose of this U.S. Coast Guard (USCG) accident data analysis is to provide information for the safety performance review component of the IWR study. USCG accident data were obtained and analyzed (as described later) in order to identify the types of incidents that have occurred and the vessel types and causal factors involved.

The accident data were interpreted keeping in mind deep-draft navigation channel design and maintenance factors. Incidents that could not have been prevented by changes in channel design or maintenance were excluded from the analysis. In addition, since factors such as shipping traffic and bathymetry within a port may vary significantly through time, emphasis was placed on more recent data available to more accurately reflect the present situations within the ports investigated.

[2] Source: MARAD publication, 1994.

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DESCRIPTION AND DISCUSSION OF USCG DATABASES

The U.S. Coast Guard is presently in the process of developing and instituting a master database system of information, accessible through the Marine Safety Management System (MSMS).[3] This system, when complete, will provide a means to access and query information not only on maritime accidents, but also on all other areas and resources of information that the USCG maintains. The USCG-maintained information is to be organized into database modules, with the marine casualty, personnel injury/death and pollution incidents residing in MINMod, i.e., the Marine Investigation Module, which falls within MSIS, the Marine Safety Information System database. At this time, the MSMS system is still under development, and the information that presently exists on marine accidents and other information is in a collection of stand-alone databases.

At present, the database location of information on marine casualty, personnel injury/death and pollution incidents varies depending on the time frame of the incidents. Data pertaining to personnel injury/death information along with vessel casualty information prior to 1992 reside in a database entitled CASMAIN[4]. The pollution information prior to 1992 resides in the Pollution Incident Reporting System (PIRS) database (1980-1991) and the Preliminary Marine Investigation Module (Pre-MINMod) database (1985-1991). Note that the PIRS and Pre-MINMod systems operated in parallel from 1985 to 1991. In an effort to consolidate computer systems, the tables in the PIRS database were moved to another computer platform. The changeover resulted in a loss of data which the Coast Guard is presently attempting to retrieve.

Beginning in 1992, information on marine casualty, personnel injury/death and pollution incidents has been kept in the MINMod database, which is part of the Marine Safety Information System (MSIS), a network database residing in Martinsburg, West Virginia. USCG Headquarters receives quarterly extracts of the MSIS. MSIS investigation cases are entered at each marine safety unit by Coast Guard investigators. MSIS also contains other information, such as information on all USCG registered vessels and facilities, whether or not the vessels/facilities have been involved in USCG reported incidents.

In addition to this information on marine casualty, personnel injury/death and pollution incidents, the USCG began a system in 1994 to report pollution ticketing cases, within the TICKET database. These cases are incidents in which 100 gallons or less of oil was discharged into the environment. Oil spills over 100 gallons or other substances discharged into the navigable waters of the U.S. are reported in the MINMod database.

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[3]See USCG Marine Safety Manual, Volume 1 (Administration and Management), Chapter 12 (Information and Data Systems), for more on USCG information management regarding Marine Safety Issues.

[4] Information entered into the CASMAIN database is still accessible (in plain-text, tabular form) and includes personnel and vessel casualty information spanning the time period from 1980-1991. However, the database is not presently in use by the USCG. The database currently used for entry of casualty information is MINMod.

Acquisition of Database Information

These databases, specifically, CASMAIN, PIRS, Pre-MINMod, MINMod, TICKET and MSIS, are not directly distributed by the U.S. Coast Guard.[5] Rather, selected information in the form of tables extracted from these databases are made available to the public by a third-party distributer.

The U.S. Coast Guard has arranged with the National Technical Information Service (NTIS) for the distribution of its accident information.[6] The Coast Guard furnishes NTIS with copies of tables from these databases in [ASCII] text format and documentation on CD-ROM. The database is transferred to NTIS approximately three (3) weeks following the end of each calendar year quarter. The data are furnished on two (2) CD-ROMs and include forty (40) data tables derived from marine casualty and pollution investigations conducted by investigators at USCG Marine Safety Offices throughout the United States. Included are one file on vessel information, one file on facility information, and 38 files covering marine casualty, personnel injury/death and pollution incidents. A brief listing of the files is shown in Table 1. Note that the vessel identification table is larger than 300 megabytes (MB). The 38 files covering marine casualty, personnel injury/death and pollution incidents also comprise over 300 MB of data; most of the tables are over 1 MB individually. Details regarding the specific fields contained in the files associated with the MSIS, MINMod, Pre-MINMod, TICKET and CASMAIN databases are shown in Appendix A[7]. The point of contact for questions concerning this accident data is the USCG Marine Safety and Environmental Protection Data Administration Division[8].

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[5]Note that some information contained in MSIS is protected from release under the Privacy Act and Freedom of Information Act.

[6] See References for order details.

[7] The detailed descriptions for the tables associated with the PIRS (pollution incident reporting system) databases were not included in Appendix A since they were not used in this analysis. Other tables (such as those from CASMAIN) were also not used, but are described in Appendix A for informational purposes since their content is relevant to this study.

[8] COMDT G-MRI-1: Data Administration Division of the Office of Information Resources of the Director of Resources of the Assistant Commandant for Marine Safety and Environmental Protection. POC: Mr. Harold Krevait, telephone: (202) 267-6833.

Table 1: USCG Database Table Descriptions

Table Name	Database	Rec Size	No. of Records	File Size (KB)	Description
vidt.txt	MSIS	718	438,829	309,000	Vessel Identification Table (1998)
fidt.txt	MSIS	278	32,676	8,903	Facility Identification Table (1998)
cirt.txt	MINMod	428	131,402	55,051	Marine Casualty and Pollution Master Table (beginning 1992)
civt.txt	MINMod	138	107,181	14,549	Marine Casualty Vessel Supplement Table (beginning 1992)
cift.txt	MINMod	120	37,161	4,392	Marine Casualty Facility Supplement Table (beginning 1992)
cevt.txt	MINMod	83	75,357	6,182	Marine Casualty Event Table (beginning 1992)
ccft.txt	MINMod	95	79,278	7,433	Marine Casualty Causal Factor Table (beginning 1992)
ccgt.txt	MINMod	57	17,129	971	Marine Casualty Collision and Grounding Table (beginning 1992)
csft.txt	MINMod	49	1,649	81	Marine Casualty Structural Failure Table (beginning 1992)
cfct.txt	MINMod	286	5,532	1,523	Marine Casualty Flooding and Capsizing Table (beginning 1992)
cpdt.txt	MINMod	173	12,489	9,441	Marine Pollution Substance Table (beginning 1992)
cpct.txt	MINMod	420	55,559	5,135	Marine Casualty Personnel Injury & Death Table (beginning 1992)
cfet.txt	MINMod	392	1,450	557	Marine Casualty Fire and Explosion Table (beginning 1992)
cwxt.txt	MINMod	456	4,762	2,126	Marine Casualty Weather Supplement Record (beginning 1992)
prit.txt	Pre-MINMod	261	64,435	16,487	Pre-MINMod Pollution Master Table (1985-1991)
pvst.txt	Pre-MINMod	207	28,668	5,824	Pre-MINMod Pollution Vessel Supplement Record (1985-1991)
post.txt	Pre-MINMod	244	36,327	8,692	Pre-MINMod Pollution Facility Supplement Record (1985-1991)
psst.txt	Pre-MINMod	150	66,683	9,834	Pre-MIN Pollution Substance Table (1985-1991)
converta.txt	Pre-MINMod/ MINMod/ TICKET	167	137,324	22,530	Pollution Substance Table [(beginning 1985) includes Ticket Cases]
prittk.txt	TICKET	261	15,385	3,937	Ticket Investigation Master Table (beginning 1994)
mvct.txt	TICKET	303	81,119	24,083	Ticket Investigation Marine Violation Case Table (beginning 1994)
mtkt.txt	TICKET	166	15,385	2,510	Ticket Investigation Report Table (beginning 1994)
tcet.txt	TICKET	133	14,714	1,926	Ticket Investigation Casualty Event Table (beginning 1994)
pssttk.txt	TICKET	150	14,317	2,112	Ticket Investigation Marine Pollution Substance Table (beginning 1994)
pcas.txt	CASMAIN	259	20,753	5,270	Personnel Injuries/Deaths (1980-1991)
vcas.txt	CASMAIN	333	68,595	22,374	Vessel Casualties (1980-1991)
mpir70.txt	PIRS	194	98,447	18,748	Master Pollution Table (1973-1979)
mpir80.txt	PIRS	194	127,967	24,369	Master Pollution Table (1980-1991)
mprc70.txt	PIRS	75	6,970	518	Coast Guard Response Table (1973-1979)
mprc80.txt	PIRS	74	111,633	8,177	Coast Guard Response Table (1980-1991)
mprn70.txt	PIRS	32	17,589	567	Non-Coast Guard Response Table (1973-1979)
mprn80.txt	PIRS	32	33,028	1,065	Non-Coast Guard Response Table (1980-1991)
mpsf70.txt	PIRS	86	69,916	5,873	Marine Pollution Facility Table (1973-1979)
mpsf80.txt	PIRS	86	83,120	6,982	Marine Pollution Facility Table (1980-1991)
mpsv70.txt	PIRS	121	28,527	3,371	Marine Pollution Vessel Table (1973-1979)
mpsv80.txt	PIRS	121	44,580	5,268	Marine Pollution Vessel Table (1980-1991)
mtl70.txt	PIRS	68	98,488	6,634	Marine Pollution Substance Table (1973-1979)
mtl80.txt	PIRS	68	129,751	8,743	Marine Pollution Substance Table (1980-1991)
mv70.txt	PIRS	76	32,761	2,464	Marine Violation Table (1973-1979)
mv80.txt	PIRS	76	52,635	3,958	Marine Violation Table (1980-1991)

The National Maritime Safety Incident Reporting System: An Additional Resource for Future Analysis

During the course of this analysis of USCG accident data, it was learned that a memorandum of agreement (MOA) between the U.S. Coast Guard and the Maritime Administration (MARAD) to facilitate development of a National Maritime Safety Incident Reporting System had been signed at the end of calendar year 1997. This MOA states, in part, that the USCG and MARAD agree to work together with industry to develop and implement a practical, voluntary, confidential system to receive, analyze and disseminate information about unsafe maritime circumstances. It will essentially be a database, much like the existing USCG databases, but with information regarding near-miss and other safety-related mariner information. These incidents would normally not be reported to the USCG. However, there is often as much to learn about how and why an accident did not take place as there is in how and why one actually did occur.

According to the U.S. Coast Guard, these non-accidents or problem events are an untapped source of data that can serve as leading indicators on safety in the maritime community and can provide the information necessary to prevent accidents before they happen rather than addressing prevention after they occur. The goals of the effort are to reduce the frequency of marine casualties, the extent of injuries and property damage including environmental damage, and to create a safer and more efficient shipping transportation system and mariner work environment.[9]

The MOA, as shown in Appendix B, solicits inputs from any interested person, group, and/or business.[10] Part of the success and usefulness of the system will depend on the suggestions of those who are intended to use it. Yet it is apparent that once it is available, a system such as this should prove to be an invaluable resource for many groups of people, as well as for studies such as the IWR study.

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[9] From USCG News release, 23 February 1998.

[10] Ideas, comments, and questions are requested to be forwarded to the project officers (preferably electronically) as follows:

Mr. Alexander C. Landsburg, Maritime Administration, Program Manager for Systems Safety and Human Factors, (202) 366-1923, fax: (202) 493-2288, e-mail: alex.landsburg@marad.dot.gov, mailing address: Office of Maritime Labor, Training, and Safety, U.S. Department of Transportation, Maritime Administration, MAR-250, Room 7302, 400 Seventh Street, SW, Washington, DC 20590;

LCDR Scott J. Ferguson, U.S. Coast Guard, Office of Investigations and Analysis, (202) 267-0715/1430, fax: (202) 267-1416, e-mail: sferguson@comdt.uscg.mil, mailing address: Commandant (G-MOA), U.S. Coast Guard Headquarters, 2100 Second Street, SW, Washington, DC 20593-0001; or

Mr. Ken Olsen, U.S. Coast Guard, Office of Investigations and Analysis, (202) 267-1417/1430, fax: (202) 267-1416, e-mail: kolsen@comdt.uscg.mil, mailing address: Commandant (G-MOA), U.S. Coast Guard Headquarters, 2100 Second Street, SW, Washington, DC 20593-0001.

DATABASE ANALYSIS

The purpose of this accident data analysis portion of the IWR study is to assist in identifying harbors and channels with the greatest safety and piloting concerns. In order to accomplish this, the type of data available from USCG databases was first carefully interpreted and considered for inclusion in this analysis. Incidents that clearly could not have been prevented by changes in channel design or maintenance were excluded from the analysis. Two time periods were analyzed throughout the study: (1) 1992-1998, and (2) 1996 only. The latter shorter time period was analyzed for two reasons: to verify temporal consistency of the data trends throughout the dataset, and to provide a direct correlation to transit data used later in the study.

Accident Types

Table 2 and Figure 1 show the different types of incidents reported in the MINMod database. Note that a particular accident case may involve more than one event; for example, a collision may be followed by a sinking. This example situation would yield two separate entries, even though both events were part of the same casualty case. For this reason, two different percentages are given. The first is a simple percentage of the total entries, whereas the second is the percentage of cases in which the particular accident type occurred. Approximately one-quarter of the cases involved two or more entries.

Based on this incident frequency data, it can be seen that the occurrence rate (e.g. percentage of entries) of each incident type is nearly constant for the two different time frames, with the exception of the pollution incident type. The percentage of pollution incidents is significantly lower for the 1996 data than for the 1992-1998 data. Since 1996 falls later within the 1992-1998 time frame, it follows that pollution cases should be lower since regulations regarding pollution prevention and abatement have been steadily increasing throughout that time period. Pollution-reducing vessel features such as double hulls – which are becoming more and more prevalent – may also contribute to the decreasing occurrence rate of pollution events.

After the types of incidents recorded within the USCG database were identified, a key question that needed to be answered as part of this analysis was: What types of incidents could have been minimized or prevented by changes in deep-draft channel design or maintenance? Repeated groundings within a channel (presuming the drafts of the vessels do not exceed the design depth of the channel) may be prevented by more frequent maintenance dredging. Alternatively, a personnel injury that occurred onboard a vessel, unrelated to an allision, collision or grounding, would likely not have been avoided by changes in channel design or maintenance.

Table 2: Incident Types within MINMod Database

	1992-1998 Data			1996 Data		
	# Entries	**% Entries**	**% Cases** (of 62,519)	**# Entries**	**% Entries**	**% Cases** (of 9,619)
Grounding - Accidental	**15,291**	**16.6%**	**24.5%**	**2,559**	**18.3%**	**26.6%**
Pollution	15,118	16.4%	24.2%	1,465	10.5%	15.2%
Personnel Casualty	12,475	13.6%	20.0%	1,828	13.1%	19.0%
Loss of Vessel Control	12,162	13.2%	19.5%	2,009	14.4%	20.9%
Allision[11]	**11,729**	**12.8%**	**18.8%**	**2,080**	**14.9%**	**21.6%**
Collision[11]	**6,194**	**6.7%**	**9.9%**	**1,011**	**7.2%**	**10.5%**
Flooding	5,303	5.8%	8.5%	846	6.1%	8.8%
Sinking	3,752	4.1%	6.0%	465	3.3%	4.8%
Structural Failure	3,415	3.7%	5.5%	668	4.8%	6.9%
Fire	1,543	1.7%	2.5%	248	1.8%	2.6%
Loss of Electric Power	1,383	1.5%	2.2%	249	1.8%	2.6%
Empty/Other	1,001	1.1%	1.6%	117	0.8%	1.2%
Abandonment	906	1.0%	1.4%	154	1.1%	1.6%
Capsizing	773	0.8%	1.2%	105	0.8%	1.1%
Grounding - Intentional	**702**	**0.8%**	**1.1%**	**131**	**0.9%**	**1.4%**
Explosion	187	0.2%	0.3%	25	0.2%	0.3%
	91,934	100.0%		13,960	100.0%	

However, other incidents, such as collisions (vessel with vessel), allisions (vessel with structure), and other types of grounding events are usually more difficult to categorize. In his book, *Maritime Accidents: What Went Wrong?*, Gates suggests that incidents such as collisions which may initially appear to be cases of human error or misjudgement, actually may have been prevented by changes in channel design or maintenance. For instance, Gates describes a casualty case that occurred within the Houston ship channel. A collision between two vessels was actually due to excessive vessel squat, due to decreasing channel depth experienced by a vessel heading outbound. In short, if the channel had been dredged to a deeper depth near the entrance of the channel or at least to a constant depth throughout the length of the channel, the incident would probably not have occurred.

Other cases similar to those described by Gates suggest that many collisions and allisions could be avoided by improving a channel's design, maintenance or markings. Even groundings occurring outside a channel may indicate a need to modify a channel's design; e.g., perhaps the particular grounding location should actually be inside the channel. Accordingly, it is difficult to eliminate any allision, collision or grounding even then without accessing, carefully reading and investigating the actual accident report for each incident. For these reasons, this study includes all

[11]An allision is an impact of a vessel with a structure (e.g. a ship with a bridge or pier). A collision is an impact between two vessels (e.g. ship with ship).

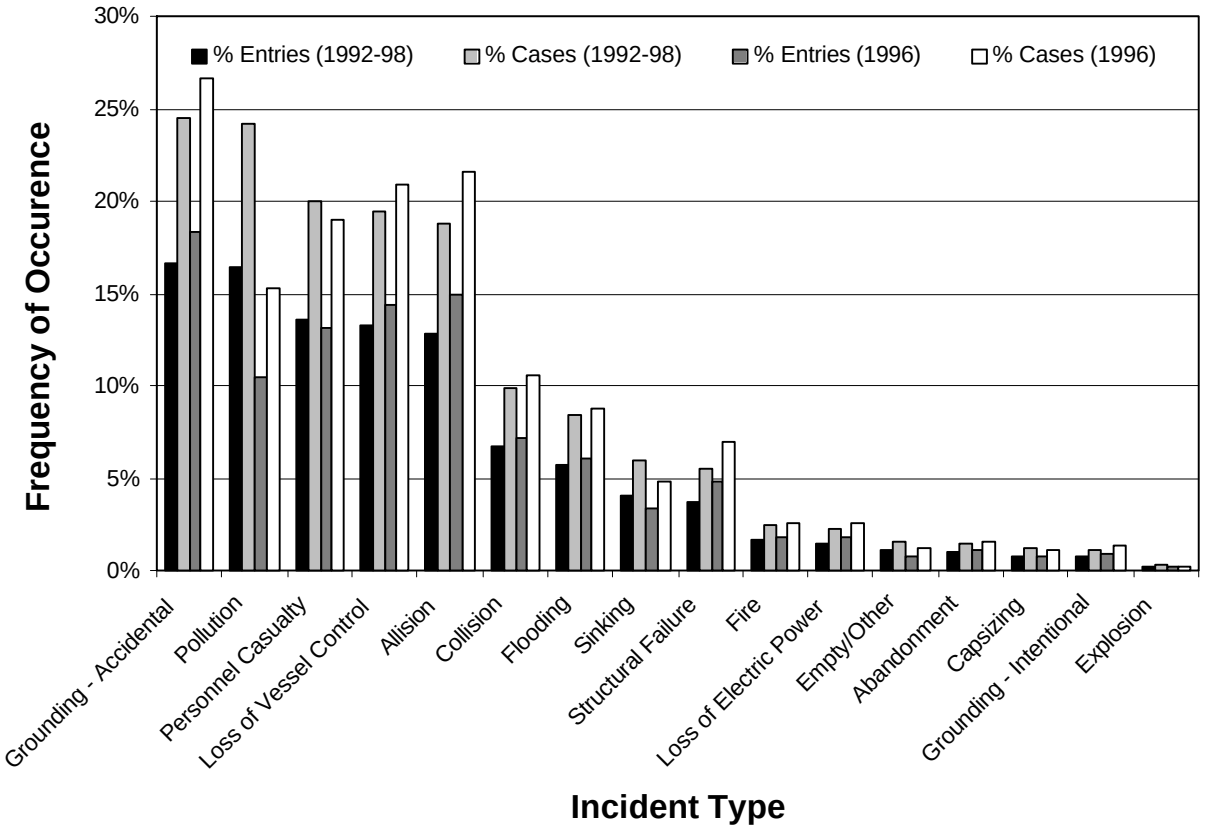

Figure 1: Accident Types Reported in USCG MINMod Database

allisions, collisions and groundings in the analysis of vessel accident data. This approach yields statistics on the conservatively high side.

The other accidents types, namely Pollution, Personnel Casualty, Loss of Vessel Control, Flooding, Sinking, Structural Failure, Fire, Loss of Electric Power, Empty/Other, Abandonment, Capsizing, and Explosion were not considered in this analysis since their direct relation to channel design and maintenance is highly unlikely. Any relation these incidents would have to channels would likely be linked by an allision, collision or grounding event.

Vessel Types

The distribution of vessel types within the data was also examined and is shown in Table 3 and Figures 2 and 3. The type of vessel involved in all USCG accident cases was investigated, as well as the vessel types involved in only allisions, collisions and groundings. As shown in the table and the figures, towboats/tugboats and barges are involved in the most cases: 25% and 22% of all incidents and 30% and 34% of allisions, collisions and groundings, respectively. Fishing vessels rank third within all incidents, but lower, fifth, when considering only allisions, collisions and groundings.

Table 3: Vessel Types Involved in MINMod Incidents

	All Incident Types	Allisions, Collisions and Groundings Only
Towboats/Tugboats	24.9%	30.4%
Barges (Freight & Tank)	21.7%	34.0%
Fishing Vessels	14.5%	6.3%
Ships (Freight, Tank, OSVs)	11.4%	7.7%
Passenger Vessels	9.6%	5.6%
Unclassified Vessel	6.9%	4.8%
Commercial	5.8%	7.4%
Others	2.8%	2.0%
Recreational	2.4%	1.7%

The fishing vessels rank significantly lower in the latter category since they typically have high occurrences of fire, capsizing and sinking as compared to the other vessel types.

To keep with the deep-draft channel emphasis of the study, this analysis concentrates on freight ship and tank ship accident data. Freight and tank ships were chosen to be easily representative of deeper-draft vessels; there are very few tankers or freighters with design drafts less than 15 ft, whereas the other vessel-type categories are either primarily shallow-draft vessels or mixed with some shallower and some deeper-draft types[12]. (The USCG database does not include an entry for "vessel draft" at time of accident.) It should be noted that ships are involved in only about 8% of allisions, collisions and groundings.

[12]The USCG accident database includes a table (vidt.txt) of vessel particulars, which includes physical particulars. However, a vessel's draft at the time of the incident is not directly accessible. This information is usually included in the associated USCG incident report (a separate report publication), but does not appear in any of the database tables. Therefore, this inference of "deep-draft" vessels was made, based on the known characteristics of the different vessel types that appear throughout the USCG database.

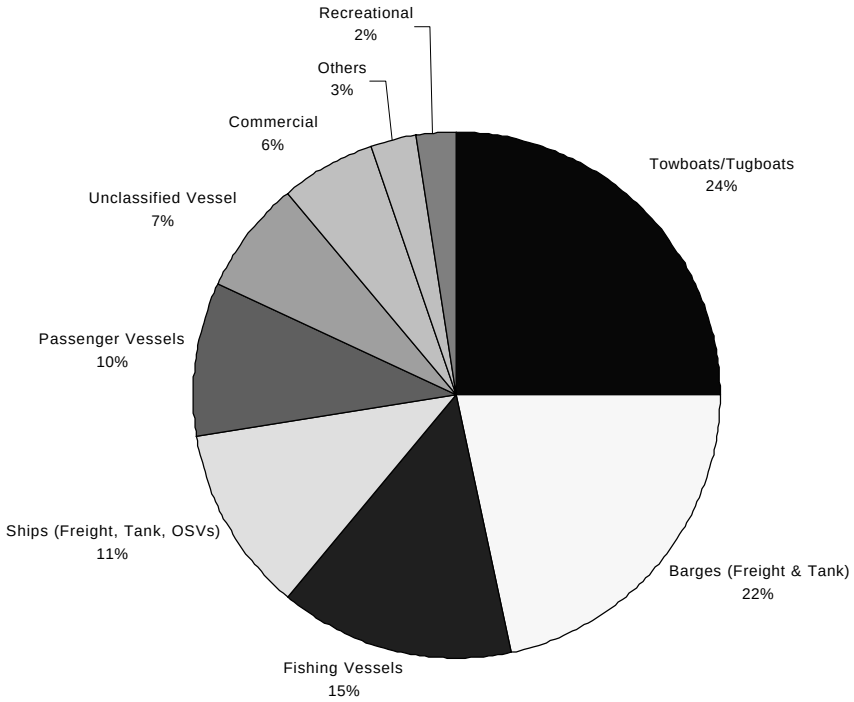

Figure 2: Vessel Types Involved in All Accident Types

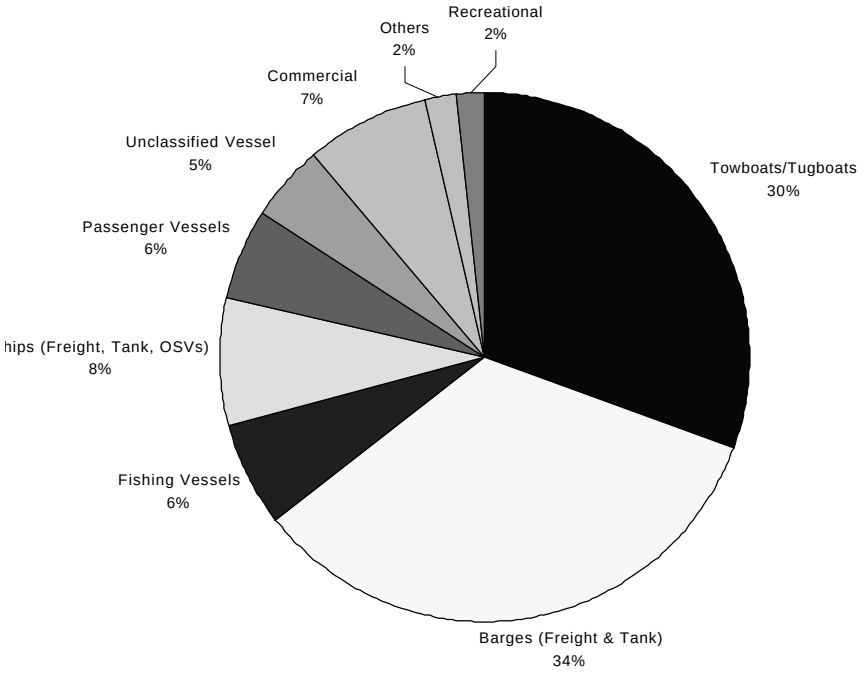

Figure 3: Vessel Types Involved in Allisions, Collisions, and Groundings

Vessel Registry

It was found that 75% of vessels involved in the 1992-1998 incidents were U.S.-flag vessels. However, only about 48% of the freight and tank ships involved in all events were U.S.-flag, and 27% of the freight and tank ships involved in allisions, collisions and groundings were U.S.-flag. This indicates that although most of the vessels involved in marine casualties are U.S.- flag ships, they are typically those vessels involved in domestic trade or service, such as barges and tugboats[13].

It appears that the percentage of U.S.-flag freight and tank ships involved in accidents is still abnormally high as compared to the percentage of U.S.-flag freight ship and tank ship traffic on deep waterways. U.S.-flag ships typically comprise much less than 25% of the deep-draft traffic on our waterways. It may be because of stricter piloting requirements that foreign-flag ships are involved in proportionately fewer accidents: foreign-flag vessels are required to take aboard a "local" pilot when entering a U.S. waterway; whereas U.S.-flag vessels are not required to do so[14]. If a U.S.-flag vessel does not have a local pilot aboard, it may be at a higher risk of experiencing a channel-related accident such as an allision, collision or grounding.

Temporal and Spatial Consistency of Data

A concern that was addressed during the data analysis was one regarding temporal and spatial consistency of the data. When the U.S. Coast Guard changed databases in 1992 from CASMAIN to MINMod for reporting of vessel and personnel casualties, many of the data entry fields changed significantly as well. This resulted in a temporal inconsistency with the dataset. It was therefore decided to use only the MINMod database within this analysis for consistency.

In addition, as mentioned previously, since factors such as shipping traffic and bathymetry within a port may vary significantly through time, it was decided to place emphasis on more recent data in this analysis, in order to more accurately reflect the present situations within the locations investigated. The entire seven-year dataset from the USCG MINMod database, covering the years 1992-1998 was analyzed. As is discussed later, the data from the single year, 1996, was also analyzed in depth, to correlate directly with the time period of the transit statistics data available. In both cases, the analysis concentrated on freight ship and tank ship incidents since these vessel types usually possess deeper vessel drafts.

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[13] Note that the Jones Act (46 USC 883; 19 CFR 4.80 and 4.80b) requires that a vessel engaged in domestic commerce be U.S.-flagged. Therefore, a foreign-flag vessel calling on a U.S. port must be engaged in international trade since a foreign-flag ship cannot run a domestic route under this law.

[14] In many waterways across the country, U.S.-flag ships do frequently take aboard local ("state-licensed") pilots. However, as long as the ship is U.S.-flag vessel and has a "federally-licensed" pilot aboard, in most waterways the ship is not required to use a local pilot. Thus there exists a trade-off between safety and economics – a local pilot should know a waterway better than a non-local pilot, but since local pilotage fees can be thousands of dollars for a one-way voyage, a ship master may opt to not use the local pilot – provided that one of the ship's normal complement is a federally-licensed pilot .

