



**Alaska DEC 2011  
Small Commercial  
Passenger Vessel and Ferry  
Wastewater Sampling Results**

February 2013

---



## Introduction

In 2001, Alaska Statute (AS) 46.03.460-46.03.490 established the Commercial Passenger Vessel Environmental Compliance Program (CPVEC), which is administered by the Alaska Department of Environmental Conservation (DEC). The CPVEC program applies to large<sup>1</sup> and small<sup>2</sup> commercial passenger vessels. The law requires small vessels to sample their wastewater discharges twice per season.

Small cruise ships are required to meet standard terms and conditions, or seek alternative terms and conditions in order to discharge blackwater<sup>3</sup> and graywater<sup>4</sup> in Alaska marine waters. Under standard terms and conditions blackwater, graywater, and other wastewater must contain no more than 200 fecal coliform per 100 milliliters and no more than 150 milligrams per liter of total suspended solids. These are the US Coast Guard performance requirements for approval of Type II Marine Sanitation Devices (MSD) under test conditions. A MSD is required for discharge of blackwater in US waters. Some small cruise ships and ferries also treat their graywater with their MSD.

Alaska's original CPVEC law in 2001 established the standard terms and conditions and the alternative terms and conditions. Changes to Alaska's CPVEC law in 2004 (AS 46.03.462 (e)) established additional alternative terms and conditions allowing a Best Management Practices plans (BMP). For more information about best management practices please see the cruise ship web site at the following address:  
[http://www.dec.state.ak.us/water/cruise\\_ships/small\\_vessel\\_dischargeoptions.htm](http://www.dec.state.ak.us/water/cruise_ships/small_vessel_dischargeoptions.htm)

Twelve small ships registered with the CPVEC program in 2011, including five state ferries that operate in Alaska year-round. A list of registered small cruise vessels can be found in Appendix 1. All registered small vessels that discharged into Alaskan waters obtained approved BMP plans and operated under these plans. One small cruise ship, the Bremen, did not discharge into Alaskan waters and was not sampled. Tables 1 and 2 summarize the 2011 small ship sampling results using the median<sup>5</sup> results for each pollutant. Data from the 11 ships were combined and results show that small-ship effluent generally had difficulty meeting water quality standards at the end of pipe for fecal coliform, chlorine, dissolved copper, and biological oxygen demand (BOD). Because of results seen in previous samples, the BMPs minimize the discharge of wastewater while in port or in sensitive locations like herring spawning areas. This should maximize dilution of the wastewater, and minimize discharge in locations near shore.

---

<sup>1</sup> A large vessel has >250 overnight passengers as defined in AS 46.03.490(13)

<sup>2</sup> A small vessel has 50-249 overnight passengers as defined in AS 46.03.490(7)

<sup>3</sup> Wastewater from toilets as defined in AS 46.03.490(12).

<sup>4</sup> As defined in AS 46.03.490(6). Wastewater from galley, dishwasher, bath and laundry.

<sup>5</sup> The median is the middle of a distribution: half the scores are above the median and half are below the median. The median is less sensitive to extreme scores than an average and is thus a better measure for skewed distributions.

Table 1. Summary of 2011 Small Vessel Median Sampling Results – Part 1 (11 vessels)

	Ammonia as N	pH	Biochemical O <sub>2</sub> Demand	Chemical Oxygen Demand	Total Suspended Solids	Total Chlorine, Residual	Fecal Coliform Bacteria by MPN
Alaska Water Quality Standards	1 *	6.5-8.5	60	n/a	150**	0.0075	200 ***
Units	mg/L	s.u.	mg/L	mg/L	mg/L	mg/L	fc/100 ml
Graywater (6 samples)	0.15	7.95	205	310	39	0.0	4
Blackwater (6samples)	0.25	7.79	41	780	51	0.1	31
Mixed Blackwater & Graywater (17 Samples)	12	6.89	120	1150	60	0.0	Unknown****

\* Ammonia standards are based on temperature, pH and salinity. This standard is from Table IX in the *Alaska Water Quality Criteria Manual for Toxics and Other Deleterious Organic and Inorganic Substances*.

\*\* Federal Marine Sanitation Device requirements are 150 mg/L for TSS and 200 fc/100 ml for fecal coliform.

