

**Updated: Analysis of Crude Oil Tanker Ballast Water Data
for Valdez & Prince William Sound, Alaska**

Final Report

Presented To:

Prince William Sound Regional Citizens' Advisory Council
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The opinions expressed in this PWSRCAC-commissioned report
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Executive Summary

This report describes ballast water data reported by crude oil tankers arriving to Valdez and Prince William Sound, Alaska, from 2005 through 2015. The analysis includes the following:

- Annual number of vessels that discharged ballast water
- Annual volumes of ballast water discharge
- Annual volumes of dirty ballast water discharge (2010 – 2015)
- Ballast water source locations
- Ballast water management locations
- Ballast water management rates
- Ballast water management methods

Between 2005 and 2015, 23 crude oil tankers reported discharging 87,855,788 metric tons of ballast water to Valdez and Prince William Sound. The majority of ballast water was sourced from locations on the west coast of the United States such as Puget Sound, WA, and San Francisco Bay, CA, resulting in 96% coastwise ballast water discharge. The remainder (4%) was sourced from distant locations such as Hawaii and Singapore. Of the 34% of ballast water that was reported to be managed, flow-through ballast water exchange was the preferred method (67%), followed by empty-refill exchange (29%), and alternate methods (4%).

Trends in data should be considered in the context of changes in policy during the time period. For example, the Environmental Protection Agency's 2008 Vessel General Permit (VGP) significantly influenced the management and recordkeeping requirements for crude oil tankers engaged in coastwise trade. The 2008 VGP went into effect in Alaska on February 6, 2009.

Data on dirty ballast water discharge (section E) were provided by the Prince William Sound Regional Citizens' Advisory Council; all other data were obtained from the National Ballast Information Clearinghouse.

National Ballast Information Clearinghouse 2016. NBIC Online Database. Electronic publication, Smithsonian Environmental Research Center & United States Coast Guard. Available from <http://invasions.si.edu/nbic/search.html>; searched 20 February 2016.

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Definitions & Acronyms

Coastwise:	Ballast water that does not transit beyond the combined exclusive economic zones of the United States and Canada
Overseas:	Ballast water that transits beyond the combined exclusive economic zones of the United States and Canada
Coastal:	Within 200 nautical miles from shore; may pertain to ballast water origin or management location
Mid Ocean:	Beyond 200 nautical miles from shore; may pertain to ballast water origin or management location
Source:	Source locations indicate the ports or geographic coordinates where ballast water was taken onboard prior to management, as reported in the “BW Source” section of the National Ballast Information Clearinghouse Reporting Form
Management:	Management locations indicate the endpoint geographic coordinates where ballast water was exchanged, as reported in the “BW Management Practices” section of the National Ballast Information Clearinghouse Reporting Form
BWE:	Ballast Water Exchange
COTP:	Captain of the Port
EEZ:	Exclusive Economic Zone; as defined in 33 CFR 151.1504, for the purpose of ballast water management the exclusive economic zone is considered to be the area extending outward 200 nautical miles from the baseline of the United States and the equivalent zone of Canada
MT:	Metric Tons

A. Valdez: Vessels

There were 22 crude oil tankers that reported discharging ballast water in Valdez, Alaska, between 2005 and 2015. Vessel 18 reported discharging ballast water to Prince William Sound only.

Table A.1. Reported annual number of arrivals by crude oil tankers that discharged ballast water in Valdez, Alaska, 2005 through 2015.

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Vessel 1	23	19	12	2	21	23	10	23	19	17	17	186
Vessel 2	0	7	22	1	24	26	18	23	16	20	5	162
Vessel 3	9	8	3	0	20	20	23	10	21	20	16	150
Vessel 4	13	8	10	0	6	19	24	13	19	20	17	149
Vessel 5	0	0	0	0	24	25	16	23	16	10	0	114
Vessel 6	12	7	20	19	23	6	0	0	0	0	0	87
Vessel 7	0	1	1	0	24	12	23	23	10	19	16	129
Vessel 8	0	0	0	0	19	21	13	24	20	18	22	137
Vessel 9	0	0	0	0	4	18	25	18	25	0	0	90
Vessel 10	0	0	0	0	19	17	12	16	16	19	16	115
Vessel 11	0	0	0	0	20	12	16	15	16	17	12	108
Vessel 12	0	0	0	0	14	14	17	16	8	15	17	101
Vessel 13	9	19	3	1	9	0	0	0	0	0	0	41
Vessel 14	0	0	0	0	1	4	17	14	17	14	17	84
Vessel 15	7	0	0	0	0	0	0	0	0	0	0	7
Vessel 16	1	2	0	1	1	0	0	0	0	0	0	5
Vessel 17	1	0	0	0	0	0	0	0	0	0	0	1
Vessel 19	0	0	0	0	0	0	0	0	19	11	22	52
Vessel 20	0	0	0	0	0	0	0	0	19	16	13	48
Vessel 21	0	0	0	0	0	0	0	0	18	12	14	44
Vessel 22	0	0	0	0	0	0	0	0	0	5	19	24
Vessel 23	0	0	0	0	0	0	0	0	0	0	11	11

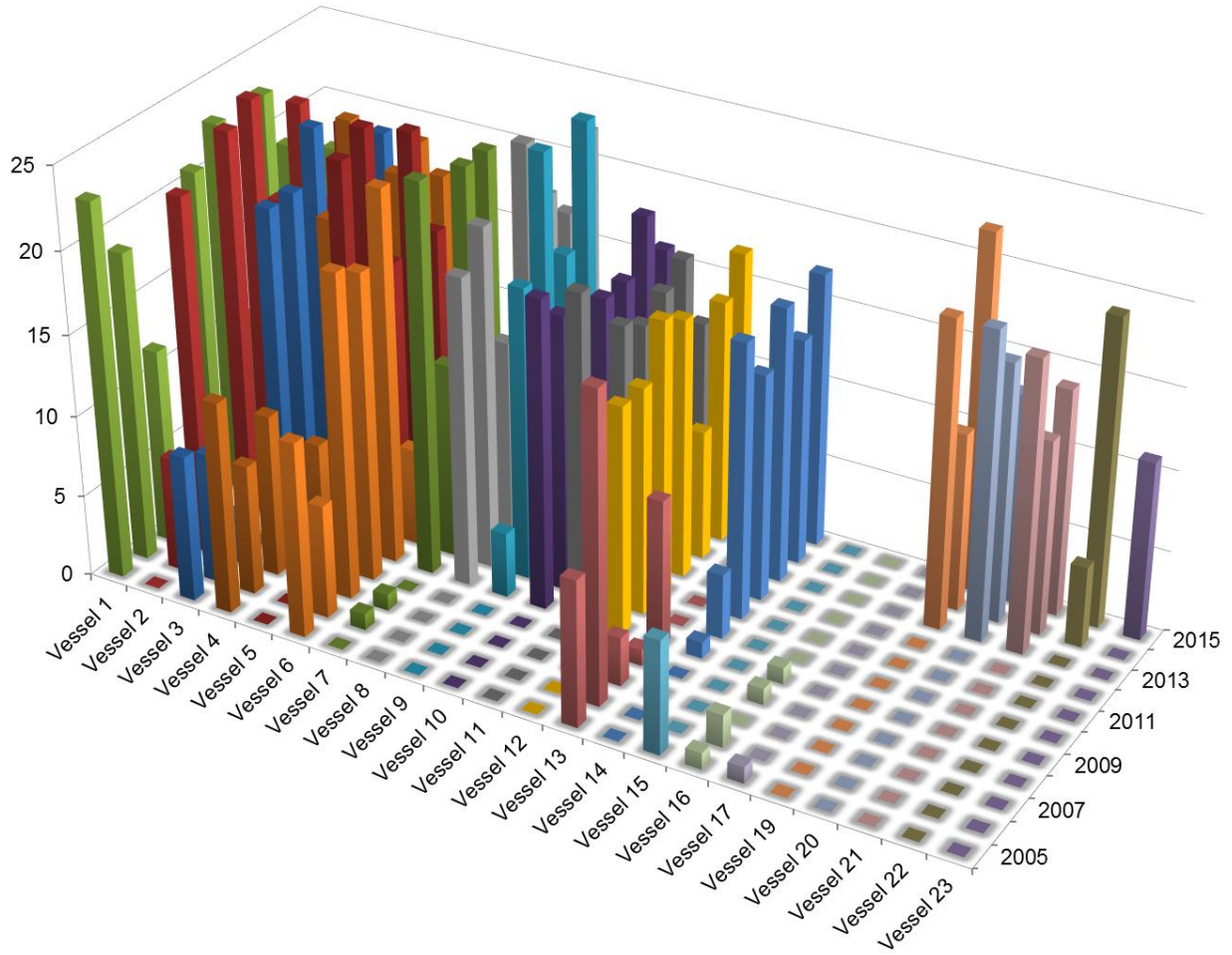


Figure A.1. Reported annual number of arrivals by crude oil tankers that discharged ballast water in Valdez, Alaska, 2005 through 2015.