Spatial consistency is difficult to assess for all types of incidents. USCG representatives were consulted regarding their opinions on this matter. Some indicated that some port users and USCG investigators have somewhat different standards as to what a "reportable" incident is, especially in the case of groundings. For example, in certain locations, *any* contact with the channel bottom is considered a reportable grounding, even if no damage or delay was incurred by the vessel. However, in other locations, a minor touching of the channel bottom may go unreported, especially if no damage, delay or pollution occurred and no Coast Guard intervention or assistance was required. Although these and other differences may exist, no conclusions could be made as to systematic differences between locations.

Another issue of spatial data integrity was addressed. The USCG database entries are categorized by reporting unit. While there are more than 300 ports in the U.S., there are fewer than eighty USCG reporting units. In addition, there are many docks and berthing facilities located outside traditional port boundaries on the shallow-draft waterways. As a result, there are incidents reported to particular USCG units that do not occur in the ports where the units are located. Also, since this data analysis concentrated on deep-draft accidents and deep-draft transit statistics, the issue of inland shallow-draft data confusion should be all but eliminated. Therefore, categorizing the data in this fashion for this study is reasonable.

As is discussed later, the accident data analyzed in this study was also carefully examined and "filtered" to remove any extraneous cases that clearly occurred beyond or unrelated to a particular unit's channels. For example, by considering latitude and longitude recordings, incidents attributed to a particular USCG unit that occurred in another unit's jurisdiction or in the open sea were removed.

Manipulation of Data

Since the USCG raw data are supplied in simple [ASCII] text format, it must be imported into a third-party program for analysis. The very large size of most files exceeds the import capability of most spreadsheet programs which prevented their use. Rather, more powerful database analysis software was required to analyze the contained data.

For this study, the data from various tables were first imported into Microsoft Access, a data management program of Microsoft Office. Within Access, different queries were executed on the data tables in order to filter, sort and extract data of interest. Summary tables derived from the data were then exported into Microsoft Excel for further analysis. Excel also provided a convenient means to format the data and results for presentation purposes.

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RESULTS

Preliminary Results Based on Raw USCG Accident Data

The data analyzed covering the time 1992-1998 period contained 91,934 entries, with 62,519 distinct cases. Out of all of the 1992-1998 entries, 33,916 were allisions, collisions, or groundings. The data analyzed during the year 1996 contained 13,960 entries, with 9,619 distinct cases, and of those cases, 7,449 involved only one incident type. Out of all of the 1996 entries, 5,781 were allisions, collisions, or groundings. A brief summary of the dataset counts for the 1992-1998 and 1996-only data are shown in Table 4. From these numbers, it can be assumed that the datasets are large enough to draw statistical trends from the data for the purposes of this study.

Table 4: Summary of MINMod Datasets Analyzed

	1992-1998 Data	1996 Only Data
Number of Allisions	11,729	2,080
Number of Collisions	6,194	1,011
Number of Accidental Groundings	15,291	2,559
Number of Intentional Groundings	702	131
Total ACGs	33,916	5,781

"Filtering" of the USCG Data

As mentioned previously, the system of accident reporting used by the USCG attributes accidents to a particular USCG unit, or specifically, to a marine safety office. In most cases, especially for allisions, collisions and groundings inside of a unit or within a unit's channels, the reporting office is the same as the office with responsibility over the geographical area in which the accident occurred. However, exceptions do exist, with the number and percentage of exceptions varying from unit to unit.

It was desired to improve the integrity of the USCG accident data used. After close inspection of the raw data, it was found that units with high military traffic – Norfolk and Honolulu (Pearl Harbor) – generally had much higher cases of reported incidents that occurred *outside* of the normal geographical jurisdiction of the USCG unit. On average, about 10% of the total reported ship incidents occurred outside of the unit's normal jurisdiction. (This number includes those incidents that occurred "at sea" or clearly offshore.) For allisions, collisions and groundings, this rate was lower.

In an effort to improve the data integrity, the accident entries for this portion of the analysis were carefully inspected. Based on latitude and longitude records, along with the descriptive records of the incident location, the accident data of each USCG unit was "filtered" to remove incidents from

a unit's accident statistics that occurred outside the unit's jurisdiction or outside of the unit's navigation channels. Accidents that occurred just outside of a channel (i.e. at the entrance channel or approach) were not removed, but those incidents that occurred significantly offshore were removed, since their relevance to channel design and/or maintenance was not apparent.

Tables 5 and 6 summarize the ship accident data by USCG units for the 1992-1998 and 1996 time periods, respectively. The ship ACG data is plotted in Figure 4 for the 25 USCG units with the highest ACG counts during the 1992-1998 period. Finally, these 25 units were ranked and listed in descending order per 1992-1998 data in Table 7. It should be noted that the New Orleans, Houston, Miami, New York and Galveston units experience the greatest number of accidents for both time periods analyzed.

Table 5: Summary of Ship Accidents by USCG Unit, 1992-1998 Data

USCG Unit		Total Ship Accidents			Ship ACGs Analysis						Rank			
					A	C	G			T	1992-1998		1996	
		Total	US	%US	Alli	Colli	Grounding				Total	ACG	Total	ACG
	*=not analyzed		Flag	Flag	sion	sion	Acc	Int	Total	ACG	Ship	Ship	Ship	Ship
ASOD	American Samoa*													
ANCMS	Anchorage	127	99	78%	9	9	8	1	9	27	20	19	19	27
BALMS	Baltimore	103	26	25%	10	1	12	1	13	24	22	24	16	23
BAND	Bangor	14	7	50%	0	1	0	0	0	1	51	53	42	36
BATD	Baton Rouge	53	2	4%	7	5	10	0	10	22	35	25	32	17
BOSMS	Boston	90	23	26%	8	4	6	0	6	18	27	26	21	13
BRND	Brownsville	16	0	0%	2	1	3	0	3	6	48	43	42	32
BUFMS	Buffalo	57	39	68%	4	0	13	0	13	17	33	28	42	36
CHAMS	Charleston	102	34	33%	4	0	9	0	9	13	23	32	30	20
CHIMS	Chicago	86	64	74%	14	5	7	0	7	26	28	20	31	32
CIND	Cincinnati	0	0		0	0	0	0	0	0				
CLEMS	Cleveland	97	85	88%	23	0	8	0	8	31	25	18	15	20
COND	Concord	17	9	53%	1	0	1	0	1	2	46	50		
CORMS	Corpus Christi	165	40	24%	14	8	20	2	22	44	16	15	25	13
DAVD	Davenport	0	0		0	0	0	0	0	0				
DETMS	Detroit	169	116	69%	27	11	33	1	34	72	14	10	14	10
DULMS	Duluth	86	64	74%	10	0	8	0	8	18	28	26	17	23
EURMI	Europe*													
FEAMI	Far East Asia*													
GALMS	Galveston	290	68	23%	28	33	39	3	42	103	11	5	8	2
GHND	Grand Haven	16	14	88%	6	0	5	0	5	11	48	36	41	23
GRND	Greenville	0	0		0	0	0	0	0	0				
GUAMS	Guam*													
HMRMS	Hampton Roads	313	129	41%	40	8	28	0	28	76	9	9	9	6
HONMS	Honolulu	64	39	61%	9	2	2	0	2	13	32	32	33	20
HMAD	Houma	0	0		0	0	0	0	0	0				
HOUMS	Houston	657	67	10%	71	40	38	1	39	150	2	2	2	3
HUNMS	Huntington	0	0		0	0	0	0	0	0				
JACMS	Jacksonville	168	81	48%	19	10	23	0	23	52	15	12	26	32
JUNMS	Juneau	40	22	55%	1	0	9	1	10	11	39	36	42	36
KEND	Kenai	31	27	87%	1	1	0	0	0	2	41	50	46	
KETD	Ketchikan	17	12	71%	0	0	2	1	3	3	46	47	46	
KODD	Kodiak	8	6	75%	0	1	1	0	1	2	55	50		
LKCD	Lake Charles	44	8	18%	0	3	6	2	8	11	38	36	37	27
LOSMS	LA-Long Beach	379	247	65%	8	11	6	0	6	25	5	21	3	16
LISCP	Long Island Sound	12	2	17%	0	0	0	0	0	0	54		48	
LOUMS	Louisville	0	0		0	0	0	0	0	0				
MASD	Massena	94	0	0%	18	1	18	0	18	37	26	17	17	10
MEMMS	Memphis	3	2	67%	0	0	0	0	0	0	56		48	
MIAMS	Miami	365	71	19%	53	15	45	1	46	114	6	3	6	4
MILMS	Milwaukee	22	22	100%	3	0	0	0	0	3	45	47	33	36
STPD	Minneapolis/St Paul	1	1	100%	0	0	0	0	0	0	59			
MOBMS	Mobile	157	33	21%	12	9	24	0	24	45	17	14	12	13
MORMS	Morgan City	50	3	6%	1	7	7	1	8	16	36	29	33	27
NASD	Nashville	0	0		0	0	0	0	0	0				
PORD	New Castle	3	0	0%	0	0	1	0	1	1	56	53		
NEWMS	New Orleans	1177	158	13%	108	112	129	4	133	353	1	1	1	1
NYCMI	New York	490	248	51%	42	16	53	0	53	111	4	4	5	5
PADMS	Paducah	0	0		0	0	0	0	0	0				
PCDD	Panama City	12	1	8%	0	0	0	0	0	0	52		48	
PEOD	Peoria	0	0		0	0	0	0	0	0				
PHIMS	Philadelphia	331	39	12%	24	10	42	1	43	77	8	8	11	10
PITMS	Pittsburgh	0	0		0	0	0	0	0	0				
PATMS	Port Arthur	189	88	47%	21	19	26	0	26	66	12	11	21	8
PTCD	Port Canaveral	15	2	13%	4	0	0	0	0	4	50	46	48	
PLAD	Port Lavaca	38	3	8%	0	2	7	0	7	9	40	40		
POMMS	Portland (Me)	57	14	25%	7	3	3	0	3	13	33	32	23	23
PORMS	Portland (Or)	291	104	36%	13	10	66	1	67	90	10	7	10	6
PROMS	Providence	70	29	41%	3	2	9	1	10	15	30	31	39	27
SEAMS	Puget Sound	344	278	81%	5	7	4	0	4	16	7	29	6	36
SDCMS	San Diego	47	36	77%	6	0	2	0	2	8	37	41	26	27
SFCMS	San Francisco	536	317	59%	32	24	40	1	41	97	3	6	4	8
SJPMS	San Juan*													
SBCD	Santa Barbara	12	3	25%	0	2	1	0	1	3	52	47		
SSMMS	Sault Ste Marie	146	112	77%	8	0	30	0	30	38	18	16	13	17
SAVMS	Savannah	111	11	10%	12	2	11	0	11	25	21	21	26	32
SIND	Singapore*													
SITD	Sitka	0	0		0	0	0	0	0	0				
STCD	St. Croix*													
SIMMI	St. Ignace	25	20	80%	3	1	6	0	6	10	43	39		
SLMMS	St. Louis	0	0		0	0	0	0	0	0				
STTD	St. Thomas*													
STBMI	Sturgeon Bay	25	22	88%	6	0	2	0	2	8	44	41	39	
TAMMS	Tampa	182	27	15%	11	13	22	0	22	46	13	13	19	17
TOLMS	Toledo	98	67	68%	15	1	9	0	9	25	24	21	23	36
DHAD	Unalaska	27	14	52%	3	1	1	0	1	5	42	45	37	36
VALMS	Valdez	132	126	95%	0	4	2	0	2	6	19	43	26	36
WNCMS	Wilmington	69	29	42%	6	0	6	1	7	13	31	32	33	36
		8340	3210	38%						2034				

Table 6: Summary of Ship Accidents by USCG Unit, 1996 Data

USCG Unit		Total Ship Accidents			Ship ACGs Analysis						Rank			
					A	C	G			T	1992-1998		1996	
		Total	US	%US	Alli	Colli	Grounding				Total	ACG	Total	ACG
	*=not analyzed		Flag	Flag	sion	sion	Acc	Int	Total	ACG	Ship	Ship	Ship	Ship
ASOD	American Samoa*													
ANCMS	Anchorage	18	14	78%	2	1	0	0	0	3	20	19	19	27
BALMS	Baltimore	20	6	30%	1	1	2	0	2	4	22	24	16	23
BAND	Bangor	4	2	50%	0	1	0	0	0	1	51	53	42	36
BATD	Baton Rouge	9	0	0%	4	0	2	0	2	6	35	25	32	17
BOSMS	Boston	17	1	6%	4	2	2	0	2	8	27	26	21	13
BRND	Brownsville	4	0	0%	2	0	0	0	0	2	48	43	42	32
BUFMS	Buffalo	4	4	100%	1	0	0	0	0	1	33	28	42	36
CHAMS	Charleston	11	1	9%	2	0	3	0	3	5	23	32	30	20
CHIMS	Chicago	10	10	100%	1	0	1	0	1	2	28	20	31	32
CIND	Cincinnati	0	0		0	0	0	0	0	0				
CLEMS	Cleveland	21	20	95%	4	0	1	0	1	5	25	18	15	20
COND	Concord	0	0		0	0	0	0	0	0	46	50		
CORMS	Corpus Christi	14	2	14%	3	1	3	1	4	8	16	15	25	13
DAVD	Davenport	0	0		0	0	0	0	0	0				
DETMS	Detroit	24	19	79%	3	4	2	0	2	9	14	10	14	10
DULMS	Duluth	19	8	42%	1	0	3	0	3	4	28	26	17	23
EURMI	Europe*													
FEAMI	Far East Asia*													
GALMS	Galveston	42	8	19%	3	12	7	0	7	22	11	5	8	2
GHND	Grand Haven	5	4	80%	3	0	1	0	1	4	48	36	41	23
GRND	Greenville	0	0		0	0	0	0	0	0				
GUAMS	Guam*													
HMRMS	Hampton Roads	40	13	33%	4	1	6	0	6	11	9	9	9	6
HONMS	Honolulu	8	6	75%	4	0	1	0	1	5	32	32	33	20
HMAD	Houma	0	0		0	0	0	0	0	0				
HOUMS	Houston	73	4	5%	8	8	5	0	5	21	2	2	2	3
HUNMS	Huntington	0	0		0	0	0	0	0	0				
JACMS	Jacksonville	13	6	46%	0	1	1	0	1	2	15	12	26	32
JUNMS	Juneau	4	4	100%	0	0	1	0	1	1	39	36	42	36
KEND	Kenai	2	0	0%	0	0	0	0	0	0	41	50	46	
KETD	Ketchikan	2	0	0%	0	0	0	0	0	0	46	47	46	
KODD	Kodiak	0	0		0	0	0	0	0	0	55	50		
LKCD	Lake Charles	7	3	43%	0	2	0	1	1	3	38	36	37	27
LOSMS	LA-Long Beach	67	42	63%	2	1	4	0	4	7	5	21	3	16
LISCP	Long Island Sound	1	0	0%	0	0	0	0	0	0	54		48	
LOUMS	Louisville	0	0		0	0	0	0	0	0				
MASD	Massena	19	0	0%	2	0	7	0	7	9	26	17	17	10
MEMMS	Memphis	1	0	0%	0	0	0	0	0	0	56		48	
MIAMS	Miami	43	8	19%	9	2	9	0	9	20	6	3	6	4
MILMS	Milwaukee	8	8	100%	1	0	0	0	0	1	45	47	33	36
STPD	Minneapolis/St Paul	0	0		0	0	0	0	0	0	59			
MOBMS	Mobile	30	6	20%	1	2	5	0	5	8	17	14	12	13
MORMS	Morgan City	8	0	0%	0	0	2	1	3	3	36	29	33	27
NASD	Nashville	0	0		0	0	0	0	0	0				
PORD	New Castle	0	0		0	0	0	0	0	0	56	53		
NEWMS	New Orleans	110	8	7%	13	12	10	0	10	35	1	1	1	1
NYCMI	New York	60	33	55%	6	2	6	0	6	14	4	4	5	5
PADMS	Paducah	0	0		0	0	0	0	0	0				
PCDD	Panama City	1	0	0%	0	0	0	0	0	0	52		48	
PEOD	Peoria	0	0		0	0	0	0	0	0				
PHIMS	Philadelphia	31	2	6%	1	1	7	0	7	9	8	8	11	10
PITMS	Pittsburgh	0	0		0	0	0	0	0	0				
PATMS	Port Arthur	17	6	35%	0	5	5	0	5	10	12	11	21	8
PTCD	Port Canaveral	1	1	100%	0	0	0	0	0	0	50	46	48	
PLAD	Port Lavaca	0	0		0	0	0	0	0	0	40	40		
POMMS	Portland (Me)	15	1	7%	2	1	1	0	1	4	33	32	23	23
PORMS	Portland (Or)	39	10	26%	0	0	11	0	11	11	10	7	10	6
PROMS	Providence	6	4	67%	0	0	3	0	3	3	30	31	39	27
SEAMS	Puget Sound	43	35	81%	0	0	1	0	1	1	7	29	6	36
SDCMS	San Diego	13	12	92%	3	0	0	0	0	3	37	41	26	27
SFCMS	San Francisco	64	38	59%	4	3	3	0	3	10	3	6	4	8
SJPMS	San Juan*													
SBCD	Santa Barbara	0	0		0	0	0	0	0	0	52	47		
SSMMS	Sault Ste Marie	25	19	76%	2	0	4	0	4	6	18	16	13	17
SAVMS	Savannah	13	0	0%	1	0	1	0	1	2	21	21	26	32
SIND	Singapore*													
SITD	Sitka	0	0		0	0	0	0	0	0				
STCD	St. Croix*													
SIMMI	St. Ignace	0	0		0	0	0	0	0	0	43	39		
SLMMS	St. Louis	0	0		0	0	0	0	0	0				
STTD	St. Thomas*													
STBMI	Sturgeon Bay	6	6	100%	0	0	0	0	0	0	44	41	39	
TAMMS	Tampa	18	4	22%	1	1	4	0	4	6	13	13	19	17
TOLMS	Toledo	15	14	93%	1	0	0	0	0	1	24	21	23	36
DHAD	Unalaska	7	3	43%	0	0	1	0	1	1	42	45	37	36
VALMS	Valdez	13	12	92%	0	1	0	0	0	1	19	43	26	36
WNCMS	Wilmington	8	2	25%	0	0	1	0	1	1	31	32	33	36
		1053	409	39%						293				

Table 7: Rank-Ordered Summary of USCG Units with Highest Ship Accident (ACG) Counts

		1992-1998 Data		1996 Data		Rank			
		Ship Accidents	**Ship ACG**	Ship Accidents	**Ship ACG**	1992-1998 Total Ship	**1992-1998 ACG Ship**	1996 Total Ship	**1996 ACG Ship**
NEWMS	New Orleans	1177	**353**	110	**35**	1	**1**	1	1
HOUMS	Houston	657	**150**	73	**21**	2	**2**	2	3
MIAMS	Miami	365	**114**	43	**20**	6	**3**	6	4
NYCMI	New York	490	**111**	60	**14**	4	**4**	5	5
GALMS	Galveston	290	**103**	42	**22**	11	**5**	8	2
SFCMS	San Francisco	536	**97**	64	**10**	3	**6**	4	8
PORMS	Portland (Or)	291	**90**	39	**11**	10	**7**	10	6
PHIMS	Philadelphia	331	**77**	31	**9**	8	**8**	11	10
HMRMS	Hampton Roads	313	**76**	40	**11**	9	**9**	9	6
DETMS	Detroit	169	**72**	24	**9**	14	**10**	14	10
PATMS	Port Arthur	189	**66**	17	**10**	12	**11**	21	8
JACMS	Jacksonville	168	**52**	13	**2**	15	**12**	26	32
TAMMS	Tampa	182	**46**	18	**6**	13	**13**	19	17
MOBMS	Mobile	157	**45**	30	**8**	17	**14**	12	13
CORMS	Corpus Christi	165	**44**	14	**8**	16	**15**	25	13
SSMMS	Sault Ste Marie	146	**38**	25	**6**	18	**16**	13	17
MASD	Massena	94	**37**	19	**9**	26	**17**	17	10
CLEMS	Cleveland	97	**31**	21	**5**	25	**18**	15	20
ANCMS	Anchorage	127	**27**	18	**3**	20	**19**	19	27
CHIMS	Chicago	86	**26**	10	**2**	28	**20**	31	32
LOSMS	LA-Long Beach	379	**25**	67	**7**	5	**21**	3	16
SAVMS	Savannah	111	**25**	13	**2**	21	**21**	26	32
TOLMS	Toledo	98	**25**	15	**1**	24	**21**	23	36
BALMS	Baltimore	103	**24**	20	**4**	22	**24**	16	23
BATD	Baton Rouge	53	**22**	9	**6**	35	**25**	32	17

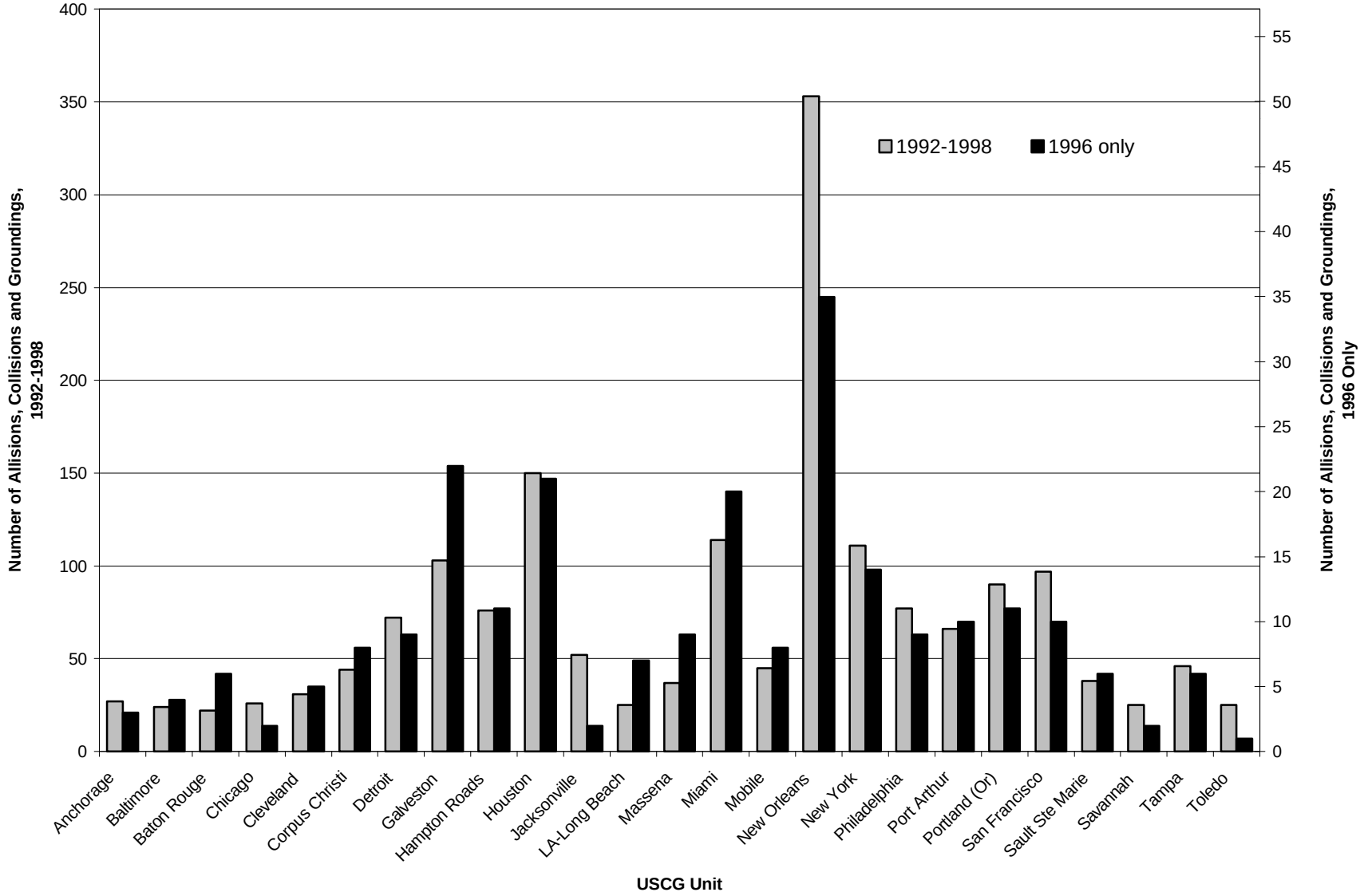

Figure 4: Ship Allisions, Collisions and Groundings – 25 USCG Units with Highest Totals Shown

Analysis of Causal Factors and Incident Severity

Additional queries into causal factors and other related factors for these accidents were also performed, and a few key pieces of information were gleaned from the data. From the primary causal factors[15] data entry field, "Human Factors" was indicated as the primary causal factor in more than 50% of ship ACGs, "Weather" was the listed factor in about 25% of the incidents, and "Equipment Failure" in about 20% of the incidents. A fourth option, Hazardous Materials, did not appear in any significant portion of ship ACG incident records. In addition, it was found that for grounding incidents, silting/shoaling was indicated as a factor in about 10% of the cases.[16] Groundings were listed as "intentional"[17] in 5% and "accidental" in 95% of the reported groundings. Unfortunately, limited conclusions were able to be drawn from the data regarding this type of information, because of the apparent limited and inconsistent nature of the USCG database data entry options.

An investigation and analysis of accident severity was also attempted, via inspection of other events in the USCG accident database. One approach incorporated weighting factors for pollution, damage costs and personnel casualty (specifically death) reports associated with allisions, collisions and groundings. In this way, a grounding that resulted in a pollution incident, substantial damage and/or a death would receive a higher emphasis than one that did not entail any of these additional factors. However, this "severity analysis" was inconclusive for several reasons. First, the pollution and damage cost data does not exist for every incident. And unfortunately, the absence of this data does not necessarily equate to absence of pollution or damage costs[18]. Second, the death data related to allisions, collisions and groundings were very sparse – a total of only 61 deaths were associated with more than 30,000 allisions, collisions and groundings from 1992-1998. (Death occurrences are usually associated with other incident types, such as fires and sinkings.) And of the death incidents associated with allisions, collisions or groundings, in more than a few cases it was found that the personnel casualty – the death – actually *preceded* the allision, collision or grounding. So in these cases, it appears that the allision, collision or grounding was caused by the death, and not vice-versa. Since this accident analysis aims to identify locations where accidents may be attributable to navigation channel design or maintenance, it is therefore not logical to add emphasis to these latter cases.

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[15] This information was listed under "category" in table ccft of MINMod. The field contained one of four options: EF (equipment failure), HF (human factors), WX (weather) or HM (hazardous materials).

[16] This information is from the "sub-class" field of the ccft table, which included a variety of types of information, based on the primary nature of the incident.

[17] Intentional groundings usually occur in cases where a vessel operator is trying to avoid a more serious accident, such as a collision with another vessel or an allision with a structure such as a bridge.

[18] As per discussions with several USCG accident investigators.

Vessel Transit Statistics and Correlation of USCG Units to USACE Districts

It was desired to normalize the accident data to vessel transit statistics for each USCG unit. However, as discussed in some depth in the *Hawaii Vessel Traffic Analysis,* vessel traffic analysis is a difficult task. Although there are agencies that collect vessel transit information, there does not appear to be any clear correlation between vessel transit statistics and associated region delineations with the USCG data/USCG unit delineations for all major ports throughout the country.

For this study, it was therefore decided to use the best available compilation of vessel transit statistics, published by the USACE Water Resources Support Center's Navigation Data Center (NDC). This data was used since it is the most detailed and comprehensive navigation database available that covers all U.S. deep-draft (as well as shallow-draft) ports. NDC is responsible for establishing and maintaining a variety of navigation-oriented databases. These include databases of waterborne commerce, domestic commercial vessels, port facilities, lock facilities and lock operations, and navigation dredging projects. The vessel transit statistics compiled by NDC include data categorized by waterway and/or port, inbound/outbound vessel direction, foreign/domestic vessel, vessel type, vessel draft, as well as additional tables covering commodity types and tonnages. For this portion of the study, the "Vessel Trips and Drafts" data from within the NDC publications was used to assess vessel movements within particular regions of accident statistics.

The transit statistics used for this study were the latest complete set available – from 1996. It should be noted that although seven years of accident data were used and only one year of transit data was used, the normalization takes the difference in time periods into account, when needed. That is, the calculated accident rate for the 1992-1998 was obtained by approximating the vessel traffic to be seven times the traffic experienced in the single year, via the following equation:

$$\frac{\textit{Accidents}}{\textit{per } 1000 \textit{ Transits}} = \frac{\textit{Number of Accidents During 7\&year Period: 1992\&1998}}{7 \times \left(\textit{Vessel Transit Data From 1\&year Period: 1996}\right)} \times 1000$$

The 1996 accident data rates were calculated by:

$$\frac{\textit{Accidents}}{\textit{per } 1000 \textit{ Transits}} = \frac{\textit{Number of Accidents During 1\&year Period: 1996}}{\textit{Vessel Transit Data From 1\&year Period: 1996}} \times 1000$$

The NDC transit data is divided into many subcategories, e.g., specific waterways, waterway locations, river reaches, etc. Although some of the USCG accident data includes location descriptors related to waterway locations, these descriptors are not as detailed as the NDC groupings, not standardized and are often erroneous or missing. Still, the USCG areas of responsibility were investigated and correlated as closely as possible to NDC waterway descriptors.