\*\*\*The standard in receiving water for consumption of raw shellfish is 14 fecal coliform bacteria per 100 ml.

\*\*\*\* Three results were “Too Numerous To Count” making a median impossible to determine.

Table 2. Summary of 2011 Small Vessel Median Sampling Results – Part 2 (11 vessels)

	Arsenic, dissolved	Chromium, dissolved	Copper, dissolved	Lead, dissolved	Nickel, dissolved	Selenium, dissolved	Zinc, dissolved
Alaska Water Quality Standards	36	N/A	3.1	8.1	8.2	71	81
Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Median (12 samples)	24	0.9	95	0	10.8	95	77.5

### Wastewater results for individual ships

Tables 3 through 7 show the 2011 twice-per-season sampling results for each of the 11 ships sampled. Samples were analyzed for conventional and priority pollutants as listed in the [Quality Assurance Project Plan \(QAPP\)](#). Results highlighted in yellow are outside the standard terms and conditions or appropriate water quality standard. Small cruise ships operating under BMP plans do not need to meet standard terms and conditions, so no enforcement action was required. DEC does look for progress on wastewater sample results, and requires improvements prior to issuing extensions to the BMP plans. When there was a non-detect for a parameter, the result was listed as zero.

#### *Bacteria and chlorine*

Small ships continue to try to balance bacterial disinfection and chlorine use. Chlorine is used to disinfect bacteria, but it is toxic to marine organisms and high residuals must be avoided. The median total residual chlorine result for mixed black and graywater in 2011 was a non-detect. In 2010, total residual chlorine was 490 times higher than Alaska’s marine water quality standard (AMWQS). The maximum total residual chlorine results for small-ship graywater and blackwater were 0.9 mg/L and 1.01 mg/L, respectively. The

maximum total residual chlorine for mixed graywater and blackwater was 8.0 mg/L, over 1,000 times AMWQS.

The fecal coliform standard is 200 colonies per 100 ml for approved Type II Marine Sanitation Devices. The most stringent AMWQS is 43 colonies per 100 ml to collect shellfish for raw consumption, and is the standard used to protect all uses of all waters. Traditionally blackwater has had the highest median fecal coliform results, although in the recent past very high results have been found in graywater as well. The maximum fecal coliform result for any sample was from a ferry, the Taku. With a mixed wastewater result of 1,200,000 colonies per 100 ml, this is over 27,000 times AMWQS daily maximum for raw shellfish consumption. Three mixed samples were labeled as “TNTC” (too numerous to count) for fecal coliform. These results are extremely high, and the lack of an actual number artificially lowers the median for mixed wastewater.

### ***Other Pollutants***

One of the two samples for each ship was analyzed for 167 “priority pollutants:” 13 total metals, 12 dissolved metals; 72 volatile organic compounds (VOCs); and 70 bases, neutral, acids (BNAs). These parameters are listed in the vessels’ Quality Assurance Project Plan. Some small ships have separate graywater and blackwater discharges. The department allowed these ships to sample priority pollutants on only one of their wastewater discharges per season.

Most of the priority pollutants were not detected in small ship discharges. Table 7 includes only a selection of the priority results. Full priority results are available on request by contacting the CPVEC program.

Alaska uses dissolved metal concentration (a subset of total recoverable metals) for its water quality standards, but Table 6 also includes the total recoverable metals results for informational purposes. There are Alaska Marine Water Quality Standards (AMWQS) for dissolved arsenic, cadmium, chromium, copper, lead, selenium, nickel and zinc. All small cruise ships met the AMWQS for dissolved cadmium, chromium, lead, mercury, and silver. All sampled vessels exceeded the AMWQS for copper. Eight ships exceeded the AMWQS for selenium, three for arsenic, eight for nickel, and four for zinc.

### **Conclusion**

The wastewater sample results in this report were taken at the point of discharge with no mixing zone. A mixing zone is an area of water surrounding the point of discharge where the wastewater can be diluted by the receiving water. Most permitted wastewater facilities receive a mixing zone. For marine vessels it would be difficult to establish a mixing zone as they are mobile dischargers. DEC has addressed this issue in the BMP plans to minimize discharge in sensitive areas and near shore. The BMPs are renewed every three years, and DEC reviews the renewal applications for progress on wastewater sample results. The law that authorizes BMPs is set to expire at the end of 2015. At that time the small commercial passenger vessels will be required to meet AMWQS at the point of discharge or obtain a DEC permit to discharge.

