## 2004 Small Ship Wastewater Sampling Results

Alaska Statute (AS) 46.03.460-46.03.490 establishes the Commercial Passenger Vessel Environmental Compliance Program (CPVEC), which is administered by the Alaska Department of Conservation (ADEC) and 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. Several key aspects of the CPVEC program, such as payment of environmental compliance fees and compliance with wastewater discharge standards, became effective for small commercial passenger vessels on January 1, 2004.

Small cruise ships are now 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.

In 2004, most small vessels and ferries sought alternative terms and conditions under an Interim Protective Measures (IPM) Plan because the effluent from the treatment systems on board does not meet standard terms and conditions and advanced treatment systems installed on large ships are not yet commercially available to small vessels.

Nineteen small ships registered with the CPVEC program in 2004, including five state ferries that operate in Alaska year-round. Four of the small ships did not report wastewater sampling results: one canceled its Alaska itineraries, one did not discharge into Alaska water and did not need to sample under state law, one hit a rock early in the season and was out of service for the remainder of the year. One small ship operator did not sample its wastewater as required and received a notice of violation and subsequent fine from ADEC.

Table 1 summarizes the 2004 small ship sampling results using the median<sup>5</sup> results for each pollutant. Data from the 15 ships are aggregated. Results show that small-ship effluent does not meet water quality standards at the end of pipe for fecal coliform, chlorine, residual dissolved copper and dissolved selenium.

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

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

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

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

<sup>&</sup>lt;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.

	Ammonia as N	рH	Biochemical $O_2$ Demand, 5 day	Chemical Oxygen Demand	Total Suspended Solids	Free Chlorine, Residual	Fecal Coliform Bacteria by MPN
Alaska Standards	17.0 <sup>6</sup>	6.5-8.5	None	none	150.0	0.0075	2007
Units	Mg/L		Mg/L	Mg/L	Mg/L	Mg/L	MPN/100ml
Graywater							
(samples=14)	1.20	7.15	156.00	311	63.1	<mark>0.0750</mark>	<mark>1,250</mark>
Blackwater							
(samples=15)	15.00	7.83	47.80	290	38.4	<mark>0.0500</mark>	<mark>16,000</mark>
Mixed Blackwater							
&Graywater Samples=17	9.70	7.24	179.50	580	104.0	<mark>0.0500</mark>	<mark>1,600</mark>

 Table 1.
 Summary 2004 Small Vessels Median Sampling Results (15 vessels)

Sample Name	Arsenic, dissolved	Chromium, dissolved	Copper, dissolved	Lead, dissolved	Selenium, dissolved	Nickel, dissolved	Zinc, dissolved
Reportable Limit (PQL)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Alaska Standards	36.0	50.0	3.1	8.1	71.0	8.2	81.0
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Median (samples=15)	25.7	1.3	<mark>26.1</mark>	0.3	<mark>92.4</mark>	6.3	59.6

### Wastewater results for individual ships

Tables 2 through 5 show the 2004 twice-per-season sampling results for each of the 15 ships that reported. Results highlighted in yellow are outside the standard terms and conditions or appropriate water quality standard. The small ships operating under interim protection measures plans do not need to meet standard terms and conditions, so no enforcement action was required.

### Bacteria

The 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 chlorine residual result is 100 times Alaska's marine water quality standard (AMWQS). The maximum chlorine residual results for small-ship graywater and blackwater were 11 mg/L and 25 mg/L, respectively—more than 1000 times Alaska's marine water quality standard (AMWQS). The fecal coliform standard is 200 colonies per 100 ml to meet AMWQS for secondary-contact recreation. The most stringent AMWQS is 14 colonies per 100 ml to collect shellfish for raw

<sup>&</sup>lt;sup>6</sup> 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* using a ph of 7.0, salinity of 20 g/kg and temperature of 10-15 degrees Celsius. Large ships while stationary have a minimum dilution factor of 10. Ammonia levels greater than 20 mg/L exceed water quality standards in the receiving water.

