



Alaska DEC 2013

Small Commercial

Passenger Vessel and Ferry

Wastewater Sampling Results

10 15 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 large¹ and small² 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 blackwater³ and graywater⁴ 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 alternative terms allowing a Best Management Practices plan (BMP). In 2013, HB 80 extended the BMP program past 2015. 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

Seventeen (17) small ships registered with the CPVEC program in 2013, 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 Best Management Practices plans and operated under these plans. Two small cruise ships, the Bremen and the Hanseatic, did not discharge into Alaskan waters and was not sampled. Tables 1 and 2 summarize the 2013 small ship sampling results using the median⁵ results for each pollutant. Data from the 15 ships were combined and results show that small-ship effluent generally had difficulty meeting water quality standards or secondary treatment standards at the end of pipe for fecal coliform, chlorine, and biological oxygen demand (BOD). One ship, the American Spirit had generally good results for a small cruise ship in its second year of a BMP. 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.

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

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

³ Wastewater from toilets as defined in AS 46.03.490(12).

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

⁵ 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 2013 Small Vessels Median Sampling Results –Part 1 (15 vessels)

	Ammonia as N	pH	Biochemical O ₂ 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 (14 samples)	0.98	7.35	230	405	50.5	0.0	1,850
Blackwater (14 samples)	29.5	7.7	190	910	190	1.1	4,000
Mixed Blackwater & Graywater (14 Samples)	6.45	7.34	115	430	59.5	0.37	44.5

* 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.

Table 2. Summary 2013 Small Vessels Median Sampling Results – Part 2 (15 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 (16 samples)	35	0	87	0	9.7	120	53

Wastewater results for individual ships

Tables 3 through 7 show the 2013 twice-per-season sampling results for each of the 15 ships that reported. 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 Best Management Practice 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 Best Management Practices 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 2013 was 0.37 mg/L in 2010 it was 490 times the Alaska's marine water quality standard (AMWQS). The maximum total residual chlorine results for small-ship graywater or blackwater were 51 mg/L and 47 mg/L, respectively. The maximum total residual chlorine for mixed graywater and blackwater was 12 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 daily maximum 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 (especially untreated or partially treated) as well. The highest reported result was 4,300,000. With a graywater result of 4,300,000 colonies per 100 ml, this is 100,000 times AMWQS daily maximum for raw shellfish consumption. Two graywater and one blackwater samples were labeled as “TNTC” (too numerous to count) for fecal coliform. These results are likely very high, and the lack of an actual number skews the median for mixed wastewater down.

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); 70 bases, neutral, acids (BNAs). These parameters are listed in the vessel’s Quality Assurance Project Plan (QAPP) and in the NWCCA QAPP which was used by some small cruise ships and the state ferries. 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 (those that were detected). Full priority results are available on request to DEC.

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, mercury, and silver. All sampled vessels exceeded the AMWQS for copper. Five of fifteen samples exceeded the AMWQS for selenium, one for lead, two for arsenic, seven for nickel, 14 for copper, and six 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. DEC has addressed this issue in the Best Management Practices plans (BMPs) to minimize discharge in sensitive areas and near shore. The BMPs are renewed every five years, and DEC reviews the renewal applications for progress on wastewater sample results.

Small commercial passenger vessels and state ferries have made progress in terms of overall effluent quality since the beginning of the CPVEC BMP program. Unfortunately, some ships 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. 2013 Small Ship Graywater Sampling (not including priority pollutants)