There was a large change in the composition of sampled vessels in 2011. Cruise West declared bankruptcy at the end of the 2010 cruise season. Cruise West was the largest operator of small cruise ships in Alaska.

Small commercial passenger vessels and state ferries have made progress in terms of overall effluent quality since the beginning of the CPVEC BMP plan program. Some

ships still struggle to meet the standards for suspended solids, fecal coliform, BOD, and chlorine. Overall effluent quality appears to have improved since 2004. DEC believes improvements can be made by small cruise ships and ferries, especially with regard to chlorine, fecal coliform, TSS, and biological oxygen demand (BOD).

**Table 3.** 2011 Small Ship Graywater Sampling Results (not including priority pollutants.)

		Ammonia as N	pH	Biochemical O <sub>2</sub> Demand	Chemical Oxygen Demand	Total Suspended Solids	Total Chlorine	Free Chlorine	Fecal Coliform Bacteria	Conduc tivity	Oil & Grease	Total Organic Carbon	Alkalinity	Total Nitrate & Nitrite	Total Phosphorus	Total Kjeldahl Nitrogen	Total Settleable Solids
Reportable Limit (PQL)		0.1	0.1	2	10	4	0.1	0.1	2	2	5	1	2	1	0.05	1	0.1
Units		mg/L	s.u.	mg/L	mg/L	mg/L	mg/L	mg/L	FC/100ml	umhos/ cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ml/L
Alaska Marine Water Quality Standards or MSD Limits		1	6.5- 8.5	60	n/a	150	0.0075	n/a	14	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Vessel Name	Sample Date																
Admiralty Dream	6/14/11	0.13	5.08	530	1,100	56	0	0	1,400	355	5.6	330	25	0	0.7	5.8	0.0
Admiralty Dream	8/3/11	0.15	8.13	140	13	56	0	0	90	238	0.0	4	0	0	0.0	0.63	0.1
Sea Bird	6/5/11	0.13	8.51	400	620	15	0	0	0	662	39.0	130	62	0	1.40	9.20	0.7
Sea Bird	8/14/11	0.14	7.77	100	170	0	0	0	0	409	5.4	15	63	0	0.26	2.90	0
Sea Lion	6/4/11	0.19	8.64	17	21	22	0.11	0	8	200	0.0	7	70	0	0.27	1.20	0
Sea Lion	8/13/11	0.83	7.60	270	450	64	0.9	0	0	1,440	33.0	120	140	0.36	2.20	15.0	0.3
<b>Minimum</b>		<b>0</b>	<b>5.08</b>	<b>17</b>	<b>13</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0</b>	<b>200</b>	<b>0.0</b>	<b>4.2</b>	<b>0.0</b>	<b>0.00</b>	<b>0.00</b>	<b>0.63</b>	<b>0.00</b>
<b>Maximum</b>		<b>1</b>	<b>8.64</b>	<b>530</b>	<b>1,100</b>	<b>64.0</b>	<b>0.9</b>	<b>0.0</b>	<b>1,400</b>	<b>1,440</b>	<b>39.0</b>	<b>330.0</b>	<b>140.0</b>	<b>0.36</b>	<b>2.20</b>	<b>15.00</b>	<b>0.70</b>
<b>Median</b>		<b>0.15</b>	<b>7.95</b>	<b>205</b>	<b>310</b>	<b>39.0</b>	<b>0.0</b>	<b>0.0</b>	<b>4</b>	<b>382</b>	<b>5.5</b>	<b>67.5</b>	<b>62.5</b>	<b>0.00</b>	<b>0.48</b>	<b>4.35</b>	<b>0.05</b>

Non-detects recorded as zero.

