

Refuge Total Phosphorus Compliance Status

Orange highlighted and bolded months' geomeans were higher than interim limits.
 Yellow highlighted and bolded months' geomeans were higher than long term levels.
 Green highlighted and italicized months' levels were not applicable (N/A) because the average stages were less than 15.42 feet.

Month-Year	TP Geomean (ppb)	Interim Level (ppb) <small>(Effective 2/1/1999 - 12/30/2006)</small>	Long-Term Level (ppb) <small>(Effective 12/31/2006)</small>	Average Stage (feet)	TP Sample Data (n)	Stage Data (n)
Feb-1999	6.8	10.8	9.1	16.62	11	3
Mar-1999	9.1	14.1	11.6	16.14	9	3
Apr-1999	11.9	N/A	N/A	15.35	3	3
May-1999	16.4	N/A	N/A	15.20	2	3
Jun-1999	14.2	11.7	9.8	16.47	13	3
Jul-1999	11.1	14.4	11.8	16.11	10	3
Aug-1999	12.7	15.1	12.3	16.03	8	3
Sep-1999	10.3	9.9	8.4	16.79	14	3
Oct-1999	10.3	8.3	7.2	17.28	14	3
Nov-1999	9.0	8.3	7.2	17.25	14	3
Dec-1999	9.1	9.1	7.9	16.94	14	3
Jan-2000	8.1	10.5	8.9	16.67	14	3
Feb-2000	9.6	11.8	9.9	16.45	13	3
Mar-2000	10.6	14.8	12.1	16.06	12	3
Apr-2000	10.4	12.9	10.6	16.30	14	3
May-2000	9.3	14.6	11.9	16.09	11	3
Jun-2000	12.4	N/A	N/A	15.31	6	3
Jul-2000	10.8	17.0	13.7	15.83	6	3
Aug-2000	9.4	14.1	11.6	16.14	10	3
Sep-2000	10.2	13.5	11.1	16.22	11	3
Oct-2000	8.8	8.3	7.2	17.49	13	3
Nov-2000	7.5	8.8	7.6	17.01	14	3
Dec-2000	6.0	11.2	9.4	16.55	9	3
Jan-2001	7.2	14.3	11.7	16.13	8	3
Feb-2001	9.6	17.2	13.8	15.82	9	3
Mar-2001	19.3	N/A	N/A	15.08	2	3
Apr-2001	11.5	21.4	16.9	15.48	6	3
May-2001	18.3	N/A	N/A	14.88	2	3
Jun-2001	15.1	N/A	N/A	15.42	9	3
Jul-2001	11.4	17.2	13.8	15.82	11	3
Aug-2001	10.0	10.1	8.6	16.74	14	3
Sep-2001	9.6	11.1	9.3	16.57	14	3
Oct-2001	8.8	8.3	7.2	17.24	14	3
Nov-2001	6.6	8.3	7.2	17.46	14	3
Dec-2001	7.5	8.9	7.7	16.98	14	3
Jan-2002	6.4	10.4	8.8	16.69	14	3
Feb-2002	7.8	10.7	9.1	16.63	14	3
Mar-2002	7.3	11.5	9.7	16.50	14	3
Apr-2002	7.5	15.6	12.7	15.98	11	3
May-2002	10.0	N/A	N/A	15.04	3	3
Jun-2002	13.4	16.0	12.9	15.94	10	3
Jul-2002	11.2	9.7	8.3	16.82	14	3
Aug-2002	9.0	13.5	11.1	16.22	12	3
Sep-2002	8.3	10.6	8.9	16.66	11	3
Oct-2002	7.5	10.7	9.0	16.64	12	3
Nov-2002	6.9	10.5	8.9	16.66	12	3
Dec-2002	5.9	9.2	7.9	16.93	14	3
Jan-2003	5.7	10.0	8.5	16.76	13	3
Feb-2003	7.5	11.3	9.5	16.54	11	3

Refuge Monthly Inflow Load

TP loads are calculated using "no ratio-adjustment" and "14 day maximum for auto sampler composite concentration" algorithm.