B. Valdez: Ballast Water Source

Crude oil tankers reported discharging 86,018,598 metric tons (MT) of ballast water to Valdez, Alaska, between 2005 and 2015. The reported volume of ballast water discharge increased from 549,407 MT to 10,947,911 MT (1893%) between 2008 and 2009 and remained relatively steady through 2015. Overseas ballast water increased to eight and ten percent of the total discharge volume during 2014 and 2015, respectively. However, the vast majority of ballast water was sourced on the west coast of the United States, including ports in the vicinity of Puget Sound, WA, San Francisco Bay, CA, and Long Beach, CA.

See Tables B.1. – B.2. and Figures B.1. – B.3.

Table B.1. Reported annual volume of ballast water discharged by crude oil tankers in Valdez, Alaska, 2005 through 2015. Total discharge volume is shown as a percentage of coastwise, overseas, or unknown type and further divided into coastal or mid ocean origin.

Annual Ballast Water Discharge Volume (x1000 MT) – Valdez Sources												
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Discharge Volume	3,411.9	2,984.1	2,661.7	549.4	10,947.9	10,650.2	10,818.3	10,781.7	11,438.6	11,043.8	10,731.1	86,018.6
Coastwise	3,097.2 (90.8%)	2,784.9 (93.3%)	2,659.5 (99.9%)	506.5 (92.2%)	10,606.9 (96.9%)	10,347.9 (97.2%)	10,558.6 (97.6%)	10,564.9 (98.0%)	11,239.3 (98.3%)	10,172.7 (92.1%)	9,679.9 (90.2%)	82,218.3 (95.6%)
Coastal Origin	3,097.2	2,784.9	2,659.5	506.5	10,606.9	10,347.9	10,558.6	10,564.9	11,239.3	10,172.7	9,679.9	82,209.8
Mid Ocean Origin	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Overseas	279.4 (8.2%)	199.2 (6.7%)	2.1 (0.1%)	42.9 (7.8%)	314.6 (2.9%)	268.0 (2.5%)	259.6 (2.4%)	216.8 (2.0%)	199.3 (1.7%)	871.1 (7.9%)	1,051.2 (9.8%)	3,704.3 (4.3%)
Coastal Origin	182.1	103.0	2.1	42.9	32.8	204.6	223.4	130.5	113.6	615.6	744.3	2,395.0
Mid Ocean Origin	97.3	96.2	0.0	0.0	281.8	63.3	36.3	86.3	85.7	255.5	306.9	1,309.3
Unknown	35.3 (1.0%)	0.0 (0.0%)	0.0 (0.0%)	0.0 (0.0%)	26.4 (0.2%)	34.4 (0.3%)	0.0 (0.0%)	0.0 (0.0%)	0.0 (0.0%)	0.0 (0.0%)	0.0 (0.0%)	96.1 (0.1%)

Table B.2. Reported source locations and volume of ballast water discharged by crude oil tankers in Valdez, Alaska, 2005 through 2015. Source locations reported as geographic coordinates are not listed individually. Source locations are listed in decreasing order of total ballast discharge. Percentages represent proportion of total annual contributions.

Annual Ballast Water Discharge Volume per Source Location (x1000 MT)												
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Anacortes, WA	1,371.2 (40.2%)	1,151.6 (38.6%)	978.2 (36.7%)	39.6 (7.2%)	1,952.3 (17.8%)	1,653.1 (15.5%)	1,199.9 (11.1%)	1,914.3 (17.8%)	1,568.6 (13.6%)	1,902.7 (17.1%)	1,701.7 (15.8%)	15,433.1 (17.9%)
Long Beach, CA	35.2 (1.0%)	25.1 (0.8%)	49.3 (1.9%)	15.6 (2.8%)	1,572.5 (14.4%)	1,222.9 (11.5%)	1,331.7 (12.3%)	1,246.3 (11.6%)	731.1 (6.4%)	1,469.8 (13.2%)	1,341.6 (12.4%)	9,041.0 (10.5%)
LAT LON	294.0 (8.6%)	322.5 (10.8%)	48.9 (1.8%)	10.0 (1.8%)	769.6 (7.0%)	1160.7 (10.9%)	1215.6 (11.2%)	1419.8 (13.2%)	1,854.9 (16.1%)	775.9 (7.0%)	1,097.4 (10.2%)	8,969.2 (10.4%)
Benicia, CA	502.4 (14.7%)	512.2 (17.2%)	532.3 (20.0%)	86.5 (15.7%)	1,428.9 (13.1%)	907.8 (8.5%)	637.5 (5.9%)	1,028.4 (9.5%)	1,497.4 (13.0%)	1,049.3 (9.5%)	753.2 (7.0%)	8,935.8 (10.4%)
Cherry Point, WA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2,287.0 (19.9%)	2,133.1 (19.2%)	2,184.5 (20.2%)	6,604.5 (7.7%)
Bellingham, WA	46.3 (1.4%)	0.0	125.4 (4.7%)	11.7 (2.1%)	1,608.1 (14.7%)	979.0 (9.2%)	1,702.3 (15.7%)	1,067.4 (9.9%)	0.0	0.0	0.0	5,540.3 (6.4%)
Richmond, CA	302.7 (8.9%)	47.1 (1.6%)	71.2 (2.7%)	45.6 (8.3%)	989.3 (9.0%)	1,177.4 (11.1%)	315.5 (2.9%)	401.2 (3.7%)	444.3 (3.9%)	840.1 (7.6%)	784.1 (7.3%)	5,418.5 (6.3%)
Puget Sound	0.0	96.8 (3.2%)	0.0	0.0	1.1 (0.01%)	326.8 (3.1%)	1,738.6 (16.1%)	1,296.1 (12.0%)	1,042.9 (9.1%)	482.8 (4.4%)	278.9 (2.6%)	5,263.9 (6.1%)

Tacoma, WA	99.7 (2.9%)	260.9 (8.7%)	297.5 (11.2%)	0.0	943.6 (8.6%)	999.7 (9.4%)	757.1 (7.0%)	663.1 (6.2%)	88.5 (0.8%)	0.0	0.0	4,110.2 (4.8%)
San Francisco, CA	131.5 (3.9%)	159.0 (5.3%)	109.9 (4.1%)	54.4 (9.9%)	525.3 (4.8%)	530.1 (5.0%)	637.1 (5.9%)	540.8 (5.0%)	116.8 (1.0%)	94.9 (0.9%)	637.0 (5.9%)	3,536.7 (4.1%)
Nikiski, AK	141.7 (4.2%)	88.7 (3.0%)	163.2 (6.1%)	156.9 (28.6%)	142.8 (1.3%)	70.1 (0.7%)	0.0	0.0	595.2 (5.2%)	344.2 (3.1%)	523.7 (4.9%)	2,226.3 (2.6%)
Port Angeles, WA	62.1 (1.8%)	62.8 (2.1%)	7.5 (0.3%)	11.0 (2.0%)	322.6 (2.9%)	526.1 (4.9%)	213.1 (2.0%)	183.3 (1.7%)	120.4 (1.0%)	322.2 (2.9%)	56.3 (0.5%)	1,887.4 (2.2%)
Rodeo, CA	163.0 (4.8%)	97.5 (3.3%)	55.3 (2.1%)	25.4 (4.6%)	381.8 (3.5%)	419.6 (3.9%)	278.0 (2.6%)	301.9 (2.8%)	99.3 (0.9%)	0.0	26.7 (0.2%)	1,848.4 (2.1%)
Ferndale, WA	29.0 (0.8%)	59.5 (2.0%)	46.4 (1.7%)	0.0	106.3 (1.0%)	248.8 (2.3%)	139.4 (1.3%)	279.5 (2.6%)	238.1 (2.1%)	318.0 (2.9%)	59.8 (0.6%)	1,524.8 (1.8%)
Barbers Point, HI	0.0	17.6 (0.6%)	0.0	0.0	0.0	0.0	0.0	0.0	26.7 (0.2%)	614.7 (5.5%)	680.6 (6.3%)	1,339.6 (1.6%)
Singapore	78.8 (2.3%)	0.5 (0.02%)	0.0	10.1 (1.8%)	0.0	151.1 (1.4%)	197.1 (1.8%)	47.9 (0.4%)	13.2 (0.1%)	63.9 (0.6%)	67.7 (0.6%)	630.3 (0.7%)
Kenai, AK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	214.0 (1.9%)	148.5 (1.3%)	76.1 (0.7%)	438.6 (0.5%)
El Segundo Terminal, CA	0.0	0.0	20.9 (0.8%)	0.0	62.2 (0.6%)	0.0	0.0	129.1 (1.2%)	214.8 (1.9%)	0.0	0.0	427.0 (0.5%)
Strait of Juan de Fuca	0.0	0.0	8.1 (0.3%)	0.0	9.0 (0.1%)	115.9 (1.1%)	213.5 (2.0%)	68.4 (0.6%)	0.0	0.0	0.0	414.9 (0.5%)
Carquinez, CA	0.0	0.0	0.0	0.0	0.0	106.7 (1.0%)	197.9 (1.8%)	0.0	40.3 (0.4%)	37.1 (0.3%)	0.0	381.9 (0.4%)