<sup>&</sup>lt;sup>7</sup> The standard in receiving water for consumption of raw shellfish is 14 fecal coliform bacteria per 100 ml. Effluent levels below 200 fc/100ml means that with dilution, the 14 fc/100ml standard will be meet in the receiving water.

consumption, and is the standard used to protect all uses of all waters. Blackwater has the highest median fecal coliform results. At 16,000 colonies per 100 ml, the median is more than 1000 times the AMWQS for raw consumption of shellfish. The maximum fecal coliform result was for mixed blackwater and graywater from the Matanuska state ferry. At 197,000,000 colonies per 100 ml, this is 14 million times AMWQS for raw shellfish consumption.

#### **Other Pollutants**

For one of the two samples for each ship, ADEC analyzed 167 "priority pollutants:" 13 total metals, 12 dissolved metals; 72 volatile organic compounds (VOCs); 70 bases, neutral, acids (BNAs). Some small ships have separate graywater and blackwater discharges. The department allowed these ships to sample priority pollutants<sup>8</sup> on one of their wastewater discharges per season.

Most of the priority pollutants were not detected in small ship discharges. Table 5 includes only priority pollutants with medians that exceeded the practical quantitation limit (PQL) or a pollutant with a maximum value 10 times the PQL. Table 5 also does not include total recoverable metals because Alaska uses dissolved metal concentration (a subset of total recoverable metals) for its water quality standards. The pollutants not listed here are considered not detected and the analysis of those pollutants is unnecessary.

Alaska does not currently have marine water quality standards for chloroform, bromoform, methylphenol, chlorophenylmethylsulfone, and benzoic acid. There are Alaska Marine Water Quality Standards (AMWQS) for arsenic, chromium, copper, lead, selenium, nickel and zinc.

With one exception, all small ships met the AMWQS for dissolved arsenic, chromium and lead. The Spirit of Endeavor exceeded the AMWQS for arsenic by 3.6 microgram per liter (ug/L). Most small ships that operated in Alaska in 2004 exceeded the AMWQS for copper, selenium, nickel and zinc.

<sup>&</sup>lt;sup>8</sup> The priority pollutants analysis can be found in the Large Ship Unannounced Sampling Report.

VESSEL_ID	Sample date	Ammonia as N	рН	BOD	COD	TSS	Chlorine, Residual	Fecal Coliform Bacteria by MPN	conductivity	Chlorine, Free	Oil& grease	Total Organic Carbon	alkalinity, Total as CaCO3	Total Nitrate & Nitrite as N	Phosphorus, Total	Nitrogen, Total Kjeldahl	Total Settleable Solids
		0.100	0.10	2.00	10	4.0	0.10	2	2	0.10	5.00	1.00	2.0	1.00	0.050	1.00	0.10
		mg/L	s.u.	mg/L	mg/L	mg/L	mg/L	MPN/100ml	Umhos/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
		17.000	6.5-8.5					14		0.0075							
Sea Bird	6/20	0.110	7.55	118.00	150	59.9	9.80	1	565	<mark>6.500</mark>	2.5	85.00	120.0	0.26	0.500	4.08	0.00
Sea Bird	8/1	0.030	8.03	14.80	52	6.7	10.00	1	213	11.000	2.5	10.30	59.8	0.24	0.210	0.50	0.05
Sea Lion	6/19	2.700	7.19	133.00	140	43.8	0.05	50	949	0.000	5.9	83.00	137.0	0.22	3.500	14.00	0.41
Sea Lion	7/31	0.860	6.43	448.00	420	72.8	0.05	<mark>124,000</mark>	449	0.000	2.5	366.00	125.0	0.14	1.200	8.49	0.00
Spirit of 98	7/1	2.500	7.11	179.00	110	89.6	0.16	300	136	0.000	2.5	0.00	46.1	0.43	0.660	5.95	0.00
Spirit of 98	8/12	1.100	7.34	22.30	67	19.7	0.30	1,600	148	<mark>0.100</mark>	2.5	6.33	42.5	0.17	0.140	3.80	0.00
Spirit of Alaska	7/2	1.270	6.30	1.00	341	66.2	1.05	5,000	171	<mark>0.950</mark>	54.3	71.00	47.0	0.05	0.358	5.16	0.00
Spirit of Alaska	8/23	1.650	5.90	1.00	402	40.7	0.05	42	226	0.050	42.5	58.00	23.0	0.50	0.609	5.45	0.05
Spirit of Columbia	6/22	0.550	6.02	220.00	520	66.8	0.05	900	416	0.000	2.5	170.00	83.7	0.05	43.000	6.12	0.11
Spirit of Columbia	8/3	0.510	5.42	671.00	1200	75.8	0.10	1,600	477	0.100	2.5	166.00	77.2	0.27	1.800	7.86	0.20
Spirit of Discovery	7/2	0.180	6.85	514.00	1900	108.0	0.05	260,000	208	0.000	2.5	15.00	83.3	0.18	2.000	14.00	0.00
Spirit of Discovery	8/13	1.900	10.90	772.00	610	81.2	5.50	8,000,000	1360	<mark>0.200</mark>	2.5	83.60	357.0	0.28	67.000	16.30	1.00
Spirit of Endeavor	6/24	1.900	9.17	131.00	130	57.6	0.24	1,600	445	<mark>0.190</mark>	2.5	64.00	173.0	0.31	1.500	8.41	0.00
Spirit of Endeavor	8/18	2.900	9.14	241.00	280	53.6	0.05	710	538	0.000	25.0	108.00	166.0	0.21	4.600	10.30	0.85
Minimum		0.030	5.42	1.00	52	6.7	0.05	1	136	0.000	2.5	0.00	23.0	0.05	0.140	0.50	0.00
Maximum		2.900	10.90	772.00	1900	108.0	10.00	8,000,000	1360	11.000	54.3	366.00	357.0	0.50	67.000	16.30	1.00
Median		1.185	7.15	156.00	311	63.1	0.13	1250	431	0.075	2.5	77.00	83.5	0.23	1.350	6.99	0.03
Geometric Mean								1,055									