	Ammonia as N	pH	Biochemical O ₂ Demand	Chemical Oxygen Demand	Total Suspended Solids	Total Chlorine	Free Chlorine	Fecal Coliform Bacteria	Conductivity	Oil & Grease	Total Organic Carbon	Alkalinity	Hardness (as CaO ₃)	Nitrogen, Nitrate-Nitrite (as N)	Total Phosphorus	Total Kjeldahl Nitrogen	Total Settleable Solids	
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	mg/L	ml/L	
Alaska Marine Water Quality Standards or MSD Limits	1	6.5-8.5	60	n/a	150	0.01	n/a	43	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
Vessel Name	Sample Date																	
Admiralty Dream	5/26/13	1.8	6.65	300	620	62	0	0	8,200	295	13	200	45	0	2.0	19.0	9.0	
Admiralty Dream	7/10/13	1.10	7.46	390	940	84	1.06	0.11	2,100	495	41	190	55	0.2	1.6	16	0	
Caledonian Sky	6/25/13	1.40	6.32	1,500	1,500	850	0	0	4,300,000	400	150	60	66	33	0	5.80	24	1
Safari Endeavour	6/23/13	1.30	7.31	230	400	46	0	0	6,600	400	40	69	50	0.17	1.30	18	0	
Safari Endeavour	7/21/13	0.15	7.06	450	650	28	0	0	25,000	424	14	120	50	43	0.18	1.9	18	0
Safari Legacy	8/22/13	0.00	7.63	160	17	20	0	0	11,000	94	0	4.7	30	0	0.0	0	0	
Sea Bird	6/16/13	3.30	7.38	44	670	24	0	0	30	335	36	420	39	0	2.6	24	0	
Sea Bird	8/25/13	0.00	7.61	140	240	8	0	0	0	718	6.5	100	58	0	0.3	2.8	0	
Sea Lion	6/15/13	1.20	6.93	220.0	410	200	0	0	TNTC*	313	32	100	77	0	1.1	18	0	
Sea Lion	8/24/13	22	9.98	250	330	55	51	43	0	2,070	32	86	340	73	0.24	2.2	11	0
Wilderness Discoverer	6/15/13	0.85	5.98	>2175	1,400	1,300	0	0	TNTC*	437	69	980	46	0	9.6	61	10	
Wilderness Discoverer	6/29/13	0.00	4.58	74	390	380	0	0	1,000	141	77	43	0	0	0.82	7.6	1.2	
Wilderness Explorer	6/1/13	0.24	8.10	0	0	0	0	0.1	110	166	0	1	48	0.11	0	0	0	
Wilderness Explorer	6/29/13	0.00	7.52	500	66	16	0	0	1,600	210	0	22	42	0	0	2	0	
Minimum	0	4.58	0	0	0.0	0.0	0.0	0.0	0	94	0.0	1.0	0.0	33.0	0.00	0.00	0.00	0.00
Maximum	22	9.98	1,500	1,500	1,300.0	51.0	43.0	4,300,000	2,070	150.0	980.0	340.0	73.0	0.24	9.60	61.00	10.00	
Median	0.98	7.35	230	405	50.5	0.0	0.0	1,850	368	32.0	93.0	49.0	43.0	0.00	1.45	17.00	0.00	
Nondetects set to 0					* Too numerous to count													
Above Water Quality Standards or secondary treatment standards (monthly average) in yellow																		

Table 4. 2013 Small Ship Blackwater Sampling (not including priority pollutants)

	Ammonia as N	pH	Biochemical O ₂ Demand	Chemical Oxygen Demand	Total Suspended Solids	Total Chlorine	Free Chlorine	Fecal Coliform Bacteria	Conductivity	Oil & Grease	Total Organic Carbon	Alkalinity	Hardness (as CaCO ₃)	Nitrogen, Nitrate-Nitrite (as N)	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	mg/L	ml/L	
Alaska Marine Water Quality Standards or MSD Limits	1	6.5-8.5	60	n/a	150	0.008	n/a	43	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
Vessel Name	Sample Date																	
Admiralty Dream	5/26/13	19	8.66	180	1,300	200	8.8	0.23	0	22,200	7	230	640		0.83	14	100	0
Admiralty Dream	7/10/13	66	8.13	230	1,400	180	7.3	0.23	200	39,100	0	140	340	4,700	0.33	11	46	9.1
Caledonian Sky	6/25/13	0.77	8.21	52	1,500	120	47	35	400	40,800	22	60	120	4,800	0.10	1.1	1.5	12
Safari Endeavour	6/23/13	37	7.21	390	1,900	360	5.7	1.60	13,000	28,900	22	170	280		0.65	15	85	10
Safari Endeavour	7/21/13	21	7.62	140	800	160	1.7	0	250,000	24,800	22	54	210		0.36	6.8	55	4
Safari Legacy	8/22/13	98	8.45	79	430	44	0	0	720,000	33,500	0	59	500	3,800	0.14	9	150	0
Sea Bird	6/16/13	1	7.38	44	1200	24	0	0	30	35.3	0	35	90		0	0.85	0	0
Sea Bird	8/25/13	3.7	7.74	160	520	140	0	0	0	30,800	8	110	100	3,500	0.16	2	23	0
Sea Lion	6/15/13	5.9	8.22	19	78	37	2.2	2.2	0	21.9	0	1.2	140		0	2.1	17	2.8
Sea Lion	8/24/13	22	8.03	210	840	280	0	0	620,000	31,300	10	35	350		0.18	9.1	60	60
Wilderness Discoverer	6/15/13	39	6.68	350	210	200	0	0	TNTC*	27	36	82	280		0	9.8	19	2.3
Wilderness Discoverer	6/29/13	55	7.66	200	900	480	5.1	1	4,000	36,300	19	86	260		0	8.2	17	47
Wilderness Explorer	6/1/13	81	7.52	270	920	220	0.4	0.2	4,600,000	18,000	7.4	44	580		0.12	12	100	3.5
Wilderness Explorer	6/29/13	71	7.42	380	1,700	270	0	0	930,000	27,700	9	59	500	3,000	ND	9	18	8
Minimum	0.77	6.68	19	78	24.0	0	0	0	0	22	0.0	1.2	90.0	3,000.0	0	0.85	0.00	0.00
Maximum	98	8.66	390	1,900	480	47.0	35.0	4,600,000	40,800	36.0	230.0	640	4,800	0.83	15.00	150.00	60.00	
Median	29.50	7.70	190	910	190.0	1.1	0.1	4,000	28,300	8.5	59.5	280.0	3,800.0	0.14	8.85	34.50	3.75	
Above Water Quality Standards or secondary treatment standards (monthly average) in yellow									* Too numerous to count									