Month-Year	Inflow (kac-ft)	TP loads (metric tons)	Inflow FWMC (ppb)
Feb-1999	26	3.1	96
Mar-1999	1	0.1	43
Apr-1999	27	1.5	44
May-1999	19	1.3	55
Jun-1999	142	29.4	167
Jul-1999	38	6.4	137
Aug-1999	22	4.3	155
Sep-1999	91	19.5	173
Oct-1999	151	25.5	137
Nov-1999	45	6.0	108
Dec-1999	36	3.2	72
Jan-2000	35	3.7	86
Feb-2000	13	0.9	58
Mar-2000	33	4.3	106
Apr-2000	58	11.0	154
May-2000	25	2.5	82
Jun-2000	9	0.7	68
Jul-2000	56	6.6	94
Aug-2000	47	3.8	65
Sep-2000	63	8.7	111
Oct-2000	125	24.1	157
Nov-2000	2	0.1	33
Dec-2000	11	0.7	54
Jan-2001	3	0.1	39
Feb-2001	0.2	0.05	185
Mar-2001	15	3.6	197
Apr-2001	2	0.1	31
May-2001	1	0.1	120
Jun-2001	5	0.6	105
Jul-2001	53	4.9	74
Aug-2001	57	4.1	58
Sep-2001	66	3.5	43
Oct-2001	60	3.2	43
Nov-2001	16	1.2	60
Dec-2001	5	0.2	34
Jan-2002	13	0.3	19
Feb-2002	39	1.4	30
Mar-2002	1	0.1	63
Apr-2002	1	0.01	18
May-2002	13	0.4	25
Jun-2002	69	4.4	52
Jul-2002	79	4.8	50
Aug-2002	70	3.3	38
Sep-2002	76	4.5	48
Oct-2002	79	4.5	46
Nov-2002	34	2.3	54
Dec-2002	77	6.6	70
Jan-2003	63	5.3	68
Feb-2003	25	4.4	144

Refuge Total Phosphorus Compliance Status

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Month-Year	TP Geomean (ppb)	Interim Level (ppb) <small>(Effective 2/1/1999 - 12/30/2006)</small>	Long-Term Level (ppb) <small>(Effective 12/31/2006)</small>	Average Stage (feet)	TP Sample Data (n)	Stage Data (n)
Mar-2003	8.0	13.4	11.1	16.23	9	3
Apr-2003	7.6	13.7	11.2	16.20	12	3
May-2003	14.0	18.3	14.6	15.72	7	3
Jun-2003	7.9	14.8	12.1	16.06	11	3
Jul-2003	7.7	15.2	12.3	16.02	9	3
Aug-2003	8.0	10.1	8.6	16.74	14	3
Sep-2003	8.8	8.3	7.2	17.23	13	3
Oct-2003	7.0	8.3	7.2	17.15	14	3
Nov-2003	7.5	8.9	7.7	16.98	11	3
Dec-2003	7.6	9.3	8.0	16.91	14	3
Jan-2004	7.4	10.3	8.7	16.71	14	3
Feb-2004	8.2	10.3	6.7	16.71	14	3
Mar-2004	9.0	11.8	9.8	16.46	14	3
Apr-2004	9.6	16.3	13.1	15.91	9	3
May-2004	12.4	N/A	N/A	15.37	9	3
Jun-2004	40.0	N/A	N/A	15.22	2	3
Jul-2004	21.0	N/A	N/A	15.00	1	3
Aug-2004	17.5	15.4	12.5	16.00	12	3
Sep-2004	8.5	9.9	8.4	16.79	14	3
Oct-2004	8.9	10.0	8.5	16.76	13	3
Nov-2004	8.3	10.6	9.0	16.65	14	3
Dec-2004	10.4	12.4	10.3	16.37	13	3
Jan-2005	7.9	13.9	11.4	16.17	12	3
Feb-2005	9.4	15.1	12.3	16.03	11	3
Mar-2005	13.4	16.6	13.4	15.88	11	3
Apr-2005	8.6	13.9	11.4	16.17	11	3
May-2005*		17.6		15.78		3
Jun-2005*		13.9		16.17		3
Jul-2005	7.4	14.9	12.1	16.05	14	3
Aug-2005	6.5	13.9	11.4	16.17	12	3
Sep-2005	7.5	13.0	10.8	16.28	11	3
Oct-2005	6.5	11.4	9.6	16.52	13	3
Nov-2005	7.8	9.9	8.4	16.79	14	3
Dec-2005	7.6	9.6	8.2	16.85	14	3
Jan-2006	6.3	11.6	9.7	16.49	13	3
Feb-2006	6.4	11.7	9.8	16.48	13	3
Mar-2006	8.1	13.1	10.8	16.28	12	3
Apr-2006	8.4	14.9	12.2	16.05	12	3
May-2006	8.8	20.1	15.9	15.58	10	3
Jun-2006	9.9	21.0	16.5	15.51	5	3
Jul-2006	11.7	16.1	13.0	15.92	9	3
Aug-2006	9.0	13.5	11.1	16.22	11	3
Sep-2006	8.2	9.1	7.8	16.96	14	3
Oct-2006	7.5	10.1	8.6	16.74	14	3
Nov-2006	7.4	11.1	9.4	16.56	14	3
Dec-2006	5.6	13.4	11.0	16.23	11	3
Jan-2007	6.9	11.1	9.3	16.57	14	3
Feb-2007	6.2	12.6	10.4	16.34	13	3
Mar-2007	7.3	14.5	11.8	16.10	10	3