# Table 2.2004 Small Ship Graywater Unannounced Sampling (not including priority pollutants)

VESSEL_ID	Sample date	Ammonia as N	рН	BOD	COD	TSS	Chlorine, Residual	Fecal Coliform Bacteria by MPN	conductivity	Chlorine, Free	, Oil& grease	Total Organic Carbon	alkalinity, Total as CaCO3	Total Nitrate & Nitrite as N	e Phosphorus, Total	Nitrogen, Total Kjeldahl	Total Settleable Solids
	'	0.100	0.10	2.00	10	4.0	0.10	) 2	2	0.10	) 5.00	1.00	2.0	1.00	0.050	1.00	0.10
	'	Mg/L	s.u.	. Mg/L	mg/L	mg/L	mg/L	MPN/100ml	umhos/cm	mg/L	L mg/L	. mg/L	. mg/L	. mg/L	L mg/L	. mg/L	, mg/L
		17	6.5-8.5	_ <b>_</b> '	'	'		14	'	0.0075		_ <u>[</u> '	'				<u> </u>
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Sea Bird	6/20	0.087							29400	<mark>2.00</mark>							
Sea Bird	8/1	5.200	7.41	138.00	290	239.0	35.00	) 1,200	28200	<mark>25.00</mark>	2.50	82.20	98.5	0.24	9.100	30.30	26.00
Sea Lion	6/19	0.051	7.95	1.00	52	9.0	0.80	23	30400	0.80	2.50	1.10	74.1	6.10	0.025	0.00	0.00
Sea Lion	7/31	0.062												0.05	5 0.040	0.00	
Spirit of 98	7/1	160.000					-									138.00	
Spirit of 98	8/12	<mark>110.000</mark>	7.38	489.00	1700	36.7	0.50	9,000,000	23400	0.40	2.50	128.00	772.0	5.20	25.000	125.00	1.90
Spirit of Alaska	7/2	1.520			158	45.8	1.06	5 160,000	27700	1.20		-	1 1			1.72	0.10
Spirit of Alaska	8/23	3.540	8.20	12.90	953	46.8	0.05	5 16,000	2430	0.05	5 2.98	12.00	98.0	0.50	0.425	5.70	10.00
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Spirit of Columbia	6/22	0.420	6.96	119.00	360	38.4	0.05	5 24,000	48700	0.00	8.80	12.00	259.0	18.00	0.110	6.12	0.00
Spirit of Columbia	8/3	15.000	7.80	30.80	130	14.0	0.05	5 <u>1,600</u>	31000	0.00	) 2.50	17.50	132.0	7.00	1.600	14.80	0.00
Spirit of Discovery	6/26	<mark>26.000</mark>	7.31	19.30	58	10.7	0.13	23	15400	0.13	3 2.50	10.00	216.0	0.58	3 0.025	19.00	0.00
Spirit of Discovery	7/2	<mark>38.000</mark>	8.65	10.30			0.05	5 7,000	19000	0.00	) 2.50	4.40	312.0	3.80	0.920	37.60	0.00
Spirit of Discovery	8/13	<mark>94.000</mark>			320	158.0	0.05	5 1,670,000	23800	0.00	) 2.50	91.70	437.0	0.05	5 11.000	108.00	0.00
Spirit of Endeavor	6/24	<mark>37.000</mark>	7.35	142.00	440	239.0	0.16	5 3,000,000	22800	0.00	) 2.50	120.00	399.0	6.70	9.000	107.00	10.00
Spirit of Endeavor	8/18	<mark>66.000</mark>	8.20	328.00	400	339.0	0.05	5,300,000	31400	0.00	) 13.00	217.00	739.0	0.50	45.000	187.00	28.00
Minimum	ı	0.051	6.96	1.00			0.05	1	2430	0.00	) 2.50	1.10	59.5	0.05	6 0.025	0.00	0.00
Maximum	'	160.000	8.65	489.00	1700	339.0	35.00	9,000,000	48700	25.00	) 57.40	217.00	772.0	18.00	45.000	187.00	28.00
Median	' بــــــــــــــــــــــــــــــــــــ	15.000	7.83	47.80	290	38.4	0.13		23800	0.05	5 2.50	14.00	216.0	3.70	0.920	19.00	0.00
Geometric Mean	<u> </u>	'	′	<u> </u>	<u> </u>	<u> </u>	<u> </u>	11,611				'	′				