Non-detects recorded as zero.

Table 5. 2013 Small Ship Sampling Mixed Blackwater and Graywater Mixed Results (not including priority pollutants)

Non-detects recorded as zero.

	Ammonia as N	pH	Biochemical O ₂ Demand	Chemical Oxygen Demand	Total Suspended Solids	Total Chlorine	Free Chlorine	Fecal Coliform Bacteria	Conductivity	Oil & Grease	Total Organic Carbon	Alkalinity	Hardness (as CaCO ₃)	Nitrogen, Nitrate-Nitrite (as N)	Nitrate as N	Nitrite as N	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	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	0.008	n/a	43	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Vessel Name	Sample Date																			
Columbia	4/8/13	0.33	6.40	160	540	210	0.2	0	2	21,600	0	0	120			0.24	0	0	0.00	2.9
Columbia	6/24/13	14.0	6.52	77	1,200	60	0	0	0	26,200	7	37	130	0.13			2.6	20.0	0	
Kennicott	4/8/13	7.5	7.89	23	260	41	2.4	2.2	10	33,300	30	23	110		0	0	3.4	1.1	0	
Kennicott	8/6/13	0	8.82	8	480	37	3.5	2.5	22	34,500	8.7	0.98	86	0			0	0.65	0	
Malaspina	5/8/13	13	6.69	140	380	56	12	2	0	18,500	7.4	43	130	0.25			3.6	21	0	
Malaspina	7/7/13	7.1	7.08	150	330	72	0	0	650,000	13,500	17	35	130	1,300	0.38		6.4	17	0	
Matanuska	5/8/13	6.1	6.75	120	330	54	0	0	25,000	20,600	6.0	32	140	4,600	0.27		2.3	18	0	
Matanuska	7/21/13	6.8	6.78	140	380	75	5.10	0.35	120	24,900	13	32	100	0			2.3	15	0.3	
Taku	3/13/13	4.4	6.64	97	520	110	0.53	0.27	67	30,300	21	52	110	0			3.7	43	1.5	
Taku	7/30/13	4.4	7.81	110	550	59	8.8	5.5	0	25,200	11.0	5.5	94	0.13			2.4	21	0	
American Spirit	6/15/13	0.4	7.60	5	18	0	0	0	0	158	0	3.3	34	0.32			0.27	2	0	
American Spirit	7/20/13	0	7.80	0	0	0	0.21	0.12	370	148	0	0.92	44	62	0.28		0	0	0	
Wilderness Adventurer	5/25/13	71	8.47	190	950	200	11.30	0.42	530,000	17,900	10	130	410	0.39			12	70	27	
Wilderness Adventurer	7/20/13	76	7.94	360	1,300	1,000	0	0	1,200,000	32,400	0	120	440	2,500	0.22		17.0	120.0	34	
Minimum	0	6.4	0	0	0	0	0	0	0	148	0	0	34.0	62.0	0	0	0	0	0	0
Maximum	76.0	8.8	360	1,300	1,000	12.0	5.5	1,200,000	34,500	30.0	130	440	4,600	0.4	0.2	0	17	120	34	
Median	6.45	7.34	115	430	59.5	0.37	0.20	44.50	23,250	8.05	32	115	1,900	0.24	0.12	0	2.5	17.5	0	