These correlations appear in detail in Appendix D. A brief summary correlation table of USCG Units to USACE districts[19] is shown in Table 8.

The transit data provided by NDC was also analyzed with consideration of the deep-draft emphasis of the study. Only the transits on waterways that accommodated 20-ft or greater draft vessels were counted in the transit totals. The designation of the 20-ft threshold was chosen because of the organization of the *Trips and Drafts of Vessels* tables from NDC; most waterway tables had transits listed at every foot of draft above 18-ft, with the shallower draft transits grouped together in one category labeled "#18." It is recognized that the 20-ft threshold is higher than the nominal USACE "deep-draft" designation of 15 ft, but this "deeper" deep-draft cutoff of 20 ft made logical sense since it encompasses the larger freight and tanker traffic, but excludes the shallower barge and recreational/passenger vessels.

The determination whether a waterway had accommodated a 20-ft or greater draft vessel was made by inspection. If the data indicated that a vessel greater than 20-ft draft had traversed the waterway, the transits on that waterway were included. The sum of the inbound and outbound traffic (of all vessel types) are included in the totals for deep-draft channels. In addition, the transits of only deep-draft vessels on those channels (i.e., vessels whose drafts were actually greater than or equal to 20 ft) were also tabulated. These waterway totals are shown in detail in Appendix C. On average, deep-draft vessels comprised 11% of the transits along deep-draft waterways. Listed in Table 9 are the totals corresponding to each USCG unit. For details on the specific waterway data contributing to the USCG unit totals, see Appendix D.

It should be stressed that careful attention must be paid to interpretation of NDC's transit statistics. In certain cases double, triple and quadruple accounting for ship transits may be encountered if the statistics are not scrutinized. For example, in the case of New Orleans, a ship traveling from the Gulf of Mexico up to Baton Rouge would be counted in the statistics for multiple separately-counted sub-stretches of the Mississippi River. However, in other ports with the same approximate channel length, a similar transit would be counted only once. These multiple counts were omitted whenever possible.

[19]These correlations are approximate. In some cases, a USCG unit may overlap waterways from more than one USACE district. See Appendix D for more accurate and detailed correlations.

Table 8: Approximate Correlation between USCG Units and USACE Deep-draft Districts

USCG Unit Code	USCG Unit Name		Corresponding USACE Deep-draft District
ASOD	**American Samoa***	AQ	(Pacific Ocean Division)
ANCMS	**Anchorage**	AK	Alaska
BALMS	**Baltimore**	MD	Baltimore
BAND	**Bangor**	ME	New England
BATD	**Baton Rouge**	LA	New Orleans
BOSMS	**Boston**	MA	New England
BRND	**Brownsville**	TX	Galveston
BUFMS	**Buffalo**	NY	Buffalo
CHAMS	**Charleston**	SC	Charleston
CHIMS	**Chicago**	IL	Chicago
CIND	**Cincinnati***	OH	*(Louisville)*
CLEMS	**Cleveland**	OH	Buffalo
COND	**Concord***	CA	(San Francisco)
CORMS	**Corpus Christi**	TX	Galveston
DAVD	**Davenport***	IA	*(Rock Island)*
DETMS	**Detroit**	MI	Detroit
DULMS	**Duluth**	MN	Detroit
EURMI	**Europe***		n/a
FEAMI	**Far East Asia***		(Pacific Ocean Division)
GALMS	**Galveston**	TX	Galveston
GHND	**Grand Haven**	MI	Detroit
GRND	**Greenville***	MS	*(Vicksburg)*
GUAMS	**Guam***	GQ	(Pacific Ocean Division)
HMRMS	**Hampton Roads**	VA	Norfolk
HONMS	**Honolulu**	HI	Honolulu
HMAD	**Houma***	LA	(New Orleans)
HOUMS	**Houston**	TX	Galveston
HUNMS	**Huntington***	WV	*(Huntington)*
JACMS	**Jacksonville**	FL	Jacksonville
JUNMS	**Juneau**	AK	Alaska
KEND	**Kenai**	AK	Alaska
KETD	**Ketchikan**	AK	Alaska
KODD	**Kodiak**	AK	Alaska
LKCD	**Lake Charles**	LA	New Orleans
LOSMS	**LA-Long Beach**	CA	Los Angeles
LISMS	**Long Island Sound**	CT/ NY	New York
LOUMS	**Louisville***	KY	(Louisville)
MASD	**Massena**	NY	Buffalo
MEMMS	**Memphis***	TN	*(Memphis)*
MIAMS	**Miami**	FL	Jacksonville
MILMS	**Milwaukee**	WI	Detroit
STPD	**Minneapolis/St Paul***	MN	(Detroit)
MOBMS	**Mobile**	AL	Mobile
MORMS	**Morgan City***	LA	(New Orleans)
NASD	**Nashville***	TN	*(Nashville)*
PORD	**New Castle***	NH	(New England)
NEWMS	**New Orleans**	LA	New Orleans
NYCMI	**New York**	NY	New York
PADMS	**Paducah***	KY	*(Louisville)*
PCDD	**Panama City**	FL	Mobile
PEOD	**Peoria***	IL	*(Rock Island)*
PHIMS	**Philadelphia**	PA	Philadelphia
PITMS	**Pittsburgh***	PA	*(Pittsburgh)*
PATMS	**Port Arthur**	TX	Galveston
PTCD	**Port Canaveral**	FL	Jacksonville
PLAD	**Port Lavaca**	TX	Galveston
POMMS	**Portland (Me)**	ME	New England
PORMS	**Portland (Or)**	OR	Portland
PROMS	**Providence**	RI	New England
SEAMS	**Puget Sound**	WA	Seattle
SDCMS	**San Diego**	CA	Los Angeles
SFCMS	**San Francisco**	CA	San Francisco
SJPMS	**San Juan***	PR	(Jacksonville)
SBCD	**Santa Barbara**	CA	Los Angeles
SSMMS	**Sault Ste Marie**	MI	Detroit
SAVMS	**Savannah**	GA	Savannah
SIND	**Singapore***		(Pacific Ocean Division)
SITD	**Sitka***	AK	(Alaska)
STCD	**St. Croix***	VI	(Jacksonville)
SIMMI	**St. Ignace**	MI	Detroit
SLMMS	**St. Louis***	MO	*(St. Louis)*
STTD	**St. Thomas***	VI	(Jacksonville)
STBMI	**Sturgeon Bay**	WI	Detroit
TAMMS	**Tampa**	FL	Jacksonville
TOLMS	**Toledo**	OH	Buffalo
DHAD	**Unalaska**	AK	Alaska
VALMS	**Valdez**	AK	Alaska
WNCMS	**Wilmington**	NC	Wilmington

*= Not Analyzed – either foreign or shallow draft only (*Italic type indicates that the USACE district is exclusively or primarily shallow-draft.*)

Results of Data Normalization

The "filtered" USCG ship accident data (as described previously) were normalized by the transit totals for each USCG unit, as shown in Appendix D. Two normalization methods were used: in the first, the accidents were normalized by the total number of deep-draft transits on deep-draft channels (these transits include only vessels with drafts greater than 20 ft), and in the second, the accidents were normalized by the total number of vessel transits on the deep-draft waterways (these transits include vessels with drafts less than and greater than 20 ft). These results are shown in Table 9 and also graphically in Figures 5 and 6.

In the data normalization, the USCG units experienced an average of 1.65 ship ACGs per 1000 deep-draft transits on deep waterways, and 0.25 ship ACGs per 1000 total vessel transits on deep waterways. The normalization results are significant because it shows that New Orleans, which ranked no. 1 in raw accident numbers, far ahead of other units, had an accident rate ranking of 4th after normalization by deep-draft traffic, and 19th when normalized by total traffic on deep waterways. The USCG units that were highest ranked after normalization by deep-draft traffic only were Buffalo, Galveston, Anchorage, New Orleans and San Diego. When normalized by all traffic, Anchorage, Duluth, Jacksonville, Tampa and Cleveland had the highest accident rates.

It is interesting to notice how significantly the results differ when normalized by the two different traffic counts. Essentially, those locations which have a high volume of barge traffic all but disappear from the ranking when shallow-draft vessels are included in the transit counts. It is also interesting to note that many locations have a considerably high shallow traffic volume on their deep-draft channels. Figure 7 shows the reduction in accident rate due to the inclusion of shallow-draft transit statistics. (Note that only deep-draft waterways are included.) This accident rate reduction is equivalent to the ratio of shallow-draft traffic to total traffic. As can be seen from the figure, units such as Anchorage, which have noticeably low shallow to deep traffic ratios, seem to suffer in comparison to the other locations when normalized by total traffic counts.

Table 9: Summary of Normalized Accident Data by USCG Unit

USCG Unit	Accident Data 1992-98 Total Ship	Accident Data 1992-98 ACG Ship	Accident Data 1996 Total Ship	Accident Data 1996 ACG Ship	Transit Data for Deep W'ways All Vessel Transits	Transit Data for Deep W'ways **Deep-Draft Vessel Transits (>=20')**	Normalized Results 1992-1998 ACGs per 1000 Total Transits	Normalized Results 1992-1998 ACGs per 1000 Deep Transits	Normalized Results 1996 only ACGs per 1000 Total Transits	Normalized Results 1996 only ACGs per 1000 Deep Transits	Rank: Normal'd Results 1992-1998 ACGs per 1000 Total Transits	Rank: Normal'd Results 1992-1998 ACGs per 1000 Deep Transits	Rank: Normal'd Results 1996 only ACGs per 1000 Total Transits	Rank: Normal'd Results 1996 only ACGs per 1000 Deep Transits
Anchorage	127	**27**	18	**3**	883	**600**	4.368	**6.429**	3.398	**5.000**	1	3	1	3
Baltimore	103	**24**	20	**4**	42,080	**4,471**	0.081	**0.767**	0.095	**0.895**	33	37	27	29
Bangor	14	**1**	4	**1**	1,485	**345**	0.096	**0.414**	0.673	**2.899**	30	47	4	9
Baton Rouge	53	**22**	9	**6**	134,702	**4,414**	0.023	**0.712**	0.045	**1.359**	49	39	37	26
Boston	90	**18**	17	**8**	25,131	**2,197**	0.102	**1.170**	0.318	**3.641**	26	25	12	7
Brownsville	16	**6**	4	**2**	4,850	**552**	0.177	**1.553**	0.412	**3.623**	15	16	9	8
Buffalo	57	**17**	4	**1**	21,812	**229**	0.111	**10.605**	0.046	**4.367**	25	1	36	5
Charleston	102	**13**	11	**5**	18,514	**2,778**	0.100	**0.669**	0.270	**1.800**	27	42	14	18
Chicago	86	**26**	10	**2**	94,880	**2,290**	0.039	**1.622**	0.021	**0.873**	44	14	40	30
Cleveland	97	**31**	21	**5**	9,056	**3,053**	0.489	**1.451**	0.552	**1.638**	5	20	7	20
Corpus Christi	165	**44**	14	**8**	63,564	**5,391**	0.099	**1.166**	0.126	**1.484**	28	26	22	22
Detroit	169	**72**	24	**9**	27,238	**14,677**	0.378	**0.701**	0.330	**0.613**	9	41	11	38
Duluth	86	**18**	19	**4**	3307	**2727**	0.778	**0.943**	1.210	**1.467**	2	30	2	23
Galveston	290	**103**	42	**22**	36,592	**2,213**	0.402	**6.649**	0.601	**9.941**	7	2	5	1
Grand Haven	16	**11**	5	**4**	5,679	**806**	0.277	**1.950**	0.704	**4.963**	12	11	3	4
Hampton Roads	313	**76**	40	**11**	166,829	**14,384**	0.065	**0.755**	0.066	**0.765**	38	38	34	32
Honolulu	64	**13**	8	**5**	23,909	**3,130**	0.078	**0.593**	0.209	**1.597**	37	44	16	21
Houston	657	**150**	73	**21**	122,329	**9,047**	0.175	**2.369**	0.172	**2.321**	16	8	19	12
Jacksonville	168	**52**	13	**2**	10,858	**2,962**	0.684	**2.508**	0.184	**0.675**	3	7	18	34
Juneau	40	**11**	4	**1**	9,520	**1,935**	0.165	**0.812**	0.105	**0.517**	18	36	25	39
Kenai	31	**2**	2	**0**	1,866	**285**	0.153	**1.003**	0.000	**0.000**	20	29		
Ketchikan	17	**3**	2	**0**	8,782	**738**	0.049	**0.581**	0.000	**0.000**	43	45		
Kodiak	8	**2**	0	**0**	1,089	**191**	0.262	**1.496**	0.000	**0.000**	14	19		
Lake Charles	44	**11**	7	**3**	49,303	**1,439**	0.032	**1.092**	0.061	**2.085**	47	27	35	16
LA-Long Beach	379	**25**	67	**7**	93,691	**10,843**	0.038	**0.329**	0.075	**0.646**	46	49	32	36
Long Island Sound	12	**0**	1	**0**	28,820	**1,062**	0.000	**0.000**	0.000	**0.000**				
Miami	365	**114**	43	**20**	42,488	**9,347**	0.383	**1.742**	0.471	**2.140**	8	12	8	15
Milwaukee	22	**3**	8	**1**	5,310	**349**	0.081	**1.228**	0.188	**2.865**	36	24	17	10
Mobile	157	**45**	30	**8**	79,577	**4,488**	0.081	**1.432**	0.101	**1.783**	35	21	26	19
New Orleans	1177	**353**	110	**35**	320,005	**12,724**	0.158	**3.963**	0.109	**2.751**	19	4	23	11
New York	490	**111**	60	**14**	412,258	**22,360**	0.038	**0.709**	0.034	**0.626**	45	40	38	37
Panama City	12	**0**	1	**0**	4,322	**228**	0.000	**0.000**	0.000	**0.000**				
Philadelphia	331	**77**	31	**9**	112,864	**10,837**	0.097	**1.015**	0.080	**0.830**	29	28	30	31
Port Arthur	189	**66**	17	**10**	115,874	**4,655**	0.081	**2.025**	0.086	**2.148**	34	9	29	14
Port Canaveral	15	**4**	1	**0**	4,163	**1,449**	0.137	**0.394**	0.000	**0.000**	22	48		
Port Lavaca	38	**9**	0	**0**	22,843	**1,579**	0.056	**0.814**	0.000	**0.000**	40	35		
Portland (Me)	57	**13**	15	**4**	37,391	**951**	0.050	**1.953**	0.107	**4.206**	41	10	24	6
Portland (Or)	291	**90**	39	**11**	139,708	**8,358**	0.092	**1.538**	0.079	**1.316**	31	18	31	27
Providence	70	**15**	6	**3**	12,853	**1,384**	0.167	**1.548**	0.233	**2.168**	17	17	15	13
Puget Sound	344	**16**	43	**1**	207,745	**8,190**	0.011	**0.279**	0.005	**0.122**	50	50	42	42
San Diego	47	**8**	13	**3**	23,408	**316**	0.049	**3.617**	0.128	**9.494**	42	5	21	2
San Francisco	536	**97**	64	**10**	115,435	**15,265**	0.120	**0.908**	0.087	**0.655**	23	31	28	35
Santa Barbara	12	**3**	0	**0**	5,035	**491**	0.085	**0.873**	0.000	**0.000**	32	33		
Sault Ste Marie	146	**38**	25	**6**	90,384	**4,246**	0.060	**1.279**	0.066	**1.413**	39	23	33	25
Savannah	111	**25**	13	**2**	11,750	**4,082**	0.304	**0.875**	0.170	**0.490**	10	32	20	40
St. Ignace	25	**10**	0	**0**	10,028	**2,653**	0.142	**0.538**	0.000	**0.000**	21	46		
Sturgeon Bay	25	**8**	6	**0**	2,338	**660**	0.489	**1.732**	0.000	**0.000**	6	13		
Tampa	182	**46**	18	**6**	10,234	**4,172**	0.642	**1.575**	0.586	**1.438**	4	15	6	24
Toledo	98	**25**	15	**1**	30,338	**1,315**	0.118	**2.716**	0.033	**0.760**	24	6	39	33
Unalaska	27	**5**	7	**1**	2,562	**518**	0.279	**1.379**	0.390	**1.931**	11	22	10	17
Valdez	132	**6**	13	**1**	3,186	**1,032**	0.269	**0.831**	0.314	**0.969**	13	34	13	28
Wilmington	69	**13**	8	**1**	70,894	**3,125**	0.026	**0.594**	0.014	**0.320**	48	43	41	41

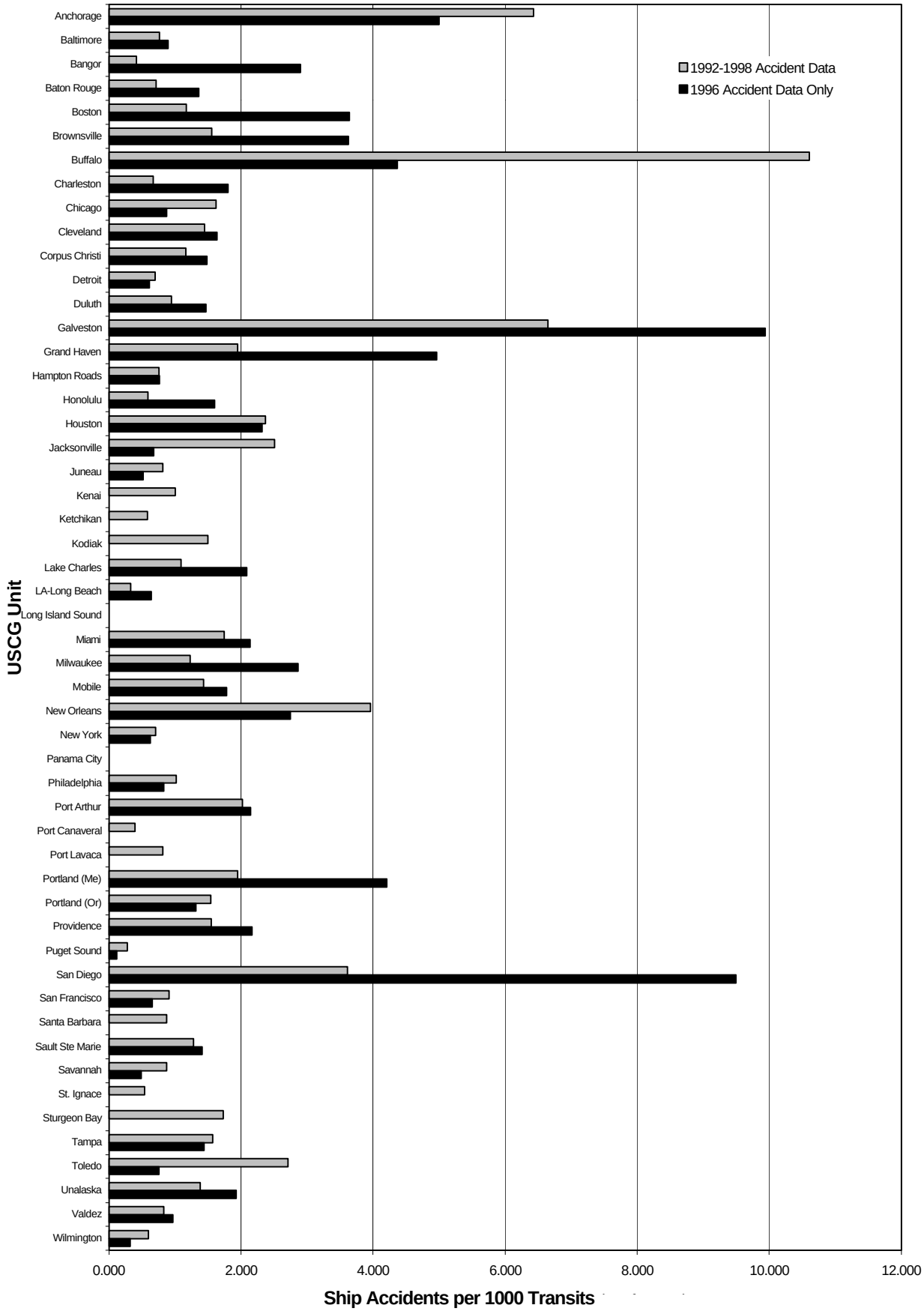

Figure 5: Normalized Accident Data: Ship ACGs
per 1000 Deep-Draft Vessel Transits on Deep-Draft Waterways

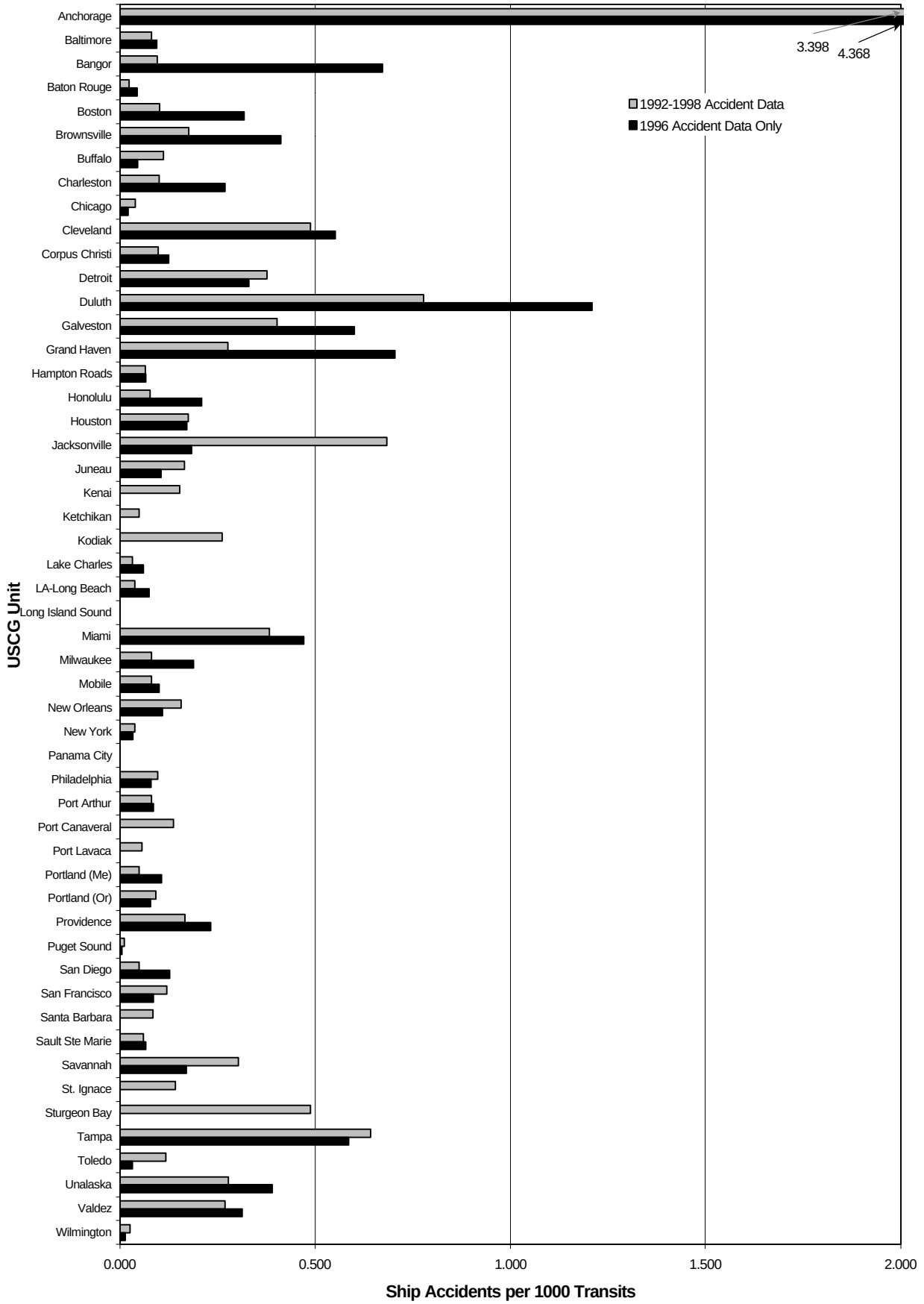

Figure 6: Normalized Accident Data – Ship ACGs
per 1000 Total Vessel Transits on Deep-Draft Waterways

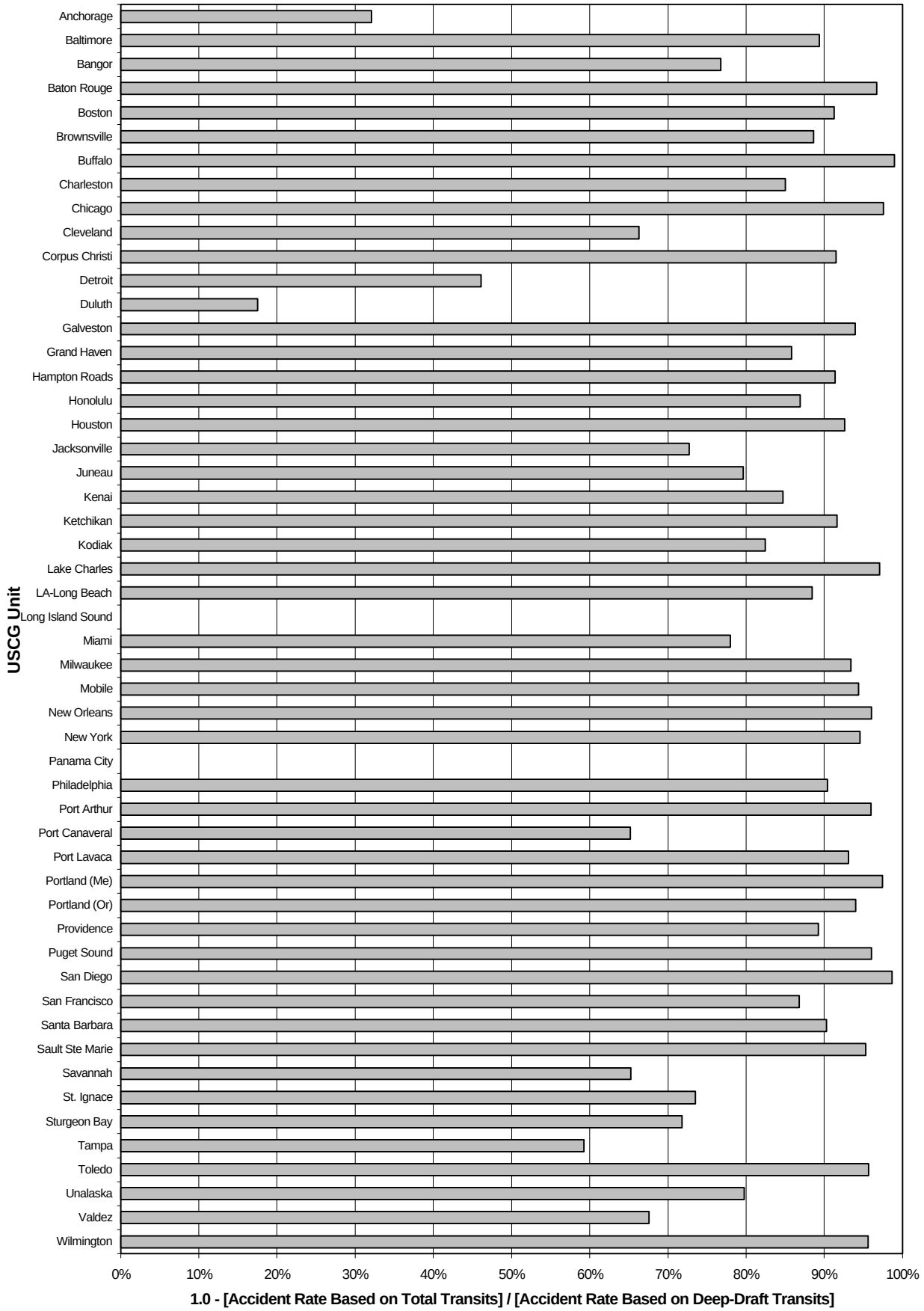

Figure 7: Percent Reduction in Accident Rate Due to the Inclusion of Shallow-Draft Vessels (Based on 1992-1998 ship ACGs and 1996 deep draft waterway transit data)

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SUMMARY AND CONCLUSIONS

USCG accident data within the MINMod database covering the period from 1992-1998 were analyzed for information regarding incidents that may have been related to the design or maintenance of domestic deep-draft channels. A parallel analysis which included data from 1996 only was also performed to correspond more directly to available transit data. A general review of database information was performed and guided the methods of further data analysis for this study. In keeping with the deep-draft concentration of the project, the accidents involving freight ship and tank ship vessel types (which are typically deeper-draft vessels) were further analyzed. These vessel types were chosen for further analysis since direct information on vessel drafts involved in USCG incidents was unavailable.

Table 10 summarizes the highest-ranked USCG units for the different methods of analysis discussed in the report. New Orleans and Galveston are the only 2 units that rank within the top 5 for non-normalized data and for (one type of) normalized data. Anchorage ranks in the top 5 for both methods of data normalization.

It seems significant that Anchorage has a relatively high ship accident rate when normalized by deep-draft transits as well as by all transits. Contrariwise, although Buffalo, Galveston, New Orleans and San Diego have high ship accident rates when normalized by deep-draft transits, they have experienced low-to-moderate ship accident rates when normalized by all traffic. This may imply that congestion contributes to the accidents occurring in these latter locations. Since the total number of Anchorage transits is low, the high accident rate (normalized) may be attributed to extreme environmental factors such as tides, currents and visibility.

