



Alaska DEC 2012

Small Commercial

Passenger Vessel and Ferry

Wastewater Sampling Results

2 11 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). 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

Fifteen (15) small ships registered with the CPVEC program in 2012, 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. One small cruise ship, the Hanseatic, did not discharge into Alaskan waters and was not sampled. One cruise ship, The World was listed with the large cruise ships in the initial wastewater discharge tables because of its large physical size; although by passenger count it was a small cruise ship. The World is a private residential owned ship that did not discharge on its voyage through Alaska. Tables 1 and 2 summarize the 2012 small ship sampling results using the median⁵ results for each pollutant. Data from the 13 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, copper, and biological oxygen demand (BOD). One new ship to Alaska, the American Spirit had generally good results for a small cruise ship in its first 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 2012 Small Vessels Median Sampling Results –Part 1 (13 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 (10 samples)	0.76	7.46	130	285	28.5	0.0	5500
Blackwater (10 samples)	2.25	7.74	37	1100	82.5	0.1	7
Mixed Blackwater & Graywater (16 Samples)	6.25	6.73	88.5	950	64	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 2012 Small Vessels Median Sampling Results – Part 2 (13 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)	20	1.1	91	0	6.2	64	80

Wastewater results for individual ships

Tables 3 through 7 show the 2012 twice-per-season sampling results for each of the 13 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 2012 was a non-detect, 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 1.73 mg/L and 8.8 mg/L, respectively. The maximum total residual chlorine for mixed graywater and blackwater was 8.8 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 1,000,000. With a graywater result of 1,000,000 colonies per 100 ml, this is over 23,000 times AMWQS daily maximum for raw shellfish consumption. Two mixed 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 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 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 Alaska Marine Water Quality Standards (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. In 2012 the number of small cruise ships increased from 13 to 16.

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 ship 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. 2012 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	Conduc- tivity	Oil & Grease	Total Organic Carbon	Alkalinity	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	ml/L
Alaska Marine Water Quality Standards or MSD Limits		1	6.5- 8.5	60	n/a	150	0.0075	n/a	43	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Vessel Name	Sample Date																
Admiralty Dream	9/4/12	3.0	8.01	110	130	130	0.73	0.76	1,000,000	347	44	14	38	0	1.2	8.6	0.2
Admiralty Dream	9/9/12	17.00	6.73	610	760	220	1.73	2.20	118,181	481	33.0	33	110	0.27	4.8	55	5
Safari Endeavor	6/17/12	0.73	6.32	310	490	31	0	0	750,000	261	8.4	85	40	0	0.78	12	0
Safari Endeavor	7/22/12	0.78	9.79	400	550	26	0	0	0	501	140.0	94	120	0.12	0.89	9.5	0.2
Wilderness Explorer	7/14/12	0.23	7.10	0	0	0	0	0	240,000	229	0	2.2	100	0.24	0	0	0
Wilderness Explorer	8/11/12	0.12	7.92	9.8	0	0	0	0	7,500	320	0	3.1	52	0	0.39	0.95	0
Sea Bird	6/3/12	0.24	7.68	150	380	5	0	0	0	666	9.4	150	56	0.19	0.72	4.8	0
Sea Bird	8/26/12	0.46	7.84	140	310	8	0	0	0	526	13	110	61	0.11	0.74	4.8	0
Sea Lion	6/2/12	1.90	7.24	49.0	140	62	0.19	0	26	802	6.9	10	84	0	1.70	13.0	0
Sea Lion	8/25/12	1.50	7.12	120	260	56	0	0	3,500	780	15	32	110	0	1.20	8.6	0.27
Minimum		0	6.32	0	0	0.0	0.0	0.0	0	229	0.0	2.2	38.0	0.00	0.00	0.00	0.00
Maximum		17	9.79	610	760	220.0	1.7	2.2	1,000,000	802	140.0	150.0	120.0	0.27	4.80	55.00	5.00
Median		0.76	7.46	130	285	28.5	0.0	0.0	5,500	491	11.2	32.5	72.5	0.06	0.84	8.60	0.00
Nondetects set to 0																	
Above Water Quality Standards or secondary treatment standards (monthly average) in yellow																	

Non-detects recorded as zero.

