Summary of the VGP Vessel Universe:

Information Submitted by Vessel Owner/Operators for Coverage under the 2008 Vessel General Permit (VGP)

U.S. Environmental Protection Agency
Office of Water, Water Permits Division
EPA-833-K-11-102

March 2013

The primary technical contacts for this document are:

Kathryn Kelley
(202) 564-7004 (telephone)

Ryan Albert
(202) 564-0763 (telephone)

U.S. Environmental Protection Agency
Office of Water (Mail Code: 4203M)
1200 Pennsylvania Avenue, NW
Washington, DC 20460

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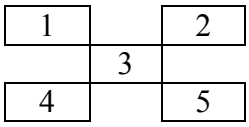

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1 Introduction

The United States Environmental Protection Agency's (EPA) National Pollutant Discharge Elimination System (NPDES) vessel program regulates incidental discharges from the normal operation of vessels operating in a capacity as a means of transportation. In 2008, EPA issued its first Vessel General Permit (VGP) (EPA, 2008a). When finalizing that permit, EPA estimated that approximately 70,000 vessels would be eligible for coverage under the VGP. Part 1.5.1.1 of the 2008 VGP requires owners or operators of vessels that are greater than or equal to 300 gross [registered] tons *or* have the capacity to hold or discharge more than 8 cubic meters (2,113 gallons) of ballast water to submit a complete and accurate Notice of Intent (NOI) in accordance with Part 10 of the VGP to obtain authorization to discharge. Owners and operators of existing vessels had until September 19, 2009 to submit an NOI to seek coverage under the VGP.[1] Vessels less than 300 gross tons that do not have the capacity to hold or discharge more than 8 cubic meters (m^3) of ballast water are authorized to discharge without having to submit an NOI.

1.1 Purpose of Report

The purpose of this report is to provide a summary of the characteristics and conditions of vessel discharges based on information submitted in NOIs filed under the 2008 VGP. This report presents NOI data reported by owners/operators (respondents/permittees) who applied for coverage under the VGP during the period of June 1, 2009 (the launch of the electronic NOI system (eNOI)) through August 5, 2010, and represents the first comprehensive summary of vessel information for vessels authorized to discharge under the VGP. This information is stored within an EPA NOI database. Information about individual NOIs is available to the public at http://cfpub.epa.gov/npdes/vessels/vesselsnoisearch.cfm

1.2 NOI Requirements

Submission of NOIs requires the following information: vessel type, Employer Identification Number (EIN), company International Maritime Organization (IMO) number, vessel identifier, certifying official data, vessel weight, vessel ballast water capacity, frequency and location of ballast tank sediment disposal, waste discharges generated by the vessel, hull husbandry best management practices (BMPs), indication of travel outside the U.S. exclusive economic zone (EEZ), etc. For NOIs submitted that were missing a significant amount of mandatory data, EPA retained the option to contact the responder to collect the missing data for that vessel owner/operator to secure coverage under the VGP.

Note that because the eNOI system does not automatically verify user entries (e.g., to identify and correct misspellings), for the purpose of this analysis, EPA has:

- unified terminology or classification used by responders when necessary, and
- made other minor modifications for clarity or to facilitate data summary when entries contained obvious errors.

[1] EPA's NPDES vessels program regulates incidental discharges from the normal operation of vessels. The NPDES vessels program does not regulate discharges from military vessels or recreational vessels. Instead, those are regulated by other EPA programs under section 312 of the Clean Water Act (CWA).

For example, EPA standardized entries for "NOLA" and New Orleans, LA as a home/most frequented port. EPA also developed a coding system to sort and categorize reported information on hull husbandry practices and frequency with which those practices were implemented.

1.3 Uncertainty and Supplementing NOI information

In the VGP (Part 1.5.1.1), EPA limited which vessels had to submit an NOI to focus data collection on vessels with larger volumes of permitted discharges (see Part 3.7.1 of the VGP Fact Sheet for further discussion) (EPA, 2008b). As of August 5, 2010, approximately 43,431 uniquely identified vessels,[2] owned/operated by 3,430 different permittees, had active NOI coverage. There is uncertainty as to the exact number of permittees because of different spellings that in fact may be the same permittee.

In summarizing and comparing the characteristics of the vessel population, EPA assumed the data submitted by each respondent were accurate, unless the data were found to be clearly erroneous (e.g., a vessel noted to be over 650,000 feet in length). To account for error, the upper range of quantitative values submitted for select characteristics (e.g., vessel weight and length, ballast water capacity, etc.) has been truncated to the 90th percentile value. For 6,468 out of the 43,431 uniquely identified vessels, the information provided by the respondent was incomplete or insufficient (e.g., did not include a specific entry/value for tonnage or ballast water capacity) and was not included in the overall analysis. Instead, EPA complemented the incomplete or insufficient data with information from two databases: the U.S. Coast Guard's Marine Information for Safety and Law Enforcement (MISLE) database (USCG, 2009) and National Ballast Water Information Clearinghouse (NBIC). MISLE provides a wide range of information regarding vessel characteristics, hailing ports, and other pertinent information tracked by the U.S. Coast Guard. EPA used the MISLE database to support vessel characterizations in their 2010 Report to Congress.[3] NBIC provides data on ballast water management practices of commercial ships that operate in the waters of the United States.

These two databases were used to develop estimates of the number of vessels eligible for coverage under the VGP (Abt Associates, 2008). To check the accuracy of EPA's original estimates and to evaluate whether vessels that should be seeking coverage actually were doing so, EPA compared the number of NOIs submitted to the MISLE and NBIC estimates, as summarized in section 2.3 of this document. Furthermore, Appendix A of this report provides a comparison of the information contained in the NOI database with estimates developed as part of the economic analysis for the 2008 VGP.

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[2] In this analysis, EPA defines uniquely identified vessels as those that are certified and have active permits. These vessels all have a unique IMO registration or other vessel identifier number; vessel name; and/or call sign in the NOI database, as well as a permit status labeled as either 'Active' or 'Certified'. EPA determined that 43,431 out of 53,567 total vessels currently meet these criteria. Vessels that are not considered in this analysis include 3,563 vessels with an archived status and 2,692 vessels with a terminated status. EPA notes that owner/operators of some vessels with an archived status intended to seek active coverage, but did not take all necessary steps in the electronic NOI system to finalize that coverage.

[3] U.S. EPA, 2010. *Report to Congress: Study of Discharges Incidental to Normal Operation of Commercial Fishing Vessels and Other Non-Recreational Vessels Less than 79 Feet*. Report EPA 833-R-10-005. August 2010.

2 NOI Vessel Universe

This section of this document provides a comprehensive summary of vessel information submitted by vessel owner/operators in their NOIs. The EPA NOI database (dated August 5, 2010) includes data for 43,431 vessels with an active or certified NOI[4] status that operate in U.S. waters, including 6,468 vessels for which tonnage and/or ballast water capacity is missing (Figure 2.1-1). Section 2.2 of this document presents results from 36,642[5] uniquely identified vessels that submitted complete NOIs. Section 2.3 compares the insufficient NOI data with MISLE and NBIC databases for the remaining 6,468 vessels.

2.1 Overview of Vessels by Vessel Type

Vessel owner/operators can classify their vessel under Question B.5 on the VGP NOI form as one of eight listed vessel types (plus an "other" category). Of the 36,642 uniquely identified vessels, 24,241 vessels were listed under one of these eight classifications (in order of number of vessels identified):

- Barges of all types;
- Oil or Gas Tankers;
- Commercial Fishing Vessels with Ballast Water (hereinafter Commercial Fishing Vessels);
- Large Ferries (250+ passengers or more than 100 tons of cargo, e.g., cars, trucks, trains, or other land-based transportation);
- Large Cruise Ships (500+ passengers);
- Research Vessels;
- Emergency Vessels;
- Medium Cruise Ships (100 to 499 passengers).

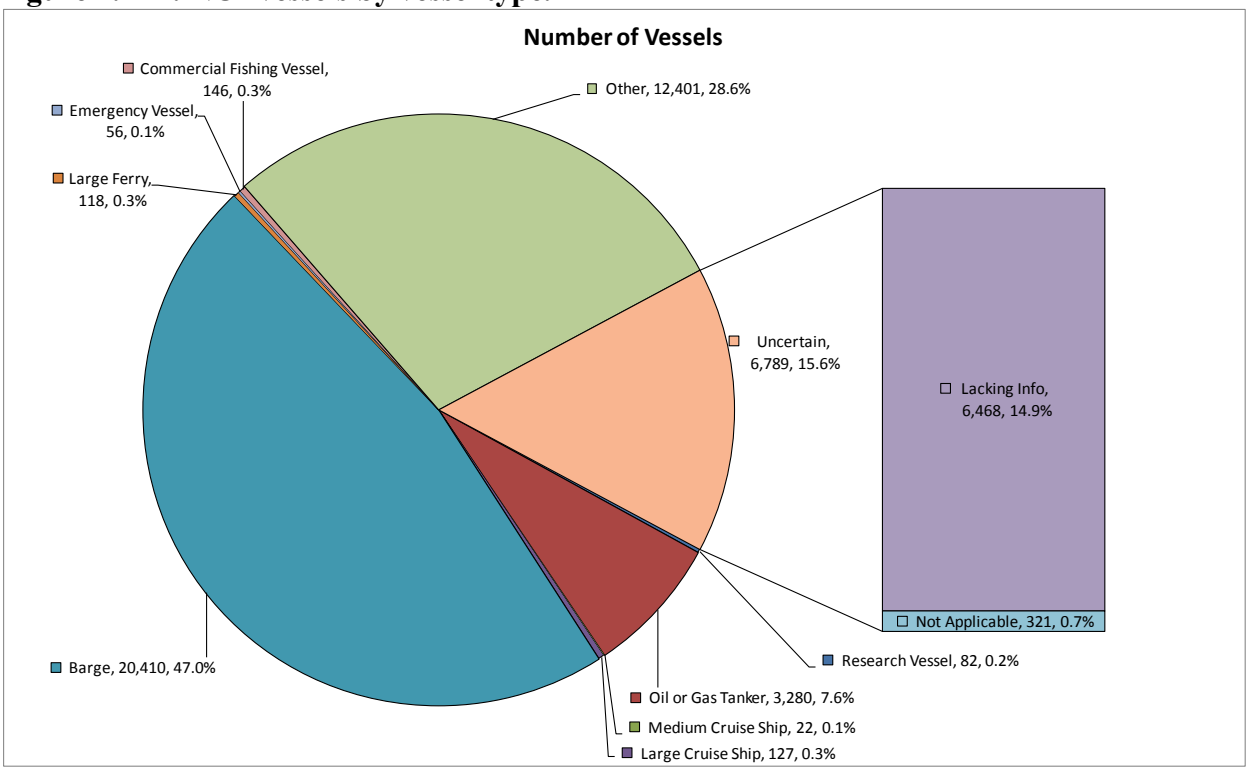
Of these 24,241 vessels, barges, followed by oil and gas tankers, represent the largest percentage of vessels (Figure 2.1-1). Commercial fishing vessels with ballast water, large ferries, large and medium cruise ships, and research and emergency vessels, combined, represent about one percent or so of the total.

The remaining 12,401 vessels were identified as "other," making this the second largest category of vessels overall. Many vessel operators who checked "Other" also filled in a secondary vessel type (see additional details provided in section 2.2.1.1 of this document).

[4] An active NOI refers to those for which the 30-day waiting period has been completed and no additional issues have been identified, whereas a certified NOI is one that is in the 30-day waiting period prior to becoming active. Note: not all NOIs in the current system are active (see footnote 2).

[5] The values reported for vessel tonnage and/or ballast capacity for 321 vessels with active or certified NOI status are less than 300 gross registered tons and 8 m^3, respectively, and therefore, are also excluded from the more detailed examination of vessel characteristics data summarized in this report.

Figure 2.1- 1: NOI vessels by vessel type.[6]



2.2 Comprehensive Summary and Analysis of NOI Vessel Universe

Section 2.2 of this document presents vessel characteristic data reported in the NOI for the 36,642 uniquely identified vessels for the following four types of information:

Vessel General Characteristics and Voyage Related Information – vessel subtypes; tonnage, length, and age; date of last dry dock; home/most frequented port; and crew size/passenger capacity.

Ballast Water and Ballast Water Treatment – ballast water capacity; ballast water management plan, tank cleaning and sediment disposal; and experimental ballast water treatment systems and associated discharge of residual biocides.

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[6] Source: EPA NOI database, August, 5, 2010. Note: Percentages are based on the total number of vessels within a given type out of the total 43,431 uniquely identified vessels in the NOI. The subset of 6,468 vessels within the "Uncertain" group and identified as "Lacking Information" consists of those vessels for which the information reported in the NOI regarding tonnage or ballast water capacity was missing. These vessels are discussed further in Section 2.3 of this document, and have been excluded from the more detailed data summary and analysis included in section 2.2 of this document. Again, EPA did not analyze the 321 vessels identified as "Not Applicable" because the tonnage and ballast water capacity reported in the NOI for these particular vessels are less than 300 gross tons and/or 8 m^3, respectively. However, EPA notes that these vessels may have chosen to submit an NOI despite being smaller than these thresholds, or if the vessel is below 79 feet, may be seeking coverage for the ballast water discharges only as authorized in Part 1.2.1 of the VGP.

Vessel Discharge and Treatment System – applicable discharges and onboard treatment systems and the waste-streams they are designed to treat.

Anti-fouling Hull Coatings – type of coating; interval since last application; and hull husbandry practices, including the frequency with which the practices are implemented.

2.2.1 Vessel General Characteristics and Voyage Related Information

2.2.1.1 Vessel Subtypes

Respondents who selected one of the eight listed vessel types also had an opportunity to further classify their vessel. Table 2.1 shows the number of owners/operators who either selected "other" or specified a subtype in addition to one of the eight vessel types. The percentage of vessels that were further specified as a subtype was highest for emergency vessels (79 percent) and commercial fishing vessels (57 percent). Notably, of the 12,401 respondents who classified their vessel type exclusively as "Other" only 21 percent actually wrote in a specific subtype as requested by the NOI form.

Table 2.1. Number of respondents who further classified their vessel by writing in a subtype on their NOI.

Subtype Specification	Barges	Oil and Gas Tankers	Comm. Fishing	Large Ferries	Large Cruise Ship	Med. Cruise Ship	Research	Emerg.	Other
Yes	106	82	84	7	1	1	2	44	2,562
No	20,304	3,198	62	111	126	21	80	12	9,839
Total	20,410	3,280	146	118	127	22	82	56	12,401
Subtype Specified (%)	<1%	2.5%	57%	5.9%	<1%	<1%	2.4%	79%	21%

Barges

Of the 20,410 barges, less than one percent (106 barges) were sub-classified by respondents. The largest number were designated dredge attendant plants (50 barges), followed by dredgers (15), deck barges for construction materials (13), oil and gas or other tank barges (10), and cranes of various types (10).

Oil and Gas Tankers

Of the 3,280 oil and gas tankers, only 2.5 percent were specifically sub-classified, with the largest number identified as either chemical tankers (51) or barge or tank barges (20).

Commercial Fishing Vessels

Roughly 58 percent of commercial fishing vessels (84 out of 146 vessels) were sub-classified as bulk carriers, cargo or container vessels (56), with a much smaller number sub-classified as tug/towboats (6), barges (5), or off-shore supply vessels (5).