Appendix E also provides additional notes on repeat accident locations within all of the USCG unit designations.

Table 10: Summary of 5 Top-Ranked USCG Units Based on Different Ship Accident (ACG) Analyses

Rank	Based on Accident Counts	Normalized by Deep Transits	Normalized by All Transits
1	New Orleans	Buffalo	Anchorage
2	Houston	Galveston	Duluth
3	Miami	Anchorage	Jacksonville
4	New York	New Orleans	Tampa
5	Galveston	San Diego	Cleveland

Other facts of relevance and/or interest to this study include:

- Most of the vessels involved in USCG reported accidents were of U.S.-flag registry. Of the freight and tank ships, the percentage of vessels that were U.S.-flag was significantly lower, but still abnormally high. This high percentage is most likely due to piloting requirements; within most ports, foreign flag vessels must take aboard a state-licensed, "local" pilot, whereas U.S.-flag ships are usually not required to do so.
- The types of vessels most commonly involved in allisions, collisions and groundings were barges. This can be attributed to the limited maneuverability of these vessels compounded by the high number of these vessels within some port systems. Barges were followed by towboats/tugboats, then ships, commercial vessels, fishing vessels and passenger vessels. The USCG units having the highest accident rates are also those that support high barge traffic.
- The most common cause of allisions, collisions and groundings reported was "Human Factors," followed by "Weather" and "Equipment Failure".
- Of the events that included grounding, approximately two-thirds were stated as "Out of Channel," while one-third were within the channel. Silting/shoaling was mentioned as a causal factor in one-tenth of these events. Grounding was listed as "intentional" in 5% of the cases and "accidental" in 95% of the cases.

It is worthwhile to point out that while much of the channel usage problems point to domestic and not international traffic, these domestic traffic problems are likely to be critical factors in the infrastructure supporting transshipments from international shipping trade. Therefore, no group of data can be easily neglected when attempting to analyze channel design and maintenance effects on international trade.

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APPENDIX A

U.S. Coast Guard Database Table
Content Descriptions

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Table A-1: U.S. Coast Guard Database Table Content Descriptions

Table Header	Column Name	Attribute Name	Attribute Definition	Column Datatype
vidt	vkey	Vessel Key	Primary key to identify a vessel and join records.	CHAR(10)
(MSIS)	poc	Port of Certification	Port of Certification - CG port issuing last Certification of Inspection. Data consists of MSIS Port Code (or NULL).	CHAR(5)
	pod	Home Port	Port of Documentation. The CG documentation port code.	CHAR(5)
	vname	Vessel Name	Vessel Name. (Asterisk in last column of name indicates the vessel is archived).	CHAR(33)
	vin	Primary VIN	Primary Vessel Identification Number for vessel in MSIS.	CHAR(10)
	call_sign	Call Sign	Call sign of vessel.	CHAR(8)
	flag	Flag	Vessel flag code	CHAR(2)
	vin1	1st Alternate VIN	1st Alternate VIN.	CHAR(8)
	vin2	2nd Alternate VIN	2nd Alternate VIN.	CHAR(8)
	vin3	3rd Alternate VIN	3rd Alternate VIN.	CHAR(8)
	vin4	4th Alternate VIN	4th Alternate VIN.	CHAR(8)
	design	Design Type	Design Code	CHAR(19)
	service	Service	Service Code (insp vessels).	CHAR(19)
	coi_dt	Inspect Cert Date	Date of Inspection for Certification (insp vsls).	CHAR(8)
	cod_ind	COD Indicator	"X" - vessel is documented.	CHAR(1)
	ic_ind	Inspection Concern	"I" - vessel has a Certification of Inspection "C" - vessel has had a Certificate of Compliance	CHAR(1)
	psbr_ind	Port Safety Concern	"X" - vessel has a Port Safety Boarding history.	CHAR(1)
	va_ind	Vessel Archive Ind	"X" - vessel has been archived.	CHAR(1)
	imo_num	IMO Number	Lloyd's Registry number (less the 'L' prefix).	CHAR(7)
	subchap	Inspection Subchapter	Subchapter (46 CFR) that vessel is inspected under.	CHAR(2)
	v_use	Use	Vessel use code	CHAR(19)
	dwt	Deadweight Tons	Deadweight tonnage.	CHAR(6)
	bld_dt	Build Date	Date of build.	CHAR(7)
	bld_pl	Build Place 1	Place of build.	CHAR(36)
	keel_dt	Date Keel Laid	Date keel laid.	CHAR(8)
	route	Operating Route	Route code CC=COASTWISE CG COASTWISE AND GREAT LAKES GG=GREAT LAKES LC=COASTWISE LIMITED LG=LAKES, BAYS, SOUNDS AND GREAT LAKES LL=LAKES, BAYS, SOUNDS NA=NOT APPLICABLE OO=OCEANS RG=RIVERS AND GREAT LAKES - LIMITED RR=RIVERS	CHAR(2)
	min_crew	Minimum Crew	Minimum crew (insp vsls).	CHAR(4)
	num_pass	Passengers Permitted	Number of passengers permitted (insp vessels).	CHAR(4)
	max_persons	Maximum Persons Allwd	Maximum persons allowed (insp vessels).	CHAR(4)
	oth_crew	Other Crew Allowed	Number of other crew permitted (insp vessels).	CHAR(4)
	p_a_crew	Persons in Add to Crew	Number of persons in addition to crew (insp vessels).	CHAR(4)
	stab_status	Stability Doc Status	Stability Document Status (PERM/TEM) (insp vessels).	CHAR(4)
	cargo_auth	Cargo Authority	Bulk dangerous cargo carrying authority.	CHAR(60)
	hi_grd_auth	Highest Cargo Grade	Highest grade of liquid cargo authorized for carriage. (A,B,C, LPG etc.)	CHAR(3)
	tot_cap	Capacity in Barrels	Total cargo capacity.	CHAR(8)
	stab_ltr_ind	Stability Letter Ind	"X" - stability letter issued.	CHAR(1)
	stab_book_ind	Stability Book Inc	"X" - stability book issued.	CHAR(1)
	stab_app_date	Stability Approval Date	Stability approval date.	CHAR(8)
	stab_port	Unit Issue Stab Cert	Port issuing stability approval (MSIS port code).	CHAR(5)
	cfr_pt_11	CFR Part Used LL	CFR Part used for loadline.	CHAR(2)

Table A-1: U.S. Coast Guard Database Table Content Descriptions

Table Header	Column Name	Attribute Name	Attribute Definition	Column Datatype
	admin_11	Vessel Loadline Type	Vessel type (for loadline)	CHAR(4)
	route_11	Route Type LL	Loadline route type.	CHAR(9)
	stab_freebrd	Freebrd Used in Stab	Freeboard used for stability analysis.	CHAR(4)
	hazbulk_ind	Hazard Bulk Solid Ind	"X" - solid hazardous bulk carriage authority.	CHAR(1)
	dk_drain	Deck Drainage Class	Deck drainage class code (T boats) see table 8.	CHAR(12)
	cont_dt	Contract Date	Date contracted for construction.	CHAR(8)
	del_dt	Delivery Date	Date vessel delivered.	CHAR(8)
	ini_coi_dt	Init Cert Date	Date of initial Inspection for Certification.	CHAR(8)
	bld_yr	Build Year	Year built (e.g. 1981) - maybe 'UNKN'.	CHAR(4)
	cap_units	Capacity Units	Cargo carriage capacity units (BBLS, MTONs, etc.)	CHAR(4)
	plan_rev_unit	Plan Review Office	Unit conducting plan review (MSIS Port Code).	CHAR(5)
	yard	Yard Built	Yard where vessel was built.	CHAR(25)
	hull_num	Hull Number	Yard hull number.	CHAR(12)
	bld_cty	Build Country 1	Code for country where built	CHAR(3)
	ton_calc	Calculation Method	Tonnage calculation method (documented vessels).	CHAR(7)
	reg_gt	Gross Tons	Registered Gross Tons.	CHAR(6)
	itc_gt	ITC Gross Tons	ITC Gross Tons.	CHAR(6)
	dual_grt	Dual Gross Tons	Dual Gross Tons.	CHAR(6)
	reg_net	Net Tons	Registered Net Tons.	CHAR(6)
	itc_net	ITC Net Tons	ITC Net Tons.	CHAR(6)
	dual_net	Dual Net Tons	Dual Net Tons.	CHAR(6)
	reg_lgth	US Length	Registered Length.	CHAR(7)
	reg_brdth	US Breadth	Registered Breadth.	CHAR(7)
	reg_dpth	US Depth	Registered Depth.	CHAR(7)
	itc_lgth	ITC Length	ITC Length.	CHAR(7)
	itc_brdth	ITC Breadth	ITC Breadth.	CHAR(7)
	itc_dpth	ITC Depth	ITC Depth.	CHAR(7)
	overall_lgth	Overall Length	Length overall.	CHAR(7)
	disp_tons	Displacement Tons	Registered displacement tonnage.	CHAR(7)
	itc_ton_ind	ITC Tonnage Indicator	"X" - ITC tonnage used on Certification of Documentation.	CHAR(1)
	mes_ves_type	Vessel Type	Vessel type code used for admeasurement purposes.	CHAR(2)
	hull_mat	Hull Material	Hull Material Code	CHAR(11)
	selfprop_ind	Self Propelled Ind	"Y"/"N" - self propelled.	CHAR(1)
	t_cw	Coastwise Trade	"X" - Coastwise trade.	CHAR(1)
	t_gl	Great Lakes Trade	"X" - Great Lakes license.	CHAR(1)
	t_fish	Fisheries Trade	"X" - Fishing license.	CHAR(1)
	t_bow	Coastwise Bowater Only	"X" - Bowater license.	CHAR(1)
	t_reg	Registry	"X" - Registry license.	CHAR(1)
	t_rec	Recreation	"X" - Recreation license.	CHAR(1)
	rest_cw	Restrict-No CW/GL	"X" - no Coastwise or Great Lakes.	CHAR(18)
	rest_fish	Restrict-No Fishing	"X" - no Fishing.	CHAR(18)
	rest_reg	Restrict-No Registry	"X" - no Registry.	CHAR(18)
	rest_rec	Restrict-No Rec Lic	"X" - no Recreation.	CHAR(18)
	rest_gl	Restrict-No GL License	"X" - no Great Lakes.	CHAR(18)
	e_sl_cw	Spec Leg Coastwise	"X" - special legislation for coastwise trade.	CHAR(1)
	e_cf_cap	Captured Vessel	"X" - captured (in war).	CHAR(1)
	e_sl_fishery	Spec Leg Fishery	"X" - special legislation for fisheries.	CHAR(1)

Table A-1: U.S. Coast Guard Database Table Content Descriptions

Table Header	Column Name	Attribute Name	Attribute Definition	Column Datatype
	e_cf_forfeit	Forfeited Vessel	"X" - forfeited vessel.	CHAR(1)
	e_sl_call_hp	Spec Leg Call Home Port	"X" - special legislation contact home port.	CHAR(1)
	e_cf_wrecked	Wrecked Vessel	"X" - wrecked vessel.	CHAR(1)
	e_none	No Entitlements	"X" - no entitlements.	CHAR(1)
	us_serv_ind	US Service Ind	"Y" - US service indicator.	CHAR(1)
	cod_stat	COD Status	Certificate of Documentation Status VALID EXPIRED CANCEL DELETE INVALID DELETE-PM VALID-VFY VALID-NVFY VD case numbers(IN PROCESS)	CHAR(11)
	dblside_typ	Double Side Type	Double side type for tank vessels. WT = Watertight, NT = Non tight, NA = No double bottom.	CHAR(2)
	dblbott_typ	Double Bottom Type	Double bottom type for tank vessels. FULL = Full double bottoms, PART = Partial double bottoms, NONE = No double bottom.	CHAR(4)
	prop_typ	Propulsion Type	The main propulsion type of the vessel. (Insp vsls): AUXILIARY SAIL COMBINATION TYPES DIESEL DIRECT DIESEL ELECTRIC DIESEL OUTDRIVE DIESEL REDUCTION ELECTRIC MOTOR GASOLINE ENGINE GAS TURBINE NONE NOT CLASSIFIED SAIL STEAM TURBOELECTRIC STEAM RECIPROCATING STEAM TURBINE UNKNOWN	CHAR(20)
	sp	Filler	Filler	CHAR(1)
fidt (MSIS)	fkey	Facility Key	Primary key to identify a facility.	CHAR(10)
	port_zone	Port Zone	Unit zone.	CHAR(10)
	unit	Unit	Unit.	CHAR(8)
	unit_cat	Unit Category	Unit category.	CHAR(8)
	fin	Primary FIN	Primary facility identification number	CHAR(8)
	fin1	1st Alternate FIN	First Alternate FIN	CHAR(8)
	fin2	2nd Alternate FIN	Second Alternate FIN.	CHAR(8)
	fin3	3rd Alternate FIN	Third Alternate FIN.	CHAR(8)
	fname	Facility Name	Name of the Facility.	CHAR(33)
	lcl_id	Local ID	Local identification.	CHAR(10)
	category	Category	Type of category.	CHAR(20)
	fuse	Use	Facility use.	CHAR(15)
	ownership	Ownership	Ownership.	CHAR(15)
	nec_cat	Description for NEC	Not else classified description.	CHAR(25)
	inact_ind	Facility Inactive Ind	Facility inactive indicator.	CHAR(1)
	contact	Contact	Point of contact.	CHAR(33)
	day_phone	Day Phone Number	Day phone number.	CHAR(12)
	night_phone	Night Phone Number	Night phone number.	CHAR(12)
	emergency	Emergency Number	Emergency number.	CHAR(12)
	inspect_dt	Last Inspection Date	Last inspection date.	CHAR(8)
	marpol_solo_ind	Marpol Solo Ind	"X" - Marpol Solo indicator.	CHAR(1)
	marpol_super_ind	Marpol Super Ind	"X" - Marpol super indicator.	CHAR(1)
	marpol_fkey	Marpol Parent Fkey	Marpol facility number.	CHAR(10)
	sp	Filler	Filler	CHAR(1)

Table A-1: U.S. Coast Guard Database Table Content Descriptions

Table Header	Column Name	Attribute Name	Attribute Definition	Column Datatype
cirt	mccase	Marine Casualty Case	MSIS MC Case.	CHAR(10)
(MINMod)	unit	Port	MSIS Port code for unit.	CHAR(5)
	last_updt	Last Update	Date record last updated.	CHAR(8)
	vsl_ind	Vessel Indicator	'X' = vessel involved.	CHAR(1)
	pers_ind	Personnel Indicator	'X' = personnel involved.	CHAR(1)
	fac_ind	Facility Indicator	'X' = facility involved.	CHAR(1)
	pol_ind	Pollution Indicator	'X' = pollution involved.	CHAR(1)
	incident_dt	Incident Date	Incident date.	CHAR(8)
	incident_time	Incident Time	Incident time.	CHAR(4)
	inc_dt_known	Date/Time Known	'X' = Incident Date known.	CHAR(1)
	ref_case	Reference Case	MSIS reference case.	CHAR(10)
	notify_dt	Notify Date	Date unit notified.	CHAR(8)
	notify_time	Notify Time	Time unit notified.	CHAR(4)
	reporter_typ	Reporter Type	Reporting Source Category Type.	CHAR(15)
	subject	Subject	Incident Name as input by reporting unit.	CHAR(30)
	location	Location	Incident Location.	CHAR(30)
	stat_verify	Status Verified	'X' = Incident Verified.	CHAR(1)
	stat_not_verify	Status Not Verified	'X' = Incident NOT Verified.	CHAR(1)
	verify_not_rpt	Verified Not Reportable	'X' = Verified, NOT reportable.	CHAR(1)
	ctf_ind	CTF	'X' = Incident Closed to File.	CHAR(1)
	invest_dt	Investigator Date	Date Investigator Endorsed.	CHAR(8)
	command_endorse	Unit Command End/Fwd	'X' = Command Endorsed.	CHAR(1)
	command_cls	Unit Command End/Cls	'X' = Command Closed Case.	CHAR(1)
	command_dt	Unit Command Date	Date Command Endorsed/Clsd.	CHAR(8)
	dist_req	Dist Required	'X' = District Action Req'd.	CHAR(1)
	dist_endorse	District End/Fwd	'X' = District Endorsed.	CHAR(1)
	dist_cls	District End/Cls	'X' = District Closed.	CHAR(1)
	dist_dt	District Date	Date Dist Endorsed/Clsd.	CHAR(8)
	hq_req	HQ Required	'X' = HQ Endorse Req'd.	CHAR(1)
	hq_endorse	HQ End/Cls	'X' = HQ Endorsed.	CHAR(1)
	hq_dt	HQ Date	Date HQ Endorsed.	CHAR(8)
	city	City	City of Incident.	CHAR(25)
	state	State	State (code) of Incident.	CHAR(2)
	waterbody	Waterbody	Name of Waterbody.	CHAR(29)
	river_mile	River Mile	River Mile and tenths.	CHAR(4)
	river_tenths	River Tenth-Miles	River mile and tenths.	CHAR(1)
	latitude	Latitude	Latitude of Incident.	CHAR(6)
	longitude	Longitude	Longitude of Incident.	CHAR(7)
	pri_nature	Type	Primary Nature: FIRE CAPSIZE MISSING SINKING ALLISION FLOODING BREAKAWAY COLLISION EXPLOSION GROUNDING POLLUTION EQUIP FAIL PERSON CAS STRUCT FAIL	CHAR(11)
	cas_class	Class	Casualty Class: NONE MAJOR SERIOUS SIGNIFICANT PUBLIC/NONPUBLIC	CHAR(16)
	smi	SMI	'X' - Significant Marine Incident Indicator.	CHAR(1)
	deaths	Deaths	Number of Deaths.	CHAR(3)
	missing	Missing	Number Persons Missing.	CHAR(3)
	injured	Injured	Number Persons Injured.	CHAR(3)

Table A-1: U.S. Coast Guard Database Table Content Descriptions

Table Header	Column Name	Attribute Name	Attribute Definition	Column Datatype
	total_damage	Total Damage	Total Damage.	CHAR(9)
	mode	Mode	Environmental Impact Mode: (WATER, AIR, LAND, THREAT)	CHAR(6)
	severity	Severity Category	Incident Severity Level: (MAJOR, MEDIUM, MINOR, POTENT, NS = NO SPILL)	CHAR(6)
	mat_category	Material Category	Spill Material Category (OIL/OILY, HAZMAT, MARPOL V).	CHAR(8)
	osc	OSC	On Scene Coordinator Code (USCG, EPA, DOD).	CHAR(5)
	epa_reg	EPA Region	EPA Region Number.	CHAR(2)
	epa_resp	Response Required	'X' = EPA Response to spill.	CHAR(1)
	nrc_case	NRC Case	NRC Case Number.	CHAR(10)
	dist	District	District Port Code.	CHAR(5)
	case_ctl_lev	Case Control Level	Case Control Level Code 'I' = Investigator, 'U' = Unit, 'D' = District, 'H' = Hdqtrs.	CHAR(1)
	mcpd_ind	MCPD Indicator	Nr of subjects that have a case mcpd filed against it.	CHAR(2)
	mcns_ind	MCNS Indicator	Marine Casualty narrative supplement	CHAR(1)
	mcpa_ind	MCPA Indicator	Nr Personnel Action.	CHAR(2)
	mcts_ind	MCTS Indicator	Nr Towing Supplements.	CHAR(2)
	mcpi_ind	MCPI Indicator	Nr Personnel Involvement.	CHAR(2)
	mccr_ind	MCCR Indicator	X = Case Recommendation.	CHAR(1)
	mcsi_ind	MCSI Indicator	Nr SMI Supplements.	CHAR(2)
	mcdd_ind	MCDD Indicator	'X' = Casualty Details.	CHAR(1)
	mcdr_ind	MCDR Indicator	Nr Deficiency Reports.	CHAR(2)
	mccg_ind	MCCG Indicator	Nr Collision/Grounding.	CHAR(2)
	mcfc_ind	MCFC Indicator	Nr Flood, Capsize, Sinking.	CHAR(2)
	mcfe_ind	MCFE Indicator	Nr Fire/Explosion.	CHAR(2)
	mscf_ind	MSCF Indicator	Nr Structural Failure.	CHAR(2)
	mchm_ind	MCHM Indicator	Nr Haz Material.	CHAR(2)
	mcpc_ind	MCPC Indicator	Nr Personnel Casualty.	CHAR(2)
	mchf_ind	MCHF Indicator	Nr Human Factors records.	CHAR(2)
	nrc_ind	NRC Indicator	National Response Center Indicator.	CHAR(1)
	pub_vsl_ind	Public Vessel	"X" or NULL.	CHAR(1)
	boating_ind	Boating	"X" or NULL.	CHAR(1)
	num_vsl	Number of Vsls Inv	Number of vessels involved.	CHAR(2)
	num_fac	Number of Fac Inv	Number of facilities involved.	CHAR(2)
	mcls_ind	MCLS Indicator	Lifesaving involved.	CHAR(2)
	mcwx_ind	MCWX Indicator	"X" = case filed.	CHAR(2)
	rec_end_ind	Recomm Endorsed Inc	"X" = recommendation filed with case.	CHAR(1)
	supp_comp	Supplements Completed	'X' = All supplements completed.	CHAR(1)
	fwpca	FWPCA	FWPCA Case Number.	CHAR(9)
	fwpca_amt	FWPCA Amount	FWPCA Ceiling.	CHAR(7)
	cercla	CERCLA	CERCLA Case Number.	CHAR(9)
	cercla_amt	CERCLA Amount	CERCLA Ceiling.	CHAR(7)
	nfs_ind	Response by NFS	'X' = Strike Force Response.	CHAR(1)
	mcpd_closed	MCPD Closed Indicator	"X" = Pollution Details Supplement Closed.	CHAR(1)
	human_fac_num	Human Fac Num	Nr Human Factors.	CHAR(3)
	fy	Fiscal Year	Fiscal year.	CHAR(2)
	closed_by	Case Closed By	H = Case closed by HQ D = Case closed by District U = Case closed by Unit.	CHAR(1)

Table A-1: U.S. Coast Guard Database Table Content Descriptions

Table Header	Column Name	Attribute Name	Attribute Definition	Column Datatype
	sp	Filler	Filler	CHAR(1)
civt	mccase	Marine Casualty Case	Marine Casualty case number.	CHAR(10)
(MINMod)	vin	Vessel Identification	Vessel Identification number.	CHAR(8)
	vname	Name	Vessel name.	CHAR(33)
	flag	Flag	Vessel flag.	CHAR(2)
	service	Service	Service of the vessel	CHAR(19)
	mcpd_ind	MCPD Filed Ind	"X" = pollution detail was filed.	CHAR(1)
	mcpa_ind	MCPA Filed Ind	"X" = personnel action filed.	CHAR(1)
	mcpi_ind	MCPI Filed Inc	"X" = personnel inspection filed.	CHAR(1)
	mcsi_ind	MCSI Filed Inc	"X" = SMI filed.	CHAR(1)
	tow_supp	Towing Supp - MCTS	"X" = towing supplement reference.	CHAR(1)
	dam_eval	Damage Evaluation	Evaluation of seaworthiness of the vessel.	CHAR(4)
	operation	Operation - MCDD	FF operation prior to casualty.	CHAR(9)
	vsl_status	Control Status - MCDD	Status of vessel: TOWED MOORED ANCHORED UNDERWAY	CHAR(8)
	vkey	VKEY	Key to identify a vessel and joining record.	CHAR(10)
	towed_vsl_pos	Towing Supp Location	Position of the tow configuration.	CHAR(4)
	tow_status	Towing Supp Status	Status of vessel at time of tow: ASSIST CONTROL TOWED P TOWED NP	CHAR(10)
	subject	Subject Key	Subject case number.	CHAR(10)
	subj_ref_num	Subject Ref No	Identifies the vessel involved.	CHAR(3)
	mcpd_closed	MCPD Closed Ind	Marine Casualty Pollution Detail case closed.	CHAR(1)
	sp	Filler	Filler	CHAR(1)
cift	mccase	Marine Casualty Case	Marine Casualty Case number.	CHAR(10)
(MINMod)	fin	FIN	Facility Identification Number.	CHAR(8)
	fname	Involved Name	Facility name.	CHAR(33)
	category	Involved Category	Type of facility.	CHAR(20)
	mcpd_ind	MCPD File Ind	'X' = Pollution details filed.	CHAR(1)
	mcpd_clsd	MCPD Closed Ind	'X' = Pollution detail closed.	CHAR(1)
	pers_action	Personnel Action	Personnel Action Taken	CHAR(1)
	mcpa_ind	MCPA Filed Ind	'X' = Civil penalty action.	CHAR(1)
	mcpi_ind	MCPI Filed Ind	'X' = Personnel involvement.	CHAR(1)
	mcsi_ind	MCSI Filed Ind	'X' = SMI supplements filed.	CHAR(1)
	operation	Operation	FF Operation at time of casualty.	CHAR(9)
	cont_stat	Cont Stat	Status of facility: TOWED MOORED ANCHORED UNDERWAY	CHAR(8)
	verified	Verified Ind	Case verified.	CHAR(1)
	fkey	Fkey	Facility key. Primary join to other facility tables.	CHAR(10)
	subject	Subject	Subject case number.	CHAR(10)
	subj_ref_num	Subject Ref Number	Identify the vessel involved.	CHAR(3)
	sp	Filler	Filler	CHAR(1)
cevt	mccase	Marine Casualty Case	Marine Casualty Case Number.	CHAR(10)
(MINMod)	event	Event	Sequence of events of occurrence.	CHAR(2)

Table A-1: U.S. Coast Guard Database Table Content Descriptions

Table Header	Column Name	Attribute Name	Attribute Definition	Column Datatype
	subject1	First Subject Num	Vessel/Facility identification number.	CHAR(3)
	subject2	Second Subject Num	Vessel/Facility identification number.	CHAR(3)
	type	Type	Nature of incident. FIRE SINK CAPSIZE REMOVED ALLISION FLOODING POLLUTION LEFT BLANK ABANDONMENT EXPLOSION-INC GROUNDING ACC GROUNDING INT PERSONNEL CAS LOSS VES CNTRL LOSS ELEC POWER STRUCTURAL FAIL	CHAR(15)
	class	Class	Further modifies nature of incident.	CHAR(20)
	state	State	Modifies class.	CHAR(22)
	causal_event1	First Prec Event	The previous event of the casualty.	CHAR(2)
	causal_event2	Second Prec Event	The second previous event of the casualty.	CHAR(2)
	subj1_sig_ind	First Subject Sign	First significant subject.	CHAR(1)
	subj2_sig_ind	Second Subject Sign	Second significant subject.	CHAR(1)
	sp	Filler	Filler	CHAR(1)
ccft (MINMod)	mccase	MCCase	Marine Casualty case number.	CHAR(10)
	event	Event	Event chain.	CHAR(2)
	category	Category	Cause of the event.	CHAR(2)
	subject	Subject	Vessel/facility identification number.	CHAR(3)
	class	Type	Details of the category.	CHAR(15)
	subclass	Modifier 1	Details of the class.	CHAR(29)
	state	Modifier 2	Circumstances of the class.	CHAR(16)
	party	Party	Causal party.	CHAR(5)
	causal_event1	Prec Event 1	First causal event.	CHAR(2)
	causal_event2	Prec Event 2	Second causal event.	CHAR(2)
	supp_ind	Supplement Indicator	Supplement indicator.	CHAR(1)
	supp_id	Supplement Identifier	Identifies the supplement.	CHAR(4)
	hfnum	Human Factor No	Human factor number.	CHAR(2)
	sp	FILLER	FILLER	CHAR(1)
ccgt (MINMod)	mccase	Marine Casualty Case	Marine Casualty case number.	CHAR(10)
	subject	Subject	Vessel/facility identification number.	CHAR(10)
	speed	Speed	Speed at time of casualty.	CHAR(3)
	impact_location	Impact Location	Location where impact was incurred.	CHAR(30)
	dbl_bott	Double Bottomed Vessel	'Y/N' if doubled bottom.	CHAR(1)
	dbl_hull	Double Hulled Vessel	'Y/N' if doubled hull.	CHAR(1)
	sp	Filler	Filler	CHAR(1)
csft (MINMod)	mccase	Marine Casualty Case	Marine Casualty case number.	CHAR(10)
	subject	Subject	Subject case number.	CHAR(10)
	class	Class	Classification of the structural failure.	CHAR(1)
	type	Type	Type of structural failure.	CHAR(15)
	patt_typ	Pattern Type	Y/N - Structure failure pattern type.	CHAR(1)

Table A-1: U.S. Coast Guard Database Table Content Descriptions (continued)