**Table 4.** 2011 Small Ship Blackwater Sampling Results (not including priority pollutants.)

		Ammonia as N	pH	Biochemical O <sub>2</sub> Demand	Chemical Oxygen Demand	Total Suspended Solids	Total Chlorine	Free Chlorine	Fecal Coliform Bacteria	Conduc tivity	Oil & Grease	Total Organic Carbon	Alkalinity	Total Nitrate & Nitrite	Total Phosphor us	Total Kjeldahl Nitrogen	Total Settleable Solids
Reportable Limit (PQL)		0.1	0.1	2	10	4	0.1	0.1	2	2	5	1	2	1	0.05	1	0.1
Units		mg/L	s.u.	mg/L	mg/L	mg/L	mg/L	mg/L	FC/100ml	umhos/ cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ml/L
Alaska Marine Water Quality Standards or MSD Limits		1	6.5-8.5	60	n/a	150	0.0075	n/a	14	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Vessel Name	Sample Date																
Admiralty Dream	6/14/11	12	7.75	81	1,200	110	0	0	1,000,000	42,400	6.3	30	0	0.19	3.8	0.19	5
Admiralty Dream	8/3/11	0.14	7.75	55	81	190	0	0	2,700	22,400	0	0	72	0	0.37	1.2	4.2
Sea Bird	6/5/11	0.12	8.10	26	1,000	14	0	0	0	28,500	0	17	70	0	0	0.77	0
Sea Bird	8/14/11	5.20	7.82	60	730	62	0.12	0	62	32,300	0	28.0	95	0.17	3	11	0.5
Sea Lion	6/4/12	0.30	8.34	6.8	50	13	0.15	0	0	14,600	0	0	66	0	0.28	1.3	0
Sea Lion	8/13/11	0.19	6.93	27	830	40	1.01	0.23	0	28,600	0	0.95	75	0	0.22	1.3	0
<b>Minimum</b>		<b>0.12</b>	<b>6.93</b>	<b>7</b>	<b>50</b>	<b>13.0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>14,600</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0</b>	<b>0.00</b>	<b>0.19</b>	<b>0.00</b>
<b>Maximum</b>		<b>12</b>	<b>8.34</b>	<b>81</b>	<b>1,200</b>	<b>190</b>	<b>1.0</b>	<b>0.2</b>	<b>1,000,000</b>	<b>42,400</b>	<b>6.3</b>	<b>30.0</b>	<b>95</b>	<b>0.19</b>	<b>3.80</b>	<b>11.00</b>	<b>5.00</b>
<b>Median</b>		<b>0.25</b>	<b>7.79</b>	<b>41</b>	<b>780</b>	<b>51.0</b>	<b>0.1</b>	<b>0.0</b>	<b>31</b>	<b>28,550</b>	<b>0.0</b>	<b>9.0</b>	<b>71.0</b>	<b>0.00</b>	<b>0.33</b>	<b>1.25</b>	<b>0.25</b>

Non-detects recorded as zero.

