

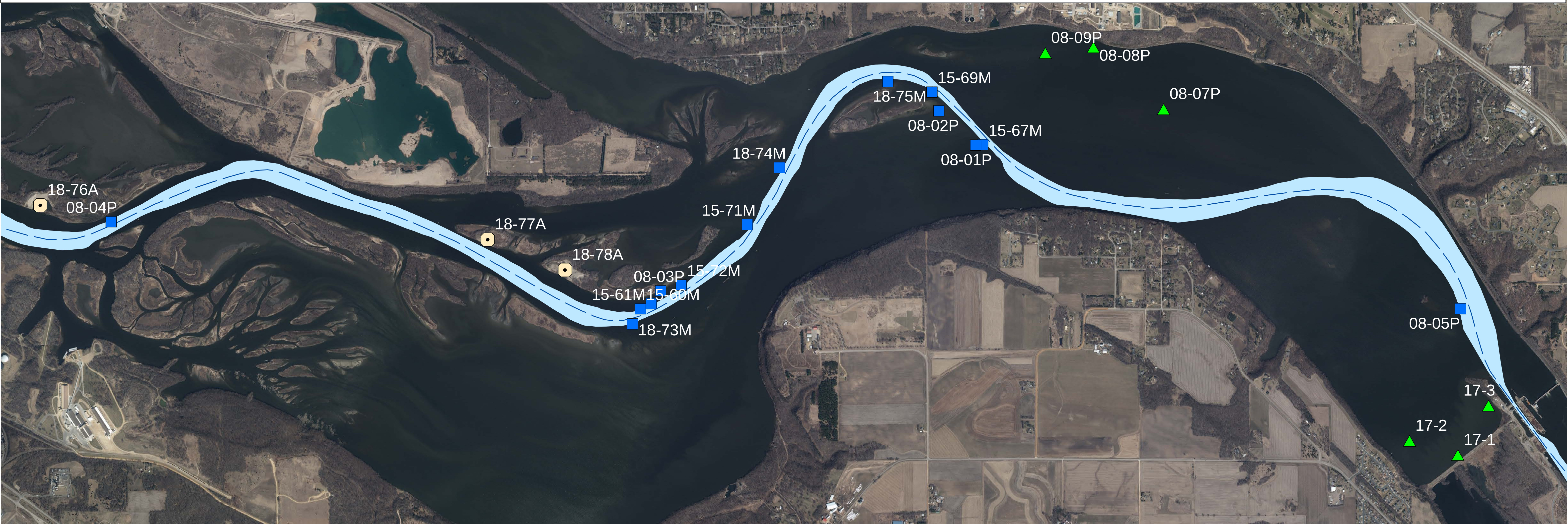
Appendix G:

Sediment Quality

Sediment Data Post-2008

				MPCA SQT I	MPCA SQT II	Current Residential Soil Reference Value (SRV) mg/kg	Proposed MPCA Res/Rec Soil Reference Value (SRV) August 2016	Current Industrial Soil Reference Value (SRV) mg/kg	Proposed MPCA Comm/Ind Soil Reference Value (SRV) August 2016	Lower Apprch LD 1	Lower Apprch LD 1	Above Smith Ave	Below Smith Ave	Small Boat Harbor - St. Paul	Small Boat Harbor - St. Paul	St. Paul Barge Terminal	St. Paul Barge Terminal	Robinson Rocks/Gray Cloud Slough	Robinson Rocks/Gray Cloud Slough	Boulanger	Boulanger	Boulanger/lower light	Boulanger/lower light	Abv Wabasha Ave Br	Abv Wabasha Ave Br	Pine Bend Landing	Pine Bend Landing	Pine Bend	Pine Bend	Freeborn Light	Freeborn Light	Upper Appch L/D 2	Upper Appch L/D 2
Pool										2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Latitude										44°54'47.6"N	44°54'45.6"N	44°55'58.40"N	44°56'4.70"N	44°56'26.80"N	44°56'28.20"N	44°56'4.00"N	44°55'57.60"N	44°47'59.20"N	44°47'54.50"N	44°46'7.60"N	44°46'0.60"N	44°46'54.30"N	44°46'54.70"N	44°56'33.53"N	44°56'32.89"N	44°46'39.15"N	44°46'34.09"N	44°46'31.6"N	44°46'18.2"N	44°46'43.22"N	44°46'46.31"N	44°46'53.101"N	44°46'11.87"N
Longitude										93°12'07.9"W	93°12'07.1"W	93° 6'18.50"W	93° 6'11.80"W	93° 5'34.40"W	93° 5'32.80"W	93° 3'12.90"W	93° 3'1.90"W	93° 1'10.00"W	93° 1'12.60"W	92°56'37.40"W	92°56'59.50"W	92°55'44.20"W	92°55'36.90"W	93°05'36.24"W	93°05'36.59"W	93°01'07.62"W	93°01'00.93"W	93°01'01.6"W	93°00'05.3"W	92°55'17.10"W	92°55'17.10"W	92°52'53.24"W	92°52'29.97"W
Lab										ADRL INC	ADRL INC	ADRL INC	ADRL INC	ADRL INC	ADRL INC	ADRL INC	ADRL INC	ADRL INC	ADRL INC	ADRL INC	ADRL INC	ADRL INC	ADRL INC	ADRL INC	ADRL INC	ADRL INC	ADRL INC	ADRL INC	ADRL INC	ADRL INC	ADRL INC	ADRL INC	ADRL INC
Lab ID										008328-02	008328-01	8967-10	8967-09	8967-08	8967-07	8967-06	8967-05	8967-11	8967-12	8967-15	8967-16	8967-13	8967-14	8006-05	8006-06	8006-07	8006-08	008320-07	8006-09	8006-10	8006-11	8006-12	
Corps ID										17-21-P2	17-22-P2	15B	15A	14B	14A	13B	13A	16A	16B	18A	18B	17A	17B	Abv Wabasha Ave Br A	Abv Wabasha Ave Br B	Pine Bend Landing A	Pine Bend Landing B	17-7-P2	17-8-P2	Freeborn Light A	Freeborn Light B	Upper Appch L/D 2 A	Upper Appch L/D 2 B
Date Collected										8/30/2017	8/31/2017	9/10/2013	9/10/2013	9/10/2013	9/10/2013	9/10/2013	9/10/2013	9/11/2013	9/11/2013	9/11/2013	9/11/2013	9/11/2013	9/11/2013	10/21/2014	10/21/2014	10/21/2014	10/21/2014	8/29/2017	8/29/2017	10/22/2014	10/22/2014	10/22/2014	10/22/2014
Metals	ug/kg			Acenaphthylene	5.9	130				39.9	71.8	ND	ND	1.45 J	ND	ND	3.96	-3.94	-4.01	12.2	17.3	10.3	9.32	1.05 J	<0.923	<0.824	<0.815	2.77 J	<3.74	3.37 J	3.74 J	31	40.7
	ug/kg			Acenaphthene	6.7	89	1200000		1300000	98.9	18.1	ND	2.77 J	ND	1.28 J	ND	1.51 J	-3.94	-4.01	5.24	5.71	2.82 J	4.98J	<0.887	<0.923	<0.824	<0.815	<3.83	1.47 J	1.59 J	5.06	5.04 J	
	ug/kg			Anthracene	57	850	7880000		6500000	96.8	76.4	ND	1.21 J	1.55 J	3.33 J	1.4 J	4.95	-3.94	-4.01	16.4	39.1	1.57 J	12.4	1.64 J	1.57 J	<0.824	<0.815	2.26 J	1.17 J	5.99	6.95	36.8	38.5
	ug/kg			Fluoranthene	420	2200	1080000		510000	769	500	7.9	4.6	16.5	41.6	13.7	35.1	5.55	6.54	140	181	79.9	102	23	22.9	3.99 J	1.17 J	28.1	4.24	62.5	56.2	192	186