Large Ferries, Large and Medium Cruise Ships, and Research Vessels

Very few ferries and large and medium cruise ships were sub-classified. Of the 118 large ferries, four are sub-categorized as large cruise ships and three as medium cruise ships. Of the 127 large cruise ships, one was sub-classified as a barge. Of the 22 medium cruise ships, one was sub-

classified as a large ferry. Likewise, only two of the 56 research vessels were sub-classified, with both identified as workboats.

Emergency Vessels
In contrast, 44 of 56 emergency vessels were sub-classified; 43 as oil recovery vessels and one as a research vessel.

"Other" Vessels
Respondents were also given the choice to exclusively select "Other" and write in a specific vessel type. Of the 12,401 "Other" vessels, only 2,562 respondents (21 percent) wrote in a subtype as requested by EPA, while 9,839 respondents (79 percent) did not. Furthermore, out of the 2,562 respondents who wrote in a specific vessel type, 67 respondents provided an entry that matched one of the eight vessel types listed in the NOI form.

Cargo carriers (See Table 2.2 below) comprised the vast majority of the "Other" vessels (2,044 vessels), followed by tugs/tow boats (143), crew/supply/support vessels (115), chemical/oil tankers (83), barges (34), and passenger vessels (18).

Table 2.2. Cargo carrier type specified within the "Other" vessel category.

CARGO CARRIER TYPE	# Vessels
General Cargo (Not Otherwise Specified)	1,870
Car/Truck Carrier	74
Refrigerated Cargo	47
Log/Lumber/Woodchip Carrier	25
Roll-on Roll-off Cargo	19
Cement Carrier	3
Grain/Ore Carrier	2
Irradiated Nuclear Fuel Carrier	2
Ore/Bulk/Oil Carrier	2

2.2.1.2 Vessel size and age

Tonnage
Table 2.3 provides a summary of the statistical distribution of tonnage[7] of NOI vessels by vessel type. Median tonnage ranges from 563 gross tons (GT) for emergency vessels to 53,526 GT for large cruise ships. Barges, in general, are lighter than other vessel types with 90 percent of the barges weighing less than 1,065 GT.

[7] Vessel tonnage is reported in terms of gross tons (GT) here and throughout the remainder of this data summary report. For purposes of this analysis, where data was entered as gross registered tons (GRT), values were converted to GT using a multiplication factor of 0.592885 (or approximately 300 GT per 506 GRT) to standardize numbers. This conversion factor was recommended by the U.S. Coast Guard (personal communication between Jordan Gilliland, Environmental Scientist, EPA NOI Processing Center (staffed by the Avanti Corporation), and the U.S. Coast Guard; December 2010). EPA recognizes that calculation of GRT is complex and does not necessarily result in a linear relationship between GT and GRT. Thus values for vessel tonnage may be over- or under-estimated in this report for certain vessels.

Table 2.3. Statistical distribution of tonnage (GT) of NOI vessels by vessel type.

Statistic	Barges	Oil and Gas Tankers	Comm. Fishing	Large Ferries	Large Cruise Ship	Med. Cruise Ship	Research	Emerg.	Other[8]
Minimum	5	25	58	99	391	99	82	70	9
10th Percentile	418	6,039	117	374	8,767	395	174	94	189
25th Percentile	453	14,224	325	498	33,094	1,147	682	488	3,904
Median	705	24,908	1,997	1,451	53,526	4,584	1,780	563	15,939
75th Percentile	788	46,730	15,542	3,216	81,984	17,951	2,925	2,711	27,681
90th Percentile	1,065	93,033	26,512	9,149	101,415	27,993	5,606	7,905	43,286
N (sample size)	20,364	3,244	145	118	127	22	81	56	12,241

Length

A summary of the statistical distribution of vessel length among vessels in the NOI is provided in Table 2.4. Median length ranges from 200 feet for emergency vessels and barges to over 857 feet for large cruise ships. Cruise ships are the longest vessels overall followed by oil and gas tankers.

Table 2.4. Statistical distribution of length (feet) of NOI vessels by vessel type.

Statistic	Barges	Oil and Gas Tankers	Comm. Fishing	Large Ferries	Large Cruise Ship	Med. Cruise Ship	Research	Emerg.	Other
Minimum	14	27	65	91	142	95	87	64	30
10th Percentile	190	412	114	139	477	119	124	96	122
25t Percentile	195	577	147	180	713	292	187	156	371
Median	200	620	265	260	857	420	224	194	600
75th Percentile	200	818	554	364	962	594	283	286	738
90th Percentile	264	1,034	628	583	1,021	613	321	322	915
N (sample size)	20,256	3,274	146	118	127	22	77	55	12,151

Age

Table 2.5 provides the distribution of the age of vessels by vessel type. The median age of all vessel types is approximately 18 years old, ranging from six years for oil and gas tankers to 26 years for large ferries and emergency vessels. Oil and gas tankers and large cruise ships tend to be newer with 90 percent of these vessels equal to or less than 18 and 20 years old, respectively. In contrast, large ferries tend to be older.

[8] As discussed previously, "other" vessels comprise a wide variety of vessel types; hence, the summary statistics for the "other" vessels have a wide distribution.

Table 2.5. Statistical distribution of age[a] (years) of NOI vessels by vessel type.

Statistic	Barges	Oil and Gas Tankers	Comm. Fishing	Large Ferries	Large Cruise Ship	Med. Cruise Ship	Research	Emerg.	Other
Minimum	1	1	1	1	1	2	2	3	1
10th Percentile	4	2	7	7	3	10	8	18	2
25th Percentile	9	3	12	12	7	11	14	18	5
Median	15	6	23	26	11	20	23	26	11
75th Percentile	29	12	32	42	16	26	34	35	22
90th Percentile	33	18	38	54	20	37	42	43	33
N (sample size)	20,307	3,267	146	118	127	22	81	56	12,262

[a] Age determined by subtracting year built from 2011.

2.2.1.3 Dates of Dry Docking

Table **2.6** summarizes the time interval since the last drying docking for vessels by vessel type. Among vessels that have been dry docked, the median length of time (in years) that elapsed since the last dry dock is from 2 to 4 years with 3 years being the most common. The longest time that elapsed since the last dry dock for any vessel was 37 years. Overall, the time since the last dry dock is longest for barges. With the exception of barges, at least 90 percent of all other vessels have been dry docked within the past 5 years.

Table 2.6. Statistical distribution of the time interval since the last dry docking by vessel type (by years).

Statistic	Barges	Oil and Gas Tankers	Comm. Fishing	Large Ferries	Large Cruise Ship	Med. Cruise Ship	Research	Emerg.	Other
Minimum	1	1	1	2	2	1	1	2	1
10th Percentile	2	2	2	2	2	2	2	2	2
25th Percentile	2	2	2	2	3	2	2	3	2
Median	4	3	3	3	3	2	3	3	3
75th Percentile	6	4	4	3	4	3	4	4	4
90th Percentile	9	5	4	5	5	3	4	5	5
Maximum	23	7	28	37	7	4	6	7	32
N (sample size)	6,943	1,507	135	111	93	18	80	56	7,113

2.2.1.4 Home/Most Frequented Port and Geographical Area of Operation

The information submitted regarding home/most frequented port city[9] and/or general geographic area of operation varies greatly both between and within vessel types, and is summarized by vessel type below.

[9] Note here that vessels may not always operate in their home/most frequented port, or remain at their home/most frequented port for significant intervals of time. Many vessels might travel/work between numerous ports. Because it is difficult for EPA to discern which city listed in the NOI is the primary home/most frequented port city, when more than one city was entered, the first city in the list was assumed to be the primary home/most frequented port city.

Barges
Information on home/most frequented port was provided for 15,641 barges, 11,480 of which actually listed a specific city (equivalent to a 56 percent response rate for the 26,410 uniquely identified barges in the NOI database), and is summarized in Table 2.7. Of the approximately 240 cities cited as home/most frequented port, New Orleans, LA and Jeffersonville, IN were the most frequently listed (at 24 and 22 percent of barges, respectively).

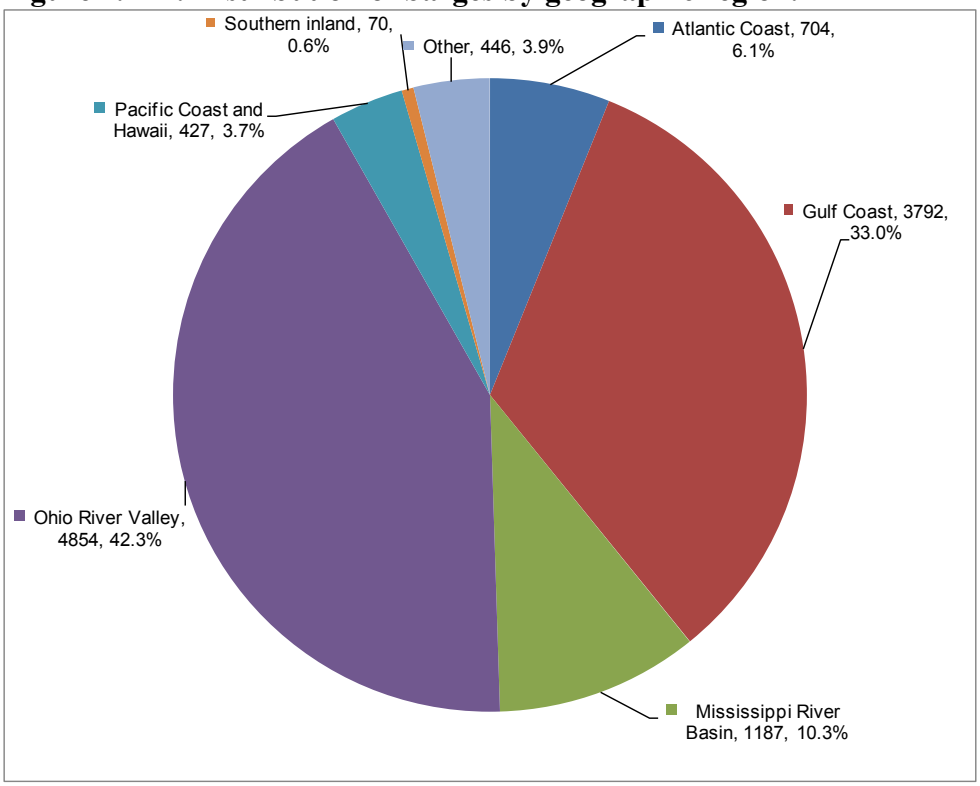
The top 15 home/most frequented port cities are host to approximately 85 percent of the barges (9,787). Of the top 50 home/most frequented ports, port cities along the Ohio River Valley are host to 42 percent of the barges, followed closely by Gulf Coast cities (33 percent) and more distantly by cities along the Mississippi River (10 percent) and Atlantic Coast (6 percent), respectively. The distribution of barges by geographic region is provided in Figure 2.2-1. Assuming most owners/operators listing home/most frequent port cities in the Gulf Coast region have done so because their barges only operate along the Mississippi and Ohio Rivers, this means up to 85 percent of covered barges are likely operating within the larger Mississippi-Ohio River system.

Only 2 percent of barges (361 of 19,558 reported) travel beyond the U.S. EEZ and more than 200 nm from any shore. Similarly, only 2 percent of barges (344 of 19,595 reported) engage in Pacific nearshore voyages. These 344 barges represent approximately three quarters of the total number of barges where home/most frequented port city was provided as being on the West Coast or Hawaii.

Table 2.7. Top fifteen home/most frequent port cities for barges.

Home/Most Frequented U.S. Port	# Vessels
New Orleans, LA	2,771
Jeffersonville, IN	2,513
Pittsburgh, PA	981
St Louis, MO	823
Metropolis, IL / Davant, LA	675
New York, NY	353
Cincinnati, OH	277
Houston, TX	242
Tuscaloosa, AL	229
Houma, LA	197
Ashland, KY	191
Boston, MA	153
Seattle, WA	147
Baton Rouge, LA	124
Grand Rivers, KY	111
Total other (non-descript) home ports:	**4,161**
Inland Waterway Systems-	4,117
Seaboard and Gulf Coast (ports)-	24
(Ports in) Coastal Waters-	20
Grand Total	**15,641**

Figure 2.2- 1: Distribution of barges by geographic region.[10]



Oil and Gas Tankers

Table 2.8 summarizes the home/most frequented port for 2,350 oil and gas tankers reporting this information. The top ten most commonly cited home/most frequented port cities are in the following states: Texas, New York, California, Louisiana, and Pennsylvania (in order of prevalence). Houston, Texas was the most common city, representing approximately 40 percent of the total oil and gas tankers. Of the top 10 home/most frequented port cities, approximately 46 percent are from the Gulf Coast, nine percent are from the East Coast, and five percent are from the West Coast. The top ten cities identified represent more than half of the entries listed under home/most frequented port for oil and gas tankers.

[10] Geographic region assigned by EPA based on home/most frequented port city.

Table 2.8. Top ten home/most frequented port cities for oil and gas tankers.

Home/Most Frequented U.S. Port	# Vessels
Houston, TX	811
New York, NY	183
Texas City, TX	74
Galveston, TX	70
Los Angeles, CA	70
New Orleans, LA	55
Long Beach, CA	49
Louisiana Offshore Oil Port	36
Philadelphia, PA	34
Lake Charles, LA	32
Total # Vessels for which Home Port was provided	**2,350**

Information about whether the vessel travels beyond the U.S. EEZ and more than 200 nm from any shore was provided for 3,114 oil and gas tankers. Of those, 95 percent (2,966 of 3,114) were reported to travel outside the U.S. EEZ. Twenty-four percent (627 out of 2,617 tankers) were reported as being engaged in Pacific nearshore voyages.

Commercial Fishing Vessels

Information on home/most frequented port was provided for 84 commercial fishing vessels. The top three most commonly cited port cities were Dutch Harbor, AK; Seattle, WA and New Orleans, LA. Of the 24 home/most frequented port cities, 54 percent are from the West Coast, 33 percent from the Gulf Coast, and five percent from the East Coast.

Information about whether the vessel travels beyond the U.S. EEZ and more than 200 nm from any shore was provided for 146 commercial fishing vessels. Of those vessels, 75 percent (110 vessels) were reported to travel outside the U.S. EEZ. Only 23 percent (33 vessels) were reported to engage in Pacific nearshore voyages.