**Table 5.** 2011 Small Ship Mixed Blackwater and Graywater Sampling Results (not including priority pollutants.)

		Ammonia as N	pH	Biochemical O <sub>2</sub> Demand	Chemical Oxygen Demand	Total Suspended Solids	Total Chlorine	Free Chlorine	Fecal Coliform Bacteria	Conduc tivity	Oil & Grease	Total Organic Carbon	Alkalini ty	Total Nitrate & Nitrite	Total Phosp horus	Total Kjeldahl Nitrogen	Total Settleable Solids
Reportable Limit (PQL)		0.1	0.1	2	10	4	0.1	0.1	2	2	5	1	2	1	0.05	1	0.1
Units		mg/L	s. u.	mg/L	mg/L	mg/L	mg/L	mg/L	FC/100ml	umhos/ cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ml/L
Alaska Marine Water Quality Standards or MSD Limits		1	6.5- 8.5	60	n/a	150	0.0075	n/a	14	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Vessel Name	Sample Date																
Columbia	5/30/11	11	6.62	160.0	1,200	136	0	0	2	31,700	28	60	120	0	2.5	0.99	0
Columbia	8/29/11	2.2	6.46	49.0	740	42	0	0	10	26,700	0	230	82	0	2.1	8.6	0
Kennicott	4/29/11	0	8.33	10	1,500	21	0.7	0.6	68	43,900	0	5.5	100	0	0	0	0
Kennicott	6/29/11	9.1	7.51	72.0	480	36	0	0	*	20,600	8	19	100	0	1.6	15	0
Kennicott	9/22/12	0.47	7.65	4.4	720	25	1.8	1.3	20	35,100	0	110	97	0	8.9	1.8	0.2
Malaspina	5/2/11	23	6.95	120.0	240	65	0	0	0	33,900	14	300	140	0.25	4.8	24	0.8
Malaspina	8/30/11	14	6.57	100.0	1,200	80	0	0	1,500	22,200	11	74	130	0	3.7	29	0
Matanuska	5/5/11	4.4	6.67	140.0	880	58	0	0	2	37,600	11	63	120	0.11	2.2	17	0
Matanuska	8/21/11	13	6.74	110.0	1,100	46	0	0	280	26,200	14	6.5	110	0.11	2.3	25	0
Taku	6/28/11	9.9	6.58	130	1,000	57	8.0	2.0	0	30,000	10	16	100	0	2.6	10	0
Taku	7/26/11	10	7.34	120	2,100	84	0	0	0	30,800	19	260	150	0	3	31	0
Orion II **	6/2/11		6.50	75		42	0	0	0								
Orion II	6/16/11	16	6.83	420	640	60	0	0	1,200,000	1,650	36	90	200	0	7.7	31	0.1
Wilderness Adventurer	8/6/11	47	7.40	1,600	3,300	760	2.2	0	*	22,100	210	410	260	0.3	11	140	14
Wilderness Adventurer	8/20/11	67	6.96	2,800	4,900	3,800	0	0	*	23,300	830	300	360	0.21	27	71	180
Wilderness Discoverer	7/30/11	16	7.10	420	2,400	740	2.2	1.18	9,100	42,200	65	110	150	0	6.2	38	12
Wilderness Discoverer	8/13/12	38	6.89	350	1,500	430	6.8	1.3	430,000	44,600	60	46	200	0	7.6	12	5.8
<b>Minimum</b>		<b>0.00</b>	<b>6.46</b>	<b>4</b>	<b>240</b>	<b>21.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0</b>	<b>1,650</b>	<b>0.0</b>	<b>5.5</b>	<b>82.0</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>Maximum</b>		<b>67.00</b>	<b>8.33</b>	<b>2,800</b>	<b>4,900</b>	<b>3,800.0</b>	<b>8.0</b>	<b>2.0</b>	<b>1,200,000</b>	<b>44,600</b>	<b>830.0</b>	<b>410.0</b>	<b>360</b>	<b>0.30</b>	<b>27.00</b>	<b>140.00</b>	<b>180.00</b>
<b>Median</b>		<b>12.00</b>	<b>6.89</b>	<b>120</b>	<b>1,150</b>	<b>60.0</b>	<b>0.0</b>	<b>0.0</b>	<b>15</b>	<b>30,400</b>	<b>14.0</b>	<b>82.0</b>	<b>125</b>	<b>0.00</b>	<b>3.35</b>	<b>20.50</b>	<b>0.00</b>

Nondetects set to 0

\* Too numerous to count

Non-detects recorded as zero.