* Too numerous to count

Above Water Quality Standards or secondary treatment standards (monthly average) in yellow

Table 6. 2013 Small Ship Sampling Metal Results (part 1)

			Antimony (TR)	Antimony dissolved	Arsenic (TR)	Arsenic dissolved	Beryllium (TR)	Beryllium dissolved	Cadmium (TR)	Cadmium dissolved	Chromium (TR)	Chromium dissolved	Copper (TR)	Copper dissolved
Reportable Limit (PQL)			1	1	1	2.5	1	1	1	1	1	1	1	1
Units			µg/mg	µg/mg	µg/mg	µg/mg	µg/mg	µg/mg	µg/mg	µg/mg	µg/mg	µg/mg	µg/mg	µg/mg
Alaska Marine Water Quality Standards (chronic for marine life)			N/A	N/A	N/A	36	N/A	N/A	N/A	8.8	N/A	50 (chromium IV)	N/A	3.1
Vessel Name	Sample Date	Sample Type												
Columbia	4/8/13	Mixed	0	0	68	70	0	0	0	0	0	0	170	170
Kenicott	4/8/13	Mixed	0	0	54	33	0	0	0	0	0	0	230	140
Malaspina	7/7/13	Mixed	0	0	20	20	0	0	0	0	2.2	1.4	120	53
Matanuska	5/9/13	Mixed	0	0	58	54	0	0	0	0	0	0	280	180
Taku	3/13/13	Mixed	0	0	53	47	0	0	0	0	3.2	0	290	200
Admiralty Dream	7/10/13	BW	0	0	88	80	0	0	0	0	0	0	190	150
American Spirit	7/20/13	Mixed	0	0	0	0	0	0	0	0	0	0	2.8	2
Caledonian Sky	6/25/13	BW	0	0	66	33	0	0	0	0	9	6.7	210	140
Caledonian Sky	6/25/13	GW	0	0	0	0	0	0	0	0	0	6.5	120	51
Safari Endeavor	7/21/13	GW	0	1.2	1.3	0	0	0	0	0	3.5	1.5	44	34
Safari Legacy	8/22/13	BW	0	0	51	53	0	0	0	0	0	0	110	84
Sea Bird	8/25/13	BW	0	0	45	49	0	0	0	0	0	0	79	79
Sea Lion	8/24/13	GW	0	1	0	0	0	0	0	0	0	0	180	130
Wilderness Adventurer	7/20/13	Mixed	0	0	37	36	0	0	0	0	0	0	280	67
Wilderness Discoverer	6/29/13	GW	0	0	0	0	0	0	0	0	2.3	0	63	22
Wilderness Explorer	6/29/13	BW	0	0	62	59	0	0	0	0	0	0	150	89
Minimum			0.00	0.00	0	0	0	0	0	0	0	0.0	2.8	2.0
Maximum			0.0	1.20	88	80	0	0	0	0	9	6.7	290.0	200
Median			0.00	0.00	48	35	0	0	0	0	0	0.0	160.0	86.5
Exceeds WQS. Not a violation under BMP regulations.														

Non-detects set to zero.

Table 6 (continued) 2013 Small Ship Sampling Metal Results (part 2)