Large Ferries

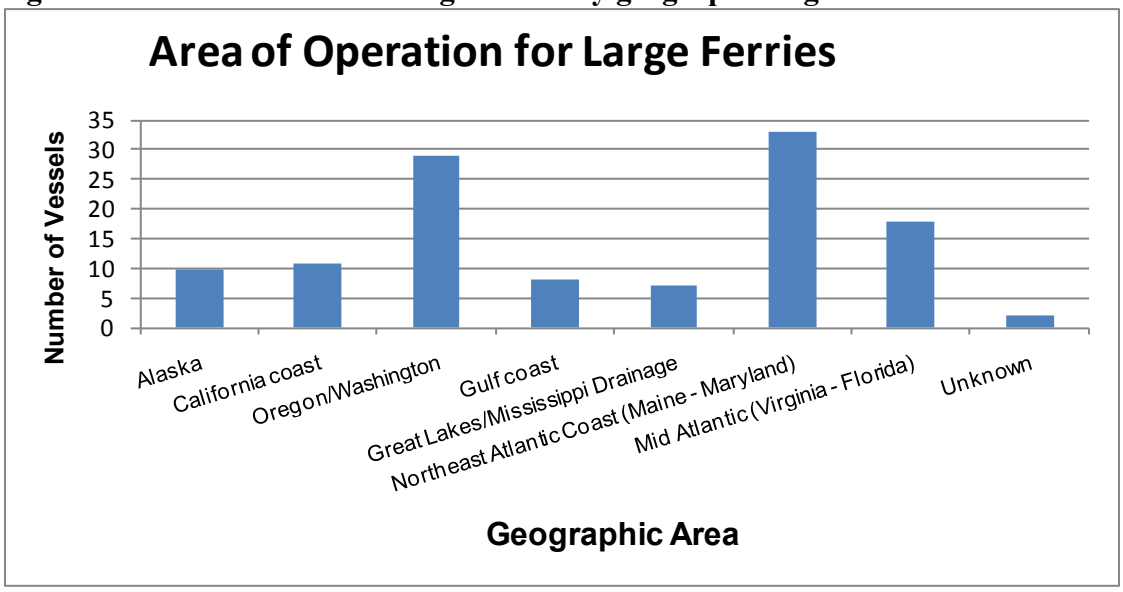
Table 2.9 summarizes the home/most frequented port for large ferries. The home/most frequented ports of operation for 51 of 116 ferries (44 percent) are located along the Northeast Atlantic coast, concentrated in the cities of New York, NY; Burlington, VT; Woods Hole, MA; and Cape May, NJ. The highest home/most frequented port city listed for large ferries is Seattle, WA, where 23 large ferries (20 percent) are located.

Table 2.9. Home/most frequented port for large ferries.

Home/Most Frequented U.S. Port City	# Vessels
Seattle, WA	23
New York, NY	8
Burlington, VT	6
Woods Hole, MA	6
Cape May, NJ	5
Galveston, TX	5
Larkspur, CA	5
Cedar Island, NC	4
Juneau, AK	4
Ketchikan, AK	4
Hatteras, NC	3
Mobile, AL	3
New London, CT	3
Pittsburgh, PA	3
Port Hueneme, CA	3
Total # Vessels for which Home Port was provided	**116**

Figure 2.2-2 shows the distribution of large ferries by general geographic region of operation.

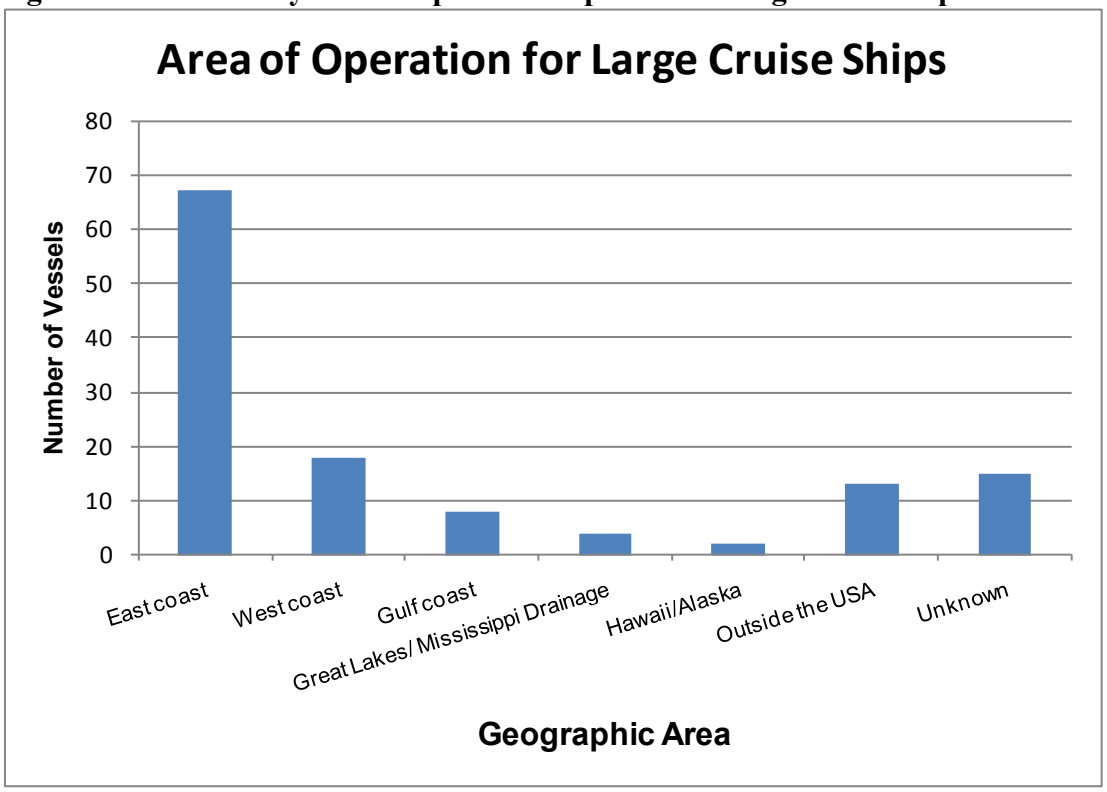
Figure 2.2- 2: Distribution of large ferries by geographic region.



Information about whether the vessel travels beyond the U.S. EEZ and more than 200 nm from any shore was provided for 118 large ferries. Of those, 10 were reported to travel outside the U.S. EEZ, while 17 were identified as being engaged in Pacific nearshore voyages.

Large Cruise Ships
Home/most frequented port cities for 67 of the 112 large cruise ships are located on the East Coast of the United States. Fifteen of these vessels operate in and out of New York, NY and three operate out of Boston, MA. Forty-seven of the large cruise ships have home/most frequented ports listed along the Atlantic coast of Florida, primarily in Miami (17), Port Everglades (11), Port Canaveral (9), and Fort Lauderdale (8). There are 17 large cruise ships with port cities located along the West Coast, while eight ships have home ports along the Gulf Coast. Thirteen large cruise ships have home ports located outside of the U.S. Home/most frequented port was not listed by 15 respondents. Figure 2.2-3 shows the distribution of large cruise ships by primary area of operation.

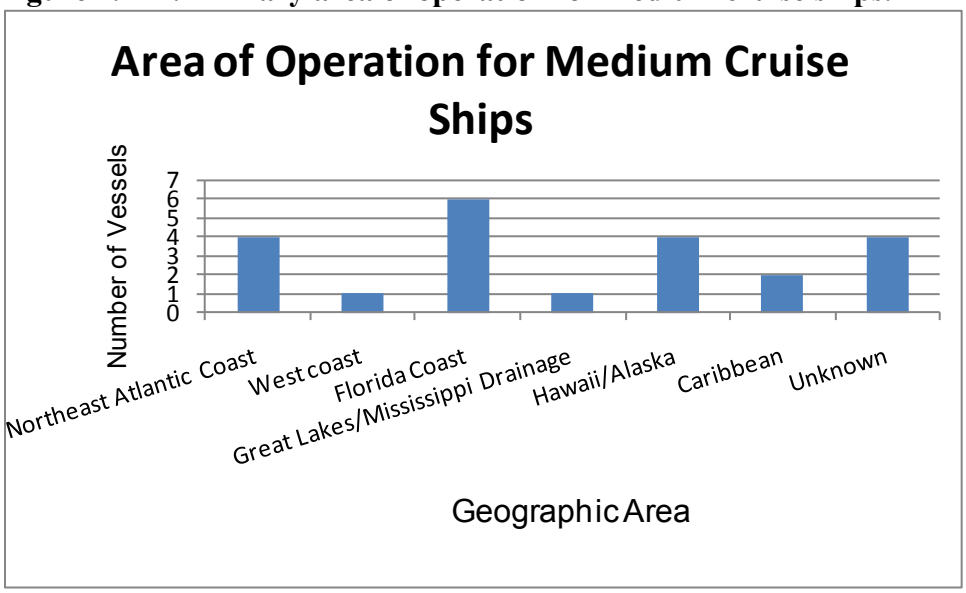
Figure 2.2- 3: Primary area of operation reported for large cruise ships.



Information about whether the vessel travels beyond the U.S. EEZ and more than 200 nm from any shore was provided for 114 large cruise ships. Of those, 84 (74 percent) were reported to travel outside the U.S. EEZ while 34 were engaged in Pacific nearshore voyages.

Medium Cruise Ships
The home/most frequented ports listed for six of the 22 medium cruise ships were located along the Florida coast. Four ships operate along the Northeast Atlantic Coast in New York City, NY, Boston, MA and Newport, RI. Four medium cruise ships operate along the Alaskan and Hawaiian coasts and two operate in the Caribbean. Figure 2.2-4 shows the distribution of medium cruise ships by primary area of operation.

Figure 2.2- 4: Primary area of operation for medium cruise ships.



Information about whether the vessel travels beyond the U.S. EEZ and more than 200 nm from any shore was provided for 19 medium cruise ships. Thirteen of the 19 medium cruise ships (68 percent) travel outside the U.S. EEZ and only four are reported to engage in Pacific nearshore voyages.

Research Vessels

Table 2.10 provides information on the home/most frequented port information, for which 70 of the 82 research vessels (85 percent) provided information. Eleven vessels listed Seattle, WA as their home/most frequented port city, followed by Galveston, TX (8) and Honolulu, HI (6). A total of 33 U.S. cities were listed, of which 20 were listed as home/most frequented port for only a single vessel. The seven cities listed in Table 2.10 account for 41 of the 70 (59 percent) research vessels.

Table 2.10. Top seven home/most frequented port cities for research vessels.

Home/Most Frequent U.S. Port	# Vessels
Seattle, WA	11
Galveston, TX	8
Honolulu, HI	6
Guam	5
Houston, TX	5
Pascagoula, MS	3
Tampa, FL	3
Total # Vessels for which Home Port was provided	**70**

Information about whether the vessel travels beyond the U.S. EEZ and more than 200 nm from any shore was provided for 79 research vessels: 67 of these (85 percent) traveled outside the U.S. EEZ and 33 engaged in Pacific nearshore voyages.

Emergency Vessels
Information on home/most frequented port city was provided for 55 of the 56 emergency vessels, which included a total of 34 different U.S. cities/ports. Only three cities (Galveston, TX, Long Beach, CA, and Port Angeles, WA) were reported to have four or more covered emergency vessels.

A total of 50 of the 56 emergency vessels (89 percent) reported travelling beyond the U.S. EEZ, and 42 (75 percent) reported engaging in Pacific near shore voyages.

Other Vessels
Information on home/most frequented port was provided for a total of 8,323 "Other" vessels, 6,356 of which provided a specific city. While a number of responses contained multiple home/most frequented cities, a total of 212 unique cities were identified. New Orleans, LA was the highest ranking home/most frequented port (22 percent), followed by Houston, TX (10 percent) and Los Angeles, CA (6 percent). The top 10 home/most frequented port cities account for over 61 percent of the "Other" vessels (Table 2.11). On a regional basis, the Gulf Coast accounts for 49 percent of the home/most frequented ports, followed by the Northeast coast (16 percent) and Southwest coast (12 percent). Inland ports accounted for seven percent of home/most frequented ports, while Alaskan and Hawaiian cities each accounted for less than one percent.

Table 2.11. Top 10 Home/most frequented port cities for "Other" vessels.

Home / Most Frequent US Port	# Vessels
New Orleans, LA	1,405
Houston, TX	669
Los Angeles, CA	400
New York, NY	347
Port Fourchon, LA	225
Long Beach, CA	214
Baltimore, MD	176
Seattle, WA	176
Norfolk, VA	163
Houma, LA	152

Information about whether the vessel travels beyond the U.S. EEZ and more than 200 nm from any shore was provided for 11,627 "Other" vessels: 9,105 (over 78 percent) were reported to travel outside the U.S. EEZ. Permittees reported 2,272 "Other" vessels (out of 9,659 responses) were engaged in Pacific nearshore voyages.

2.2.1.5 Crew and Passengers

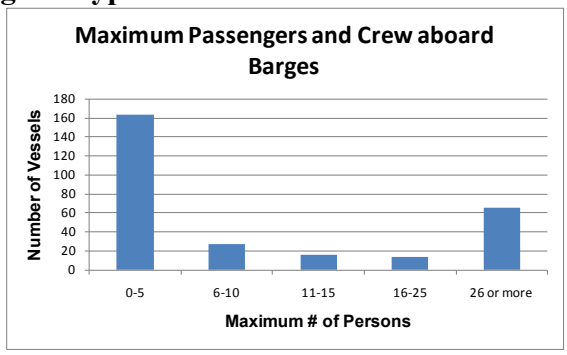
Table 2.12 provides a summary of the maximum crew and passenger capacity for vessels having submitted an NOI. As shown, the large/medium cruise ships and large ferries have a greater capacity for persons (includes crew and passengers) onboard than other vessel types. The maximum number of people (crew and passengers) aboard large cruise ships and ferries is at least an order of magnitude greater than for any other vessel type. Barges, on the other hand, tend to operate with fewer persons on board, and are assumed to be unmanned in many cases. The majority of barge operators (approximately 6,900) did not list any information for maximum capacity. EPA assumes that these barges are unmanned and/or unpowered, and that a blank response likely meant "zero persons." The distribution of maximum persons aboard any given type of vessel is graphically displayed in Figures 2.2-2 and 2.2-6.

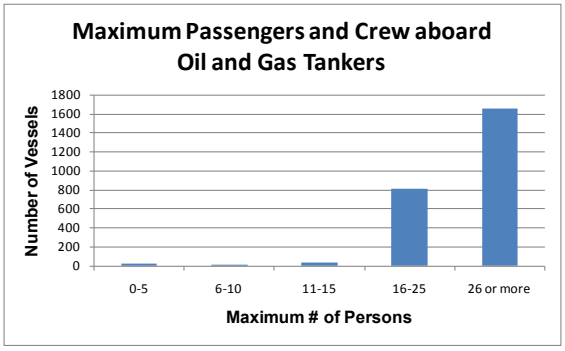
Table 2.12. Summary statistics of maximum crew and passenger capacity for vessels having submitted an NOI.

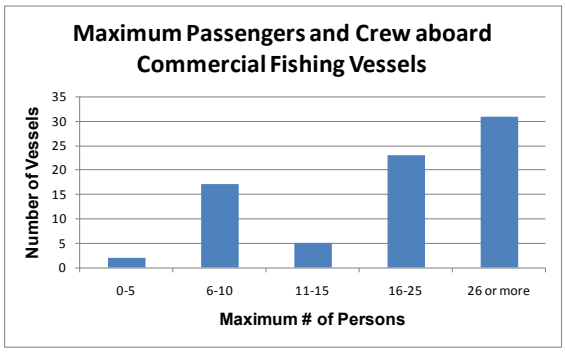
Statistic	Barge[11]	Comm. Fishing	Oil and Gas Tankers	Large Ferries	Large Cruise Ships	Med. Cruise Ships	Research	Emerg.	Other
Minimum	1	4	2	8	560	95	5	6	2
25th percentile	2	11	25	307	1,900	208	33	16	20
Median	4	22	29	559	3,455	315	41	16	25
75th percentile	20	35	32	1,042	4,200	557	60	50	30
Maximum	336	192	70	6,012	8,460	800	150	56	6,014
# Non-zero Responses	284	78	2,530	115	113	19	81	53	9,129

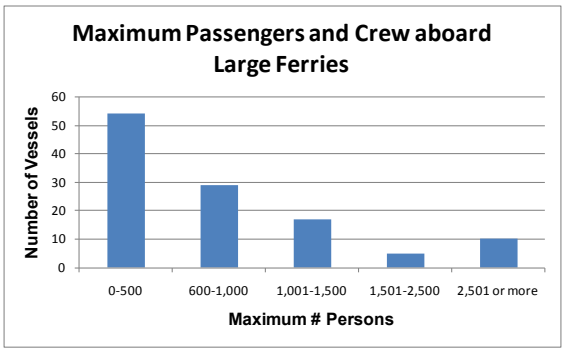
[11] EPA notes that more than 6,900 owners/operators of barges did not submit any information on the maximum number of persons. As discussed above, since the vast majority of barges are unmanned, EPA assumes that barges that did not respond are unmanned.