Table 3.2004 Small Ship Blackwater Unannounced Sampling (not including priority pollutants)

VESSEL_ID	Sample date	Ammonia as N	рН	BOD	COD	TSS	Chlorine, Residual	Fecal Coliform Bacteria by MPN	Conductivit y	Chlorine , Free	Oil& grease	Total Organi c Carbon	alkalinity, Total as CaCO3	Total Nitrate & Nitrite as N	Phosphor us, Total	Nitroge n, Total Kjeldah l	Total Settleable Solids
		0.100	0.10	2.00	10	4.0	0.10	2	2		5.00	1.00	2.0	1.00	0.050	1.00	0.10
		Mg/L	s.u.	mg/L	Mg/L	mg/L	mg/L	MPN/100ml	umhos/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
		17.000	6.5-8.5					200		0.0075							
Columbia	6/28	0.870	7.46	470.00	120	667.0	3.10	1	31600	2.4000	2.5	53.00	125.0	3.70	1.200	13.80	80.00
Columbia	8/2	12.000	7.24	95.90	240	73.2	0.05	22	24900	0.0000	2.5	256.00	118.0	0.10	1.600	21.90	0.49
Kennecott	6/22	9.700	7.23	113.00	240	54.2	0.05	<mark>1,600</mark>	30000	0.0000	2.5	58.00	127.0	6.30	2.100	18.10	3.50
Kennecott	8/3	0.200	7.90	1.00	270	16.2	4.00	76	33900	<mark>1.2000</mark>	2.5	140.00	84.6	5.30	0.025	1.33	0.25
		15 500	- 10	220.00	100	120.0	0.07		10000	0.0000	Broken Containe	105 00	205.0	0.05	< 0.00	20.40	0.05
Malaspina	8/14	17.700	7.10	329.00	490	130.0	0.05	<mark>26,000,000</mark>	13300	0.0000	r	107.00	285.0	0.05	6.000	29.40	0.05
Malaspina	9/20	20.200	6.80	230.00	730	145.0	0.05	<mark>250</mark>	28800	0.0000	6.5	159.00	148.0	10.00	2.800	53.00	2.10
Malaspina	9/20	21.000	6.81	244.00	1200	120.0	0.05	10	28500	0.0000	6.7	408.00	153.0	9.80	3.000	52.60	2.30
Matanuska	6/17	0.050	7.34	Lab error	1600	104.0	0.25	16,000,000	23600	<mark>0.1000</mark>	2.5	60.00	157.0	5.10	2.300	31.00	0.47
Matanuska	8/12	1.200	6.57	162.00	150	78.0	0.10	<mark>197,000,000</mark>	19000	<mark>0.1000</mark>	2.5	268.00	116.0	0.05	1.800	27.20	0.65
Taku	8/13	0.590	8.08	156.00	230	69.1	3.00	35	31500	<mark>1.2000</mark>	0.0	73.40	91.1	0.00	0.000	8.86	2.50
Taku	9/17	0.800	7.91	58.20	580	93.3	0.05	1	37300	<mark>0.8000</mark>	Missing	618.00	108.0	6.90	Missing	4.61	1.20
Spirit of Oceanus	6/12	2.040	6.00	178.00	888	26.1	0.05	<mark>9,000</mark>		0.0000	149.0	140.00	81.0	0.05	8.390	14.50	0.00
Spirit of Oceanus	8/15	0.820	6.72	364.00	600	102.0	0.05	17,000,000	576	0.0000	23.0	95.10	63.3	0.05	3.200	12.70	0.87
Wilderness Adventurer	7/31	14.000	7.90	155.00	110	121.0	2.20	200	32400	0.4000	6.9	59.90	151.0	0.16	3.000	38.00	8.00