Table Header	Column Name	Attribute Name	Attribute Definition	Column Datatype
	port	Port	"X" - failure port.	CHAR(1)
	stbd	STBD	"X" - failure starboard.	CHAR(1)
	ctr	Center	"X" - failure center.	CHAR(1)
	deck	Deck	"X" - failure on deck.	CHAR(1)
	bott	Bottom	"X" - failure on bottom.	CHAR(1)
	side	Side Shell	"X" - failure on side.	CHAR(1)
	intern	Internal	"X" - failure internal.	CHAR(1)
	bow	Bow	"X" - failure on bow.	CHAR(1)
	strn	Stern	"X" - failure on stern.	CHAR(1)
	spec_attn	Special Atten Vsl	Structural failure special attention vessel indicator.	CHAR(1)
	sp	Filler	Filler	CHAR(1)
cfct (MINMod)	mccase	Marine Casualty Case	Marine Casualty case number	CHAR(10)
	subject	Subject	Subject number	CHAR(10)
	intact_dam_cond	Intact Or Damage Condition	Intact or damaged condition	CHAR(7)
	cause	Cause of Flooding	Cause of flooding	CHAR(10)
	special_cir_1	Special Circumstances 1	Special circumstances 1	CHAR(10)
	special_cir_2	Special Circumstances 2	Special circumstances 2	CHAR(10)
	special_cir_3	Special Circumstances 3	Special circumstances 3	CHAR(10)
	special_cir_4	Special Circumstances 4	Special circumstances 4	CHAR(10)
	special_cir_5	Special Circumstances 5	Special circumstances 5	CHAR(10)
	req_intact_stab	Required to Meet Intact Stability	Required to meet intact stability	CHAR(1)
	meet_intact_stab	Meet Intact Stability	Meet intact stability	CHAR(1)
	req_dam_stab	Required To Meet Damaged Stability	Required to meet damaged stability	CHAR(1)
	meet_dam_stab	Meet Damaged Stability	Meet damaged stability	CHAR(1)
	special_stab_info_avail	Special Stability Info Available	Special stability information available	CHAR(1)
	special_stab_info_fol	Special Stability Info Followed	Special stability information followed	CHAR(1)
	per_know_how_to_use	Personnel Know how to Use Info	Personnel know how to use information	CHAR(1)
	no_compart_flooded	No of Compartments Flooded	Number of compartments flooded	CHAR(3)
	use_flooded_comp1	Use of Flooded Compartment 1	Use of flooded compartment 1	CHAR(10)
	use_flooded_comp2	Use of Flooded Compartment 2	Use of flooded compartment 2	CHAR(10)
	use_flooded_comp3	Use of Flooded Compartment 3	Use of flooded compartment 3	CHAR(10)
	use_flooded_comp4	Use of Flooded Compartment 4	Use of flooded compartment 4	CHAR(10)
	use_flooded_comp5	Use of Flooded Compartment 5	Use of flooded compartment 5	CHAR(10)
	use_flooded_comp6	Use of Flooded Compartment 6	Use of flooded compartment 6	CHAR(10)
	use_flooded_comp7	Use of Flooded Compartment 7	Use of flooded compartment 7	CHAR(10)
	hours	Time to Sink Hours	Time to sink hours	CHAR(4)
	minutes	Time to Sink Minutes	Time to sink minutes	CHAR(2)
	man_of_sinking	Manner of Sinking	Manner of sinking	CHAR(79)
	pre_cas_drafts_fwd1	Pre-Casualty Drafts FWD 1	Pre-Casualty drafts FWD 1	CHAR(3)
	pre_cas_drafts_fwd2	Pre-Casualty Drafts FWD2	Pre-Casualty Drafts FWD 2	CHAR(3)
	pre_cas_fwd_units	Pre-Casualty FWD Units	Pre-Casualty FWD units	CHAR(1)
	pre_cas_drafts_aft1	Pre-Casualty Drafts AFT 1	Pre-Casualty Drafts AFT 1	CHAR(3)
	pre_cas_drafts_aft2	Pre-Casualty Drafts AFT 2	Pre-Casualty Drafts AFT 2	CHAR(3)
	pre_cas_aft_units	Pre-Casualty AFT Units	Pre-Casualty AFT units	CHAR(1)
	post_cas_drafts_fwd1	Post-Casualty Drafts FWD 1	Post-Casualty Drafts FWD 1	CHAR(3)

Table A-1: U.S. Coast Guard Database Table Content Descriptions (continued)

Table Header	Column Name	Attribute Name	Attribute Definition	Column Datatype
	post_cas_drafts_fwd2	Post-Casualty Drafts FWD 2	Post-Casualty Drafts FWD 2	CHAR(3)
	post_cas_fwd_units	Post-Casualty FWD Units	Post-Casualty FWD Units	CHAR(1)
	post_cas_drafts_aft1	Post-Casualty Drafts AFT 1	Post-Casualty drafts AFT 1	CHAR(3)
	post_cas_drafts_aft2	Post-Casualty Drafts AFT 2	Post-Casualty drafts AFT 2	CHAR(3)
	post_cas_aft_units	Post-Casualty AFT Units	Post-Casualty AFT units	CHAR(1)
	page_key	Page Key	Page key	CHAR(3)
	sup_for_fac	Supplement N/A for Facility	Supplement N/A for Facility	CHAR(1)
	sp	Filler	Filler	CHAR(1)
cpdt (MINMod)	mccase	Marine Casualty Case	Marine Casualty case number.	CHAR(10)
	subject	Subject	Subject case number.	CHAR(10)
	chris_code	Chris Code	CHEM ID Code (based on CHRIS Code).	CHAR(3)
	type	Type	Single character indicating type of substance: L = Liquid G = Gas S = Solid	CHAR(1)
	potential_qty	Total Potential	Quantity of potential substance spilled.	CHAR(12)
	out_of_water_spilled	Spilled Out of Water	Quantity spilled out of water.	CHAR(12)
	out_of_water_qty_rec	Recovered Out of Water	Quantity recovered out of water.	CHAR(12)
	in_water_qty_spilled	Spilled in Waterway	Quantity spilled in water.	CHAR(12)
	in_water_qty_rec	Recovered in Waterway	Quantity recovered in water.	CHAR(12)
	units_measure	Units for Non-Liquids	Units of measure.	CHAR(8)
	substance_name	Name	Substance spilled name.	CHAR(70)
	cat	Category	Category of substance. P=Petroleum Based Products O=Other Oil Products C=Chemical N=Natural Substance M=Multiple Substances G=Garbage U=Unknown	CHAR(1)
	spdt_rpdt	Spill Date	Date of spill (from prit).	CHAR(8)
	sp	Filler	Filler	CHAR(1)
cpct (MINMod)	mccase	Marine Casualty Case	Marine Casualty case number.	CHAR(10)
	subject	Subject	Subject case number.	CHAR(13)
	ipn	Involved Party Number	Involved party number.	CHAR(10)
	lname	Last Name	Last name of involved party.	CHAR(20)
	fname	First Name	First name of involved party.	CHAR(20)
	dob	Date of Birth	Date of birth of involved party.	CHAR(8)
	status	Status	Position of involved party.	CHAR(15)
	injury	Casualty Type - Injury	"X" = Involved party was injured.	CHAR(1)
	dead	Casualty Type - Dead	"X" = Involved party died.	CHAR(1)
	missing	Casualty Type - Missing	"X" = Involved party missing.	CHAR(1)
	on_duty	On Duty	Y/N - was the involved party on duty.	CHAR(1)
	dt_of_death	Date of Death	Date of death of involved party.	CHAR(8)
	incapacitated	Incap Over 72 Hours	Y/N - was the involved party incapacitated.	CHAR(1)
	duty_hrs	Hours of Duty	How many hours on duty before accident.	CHAR(2)
	accident_typ	Type of Accident	Type of accident.	CHAR(20)
	resulting_injury	Resulting Injury	Result of injury.	CHAR(20)
	body_part	Body Pt Affected	Body part injured.	CHAR(20)
	activity	Activity	Activity type before accident.	CHAR(64)

Table A-1: U.S. Coast Guard Database Table Content Descriptions (continued)

Table Header	Column Name	Attribute Name	Attribute Definition	Column Datatype
	location	Location	Location of accident.	CHAR(64)
	equip_inv	Equipment Inv	Type of equipment involved.	CHAR(20)
	equip_part	Equipment Part	Part of equipment.	CHAR(20)
	yrs_in_industry	Years in this Industry	How many years involved party been in the industry.	CHAR(2)
	mths_in_industry	Months in this Industry	How many months involved party been in the industry.	CHAR(2)
	yrs_with_company	Years with this Company	How many years involved party been with company.	CHAR(2)
	mths_with_company	Months with this Company	How many months involved party been with company.	CHAR(2)
	yrs_present_job	Years in Present Job	How many years involved party been in present job.	CHAR(2)
	mths_present_job	Months in Present Job	How many months involved party been in present job.	CHAR(2)
	yrs_vsl_fac	Years on Present Ves/Fac	How many years involved party been on the vessel or facility.	CHAR(2)
	mths_vsl_fac	Months on Present Ves/Fac	How many months involved party been on the vessel or facility.	CHAR(2)
	employer_ipn	Industry Employer IPN	Industry employer identification number.	CHAR(10)
	employer_name	Industry Employer Name	Industry employer's name.	CHAR(33)
	nec_accident_typ	Explan of NEC Accident	Explanation of NEC accident type.	CHAR(20)
	sp	Filler	Filler	CHAR(1)
cfet (MINMod)	mccase	Marine Casualty Case	Marine Casualty case number.	CHAR(10)
	subject	Subject	Vessel identification number.	CHAR(10)
	location	Location	Location of the fire.	CHAR(25)
	ignition_source	Source - Ignition	Source of ignition.	CHAR(65)
	fuel_source	Source - Fuel	Source of fuel.	CHAR(65)
	detection	Initially Detected By	Who fire was detected by.	CHAR(10)
	immediate_area	Fixed Fire Equip Immediate Area	Fixed fire equipment immediate area	CHAR(50)
	adjacent_areas	Fixed Fire Adjacent Areas	Fixed fire adjacent areas	CHAR(50)
	fixed	Equipment Used Fixed	Equipment used fixed	CHAR(50)
	portable	Equipment Used Portable	Equipment used portable	CHAR(50)
	smoke_fact	Was Smoke a Factor	Was smoke a factor.	CHAR(1)
	page_Key	Page Key	Page key	CHAR(3)
	sup_ind	Supplement N/A Indicator	Supplement N/A indicator	CHAR(1)
	sp	Filler	Filler	CHAR(1)
cwxt (MINMod)	mccase	Marine Casualty Case	Marine Casualty case number	CHAR(10)
	pre_time	Pre Time	Pre time	CHAR(8)
	pre_wx	Pre Weather	Pre weather	CHAR(5)
	pre_vis_con	Pre Visibility Condition	Pre visibility condition	CHAR(4)
	pre_vis_dist	Pre Visibility Distance	Pre visibility distance	CHAR(5)
	pre_vis_dis_units	Pre Visibility Distance Units	Pre visibility distance units	CHAR(2)
	pre_ex_other	Pre Explanation of Other	Pre explanation of other	CHAR(20)
	pre_air_temp	Pre Air Temp	Pre air temp	CHAR(3)
	pre_wind_spe	Pre Wind Speed	Pre wind speed	CHAR(3)
	pre_wind_dir	Pre Wind Direction	Pre wind direction	CHAR(3)
	pre_wind_dir_units	Pre Wind Direction Units	Pre wind direction units	CHAR(1)
	pre_wave_hts	Pre Wave Height	Pre wave height	CHAR(3)
	pre_wave_dir	Pre Wave Direction	Pre wave direction	CHAR(3)
	pre_wave_dir_units	Pre Wave Direction Units	Pre wave direction units	CHAR(1)

Table A-1: U.S. Coast Guard Database Table Content Descriptions (continued)

Table Header	Column Name	Attribute Name	Attribute Definition	Column Datatype
	pre_swell_hts	Pre Swell Height	Pre swell height	CHAR(3)
	pre_well_dir	Pre Swell Direction	Pre swell direction	CHAR(3)
	pre_swell_dir_units	Pre Swell Direction Units	Pre swell direction units	CHAR(1)
	pre_crnt_spe	Pre Current Speed	Pre current speed	CHAR(3)
	pre_crnt_dir	Pre Current Direction	Pre current direction	CHAR(3)
	pre_crnt_dir_units	Pre Current Direction Units	Pre current direction units	CHAR(1)
	pre_river_stage	Pre River Stage	Pre river stage	CHAR(6)
	pre_tide	Pre Tide	Pre tide	CHAR(8)
	post_wx_sig	Post Weather Significant	Post weather significant	CHAR(1)
	post_wx	Post Weather	Post weather	CHAR(5)
	post_wx_trend	Post Weather Trend	Post weather trend	CHAR(20)
	post_vis_con_sig	Post Visibility Condition Significant	Post visibility condition significant	CHAR(1)
	post_vis_con	Post Visibility Condition	Post visibility condition	CHAR(4)
	post_vis_con_trend	Post Visibility Condition Trend	Post visibility condition trend	CHAR(20)
	post_vis_dis_sig	Post Visibility Distance Significant	Post visibility distance significant	CHAR(1)
	post_vis_dis	Post Visibility Distance	Post visibility distance	CHAR(5)
	post_vis_dis_units	Post Visibility Distance Units	Post visibility distance units	CHAR(2)
	post_vis_dis_trend	Post Visibility Distance Trend	Post visibility distance trend	CHAR(20)
	post_air_temp_sig	Post Air Temp Significant	Post air temp significant	CHAR(1)
	post_air_temp	Post Air Temp	Post air temp	CHAR(3)
	post_air_temp_trend	Post Air Temp Trend	Post air temp trend	CHAR(20)
	post_wind_spe	Post Wind Speed	Post wind speed	CHAR(3)
	post_wind_spe_trend	Post Wind Speed Trend	Post wind speed trend	CHAR(20)
	post_wave_hts	Post Wave Height	Post wave height	CHAR(3)
	post_wave_hts_trend	Post Wave Height Trend	Post wave height trend	CHAR(20)
	post_swell_hts	Post Swell Height	Post swell height	CHAR(3)
	post_swell_hts_trend	Post Swell Height Trend	Post swell height trend	CHAR(20)
	post_crnt_spe	Post Current Speed	Post current speed	CHAR(3)
	post_crnt_spe_trend	Post Current Speed Trend	Post current speed trend	CHAR(20)
	post_wind_dir	Post Wind Direction	Post wind direction	CHAR(3)
	post_wind_dir_units	Post Wind Direction Units	Post wind direction units	CHAR(1)
	post_wind_dir_trend	Post Wind Direction Trend	Post wind direction trend	CHAR(20)
	post_wave_dir	Post Wave Direction	Post wave direction	CHAR(3)
	post_wave_dir_units	Post Wave Direction Units	Post wave direction units	CHAR(1)
	post_wave_dir_trend	Post Wave Direction Trend	Post wave direction trend	CHAR(20)
	post_swell_dir	Post Swell Direction	Post swell direction	CHAR(3)
	post_swell_dir_inits	Post Swell Direction Units	Post swell direction units	CHAR(1)
	post_swell_dir_trend	Post Swell Direction Trend	Post swell direction trend	CHAR(20)
	post_crnt_dir	Post Current Direction	Post current direction	CHAR(3)
	post_crnt_dir_units	Post Current Direction Units	Post current direction units	CHAR(1)
	post_crnt_dir_trend	Post Current Direction Trend	Post current direction trend	CHAR(20)
	post_river_stage	Post River Stage	Post river stage	CHAR(6)
	post_river_stage_trend	Post River Stage Trend	Post river stage trend	CHAR(20)
	post_tide	Post Tide	Post tide	CHAR(8)
	post_tide_trend	Post Tide Trend	Post tide trend	CHAR(20)
	post_wind_spe_sig	Post Wind Speed Significant	Post wind speed significant	CHAR(1)
	post_wave_hts_sig	Post Wave Height Significant	Post wave height significant	CHAR(1)

Table A-1: U.S. Coast Guard Database Table Content Descriptions (continued)

Table Header	Column Name	Attribute Name	Attribute Definition	Column Datatype
	post_swell_hts_sig	Post Swell Height Significant	Post swell height significant	CHAR(1)
	post_crnt_spe_sig	Post Current Speed Significant	Post current speed significant	CHAR(1)
	post_wind_dir_sig	Post Wind Direction Significant	Post wind direction significant	CHAR(1)
	post_wave_dir_sig	Post Wave Direction Significant	Post wave direction significant	CHAR(1)
	post_swell_dir_sig	Post Swell Direction Significant	Post swell direction significant	CHAR(1)
	post_crnt_dir_sig	Post Current Direction Significant	Post current direction significant	CHAR(1)
	post_river_stage_sig	Post River Stage Significant	Post river stage significant	CHAR(1)
	post_tide_sig	Post Tide Significant	Post tide significant	CHAR(1)
	sp	Filler	Filler	CHAR(1)
prit	mpcase	Marine Pollution Case	Marine Pollution Case Number. Primary join path to cases supplements (not implemented) and violation products.	CHAR(10)
(Pre-MINMod)	unit	Unit	MSIS port code (parent units only).	CHAR(5)
	osc	On Scene Coord Agency	On Scene Coordinator for incident	CHAR(4)
	spdt	Occurrence Date	Spill Date.	CHAR(8)
	city	City Nearest OCC	City spill occurred in.	CHAR(25)
	state	State of OCC	State spill occurred in.	CHAR(2)
	region	EPA Region	EPA region spill occurred in	CHAR(2)
	water	Waterbody Affected	Water body affected	CHAR(29)
	mccase	Casualty Ref	Marine Casualty Incident Report case number associated with spill case (if any).	CHAR(10)
	rpdt	Date Case Reported	Date spill reported.	CHAR(8)
	status	Clean-up Status	Case status	CHAR(2)
	num_ves	Num of Vessels Inv	Number of vessels associated with spill case.	CHAR(3)
	num_nonves	Num NonVes SRC Inv	Number of non-vessels (facilities) associated with case.	CHAR(3)
	cldt	Date Case Closed	Case closed date.	CHAR(8)
	sptime	Time of Spill	Time spill occurred (if known).	CHAR(4)
	ri_mile	River Mile	River mile spill occurred at (if applicable).	CHAR(4)
	lat_dir	Latitude Direction	Direction where spill occurred.	CHAR(1)
	latitude	Spill Latitude	Latitude where spill occurred.	CHAR(5)
	long_dir	Longitude Direction	Direction where spill occurred.	CHAR(1)
	longitude	Spill Longitude	Longitude where spill occurred.	CHAR(6)
	rem_party	Spill Removal Party	Party that conducted removal operations - see table 18.	CHAR(3)
	val_ind	Inv Rep Validated	Case validated indicator ("X" or "NULL").	CHAR(1)
	ctf_ind	Report Close to File	"X" - Case closed to file.	CHAR(1)
	pro_num	Project No	Federal project number (if any).	CHAR(10)
	pro_typ	Project Type	Project type.	CHAR(6)
	known_dt	M Spill Date Know/Est	Spill date/time known.	CHAR(1)
	auth_ceil	Auth Ceiling Cost	Authorized ceiling (Federal projects).	CHAR(12)
	ttl_cost	Total Cost of Spill	Total cost of spill cleanup.	CHAR(12)
	funds_exp	Funds Expended	Pollution fund expenditures.	CHAR(12)
	num_cg	No OPFAC Res Rep	Number of CG response reports (supplements filed).	CHAR(3)
	rptime	Time Spill Reported	Time spill reported.	CHAR(4)
	num_noncg	No NONCG Res Rep	Number of non-CG response reports (supplements filed).	CHAR(3)
	rptdby	Reported by	Spill reported by.	CHAR(12)

Table A-1: U.S. Coast Guard Database Table Content Descriptions (continued)

Table Header	Column Name	Attribute Name	Attribute Definition	Column Datatype
	subject	Subject	Cause of spill.	CHAR(26)
	nrc	NRC Notification	NRC notified unit (Y/N/NULL).	CHAR(1)
	nrccase	NRC Ref Case	NRC case number (if any).	CHAR(12)
	sp	Filler	Filler	CHAR(1)
pvst	mpcase	Marine Pollution Case	Marine Pollution Case Number. Primary join path to case supplements and violation products.	CHAR(10)
(Pre-MINMod)	vname	Vessel Name	Name of vessel at the time of the spill.	CHAR(33)
	vin	Vessel Identification	VIN of the vessel at the time of the spill.	CHAR(10)
	flag	Vessel Flag	Flag code for vessel at time of spill.	CHAR(2)
	num_pollutants	No Pollutants Spilled	Number of substances spilled.	CHAR(3)
	p_operation	Operation	Vessel operation at the time of the spill.	CHAR(26)
	vrcase	Viol Report No	Violation Report case number. Join path to OLD violation products.	CHAR(10)
	vkey	Vessel Key	Primary key to identify a vessel and joining records.	CHAR(10)
	penalty_action	Penalty Action	Legal action taken ("Y" or "N").	CHAR(1)
	primary_cause	Primary Cause	Primary cause of spill.	CHAR(23)
	secondary_cause	Secondary Cause	Secondary cause of spill.	CHAR(18)
	contributing_factor_1	Contributing Factor 1	First contributing factor of spill.	CHAR(18)
	contributing_factor_2	Contributing Factor 2	Second contributing factor of spill.	CHAR(18)
	supplement_id	Supplement ID	Each supplement associated with a case is uniquely identified by this element. Join path to psst.	CHAR(4)
	service	Service	Vessel service.	CHAR(19)
	sp	Filler	Filler	CHAR(1)
post	mpcase	Marine Pollution Case	Marine Pollution Case Number. Primary join path to cases supplements (not implemented) and violation products.	CHAR(10)
(Pre-MINMod)	supplement_id	Supplement ID	Each supplement associated with a case is uniquely identified by this element. Join path to violation tables with vrcase.	CHAR(4)
	verify_ind	Verify Indicator		CHAR(1)
	source	Source Name	Suspected or actual source of spill.	CHAR(33)
	nr_pollutants	No Pollutants Spilled	Number of substance spilled.	CHAR(3)
	operation	Operation	Vessel operation at time of the spill.	CHAR(26)
	vrcase	Violation Report No	Violation Report Case number.	CHAR(10)
	lcl_source_id	Local Source ID	Local Source Identification number.	CHAR(10)
	own_class	Ownership Class	Describes Government, Commercial, military or other facility type.	CHAR(14)
	source_typ	Source Type	Identifies the facility type	CHAR(21)
	source_use	Source Use	Describes the use of the facility.	CHAR(14)
	pen_action	Penalty Action	Was action taken.	CHAR(1)
	pri_cause	Primary Cause	Primary cause of spill.	CHAR(23)
	sec_cause	Secondary Cause	Secondary cause of spill.	CHAR(18)
	contri_factor_1	Contributing Factor 1	First contributing factor of spill.	CHAR(18)
	contri_factor_2	Contributing Factor 2	Second contributing factor of spill.	CHAR(18)
	fin	Facility FIN	Facility Identification.	CHAR(8)
	fkey	Facility Key	Key for joining facility records.	CHAR(10)
	sp	Filler	Filler	CHAR(1)

Table A-1: U.S. Coast Guard Database Table Content Descriptions (continued)

Table Header	Column Name	Attribute Name	Attribute Definition	Column Datatype
psst	mpcase	Marine Pollution Case	Marine Pollution Case Number. Primary join path to case supplements and violation products.	CHAR(10)
(Pre-MINMod)	supplement_id	Supplement ID	Each supplement associated with a case is uniquely identified by this element.	CHAR(4)
	chris_code	Substance CHRIS Code	CHEM ID Code (based on CHRIS Code).	CHAR(3)
	potential_qty	Total Potential Qty	Quantity in gallons of potential substance spilled.	CHAR(12)
	out_of_water_spilled	Out of Wtr Qty Spilled	Quantity in gallons of spill out of water.	CHAR(12)
	out_of_water_qty_rec	Out of Wtr Qty Rec	Quantity in gallons of spill recovered out of water.	CHAR(12)
	in_water_qty_spilled	In Water Qty Spilled	Quantity in gallons of spill in the water.	CHAR(12)
	in_water_qty_rec	In Wtr Qty Rec	Quantity in gallons of spill recovered in the water.	CHAR(12
	units_measure	Units of Measure	Units of measure.	CHAR(7)
	substance_name	Substance Name	Substance spilled name.	CHAR(55)
	type	Type of Substance	Single character indicating Type of Substance P=Petroleum Based Oils C=Chemicals N=Natural Substance M=Multiple Substances O=Other Oil Products G=Garbage U=Unknown	CHAR(1)
	spdt_rpdt	Spill Date/Report Date	Date of Spill or when Unknown Date Spill Reported	CHAR(8)
	sp	Filler	Filler	CHAR(1)
converta	year	Year	Year spilled occurred.	CHAR(4)
(Pre-MINMod/ MINMod/ Ticket)	chris	Chris Code	Chemical code.	CHAR(3)
	type	Type	Single character indicating type of substance: C = Chemical P = Petroleum based products O = Other oil products G = Garbage U = Unknown M = Multiple substances N = Natural substances	CHAR(1)
	cases	Cases	Case number associated with spill.	CHAR(10)
	pot	Total Potential	Quantity of potential substance spilled.	CHAR(12)
	spin	In Water Qty Spilled	Quantity of spill in the water.	CHAR(12)
	rein	In Water Qty Rec	Quantity of spill recovered in water.	CHAR(12)
	spout	Out of Wtr Qty Spilled	Quantity of spill out of water.	CHAR(12)
	reout	Out of Wtr Qty Rec	Quantity of spill recovered out of water.	CHAR(12)
	measure	Unit of Measure	Units of measure.	CHAR(7)
	name	Substance Name	Substance spilled name.	CHAR(55)
	date	Spilled Date	Date of spill.	CHAR(8)
	district	District	Investigating unit's district.	CHAR(2)
	unit	Unit	Unit conducting investigation.	CHAR(5)
	supid	Supplement ID	A value that uniquely identifies the spill source.	CHAR(10)
	sp	Filler	Filler	CHAR(1)
prittk	mpcase	Marine Pollution Case	Marine Pollution Case Number. Primary join path to cases supplements (not implemented) and violation products.	CHAR(10)
(TICKET)	unit	Unit	MSIS port code (parent units only).	CHAR(5)
	osc	On Scene Coord Agency	On Scene Coordinator for incident	CHAR(4)
	spdt	Occurrence Date	Spill Date.	CHAR(8)
	city	City Nearest OCC	City spill occurred in.	CHAR(25)

Table A-1: U.S. Coast Guard Database Table Content Descriptions (continued)

Table Header	Column Name	Attribute Name	Attribute Definition	Column Datatype
	state	State of OCC	State spill occurred in.	CHAR(2)
	region	EPA Region	EPA region spill occurred in	CHAR(2)
	water	Waterbody Affected	Water body affected	CHAR(29)
	mccase	Casualty Ref	Marine Casualty Incident Report case number associated with spill case (if any).	CHAR(10)
	rpdt	Date Case Reported	Date spill reported.	CHAR(8)
	status	Clean-up Status	Case status	CHAR(2)
	num_ves	Num of Vessels Inv	Number of vessels associated with spill case.	CHAR(3)
	num_nonves	Num NonVes SRC Inv	Number of non-vessels (facilities) associated with case.	CHAR(3)
	cldt	Date Case Closed	Case closed date.	CHAR(8)
	sptime	Time of Spill	Time spill occurred (if known).	CHAR(4)
	ri_mile	River Mile	River mile spill occurred at (if applicable).	CHAR(4)
	lat_dir	Latitude Direction	Direction where spill occurred.	CHAR(1)
	latitude	Spill Latitude	Latitude where spill occurred.	CHAR(5)
	long_dir	Longitude Direction	Direction where spill occurred.	CHAR(1)
	longitude	Spill Longitude	Longitude where spill occurred.	CHAR(6)
	rem_party	Spill Removal Party	Party that conducted removal operations	CHAR(3)
	val_ind	Inv Rep Validated	Case validated indicator ("X" or "NULL").	CHAR(1)
	ctf_ind	Report Close to File	"X" - Case closed to file.	CHAR(1)
	pro_num	Project No	Federal project number (if any).	CHAR(10)
	pro_typ	Project Type	Project type.	CHAR(6)
	known_dt	M Spill Date Know/Est	Spill date/time known.	CHAR(1)
	auth_ceil	Auth Ceiling Cost	Authorized ceiling (Federal projects).	CHAR(12)
	ttl_cost	Total Cost of Spill	Total cost of spill cleanup.	CHAR(12)
	funds_exp	Funds Expended	Pollution fund expenditures.	CHAR(12)
	num_cg	No OPFAC Res Rep	Number of CG response reports (supplements filed).	CHAR(3)
	rptime	Time Spill Reported	Time spill reported.	CHAR(4)
	num_noncg	No NONCG Res Rep	Number of non-CG response reports (supplements filed).	CHAR(3)
	rptdby	Reported by	Spill reported by.	CHAR(12)
	subject	Subject	Cause of spill.	CHAR(26)
	nrc	NRC Notification	NRC notified unit (Y/N/NULL).	CHAR(1)
	nrccase	NRC Ref Case	NRC case number (if any).	CHAR(12)
	sp	Filler	Filler	CHAR(1)
mvct (TICKET)	mvcase	Marine Violation Case	The civil penalty case identification.	CHAR(10)
	ini_unit	Initiating Unit	Unit (port code) initiating the violation case.	CHAR(5)
	ini_dist	Initiating District	Unit's district port code.	CHAR(5)
	ctl_unit	Controlling Unit	Unit controlling case.	CHAR(5)
	case_st_dt	Case Start Date	Date civil penalty case created at the district.	CHAR(8)
	final_action	Case Status	Status of penalty case.	CHAR(35)
	action_unit	Final Action Unit	Unit code performing last Case Action.	CHAR(5)
	action_dt	Final Action Date	Last case action date.	CHAR(8)
	orig_program	Originating Program	Originating Program.	CHAR(14)
	pkey	Party Key	Primary key to identify a party.	CHAR(10)
	rol	Party Role	Role of the party in the violation.	CHAR(13)
	vkey	Vessel ID	Primary key to identify a vessel.	CHAR(10)