Refuge Monthly Inflow Load

TP loads are calculated using "no ratio-adjustment" and "14 day maximum for auto sampler composite concentration" algorithm.

Month-Year	Inflow (kac-ft)	TP loads (metric tons)	Inflow FWMC (ppb)
Mar-2003	27	2.7	79
Apr-2003	13	1.2	77
May-2003	23	2.5	88
Jun-2003	48	2.7	45
Jul-2003	18	1.0	43
Aug-2003	124	9.8	64
Sep-2003	34	2.9	70
Oct-2003	13	0.9	57
Nov-2003	17	1.1	53
Dec-2003	10	0.5	43
Jan-2004	5	0.2	28
Feb-2004	24	1.0	34
Mar-2004	25	0.8	25
Apr-2004	1	0.04	36
May-2004	6	0.2	33
Jun-2004	21	0.8	32
Jul-2004	23	1.5	52
Aug-2004	92	4.9	43
Sep-2004	188	44.6	192
Oct-2004	89	22.6	207
Nov-2004	3	0.4	106
Dec-2004	11	1.2	84
Jan-2005	14	2.1	120
Feb-2005	5	0.5	96
Mar-2005	40	7.7	155
Apr-2005	2	0.1	49
May-2005	9	2.0	172
Jun-2005	79	15.7	160
Jul-2005	23	2.9	104
Aug-2005	13	1.2	77
Sep-2005	16	1.6	82
Oct-2005	47	7.2	125
Nov-2005	28	5.4	156
Dec-2005	2	0.2	91
Jan-2006	2	0.2	106
Feb-2006	29	6.9	192
Mar-2006	4	0.4	85
Apr-2006	0.2	0.01	69
May-2006	8	0.9	93
Jun-2006	10	1.3	113
Jul-2006	61	8.0	107
Aug-2006	66	7.0	86
Sep-2006	76	11.5	123
Oct-2006	3	0.3	93
Nov-2006	4	0.4	83
Dec-2006	17	1.5	74
Jan-2007	4	0.2	34
Feb-2007	1	0.05	31
Mar-2007	1	0.03	44