Table 4. 2012 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	Conducti vity	Oil & Grease	Total Organic Carbon	Alkalinity	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/c m	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	43	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Vessel Name	Sample Date																
Admiralty Dream	9/4/12	3	7.93	0	130	170	1.67	1.49	0	347	44	14	38	0	1.2	8.6	11
Admiralty Dream	9/9/12	28	7.18	36	2,000	100	2.12	1.69	0	32,400	7.5	65	200	0.61	8.6	0.6	4
Safari Endeavor	6/17/12	16	7.77	170	2,100	140	1.30	0	57,000	24,200	17	72	140	0.2	8.2	6.4	10
Safari Endeavor	7/22/12	2.4	7.46	37	2,300	77	8.80	5.20	0	33,000	5.4	19	88	0.46	2.4	17	2.5
Wilderness Explorer	7/14/12	54	6.87	170	2,300	260	0	0	660,000	25,300	0.0	40	420	1	12.0	110	4.5
Wilderness Explorer	8/11/12	0.0	8.23	0	1,100	88	0	0	0	33,900	6.6	140	1,500	7	8.1	0	2
Sea Bird	6/3/12	2.10	7.78	110	670	42	0	0	3,000	33,600	0	95	100	0.17	0.82	2.4	1.1
Sea Bird	8/26/12	0.39	7.79	170	310	36	0.19	0	10	23,400	0	150	85	0.1	0.75	8.2	0
Sea Lion	6/2/12	0	7.7	12	1100	33	0	0	16	31,900	0	0.77	86	0	1.8	0	0
Sea Lion	8/25/12	0.14	7.42	0	420	15	0	0	4	24,200	0	0.56	65	0	0	0.0	0
Minimum		0.00	6.87	0	130	15.0	0	0	0	347	0.0	0.6	38.0	0	0.00	0.00	0.00
Maximum		54	8.23	170	2,300	260	8.8	5.2	660,000	33,900	44.0	150.0	1,500	7.00	12.00	110.00	11.00
Median		2.25	7.74	37	1,100	82.5	0.1	0.0	7	28,600	2.7	52.5	94.0	0.19	2.10	4.40	2.25
Above Water Quality Standards or secondary treatment standards (monthly average) in yellow																	

Non-detects recorded as zero.

Table 5. 2012 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	Conducti vity	Oil & Grease	Total Organic Carbon	Alkalinity	Nitrogen, Nitrate- Nitrite (as N)	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/c m	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	43	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Vessel Name	Sample Date																
Columbia	5/7/12	12	6.46	120	950	42	0	0	11.6	36,300	7.2	47	140	0.12	3.3	19.00	0
Columbia	6/4/12	3.8	6.71	31	500	35	0	0	2	36,800	0	18	100	0	1.7	3.0	0
Kennicott	5/15/12	13	6.71	140	1,400	65	0	0	63,000	24,700	14	25.0	130	0.13	3.6	23	0
Kennicott	7/24/12	0.1	8.05	0	950	19	8.0	5.5	12	31,300	0	200	84	0	0	0.63	0.5
Malaspina	5/14/12	4.2	6.41	81	1,900	42	8.8	4.2	0	32,800	16	63	86	0.15	3.0	15	0
Malaspina	8/20/12	7.9	6.70	68	384	43	2.1	1.4	108	24,200	11	500	120	0.14	2.8	4.6	0.3
Matanuska	4/5/12	8.3	6.89	160	520	64	0	0	340	36,000	38	31	120	0.1	2.5	2.9	0.0
Matanuska	8/23/12	5	6.67	79	1,100	88	0	0	108	23,700	13	22.0	93	0	1.8	0	0.4
Taku	6/12/12	0.7	6.71	77	1,500	64	1.0	0	0	33,300	15	160	88	0	1.7	11	0.5
Taku	8/3/12	9	7.06	96	320	64	0	0	22	25,300	9.8	55	130	0.14	4.1	6.9	0
American Spirit	7/21/12	0.1	7.09	11	34	5	0	0	42	125	0	4.9	42	0.16	0	1.6	0
American Spirit	9/1/12	0	7.43	23	14	15	0	0	630	137	0	2.1	40	0.13	0.36	0	0.0
Wilderness Adventurer	6/9/12	38	6.74	1,200	2,500	540	0.8	0	TNTC	30,400	180	400	230	0.4	11	32	10.3
Wilderness Adventurer	8/18/12	5	6.16	140	174	96	0	0	27,000	28,100	22	41	85	0.15	2.5	2.1	0
Wilderness Discoverer	7/14/12	23	7.66	490	1,700	220	8.0	0.20	1,200	33,200	180	150	160	0.22	8.8	80	10
Wilderness Discoverer	8/11/12	66	7.89	340	1,700	330	0	0	TNTC	27,200	46	10	500	0.12	12.0	140	32.0
Minimum		0.0	6.2	0.0	14.0	5.0	0.0	0.0	0.0	125	0.0	2.1	40.0	0.0	0.0	0.0	0.0
Maximum		66.0	8.1	1,200.0	2,500.0	540.0	8.8	5.5	63,000	36,800	180.0	500.0	500.0	0.4	12.0	140.0	32.0
Median		6.25	6.73	88.50	950.00	64.00	0.00	0.00	75.00	29,250	13.50	44.00	110.00	0.13	2.65	5.75	0.00