Table A-1: U.S. Coast Guard Database Table Content Descriptions (continued)

Table Header	Column Name	Attribute Name	Attribute Definition	Column Datatype
	fkey	Facility Key	Facility Key	CHAR(10)
	inv_subj	Involved Subject	Name of Vessel or Facility.	CHAR(33)
	settled_amt	Settled Amount	Settlement Amount.	CHAR(12)
	paid_amt	Paid Amount	Amount paid.	CHAR(12)
	install_pymt	Installment Payments	Installment payments ("Y" or "N").	CHAR(1)
	board_ind	4100 Boarding Ind	4100 boarding report done.	CHAR(1)
	case_act	Case Action Code	Case action: I, D, U, and S.	CHAR(1)
	case_det	Case Detachment	Detachment's port code.	CHAR(5)
	case_unit	Case Unit	Originating unit code.	CHAR(5)
	assess	Total Assessed Amount	Total assessed for case.	CHAR(12)
	distwarn_ind	Dismiss or Warning Ind	Case dismiss or warning issued.	CHAR(1)
	case_cl_ind	Case Closed Ind	"X" = case closed.	CHAR(1)
	crim_ind	Criminal Case Ind	"X" - criminal case.	CHAR(1)
	prelim_assess	Previous Assessed Penalty	Total preliminary assessment for case.	CHAR(12)
	ref_to_att	Referred to US Attorney	"X" = US Attorney referral	CHAR(1)
	warn_ltr	Warning Letter	"X" = Warning letter issued.	CHAR(1)
	subj_name	Case Subject Name	Case subject name.	CHAR(33)
	vin_fin	Case Subject VIN/FIN	VIN or FIN of subject.	CHAR(10)
	flag	Case Subject Flag	Vessel's flag code	CHAR(2)
	service	Service	Vessel's service type.	CHAR(19)
	sp	Filler	Filler	CHAR(1)
mtkt (TICKET)	tknumber	TK Number	Ticket number	CHAR(10)
	ref_case	Reference Case	Reference Case Number	CHAR(10)
	unit	Port	Port Code of Controlling Unit	CHAR(5)
	subject	Subject	Freeform Subject that appears on Units Log(includes party, vessel name, etc.)	CHAR(30)
	val_ctf_ind	Val/Close To File Ind	Indicator that shows if a case is validated/closed to file	CHAR(1)
	val_ctf_dt	Val/Close To File Date	Validated/Closed to File Date	CHAR(8)
	forward_ind	Forward Ind	Indicator for a case forwarded from a detachment to a parent command	CHAR(1)
	forward_dt	Forward Dt	Forward Date	CHAR(8)
	appealed_ind	Appealed Ind	Indicator Marked if the Ticket was declined	CHAR(1)
	appealed_dt	Appealed Dt	Date the Decline was Received	CHAR(8)
	type	Type FWPCA or Poll Prev Regs	Indicator of type of ticket that was issued F=FWPCA P=POLLUTION PREVENTION B=BOTH M=MARINE SANITATION DEVICE	CHAR(1)
	nrc_notification	Notification From NRC	Notification from NRC	CHAR(1)
	nrc_case_num	NRC Case No	NRC Case Number	CHAR(10)
	employer	Person Rec Ticket Employer	Person Receiving Ticket - Employer	CHAR(40)
	issue_dt	Issue Dt	Date Ticket Issued	CHAR(8)
	pursued_via	Pursued Via MC PS or NO Action	An Indicator Used to Determine Further Action on a Close to File Case	CHAR(1)
	ctf_brief	CFT Brief FFKEY	Closed to File Brief(FFKEY)	CHAR(10)
	ver_ind	Party Verified Ind	Party Verified Indicator	CHAR(1)
	vin_fin_ver	Vin/Fin Verified Ind	VIN/FIN Verified Indicator	CHAR(1)
	num_cities	Number of Cites	Number of Cites	CHAR(2)
	num_pollutants	Number of Pollutants	Number of Pollutants	CHAR(2)

Table A-1: U.S. Coast Guard Database Table Content Descriptions (continued)

Table Header	Column Name	Attribute Name	Attribute Definition	Column Datatype
	address_ind	Resp Party US Or Foreign Address	Responsible Party U.S. or Foreign Address F=FOREIGN ADDRESS NULL=U.S. ADDRESS	CHAR(1)
	convert_now	Convert NOW Ind	An Indicator set by CG Headquarters to convert a ticket to a Marine Violation Case	CHAR(1)
	spec	Specification Edit/Map List Holder	Specification Edit/Map List Holder	CHAR(1)
	fwpca_cat	FWPCA Category	An Indicator that determines if ticket was issued to A=NON-COMMERCIAL C=COMMERCIAL D=NON-COMMERCIAL/REPEAT OFFENDER E=COMMERCIAL/REPEAT OFENDER F=REPEAT OFFENDER	CHAR(1)
	warn_ind	Warning Ind	Warning Indicator	CHAR(1)
	sp	Filler	Filler	CHAR(1)
tcet	tknumber	TK Number	Ticket number	CHAR(10)
(TICKET)	cas_event	Casualty Event	Casualty Event Number	CHAR(2)
	type	Casualty Event Type	Nature of Incident	CHAR(15)
	class	Casualty Event Class	Further Modifies Nature	CHAR(20)
	state	Casualty Event State	Modifies Class	CHAR(22)
	cas_causal_event	Casualty Causal Event	Casualty Event - Casual Event Number	CHAR(2)
	causal_cat	Causal Category	Cause of the Event EF=EQUIPMENT FAILURE HF=HUMAN FACTOR HM=HAZARDOUS MATERIAL WX=WEATHER	CHAR(2)
	causal_class	Causal Class	Details of the Category	CHAR(15)
	causal_subclass	Causal Subclass	Details of the Class	CHAR(20)
	causal_state	Causal State	Circumstances of the Class	CHAR(16)
	causal_party	Causal Party	Role of the Party	CHAR(5)
	causal_event	Causal Event	Event Sequence	CHAR(2)
	sp	Filler	Filler	CHAR(1)
pssttk	mpcase	Marine Pollution Case	Marine Pollution Case Number. Primary join path to case supplements and violation products.	CHAR(10)
(TICKET)	supplement_id	Supplement ID	Each supplement associated with a case is uniquely identified by this element.	CHAR(4)
	chris_code	Substance CHRIS Code	CHEM ID Code (based on CHRIS Code).	CHAR(3)
	potential_qty	Total Potential Qty	Quantity in gallons of potential substance spilled.	CHAR(12)
	out_of_water_spilled	Out of Wtr Qty Spilled	Quantity in gallons of spill out of water.	CHAR(12)
	out_of_water_qty_rec	Out of Wtr Qty Rec	Quantity in gallons of spill recovered out of water.	CHAR(12)
	in_water_qty_spilled	In Water Qty Spilled	Quantity in gallons of spill in the water.	CHAR(12)
	in_water_qty_rec	In Wtr Qty Rec	Quantity in gallons of spill recovered in the water.	CHAR(12)
	units_measure	Units of Measure	Units of measure.	CHAR(7)
	substance_name	Substance Name	Substance spilled name.	CHAR(55)
	type	Type of Substance	Single character indicating Type of Substance P=Petroleum Based Oils C=Chemicals N=Natural Substance M=Muliple Substances O=Other Oil Products G=Garbage U=Unknown	CHAR(1)
	spdt_rpdt	Spill Date/Report Date	Date of Spill or when Unknown Date Spill Reported	CHAR(8)
	sp	Filler	Filler	CHAR(1)

Table A-1: U.S. Coast Guard Database Table Content Descriptions (continued)

Table Header	Column Name	Attribute Name	Attribute Definition	Column Datatype
pcas	mccase	Marine Casualty	Case number of vessel casualty.	CHAR(10)
(CASMAIN)	lname	Last Name	First ten letters of persons last name.	CHAR(10)
	fname	First Name	First ten letters of persons first name.	CHAR(10)
	birth_date	Birth Date	Birth date.	CHAR(6)
	status	Status	Position person held on vessel.	CHAR(10)
	acc_id	Accident	Nature personnel accident.	CHAR(10)
	injury	Injury	Nature of injury.	CHAR(10)
	body_part	Body Part	Part of body injured.	CHAR(10)
	result	Result	Result injury/death: missing-NVC.	CHAR(10)
	cause1	Cause 1	Primary cause of injury/death.	CHAR(10)
	cause2	Cause 2	Secondary cause of injury/death.	CHAR(10)
	office	Office	MSO office investigating.	CHAR(3)
	p_location	Person Location	Location of person on vessel.	CHAR(4)
	activity	Activity	Type of activity person undertaking.	CHAR(2)
	wbody	Waterbody	Body water casualty occurred.	CHAR(10)
	yr_built	Year Built	Year vessel was built.	CHAR(4)
	case_date	Casualty Date	Date personnel casualty occurred.	CHAR(8)
	oper_co	Operating Company	Name of company operating vessel.	CHAR(10)
	vin	Vessel Identification	Vessel identification number.	CHAR(10)
	vkey	Vessel Key	Primary key to identify a vessel and to join records.	CHAR(10)
	flag	Flag	Flag of vessel.	CHAR(10)
	service	Service	Service of vessel.	CHAR(10)
	v_use	Vessel Use	How vessel was used.	CHAR(4)
	design	Design	Design of vessel.	CHAR(10)
	length	Length	Length of vessel.	CHAR(7)
	gr_tons	Gross Tons	Gross tons of vessel.	CHAR(6)
	vslname	Vessel Name	Name of vessel.	CHAR(40)
	numcas	Number of Casualties	Number of casualties.	CHAR(3)
	sp	Filler	Filler	CHAR(1)
vcas	mccase	Marine Casualty	Case number of vessel casualty.	CHAR(10)
(CASMAIN)	vin	Vessel Identification Number	Vessel documentation number.	CHAR(10)
	vkey	Vessel Key	Primary key to identify a vessel and joining to other tables.	CHAR(10)
	numvsdam	Number Vessels Damaged	Number of vessels damaged.	CHAR(3)
	cas_date	Casualty Date	Date of casualty.	CHAR(8)
	period_day	Period of Day	Day, night, etc.	CHAR(1)
	weather	Weather	Weather.	CHAR(2)
	water	Body Water	Body of water casualty occurred in.	CHAR(7)
	lat_hemisphere	Latitude Hemisphere	Latitude hemisphere.	CHAR(1)
	latitude	Latitude	Latitude.	CHAR(9)
	long_hemisphere	Longitude Hemisphere	Longitude hemisphere.	CHAR(1)
	longitude	Longitude	Longitude.	CHAR(9)
	rep_type	Report Type	Routine letter XMIT, Form 2692.	CHAR(6)
	total_dam	Total Damage	Total damage entire casualty case.	CHAR(13)
	unit	Unit	MSO Office investigating case.	CHAR(3)

Table A-1: U.S. Coast Guard Database Table Content Descriptions (continued)

Table Header	Column Name	Attribute Name	Attribute Definition	Column Datatype
	milepost	Milepost	River milepost.	CHAR(7)
	enter_by	Entered By	USCG employee recording case.	CHAR(10)
	wind_dir	Wind Direction	Wind direction.	CHAR(3)
	wind	Wind	Wind speed.	CHAR(3)
	inv_vsl	Involved Vessels	Number of vessels involved.	CHAR(5)
	nature1	Primary Nature	First nature of casualty.	CHAR(6)
	nature2	Second Nature	Second nature of casualty.	CHAR(6)
	nature3	Third Nature	Third nature of casualty.	CHAR(6)
	cause1	Primary Cause	First cause of nature 1.	CHAR(7)
	cause2	Second Cause	Second cause of nature 1.	CHAR(7)
	cause3	Third Cause	Third cause of nature 1.	CHAR(7)
	cause4	Fourth Cause	First cause of nature 2.	CHAR(7)
	cause5	Fifth Cause	Second cause of nature 2.	CHAR(7)
	cause6	Sixth Cause	First cause of nature 3.	CHAR(7)
	sea_con	Sea Condition	Sea condition.	CHAR(4)
	config	Configuration	Tow configuration.	CHAR(3)
	vname	Vessel Name	Vessel name.	CHAR(33)
	flag	Flag	Flag of vessel.	CHAR(2)
	yr_built	Year Built	Year vessel built.	CHAR(4)
	service	Service	Service of vessel.	CHAR(4)
	abc	ABC	How seaworthiness was affected.	CHAR(1)
	v_use	Vessel Use	How vessel was being used.	CHAR(4)
	length	Length	Vessel length.	CHAR(7)
	gr_tons	Gross Tons	Gross tonnage of vessel.	CHAR(6)
	hull	Hull	Hull material.	CHAR(2)
	prop	Propulsion	Type of propulsion.	CHAR(2)
	hp	Horse Power	Horsepower.	CHAR(6)
	design	Design	Hull design.	CHAR(4)
	vess_dam	Vessel Damage	Vessel damage.	CHAR(13)
	cargo_dam	Cargo Damage	Cargo damage.	CHAR(13)
	crew_death	Crew Death	Crew death.	CHAR(3)
	pass_death	Passenger Death	Passenger death.	CHAR(3)
	total_death	Total Death	Total count of deaths in case.	CHAR(3)
	crew_injury	Crew Injury	Crew injury.	CHAR(3)
	pass_injury	Passenger Injury	Passenger injury.	CHAR(3)
	total_injury	Total Injury	Total count of injuries in case.	CHAR(3)
	vsl_state	Vessel Status	Status of vessel.	CHAR(3)
	person_ic	Person In Charge	Person in charge of vessel movement.	CHAR(4)
	society	Society	Vessel society classing vessels.	CHAR(3)
	oper_co	Operating Company	Name of company operating vessel.	CHAR(10)
	pilot	Pilot	Verification of licensed pilot.	CHAR(4)
	sp	Filler	Filler	CHAR(1)

Table A-1: U.S. Coast Guard Database Table Content Descriptions (continued)

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APPENDIX B

Memorandum of Agreement
Between the Maritime Administration and the United States Coast Guard
on Development of a National Maritime Safety Reporting System

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Memorandum of Agreement
Between the
Maritime Administration and the United States Coast Guard
on Development of a
National Maritime Safety Reporting System

Introduction

From the inception of the marine safety program, the U.S. Coast Guard has investigated casualty events resulting in the loss of life, property, and/or damage to the environment. We have used the results of these investigations to improve design, construction, and operations in merchant vessels. On the other hand, there are many more situations that involve near misses, e.g., near collision situations, near pollution events, etc., and related precursor events, e.g., crew fatigue, equipment maintenance/failure, communication failure, etc., that but for some corrective action in the chain of events, did not result in the occurrence of an accident. These non-accidents and/or problem occurrences are an untapped source of data that serve as leading indicators on the level of safety within the maritime community.

While much attention has been placed on improving the design, construction, and operations of maritime operating equipment based on casualties, the human factor element remains the predominate contributing cause of accidents. The Prevention Through People initiative (PTP) is an approach to marine safety and environmental protection that, in part, uses job design scientism and engineering principles, e.g., Scientific Management, to systematically evaluate the human element factor. PTP recognizes that the major portion of these problems come from organizational errors, and promotes a cultural change to develop a “do it right” mindset. A maritime safety reporting system needs to follow this philosophy and recognize its potential to improve workplace safety.

Preventing accidents before they happen requires a reporting system that can identify accident precursors. Unsafe practices, near misses, and many other problem items can be identified by the people involved with the transportation system. By cataloging and analyzing near miss and related situational information, trends and root problems can be identified. This leads to corrections in the transportation system helping prevent accidents before they occur. The benefits of avoiding even a single major accident are very large.

Purpose

The purpose of this effort is to develop and implement a non-attribution national maritime safety reporting system that will capture near miss, safety, and accident precursor information and encourage and permit changes to be made in the transportation system that will help prevent accidents from occurring.

Stakeholders

There are many stakeholders in marine transportation safety. The industry is highly regulated with prescriptive requirements to ensure well designed and constructed ships. Many operational procedures and training or certification requirements have been researched and mandated to ensure safe operations. For certain maritime segments, the International Safety Management (ISM) code will enter into force soon and further insure quality of operations. Mariners, pilots, those involved with maritime traffic control or advisement systems, as well as operating companies, classification societies, State agencies, and many

others have interests in developing a practical system that contributes to safe operations and reduces the chance for an accident.

Objectives

The Maritime Administration and the U.S. Coast Guard agree to work together to facilitate the development and implementation of a practical non-attribution national maritime safety reporting system that best serves the interests of the U.S. public and the maritime stakeholders by identifying safety problems and facilitating appropriate prevention action by all involved.

Benefits

- Reduction in the annual number of marine casualties, i.e., save more lives, reduce the extent and number of injuries, save more property, and reduce damage to the environment.

- Reduction in operating costs for both the private and public segments of the maritime community through the reduction of mariner deaths and injuries, loss of property, and damage to the environment.

- A safer and more efficient work environment for the mariner.

Agreement

It is agreed that the Maritime Administration and the U.S. Coast Guard will cooperatively work together to facilitate the development and establishment of a national maritime safety reporting system.

SIGNED Date 11/28/97
John Graykowski
Acting Maritime Administrator
Maritime Administration

SIGNED Date 12/12/97
RADM Robert C. North
Assistant Commandant for Marine
Safety and Environmental Protection
United States Coast Guard

APPENDIX C

Summary of 1996 Deep-Draft
Transit Data

This data was taken from NDC's Trips and Drafts Tables from their 1996 publication. The waterways and harbors listed here are those that experienced vessel transits with drafts greater than or equal to 20 feet. (Note that this 20' threshold is higher than the nominal USACE deep-draft designation of 15 feet.) Inbound, outbound, domestic and foreign data have been combined and included in the data shown.

Note that in some locations, no draft-specific transit data was available – only overall totals for the waterway or port were listed. In these cases, an asterisk (*) appears in the "Transits <20' " and "Transits >= 20' " columns.

Also note that these listings include transits within federal and non-federal projects.
The non-federal project transit data is included since some of the accidents from the accident database did not occur inside federal projects.

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ALASKA DISTRICT

Harbors and Waterways with Transit Vessel Drafts $ 20'

	Deepest Vessel	Total Transits	Transits <20'	**Transits >=20'**
Metlakatla Harbor, AK	24	1,069	1,056	**13**
Ketchikan Harbor, AK	37	7,713	6,988	**725**
Juneau Harbor, AK	24	8,121	7,429	**692**
Skagway Harbor, AK	36	1,399	156	**1,243**
Valdez Harbor, AK	72	3,186	2,154	**1,032**
Seward Harbor, AK	38	1,148	950	**198**
Homer, AK	27	718	631	**87**
Anchorage, AK	36	883	283	**600**
Kodiak Harbor, AK	30	1,089	898	**191**
Unalaska Bay and Island, AK	34	2562	2,044	**518**
Cordova Harbor, AK	(20)	422	*	*
Kake Harbor, AK	(25)	750	*	*
Naknek River, AK	(20)	229	*	*
Nome, AK	(20)	123	*	*
Sitka Harbor, AK	(25)	4,789	*	*
Chatham Strait, AK	(31)	4,487	*	*
Clarence Strait, AK	(25)	4,546	*	*
Frederick Sound, AK	(31)	3,932	*	*
Icy Strait, AK	(36)	6,404	*	*
Lynn Canal, AK	(36)	5,193	*	*
Nikishka, AK	(39)	389	*	*
Prince of Wales Island (West Side) AK	(32)	713	*	*
Revillagigado Channel, AK	(37)	5,565	*	*
Stephens Passage, AK	(31)	6,476	*	*
Tongass Narrows, AK	(27)	2,382	*	*

BALTIMORE DISTRICT

Harbors and Waterways with Transit Vessel Drafts $ 20'

	Deepest Vessel	Total Transits	Transits <20'	**Transits >=20'**
Baltimore Harbor and Channels, MD	48	34,208	29,768	**4,440**
Potomac River below Washington, DC	36	7,872	7,841	**31**
Potomac River at Alexandria, VA	(20)	5,137	*	*

BUFFALO DISTRICT

Harbors and Waterways with Transit Vessel Drafts $ 20'

	Deepest Vessel	Total Transits	Transits <20'	**Transits >=20'**
Toledo Harbor, OH	30	2,351	1,457	**894**
Kelleys Island, OH	20	22,793	22,783	**10**
Sandusky Harbor, OH	29	4,924	4,673	**251**
Huron Harbor, OH	28	111	39	**72**
Lorain Harbor, OH	29	1,352	561	**791**
Cleveland Harbor, OH	29	3,987	2,893	**1,094**
Fairport Harbor, OH	27	1,016	830	**186**
Ashtabula Harbor, OH	31	742	176	**566**
Conneaut Harbor, OH	30	430	95	**335**
Erie Harbor, PA	28	1,529	1,448	**81**
Buffalo Harbor, NY	27	802	724	**78**
Niagra River, NY	21	10,221	10,216	**5**
Port of Buffalo, NY	27	10,570	10,489	**81**
Oswego Harbor, NY	27	219	154	**65**
Ogdensburg Harbor, NY	(22)	61	*	*
Rochester (Charlotte Harbor), NY	(21)	622	*	*
Tonawanda Harbor, NY (Included in Port of Buffalo)	(20)	423	*	*

CHARLESTON DISTRICT

Harbors and Waterways with Transit Vessel Drafts $ 20'

	Deepest Vessel	Total Transits	Transits <20'	**Transits >=20'**
Georgetown Harbor, SC (Winyah Bay)	28	628	472	**156**
Charleston Harbor, SC	42	11,766	9,235	**2,531**
Ashley River, SC	34	5,785	5,783	**2**
Shipyard River, SC	42	335	246	**89**
Port Royal Harbor, SC	(27)	40	*	*

CHICAGO DISTRICT

Harbors and Waterways with Transit Vessel Drafts $ 20'

	Deepest Vessel	Total Transits	Transits <20'	**Transits >=20'**
Waukegan Harbor, IL	23	122	119	**3**
Chicago River (Main and North Branch), IL	20	3,132	3,131	**1**
Lake Calumet, IL	27	2,119	2,054	**65**
Calumet Harbor and River, IL & IN	28	23,046	22,375	**671**
Port of Chicago, IL	28	60,089	59,416	**673**
Indiana Harbor, IN	31	6,372	5,495	**877**
Burns Waterway Harbor, IN	28	3,275	2,885	**390**
Chicago Harbor, IL	(25)	26,123	*	*
Buffington Harbor, IN	(27)	337	*	*
Gary Harbor, IN	(29)	2,230	*	*

DETROIT DISTRICT

Harbors and Waterways with Transit Vessel Drafts $ 20'

	Deepest Vessel	Total Transits	Transits <20'	**Transits >=20'**
Two Harbors (Agate Bay), MN	29	527	23	**504**
Duluth Superior Harbor, MN & WI	29	2,400	66	**1,934**
Taconite Harbor, MN	29	380	91	**289**
Presque Isle Harbor, MI	29	615	173	**442**
Marquette Harbor, MI	28	106	37	**69**
Ontonagon Harbor, MI	21	22	4	**18**
Drummond Island, MI	27	21,630	21,519	**111**
St. Mary's River, MI	29	68,033	64,409	**3,624**
St. Mary's Falls Canal, MI & Sault Ste. Marie, Ontario Ship Canal, CN (Included in St. Mary's River)	29	4,666	1,295	**3,371**
Grays Reef Passage, MI	25	2,553	1,683	**870**
Charlevoix Harbor, MI	22	1,785	1,665	**120**
Traverse City Harbor, MI	21	799	797	**2**
Manistee Harbor, MI	27	96	65	**31**
Ludington Harbor, MI	30	805	731	**74**
Muskegon Harbor, MI	28	383	242	**141**
Grand Haven Harbor and Grand River, MI	25	587	483	**104**
Holland Harbor, MI	26	436	406	**30**
St. Joseph Harbor, MI	26	97	61	**36**
Cheboygan Harbor, MI	22	2,048	2,047	**1**
Milwaukee Harbor, WI	28	4,486	4,209	**277**
Port Washington Harbor, WI	26	66	16	**50**
Manitowoc Harbor, WI	23	758	736	**22**
Green Bay Harbor, WI	26	1,693	1,539	**154**
Alpena Harbor, MI	27	423	205	**218**
Saginaw River, MI	27	744	377	**367**
St. Clair River, MI	30	7,058	2,394	**4,664**
Port Huron, MI	27	87	66	**21**
Marysville, MI	27	130	59	**71**
St. Clair, MI	28	325	107	**218**
Marine City, MI	29	186	41	**145**
Channels in Lake St. Clair	30	6,012	1,986	**4,026**
Detroit River, MI	30	10,724	5,761	**4,963**
Detroit Harbor, MI	29	2,716	2,147	**569**
Rouge River, MI	28	2,419	1,959	**460**
Ecorse, MI	23	229	56	**173**
Port of Detroit, MI	29	5,286	4,077	**1,209**
Monroe Harbor, MI	28	159	71	**88**
Calcite, MI	28	898	271	**627**
Escanaba, MI	31	645	139	**506**
Stoneport, MI	28	778	330	**448**
Ashland Harbor, WI	(28)	12	*	*

Detour, MI and vicinity	(25)	21,433	*	*
Gladstone Harbor, MI	(22)	21	*	*
Harbor Beach, MI (Harbor of Refuge, Lake Huron)	(22)	10	*	*
Menominee Harbor, MI and WI	(27)	60	*	*
Sault Ste. Marie, MI	(27)	36,675	*	*
Sturgeon Bay and Lake Michigan Ship Canal, WI	(24)	215	*	*
Trenton, MI	(27)	22	*	*
Wyandotte, MI	(27)	154	*	*
Alabaster, MI	(24)	81	*	*
Marblehead, OH	(26)	22,937	*	*
Port Dolomite, MI	(28)	418	*	*
Port Gypsum, MI	(23)	67	*	*
Port Inland, MI	(28)	474	*	*
Silver Bay, MN	(29)	354	*	*

GALVESTON DISTRICT

Harbors and Waterways with Transit Vessel Drafts $ 20'

	Deepest Vessel	Total Transits	Transits <20'	**Transits >=20'**
Sabine-Neches Waterway, TX	43	78,271	75,950	**2,321**
Orange, TX (Sabine River)	20	2,069	2,068	**1**
Beaumont, TX (Neches River)	43	22,644	21,461	**1,183**
Port Arthur, TX	40	12,890	11,740	**1,150**
Houston Ship Channel, TX	43	122,329	113,282	**9,047**
Texas City Channel, TX	44	23,462	21,948	**1,514**
Galveston Channel, TX	42	13,130	12,431	**699**
Freeport Harbor, TX	42	18,291	17,125	**1,166**
Matagorda Ship Channel, TX	37	4,552	4,139	**413**
Corpus Christi, TX	45	30,607	27,919	**2,688**
Corpus Christi Ship Channel, TX	45	32,957	30,254	**2,703**
Brazos Island Harbor, TX	36	2,531	2,255	**276**
Brownsville, TX	36	2,319	2,043	**276**

HONOLULU DISTRICT

Harbors and Waterways with Transit Vessel Drafts $ 20'

	Deepest Vessel	Total Transits	Transits <20'	**Transits >=20'**
Hilo Harbor, HI	32	1,754	1,703	**51**
Kahului Harbor, Maui, HI	34	2,643	2,578	**65**
Barbers Point Harbor, Oahu, HI	55	2,305	2,081	**224**
Honolulu Harbor, Oahu, HI	40	15,891	13,144	**2,747**
Nawiliwili Harbor, Kauai, HI	33	1,316	1,273	**43**
Kaunakakai Harbor, Molokai, HI	(21)	2,560	*	*
Port Allen Harbor, Kauai, HI	(23)	758	*	*

JACKSONVILLE DISTRICT

Harbors and Waterways with Transit Vessel Drafts $ 20'

	Deepest Vessel	Total Transits	Transits <20'	**Transits >=20'**
Fernandina Harbor, FL	32	1,014	690	**324**
Jacksonville Harbor, FL	40	9,844	7,206	**2,638**
Canaveral Harbor, FL	37	4,163	2,714	**1,449**
Palm Beach Harbor, FL	33	7,478	7,107	**371**
Port Everglades Harbor, FL	47	11,883	8,011	**3,872**
Miami Harbor, FL	41	23,127	18,023	**5,104**
Charlotte Harbor, FL	26	791	768	**23**
Tampa Harbor, FL	39	10,234	6,062	**4,172**
San Juan Harbor, PR	41	10,676	6,724	**3,952**
Fajardo Harbor, PR	32	6,314	6,299	**15**
Ponce Harbor, PR	33	531	311	**220**
Mayaguez Harbor, PR	33	744	730	**14**
St. Thomas Harbor, VI	37	11,797	10,023	**1,774**
Fort Pierce Harbor, FL	(25)	386	*	*
Key West Harbor, FL	(21)	3,599	*	*
St. Petersburg Harbor, FL	(21)	613	*	*

LOS ANGELES DISTRICT

Harbors and Waterways with Transit Vessel Drafts $ 20'

	Deepest Vessel	Total Transits	Transits <20'	**Transits >=20'**	
San Diego Harbor, CA	40	23,408	23,092	**316**	
Long Beach Harbor, CA	58	56,465	50,580	**5,885**	
Los Angeles Harbor, CA	51	37,226	32,268	**4,958**	23' and greater
Port Hueneme, CA	35	5,035	4,544	**491**	