## Table 4.2004 Small Ship Unannounced Sampling Blackwater and Graywater Mixed Results (not including priority pollutants)

VESSEL_ID	Sample	Ammonia as N	рH	BOD	COD	TSS	Chlorine, Residual	Fecal Coliform Bacteria by MPN	Conductivit	Chlorine , Free	Oil& grease	Total Organi c Carbon	alkalinity, Total as CaCO3	Total Nitrate & Nitrite as N	Phosphor us, Total	Nitroge n, Total Kjeldah	Total Settleable Solids
VESSEE_ID	unic	0.100	0.10	2.00	10	4.0	0.10	2	2	0.10	5.00	1.00	2.0	1.00	0.050	1.00	0.10
		Mg/L	s.u.	mg/L	Mg/L	mg/L	mg/L	MPN/100ml	umhos/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
		17.000	6.5-8.5		8	0	8	200		0.0075	0				0	8	6
Wilderness Adventurer	8/28	20.000	7.66	181	675	167	1	800,000	29600	<mark>0.4000</mark>	0.0	80.6	180	1.00	5.65	52.3	8.5
Wilderness Discoverer	8/15	130.000	7.42	640.00	740	151.0	0.05	<mark>67,000,000</mark>	16500	0.0000	Broken Containe r	246.00	758.0	0.05	18.000	164.00	1.80
Wilderness Discoverer	9/12	100.000	6.87	706.00	700	366.0		100,000,000	15300		24.0	209.00	456.0	0.05	3.100	139.00	0.05
Minimum		0.05	6.00	1.00	110	16.2	0.05	1	576	0.0000	0.0	53.00	63.3	0.00	0.000	1.33	0.00
Maximum		130.00	8.08	706.00	1600	667.0	4.00	197,000,000	37300	2.4000	149.0	618.00	758.0	10.00	18.000	164.00	80.00
Median		9.70	7.24	179.50	580	104.0	0.05	1,600	28650	0.0500	2.5	140.00	127.0	0.16	2.900	27.20	1.20
Geometric Mean								12,249									