	ug/kg			Pyrene	200	1500	890000		44000	759	505	7.15	4.81	13.7	38.6	12.4	31.8	6.56	6.39	137	218	77.7	94.6	31.1	24.7	8.57	1.58 J	33.2	5.45	55.1	57.1	221	212
	ug/kg			Benzo(a) anthracene	110	1100				443	299	4.26	2.72 J	7.86	17.2	8.18	18.6	4.71	3.95 J	65	102	38.2	41.9	10.3	12.7	2.40 J	1.06 J	13.5	1.73 J	30.6	32.8	136	132
	ug/kg			Benzo(b)fluoranthene						623	382	5.51	2.44 J	12.8	32.4	12.1	33.3	5.53	5.14	116	119	71.4	91.3	33	27.5	1.48 J	0.912 J	17.9	1.87 J	46.1	47.9	189	188
	ug/kg			Benzo(k)fluoranthene						214	142	1.4 J	ND	4.01 J	9.42	3.52 J	9.21	1.59 J	1.32 J	25.2	39.1	21.4	20.1	6.87	8.28	<0.824	<0.815	5.7	<3.74	13.8	11.9	57.1	59.9
	ug/kg			Benzo(a)pyrene	150	1500	2000**		1000**	449	327	3.21 J	1.59 J	6.77	19.4	7.27	19.7	4.64	2.95 J	66.9	107	44.8	47.4	16.7	12.9	0.849 J	<0.815	15.4	1.65 J	30.9	30	149	156
	ug/kg			Benzo(g,h,i)perylene						199	163	2.8 J	1.20 J	6.13	24.4	6.4	17.3	3.48 J	2.55 J	37.9	51.2	33.5	33.5	20	8.62	<0.824	<0.815	10.5	1.09 J	21.3	12.9	63.5	62.9
	ug/kg			Hexachlorobenzene						< 5.12 Q	< 4.66	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	< 4.36	< 4.49	< 3.91	< 4.06	< 3.83	< 3.72	< 4.15	< 4.22	< 4.80	< 5.02
	ug/kg			Chlordane trans isomer						< 5.12 Q	< 4.66	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	< 4.36	< 4.49	< 3.91	< 4.06	< 3.83	< 3.72	< 4.15	< 4.22	< 4.80	< 5.02
	ug/kg			Chlordane cis isomer	3.2*	18*	13000*		9500*	< 5.12 Q	< 4.66	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	< 4.36	< 4.49	< 3.91	< 4.06	< 3.83	< 3.72	< 4.15	< 4.22	< 4.80	< 5.02
	ug/kg			P, P'-DDE	3.2	31	40000		22000	< 5.12 Q	< 4.66	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	< 4.36	< 4.49	< 3.91	< 4.06	< 3.83	< 3.72	< 4.15	< 4.22	< 4.80	< 5.02
	ug/kg			O, P'-DDD						< 5.12 Q	< 4.66	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	< 4.36	< 4.49	< 3.91	< 4.06	< 3.83	< 3.72	< 4.15	< 4.22	< 4.80	< 5.02
	ug/kg			Dieldrin	1.9	62	800		110	< 5.12 Q	< 4.66	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	< 4.36	< 4.49	< 3.91	< 4.06	< 3.83	< 3.72	< 4.15	< 4.22	< 4.80	< 5.02
	ug/kg			O, P'-DDE						< 5.12 Q	< 4.66	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	< 4.36	< 4.49	< 3.91	< 4.06	< 3.83	< 3.72	< 4.15	< 4.22	< 4.80	< 5.02
	ug/kg			O, P'-DDT						< 5.12 Q	< 4.66	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	< 4.36	< 4.49	< 3.91	< 4.06	< 3.83	< 3.72	< 4.15	< 4.22	< 4.80	< 5.02
	ug/kg			P, P'-DDD	4.9	28	56000		19000	< 5.12 Q	< 4.66	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	< 4.36	< 4.49	< 3.91	< 4.06	< 3.83	< 3.72	13.1	< 4.22	< 4.80	< 5.02
	ug/kg			P, P'-DDT	4.2	63	15000		7300	< 5.12 Q	< 4.66 Q	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	< 4.36	< 4.49	< 3.91	< 4.06	< 3.83	< 3.72	120	< 4.22	< 4.80	< 5.02
	ug/kg			PCB 1016						< 103	< 93.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	< 8.74	< 9.0	< 7.83	< 8.14	< 76.7	< 74.4	< 8.32	< 8.46	< 9.61	< 10.1
	ug/kg			PCB 1248						< 103	< 93.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	< 13.1	< 13.5	< 11.7	< 12.2	< 76.7	< 74.4	< 12.5	< 12.7	< 14.4	< 15.1
	ug/kg			PCB 1254						< 103	< 93.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	< 13.1	< 13.5	< 11.7	< 12.2	< 76.7	< 74.4	< 12.5	< 12.7	&	