**Table 6.** 2011 Small Ship Metals Sampling Results (part 1.)

Parameter			Antimony (TR)	Antimony, (Dissolved)	Arsenic (TR)	Arsenic, dissolved	Beryllium (TR)	Beryllium Dissoved	Cadmium (TR)	Cadmium Dissolved	Chromium (TR)	Chromium dissolved	Copper (TR)	Copper, dissolved
Units			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Water Quality Standards						36				8.8				3.1
Vessel Name	Sample Date	Sample Type												
Columbia	8/29/11	Mixed	0	2.3	40	20	0	0	0	0	0	0	89	87
Kenicott	6/29/11	Mixed	0	0	18	15	0	0	0	0	2	0	140	48
Kenicott	9/22/11	Mixed	0	0	46	36	0	0	0	0	0	0	140	100
Malaspina	5/2/11	Mixed	0	0	58	32	0	0	0	0	4	2.4	210	170
Matanuska	8/21/11	Mixed	1.3	1.9	33	24	0	0	0	0	5.3	3.5	250	150
Taku	7/26/11	Mixed	1.7	0	57	39	0	0	0	0	4.4	3.3	220	150
Admiralty Dream	8/3/11	BW	0	0	28	22	0	0	0	0	0	0	120	54
Orion II	6/16/11	Mixed	0	0	4	4	0	0	0	0	8.9	5.7	330	90
Wilderness Adventurer	8/20/11	Mixed	1.7	0	18	39	0	0	0	0	21	4.8	360	83
Wilderness Discoverer	8/13/12	Mixed	0	0	36	24	0	0	0	0	220	0	220	170
Sea Bird	8/14/11	BW	0	2.1	45	45	0	0	0	0	1.7	1.70	100	87
Sea Lion	8/13/11	GW	0	0	0	0	0	0	0	0	0	0	970	210
<b>MIN</b>			<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>89.00</b>	<b>48.00</b>
<b>MAX</b>			<b>1.70</b>	<b>2.30</b>	<b>58.00</b>	<b>45.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>220.00</b>	<b>5.70</b>	<b>970.00</b>	<b>210.00</b>
<b>MEDIAN</b>			<b>0.00</b>	<b>0.00</b>	<b>34.50</b>	<b>24.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>2.60</b>	<b>0.85</b>	<b>215.00</b>	<b>95.00</b>

Non-detects set to zero.

**Table 6** (continued) 2011 Small Ship Metals Sampling Results (part 2.)

Parameter			Lead (TR)	Lead, dissolved	Mercury (Total)	Nickel (TR)	Nickel, dissolved	Selenium (TR)	Selenium, dissolved	Silver (TR)	Silver, Dissolved	Thallium (TR)	Thallium, dissolved	Zinc (TR)	Zinc, dissolved	
Units			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	
Water Quality Standards				8.1	0.94		8.2		71		1.9				81	
Vessel Name	Sample Date	Sample Type														
Columbia	8/29/11	Mixed	0	0	0	7	8.8	140	62	0	0	0	0	55	70	
Kenicott	6/29/11	Mixed	0	0	0	17	15	94	87	0	0	1	0	42	8	
Kenicott	9/22/11	Mixed	0	0	0	12	10	170	140	0	0	0	0	61	42	
Malaspina	5/2/11	Mixed	1.1	0	0	19	18	220	140	0	0	0	0	94	88	
Matanuska	8/21/11	Mixed	0	0	0	19	18	120	92	0	0	0	0	22	28	
Taku	7/26/11	Mixed	2.8	0	0	20	17	230	160	0	0	0	0	180	110	
Admiralty Dream	8/3/11	BW	0	0	0	5.8	5.7	110	98	0	0	0	0	45	47	
Orion II	6/16/11	Mixed	19	2	0	14.0	13.0	7	7.3	1.9	0	0	0	750	210	
Wilderness Adventurer	8/20/11	Mixed	7.1	0	0.36	20	12	59	140	1.5	0	0	0	1300	25	
Wilderness Discoverer	8/13/12	Mixed	1	0	0	10	0	110	88	0	0	0	0	98	39	
Sea Bird	8/14/11	BW	0	0	0	6.5	7	160	160	0	0	0	0	29	34	
Sea Lion	8/13/11	GW	33	0	0	13	9.4	0	0	0	0	0	0	510	110	
<b>MIN</b>			<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>5.80</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>22.00</b>	<b>7.50</b>	
<b>MAX</b>			<b>33.00</b>	<b>2.00</b>	<b>0.36</b>	<b>20.00</b>	<b>18.00</b>	<b>230.00</b>	<b>160.00</b>	<b>1.90</b>	<b>0.00</b>	<b>1.30</b>	<b>0.00</b>	<b>1300.00</b>	<b>210.00</b>	
<b>MEDIAN</b>			<b>0.55</b>	<b>0.00</b>	<b>0.00</b>	<b>13.50</b>	<b>10.80</b>	<b>115.00</b>	<b>95.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>77.50</b>	<b>44.50</b>	

Non-detects set to zero.