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					Arsenic,	Chromium,	Copper,	Lead,	Selenium,	Nickel,	Zinc,	3&4-	chlorophenyl	Benzoic
VESSEL ID	Sample Date	Sample Name	chloroform	bromoform	dissolved	dissolved	dissolved	dissolved	dissolved	dissolved	dissolved	Methylphenol	methylsulfone	Acid
		Reportable Limit (PQL)	2.0	2.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	10	260
		Alaska Marine Water Quality			26.0	50.0	2.1	0.1	71.0		01.0			NT/A
		Standards Units	N/A	N/A	36.0	50.0	3.1 ug/L	8.1 ug/L	71.0	8.2 ug/L	81.0	N/A	N/A	N/A
Columbia	8/2	Mixed BW&GW	ug/L 1.8	ug/L 69.0	ug/L 25.8	ug/L 0.0	62.0	0.0	ug/L 88.8	4.8	ug/L 157.0	ug/L 13.0	ug/L 0.0	ug/L 140.0
Coluliola		Mixed BW&GW										15.0		
Kennicott	8/3		1.0	33.0	32.4	1.3	<mark>88.0</mark>	0.5	<mark>108.0</mark>	<mark>14.3</mark>	<mark>157.0</mark>	10.5	42.5	275.0
Malaspina	9/20	Mixed BW&GW	7.1	23.0	26.3	2.8	<mark>65.4</mark>	1.1	102.0	<mark>15.3</mark>	<mark>152.0</mark>	72.0	10.0	360.0
Malaspina	9/20	Mixed BW&GW	7.0	21.0	25.5	3.2	<mark>64.6</mark>	0.6	<mark>100.0</mark>	<mark>15.4</mark>	<mark>109.0</mark>	67.0	10.5	400.0
Matanuska	8/12	Mixed BW&GW	3.4	0.0	18.0	0.0	0.0	0.0	61.9	<mark>11.5</mark>	0.0	98.0	0.0	350.0
Sea Bird	8/1	Graywater (GW)	19.0	1.0	1.3	1.3	<mark>29.7</mark>	0.5	1.3	0.5	29.7	2.8	11.0	19.0
Sea Lion	7/31	Blackwater (BW)	0.0	0.0	18.1	0.0	<mark>5.4</mark>	0.0	<mark>90.7</mark>	3.8	8.5	0.0	0.0	0.0
Spirit of 98	8/12	Graywater (GW)	6.5	0.0	0.0	0.0	<mark>19.7</mark>	0.0	0.0	0.0	79.6	2.9	0.0	0.0
Spirit of Alaska	8/23	Graywater (GW)	16.0	0.6	0.0	0.0	<mark>71.9</mark>	2.3	0.0	3.5	<mark>340.0</mark>	8.3	10.5	70.0
Spirit of Columbia	8/3	Blackwater (BW)	0.0	0.0	32.4	0.0	0.0	0.0	108.0	0.0	19.2	0.0	0.0	0.0
Spirit of	0/3	Blackwater (BW)	0.0	0.0	52.4	0.0	0.0	0.0	108.0	0.0	19.2	0.0	0.0	0.0
Discovery	8/13	Diackwater (Dw)	0.0	0.0	26.1	3.1	<mark>4.2</mark>	0.0	<mark>94.0</mark>	5.4	39.5	37.0	0.0	18.0
Spirit of		Blackwater (BW)												
Endeavor	8/18		0.0	0.0	<mark>39.6</mark>	3.8	<mark>3.6</mark>	0.0	<mark>136.0</mark>	7.3	9.6	450.0	0.0	3200.0
Spirit of Oceanus	8/15	Mixed BW&GW	0.0	9.3	0.0	0.0	<mark>106.0</mark>	2.0	3.7	3.9	<mark>269.0</mark>	0.0	0.0	42.0
Taku	9/17	Mixed BW&GW	0.0	200.0	35.2	2.61	<mark>22.4</mark>	4.62	<mark>127.0</mark>	7.32	7.32	0.0	0.0	0.0
Wilderness		Mixed BW&GW												
Adventurer	7/31		15.0	170.0	34.0	3.6	<mark>56.4</mark>	0.0	<mark>170.0</mark>	<mark>17.5</mark>	<mark>357.0</mark>	0.0	0.0	0.0
Wilderness		Mixed BW&GW												
Discoverer	9/12		24.0	1.0	14.9	15.5	<mark>3.9</mark>	0.5	59.3	16.5	11.3	380.0	105.0	1300.0
		Minimum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		Maximum	24.0	200.0	39.6	15.5	106.0	4.6	170.0	17.5	357.0	450.0	105.0	3200.0
		Median	2.6	1.0	25.7	1.3	26.1	0.3	92.4	6.3	59.6	9.4	0.0	56.0

## Table 5.2004 Small Ship Sampling Priority Pollutants