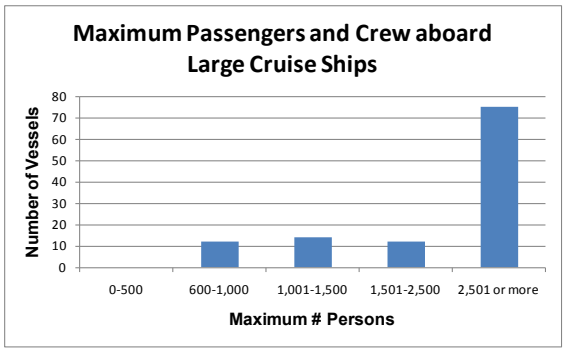
Figure 2.2- 5: Distribution of maximum persons (crew and passengers) aboard vessels of a given type.











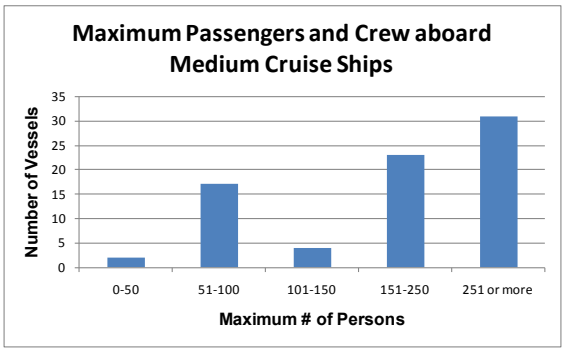
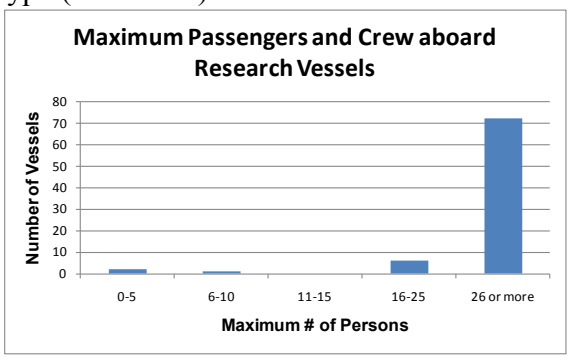
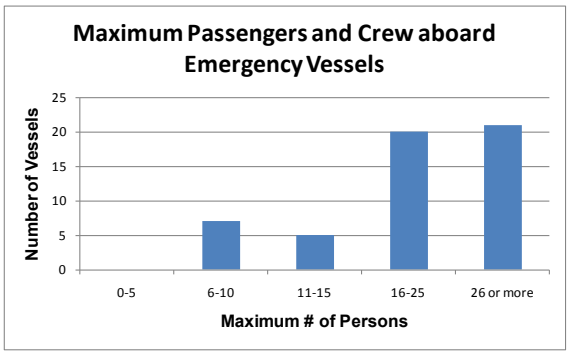
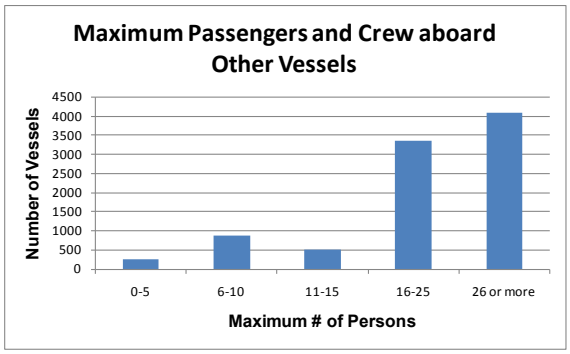


Figure 2.2- 6: Distribution of maximum persons (crew and passengers) aboard vessels of a given type (continued).







2.2.2 Ballast Water and Related Information

2.2.2.1 Ballast Water Capacity

Table 2.13 provides a summary of ballast water capacity[12] for vessels within the NOI database. Oil and gas tankers possess substantially greater ballast water capacity (median capacity of 23,893 m^3) compared to other vessel types. Vessels designated as "Other" in the NOI database tend to have a much larger ballast capacity (median ballast capacity is 10,198 m^3) than for vessels specifically identified by type, reflecting the large number of cargo carriers sub-classified under "Other" by respondents (see section 2.2.1.1 of this document).

Table 2.13. Statistical summary of ballast capacity for vessels in the NOI.

Statistic	Barges	Oil and Gas Tankers	Comm. Fishing	Large Ferries	Large Cruise Ship	Med. Cruise Ship	Research	Emerg.	Other
Minimum	0.76	34	0.09	17	19.4	9	14	12	1
10th Percentile	143	4,279	41	32	752	33	79	36	83
25th Percentile	166	17,049	168	97	2,151	204	206	200	1,710
Median	206	23,893	1,388	404	3,136	364	425	332	10,198
75th Percentile	1,030	42,350	6,775	1,631	4,334	742	814	552	23,497
90th Percentile	1,665	68,306	25,756	9,141	6,563	2,043	2,278	14,775	34,405
N (sample size)	**4,849**	**2,650**	**129**	**43**	**105**	**17**	**72**	**37**	**9,587**

The relationship between vessel tonnage and ballast water capacity is compared to the relationship between vessel length and ballast water capacity in Figure 2.2-3 through Figure 2.2-4. Overall, vessel tonnage is a slightly better predictor of ballast water capacity than length except for emergency vessels. Note: the distribution of ballast water capacity displayed in the figures has been truncated as appropriate to eliminate the influence of obvious outliers (as discussed in section 1.3 of this document).

[12] All values for ballast water capacity here and throughout this document have been converted to cubic meters (m^3) assuming 1 m^3 equals 264.17 gallons.

Figure 2.2- 7: Relationship between vessel tonnage (GT) and ballast water capacity for vessels identified in the NOI database.

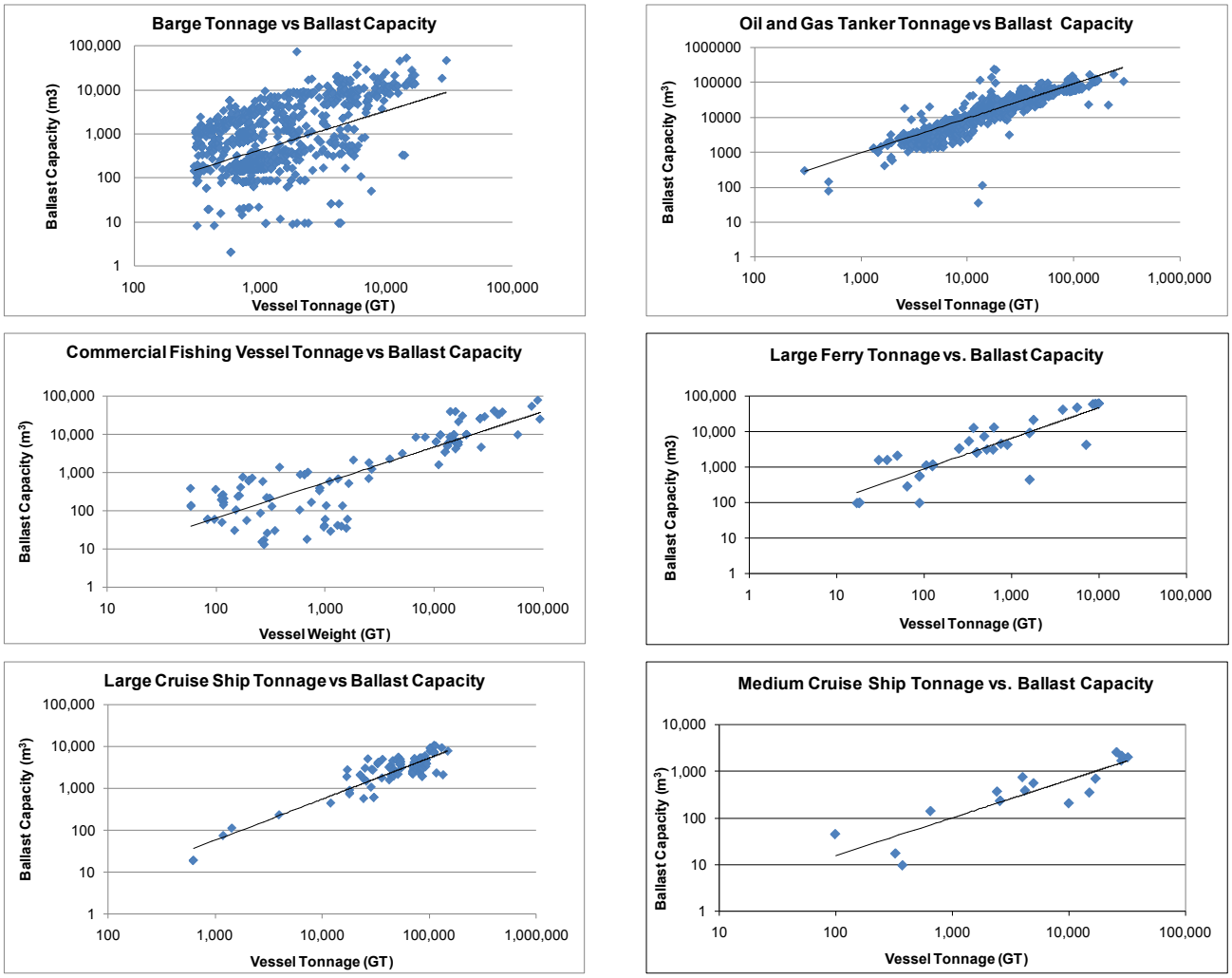
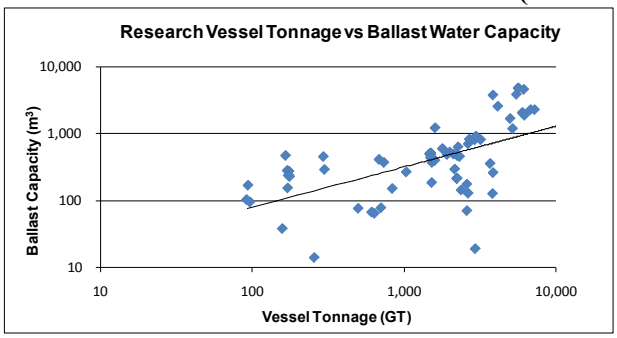
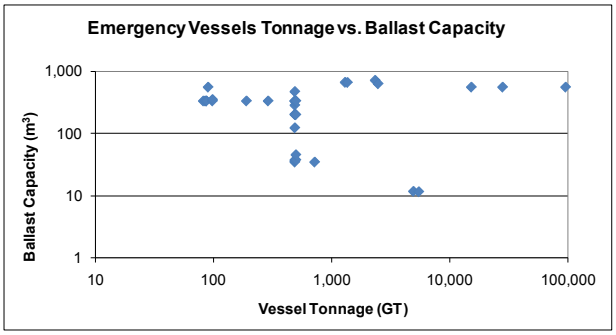


Figure 2.2- 8: Relationship between vessel tonnage (GT) and ballast water capacity for vessels identified in the NOI database (continued).





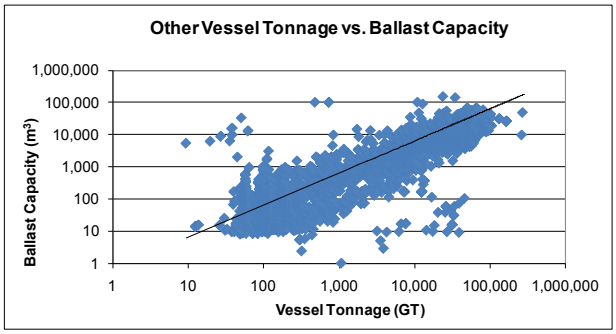


Figure 2.2- 9: Relationship between vessel length and ballast water capacity for vessels identified in the NOI database.

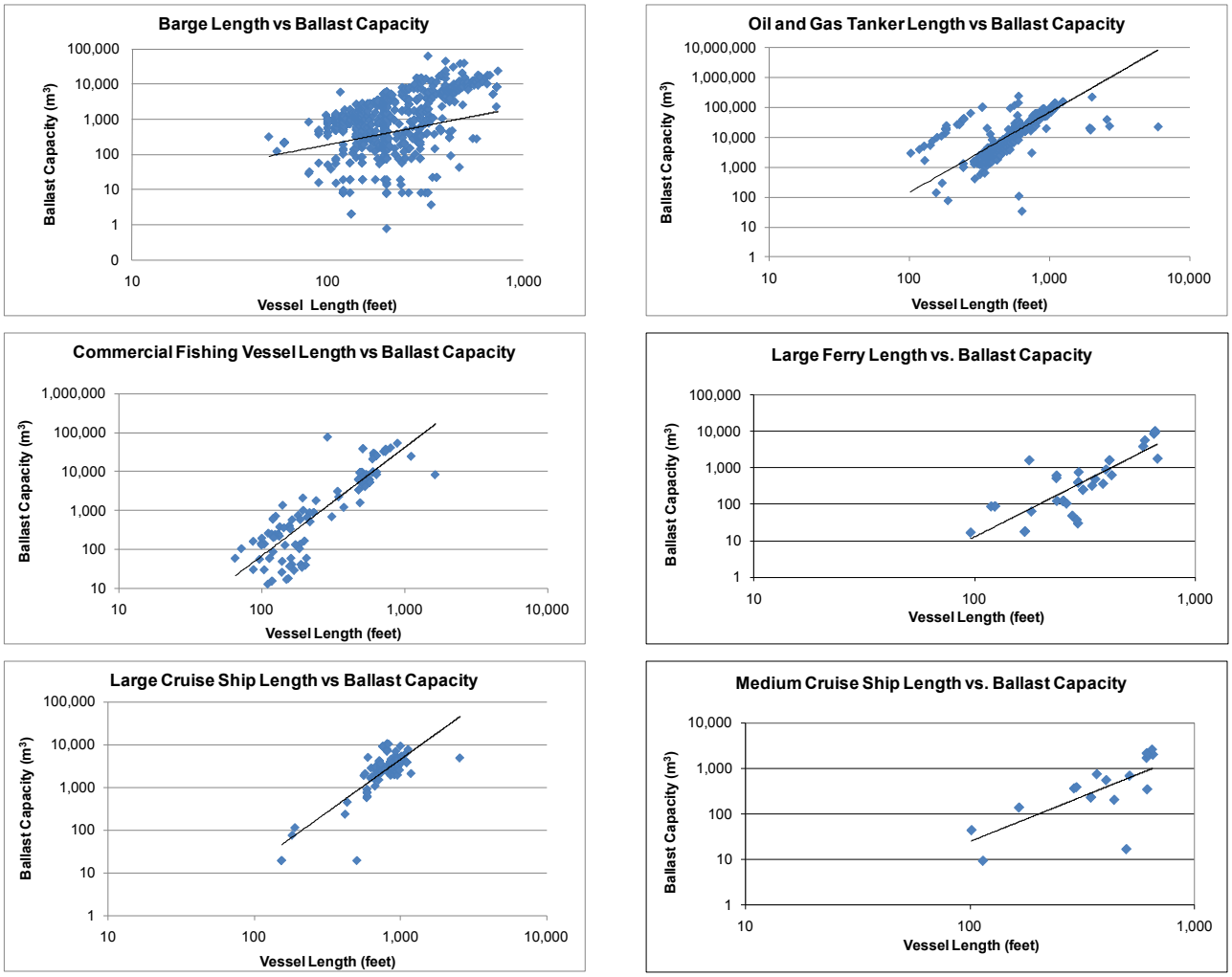
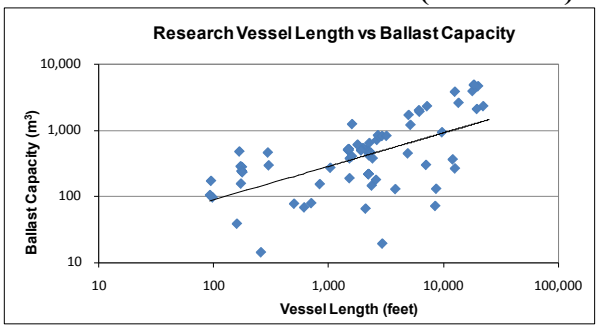
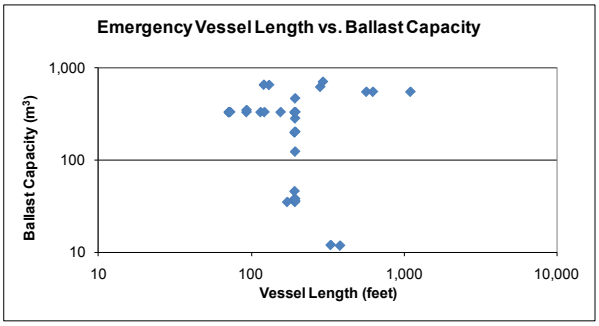
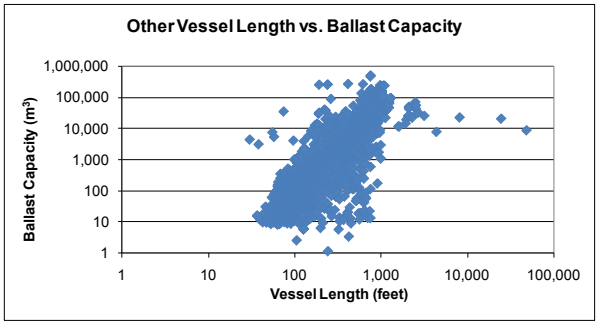