Refuge Total Phosphorus Compliance Status

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Month-Year	TP Geomean (ppb)	Interim Level (ppb) <small>(Effective 2/1/1999 - 12/30/2006)</small>	Long-Term Level (ppb) <small>(Effective 12/31/2006)</small>	Average Stage (feet)	TP Sample Data (n)	Stage Data (n)
Apr-2007	8.0	N/A	N/A	15.30	3	3
May-2007	no data	N/A	N/A	14.68	0	3
Jun-2007	13.6	N/A	N/A	15.37	4	3
Jul-2007	10.4	16.8	13.5	15.86	13	3
Aug-2007	10.1	12.7	10.5	16.33	13	3
Sep-2007	8.5	10.9	9.2	16.59	14	3
Oct-2007	8.4	8.3	7.2	17.26	14	3
Nov-2007	7.0	8.3	7.2	17.19	14	3
Dec-2007	7.9	9.6	8.2	16.84	14	3
Jan-2008	6.3	10.5	8.9	16.68	14	3
Feb-2008	7.6	11.2	9.4	16.55	14	3
Mar-2008	6.7	11.2	9.4	16.54	14	3
Apr-2008	5.8	12.5	10.3	16.36	14	3
May-2008	9.1	17.9	14.3	15.76	9	3
Jun-2008	8.9	18.8	14.9	15.68	8	3
Jul-2008	9.2	12.4	10.3	16.37	14	3
Aug-2008	8.6	12.3	10.2	16.39	14	3
Sep-2008	7.7	9.8	8.3	16.81	14	3
Oct-2008	7.2	8.3	7.2	17.42	14	3
Nov-2008	7.4	8.3	7.2	17.22	14	3
Dec-2008	6.3	9.1	7.8	16.95	14	3
Jan-2009	7.0	10.4	8.8	16.68	14	3
Feb-2009	4.7	12.5	10.4	16.35	12	3
Mar-2009	7.5	16.8	13.5	15.86	9	3
Apr-2009	9.7	18.7	14.9	15.69	8	3
May-2009	11.0	N/A	N/A	15.01	1	3
Jun-2009	13.2	14.9	12.1	16.05	12	3
Jul-2009	7.4	11.7	9.8	16.47	14	3
Aug-2009	8.8	14.0	11.5	16.16	14	3
Sep-2009	8.1	10.4	8.9	16.68	14	3
Oct-2009	7.0	9.5	8.2	16.86	14	3
Nov-2009	6.9	11.2	9.4	16.55	14	3
Dec-2009	5.8	12.5	10.4	16.36	12	3
Jan-2010	5.2	10.4	8.9	16.68	14	3
Feb-2010	6.7	10.8	9.1	16.62	14	3
Mar-2010	5.9	10.6	9.0	16.65	14	3
Apr-2010	7.2	11.5	9.6	16.51	14	3
May-2010	7.8	12.5	10.4	16.35	14	3
Jun-2010	7.3	13.2	10.9	16.26	14	3
Jul-2010	6.9	12.9	10.7	16.29	14	3
Aug-2010	6.1	14.1	11.6	16.15	10	3
Sep-2010	6.5	10.0	8.5	16.76	14	3
Oct-2010	6.2	8.9	7.7	16.99	14	3
Nov-2010	6.6	9.6	8.2	16.83	14	3
Dec-2010	4.0	11.4	9.6	16.52	13	3
Jan-2011	5.1	13.0	10.7	16.29	10	3
Feb-2011	6.0	13.7	11.3	16.19	10	3
Mar-2011	8.1	17.3	14.0	15.81	8	3
Apr-2011	11.4	20.7	16.3	15.53	7	3

Refuge Monthly Inflow Load

TP loads are calculated using "no ratio-adjustment" and "14 day maximum for auto sampler composite concentration" algorithm.

Month-Year	Inflow (kac-ft)	TP loads (metric tons)	Inflow FWMC (ppb)
Apr-2007	0.03	0.002	53
May-2007	0.03	0.003	80
Jun-2007	1	0.1	69
Jul-2007	15	0.7	36
Aug-2007	35	2.0	46
Sep-2007	45	2.2	40
Oct-2007	64	3.1	39
Nov-2007	8	0.3	28
Dec-2007	5	0.2	32
Jan-2008	1	0.02	20
Feb-2008	24	1.0	33
Mar-2008	31	0.9	24
Apr-2008	15	0.4	22
May-2008	0.4	0.01	23
Jun-2008	30	0.8	21
Jul-2008	57	1.4	19
Aug-2008	127	4.7	30
Sep-2008	70	3.2	37
Oct-2008	43	1.9	36
Nov-2008	2	0.04	19
Dec-2008	4	0.1	15
Jan-2009	1	0.02	15
Feb-2009	0.3	0.01	16
Mar-2009	0.01	0.005	(304)*
Apr-2009	0.3	0.01	24
May-2009	42	3.0	59
Jun-2009	71	5.5	63
Jul-2009	44	2.2	41
Aug-2009	25	1.6	52
Sep-2009	36	1.9	43
Oct-2009	6	0.3	41
Nov-2009	1	0.05	38
Dec-2009	12	0.4	29
Jan-2010	4	0.2	36
Feb-2010	5	0.3	49
Mar-2010	53	5.0	76
Apr-2010	10	0.8	59
May-2010	2	0.1	45
Jun-2010	30	1.2	32
Jul-2010	19	0.6	25
Aug-2010	37	1.0	22
Sep-2010	39	1.0	20
Oct-2010	7	0.2	18
Nov-2010	1	0.01	15
Dec-2010	0.3	0.01	19
Jan-2011	7	0.3	32
Feb-2011	3	0.1	23
Mar-2011	3	0.1	31
Apr-2011	4	0.2	32