Martinez, CA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	167.0 (1.5%)	131.5 (1.2%)	58.5 (0.5%)	356.9 (0.4%)
Portland, OR	0.0	0.0	11.3 (0.4%)	0.0	0.0	0.0	43.9 (0.4%)	74.0 (0.7%)	40.2 (0.3%)	0.0	89.0 (0.8%)	258.5 (0.3%)
Seattle, WA	0.0	7.5 (0.3%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	101.7 (0.9%)	90.2 (0.8%)	199.5 (0.2%)
Anchorage, AK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	66.5 (0.6%)	117.6 (1.1%)	184.1 (0.2%)
Point Wells, WA	0.0	0.0	61.3 (2.3%)	51.5 (9.4%)	32.6 (0.3%)	0.0	0.0	0.0	33.1 (0.3%)	0.0	0.0	178.5 (0.2%)
San Francisco COTP Zone	0.0	18.9 (0.6%)	16.9 (0.6%)	0.0	0.9 (0.01%)	0.0	0.0	66.7 (0.6%)	0.0	0.0	0.0	103.4 (0.1%)
Unknown	35.3 (1.0%)	0.0	0.0	0.0	26.4 (0.2%)	34.4 (0.3%)	0.0	0.0	0.0	0.0	0.0	96.1 (0.1%)
Los Angeles, CA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	56.3 (0.5%)	18.3 (0.2%)	74.6 (0.1%)
Loop, LA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	35.6 (0.3%)	30.0 (0.3%)	65.6 (0.1%)
Dutch Harbor, AK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.7 (0.1%)	32.5 (0.3%)	12.2 (0.1%)	57.3 (0.1%)
Vancouver, BC	0.0	55.9 (1.9%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	55.9 (0.1%)
Puget Sound COTP Zone	0.0	0.0	0.0	0.0	0.0	0.0	0.0	53.3 (0.5%)	0.0	0.0	0.0	53.3 (0.1%)

Honolulu, HI	48.1 (1.4%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4 (0.03%)	0.0	0.0	51.5 (0.1%)
Gulf of Mexico	0.0	0.0	0.0	0.0	51.4 (0.5%)	0.0	0.0	0.0	0.0	0.0	0.0	51.4 (0.1%)
Columbia River	50.8 (1.5%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.8 (0.1%)
Yeosu, South Korea	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	49.1 (0.4%)	0.0	49.1 (0.1%)
Houston, TX	0.0	0.0	0.0	24.6 (4.5%)	17.7 (0.2%)	0.0	0.0	0.0	0.0	0.0	0.0	42.3 (0.05%)
Sembawang, Singapore	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.7 (0.3%)	29.7 (0.03%)
West Coast	0.0	0.0	26.0 (1.0%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26. (0.03%)
Vancouver, WA	7.0 (0.2%)	0.0	15.3 (0.6%)	0.0	0.0	0.0	0.0	0.0	0.0	0.9 (0.01%)	0.0	23.2 (0.03%)
Cook Inlet, AK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3 (0.00%)	18.8 (0.2%)	19.1 (0.02%)
Hawaii	0.0	0.0	0.0	0.0	0.0	19.1 (0.2%)	0.0	0.0	0.0	0.0	0.0	19.1 (0.02%)
California	0.0	0.0	16.7 (0.6%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.7 (0.02%)
Vendovi Island, WA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.6 (0.1%)	9.6 (0.01%)

Willbridge, CA	8.6 (0.3%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.6 (0.01%)
Homer, AK	0.0	0.0	0.0	6.6 (1.2%)	0.0	0.0	0.0	0.0	0.5 (0.00%)	0.8 (0.01%)	0.0	8. (0.01%)
Valdez, AK	0.0	0.0	0.0	0.0	0.2 (0.01%)	1.1 (0.01%)	0.1 (0.00%)	0.1 (0.00%)	0.0	3.7 (0.03%)	0.2 (0.00%)	5.3 (0.01%)
Richmond, BC	4.5 (0.1%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5 (0.01%)
San Pablo Strait	0.0	0.0	0.0	0.0	3.4 (0.03%)	0.0	0.0	0.0	0.0	0.0	0.0	3.4 (0.00%)
Drift River Terminal, AK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4 (0.01%)	0.0	0.0	1.4 (0.00%)
Total	3,411.9 (100%)	2,984.1 (100%)	2,661.7 (100%)	549.4 (100%)	10,947.9 (100%)	10,650.2 (100%)	10,818.3 (100%)	10,781.7 (100%)	11,438.6 (100%)	11,043.8 (100%)	10,731.1 (100%)	86,018.6 (100%)

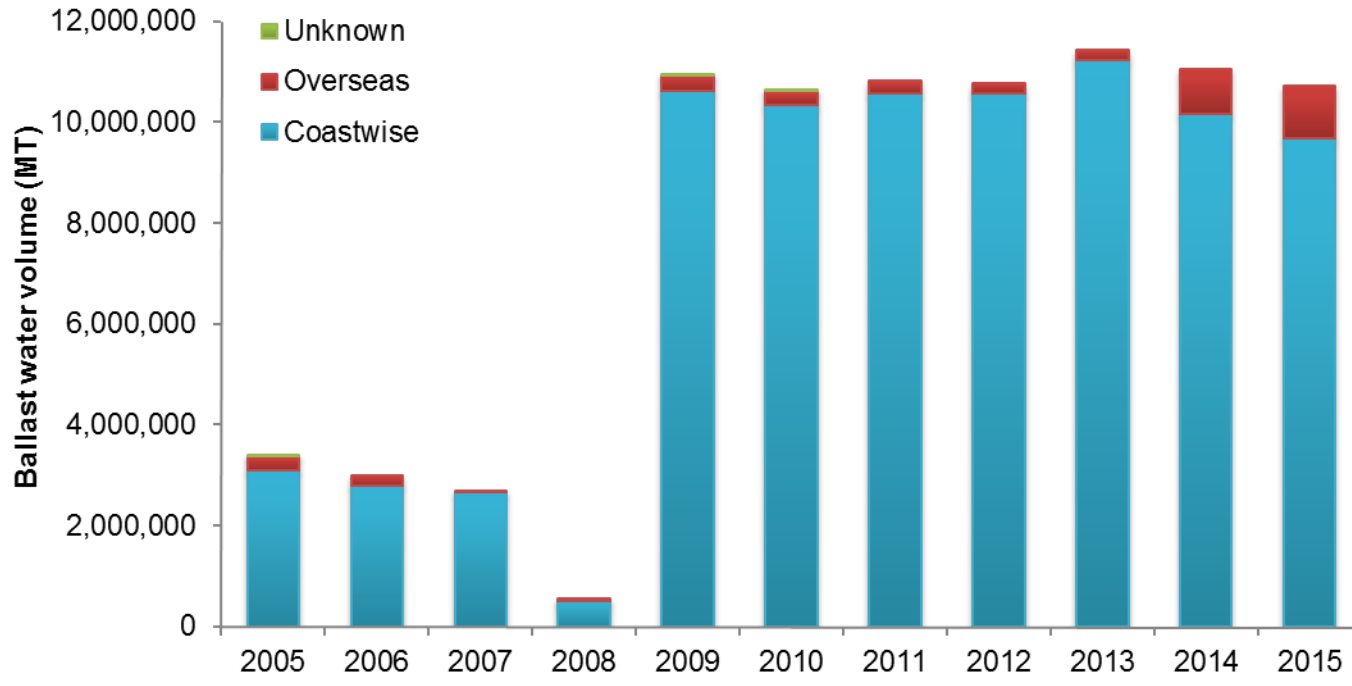


Figure B.1. Reported annual volume of ballast water discharged by crude oil tankers in Valdez, Alaska, 2005 through 2015.