Figure 2.2- 10: Relationship between vessel length and ballast water capacity of for vessels identified in the NOI database (continued).







2.2.2.2 Ballast water management, tank cleaning, and sediment disposal

Ballast Water Management

Responses on the NOI regarding whether a vessel has a ballast water management plan (BWMP) is summarized by vessel type in Table 2.14. Nearly all oil and gas tankers, most large cruise ships, and vessels designated as "Other" indicated having a BWMP. Most large ferries indicated in their NOI that they did not have a BWMP. Approximately half (50 percent) of barges did not identify whether they had a BWMP.

Table 2.14. Percentage of vessels within a given type where use/non-use of a ballast water management plan (BWMP) has been indicated.

Existing BWMP?	Barges	Oil and Gas Tankers	Comm. Fishing	Large Ferries	Large Cruise Ship	Med. Cruise Ship	Research	Emerg.	Other
Yes	23%	98%	82%	15%	91%	73%	78%	88%	91%
No	27%	1%	13%	78%	8%	27%	6%	12%	7%
Not Indicated	**50%**	**1%**	**5%**	**7%**	**1%**	**0%**	**16%**	**0%**	**2%**

Tank Cleaning Frequency

Responses on NOIs regarding the frequency of ballast tank cleaning vary widely as summarized in Table 2.15. The frequency of ballast tank cleaning for most vessels occurs every 1 to 5 years and coincides with dry docking. Notable exceptions include large cruise ships, where ballast tanks are cleaned more frequently (less than one year), and barges, where ballast tanks are rarely cleaned. The frequency of ballast tank cleaning varies most within oil and gas tankers.

Table 2.15. Summary of the frequency of ballast tank cleaning for vessel types (Values reflect percentage of vessels for which a response was provided).

Frequency	Barges	Oil and Gas Tankers	Comm. Fishing	Large Ferries	Large Cruise Ship	Med. Cruise Ship	Research	Emerg.	Other
Every 5 years or more (i.e., rarely)	47%	2%	14%	0%	14%	6%	16%	9%	11%
Other (periodical, mostly at dry dock)	30%	42%	19%	27%	14%	38%	19%	10%	54%
Every 1 to 5 years	1%	29%	45%	25%	26%	12%	23%	77%	21%
Less than 1 year	1%	23%	9%	0%	41%	19%	31%	2%	10%
Every voyage	0%	2%	0%	0%	0%	0%	0%	0%	0%
Not applicable/ No Ballast	21%	2%	13%	48%	5%	25%	11%	2%	4%
Total # Respondents	**7,427**	**2,554**	**127**	**69**	**105**	**16**	**74**	**56**	**8,724**

Sediment Disposal

Ballast water sediment disposal methods by vessel type are summarized in Table 2.16. Ballast water sediment disposal for most vessels occurs onshore at shipyards via a third party during dry docking. Large and medium cruise ships, oil and gas tankers, and "Other" vessels also identified offshore/overboard ballast sediment disposal as a commonly used method (Figures 2.2-11 and 2.2-12).

Table 2.16. Summary of ballast water sediment disposal methods for vessel types (Values reflect percentage of vessels for which a response was provided).

Methods	Barges	Oil and Gas Tankers	Comm. Fishing	Large Ferries	Large Cruise Ship	Med. Cruise Ship	Research	Emerg.	Other
Onshore at shipyards via third party	78%	37%	81%	50%	72%	49%	55%	84%	70%
Onshore/Landfill	0.2%	4%	0%	2%	0%	0%	2%	4%	0%
Onshore or Offshore	0%	19%	0%	0%	10%	13%	7%	4%	7%
Offshore/overboard	0.8%	37%	6%	6%	18%	19%	8%	5%	16%
Not applicable/ No Ballast	21%	3%	13%	42%	0%	19%	28%	3%	7%
Total # Respondents	**6,950**	**2,521**	**123**	**62**	**97**	**16**	**74**	**56**	**8,529**

Figure 2.2- 11: Sediment disposal methods based on NOI submittals.

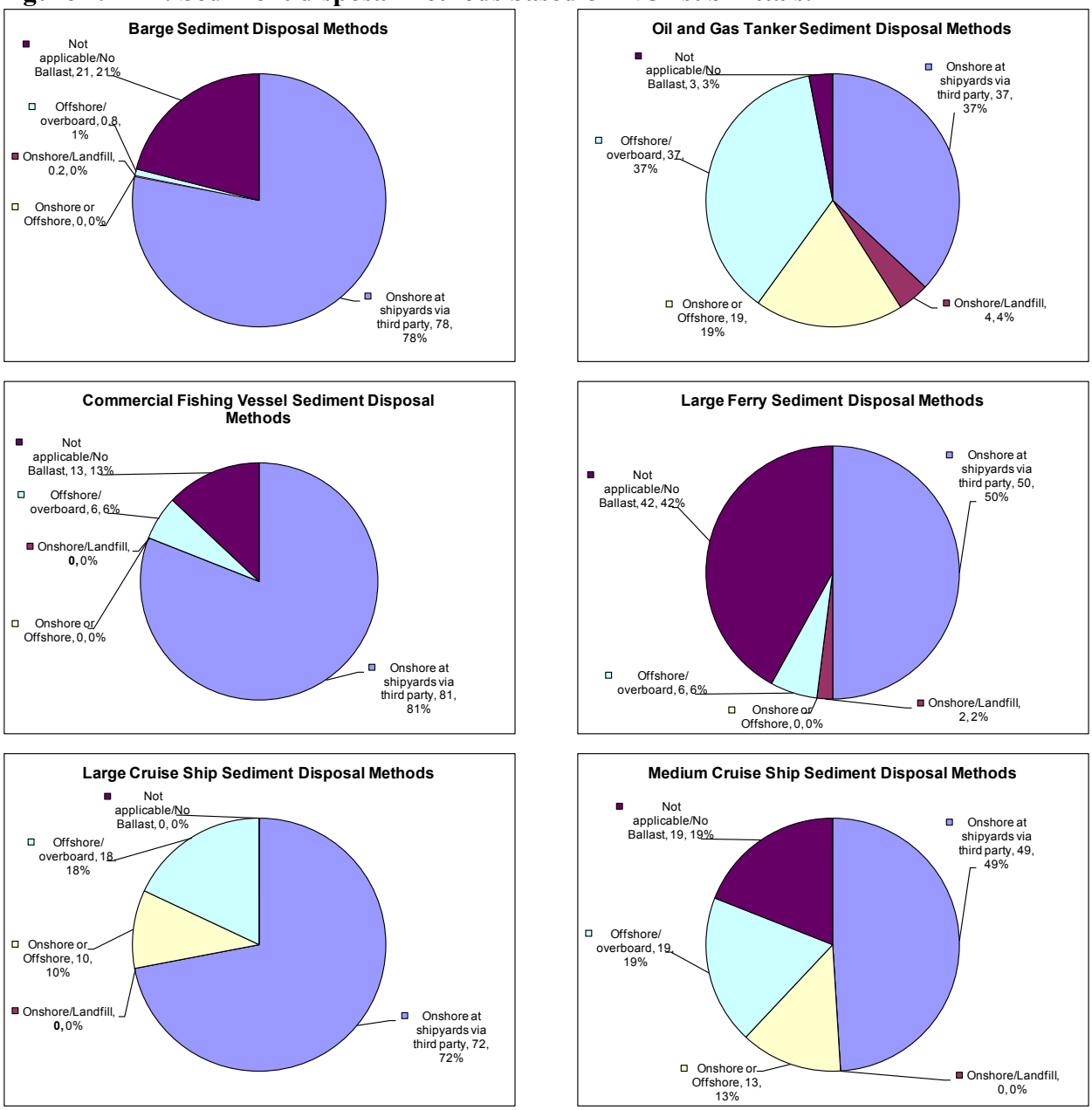
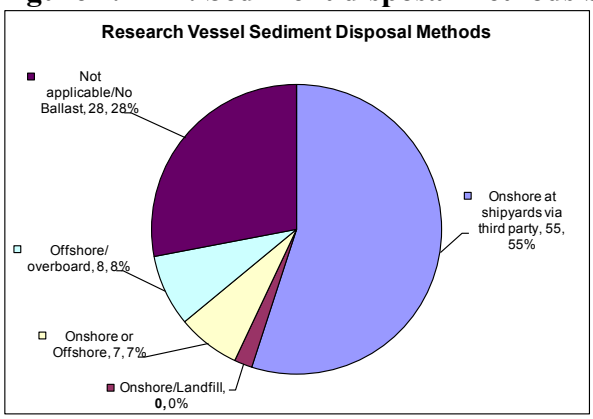
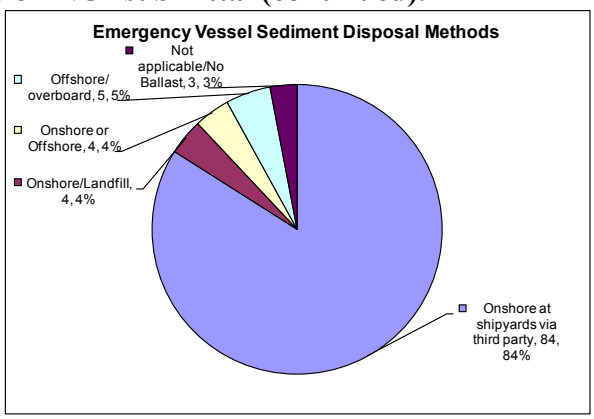
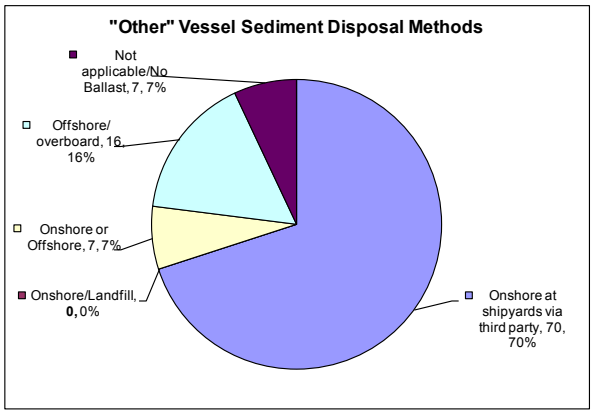


Figure 2.2- 12: Sediment disposal methods based on NOI submittal (continued).







2.2.2.3 Experimental ballast water treatment systems and discharge of residual biocides

The use of an experimental ballast water treatment system that results in the discharge of residual biocides was indicated by 26 vessels (two oil and gas tankers, one medium cruise ship, and 23 "Other" vessels). One oil and gas tanker reported a residual discharge of bi-sulfite (the other oil and gas tanker did not provide information on discharge type), and the medium cruise ship reported a residual discharge of sodium hypochlorite.

Of the 23 "Other" vessels, five of them were cargo carriers and 18 were an unspecified subtype. Information on the type of residual biocide present in the discharge was provided for only one of the 23 vessels. The residual biocide discharged was total residual chlorine.

2.2.3 Applicable Discharges and Related Information

2.2.3.1 Applicable discharges

The 2008 VGP NOI identified 26 types of vessels discharges. Table 2.17 provides a rank of the vessel discharges reported by vessel type (from high to low). The five most prevalent discharges for each type of vessel are indicated by light gray shading and bold type font. Deck washdown and runoff is reported as a top five discharge in all nine vessel types/categories. Anti-fouling hull coatings is a top five discharge in seven vessel types/categories, followed by cathodic protection and ballast water (6 vessel types/categories each), firemain systems (5), seawater cooling overboard discharge (4), bilgewater/oily water separator effluent (3), and graywater (2). Aqueous film forming foams (AFFF) is a top five discharge in emergency vessels, while underwater ship husbandry and welldeck discharges are top five discharges in barges (Table 2.17). The top 10 discharges of the "Other" vessel type/category largely reflect those reported for cargo carriers.

Table 2.17. Percentage of vessels where the applicable discharge listed is reported.
(Note: the 26 applicable discharges listed represent the possible discharges listed on the 2008 VGP NOI. The top five applicable discharges for each NOI vessel type are shaded.)