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Month-Year	TP Geomean (ppb)	Interim Level (ppb) <small>(Effective 2/1/1999 - 12/30/2006)</small>	Long-Term Level (ppb) <small>(Effective 12/31/2006)</small>	Average Stage (feet)	TP Sample Data (n)	Stage Data (n)
May-2011	<i>no data</i>	<i>N/A</i>	<i>N/A</i>	14.87	0	3
Jun-2011	<i>no data</i>	<i>N/A</i>	<i>N/A</i>	14.30	0	3
Jul-2011	20.2	<i>N/A</i>	<i>N/A</i>	15.11	4	3
Aug-2011	11.5	21.1	16.6	15.50	8	3
Sep-2011	9.8	17.4	14.0	15.80	11	3
Oct-2011	7.4	14.8	12.1	16.06	11	3
Nov-2011	7.8	11.0	9.2	16.59	14	3
Dec-2011	6.2	11.0	9.2	16.59	7	3
Jan-2012	6.0	12.0	10.0	16.43	14	3
Feb-2012	7.5	13.4	11.1	16.23	13	3
Mar-2012	6.3	15.8	12.8	15.96	10	3
Apr-2012	8.1	16.2	13.1	15.92	10	3
May-2012	7.2	14.3	11.7	16.13	12	3
Jun-2012	7.4	14.1	11.6	16.14	14	3
Jul-2012	6.0	15.4	12.5	16.00	14	3
Aug-2012	5.5	13.8	11.3	16.18	13	3
Sep-2012	7.0	8.3	7.2	17.38	14	3
Oct-2012	7.6	8.3	7.2	17.20	14	3
Nov-2012	6.1	8.4	7.3	17.11	14	3
Dec-2012	6.7	9.7	8.3	16.82	14	3
Jan-2013	7.2	10.8	9.1	16.62	14	3
Feb-2013	6.7	12.4	10.3	16.36	13	3
Mar-2013	5.8	12.0	10.0	16.42	14	3
Apr-2013	7.0	14.3	11.7	16.12	11	3
May-2013	8.0	14.1	11.5	16.15	10	3
Apr-2013	7.0	14.3	11.7	16.12	11	3
May-2013	8.0	14.1	11.5	16.15	10	3
Jun-2013	7.8	12.5	10.4	16.36	12	3
Jul-2013	6.5	11.7	9.8	16.48	14	3
Aug-2013	5.8	11.2	9.4	16.55	14	3
Sep-2013	7.0	12.3	10.3	16.38	14	3

Note: May 2005 and June 2005 Marsh TP concentration data were qualified as questionable.

Refuge Monthly Inflow Load

TP loads are calculated using "no ratio-adjustment" and "14 day maximum for auto sampler composite concentration" algorithm.

Month-Year	Inflow (kac-ft)	TP loads (metric tons)	Inflow FWMC (ppb)
May-2011	5	0.1	21
Jun-2011	2	0.1	21
Jul-2011	31	1.1	30
Aug-2011	21	0.5	20
Sep-2011	27	0.6	19
Oct-2011	36	0.9	20
Nov-2011	34	0.7	18
Dec-2011	4	0.1	24
Jan-2012	0.5	0.02	31
Feb-2012	1	0.1	30
Mar-2012	6	0.2	31
Apr-2012	3	0.1	28
May-2012	20	0.7	27
Jun-2012	31	0.8	22
Jul-2012	19	0.3	15
Aug-2012	100	9.2	74
Sep-2012	121	9.1	61
Oct-2012	30	1.2	32
Nov-2012	2	0.1	28
Dec-2012	9	0.7	65
Jan-2013	1	0.1	51
Feb-2013	19	1.2	51
Mar-2013	6	0.5	66
Apr-2013	7	0.3	36

Note: March 2009 inflow was too low to calculate inflow FWMC accurately.