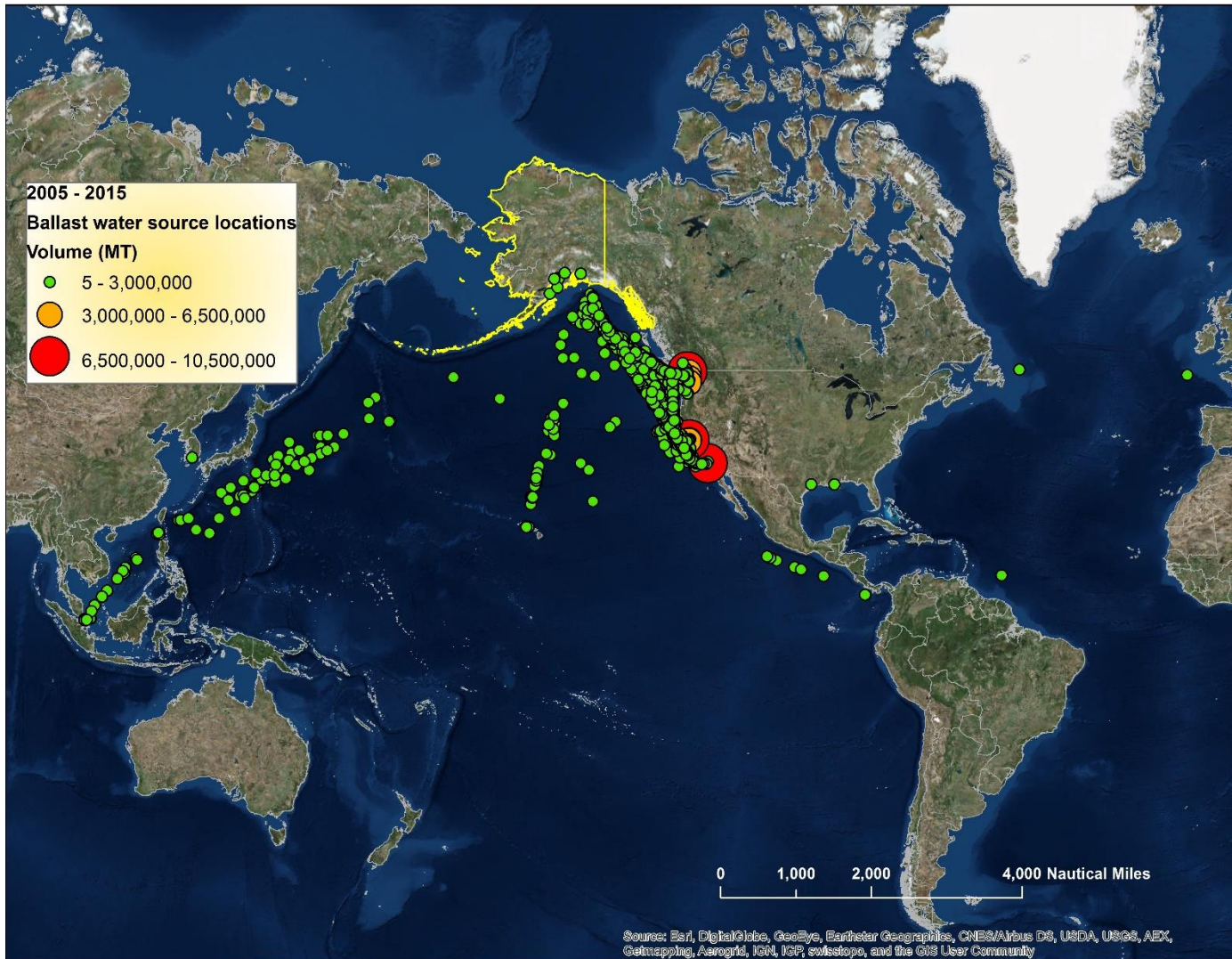


Figure B.2. Reported global source locations of ballast water discharged by crude oil tankers in Valdez, Alaska, 2005 through 2015.

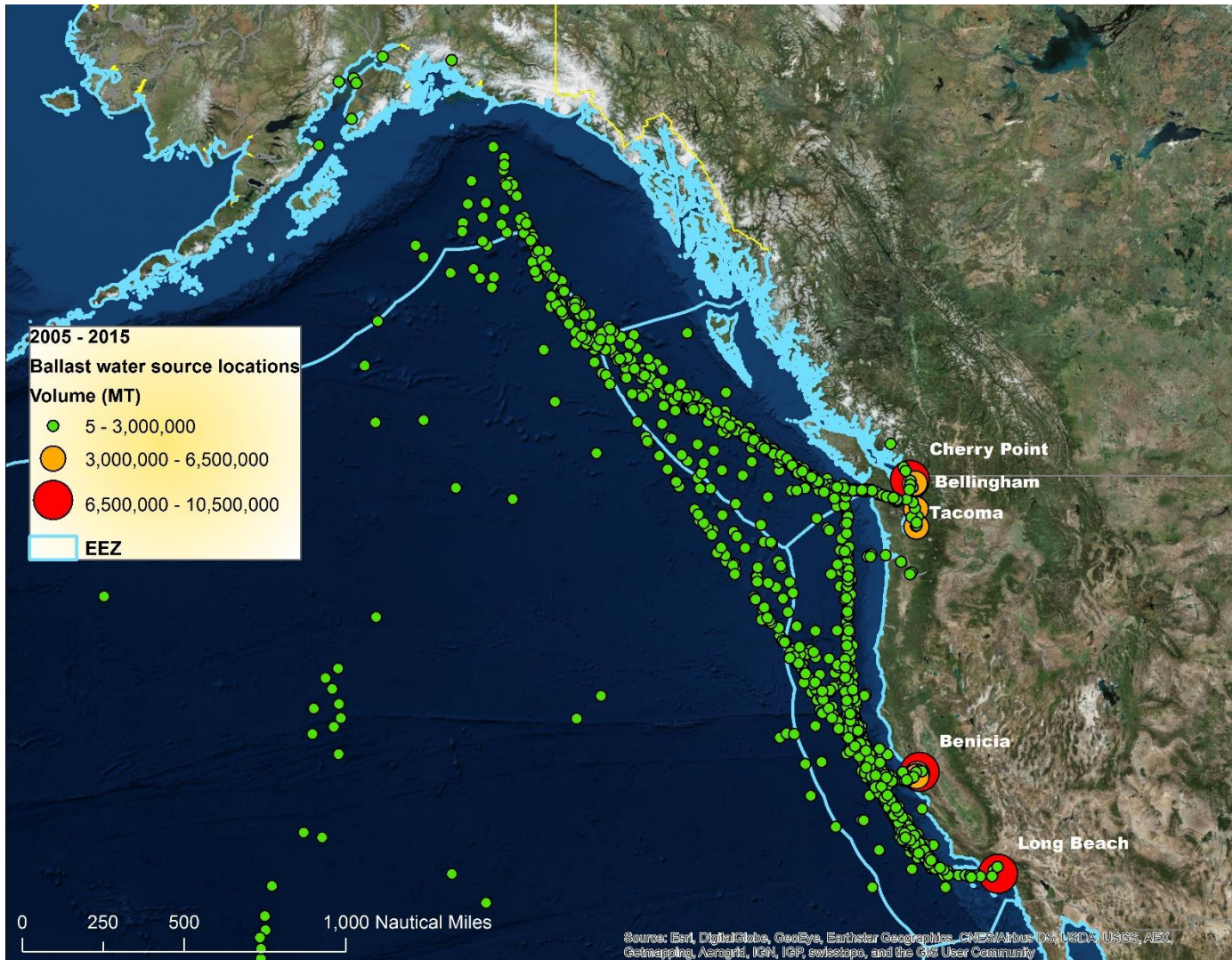


Figure B.3. Reported west coast source locations of ballast water discharged by crude oil tankers in Valdez, Alaska, 2005 through 2015.

C. Valdez: Ballast Water Management

Of the 86,018,598 MT of ballast water discharged by crude oil tankers in Valdez between 2005 and 2015, 29,723,875 MT (34.6%) was reported to be managed. Average reported management rates increased from 4.5% during 2005 – 2008 to 38.6% during 2009 – 2015. The percentage of managed ballast water trended upwards beginning in 2012, with 53.0% of discharge reported to be managed in 2015. The dominant management method was flow-through ballast water exchange (67.4% of managed ballast water), followed by empty-refill exchange (28.2%) and alternate methods (4.4%).

See Table C.1. and Figures C.1. – C.4.