Applicable discharge Type	Barges	Oil and Gas Tankers	Comm. Fishing	Large Ferries	Large Cruise Ship	Med. Cruise Ship	Research	Emerg.	Other
Ballast Water	**29%**	**99%**	**87%**	28%	90%	74%	**82%**	**96%**	**94%**
Seawater Cooling Overboard Discharge	<1%	**97%**	53%	**73%**	**96%**	**100%**	15%	2%	14%
Deck Washdown and Runoff	**99%**	**97%**	**67%**	**98%**	**99%**	**95%**	**90%**	**96%**	**96%**
Graywater	<1%	**97%**	**59%**	28%	65%	79%	29%	48%	35%
Firemain Systems	<1%	**95%**	**59%**	**91%**	**96%**	**95%**	24%	11%	41%
Chain Locker Effluent	<1%	90%	51%	25%	62%	68%	73%	57%	72%
Bilgewater/Oily Water Separator Effluent	**25%**	89%	23%	38%	58%	68%	**87%**	57%	**85%**
Boiler / Economizer Blowdown	<1%	89%	7.2%	24%	58%	63%	29%	9%	61%
Cathodic Protection	9.4%	88%	54%	**82%**	**95%**	**100%**	**80%**	**95%**	**82%**
Anti-fouling Hull Coatings	5.3%	87%	**55%**	**82%**	**90%**	**95%**	**88%**	**91%**	**78%**
Refrigeration and Air Condensate Discharge	<1%	82%	54%	48%	85%	79%	16%	4%	19%
Distillation or Reverse Osmosis Brine	<1%	72%	5.8%	3.4%	85%	58%	13%	0%	12%
Non-oily Machinery Wastewater	2.6%	71%	16%	38%	55%	68%	5%	5%	13%
Aqueous Film Forming Foams	<1%	68%	9.4%	50%	51%	37%	54%	**82%**	43%
Small Boat Engine Wet Exhaust	<1%	67%	9.4%	42%	76%	63%	9%	4%	3.5%
Underwater Ship Husbandry	**26%**	64%	10%	12%	76%	58%	1%	34%	2.5%
Controllable Pitch Propeller Hydraulic Fluid	<1%	64%	12%	42%	82%	79%	73%	54%	55%
Seawater Piping Biofouling Prevention	<1%	60%	3.6%	10%	73%	16%	0%	2%	1.1%
Exhaust Gas Scrubber Washwater Discharge	<1%	56%	2.2%	3.4%	30%	11%	0%	0%	<1%
Graywater Mixed with Sewage	1.4%	53%	48%	29%	54%	53%	4%	2%	4.5%
Freshwater Layup	<1%	35%	8.7%	15%	32%	26%	5%	2%	9%
Gas Turbine Wash Water	<1%	22%	2.2%	4.3%	27%	0%	0%	2%	1.6%
Welldeck Discharges	**22%**	17%	2.9%	7.8%	28%	16%	4%	0%	1.4%
Motor Gasoline and Compensating Discharge	<1%	13%	2.2%	4.3%	27%	5.3%	0%	2%	1.3%
Elevator Pit Effluent	<1%	11%	<1%	19%	42%	37%	1%	0%	1.3%
Sonar Dome Discharge	<1%	3.3%	<1%	4.3%	27%	0%	4%	0%	0%
Percentage of owners/operators responding	**96%**	**82%**	**95%**	**98%**	**89%**	**86%**	**100%**	**100%**	**80%**

2.2.3.2 Onboard treatment systems for generated waste streams

Indication of onboard treatment systems and the corresponding treated waste stream is summarized in Table 2.18. The majority of oil and gas tankers and large cruise ships (approximately 80 percent) have onboard treatment systems of some type. Many of these vessels have multiple treatment systems for a variety of waste streams. The most common generated waste streams were oily water, bilgewater and sewage/sanitary water.[13] Very few barges reported having onboard treatment systems for generated waste streams.

Within the large subset of "Other" vessels sub-classified as cargo carriers, approximately 88 percent (1,774 of 2,044) reported an onboard treatment system. The type of waste stream treated was identified by 1,607 cargo carriers (79 percent). The most prevalent waste stream treated aboard bulk cargo carriers was oily water (82 percent), followed by sewage/sanitary water (54 percent). Bilgewater was reported at 28 percent (see footnote "a" in Table 2.18 below).

Table 2.18. Presence of onboard treatment systems per vessel type and a summary of the types of generated waste streams that were treated
(Note: values reflect the number of vessels responding with the percentage for that class of vessels in parentheses).

Onboard Treatment Systems?	Barges	Oil and Gas Tankers	Comm. Fishing	Large Ferries	Large Cruise Ship	Med. Cruise Ship	Research	Emerg.	Other
No	18,970 (93)	156 (5)	82 (56)	65 (55)	14 (11)	8 (36)	16 (20)	32 (57)	2,377 (19)
Yes	114 (1)	2,551 (78)	60 (41)	53 (45)	100 (79)	11 (50)	64 (78)	24 (43)	7,586 (61)
Total # Respondents (Percent)	**19,084 (94)**	**2,707 (83)**	**142 (97)**	**118 (100)**	**114 (90)**	**18 (82)**	**80 (98)**	**56 (100)**	**9,963 (80)**
Type of Generated Waste Stream and the Corresponding Number (#) of Vessels that Treated it.									
Unspecified/Response Not provided	65	1,361	19	42	13	3	50	21	2,370
Wastewater (AWS)	17	79	0	0	18	0	0	0	0
Graywater	11	44	2	7	17	2	2	1	351
Sewage/Sanitary	10	629	4	8	18	3	14	1	2,433
Oily water[a]	13	1,413	31	0	36	3	26	0	3,926
Bilgewater[a]	3	500	8	1	53	6	11	3	1,588
Sludge	0	0	0	0	1	0	2	0	0
Lube oil separator	0	0	0	0	1	0	0	0	0
Incinerator	0	0	0	0	0	0	2	0	218
Seafood processing waste	0	0	2	0	0	0	0	0	0

AWS = Advanced Wastewater System.
[a] Though oily water and bilgewater are generally considered the same waste stream generated/treated aboard vessels, these waste streams are listed separately in this table to reflect the actual description provided by NOI respondents.

[13] As discussed in Part 1.2.3.2 of the VGP, discharges of sewage are regulated under section 312 of the CWA and do not require an NPDES permit.

2.2.4 Anti-fouling Hull Coatings and Related Information

2.2.4.1 Type of coating

Table 2.19 provides a summary of anti-fouling hull coatings used on vessels. With the exception of barges, the use of an anti-fouling hull coating was reported for 80 percent or more of vessels. Most were organotin-free, copper-based anti-fouling paints that are compliant with current IMO regulations (e.g., International Interclene™ 245 or International Intersmooth™ 640, Ameron™ ABC #3, Hempel Olympic™ 7660). In a limited number of instances, the hull coating reported was "anti-foulant free" epoxy coating.

Of the 12,401 vessels categorized as "Other" in the NOI database, 42 percent (5,155) reported the application of a tributyltin (TBT)-free anti-fouling hull coating, while 24 percent indicated a copper-based anti-fouling paint used to coat the hull of their vessel.

Table 2.19. Summary of anti-fouling hull coatings used on vessels as reported on the vessels' NOIs. (Note: values reflect the total number of vessels for which a response was provided, with the corresponding percentage within a class of vessels in parentheses).

Anti-fouling Hull Coating?	Barges	Oil and Gas Tankers	Comm. Fishing	Large Ferries	Large Cruise Ship	Med. Cruise Ship	Research	Emerg.	Other
No	8,542 (42)	8 (0.2)	10 (7)	13 (11)	0	0	2 (3)	2 (4)	912 (8)
Yes	838 (4)	2,630 (80)	124 (85)	102 (86)	107 (84)	18 (82)	78 (95)	54 (96)	8,072 (65)
Uncertain	149 (<1)	21 (0.6)	0	1 (0.8)	3 (2)	1 (5)	0	0	539 (4)
Total # Respondents (Percent of total)	**9,529 (47)**	**2,659 (81)**	**135 (92)**	**116 (98)**	**109 (86)**	**19 (83)**	**80 (98)**	**56 (100)**	**9,523 (77)**

2.2.4.2 Anti-fouling hull coating application and hull husbandry practices

Hull Coating Applications

Table 2.20 provides a summary of the number of years since the last anti-fouling hull coating was applied. With the exception of barges, most vessels (90 percent) received an anti-fouling hull coating within the last three to five years. The shortest median time interval between hull coatings was two years for medium cruise ships, and the longest was 5 years for barges. The longest overall time interval between hull coatings was 81 years for a barge built in 1930.

The date of last application of anti-fouling coating and last dry dock coincide for a large portion of vessels (e.g., approximately 43 percent of oil and gas tankers and bulk cargo carriers and 70 percent of barges).

Table 2.20. Summary statistics depicting number of years since last anti-fouling hull coating was applied.

Statistic	Barges	Oil and Gas Tankers	Comm. Fishing	Large Ferries	Large Cruise Ship	Med. Cruise Ship	Research	Emerg.	Other
Minimum	1	1	1	1	1	1	1	2	1
10th Percentile	2	2	2	2	2	2	2	2	2
25th Percentile	3	2	2	2	3	2	2	3	2
Median	5	3	3	3	3	2	3	4	3
75th Percentile	8	4	4	4	4	3	4	4	4
90th Percentile	11	5	4	5	5	3	5	6	5
Maximum	81	19	12	37	7	4	6	7	68
N (sample size)	2,011	2,606	127	117	109	18	80	23	8,805

Table 2.20, depicting the number of years since last anti-fouling hull coating at the time of NOI coverage, is consistent with Table 2.21 showing the frequency with which hull husbandry practices were employed. Most vessels for which NOI data are available are cleaned at either a dry dock, every 2 to 5 years, or as needed. EPA categorized the information received into hull husbandry practices done in association with dry docking and hull husbandry practices not done in association with dry docking.

Table 2.21. Summary of the frequency with which hull husbandry practices are utilized for vessels. (Values represent actual number of responses)

Frequency	Barges	Oil and Gas Tankers	Comm. Fishing	Large Ferries	Large Cruise Ship	Med. Cruise Ship	Research	Emerg.	Other
Frequency of hull husbandry practice employed not associated with dry dock									
Annual (or less)	12	75	0	6	25	3	10	2	294
Every 2 to 5 years	183	201	64	7	23	0	7	6	901
Less than once per 5 years	82	33	0	0	0	0	0	0	0
As needed	233	256	0	4	3	4	1	1	1,530
Frequency of dry docks when hull husbandry practices employed									
At dry dock unspecified	378	960	22	25	11	5	24	2	3,361
Annual (or less)	0	75	1	0	0	0	0	0	6
Every 2 to 5 years	84	414	25	20	18	7	27	42	1,154
Less than once per 5 years	15	109	1	0	0	0	0	1	0
As needed	5	49	2	0	10	0	3	1	290

Hull Husbandry Practices

Table 2.22 highlights some of the more common hull husbandry practices for NOI vessels and the number of respondents who listed them. The most common practices include the use of power washing or a scraping/power washing/sand blasting combination, after which the anti-fouling coating is re-applied, as needed.

Table 2.22. Summary of hull husbandry cleaning practices for NOI vessels. (Note: values represent actual number of responses).[14]

Practice	Barges	Oil and Gas Tankers	Comm. Fishing	Large Ferries	Large Cruise Ship	Med. Cruise Ship	Research	Emerg.	Other
Power washing only	523	992	31	21	12	3	14	45	1,723
Power washing + sand blasting	141	0	0	15	2	3	6	3	1,630
Sand blasting only	137	294	4	7	4	0	6	0	771
Scraping + power washing	55	0	0	0	0	0	4	0	106
Scraping only	21	381	4	0	0	0	5	0	64
Scraping + sand blasting	19	0	0	0	0	0	5	0	81
Scraping, power washing and/or sand blasting	13	0	14	0	0	0	1	0	112
Hosed off with water only	6	0	0	1	6	1	2	0	79
Light scraping/ Scrubbing with or w/o Detergent	3	0	0	3	33	4	0	0	126
Underwater Divers	0	0	0	1	24	1	0	0	566
Other	0	225	1	0	0	0	0	0	380
Contingent on Shipyard practice	0	170	0	0	0	0	0	0	0

2.3 Characterization of Vessels with Missing Information

The NOI database includes data for 43,431 vessels with an active or certified NOI status, 6,468 of which have missing tonnage and/or ballast water capacity information. This section of the document characterizes the 6,468 vessels with incomplete NOIs using information from other data sources.

2.3.1 Data Sources

A primary data source on vessel population characteristics is the U.S. Coast Guard's MISLE database (USCG, 2009) which contains a wide range of information on vessel characteristics, accidents, marine pollution incidents, and other pertinent information tracked by the U.S. Coast Guard. The database has a broad scope and encompasses information on vessels covered in other public data sources such as the U.S. Coast Guard's Merchant Vessels of the United States (VESDOC) data file for documented vessels and the U.S. Army Corps of Engineers' Waterborne Transportation Lines of the US (WTLUS) data.

Nearly one million vessels that operate in U.S. waters are included in the MISLE database with vessel data including:

- Identification number(s)
- Vessel category (e.g., class, type, subtype, service)
- Size (e.g., weight, length, breadth, depth)
- Area of operation (e.g., hailing port, route type)
- Passenger and crew capacity
- Propulsion (i.e., method, engine type, and horsepower)
- Construction material and design (e.g., hull material, design type, hull configuration/shape)
- Year built or age

[14] The number of hull husbandry practices used may be underrepresented. When respondents listed multiple practices on their NOI, only the first listed practice was used for this data set.

In compiling MISLE data, the U.S. Coast Guard largely relies on documents submitted by vessel owners or operators in accordance with vessel documentation requirements (e.g., certificate of documentation) or on information gathered by U.S. Coast Guard staff directly (e.g., during inspections, vessel boardings, or accident investigations). The scope of the data included in MISLE is driven in part by the regulatory requirements to which different types of vessels are subject and by activities conducted by U.S. Coast Guard offices. Therefore, MISLE is generally most comprehensive for those vessels that are documented, state registered, and/or subject to inspection requirements. Thus, the vessels in the MISLE database are often times the same vessels that are required to submit a completed NOI for coverage under the VGP. This overlap helped EPA bolster NOI forms that were submitted with missing or incomplete information.

The U.S. Coast Guard maintains a separate database, the NBIC, with information from ballast water reports submitted by all ballast tank-equipped vessels entering U.S. waters. The information provided in NBIC includes:

- Vessel name
- Vessel category (e.g. class, type, subtype, service)
- Area of operation (hailing port, or state)
- Route information (arrival date and last port at which the vessel was called)
- Information on ballast water management practices (e.g., ballast capacity, volume discharged).

EPA obtained NBIC data on foreign and domestic flag arrivals to U.S. ports during calendar year 2005. These data were used to estimate the economic benefits of the final VGP (Abt Associates, 2008). When the MISLE data failed to fully complete the missing information on a vessel's NOI, NBIC data were used to fill in data gaps where possible.

2.3.2 Methodology

EPA used the Call Sign, Primary VIN, and IMO Number fields to match NOI data to entries in the MISLE database.[15] Entries listed as blank, "N/A," "None," "na," or "Unknown" in the NOI form were not compared to the database.

For the vessels in the NOI database where information is incomplete, EPA used the information from MISLE only if the MISLE record was deemed sufficiently reliable based on the matched information.[16] In general, data compared between the NOI and MISLE databases matched reasonably well. Of the 32,199[17] vessels that were found to match between the NOI and MISLE databases (based on their Call sign, Primary VIN, or IMO number), 54 percent have names that match exactly. In other instances, the names are only slightly different (e.g., "IB935" vs. "IB 935" or "M/V Mendocino" vs. "Mendocino"). Over three quarters of the matched vessels (79 percent) have values reported for vessel tonnage that are exactly the same in the two databases, while about 86 percent have values that are within 10 percent of each other (difference often seemingly due to rounding).[18]

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[15] Note that while the call sign, VIN, and IMO number should be unique to each vessel, both the NOI and MISLE databases contain multiple entries for the same identifier (not necessarily corresponding to each other). For example, in cases where a matching algorithm identified multiple vessels with the same identifier, the matched information did not always correspond to the same vessel.

[16] EPA deemed the MISLE data sufficiently reliable if at least one of the following MISLE entries corresponded to the NOI data: vessel name matched, the vessel tonnage was within 10%, or the vessel lengths were within 10%.

[17] Out of the 43,431 uniquely identified vessels with active NOIs.