MOBILE DISTRICT

Harbors and Waterways with Transit Vessel Drafts $ 20'

	Deepest Vessel	Total Transits	Transits <20 ft	**Transits >=20 ft**
Panama City Harbor, FL	31	4,322	4,094	**228**
Pensacola Harbor, FL	33	2,174	2,129	**45**
Mobile Harbor, AL	43	47,943	46,097	**1,846**
Chickasaw Creek, AL	29	8,591	8,577	**14**
Pascagoula Harbor, MS	38	10,426	9,329	**1,097**
Bayou Casotte, MS	38	7,700	6,733	**967**
Gulfport Harbor, MS	32	2,743	2,224	**519**

NEW ENGLAND DISTRICT

Harbors and Waterways with Transit Vessel Drafts $ 20'

	Deepest Vessel	Total Transits	Transits <20 ft	**Transits >=20 ft**
Bucksport Harbor, ME	34	377	309	**68**
Penobscot River, ME	24	562	487	**75**
Searsport Harbor, ME	35	546	344	**202**
Portland Harbor, ME	46	35,519	34,839	**680**
Portsmouth Harbor, NH	37	1,872	1,601	**271**
Salem Harbor, MA	35	219	149	**70**
Port of Boston, MA	41	20,796	19,395	**1,401**
Main Waterfront (Port of Boston)	41	15,445	14,808	**637**
Chelsea River, MA	38	2,251	1,811	**440**
Mystic River, MA	37	926	752	**174**
Weymouth Fore River, MA	36	939	827	**112**
Town River, MA	34	92	79	**13**
Cape Cod Canal, MA	40	3,201	2,590	**611**
New Bedford and Fairhaven Harbor, MA	26	6,295	6,282	**13**
Fall River Harbor, MA	36	705	552	**153**
Providence River and Harbor, RI	39	2,652	2,045	**607**
New London Harbor, CT	38	12,822	12,790	**32**
Thames River, CT	34	508	455	**53**
New Haven Harbor, CT	38	4,779	4,089	**690**
Bridgeport Harbor, CT	38	10,711	10,424	**287**
Cross Rip Shoals, Nantucket Sound, MA	(27)	2,381	*	*
Gloucester Harbor, MA	(23)	983	*	*
Lagoon Pond, Martha's Vineyard, MA	(27)	1,367	*	*
Newport Harbor, RI	(28)	5,981	*	*
Plymouth Harbor, MA	(21)	1,590	*	*
Provincetown Harbor, MA	(22)	6,218	*	*

NEW ORLEANS DISTRICT

Harbors and Waterways with Transit Vessel Drafts $ 20'

	Deepest Vessel	Total Transits	Transits <20'	**Transits >=20'**
Innerharbor Navigation Canal, LA	35	34,569	33,530	**1,039**
Mississippi River Gulf Outlet, LA	39	6,934	5,999	**935**
Atchafalaya River, LA Morgan City to Gulf of Mexico	21	32,011	32,008	**3**
Calcasieu River and Pass, LA	43	49,303	47,864	**1,439**
Port of New Orleans, LA	48	125,116	119,180	**5,936**
Port of Baton Rouge, LA	43	68,922	66,394	**2,528**
Port of South Louisiana, LA	48	153,386	148,572	**4,814**
Port of Plaquemines, LA	48	65,780	63,894	**1,886**
Mississippi River Minneapolis, MN to Mouth of Passes -- Consolidated Report	48	620,665	606,490	**14,175**
Mississippi River, Baton Rouge, LA to New Orleans, LA (included in the Minneapolis to Mouth of Passes)	48	286,464	279,057	**7,407**
Mississippi River, Baton Rouge, LA to Mouth of Passes	48	448,338	434,163	**14,175**
Passes of the Mississippi River (included in the Minneapolis to Mouth of Passes)	48	31,761	17,749	**14,012**

NEW YORK DISTRICT

Harbors and Waterways with Transit Vessel Drafts $ 20'

	Deepest Vessel	Total Transits	Transits <20'	**Transits >=20'**
Flushing Bay and Creek, NY	21	4,215	4,213	**2**
Hudson River, NY (Lower Section)	35	932	902	**30**
Hudson River Channel, NY & NJ	46	29,704	28,815	**889**
East River, NY	44	92,988	92,765	**223**
Buttermilk Channel, NY	39	555	366	**189**
Bay Ridge and Red Hook Channels, NY	42	7,995	7,638	**357**
Gowanus Creek Channel, NY	34	6,161	6,098	**63**
Raritan River, NJ	25	3,414	3,350	**64**
Upper Bay NY Harbor, NY & NJ	48	113,810	111,556	**2,254**
Newark Bay, NJ	39	17,997	13,852	**4,145**
Hackensack River, NJ	22	1,128	1040	**88**
Passaic River, NJ	34	5,272	5,185	**87**
New York & New Jersey Channels, NY & NJ	39	74,831	71,544	**3,287**
Raritan River to Arthur Kill Cutoff Channel, NJ	23	3,093	3,057	**36**
New York Harbor, NY (Lower Entrance Channels)	48	25,052	15,343	**9,709**
Hudson River, NY (Mouth of Spuyten Duyvill Creek [Harlem River] to Waterford, NY)	37	17,829	17,241	**588**
Hudson River, NY (Deepwater in Upper Bay, NY to Waterford, NY) -- Consolidated Report	46	47,303	45,826	**1,477**
Port of Albany, NY	35	2,262	1,915	**347**
Port Jefferson Harbor, NY	33	9,275	9,207	**68**
Graves End Bay, NY	(45)	1,643	*	*

NORFOLK DISTRICT

Harbors and Waterways with Transit Vessel Drafts $ 20'

	Deepest Vessel	Total Transits	Transits <20'	**Transits >=20'**
Norfolk Harbor, VA	50	32,064	27,798	**4,266**
Hampton Roads, VA	50	37,127	31,143	**5,984**
Channel to Newport News, VA	49	23,768	21,865	**1,903**
Port of Newport News, VA	49	9,361	7,729	**1,632**
Port of Richmond, VA	22	4,147	4,029	**118**
Port of Hopewell, VA	27	1,433	1,366	**67**
James River, VA	27	52,779	52,588	**191**
York River, VA	38	6,150	5,927	**223**

PHILADELPHIA DISTRICT

Harbors and Waterways with Transit Vessel Drafts $ 20'

	Deepest Vessel	Total Transits	Transits <20'	**Transits >=20'**
Delaware River Between Philadelphia, PA and Trenton, NJ	41	6,001	5,343	**658**
Delaware River (Philadelphia to the Sea)	43	68,622	61,859	**6,763**
Delaware River at Camden, NJ	41	12,347	11,454	**893**
Delaware River (Trenton, NJ to the Sea) -- Consolidated Report	43	69,146	62,382	**6,764**
Schuylkill River, PA	37	6,001	5,702	**299**
Philadelphia Harbor, PA	43	25,185	23,318	**1,867**
Trenton Harbor, NJ	22	689	675	**14**
Wilmington Harbor, DE	41	3,073	2,346	**727**
Inland Waterway from the Delaware River to the Chesapeake Bay, DE & MD -- C&D Canal	32	8,770	7,604	**1,166**

PORTLAND DISTRICT

Harbors and Waterways with Transit Vessel Drafts $ 20'

	Deepest Vessel	Total Transits	Transits <20'	**Transits >=20'**
Columbia River Entrance OR & WA	42	6,930	3,444	**3,486**
Columbia River (Mouth to International Boundary)	40	82,715	79,213	**3,502**
Columbia and Lower Willamette Rivers below Vancouver, WA and Portland, OR	42	64,831	61,302	**3,529**
Port of Astoria, OR	40	1,750	1,711	**39**
Port of Longview, WA	40	5,070	4,621	**449**
Port of Kalama, WA	42	3,560	3,197	**363**
Oregon Slough (North Portland Harbor), OR	39	3,085	2,433	**652**
Port of Vancouver, WA	40	8,250	7,634	**616**
Columbia River between Vancouver, WA and Dalles, OR	20	12,881	12,880	**1**
Port of Portland, OR	40	34,692	32,630	**2,062**
Coos Bay, OR	38	6,625	6,201	**424**
Columbia River System	42	75,660	72,131	**3,529**
Yaquina Bay and Harbor, OR	(36)	70	*	*

SACRAMENTO DISTRICT

Harbors and Waterways with Transit Vessel Drafts $ 20'

	Deepest Vessel	Total Transits	Transits <20'	**Transits >=20'**
Sacramento River, CA	33	939	811	**128**
Sacramento River, Deepwater Ship Channel, CA	33	194	67	**127**
Sacramento, CA	33	768	641	**127**
San Joaquin River, CA	33	488	238	**250**
Stockton, CA	32	272	134	**138**

SAN FRANCISCO DISTRICT

Harbors and Waterways with Transit Vessel Drafts $ 20'

	Deepest Vessel	Total Transits	Transits <20'	**Transits >=20'**	
San Francisco Bay Entrance, CA	50	8,190	1,317	**6,873**	
San Francisco Harbor, CA	49	65,334	65,079	**255**	23' and greater
Redwood City Harbor, CA	33	878	838	**40**	23' and greater
Oakland Harbor, CA	38	17,907	14,406	**3,501**	23' and greater
Richmond Harbor, CA	49	6,647	5,699	**948**	23' and greater
San Pablo Bay and Mare Island Strait	45	5,823	4,286	**1,537**	23' and greater
Carquinez Strait, CA	45	5,432	4,065	**1,367**	23' and greater
Suisun Bay Channel, CA	38	2,696	2,087	**609**	
Humboldt Harbor and Bay, CA	34	2,528	2,393	**135**	
Other San Francisco Bay Area Ports, CA	(50)	42,351	*	*	

SAVANNAH DISTRICT

Harbors and Waterways with Transit Vessel Drafts $ 20'

	Deepest Vessel	Total Transits	Transits <20'	**Transits >=20'**
Savannah Harbor, GA	46	9,695	6,221	**3,474**
Brunswick Harbor, GA	35	2,055	1,447	**608**

SEATTLE DISTRICT

Harbors and Waterways with Transit Vessel Drafts $ 20'

	Deepest Vessel	Total Transits	Transits <20'	**Transits >=20'**	
Grays Harbor and Chehalis River, WA	36	1,016	792	**224**	
Port Angeles Harbor, WA	52	8,827	7,970	**857**	
Port Townsend Harbor, WA	23	10,630	10,627	**3**	23' and greater
Olympia Harbor, WA	33	719	698	**21**	
Tacoma Harbor, WA	45	46,243	44,096	**2,147**	
Seattle Harbor, WA	38	104,913	102,269	**2,644**	
Lake Washington Ship Canal, WA	29	6,391	6,389	**2**	23' and greater
Everett Harbor and Snohomish River, WA	39	7,437	7,239	**198**	
Anacortes Harbor, WA	50	18,473	16,947	**1,526**	
Bellingham Bay and Harbor, WA	33	4,112	3,320	**792**	
Columbia River (Mouth to International Boundary)	40	82,715	79,213	**3,502**	
Columbia River System	42	75,660	72,131	**3,529**	
Skagit River, WA	(22)	36	*	*	
Other Puget Sound Area Ports, WA	(56)	270,028	*	*	

WILMINGTON DISTRICT

Harbors and Waterways with Transit Vessel Drafts $ 20'

	Deepest Vessel	Total Transits	Transits <20'	**Transits >=20'**
Morehead City Harbor, NC	34	4,450	4,059	**391**
Port of Wilmington, NC	38	28,871	27,520	**1,351**
Wilmington Harbor, NC (see also Port of Wilmington, NC for port data)	38	36,406	35,039	**1,367**
Northeast (Cape Fear) River, NC	28	1,167	1,151	**16**

APPENDIX D

Accident Normalization Data and Calculations

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USCG Unit S USACE (NDC) Waterway/Harbor	1992-1998 Accident Data **Total Ship**	 **ACG Ship**	1996 Accident Data **Total Ship**	 **ACG Ship**	Deepest Vessel	1996 Transit Data Total Transits	 Transits <20'	 **Transits >=20'**	1992-1998 Accident Data ACGs per 1000 Total Transits	 ACGs per 1000 Deep Transits	1996 only Accident Data ACGs per 1000 Total Transits	 ACGs per 1000 Deep Transits
American Samoa	*Not Analyzed*											
Anchorage	127	**27**	18	**3**		883	283	600	4.368	6.429	3.398	5.000
S Anchorage					36	883	283	**600**				
Baltimore	103	**24**	20	**4**		42,080	37,609	4,471	0.081	0.767	0.095	0.895
S Baltimore Harbor and Channels					48	34,208	29,768	**4,440**				
S Potomac River below Washington, DC					36	7,872	7,841	**31**				
Bangor	14	**1**	4	**1**		1,485	1,140	345	0.096	0.414	0.673	2.899
S Bucksport Harbor					34	377	309	**68**				
S Penobscot River					24	562	487	**75**				
S Searsport Harbor					35	546	344	**202**				
Baton Rouge	53	**22**	9	**6**		134,702	130,288	4,414	0.023	0.712	0.045	1.359
S Port of Baton Rouge					43	68,922	66,394	**2,528**				
S Port of Plaquemines					48	65,780	63,894	**1,886**				
Boston	90	**18**	17	**8**		25,131	22,934	2,197	0.102	1.170	0.318	3.641
S Salem Harbor					35	219	149	**70**				
S Port of Boston					41	20,796	19,395	**1,401**				
S Chelsea River					38	2,251	1,811	**440**				
S Mystic River					37	926	752	**174**				
S Weymouth Fore River					36	939	827	**112**				
Brownsville	16	**6**	4	**2**		4,850	4,298	**552**	0.177	1.553	0.412	3.623
S Brazos Island Harbor					36	2,531	2,255	**276**				
S Brownsville					36	2,319	2,043	**276**				

USCG Unit S USACE (NDC) Waterway/Harbor	1992-1998 Accident Data **Total Ship**	 **ACG Ship**	1996 Accident Data **Total Ship**	 **ACG Ship**	Deepest Vessel	1996 Transit Data Total Transits	 Transits <20'	 **Transits >=20'**	1992-1998 Accident Data ACGs per 1000 Total Transits	 ACGs per 1000 Deep Transits	1996 only Accident Data ACGs per 1000 Total Transits	 ACGs per 1000 Deep Transits
Buffalo	57	**17**	4	**1**		21,812	21,583	229	0.111	10.605	0.046	4.367
S Buffalo Harbor					27	802	724	**78**				
S Niagra River					21	10,221	10,216	**5**				
S Port of Buffalo					27	10,570	10,489	**81**				
S Oswego Harbor					27	219	154	**65**				
Charleston	102	**13**	11	**5**		18,514	15,736	2,778	0.100	0.669	0.270	1.800
S Georgetown Harbor (Winyah Bay)					28	628	472	**156**				
S Charleston Harbor					42	11,766	9,235	**2,531**				
S Ashley River					34	5,785	5,783	**2**				
S Shipyard River					42	335	246	**89**				
Chicago	86	**26**	10	**2**		94,880	92,590	**2,290**	0.039	1.622	0.021	0.873
S Waukegan Harbor					23	122	119	**3**				
S Chicago River (Main and North Branch)					20	3,132	3,131	**1**				
S Lake Calumet					27	2,119	2,054	**65**				
S Calumet River and Harbor					28	23,046	22,375	**671**				
S Port of Chicago					28	60,089	59,416	**673**				
S Indiana Harbor					31	6,372	5,495	**877**				
Cincinnati	*Not Analyzed - Shallow*											
Cleveland	97	**31**	21	**5**		9,056	6,003	3,053	0.489	1.451	0.552	1.638
S Lorain Harbor					29	1,352	561	**791**				
S Cleveland Harbor					29	3,987	2,893	**1,094**				
S Fairport Harbor					27	1,016	830	**186**				
S Ashtabula Harbor					31	742	176	**566**				
S Conneaut Harbor					30	430	95	**335**				
S Erie Harbor					28	1,529	1,448	**81**				
Concord	*Not Analyzed - Mostly Shallow*											

USCG Unit S USACE (NDC) Waterway/Harbor	1992-1998 Accident Data **Total Ship**	 **ACG Ship**	1996 Accident Data **Total Ship**	 **ACG Ship**	Deepest Vessel	1996 Transit Data Total Transits	 Transits <20'	 **Transits >=20'**	1992-1998 Accident Data ACGs per 1000 Total Transits	 ACGs per 1000 Deep Transits	1996 only Accident Data ACGs per 1000 Total Transits	 ACGs per 1000 Deep Transits
Corpus Christi	165	**44**	14	**8**		63,564	58,173	5,391	0.099	1.166	0.126	1.484
S Corpus Christi					45	30,607	27,919	**2,688**				
S Corpus Christi Ship Channel					45	32,957	30,254	**2,703**				
Davenport	*Not Analyzed - Shallow*											
Detroit	169	**72**	24	**9**		27,238	12,561	14,677	0.378	0.701	0.330	0.613
S St. Clair River					30	7,058	2,394	**4,664**				
S Port Huron					27	87	66	**21**				
S Marysville					27	130	59	**71**				
S St. Clair					28	325	107	**218**				
S Marine City					29	186	41	**145**				
S Channels in Lake St. Clair					30	6,012	1,986	**4,026**				
S Detroit River					30	10,724	5,761	**4,963**				
S Detroit Harbor					29	2,716	2,147	**569**				
Duluth	86	**18**	19	**4**		3307	580	2727	0.778	0.943	1.210	1.467
S Two Harbors (Agate Bay)					29	527	23	**504**				
S Duluth-Superior Harbor					29	2,400	466	**1,934**				
S Taconite Harbor					29	380	91	**289**				
Europe	*Not Analyzed*											
Far East Asia	*Not Analyzed*											
Galveston	290	**103**	42	**22**		36,592	34,379	2,213	0.402	6.649	0.601	9.941
S Texas City Channel					44	23,462	21,948	**1,514**				
S Galveston Channel					42	13,130	12,431	**699**				

USCG Unit / S USACE (NDC) Waterway/Harbor	1992-1998 Accident Data Total Ship	1992-1998 Accident Data ACG Ship	1996 Accident Data Total Ship	1996 Accident Data ACG Ship	Deepest Vessel	1996 Transit Data Total Transits	1996 Transit Data Transits <20'	1996 Transit Data **Transits >=20'**	1992-1998 Accident Data ACGs per 1000 Total Transits	1992-1998 Accident Data ACGs per 1000 Deep Transits	1996 only Accident Data ACGs per 1000 Total Transits	1996 only Accident Data ACGs per 1000 Deep Transits
Grand Haven	16	**11**	5	**4**		5,679	4,873	806	0.277	1.950	0.704	4.963
S Burns Waterway Harbor					28	3,275	2,885	**390**				
S Manistee Harbor					27	96	65	**31**				
S Ludington Harbor					30	805	731	**74**				
S Muskegon Harbor					28	383	242	**141**				
S Grand Haven Harbor and Grand River					25	587	483	**104**				
S Holland Harbor					26	436	406	**30**				
S St. Joseph Harbor					26	97	61	**36**				
Greenville	*Not Analyzed*											
Guam	*Not Analyzed*											
HamptonRoads	313	**76**	40	**11**		166,829	152,445	14,384	0.065	0.755	0.066	0.765
S Norfolk Harbor					50	32,064	27,798	**4,266**				
S Hampton Roads					50	37,127	31,143	**5,984**				
S Channel to Newport News					49	23,768	21,865	**1,903**				
S Port of Newport News					49	9,361	7,729	**1,632**				
S Port of Richmond					22	4,147	4,029	**118**				
S Port of Hopewell					27	1,433	1,366	**67**				
S James River					27	52,779	52,588	**191**				
S York River					38	6,150	5,927	**223**				
Honolulu	64	**13**	8	**5**		23,909	20,779	3,130	0.078	0.593	0.209	1.597
S Hilo Harbor					32	1,754	1,703	**51**				
S Kahului Harbor					34	2,643	2,578	**65**				
S Barbers Point Harbor					55	2,305	2,081	**224**				
S Honolulu Harbor					40	15,891	13,144	**2,747**				
S Nawiliwili Harbor					33	1,316	1,273	**43**				
Houma	*Not Analyzed - Shallow*											

USCG Unit S USACE (NDC) Waterway/Harbor	1992-1998 Accident Data **Total Ship**	 **ACG Ship**	1996 Accident Data **Total Ship**	 **ACG Ship**	Deepest Vessel	1996 Transit Data Total Transits	 Transits <20'	 **Transits >=20'**	1992-1998 Accident Data ACGs per 1000 Total Transits	 ACGs per 1000 Deep Transits	1996 only Accident Data ACGs per 1000 Total Transits	 ACGs per 1000 Deep Transits
Houston	657	**150**	73	**21**		122,329	113,282	9,047	0.175	2.369	0.172	2.321
S Houston Ship Channel					43	122,329	113,282	**9,047**				
Huntington	*Not Analyzed - Shallow*											
Jacksonville	168	**52**	13	**2**		10,858	7,896	2,962	0.684	2.508	0.184	0.675
S Fernandina Harbor					32	1,014	690	**324**				
S Jacksonville Harbor					40	9,844	7,206	**2,638**				
Juneau	40	**11**	4	**1**		9,520	7,585	1,935	0.165	0.812	0.105	0.517
S Juneau Harbor					24	8,121	7,429	**692**				
S Skagway Harbor					36	1,399	156	**1,243**				
Kenai	31	**2**	2	**0**		1,866	1,581	285	0.153	1.003	0.000	0.000
S Seward Harbor					38	1,148	950	**198**				
S Homer					27	718	631	**87**				
Ketchikan	17	**3**	2	**0**		8,782	8,044	738	0.049	0.581	0.000	0.000
S Metlakatla Harbor					24	1,069	1,056	**13**				
S Ketchikan Harbor					37	7,713	6,988	**725**				
Kodiak	8	**2**	0	**0**		1,089	898	191	0.262	1.496	0.000	0.000
S Kodiak Harbor					30	1089	898	**191**				
LA-Long Beach	379	**25**	67	**7**		93,691	82,848	10,843	0.038	0.329	0.075	0.646
S Long Beach Harbor					58	56,465	50,580	**5,885**				
S Los Angeles Harbor					51	37,226	32,268	**4,958**				
Lake Charles	44	**11**	7	**3**		49,303	47,864	1,439	0.032	1.092	0.061	2.085
S Calcasieu River and Pass					43	49,303	47,864	**1,439**				

USCG Unit S USACE (NDC) Waterway/Harbor	1992-1998 Accident Data **Total Ship**	 **ACG Ship**	1996 Accident Data **Total Ship**	 **ACG Ship**	Deepest Vessel	1996 Transit Data Total Transits	 Transits <20'	 **Transits >=20'**	1992-1998 Accident Data ACGs per 1000 Total Transits	 ACGs per 1000 Deep Transits	1996 only Accident Data ACGs per 1000 Total Transits	 ACGs per 1000 Deep Transits
Long Island Sound	12	**0**	1	**0**		28,820	27,758	1,062	0.000	0.000	0.000	0.000
S New London Harbor					38	12,822	12,790	**32**				
S Thames River					34	508	455	**53**				
S New Haven Harbor					38	4,779	4,089	**690**				
S Bridgeport Harbor					38	10,711	10,424	**287**				
Louisville	*Not Analyzed - Shallow*											
Massena	*Not Analyzed - No Transit Data Available* [20]											
Memphis	*Not Analyzed - Shallow*											
Miami	365	**114**	43	**20**		42,488	33,141	9,347	0.383	1.742	0.471	2.140
S Palm Beach Harbor					33	7,478	7,107	**371**				
S Port Everglades Harbor					47	11,883	8,011	**3,872**				
S Miami Harbor					41	23,127	18,023	**5,104**				
Milwaukee	22	**3**	8	**1**		5,310	4,961	349	0.081	1.228	0.188	2.865
S Milwaukee Harbor					28	4,486	4,209	**277**				
S Port Washington Harbor					26	66	16	**50**				
S Manitowoc Harbor					23	758	736	**22**				
Minneapolis/St Paul	*Not Analyzed - Shallow*											

[20] No waterways near Massena (which is near the St. Lawrence Seaway) are listed in NDC's Trips and Drafts table in their 1996 report. NDC was contacted in an attempt to acquire this transit information separately. However, they stated that they do not keep transit information for this location. No other reliable source of transit statistics for this location was found; therefore normalization of Massena's accident data could not be and was not performed.

USCG Unit S USACE (NDC) Waterway/Harbor	1992-1998 Accident Data **Total Ship**	 **ACG Ship**	1996 Accident Data **Total Ship**	 **ACG Ship**	 Deepest Vessel	1996 Transit Data Total Transits	 Transits <20'	 **Transits >=20'**	1992-1998 Accident Data ACGs per 1000 Total Transits	 ACGs per 1000 Deep Transits	1996 only Accident Data ACGs per 1000 Total Transits	 ACGs per 1000 Deep Transits
Mobile	157	**45**	30	**8**		79,577	75,089	4,488	0.081	1.432	0.101	1.783
S Pensacola Harbor					33	2,174	2,129	**45**				
S Mobile Harbor					43	47,943	46,097	**1,846**				
S Chickasaw Creek					29	8,591	8,577	**14**				
S Pascagoula Harbor					38	10,426	9,329	**1,097**				
S Bayou Casotte					38	7,700	6,733	**967**				
S Gulfport Harbor					32	2,743	2,224	**519**				
Morgan City	*Not Analyzed - Mostly Shallow*											
S Atchafalaya River (Morgan City to Gulf of Mexico)					21	32,011	32,008	**3**				
Nashville	*Not Analyzed - Shallow*											
New Castle	*Not Analyzed - Shallow*											
NewOrleans	1177	**353**	110	**35**		320,005	307,281	12,724	0.158	3.963	0.109	2.751
S Innerharbor Navigation Channel					35	34,569	33,530	**1,039**				
S Mississippi River Gulf Outlet					39	6,934	5,999	**935**				
S Port of New Orleans					48	125,116	119,180	**5,936**				
S Port of South Louisiana					48	153,386	148,572	**4,814**				

USCG Unit S USACE (NDC) Waterway/Harbor	1992-1998 Accident Data **Total Ship**	 **ACG Ship**	1996 Accident Data **Total Ship**	 **ACG Ship**	Deepest Vessel	1996 Transit Data Total Transits	 Transits <20'	 **Transits >=20'**	1992-1998 Accident Data ACGs per 1000 Total Transits	 ACGs per 1000 Deep Transits	1996 only Accident Data ACGs per 1000 Total Transits	 ACGs per 1000 Deep Transits
NewYork	490	**111**	60	**14**		412,258	389,898	22,360	0.038	0.709	0.034	0.626
S Flushing Bay and Creek					21	4,215	4,213	**2**				
S East River					44	92,988	92,765	**223**				
S Buttermilk Channel					39	555	366	**189**				
S Bay Ridge and Bay Hook Channels					42	7,995	7,638	**357**				
S Gowanus Creek Channel					34	6,161	6,098	**63**				
S Raritan River					25	3,414	3,350	**64**				
S UpperBayNY Harbor					48	113,810	111,556	**2,254**				
S Newark Bay					39	17,997	13,852	**4,145**				
S Hackensack River					22	1,128	1040	**88**				
S Passaic River					34	5,272	5,185	**87**				
S New York and New Jersey Channels					39	74,831	71,544	**3,287**				
S New York Harbor (Lower Entrance Channels)					48	25,052	15,343	**9,709**				
S Hudson River (Consolidated Report)					46	47,303	45,826	**1,477**				
S Port of Albany					35	2,262	1,915	**347**				
S Port Jefferson Harbor					33	9,275	9,207	**68**				
Paducah	*Not Analyzed - Shallow*											
Panama City	12	**0**	1	**0**		4,322	4,094	228	0.000	0.000	0.000	0.000
S Panama City Harbor					31	4,322	4,094	**228**				
Peoria	*Not Analyzed - Shallow*											

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Philadelphia	331	**77**	31	**9**		112,864	102,027	10,837	0.097	1.015	0.080	0.830
S Delaware River (Consolidated Report)					43	69,146	62,382	**6,764**				
S Schuylkill River					37	6,001	5,702	**299**				
S Philadelphia Harbor					43	25,185	23,318	**1,867**				
S Trenton Harbor					22	689	675	**14**				
S Wilmington Harbor					41	3,073	2,346	**727**				
S Inland Waterway from the Delaware River to the Chesapeake Bay (C&D Canal)					32	8,770	7,604	**1,166**				
Pittsburgh	*Not Analyzed - Shallow*											
PortArthur	189	**66**	17	**10**		115,874	111,219	4,655	0.081	2.025	0.086	2.148
S Sabine-Neches Waterway					43	78,271	75,950	**2,321**				
S Orange					20	2,069	2,068	**1**				
S Beaumont					43	22,644	21,461	**1,183**				
S Port Arthur					40	12,890	11,740	**1,150**				
Port Canaveral	15	**4**	1	**0**		4,163	2,714	1,449	0.137	0.394	0.000	0.000
S Canaveral Harbor					37	4,163	2,714	**1,449**				
Port Lavaca	38	**9**	0	**0**		22,843	21,264	1,579	0.056	0.814	0.000	0.000
S Freeport Harbor					42	18,291	17,125	**1,166**				
S Matagorda Ship Channel					37	4,552	4,139	**413**				
Portland (Me)	57	**13**	15	**4**		37,391	36,440	951	0.050	1.953	0.107	4.206
S Portland Harbor					46	35,519	34,839	**680**				
S Portsmouth Harbor					37	1,872	1,601	**271**				