Table C.1. Reported annual volume of managed and unmanaged ballast water discharged by crude oil tankers in Valdez, Alaska, 2005 through 2015. Total discharge volume is shown as a percentage of reported managed and unmanaged ballast water. Managed ballast water is further portrayed by management location (coastal or mid ocean) and by management method (alternate, empty-refill or flow-through).

Annual Ballast Water Discharge Volume (x1000 MT) – Valdez Management												
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Discharge Volume	3,411.9	2,984.1	2,661.7	549.4	10,947.9	10,650.2	10,818.3	10,781.7	11,438.6	11,043.8	10,731.1	86,018.6
Unmanaged	3,363.7 (98.6%)	2,880.8 (96.5%)	2,646.5 (99.4%)	479.0 (87.2%)	6,667.2 (60.9%)	7,536.8 (70.8%)	6,861.9 (63.4%)	7,098.9 (65.8%)	7,432.9 (65.0%)	6,278.7 (56.9%)	5,048.3 (47.0%)	56,294.7 (65.4%)
Managed	48.2 (1.4%)	103.3 (3.5%)	15.2 (0.6%)	70.4 (12.8%)	4,280.7 (39.1%)	3,113.4 (29.2%)	3,956.4 (36.6%)	3,682.7 (34.2%)	4,005.7 (35.0%)	4,765.1 (43.1%)	5,682.8 (53.0%)	29,723.9 (34.6%)
Location – Coastal	0.0	18.9	15.2	27.2	2,862.1	1,723.2	2,488.7	2,195.2	2,690.6	3,371.3	3,369.2	18,761.6
Location – Mid Ocean	48.2	84.5	0.0	43.2	1,418.6	1,390.1	1,467.6	1,487.5	1,315.1	1,393.7	2,313.6	10,962.2
Method – Alternate	0.0	0.0	0.0	0.0	222.0	11.7	60.5	18.6	497.3	25.4	460.8	1,296.3
Method – Empty-Refill	48.2	65.6	1.2	60.6	925.2	889.9	1,049.1	1,041.5	1,014.5	1,293.1	1,989.6	8,378.5
Method – Flow-Through	0.0	37.8	14.0	9.8	3,133.5	2,211.7	2,846.8	2,622.6	2,493.8	3,446.6	3,232.4	20,049.0

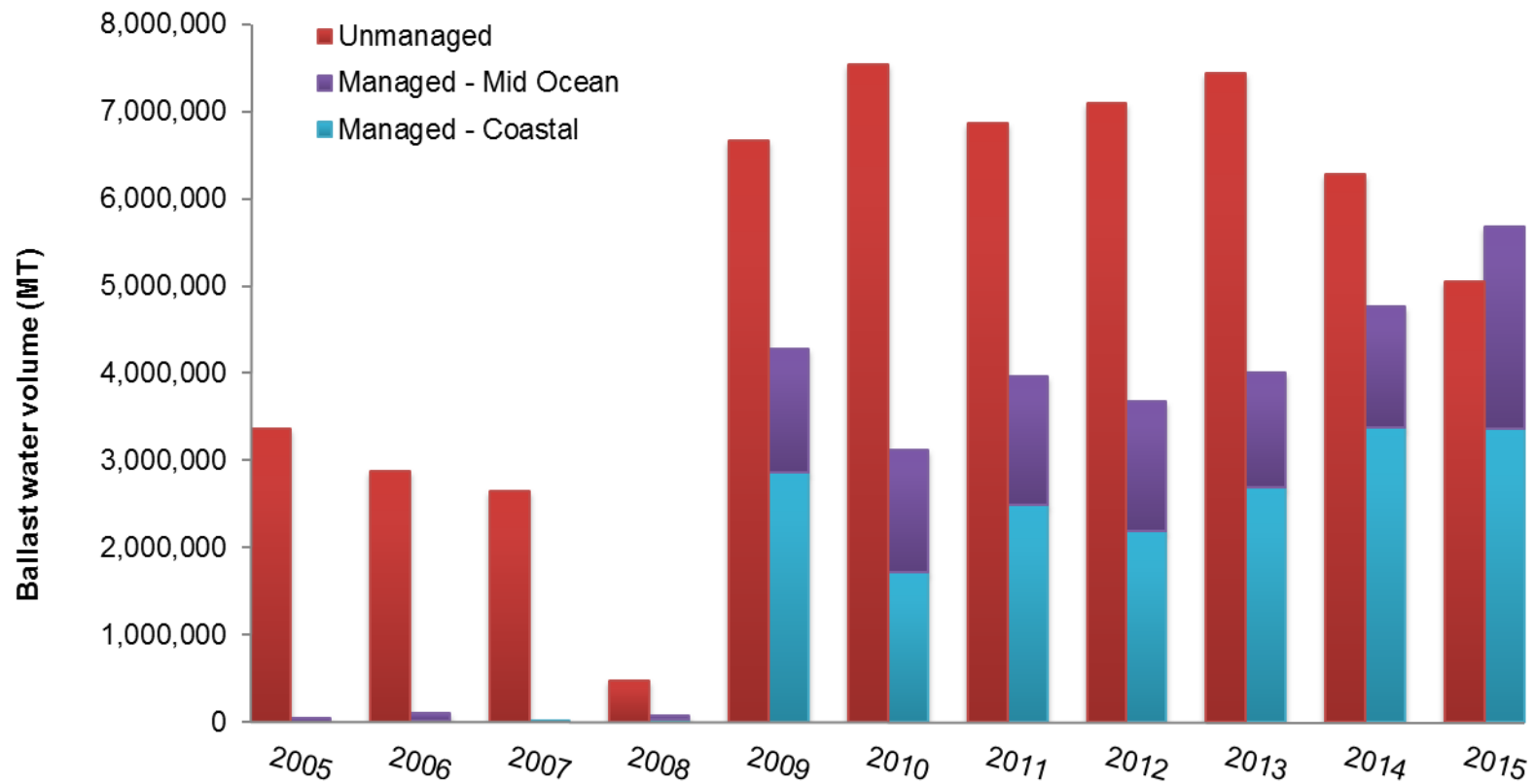


Figure C.1. Reported annual volume of managed and unmanaged ballast water discharged by crude oil tankers in Valdez, Alaska, 2005 through 2015. Managed ballast water is depicted by location: coastal or mid ocean.