* Too numerous to count

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

Table 6. 2012 Small Ship Sampling Metal Results (part 1)

2012 CPVEC Small Cruise Ship Sample Report

			Antimony (TR)	Antimony dissolved	Arsenic (TR)	Arsenic dissolved	Beryllium (TR)	Beryllium dissolved	Cadmium (TR)	Cadmium dissolved	Chromium (TR)	Chromium dissolved	Copper (TR)	Copper diss
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	6/4/12	Mixed	0	0	45	53	0	0	0	0	3	1.8	120	95
Kenicott	7/24/12	Mixed	0	0	35	48	0	0	0	0	1	2.2	100	90
Malaspina	8/20/12	Mixed	0	3.1	38	28	0	0	0	0	0	0.0	100	96
Matanuska	8/23/12	Mixed	0	0	33	9.3	0	0	0	0	7.7	0	430	190
Taku	8/3/12	Mixed	0	0	30	26	0	0	0	0	2.8	1.4	150	110
Admiralty Dream	9/9/12	GW	0	2.2	0	1	0	0	0	0	3.3	0	19	14
American Spirit	9/1/12	Mixed	0	0	0	0	0	0	0	0	0	0	4.8	3
Safari Endeavor	7/22/12	BW	0	0	30	25	0	0	0	0	3.9	1.1	80	81
Safari Endeavor	7/22/12	GW	0	1.2	0	0	0	0	0	0	2.9	2.3	160	130
Wilderness Adventurer	8/18/12	Mixed	0	0	31	13	0	0	0	0	0	1.2	410	58
Wilderness Discoverer	8/11/12	Mixed	0	0	44	34	0	0	0	0	4.4	3	180	130
Wilderness Explorer	8/11/12	BW	0	0	54	20	0	0	0	0	5.8	8.3	430	700
Wilderness Explorer	8/11/12	GW	0	0	2.1	0	0	0	0	0	0	0	55	55
Sea Bird	8/26/12	GW	0	0	1.6	1.1	0	0	0	0	3.4	0	130	91
Sea Lion	8/25/12	BW	0	0	33	33	0	0	0	0	1	0	82	60
Minimum			0.00	0.00	0	0	0	0	0	0	0	0.0	4.8	3.0
Maximum			0.0	3.10	54	53	0	0	0	0	8	8.3	430.0	700
Median			0.00	0.00	31	20	0	0	0	0	3	1.1	120.0	91.0
Exceeds WQS. Not a violation under BMP regulations.														

Non-detects set to zero.

Table 6 (continued) 2012 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	6/4/12	Mixed	0	0	0	11	9.9	22	91	0	0	0	0	27	28
Kenicott	7/24/12	Mixed	0	0	0	6.5	5.8	86	160	0	0	0	0	40	38
Malaspina	8/20/12	Mixed	0	0	0	8.5	12	140	120	0	0	0	0	32	41
Matanuska	8/23/12	Mixed	1.5	0	0	22	19	100	19	0	0	0	0	48	38
Taku	8/3/12	Mixed	4.1	1	0	10	11	110	64	0	0	0	0	590	370
Admiralty Dream	9/9/12	GW	2	0	0	6.5	3.3	2	1.7	0	0	0	0	620	110
American Spirit	9/1/12	Mixed	1.4	0	0	2.6	2.3	0	0	0	0	0	0	1500	1300
Safari Endeavor	7/22/12	BW	0	0	0	6.7	6.2	35	69	0	0	0	0	89	67
Safari Endeavor	7/22/12	GW	4.8	3.2	0	4.3	46	4	3.4	0	0	0	0	490	350
Wilderness Adventurer	8/18/12	Mixed	1	0	0	3.6	3	110	45	0	0	0	0	73	13
Wilderness Discoverer	8/11/12	Mixed	1.9	1.4	0	11	9	100	120	0	0	0	0	250	120
Wilderness Explorer	8/11/12	BW	7.2	14	0	23	140	60	66	0	0	0	0	150	240
Wilderness Explorer	8/11/12	GW	2.2	2.2	0	4	3	4.1	3	0	0	0	0	81	81
Sea Bird	8/26/12	GW	1.1	0	0	3.5	3.2	5.5	0	0	0	0	0	93	80
Sea Lion	8/25/12	BW	0	0	0	5	4.3	110	120	0	0	0	0	14	6
Minimum			0	0.00	0.00	2.60	2.30	0.00	0.00	0.00	0.00	0.00	0.00	14.00	5.90
Maximum			7.20	14.00	0.00	23.00	140.00	140.00	160.00	0.00	0.00	0.00	0.00	1500.00	1300.00
Median			1.40	0.00	0.00	6.50	6.20	60.00	64.00	0.00	0.00	0.00	0.00	89.00	80.00
Exceeds WQS. Not a violation under BMP															

Non-detects set to zero.