			Lead (TR)	Lead, diss	Mercury (Total)	Nickel (TR)	Nickel, diss	Selenium (TR)	Selenium, dissolved	Silver (TR)	Silver, diss	Thallium (TR)	Thallium, dissolved	Zinc (TR)	Zinc, diss
Reportable Limit (PQL)			1	1	0.2	1	1	1	1	1	1	1	1	1	1
Units			µg/mg	µg/mg	µg/mg	µg/mg	µg/mg	µg/mg	µg/mg	µg/mg	µg/mg	µg/mg	µg/mg	µg/mg	µg/mg
Alaska Marine Water Quality Standards (chronic for marine life)			N/A	8.1	0.94	N/A	8.2	N/A	71	N/A	1.9 (acute)	N/A	N/A	N/A	81
Vessel Name	Sample Date	Sample Type													
Columbia	4/8/13	Mixed	0	0	0	8	8.7	250	120	0	0	0	0	18	20
Kenicott	4/8/13	Mixed	3.5	0	0	11	9.4	190	120	0	0	0	0	220	120
Malaspina	7/7/13	Mixed	1.1	0	0	12	10	70	70	0	0	0	0	60	25
Matanuska	5/9/13	Mixed	0	0	0	19	19	210	190	0	0	0	0	39	35
Taku	3/13/13	Mixed	1.7	0	0	16	14	190	160	0	0	0	0	290	220
Admiralty Dream	7/10/13	BW	0	0	0	17	15	300	280	0	0	0	0	210	46
American Spirit	7/20/13	Mixed	0	0	0	0	0	0	0	0	0	0	0	460	420
Caledonian Sky	6/25/13	BW	0	0	0	20	19.0	240	120	0	0	0	0	270	210
Caledonian Sky	6/25/13	GW	4.1	0	0	12	8.6	1.3	0	1.5	0	0	0	240	150
Safari Endeavor	7/21/13	GW	2.3	1.5	0	3.2	2.6	4.8	0	0	0	0	0	270	190
Safari Legacy	8/22/13	BW	0	0	0	24	22	210	220	0	0	0	0	2800	380
Sea Bird	8/25/13	BW	0	0	0	9.3	8.6	190	200	0	0	0	0	39	15
Sea Lion	8/24/13	GW	5.3	1.6	0	6.8	3	8	1.6	0	0	0	0	230	36
Wilderness Adventurer	7/20/13	Mixed	5.1	0	0	23	14	120	130	0	0	0	0	700	46
Wilderness Discoverer	6/29/13	GW	0	0	0	0	0	1	1.6	0	0	0	0	56	59
Wilderness Explorer	6/29/13	BW	0	0	0	13	10	230	220	0	0	0	0	120	13
Minimum			0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.00	13.00
Maximum			5.30	1.60	0.00	24.00	22.00	300.00	280.00	1.50	0.00	0.00	0.00	2800.00	420.00
Median			0.00	0.00	0.00	12.00	9.70	190.00	120.00	0.00	0.00	0.00	0.00	225.00	52.50
Exceeds WQS. Not a violation under BMP															

Non-detects set to zero.

Table 7. 2013 Small Ship Priority Results with at least one detection

VESSEL_ID	Sample_Date	Sample_Type	209	186	38	215	16	40	39	193	196	198	214	82	98	100	102	103
Parameter	Sample_Date	Sample_Type	3/4-Methyl phenol	Acetone	Bromof orm	Benzyl Alcohol	Chlorofo rm	bromodic hloromet hane	dibromo chlorom ethane	m&p Xylene	O-xylene	Styrene	Benzoic Acid	Phenol	bis(2-ethylhexyl) phthalate	diethylp hthalate	di-n-butylphth alate	di-n-octylphth alate
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	µg/L	µg/L	µg/L
Water Quality Standards			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	21,000	N/A	23,000		
Vessel Name																		
Columbia	4/8/13	Mixed	0	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0
Kennicott	4/8/13	Mixed	0	0	120	0	0	0	28	0	0	0	130	0	0	0	5.3	0
Malaspina	7/7/13	Mixed	20	0	20	0	0	0	5.6	0	0	0	110	0	6.1	0	0	0
Matanuska	5/9/13	Mixed	31	0	26	0	0	0	7	0	0	0	49	0	0	0	8.1	0
Taku	3/13/13	Mixed	4.3	0	120	0	0	0	24	0	0	0	0	0	5.6	0	10	0
Admiralty Dream	7/10/13	BW	130	50	18	0	0	8.5	17	0	0	0	0	8.3	0	0	0	0
American Spirit	7/20/13	Mixed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calendonian Sky	6/25/13	BW	0	0	270	0	10	12	47	0	0	0	26	0	0	0	0	0
Calendonian Sky	6/25/13	GW	20	89	0	26	0	0	0	0	0	0	0	0	37	76	0	9.6
Safari Endeavor	7/21/13	GW	6.9	0	0	0	0	0	0	0	0	0	20	0	35	0	8.9	0
Safari Legacy	8/22/13	BW	0	2100	0	0	9.5	0	0	6.2	0	0	0	14	0	0	0	0
Sea Bird	8/25/13	BW	0	0	28	0	0	0	9	0	0	0	17	0	0	0	0	0
Sea Lion	8/24/13	GW	0	120	0	320	2400	0	0	0	0	5.9	170	0	14	0	8.4	0
Wilderness Adventurer	7/20/13	Mixed	0	0	0	0	0	0	0	6.5	5.2	0	0	0	0	0	12	0
Wilderness Discoverer	6/29/13	GW	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0
Wilderness Explorer	6/29/13	BW	23	0	0	0	0	0	0	21	7.4	0	46	0	6	0	0	0
MIN			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MAX			130	2100	270	320	2400	12	47	21	7	6	170	14	37	76	12	9.6
Median			0	0	7.0	0	0	0	0	0	0	0	8.50	0	0	0	0	0
Note: Some parameters listed have WQC for drinking water, but not for aquatic life.																		