**Table 7.** 2011 Small Ship Selected Priority Pollutant Sampling Results.

Parameter			3/4-Methyl phenol	Acetone	Bromoform	Benzyl Alcohol	Chloroform	Bromodi chloromethane	Dibromo chloromethane	Benzoic Acid	Phenol	Bis(2-ethylhexyl)phthalate
Units			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	
Water Quality Standards												
Vessel Name	Sample Date	Sample Type										
Columbia	8/29/11	Mixed	0	0	110	0	0	0	28	92	0	0
Kennicott	6/29/12	Mixed	18	0	9.1	0	0	0	0	110	0	0
Kennicott	9/22/11	Mixed	0	0	26	0	0	0	0	0	0	0
Malaspina	5/2/11	Mixed	0	0	190	0	11	18	64	230	0	6.8
Matanuska	8/21/11	Mixed	0	0	130	0	0	0	18	0	0	0
Taku	7/26/11	Mixed	0	0	200	0	0	8	39	210	0	0
Admiralty Dream	8/3/11	BW	0	0	0	0	0	0	0	0	0	0
Orion II	6/16/11	Mixed	0	58	0	0	32	7.7	11	0	0	0
Wilderness Adventurer	8/20/11	Mixed	0	0	0	0	9.6	0	0	700	0	0
Wilderness Discoverer	8/13/11	Mixed	0	0	9	0	9.8	7.1	12	0	0	0
Sea Bird	8/14/11	BW	0	0	41	0	0	0	9.6	0	0	0
Sea Lion	8/13/11	GW	0	340	0	140	370	10	0	0	0	0
<b>MIN</b>			<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>MAX</b>			<b>18</b>	<b>340</b>	<b>200</b>	<b>140</b>	<b>370</b>	<b>18</b>	<b>64</b>	<b>700</b>	<b>0</b>	<b>6.80</b>
<b>MEDIAN</b>			<b>0</b>	<b>0</b>	<b>17.55</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>10.30</b>	<b>0</b>	<b>0</b>	<b>0</b>

Non-detects set to zero.

Appendix 1

Alaska Department of Environmental Conservation

9/5/2011

2011 Small<sup>1</sup> Commercial Passenger Vessels Wastewater Treatment

	Vessel Operator	Vessel Name	Passenger Capacity	Crew Capacity	Voyages	Maximum Total Passengers	Blackwater Treatment System Manufacturer	Discharging in Alaska <sup>2</sup> & Subject to sampling program	
								BW	GW
1	Alaska Marine Highway System	<i>Columbia</i>	625	66	Year Rd.	N/A	Omnipure 15MX	Yes	Yes
2	Alaska Marine Highway System	<i>Kennicott</i>	748	42	Year Rd.	N/A	Orca II	Yes	Yes
3	Alaska Marine Highway System	<i>Malaspina</i>	500	50	Year Rd.	N/A	Omnipure 15MX	Yes	Yes
4	Alaska Marine Highway System	<i>Matanuska</i>	498	50	Year Rd.	N/A	Omnipure 15MX	Yes	Yes
5	Alaska Marine Highway System	<i>Taku</i>	370	42	Year Rd.	N/A	Effluent Technology	Yes	Yes
6	Allen Marine	<i>Admiralty Dream</i>	78	21	16	1248	Omnipure Type II	Yes	Yes
7	Inner Seas	<i>Wilderness Adventurer</i>	78	24	18	1404	Omnipure 12M	Yes	Yes
8	Inner Seas	<i>Wilderness Discoverer</i>	74	24	16	1184	Omnipure 12M	Yes	Yes
9	Hapag-Lloyd	<i>Bremen</i>	188	120	4	752	Unknown	No	No
10	National Geographic	<i>Sea Bird</i>	66	28	19	1254	Omnipure 12M	Yes	Yes
11	National Geographic	<i>Sea Lion</i>	66	28	19	1254	Omnipure 12M	Yes	Yes
12	V Ships	<i>Orion II</i>	110	68	1	110	Hamworthy Super Trident	Yes	Yes
				<b>Totals</b>	<b>93</b>	<b>7,206</b>			

<sup>1</sup>A small vessel has overnight accommodations for 50-249 passengers. A large vessel has overnight accommodations for 250 or more passengers.

<sup>2</sup>Alaska water extends 3 miles from the coastline and includes the Alexander Archipelago. Vessels discharging in Alaska water must sample their wastewater twice per season.

Not Discharging in AK waters