[18] Note that MISLE does not specify if the vessel tonnage, which is recorded in the field "gross tons", is reported as gross tons (GT) or gross *registered* tons (GRT). For the purpose of this analysis, EPA compared the exact values in MISLE to the values reported in the NOIs and did not adjust for potentially different units. EPA noticed when reviewing data for vessels for which the identifying

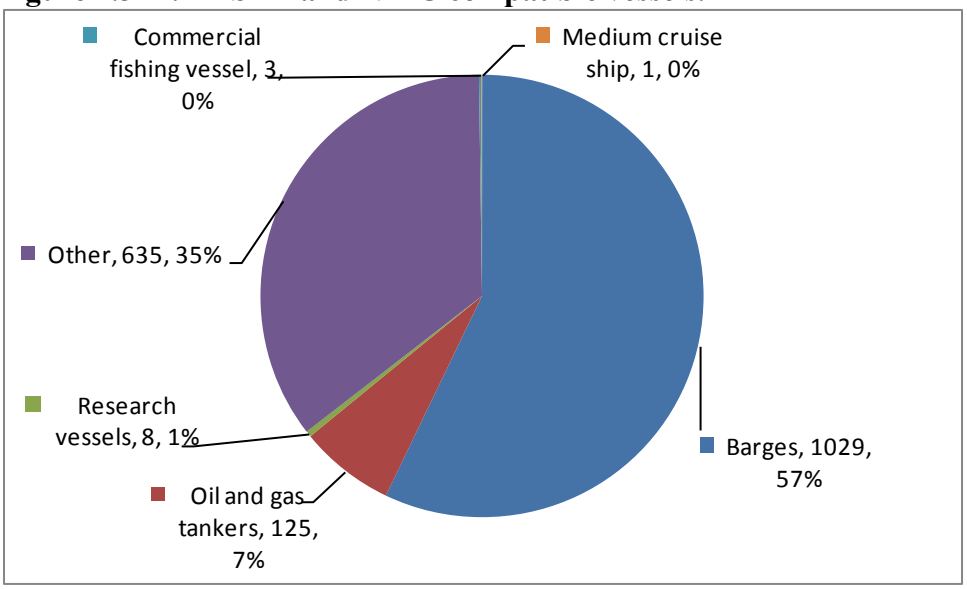
Over half of the vessels (56 percent) have the exact same length, while 84 percent have lengths that are within 10 percent of each other.

This high matching rate suggests that MISLE may be a reasonable source of data from which to draw additional information when the NOI contains insufficient information.

2.3.3 Summary and Analysis of NOI Vessels with Incomplete Information

Of the 6,468 vessels for which NOI information was missing or insufficient, vessel tonnage recorded in MISLE (or ballast capacity recorded in NBIC) was available to supplement the NOI for slightly more than a quarter (1,801) of these vessels. As shown in Figure 2.3-1, over half of the barges, roughly a third of the "Other" vessels, and just under 10 percent of the oil or gas tankers with incomplete NOI forms were able to be supplemented by data from either the MISLE or the NBIC. Information on vessel tonnage and/or ballast capacity remains missing or insufficient for 4,667 of the 43,431 uniquely-identified vessels in the NOI.

Figure 2.3- 1: MISLE and NBIC compatible vessels.



See Appendix B for more details regarding the summary of 6,468 vessels with incomplete information. Generally, EPA found that characteristics of these vessels were similar to those discussed in section 2.2 of this document for which NOI data were sufficient.

information matched in both databases, that values in the NOI database reported as GRT often matched values in the MISLE GT field, suggesting that units may not be defined consistently in the MISLE database as GT.

3 Summary

This document summarizes vessel information in EPA's NOI database and was prepared to provide useful information about VGP regulated vessels and the characteristics and conditions of their discharges.

The NOI data summarized in this document includes 36,642 uniquely identified vessels that submitted a complete NOI and 1,801 vessels where vessel tonnage and/or ballast water capacity was initially missing. For this latter group of vessels, EPA used the MISLE and NBIC databases to help fill in critical missing information to better characterize these 1,801 vessels.

Table 3.1 below summarizes key characteristics according to vessel type based on the information provided for the 36,642 vessels that submitted complete NOIs. In general, the following can be concluded:

General Characteristics and Voyage Related Information

- Oil and gas tankers and large cruise ships are the largest of the NOI vessels and also generally the newest in terms of vessel age.
- The maximum passenger and crew capacity for passenger transport and leisure vessels (large cruise ships, medium cruise ships, and large ferries) greatly exceeds that of any of the other NOI vessel types.
- A relatively large proportion of commercial fishing and emergency vessels are used for other purposes, as noted by the high degree of sub-classification.
- The Gulf Coast is the primary geographic region of operation for working boats (i.e., barges, oil and gas tankers, commercial fishing vessels) while the Pacific (Northwest especially), Northeast, and Florida Atlantic coasts appear to be the primary regions for passenger transport and leisure vessels (large cruise ships, medium cruise ships, and large ferries).
- A significant proportion of NOI vessels, except for barges and large ferries, travel beyond the US EEZ.

Ballast Water and Treatment Related Information

- The ballast water capacity of oil and gas tankers greatly exceeds that of other NOI vessels.
- Ballast sediment is disposed of predominantly onshore, with the exception of a relatively large portion (37 percent) of oil and gas tankers, which discharge sediment outside of waters covered by the VGP.
- Except for barges, which tend to have comparatively low ballast water capacity, the majority of ballast water tanks aboard vessels are cleaned at least once every 1 to 5 years.
- Few experimental ballast water treatment systems currently exist aboard NOI vessels.

Discharges and Discharge Related Information

- Deck washdown and runoff is the predominant discharge reported for all NOI vessels, followed by anti-fouling hull coatings, cathodic protection, ballast water, and firemain systems.
- More than half of the oil and gas tankers, large cruise ships, and research vessels reported having onboard treatment systems for generated waste streams. As would be expected, barges had the fewest onboard treatment systems for their generated waste streams.
- Oily/bilgewater, sewage/sanitary, and graywater are the predominant waste streams treated aboard NOI vessels.

Anti-fouling Hull Coatings and Related Information

- Except for barges, the hulls of greater than 80 percent of all NOI vessels are protected with an anti-fouling hull coating.
- Anti-fouling hull coatings are generally applied at least every 3 years for most vessels.
- The hulls of all NOI vessel types are cleaned predominantly via power/pressure washing, with some vessels also using underwater divers and scrubbing.

The use of the U.S. Coast Guard's MISLE and NBIC databases was a means of completing critical information (e.g., vessel tonnage and ballast water capacity) for NOI vessels where such information was lacking. Of the 6,468 vessels for which NOI information was missing or insufficient, vessel tonnage recorded in MISLE or ballast capacity ecorded in NBIC is available for slightly more than a quarter (1,801) of those vessels. The characteristics of these vessels (predominantly barges, oil and gas tankers, and "Other" vessels) are similar to those of vessels for which more complete information is available in the NOI database.

Table 3.1. Summary of key vessel characteristics reported in the NOI database by vessel type.

Subcategory	Vessel Type							
	Barge	Oil and Gas	Comm. Fishing	Large Ferry	Large Cruise	Medium Cruise	Research	Emergency
General Characteristics and Voyage Related Information								
Median Tonnage (GT) **Median Length (ft)** **Median Age (yrs)**	705 200 15	24,908 620 6	1,997 265 23	1,451 260 26	53.526 857 11	4,584 420 20	1,780 224 23	563 194 26
Median Dry Dock Interval (yrs)	4	3	3	3	3	2	3	3
Top Home/Most Frequented Ports	New Orleans, LA Jeffersonville, IN Pittsburgh, PA St. Louis, MO Metropolis, IL	Houston, TX New York, NY Texas City, TX Galveston, TX Los Angeles, CA	Dutch Harbor, AK Seattle, WA New Orleans, LA	Seattle, WA New York, NY Burlington, VT Woods Hole, MA	Miami, FL Pt Everglades, FL Pt Canaveral, FL San Diego, CA	New York, NY Boston, MA Newport, RI	Seattle, WA Galveston, TX Honolulu, HI	Galveston, TX Long Beach, CA Port Angeles, WA
Primary Geo Regions	Inland – Ohio R. Gulf Coast	Gulf Coast	West Coast Gulf Coast	NE Atlantic Pacific NW	Florida Coast West Coast	NE Atlantic	Pacific NW/Hawaii Gulf Coast	Pacific NW Gulf Coast
Travel Beyond EEZ (%)	2	95	76	8.5	74	68	85	89
Pacific NS Voyage (%)	2	24	23	14	29	21	41	75
Max Crew/Passenger (Median)	4	22	29	559	3,455	315	41	16
Ballast Water and Related Information								
Median Capacity (m^3)	206	23,893	1,388	404	3,136	364	425	332
Existing BWMP (%)	23	98	82	15	91	73	78	88
Cleaning Frequency	47% 5 yrs +	42% periodical (1-5 yrs or less)	45% 1 to 5 yrs	52% periodical (1-5 yrs)	41% 1 yr or less	38% periodical (1 yr or less)	31% 1 yr or less	54% periodical (1 to 5 yrs)
Discharges and Discharge Related Information								
Top Discharges	Deck wash/runoff Ballast water Underwater Hus Bilge/Oily water Welldeck	Ballast water Seawater cooling Deck wash/runoff Graywater Firemain	Ballast water Deck wash/runoff Graywater Firemain Anti-fouling hull	Deck wash/runoff Firemain Cathodic Protect Anti-fouling Hull Seawater cooling	Deck wash/runoff Seawater cooling Firemain Cathodic Protect Anti-fouling hull	Seawater cooling Cathodic Protect Deck wash/runoff Firemain Anti-fouling hull	Deck wash/runoff Anti-fouling hull Bilge/Oily water Ballast water Cathodic Protect	Deck wash/runoff Ballast water Cathodic Protect Anti-fouling hull Aq. Film Foams
Treatment Systems (%)	<1	78	42	45	79	50	78	43
Waste Streams Treated with Systems	Wastewater Graywater Sewage/Sanitary	Oily/Bilgewater Sewage/Sanitary	Oily/Bilgewater	Sewage/Sanitary Graywater	Oily/Bilgewater Sewage/Sanitary Graywater	Oily/Bilgewater Sewage/Sanitary Graywater	Oily/Bilgewater Sewage/Sanitary	Oily/Bilgewater
Anti-fouling Hull Coatings and Related Information								
Antifouling Coating (%)	4	80	85	86	84	82	95	96
Yrs Since Last Application (Median)	4	3	3	3	3	2	3	4
Most Common Husbandry Practice	Pressure wash	Pressure wash	Pressure wash	Pressure wash	Scrubbing/Divers	Pressure wash	Pressure wash	Pressure wash

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Appendix A

Comparison of the NOI Universe of Vessels versus
the Universe of Vessels in the Final 2008 VGP Economic and Benefit Analysis

This appendix summarizes findings from EPA's comparison of data submitted on NOIs (from June 1, 2009 through August 5, 2010) with prior EPA estimates of the universe of vessels subject to NOI requirements, as determined during the development of the VGP. The purpose of the comparison is to identify, and where possible, explain differences between the expected and actual vessel universe.

The Economic and Benefit Analysis of the Final Vessel General Permit (Abt Associates, 2008) provides estimates of the number of vessels that would be subject to the VGP in the first five years of the permit period, including estimates of the number of vessels that would need to submit a completed NOI to EPA. These estimates were derived mostly from public data sources, namely: (1) the WTLUS data file compiled by the Waterborne Commerce Statistics Center of the U.S. Army Corps of Engineers (USACE) Navigation Data Center, (2) the VESDOC data file compiled by the U.S. Coast Guard, and (3) information submitted by the International Association of Drilling Contractors on mobile offshore drilling units. Using these data, the number of vessels required to submit an NOI was estimated at 49,736, including 41,906 domestic vessels and 7,830 foreign vessels. Table A-1 summarizes the distribution of vessels required to submit an NOI, by vessel provenance and class.

Table A-1. Estimates of number of vessels required to submit NOI (reproduced from Abt Associates, 2008; Table 3-1 and Table 3-2).[19]

	Domestic Vessels		Foreign Vessels		TOTAL	
Vessel Classes	**Count**	**% of Total**	**Count**	**% of Total**	**Count**	**% of Total**
Commercial Fishing	26	<1	-	-	26	<1
Freight Barge	30,961	74	125	2	31,086	63
Freight Ship	469	1	5,577	71	6,046	12
Passenger Vessel	1,270	3	146	2	1,416	3
Tank Barge	4,808	11	30	<1	4,838	10
Tank Ship	117	<1	1,891	24	2,008	4
Utility Vessel	4,255	10	61	1	4,313	9
Total	**41,906**	**100**	**7,830**	**100**	**49,736**	**100**

Information in EPA's current NOI database indicates that 43,110 vessels have active coverage under the VGP as of August 5, 2010,[20] or about 15 percent less than EPA's estimate of 49,736 vessels (see Figure A-1 and Table A-2 below). Based on these data, EPA overestimated the number of vessels that would have to submit an NOI when compared to those that did (41,906 vessels estimated and 29,278 vessels with active VGP coverage), while EPA underestimated the number of foreign vessels that would be required to submit an NOI (7,830 vessels estimated and 13,832 vessels with active VGP coverage).[21] Much of the difference between the pre-permit issuance estimates and number of vessels with active VGP coverage in the NOI is accounted for by freight barges: over 9,000 fewer freight barges than expected submitted an NOI to EPA. The numbers of freight

[19] Due to gaps in the publicly available data on domestic vessel tonnage, the estimates developed for the VGP conservatively assumed that, when tonnage information was missing, vessels greater than 78 feet in length were likely to be 300 GT, and therefore, would be required to submit an NOI.

[20] This total includes vessels for which NOI applicability is still uncertain due to incomplete NOI information (see section 2.3 of this document), but excludes the very small subset of 321 vessels identified as "Not Applicable" in section 2.1 which are identified as such because the tonnage and ballast water capacity reported in the NOI for these particular vessels are less than 300 GT and/or 8 m^3, respectively.

[21] To determine domestic versus foreign vessels, EPA used the Country and State fields. Then, where those fields were blank, EPA manually checked the address and company name to determine the country of origin.

ships, tank ships, and other vessels that submitted NOIs partly offset this discrepancy, with the actual number of vessels covered under the VGP exceeding pre-permit issuance estimates by about 2,000 vessels in each of the categories.

Figure A-1: Comparison of number of vessels subject to NOI requirements – Actual number versus the number based on earlier VGP estimates.