USACE St. Paul District - PFAS Sediment Testing in Lower Pool 2 - Upper Mississippi River



N 00.250.51 Miles Placement Site Borings Sediment Samples Outside Channel Sediment Samples Inside Channel Navigation Sailing Line Navigation Project Depth															
Samples Collected Inside of Navigational Channel															
Sample ID	15-60M	15-61M	15-67M	15-69M	15-71M	15-72M	18-73M	18-74M	18-75M	08-04P	08-01P	08-02P	08-03P	08-05P	MPCA SRVs August 2016 Revised Residential/ Recreational
Depth	10.5-14.5'	8-14.0'	5.6-14.0'	4.7-14.0'	7.3-14.0'	6.5-13.5'	11.6-14.0'	5.9-14.0'	3.8-14.0'	Top 10 cm	Top 10 cm	Top 10 cm	Top 10 cm	Top 10 cm	
Date Collected	5/21/2018	5/23/2018	5/23/2018	5/23/2018	5/23/2018	5/23/2018	5/23/2018	5/23/2018	5/23/2018	10/23/2008	10/23/2008	10/23/2008	10/23/2008	10/23/2008	
UNITS ug/kg (ppb)															
Perfluorobutanesulfonic acid (PFBS)	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.4	1.4	1.4	1.4	2.1	30000
Perfluorobutanoic acid (PFBA)	ND	0.037	ND	0.12	0.054	ND	ND	ND	0.057	ND	ND	ND	ND	ND	63000
Perfluorodecanoic acid (PFDA)	ND	0.034	0.033	0.14	0.075	ND	ND	0.076	0.13	ND	ND	ND	ND	ND	
Perfluorododecanoic acid (PFDoA)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Perfluoroheptanoic acid (PFHpA)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Perfluorohexanesulfonic acid (PFHxS)	ND	ND	0.043	0.11	0.094	ND	ND	0.064	0.088	ND	ND	ND	ND	ND	
Perfluorohexanoic acid (PFHxA)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Perfluorononanoic acid (PFNA)	ND	ND	ND	0.086	ND	ND	ND	ND	0.066	ND	ND	ND	ND	ND	
Perfluorooctane Sulfonamide (PFOSA)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Perfluorooctanesulfonic acid (PFOS)	ND	ND	ND	0.58	0.36	ND	ND	0.53	1.2	0.72	1.4	1.1	1.4	3.2	1700
Perfluorooctanoic acid (PFOA)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330
Perfluoropentanoic acid (PFPeA)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Perfluoroundecanoic acid (PFUnA)	ND	ND	ND	0.31	0.064	ND	ND	0.13	0.19	ND	ND	ND	ND	ND	

Samples Collected Outside of Navigational Channel											MPCA SRVs August 2016 Revised Residential/ Recreational
CLIENT_ID	18-76A	18-77A	18-78A	17-1	17-2	17-3	08-09P	08-08P	08-07P		
Depth	0.0-2.0'	0.0-2.0'	0.0-2.0'	6.5-9'	6.5-9'	6.5-9'	Top 10 cm	Top 10 cm	Top 10 cm		
Collected	5/23/18	5/23/18	5/23/18	6/13/2017	6/13/2017	6/13/2017	10/23/2008	10/23/2008	10/23/2008		
UNITS ug/kg (ppb)											
Perfluorobutanesulfonic acid (PFBS)	ND	0.053	ND	ND	ND	ND	1.7	1.2	1.4	30000	
Perfluorobutanoic acid (PFBA)	0.06	0.056	ND	ND	ND	ND	ND	ND	ND	63000	
Perfluorodecanoic acid (PFDA)	0.13	0.25	0.08	ND	ND	ND	ND	ND	ND		
Perfluorododecanoic acid (PFDoA)	ND	0.12	ND	ND	ND	ND	ND	ND	ND		
Perfluoroheptanoic acid (PFHpA)	ND	0.074	ND	ND	ND	ND	ND	ND	ND		
Perfluorohexanesulfonic acid (PFHxS)	0.092	0.094	0.051	ND	ND	ND	ND	ND	ND		
Perfluorohexanoic acid (PFHxA)	ND	0.19	ND	ND	ND	0.201	ND	ND	ND		
Perfluorononanoic acid (PFNA)	0.078	0.25	ND	ND	ND	ND	ND	ND	ND		
Perfluorooctane Sulfonamide (PFOSA)	ND	ND	ND	0.104	0.099	0.099	ND	ND	ND		
Perfluorooctanesulfonic acid (PFOS)	0.64	1.2	0.39	0.467	0.491	0.491	2	1.1	0.91	1700	
Perfluorooctanoic acid (PFOA)	ND	0.34	ND	ND	ND	ND	ND	2.1	ND	330	
Perfluoropentanoic acid (PFPeA)	ND	0.19	ND	ND	ND	ND	ND	ND	ND		
Perfluoroundecanoic acid (PFUnA)	0.22	0.22	0.066	ND	ND	ND	ND	ND	ND		