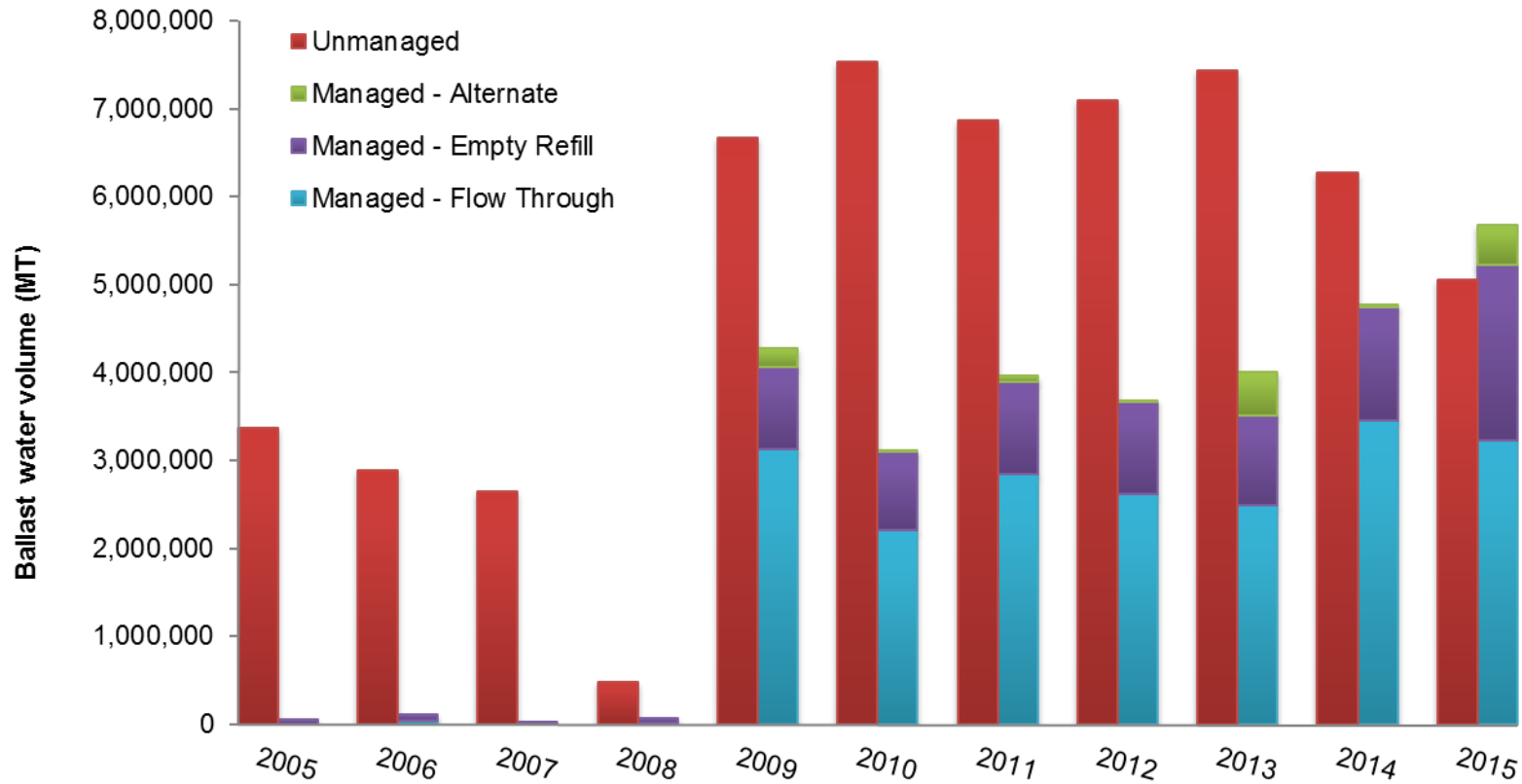


Figure C.2. Reported annual volume of managed and unmanaged ballast water discharged by crude oil tankers in Valdez, Alaska, 2005 through 2015. Managed ballast water is depicted by method: alternate, empty-refill or flow-through.

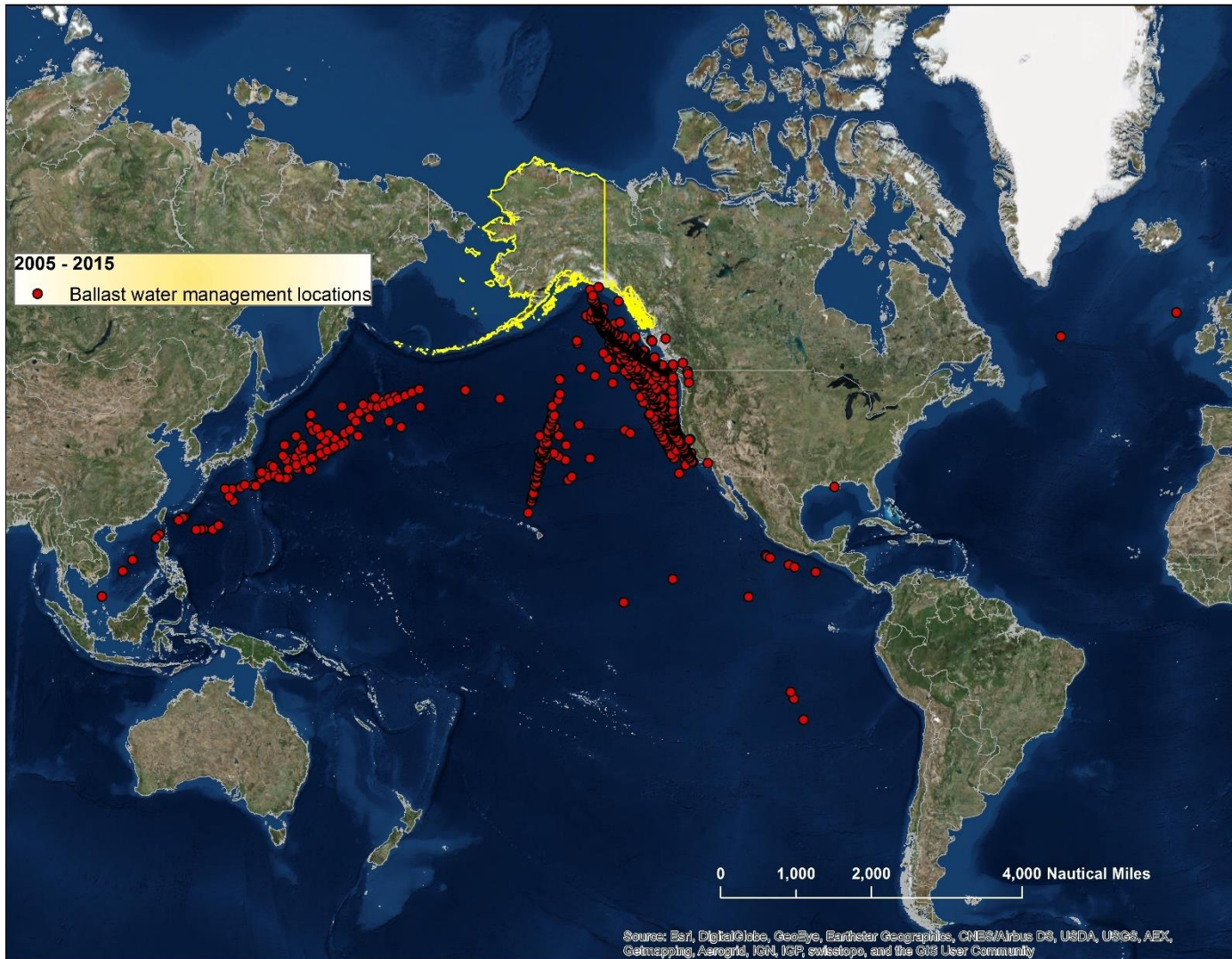


Figure C.3. Reported global management locations of ballast water discharged by crude oil tankers in Valdez, Alaska, 2005 through 2015.

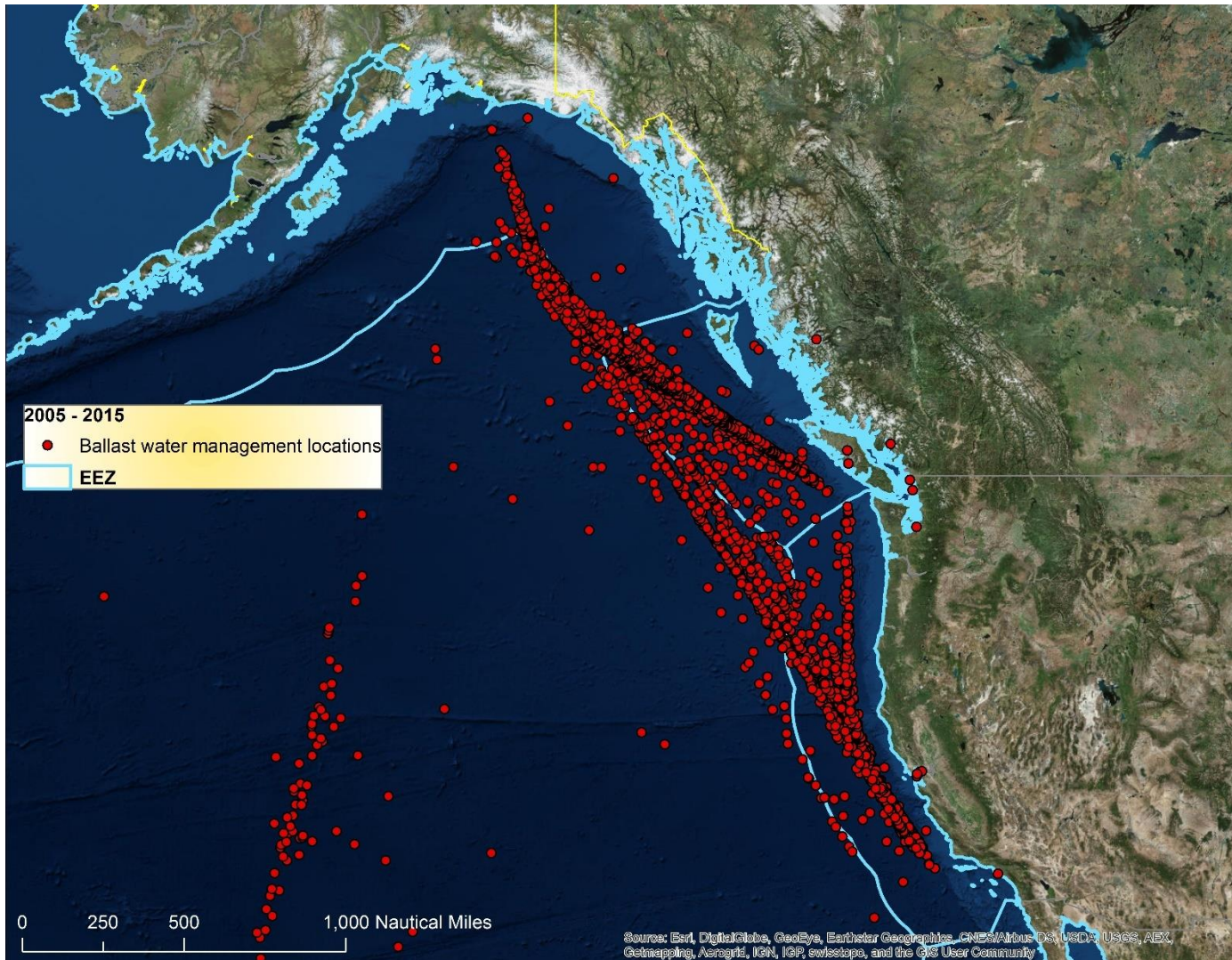


Figure C.4. Reported west coast management locations of ballast water discharged by crude oil tankers in Valdez, Alaska, 2005 through 2015.