Non-detects set to zero.

Appendix 1

Alaska Department of Environmental Conservation		4/8/2013								
2013 Small¹ Commercial Passenger Vessels Wastewater Treatment										
	Vessel Operator	Vessel Name	Passenger Capacity	Crew Capacity	Voyages	Maximum Total Passengers	Blackwater Treatment System Manufacturer	BMP	Discharging in Alaska ² & Subject to sampling program	
									BW	GW
1	Alaska Marine Highway System	<i>Columbia</i>	625	66	Year Rd.	N/A	Omnipure 15MX	Yes	Yes	Yes
2	Alaska Marine Highway System	<i>Kennicott</i>	748	42	Year Rd.	N/A	Orca II	Yes	Yes	Yes
3	Alaska Marine Highway System	<i>Malaspina</i>	500	50	Year Rd.	N/A	Omnipure 15MX	Yes	Yes	Yes
4	Alaska Marine Highway System	<i>Matanuska</i>	498	50	Year Rd.	N/A	Omnipure 15MX	Yes	Yes	Yes
5	Alaska Marine Highway System	<i>Taku</i>	370	42	Year Rd.	N/A	Effluent Technology	Yes	Yes	Yes
6	Allen Marine	<i>Admiralty Dream</i>	78	21	16	1248	Omnipure Type II	Yes	Yes	Yes
7	American Cruise Lines	<i>American Spirit</i>	76	27	11	836	Orca II	Yes	Yes	Yes
8	Inner Seas	<i>Wilderness Adventurer</i>	78	24	20	1560	Omnipure 12M	Yes	Yes	Yes
9	Inner Seas	<i>Wilderness Discoverer</i>	74	25	18	1332	Omnipure 12M	Yes	Yes	Yes
10	Inner Seas	<i>Wilderness Explorer</i>	76	27	18	1368	Red Fox Type II	Yes	Yes	Yes
11	Inner Seas	<i>Safari Endeavor</i>	86	35	17	1462	Omnipure 12MX	Yes	Yes	Yes
12	Inner Seas	<i>Safari Legacy</i>	92	34	2	184	Red Fox Type II	Yes	Yes	Yes
13	Hapag-Lloyd	<i>Bremen</i>	164	Unknown	3	492	Unknown	N/A	No	No
14	Hapag-Lloyd	<i>Hanseatic</i>	160	Unknown	1	700	Unknown	N/A	No	No
15	National Geographic	<i>Sea Bird</i>	66	28	18	1188	Omnipure 12M	Yes	Yes	Yes
16	National Geographic	<i>Sea Lion</i>	66	28	18	1188	Omnipure 12M	Yes	Yes	Yes
17	Noble Caledonia	<i>Caledonian Sky</i>	114	73	4	456	Hamworthy Super Trident	Yes	Yes	Yes
				Totals	146	12,014				
<p>¹A small vessel has overnight accommodations for 50 to 249 passengers. A large vessel has overnight accommodations for 250 or more passengers.</p> <p>²Alaska water extends 3 miles from the coastline and includes the Alexander Archipelago. Vessels discharging in Alaska water must sample their wastewater twice per season.</p> <p>Vessels highlighted in gray in the above table have registered that they will not discharge wastewater in Alaskan waters in 2013.</p>										