Sediment Data Pre-2008

Record # River Mile												37	38	407	840.5		39	40	417	408	41	418	839.6	839.6	411	47	48	1C	1T	1B	1366	2C	3C	2T	2B	3B	3T	49	50	4B	5B	5C	5T	4T	51																																																																																																																																																																																																																																																																																	
		AB&BW SMITH AVE BR	AB&BW SMITH AVE BR	AB&BW SMITH AVE BR	SMITH AVE BRIDGE 2	SMITH AVE BRIDGE 1	AB&BW SMITH AVE BR	AB&BW SMITH AVE BR	AB&BW SMITH AVE BR	AB&BW SMITH AVE BR	AB&BW SMITH AVE BR	ST. PAUL SM BOAT HRBR	ST. PAUL SM BOAT HRBR	ST. PAUL SM BOAT HRBR	ST. PAUL BARGE TERM.	ST. PAUL BARGE TERM.	ST. PAUL BARGE TERM.	ST. PAUL BARGE TERM.	ST. PAUL BARGE TERM.	ST. PAUL BARGE TERM.	ST. PAUL BARGE TERM.	ST. PAUL BARGE TERM.	ST. PAUL BARGE TERM.	ST. PAUL BARGE TERM.	ST. PAUL BARGE TERM.	ST. PAUL BARGE TERM.	ST. PAUL BARGE TERM.	ST. PAUL BARGE TERM.	ST. PAUL BARGE TERM.	ST. PAUL BARGE TERM.	ST. PAUL BARGE TERM.	ST. PAUL BARGE TERM.	ST. PAUL BARGE TERM.	ST. PAUL BARGE TERM.	ST. PAUL BARGE TERM.	ST. PAUL BARGE TERM.	ST. PAUL BARGE TERM.	ST. PAUL BARGE TERM.	ST. PAUL BARGE TERM.	ST. PAUL BARGE TERM.	ST. PAUL BARGE TERM.	ST. PAUL BARGE TERM.	ST. PAUL BARGE TERM.	ST. PAUL BARGE TERM.	ST. PAUL BARGE TERM.	ST. PAUL BARGE TERM.	ST. PAUL BARGE TERM.	ST. PAUL BARGE TERM.	ST. PAUL BARGE TERM.	ST. 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		Record #											66	493	1361	1362	67	68	69	70	71	72	73	74	494	1363	75	76	1358	1360			77	78	1359			1229	1233	1236	1272	1298	1291	1254	1310	1316	1326	1324	1338	1330																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
		River Mile											824.4	823.7	823.7	823.4	823.39	823.21	823.2	822.94	822.93	822.92	822.91	822.9	822.9	821.1	821	820.9	820.6			819.7	819.1	818.6			816.0	816.0	816.0	816.0	816.0	816.0	816.0	816.0	816.0	816.0	816.0	816.0																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
		Location											PINE BEND FOOT LIGHT	PINE BEND FOOT LIGHT	Pine Bend Foot Light 1	Pine Bend Foot Light 2	PINE BEND FOOT LIGHT	PINE BEND FOOT LIGHT	PINE BEND FOOT LIGHT	PINE BEND FOOT LIGHT	PINE BEND FOOT LIGHT	PINE BEND FOOT LIGHT	PINE BEND FOOT LIGHT	PINE BEND FOOT LIGHT	PINE BEND FOOT LIGHT	Pine Bend Foot Light 3	BOULAN GER BEND	BOULAN GER BEND	Boulander Bend 1	Boulander Bend 2			BOUL. BEND LOW LIGHT	BOUL. BEND LOW LIGHT			Boul Bend Low Light 1			Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 west	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west