D. Valdez: ‘Dirty’ Ballast Water Discharge

Ballast water is considered ‘dirty’, ‘oily’, or ‘unsegregated’ if it is stored in a tanker’s cargo tank. This ballast water is discharged to a ballast water treatment system at the Valdez Marine Terminal for processing. From 2010 – 2015, crude oil tankers reported discharging 61,434,000 barrels of dirty ballast water at the Valdez Marine Terminal. Dirty ballast water data were provided by the Prince William Sound Regional Citizens’ Advisory Council and previously adapted from the Alyeska Pipeline Service Company’s *Vessels Nearby Report*.

See Figures D.1. – D.2.

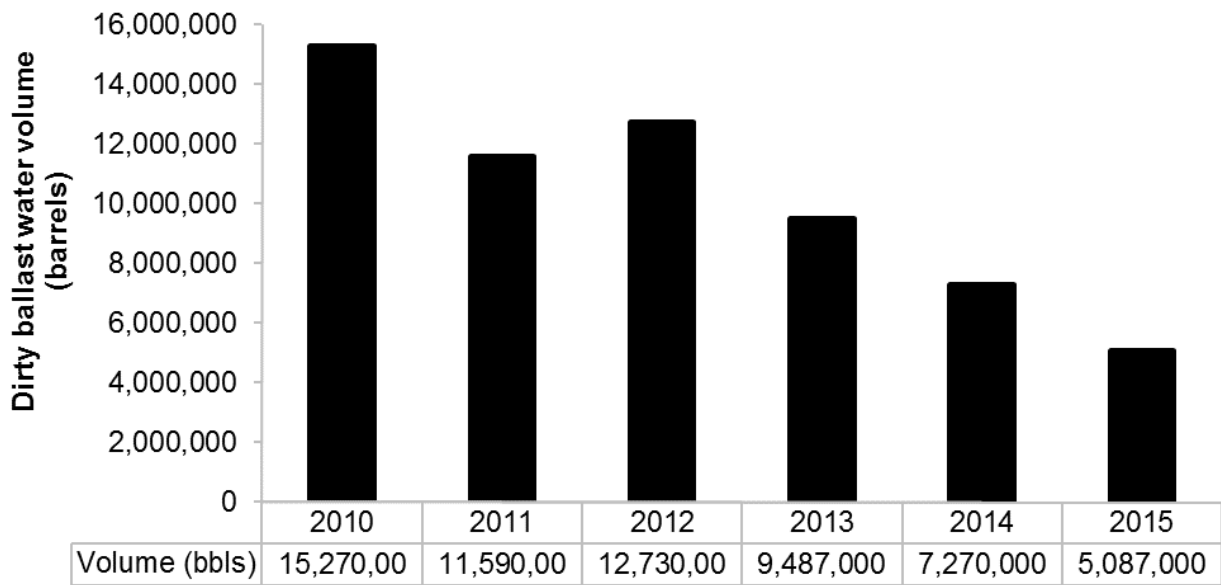


Figure D.1. Reported annual volume of dirty ballast water discharged by crude oil tankers in Valdez, Alaska, 2010 through 2015.

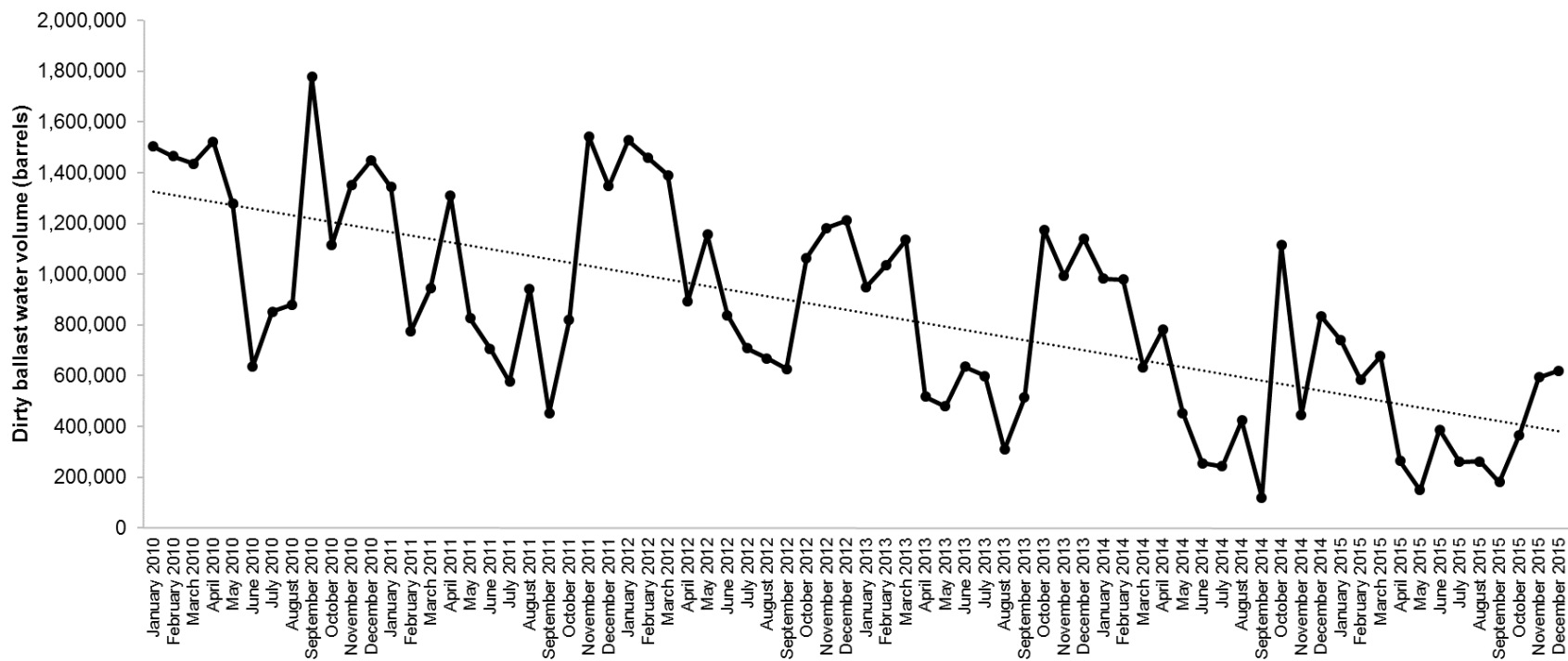


Figure D.2. Reported monthly volume of dirty ballast water discharged by crude oil tankers in Valdez, Alaska, 2010 through 2015.

E. Prince William Sound

The following data include vessel reports to Prince William Sound, Prince William Sound Captain of the Port Zone, and Knowles Head Anchorage. Seven crude oil tankers reported discharging 1,837,190 MT of ballast water between 2005 and 2015. No ballast water was reported discharged during 2008 or 2012 – 2015. The majority (96.8%) of ballast water was coastwise. Of the ballast water reported to be managed (8.3%), empty-refill exchange was the only method used.

Table E.1. Reported annual number of arrivals by crude oil tankers that discharged ballast water in Prince William Sound, Alaska, 2005 through 2015. Vessel numbers correspond to tankers that discharged ballast water in Valdez, with the addition of Vessel 18.

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Vessel 3	11	17	0	0	9	7	1	0	0	0	0	45
Vessel 7	0	1	1	0	16	2	2	0	0	0	0	22
Vessel 8	0	0	0	0	13	6	0	0	0	0	0	19
Vessel 4	3	8	3	0	0	0	5	0	0	0	0	19
Vessel 1	0	0	0	0	1	1	0	0	0	0	0	2
Vessel 18	1	0	0	0	0	0	0	0	0	0	0	1
Vessel 15	1	0	0	0	0	0	0	0	0	0	0	1

Table E.2. Reported annual volume of ballast water discharged by crude oil tankers in Prince William Sound, Alaska, 2005 through 2015. Total discharge volume is shown as a percentage of coastwise or overseas and further divided into coastal or mid ocean origin.