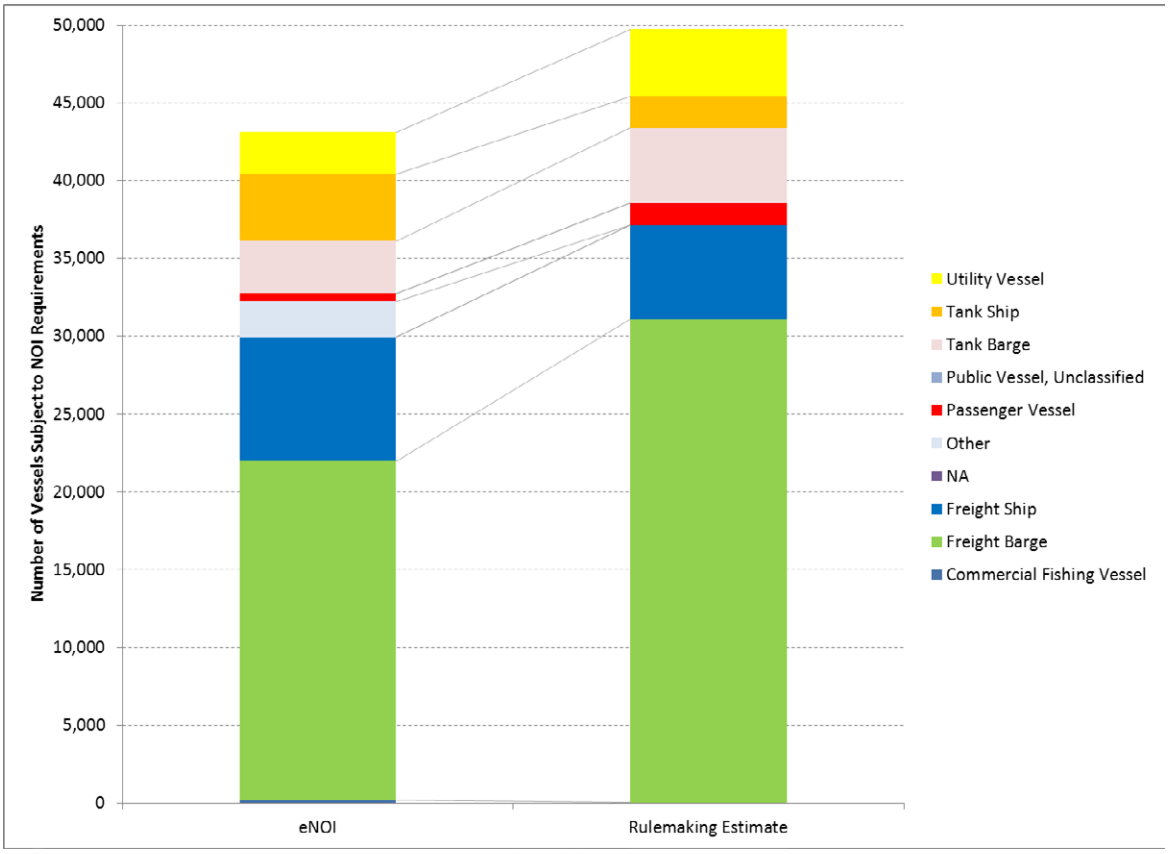

Table A-2. Comparison of actual NOI vessels and earlier VGP estimates.

	NOI Applies			Earlier VGP Estimates			
Vessel Class	**Domestic**	**Foreign**	**Total**	**Domestic**	**Foreign**	**Total**	**Difference**
Commercial Fishing Vessel	102	81	183	26		26	(157)
Freight Barge	21,684	123	21,807	30,961	125	31,086	9,279
Freight Ship	417	7,530	7,947	469	5,577	6,046	(1,901)
NA	1	-	1	-	-	-	(1)
Other	574	1,724	2,298	-	-	-	(2,298)
Passenger Vessel	450	61	511	1,270	146	1,416	905
Public Vessel, Unclassified	11	-	11	-	-	-	(11)
Tank Barge	3,362	8	3,370	4,808	30	4,838	1,468
Tank Ship	167	4,145	4,312	117	1,891	2,008	(2,304)
Utility Vessel	2,510	160	2,670	4,255	61	4,316	1,646
Grand Total	29,278	13,832	43,110	41,906	7,830	49,736	6,626

Several factors may explain differences between the vessel population estimate and NOI vessels with active VGP coverage. Main reasons include:

- **Missing or incorrect data in vessel databases**. While EPA found that public data sources generally provide reasonably accurate information for vessels that submitted an NOI, it is possible – and even likely – that outdated or incomplete data in the public databases used to derive pre-permit issuance estimates resulted in an overestimation of vessels subject to NOI requirements. For example, retired vessels are not necessarily removed from the database even as new vessels are added, and duplicate entries may be present in the database for the same vessel if the vessel information changed.[22] Furthermore, in cases when information was incomplete, EPA used conservative assumptions when estimating the number of vessels that would need to submit an NOI (e.g., in cases where data on vessel weight was missing, all vessels above 78 feet were assumed to meet the tonnage threshold and to be required to submit an NOI). This is not necessarily the case of actual vessels. In general, errors or incomplete data in the public database tended to bias pre-permit issuance estimates upward.
- **Failure to Submit an NOI or Failure to Correctly Certify an NOI**. It is possible that some vessels currently operating in U.S. waters have not submitted an NOI even though they are required to do so. Furthermore, some vessel operators may have thought they submitted an NOI successfully; however, they may have failed to certify the NOI, and therefore, did not receive active coverage. Approximately 3,600 vessels remain in archived status in the NOI database. To the extent that vessels otherwise required to submit a completed NOI have not yet done so, the actual NOI counts may under-represent the universe of vessels subject to NOI requirements.

[22] For example, EPA noticed that some vessels with different names or operators share the same identification numbers (e.g., IMO number), even though this identifier should be unique.

Appendix B

Summary of vessel characteristics where NOI information was incomplete

This section summarizes the vessel characteristic data for the 6,468 vessels that lacked complete NOIs. Using incomplete NOI data and supplementary data from MISLE or NBIC, as available, vessel characteristics for each vessel class are summarized below. A "response" or "information provided" as the terms are used below, indicate information provided on an incomplete NOI for which the MISLE and NBIC data were used to better characterize these vessels.

Barges

Vessel General Characteristics and Voyage Related Information
EPA used MISLE or NBIC to supplement incomplete NOI information for 1,029 barges. Only 13 of the 1,029 barges (1 percent) were further sub-classified, with those identified as either dredge attendant plants (11 barges) or oil and gas tankers (2).

Consistent with the information provided for the barges with complete NOIs, the median vessel tonnage, length, and age of these barges is 764 GT,[23] 200 feet, and 9 years old, respectively. (See Table 2.3 through Table 2.5)

Information on home/most frequented port was provided for 326 of these barges (32 percent). Of the 12 cities indicated as home/most frequented port, St. Louis, MO (75 percent) and New York, NY (21 percent) were listed most frequently.

Owners/operators of all but two of the approximately 330 barges for which a response was provided indicated that their vessel is unmanned (zero maximum passengers and crew). EPA inferred from this result that the majority of barges lacking a response for the maximum passengers or crew on their NOI form also were unmanned.

Ballast Water and Related Information
The NBIC database did not contain any additional ballast water capacity information that could be used to fill in the gap for the 1,029 barges with incomplete NOIs. Nevertheless, seven owner/operators out of the 342 who did respond to this question on an incomplete NOI indicated having an existing BWMP, and 11 owners/operators provided information regarding ballast sediment disposal (onshore at shipyards via third party) and ballast tank cleaning frequency (periodically; mostly at dry dock).

No owners/operators indicated having an experimental ballast treatment system aboard their vessels.

Applicable Discharges and Related Information
Of the 26 listed applicable discharges that vessels may generate (Table 2.17), the 1,029 barges identified only nine discharge types. The nine discharge types are: deck washdown and runoff (886 out of 1,029 barges), cathodic protection (79), bilgewater/oily water separator effluent (69), underwater ship husbandry (18), anti-fouling hull coatings(13), ballast water (5), small boat engine wet exhaust (1), exhaust gas scrubber washwater discharge (1), and welldeck discharges (1). This list roughly coincides with the discharge types for barges listed on complete NOIs (Table 2.17).

[23] This number assumes that MISLE information is reported as GT since the database does not specify GT or GRT; also see footnote 15.

No information about onboard treatment systems and corresponding waste streams generated/treated were listed for any of the barges (i.e., 873 of the 1,029 responded in their NOIs that no systems were on board; the remainder did not respond).

Anti-fouling Hull Coatings and Related Information
Owners/operators of only seven of the 271 barges for which a response was provided in the incomplete NOI indicated application of an anti-fouling hull coating. All seven respondents indicated coating their vessels within the last eight years. Hull husbandry practices, according to the eighteen responders, generally are employed every 2 to 5 years or as needed using a power washer while the vessel is at dry dock.

"Other" Vessels

Vessel General Characteristics and Voyage Related Information
Missing information was confirmed using MISLE or NBIC for the 635 "Other" vessels in the NOI database, only 3 of which were further sub-classified by the respondents as oil or gas tankers

For these "Other" vessels, the median vessel tonnage is 27,581,[24] the median length is 623 feet, and the median age is 18 years old. This compares closely with "Other" vessels with complete NOIs which have a median length of 600 feet and a median age of 11 years old, respectively (See Table 2.4 and Table 2.5).

Respondents provided information on home/most frequented port for only 32 of the 635 "Other" vessels with incomplete NOIs (5 percent). Of the cities indicated as home/most frequented port (note: a total of only 13 different port cities were listed), 70% of vessels listed cities in Louisiana (Fourchon, New Orleans, Houma), Alabama (Tuscaloosa, Mobile), or Texas (Houston, Texas City).

Where a response was provided regarding maximum passenger size, 74 out of 77 "Other" vessels responded that their vessel was unmanned (zero maximum passengers). Of the three remaining respondents, the maximum passenger size was 2, 4, and 10. Where a response was provided regarding maximum crew size, 115 "Other" vessels indicated a median of 30 maximum crew members. The combination of data for maximum passenger size and maximum crew sizes results in a median similar to the median for "Other" vessels with complete NOIs (see Table 2.12).

Ballast Water and Related Information
Information regarding ballast water capacity for 273 of 635 "Other" vessels with incomplete NOI data was available via matching vessels to the NBIC database. The median ballast water capacity for these vessels is 18,707 m^3, which is nearly twice as high as the median value of the "Other" vessels with complete NOIs (Table 2.13). However, these results are similar to the 90th percentile ballast water capacity (approximately 34,000 m^3).

Affirmative responses on NOIs from 476 owner/operators of "Other" vessels (94 percent) were provided regarding the existence of a BWMP. Only 12 owners/operators provided information on their NOI regarding ballast sediment disposal (11 of them indicating disposal onshore at shipyards via third party), and 13 provided information on ballast tank cleaning frequency (11 indicating that their vessel's ballast tank is cleaned periodically; mostly at dry dock).

[24] This value assumes that this tonnage reflects GT since tonnage units are not specified in MISLE; this value could be over-estimated by a factor of approximately 1.7 since 76 respondents indicated that the reported vessel tonnage in the NOI is based on GRT. Assuming instead that MISLE vessel tonnage values reflect GRT, the median value would be approximately 16,300 GT, which coincides with the value described previously for the larger subset of "Other" vessels in the NOI (i.e., 15,939 GT, see Table 2.3).

No owners/operators indicated having an experimental ballast treatment system aboard their vessels.

Applicable Discharges and Related Information
Only 116 of the 635 "Other" vessels specified their generated discharge type on their NOI. Of the 26 listed possible applicable discharges, respondents indicated generating 25 different types (the single exception being sonar dome discharge). Deck washdown and runoff and graywater were reported as being discharged from 115 "Other" vessels; cathodic protection, ballast water, and anti-fouling hull coatings were reported as discharged from over 90 vessels; and refrigeration and air condensate discharge, bilgewater/oily water separator effluent, seawater cooling overboard discharge, and non-oily machinery wastewater were reported as discharged from over 80 vessels. The list of top five applicable discharges corresponds closely with that of the "Other" vessels with completed NOIs (Table 2.17).

Onboard treatment systems and corresponding waste streams generated/treated were listed for only 78 of the 635 "Other" vessels. Bilgewater was listed as a waste stream treated by 37 of these vessels, oily water by 10 vessels, and raw sewage/sanitary by seven.

Anti-fouling Hull Coatings and Related Information
Owners/operators of 71 of the 98 "Other" vessels for which a response was provided indicated application of an anti-fouling hull coating, 90 percent of which have coated their vessels within the last six years. Hull husbandry practices, according to the very few owners/operators who responded (approximately 10), are employed as needed or every 2 to 5 years, largely while the vessel is at dry dock. Power washing is the hull husbandry method most commonly employed for nine "Other" vessels,[25] and scraping and underwater diving for one vessel each.

Oil or Gas Tankers

Vessel General Characteristics and Voyage Related Information
Missing information in the NOI was confirmed using MISLE or NBIC for 125 oil or gas tankers. The median vessel tonnage for this particular subset of oil or gas tankers is 57,162 (assumed GT), which is more than twice the median vessel tonnage for oil or gas tankers with a complete NOI (i.e., 24,908 GT, see Table 2.3). However, the 90th percentile vessel tonnages are relatively similar: approximately 83,700 and 93,000 GT, respectively.

The median length of these vessels with incomplete NOIs is slightly higher (750 feet), and their age (7 years) is slightly older compared with the information provided for the 3,280 oil or gas tankers with complete NOIs (i.e., 620 feet and 6 years old, respectively; see Table 2.4 and Table 2.5). Again, the 90th percentile values are relatively similar (i.e., 1,034 feet and 18 years old, respectively).

Home/most frequented port was not indicated for any of the 125 oil or gas tankers with incomplete NOI forms, and no information was provided regarding maximum passenger size. Owners/operators of 12 of these oil or gas tankers did provide maximum crew size, which ranged from 25 to 35 maximum crew members, coinciding with the value described for oil and gas tankers with a complete NOI (Table 2.12).

[25] See footnote "a" in Table 2.18.

Ballast Water and Related Information

Information regarding ballast water capacity for 42 of the 125 oil or gas tankers with incomplete NOIs was available via the NBIC database. The median ballast water capacity for these vessels is 37,866 m^3, which is 1.6 times higher than the median capacity for oil or gas tankers with complete NOIs (23,893 m^3) (Table 2.13). The 90th percentile ballast water capacity for these vessels, however, is 1.2 times lower than those oil or gas tankers with complete NOIs (approximately 57,300 versus 67,300 m^3, respectively).

All owner/operators of the 125 oil or gas tankers have an existing BWMP in place for their vessel, which is consistent with 98 percent of oil and gas tankers indicated as having a BWMP that submitted a complete NOI (see Table 2.14). Only one owner/operator provided information regarding ballast tank cleaning frequency (every 1 to 5 years), and no respondents provided information in the NOI regarding ballast sediment disposal for their oil or gas tanker.

No owners/operators indicated having an experimental ballast treatment system aboard their oil or gas tanker.

Applicable Discharges and Related Information
Only 12 owner/operators of the 125 oil or gas tankers with incomplete NOIs specified the applicable discharges their vessels generated. Of these twelve owner/operators, nearly all indicated discharging 25 discharge types. A few discharge types not listed as generated for each vessel includes: controllable pitch propeller hydraulic fluid (only two vessels discharge), graywater mixed with sewage (only a single vessel discharges), welldeck discharges (only a single vessel discharges), and no vessel reported discharging gas turbine wash water or sonar dome discharge. This information is consistent with that of the oil or gas tankers with complete NOIs described previously in section 2.2.3 of this document.

Responses affirming the use of an onboard treatment system were provided for only 12 of the 125 oil or gas tankers; however none of the responses included the corresponding waste streams treated.

Anti-fouling Hull Coatings and Related Information
Owners/operators of 13 of the 125 oil or gas tankers for which a response was provided indicated application of an anti-fouling hull coating; all of which have coated their vessels within the last four years. No additional information was provided regarding the hull husbandry practices employed aboard these vessels, or the frequency with which they may be implemented.

Miscellaneous Vessel Types

Missing information was confirmed using MISLE or NBIC for an additional eight research vessels, three commercial fishing vessels, and one medium cruise ship with an active or certified NOI. The vessel characteristic data provided in the NOI for these uniquely-identified vessels is similar to the information previously described for vessels with complete NOIs.