USCG Unit / S USACE (NDC) Waterway/Harbor	1992-1998 Accident Data Total Ship	1992-1998 Accident Data ACG Ship	1996 Accident Data Total Ship	1996 Accident Data ACG Ship	Deepest Vessel	1996 Transit Data Total Transits	1996 Transit Data Transits <20'	1996 Transit Data Transits >=20'	1992-1998 Accident Data ACGs per 1000 Total Transits	1992-1998 Accident Data ACGs per 1000 Deep Transits	1996 only Accident Data ACGs per 1000 Total Transits	1996 only Accident Data ACGs per 1000 Deep Transits
Portland(Or)	291	**90**	39	**11**		139,708	131,350	8,358	0.092	1.538	0.079	1.316
S Port of Astoria					40	1,750	1,711	**39**				
S Port of Longview					40	5,070	4,621	**449**				
S Port of Kalama					42	3,560	3,197	**363**				
S Oregon Slough (North Portland Harbor)					39	3,085	2,433	**652**				
S Port of Vancouver					40	8,250	7,634	**616**				
S Port of Portland					40	34,692	32,630	**2,062**				
S Coos Bay					38	6,625	6,201	**424**				
S Columbia River System					42	75,660	72,131	**3,529**				
S Grays Harbor and Chehalis River					36	1,016	792	**224**				
Providence	70	**15**	6	**3**		12,853	11,469	1,384	0.167	1.548	0.233	2.168
S Cape Cod Canal					40	3,201	2,590	**611**				
S New Bedford and Fairhaven Harbor					26	6,295	6,282	**13**				
S Providence River and Harbor					36	705	552	**153**				
S Town River					39	2,652	2,045	**607**				
PugetSound	344	**16**	43	**1**		207,745	199,555	8,190	0.011	0.279	0.005	0.122
S Port Angeles Harbor					52	8,827	7,970	**857**				
S Port Townsend Harbor					23	10,630	10,627	**3**				
S Olympia Harbor					33	719	698	**21**				
S Tacoma Harbor					45	46,243	44,096	**2,147**				
S Seattle Harbor					38	104,913	102,269	**2,644**				
S Lake Washington Ship Canal					29	6,391	6,389	**2**				
S Everett Harbor and Snohomish River					39	7,437	7,239	**198**				
S Anacortes Harbor					50	18,473	16,947	**1,526**				
S Bellingham Bay and Harbor					33	4,112	3,320	**792**				

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San Diego	47	**8**	13	**3**		23,408	23,092	316	0.049	3.617	0.128	9.494
S San Diego Harbor					40	23,408	23,092	**316**				
SanFrancisco	536	**97**	64	**10**		115,435	100,170	15,265	0.120	0.908	0.087	0.655
S San Francisco Bay Entrance					50	8,190	1,317	**6,873**				
S San Francisco Harbor					49	65,334	65,079	**255**				
S Redwood City Harbor					33	878	838	**40**				
S Oakland Harbor					38	17,907	14,406	**3,501**				
S Richmond Harbor					49	6,647	5,699	**948**				
S San Pablo Bay and Mare Island Strait					45	5,823	4,286	**1,537**				
S Carquinez Strait					45	5,432	4,065	**1,367**				
S Suison Bay Channel					38	2,696	2,087	**609**				
S Humboldt Harbor and Bay					34	2,528	2,393	**135**				
San Juan	*Not Analyzed*											
Santa Barbara	12	**3**	0	**0**		5,035	4,544	491	0.085	0.873	0.000	0.000
S Port Hueneme					35	5,035	4,544	**491**				
Sault Ste Marie	146	**38**	25	**6**		90,384	86,138	4,246	0.060	1.279	0.066	1.413
S Presque Isle					29	615	173	**442**				
S Marquette Harbor					28	106	37	**69**				
S Drummond Island					27	21,630	21,519	**111**				
S St. Mary's River					29	68,033	64,409	**3,624**				
Savannah	111	**25**	13	**2**		11,750	7,668	4,082	0.304	0.875	0.170	0.490
S Savannah Harbor					46	9,695	6,221	**3,474**				
S Brunswick Harbor					35	2,055	1,447	**608**				
Singapore	*Not Analyzed*											
Sitka	*Not Analyzed*											

USCG Unit S USACE (NDC) Waterway/Harbor	1992-1998 Accident Data **Total Ship**	 **ACG Ship**	1996 Accident Data **Total Ship**	 **ACG Ship**	Deepest Vessel	1996 Transit Data Total Transits	 Transits <20'	 **Transits >=20'**	1992-1998 Accident Data ACGs per 1000 Total Transits	 ACGs per 1000 Deep Transits	1996 only Accident Data ACGs per 1000 Total Transits	 ACGs per 1000 Deep Transits
St. Croix	*Not Analyzed*											
St. Ignace	25	**10**	0	**0**		10,028	7,375	2,653	0.142	0.538	0.000	0.000
S Grays Reef Passage					25	2,553	1,683	**870**				
S Charlevoix Harbor					22	1,785	1,665	**120**				
S Traverse City Harbor					21	799	797	**2**				
S Cheboygan Harbor					22	2,048	2,047	**1**				
S Alpena Harbor					27	423	205	**218**				
S Saginaw River					27	744	377	**367**				
S Calcite					28	898	271	**627**				
S Stoneport					28	778	330	**448**				
St. Louis	*Not Analyzed - Shallow*											
St. Thomas	*Not Analyzed*											
Sturgeon Bay	25	**8**	6	**0**		2,338	1,678	660	0.489	1.732	0.000	0.000
S Green Bay Harbor					26	1,693	1,539	**154**				
S Escanaba					31	645	139	**506**				
Tampa	182	**46**	18	**6**		10,234	6,062	4,172	0.642	1.575	0.586	1.438
S Tampa Harbor, FL					39	10,234	6,062	**4,172**				
Toledo	98	**25**	15	**1**		30,338	29,023	1,315	0.118	2.716	0.033	0.760
S Toledo Harbor					30	2,351	1,457	**894**				
S Kelleys Island					20	22,793	22,783	**10**				
S Sandusky Harbor					29	4,924	4,673	**251**				
S Huron Harbor					28	111	39	**72**				
S Monroe Harbor					28	159	71	**88**				
Unalaska	27	**5**	7	**1**		2,562	2,044	518	0.279	1.379	0.390	1.931
S Unalaska Bay and Harbor					34	2562	2,044	**518**				

USCG Unit S USACE (NDC) Waterway/Harbor	1992-1998 Accident Data **Total Ship**	 **ACG Ship**	1996 Accident Data **Total Ship**	 **ACG Ship**	 Deepest Vessel	1996 Transit Data Total Transits	 Transits <20'	 **Transits >=20'**	1992-1998 Accident Data ACGs per 1000 Total Transits	 ACGs per 1000 Deep Transits	1996 only Accident Data ACGs per 1000 Total Transits	 ACGs per 1000 Deep Transits
Valdez	132	**6**	13	**1**		3,186	2,154	1,032	0.269	0.831	0.314	0.969
S Valdez Harbor					72	3,186	2,154	**1,032**				
Wilmington	69	**13**	8	**1**		70,894	67,769	3,125	0.026	0.594	0.014	0.320
S Morehead City Harbor					34	4,450	4,059	**391**				
S Port of Wilmington					38	28,871	27,520	**1,351**				
S Wilmington Harbor					38	36,406	35,039	**1,367**				
S Northeast (Cape Fear) River					28	1,167	1,151	**16**				

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APPENDIX E

Notes on 1992-1998 USCG Accident Data
of Tank Ships and Freight Ships
Involved in Allisions, Collisions and Groundings

The following notes are taken from 1992-1998 USCG accident data of **freight ship and tank ship vessel types involved in allisions, collisions and groundings *only***. These notes were taken in order to highlight particular channels or areas of channels that have experienced multiple incidents. Note that multiple accidents occurring on the same day and/or by the same vessel are generally not as significant (i.e. indicative that the incidents were related to the channel's design) as accidents occurring at different times by different vessels.

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ANCMS (Anchorage)

- One (1) allision/accidental grounding and one (1) collision reported in the Egagik River (Dillingham).
- Two (2) allisions reported near St. Paul Island (St. Paul).

BALMS (Baltimore)

- Three (3) allisions reported at the Dundalk Marine Terminal (Baltimore/Dundalk).
- Three (3) accidental groundings reported in the Patapsco River (Baltimore).
- Two (2) accidental groundings reported in the Craighill Channel (Baltimore).

BAND (Bangor)

- Only one (1) collision reported - no significant findings.

BATD (Baton Rouge)

- Two (2) ships had two (2) allisions each at Dow Chemical (Plaquemine) reported on the same day at N30144, W091134.
- Six (6) accidental groundings reported at Lower Mississippi River mile 223.0-223.3 (Plaquemine/ Baton Rouge).

BOSMS (Boston)

- Two (2) allisions reported in Chelsea Creek (Boston).
- Two (2) allisions reported at the Chelsea Street Bridge (Boston).

BRND (Brownsville)

- One (1) collision/accidental grounding and one (1) accidental grounding reported in the Laguna Madre Ship Channel (South Padre Island).

BUFMS (Buffalo)

- One (1) allision, one (1) accidental grounding and one (1) allision/accidental grounding reported at the Mountfort Terminal (Erie).
- Two (2) accidental groundings reported in Dunkirk Harbor (Dunkirk).
- Three (3) accidental groundings reported in Oswego Harbor (Oswego).

CHAMS (Charleston)

- Two (2) allisions reported in Charleston Harbor (Charleston).
- Two (2) allisions/accidental groundings reported in Georgetown on same day at N33215, W079175.
- Seven (7) accidental groundings reported in Charleston Harbor (Charleston).

CHIMS (Chicago)

- Seven (7) allisions and one (1) accidental grounding reported in the Calumet River (Chicago) - all but two (2) at N41400, W087250.
- Three (3) accidental groundings at the entrance to Muskegon Harbor (Muskegon, MI).

CLEMS (Cleveland)

- Three (3) allisions reported on the Cuyahoga River (Cleveland) at N41293, W081404, four (4) allisions on the Cuyahoga River (Cleveland) near Mile 5.4.
- One (1) allision and one (1) accidental grounding reported in Ashtabula Harbor (Ashtabula) near N41544, W080475.
- Three (3) accidental groundings reported in the entrance to Fairport Harbor (Fairport).
- Two (2) accidental groundings reported at the Pinney Dock on Lake Erie (Ashtabula).

COND (Concord)

- Only two (2) incidents reported - no significant findings.

CORMS (Corpus Christi)

- Two (2) allisions and one (1) collision reported in the Corpus Christi inner harbor (Corpus Christi).
- Two (2) allisions reported near Harbor Island (Port Aransas).
- Two (2) allisions and one (1) collision reported at the Reynolds Metals Facility in the Corpus Christi Ship Channel (Corpus Christi).
- Three (3) accidental groundings reported in the La Quina Ship Channel (Corpus Christi) at N27525, W097154.

DETMS (Detroit)

- Three (3) allisions reported at the Conrail RR Bridge #620 over the Rouge River (Dearborn).
- Three (3) allisions reported at the Grosse Ile Toll Bridge over the Detroit River (Grosse Ile).
- Four (4) allisions reported in the same area of the St. Clair River (Port Huron).
- Three (3) collisions reported in Lake St. Clair (Gross Point Woods).
- Two (2) allisions reported on the Saginaw River (Bay City).
- Two (2) accidental groundings reported on the Detroit River (Port Huron).
- Two (2) accidental groundings reported on same day on the Detroit River off Belle Isle (Detroit).
- Two (2) accidental groundings reported near N43320, W08530 on Saginaw River.
- One (1) accidental grounding and one (1) intentional grounding reported by the same ship on the Saginaw River (Bay City) at N43330, W083542.

DULMS (Duluth)

- Two (2) allisions reported on the St. Mary's River (Sault Ste. Marie).
- Two (2) allisions reported at the Mesabi Ore Dock on Lake Superior (Duluth).
- Two (2) accidental groundings reported in the Duluth-Superior Channel (Duluth).

GALMS (Galveston)

- Two (2) allisions reported on the same day on Galveston Bay (Texas City) at N29217, W094560.
- Seven (7) allisions reported in the Bolivar Roads Anchorage on Galveston Bay (Galveston) - two (2) of them on the same day at N29209, W094437 and four (4) of them on the same day at N29211, W094437.
- Two (2) allisions reported on the same day in the Galveston Entrance Channel (Galveston) at N29175, W094395.
- Two (2) allisions reported near each other on the Intercoastal Waterway (Freeport).
- Four (4) allisions reported near each other by the Texas City Dock on Galveston Bay (Texas City).
- Two (2) collisions reported near each other in the Gulf of Mexico (Freeport).
- Three (3) accidental groundings reported near Buoy 16 in the Houston Ship Channel (Galveston).
- Two (2) accidental groundings reported on the same day in the Galveston Entrance Channel (Galveston) at N29175, W094395.
- Three (3) accidental groundings reported near Buoy 18 in the Houston Ship Channel (Texas City).
- Two (2) accidental groundings reported near Texas City Channel #5.

GHND (Grand Haven)

- Two (2) allisions reported by the same ship in the St. Joseph River (St. Joseph) at N42064, W086285.

HMRMS (Hampton Roads)

- Two (2) allisions reported near the Newport News Marine Terminal on the Hames River (Newport News).
- Two (2) allisions reported on the same day at Lambert's Point on the Elizabeth River (Norfolk) at N36550, W076140.
- Two (2) allisions reported on the same day at Sewells Point on the Elizabeth River (Norfolk) at N36560, W076200.
- Three (3) accidental groundings (two (2) on same day) reported near Buoy 13 on the James River (Newport News).
- Two (2) accidental groundings reported near the Portsmouth Marine Terminal on the Elizabeth River (Portsmouth/Norfolk).
- Three (3) accidental groundings reported on the Rocklanding Shoal on the James River (Ft. Eustis/ Norfolk).
- Two (2) accidental groundings reported at the southern approach to the Chesapeake Bay on the North Atlantic.

HONMS (Honolulu)

- Two (2) allisions reported on the same day off Berth 52 (Honolulu).

HOUMS (Houston)

- Two (2) allisions on the same day at the Cargill Dock on the Houston Ship Channel (Houston).
- Four (4) allisions (two (2) each on two different days) at City Dock 17/18 on the Houston Ship Channel (Houston/ Deer Park).
- Seven (7) allisions and two (2) collisions reported at Exxon Baytown on the Houston Ship Channel (Baytown).
- One (1) allision and one (1) collision reported at Green's Bayou on the Houston Ship Channel (Houston/ Channelview).
- Four (4) allisions reported at the Greensport Terminal on the Houston Ship Channel (Houston).
- Five (5) allisions reported at the Houston Fuel Oil Terminal on the Houston Ship Channel (Houston).
- Two (2) allisions reported on the same day at Barbours Cut Lash Dock on the Houston Ship Channel (Houston).
- Two (2) allisions reported on the same day at the Imbessa Dock on the Houston Ship Channel (Jacintoport).
- Two (2) allisions reported on the same day at the Inbesa Terminal on the Houston Ship Channel.
- Two (2) allisions reported on the same day at the Manchester B Dock on the Houston Ship Channel (Houston).
- Two (2) allisions reported at the Pak Tank on the Houston Ship Channel (Deer Park).
- Three (3) allisions reported on the same day at the Pacific Molasses Dock on the Houston Ship Channel (Houston).
- Two (2) allisions at the oil-tanking docks on the Houston Ship Channel (Houston).
- Two (2) allisions on the same day at Warren Dock #2 on the Houston Ship Channel (Houston).
- Two (2) accidental groundings at the Bayport Ship Channel on the Houston Ship Channel (Houston).
- Two (2) accidental groundings near Light 125/126 on the Houston Ship Channel (Houston).
- Three (3) accidental groundings at Lynchburg on the Houston Ship Channel (Houston).
- Two (2) accidental groundings near Barbour's Point on the Houston Ship Channel (Morgan's Point).
- Two (2) accidental groundings in the Omniport Basin on the Houston Ship Channel (Houston).

JACMS (Jacksonville)

- Two (2) allisions reported at the Nassau Terminals on the St. Johns River (Jacksonville).
- Two (2) allisions reported on the same day at the Fernandina Beach Terminals (Fernandina Beach).
- Three (3) allisions reported at the Middle Basin of Port Canaveral (Port Canaveral).
- Two (2) allisions reported near the Sea-Land Terminal on the St. Johns River (Jacksonville).
- Four (4) allisions and one (1) collision reported near the Tallyrand Docks on the St. Johns River (Jacksonville).
- One (1) allision and one (1) collision reported at Blount Island Berth seven (7) on the St. Johns River (Jacksonville).
- Two (2) accidental groundings reported on the same day at Drummond Range on the St. Johns River (Jacksonville).
- Two (2) accidental groundings reported at Blount Island on the St. Johns River (Jacksonville).
- Two (2) accidental groundings reported at Buoy 63 and 64 on the St. Johns River (Jacksonville).

JUNMS (Juneau)

- No significant findings.

KETD (Ketchikan)

- Only three (3) incidents reported - no significant findings.

KODD (Kodiak)

- Only two (2) incidents reported - no significant findings.

LKCD (Lake Charles)

- No significant findings.

LISCP (Long Island Sound)

- No incidents reported.

LOSMS (Los Angeles)

- Two (2) allisions reported on the same day at Pier 09 of LA Harbor (Los Angeles).

MASD (Massena)

- Nine (9) allisions and two (2) accidental groundings reported at the Eisenhower Lock on the St. Lawrence River (Massena).
- Eight (8) allisions reported at the Snell Lock on the St. Lawrence River (Massena).
- Four (4) accidental groundings reported at Copeland's Cut on the St. Lawrence River (Massena).

MEMMS (Memphis)

- No incidents reported.

MIAMS (Miami)

- Two (2) allisions reported on the same day at Berth 29 North Port Everglades.
- Two (2) allisions reported near Ft. Pierce (Ft. Pierce).
- Two (2) allisions reported on the same day near Lummus Island in the Port of Miami.
- Twelve (12) allisions and two (2) collisions reported near the mouth of the Miami River (Miami).
- Three (3) allisions (two (2) of which were on the same day) reported in Port Everglades (Port Everglades).
- Two (2) allisions reported on the same day at the Miami Shipyard on the Miami River (Miami).
- Four (4) allisions (two (2) of which were on the same day) reported near Pier #30 in Port Everglades (Port Everglades).
- Two (2) allisions reported on the same day in the Port of Miami (Miami) at N25459, W080090.
- Two (2) allisions reported on the same day in the Port of Miami (Miami) at N25464, W080105.
- Two (2) accidental groundings reported on the same day near the Flagler St. Bridge on the Miami River (Miami).
- Two (2) accidental groundings reported in the Port of Miami (Miami) at N25430, W080080.
- Three (3) accidental groundings reported at the Port Everglades Entrance (Fort Lauderdale).

MILMS (Milwaukee)

- Two (2) allisions reported at the Water Street Bridge on the Milwaukee River (Milwaukee).

STPD (Minneapolis/St. Paul)

- No incidents reported.

MOMBS (Mobile)

- Two (2) allisions and one (1) collision in the Mobile Channel on the Mobile River (Mobile).
- Two (2) allisions/accidental groundings on the same day in the Theodore Canal (Theodore).
- Two (2) accidental groundings in the Bayou Casotte Channel (Pascagoula).
- Two (2) accidental groundings near Buoy 33 in the Gulfport Ship Channel.

MORMS (Morgan City)

- No significant findings.

NEWMS (New Orleans)

- Two (2) allisions (on the same day) and one (1) collision reported on the Lower Mississippi River (Kenner) at N29576, W090177.
- Three (3) allisions reported at the Burnside Anchorage on the Lower Mississippi River (Burnside).
- One (1) allision and two (2) collisions reported near Avondale on the Lower Mississippi River (New Orleans/ Algiers).
- Two (2) allisions on the same day reported at the Global Plex Terminal on the Lower Mississippi River (Reserve).
- Three (3) allisions and one (1) collision reported between Miles 118-119 on the Lower Mississippi River (New Orleans).
- Two (2) allisions reported on the same day at the Lagrange Anchorage on the Lower Mississippi River (Lagrange).
- Two (2) allisions reported between Miles 125-126 on the Lower Mississippi River (Goodhope/Hahnville).
- Two (2) allisions (on the same day) and one (1) collision reported between Miles 156-157 on the Lower Mississippi River (St. James/College Point).
- Two (2) allisions and two (2) collisions reported between Miles 172-173 on the Lower Mississippi River (New Orleans/Donaldsonville).
- Three (3) allisions and four (4) collisions reported between Miles 163-164 on the Lower Mississippi River (New Orleans/Convent).
- Four (4) allisions (three (3) on the same day) reported at Mile 90 on the Lower Mississippi River (Chalmette).
- Two (2) allisions reported (on the same day) at Mile 210 on the Lower Mississippi River (Plaquemine).

- One (1) allision and one (1) collision reported near the Mandeville St. Wharf on the Lower Mississippi River (New Orleans).
- One (1) allision and one (1) collision reported at Mile 180 on the Lower Mississippi River (Philadelphia Point).
- Two (2) allisions reported on the same day at Mile 80 on the Lower Mississippi River .
- Two (2) allisions reported at Nine Mile Point on the Lower Mississippi River (New Orleans).
- Three (3) allisions reported on the Lower Mississippi River (New Orleans) at N29569, W090035.
- Two (2) allisions reported on the same day at Mile 75 on the Lower Mississippi River (Belle Chase).
- Two (2) collisions reported at the Perry St. Wharf on the Lower Mississippi River (New Orleans).
- Two (2) collisions reported at the Nine Mile Point Anchorage on the Lower Mississippi River (New Orleans).
- Two (2) accidental groundings reported on the same day on the Lower Mississippi River (Pilottown) at N29116, W089163.
- Two (2) accidental groundings reported on the coastal Gulf of Mexico near N28528, W089263.
- Two (2) accidental groundings reported on the Lower Mississippi River near N29210, W089280.
- Two (2) accidental groundings reported on the same day on the Lower Mississippi River (Darrow) at N30066, W090598.
- Three (3) accidental groundings (two (2) on the same day) reported at the 12 Mile Anchorage near Mile 80 on the Lower Mississippi River (English Turn Bend).
- Three (3) accidental groundings reported at 12 Mile Point near Mile 190 on the Lower Mississippi River (Belle Chasse/Avondale).
- Two (2) accidental groundings reported near Mile 3 on the Lower Mississippi River (Cupits Gap/Venice).
- Two (2) accidental groundings reported near 81 Mile Point on the Lower Mississippi River (Darrow).
- Two (2) accidental groundings reported near Mile 141 on the Lower Mississippi River (New Orleans).
- Two (2) accidental groundings reported near 60 Mile Point on the Lower Mississippi River (Hesperides).

NYCMI (New York)

- One (1) allision and one (1) collision reported near the Ambrose Light in the New York Harbor Lower Bay (New York).
- Two (2) allisions reported at the Brooklyn Bridge over the East River (New York).
- Three (3) allisions reported at the Constable Hook Reach in the Kill Van Kull (Bayonne).
- Two (2) allisions reported near the GATX Carteret on the Arthur Kill (Carteret).
- Two (2) allisions reported on the same day at the Gleobal Terminal on the New York Harbor Upper Bay (Bayonne).
- Two (2) allisions reported on the same day at Berth 57 on the Elizabeth River (Port Elizabeth).
- Two (2) allisions reported on the same day in the Port of Newark (Newark) at N40409, W074124.
- Five (5) allisions (two (2) on the same day) and one (1) collision reported in the Stapleton Anchorage in the New York Harbor Upper Bay (Staten Island).
- Two (2) accidental groundings reported at the Bay Ridge Flats in the New York Harbor Upper Bay (Brooklyn).
- Three (3) accidental groundings reported on the Kill Van Kull (Bayonne).
- Fwo (2) accidental groundings reported in the East Rockaway Inlet on the North Atlantic Coastal Zone.
- Four (4) accidental groundings (two (2) on the same day) reported in the Hog Island Channel (Oceanside).
- Two (2) accidental groundings reported on the Kill Van Kull near Buoy #12 (Oceanside).

PCDD (Panama City)

- No incidents reported.

PHIMS (Philadelphia)

- Two (2) allisions reported in the Port of Wilmington on the Delaware River (Wilmington).
- Three (3) allisions and one (1) accidental grounding reported at Pier 179 on the Delaware River (Philadelphia).
- One (1) allision and four (4) accidental groundings reported on the Delaware River (Marcus Hook).
- One (1) allision and one (1) collision reported at the Liston Range on the Delaware River.
- Seven (7) accidental groundings reported at the Big Stone Anchorage on the Delaware River (Philadelphia).
- Two (2) accidental groundings reported near the Penn Terminal on the Delaware River (Chester).
- Three (3) accidental groundings reported at the Marcus Hook Anchorage.
- Two (2) accidental groundings reported at the Mantua Creek Anchorage (Philadelphia).

PATMS (Port Arthur)

- One (1) allision and one (1) accidental grounding reported on the Sabine/Neches River near N29520, W093550.
- Two (2) allisions on the same day reported at the Pabtex Dock on the coastal Gulf of Mexico.
- Two (2) allisions on the same day reported in the Port of Port Arthur on the Sabine/Neches River (Port Arthur).
- One (1) allision and one (1) collision reported at the R&R Dock on the Sabine/Neches River (Port Arthur).
- Two (2) allisions reported at the Unocal Terminal on the Sabine/Neches River (Nederland).
- Two (2) accidental groundings reported in the Sabine Pass Channel of the Gulf of Mexico.
- Two (2) accidental groundings reported in the Taylor's Bayou Turning Basin on the Sabine/Neches River (Port Arthur).

PLAD (Port Lavaca)

- Four (4) accidental groundings reported on the Matagorda Ship Channel on Matagorda Bay (Port O'Connor/ Point Comfort).

PTCD (Port Canaveral)

- Two (2) allisions reported on the same day at the Central Turning Basin on Port Canaveral (Port Canaveral).

POMMS (Portland, ME)

- Three (3) allisions reported near the Million Dollar Bridge on the Portland Harbor/River (Portland).

PORMS (Portland, OR)

- Two (2) allisions reported on the Columbia River (Astoria).
- One (1) allision and one (1) accidental grounding reported at the Harvest States Grain Terminal on the Columbia River (Kalama).
- One (1) allision and one (1) accidental grounding reported at Pier #1 on the Columbia River (Astoria).
- Two (2) allisions at Berth 401 reported on the Willamette River (Portland).
- Two (2) accidental groundings reported on the Columbia River (Portland/Vancouver) at N45400, W122500.
- Thirteen (13) accidental groundings reported at the Astoria Anchorage on the Columbia River (Astoria).
- Two (2) accidental groundings reported at Kelley Point on the Columbia River (Portland).
- Two (2) accidental groundings reported on the same day at Tongue Point on the Columbia River (Astoria).

PROMS (Providence)

- No significant findings.

SDCMS (San Diego)

- Three (3) allisions reported at NASSCO Shipyard on the San Diego Harbor (San Diego).

SFCMS (San Francisco)

- Two (2) allisions reported at Hunters Point on the coastal North Pacific Ocean (San Francisco).
- Two (2) allisions reported at Berth 20 on San Francisco Bay (Oakland).
- Three (3) allisions reported at the Richmond Long Wharf on San Francisco Bay (Richmond).
- Three (3) accidental groundings reported near the Bull Head Channel in the San Francisco Bay (Martinez).
- Two (2) accidental groundings reported in the Inner Harbor Reach of San Francisco Bay (Oakland).
- Two (2) accidental groundings reported in the Oakland Outer Harbor of San Francisco Bay (Oakland) near N38482, W122211.
- Three (3) accidental groundings reported near Oakland Berth 33 on San Francisco Bay (Oakland).

SBCD (Santa Barbara)

- Only three (3) incidents reported - no significant findings.

SAVMS (Savannah)

- Two (2) allisions reported on the same day at the Colonial Dock #2 on the Savannah River (Savannah).
- Two (2) allisions reported on the same day on the Savannah River (Savannah) at N32051, W081064.
- Two (2) accidental groundings reported on the same day at Buoy eight (8) on the Savannah River (Savannah).

SEAMS (Seattle)

- No significant findings.

SIMMI (St. Ignace)

- No significant findings.

STBMI (Sturgeon Bay)

- Four (4) allisions and one (1) accidental grounding reported near Mile 3 on the Fox River (Green Bay).

TAMMS (Tampa)

- Two (2) allisions and one (1) collision reported in Port Sutton (Tampa) near N27542, W082253.
- Two (2) allisions reported at the Port Sutton Terminals on Tampa Bay (Tampa).
- Two (2) collisions and two (2) accidental groundings reported at Buoys 1&3 of the Port Sutton Channel (Tampa) at N27540, W082250.
- Two (2) accidental groundings reported in the Cut “J” Channel of Tampa Bay (Tampa).

TOLMS (Toledo)

- Two (2) allisions reported near Mile one of the Maumee River (Toledo).
- Five (5) allisions (two (2) on the same day) and two (2) accidental groundings (on the same day) on the Maumee River (Toledo) very close to N41379, W083319.

DHAD (Unalaska)

- Only five (5) incidents reported - no significant findings.

VALMS (Valdez)

- Only six (6) incidents reported - no significant findings.

WNCMS (Wilmington)

- No significant findings.