Annual Ballast Water Discharge Volume (x1000 MT) – Prince William Sound Sources												
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Discharge Volume	673.3	807.0	13.8	0.0	235.0	80.3	27.9	0.0	0.0	0.0	0.0	1,837.2
Coastwise	619.6 (92.0%)	807.0 (100%)	13.8 (100%)	0.0 (0.0%)	230.0 (97.9%)	80.3 (100%)	27.9 (100%)	0.0 (0.0%)	0.0 (0.0%)	0.0 (0.0%)	0.0 (0.0%)	1,778.5 (96.8%)
Coastal Origin	619.6	807.0	13.8	0.0	230.0	80.3	27.9	0.0	0.0	0.0	0.0	1,778.5
Mid Ocean Origin	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Overseas	53.7 (8.0%)	0.0 (0.0%)	0.0 (0.0%)	0.0 (0.0%)	4.9 (2.1%)	0.0 (0.0%)	0.0 (0.0%)	0.0 (0.0%)	0.0 (0.0%)	0.0 (0.0%)	0.0 (0.0%)	58.6 (3.2%)
Coastal Origin	49.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	49.3
Mid Ocean Origin	4.4	0.0	0.0	0.0	4.9	0.0	0.0	0.0	0.0	0.0	0.0	9.3

Table E.3. Reported source locations and volume of ballast water discharged by crude oil tankers in Prince William Sound, Alaska, 2005 through 2015. Source locations provided as geographic coordinates are not listed. Source locations are listed in decreasing order of total ballast water discharge.

Annual Ballast Water Discharge Volume per Source Location (x1000 MT)												
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Anacortes, WA	215.8	406.8	0.0	0.0	96.4	24.7	7.4	0.0	0.0	0.0	0.0	751.0
Benicia, CA	197.0	204.3	9.6	0.0	43.1	6.6	0.0	0.0	0.0	0.0	0.0	460.6
Richmond, CA	133.3	27.1	0.0	0.0	7.8	3.2	0.0	0.0	0.0	0.0	0.0	171.4
Ferndale, WA	0.0	111.4	0.0	0.0	5.5	4.0	0.0	0.0	0.0	0.0	0.0	121.0
Tacoma, WA	0.0	0.0	3.5	0.0	26.6	23.3	4.7	0.0	0.0	0.0	0.0	58.1
San Francisco COTP Zone	54.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	54.3
Barbers Point, HI	49.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	49.3
Bellingham, WA	0.0	39.8	0.0	0.0	3.8	4.0	0.0	0.0	0.0	0.0	0.0	47.7
San Francisco, CA	15.5	16.9	0.0	0.0	4.0	4.0	0.0	0.0	0.0	0.0	0.0	40.5
Rodeo, CA	0.0	0.7	0.0	0.0	35.4	0.0	2.7	0.0	0.0	0.0	0.0	38.8
Puget Sound	0.0	0.0	0.0	0.0	0.0	0.0	8.2	0.0	0.0	0.0	0.0	8.2
Port Angeles, CA	0.0	0.0	0.0	0.0	0.7	7.1	0.0	0.0	0.0	0.0	0.0	7.8
Gulf of Mexico	0.0	0.0	0.0	0.0	4.3	0.0	0.0	0.0	0.0	0.0	0.0	4.3
Columbia River	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8
Carquinez, CA	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.0	0.0	0.0	0.0	2.5
Long Beach, CA	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7
Strait of Juan de Fuca	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.7
Total	673.3	807.0	13.8	0.0	235.0	80.3	27.9	0.0	0.0	0.0	0.0	1,837.2

Table E.4. Reported annual volume of managed and unmanaged ballast water discharged by crude oil tankers in Prince William Sound, Alaska, 2005 through 2015. Total discharge volume is shown as a percentage of reported managed and unmanaged ballast water. Managed ballast water is further portrayed by management location (coastal or mid ocean) and by management method (alternate, empty-refill or flow-through).

Annual Ballast Water Discharge Volume (x1000 MT) – Prince William Sound Management												
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Discharge Volume	673.3	807.0	13.8	0.0	235.0	80.3	27.9	0.0	0.0	0.0	0.0	1,837.2
Unmanaged	673.3 (100%)	807.0 (100%)	13.8 (100%)	0.0 (0.0%)	140.2 (59.7%)	31.9 (39.7%)	19.4 (69.6%)	0.0 (0.0%)	0.0 (0.0%)	0.0 (0.0%)	0.0 (0.0%)	1,685.5 (91.7%)
Managed	0.0 (0.0%)	0.0 (0.0%)	0.0 (0.0%)	0.0 (0.0%)	94.8 (40.3%)	48.4 (60.3%)	8.5 (30.4%)	0.0 (0.0%)	0.0 (0.0%)	0.0 (0.0%)	0.0 (0.0%)	151.7 (8.3%)
Type – Coastal	0.0	0.0	0.0	0.0	48.4	18.2	5.6	0.0	0.0	0.0	0.0	72.3
Type – Mid Ocean	0.0	0.0	0.0	0.0	46.4	30.2	2.9	0.0	0.0	0.0	0.0	79.4
Method – Alternate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Method – Empty-Refill	0.0	0.0	0.0	0.0	94.8	48.4	8.5	0.0	0.0	0.0	0.0	151.7
Method – Flow-Through	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Appendix 1. Ballast Water Reporting Form for the National Ballast Information Clearinghouse for the period covered by this report. As of February 22, 2016, the form has been modified. See <http://invasions.si.edu/nbic/submit.html> for submission requirements and methods.

OMB Control Number 1625-0089
Exp. Date: 31-May-2015

BALLAST WATER REPORTING FORM

IS THIS AN AMENDED BALLAST REPORTING FORM? YES NO

1. VESSEL INFORMATION

Vessel Name:

IMO Number:

Owner:

Type:

GT:

Call Sign:

Flag:

2. VOYAGE INFORMATION

Arrival Port:

Arrival Date (D/M/YYYY):

Agent:

Last Port:

Country of Last Port:

Next Port:

Country of Next Port:

3. BALLAST WATER USAGE AND CAPACITY
Specify Units Below (m³, MT, LT, ST)

Total Ballast Water on Board:

Volume	Units	No. of Tanks in Ballast
<input type="text"/>	<input type="text"/>	<input type="text"/>

Total Ballast Water Capacity:

Volume	Units	Total No. of Tanks on Ship
<input type="text"/>	<input type="text"/>	<input type="text"/>

4. BALLAST WATER MANAGEMENT Total No. Ballast Water Tanks to be discharged:

Of tanks to be discharged, how many: Underwent Exchange: Underwent Alternative Management:

Please specify alternative method(s) used, if any:

If no ballast treatment conducted, state reason why not:

Ballast management plan on board? YES NO Management plan implemented? YES NO

IMO ballast water guidelines on board [res. A.868(20)]? YES NO

5. BALLAST WATER HISTORY: Record all tanks to be deballasted in port state of arrival; IF NONE, GO TO #6 (Use additional sheets as needed)

Tanks/ Holds <small>List multiple sources/tanks separately</small>	BW SOURCE				BW MANAGEMENT PRACTICES					BW DISCHARGE				
	DATE D/M/YYYY	PORT or LAT. LONG.	VOLUME (units)	TEMP (units)	DATE D/M/YYYY	ENDPOINT LAT. LONG.	VOLUME (units)	% Exch	METHOD (ER/FT/ ALT)	SEA HT. (m)	DATE D/M/YYYY	PORT or LAT. LONG.	VOLUME (units)	SALINITY (units)
			m3	C			m3		ER				m3	sg
			m3	C			m3		ER				m3	sg
			m3	C			m3		ER				m3	sg
			m3	C			m3		ER				m3	sg
			m3	C			m3		ER				m3	sg
			m3	C			m3		ER				m3	sg
			m3	C			m3		ER				m3	sg
			m3	C			m3		ER				m3	sg

Ballast Water Tank Codes: Forepeak = FP, Aftpeak = AP, Double Bottom = DB, Wing = WT, Topside = TS, Cargo Hold = CH, Other = O

6. RESPONSIBLE OFFICER'S NAME AND TITLE, PRINTED AND SIGNATURE:

Released 12-Aug-2010

OR OR

[NBICReportingForm.pdf](#)