Table 7. 2012 Small Ship Selected Priority Results

Parameter	Sample Date	Sample Type	1,1-dichloroethane	1,1,1,2-tetrachloroethane	carbon tetrachloride	3/4-Methylphenol	trichloroethene	Acetone	Bromoform	Benzyl Alcohol	Chloroform	bromodichloromethane	bromomethane	chloroethane	methylene chloride	dibromochloroethane	Carbon disulfide	m&p Xylene	1,1,1,2-tetrachloroethane	Benzoic Acid	Phenol	bis(2-ethylhexyl)phthalate	diethylphthalate	bromochloromethane	1,2,4-trimethylbenzene	1,3,5-trimethylbenzene	dichlorodifluoromethane	
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	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	N/A	N/A	N/A	N/A	N/A	N/A	N/A	21,000	N/A	23,000	N/A	N/A	N/A	N/A	
Vessel Name																												
Columbia	6/4/12	Mixed	0	0	0	0	0	0	95	0	0	0	0	0	0	23	0	0	0	89	0	0	0	0	0	0	0	
Kennicott	7/24/12	Mixed	0	0	0	0	0	0	47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Malaspina	8/20/12	Mixed	0	0	0	0	0	52	59	0	9.4	0	0	0	0	13	0	0	0	120	0	0	0	0	0	0	0	
Matanuska	8/23/12	Mixed	0	0	0	2.8	0	0	72	0	0	0	0	0	0	16	0	0	0	63	0	0	0	0	0	0	0	
Taku	8/3/12	Mixed	0	0	0	0	0	0	130	0	0	8	0	0	0	36	0	0	0	110	0	0	0	0	0	0	0	
Admiralty Dream	9/9/12	GW	0	0	0	61	0	0	0	0	22	0	0	0	0	0	0	0	710	0	0	0	0	0	12	5.6	0	
American Spirit	9/1/12	Mixed	0	0	0	0	0	0	0	0	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Safari Endeavor	7/22/12	BW	0	0	0	0	0	0	0	0	0	9.9	0	0	0	220	0	0	0	19	0	0	0	0	0	0	43	
Safari Endeavor	7/22/12	GW	0	0	0	8.1	0	0	0	7.3	140	7.5	0	0	0	0	0	0	36	0	11	0	0	0	0	0	0	
Wilderness Adventurer	8/18/12	Mixed	0	0	0	66	0	0	38	0	5	10	0	0	0	28	0	0	0	89	0	0	0	0	0	0	0	
Wilderness Discoverer	8/11/12	Mixed	0	0	0	170	0	0	0	0	7.3	0	0	0	0	0	0	6	0	1700	52	0	0	0	0	0	0	
Wilderness Explorer	8/11/12	BW	5.9	2.8	240	0	19	0	340	0	1800	1700	0	2100	100	0	0	0	9.7	840	0	0	0	8.3	0	0	0	
Wilderness Explorer	8/11/12	GW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Sea Bird	8/26/12	GW	0	0	0	0	0	0	0	0	140	0	0	0	0	0	0	0	270	0	3.7	5.2	0	0	0	0	0	
Sea Lion	8/25/12	BW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
MIN			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
MAX			5.90	2.80	240.00	170	19.00	52	340	7	1800	1700	10	2100	100	36	220	6	10	1700	52	11.00	5.20	8.30	12.00	5.60	43.00	
Median			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	89.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

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		12/11/2012								
2012 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	17	1326	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	21	1638	Omnipure 12M	Yes	Yes	Yes
9	Inner Seas	<i>Wilderness Discoverer</i>	74	25	19	1406	Omnipure 12M	Yes	Yes	Yes
10	Inner Seas	<i>Wilderness Explorer</i>	76	27	15	1140	Red Fox	Yes	Yes	Yes
11	Inner Seas	<i>Safari Endeavor</i>	86	35	13	1118	Omnipure 12MX	Yes	Yes	Yes
12	Hapag-Lloyd	<i>Hanseatic</i>	175	120	4	700	Unknown	N/A	No	No
13	National Geographic	<i>Sea Bird</i>	66	28	18	1188	Omnipure 12M	Yes	Yes	Yes
14	National Geographic	<i>Sea Lion</i>	66	28	18	1188	Omnipure 12M	Yes	Yes	Yes
15	ResidenSea	<i>The World</i>	240	Unknown	1	240	Unknown	N/A	No	No
				Totals	137	10,780				
<p>¹A small vessel has overnight accommodations for 50-249 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 are not registered to discharge wastewater in Alaskan waters during the 2012 season.</p>										