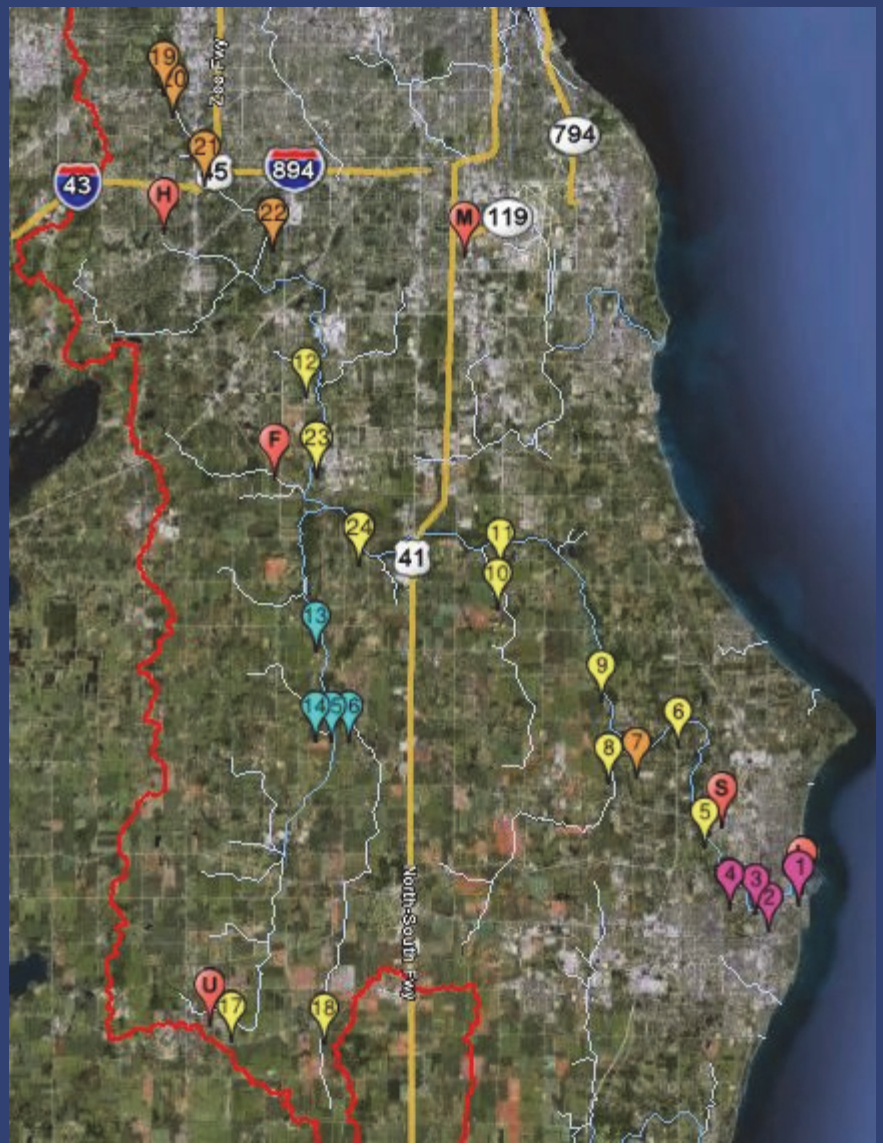
BASELINE ASSESSMENT OF WATER QUALITY IN SUPPORT OF THE ROOT RIVER WATERSHED RESTORATION PLAN

Year 1 Preliminary Data Report
8.3.11 – 8.1.12

Dr. Julie Kinzelman
Sarah Wright
September 26, 2012

2011-2012 RHD and MMSD Root River Monitoring Sites



Marker Color Key	
	Urban Land Use
	Suburban Land Use
	Parkland Land Use
	Agricultural Land Use
	Rain Gauge Station

Water Use Classifications, Applicable State and Recommended Standards, and Pollutant: Impairment by Site in the Root River Watershed

Water Use Classification	Applicable State and Recommended Standards Based on Water Use Classification						
	The ranges listed in this table represent state and recommended standard violations and therefore poor water quality.						
	E. coli Geomean* (MPN/100ml)	**Water (˚C)**	**DO (mg/L)**	**pH (1-14)**	**Conductivity (µS/cm)**	**Turbidity (NTU)**	**Phosphorus (mg/L)**
Full Fish and Aquatic Life - Warm Water Fishery, Full Recreational Use (FAL, Full Rec.)	> 126	by month	< 5.0	< 6.0; > 9.0	< 150; > 1,500	< 10; > 25	> 0.075 mg/L
Limited Forage Fish, Limited Recreational Use (LFF, Lim. Rec.)	N/A	by month	< 3.0	< 6.0; > 9.0	< 150; > 1,500	< 10; > 25	> 0.075 mg/L
Limited Aquatic Life, Limited Recreational Use (LAL, Lim. Rec.)	N/A	> 30	< 1.0	< 6.0; > 9.0	< 150; > 1,500	< 10; > 25	N/A
Red Font Color: State Standard; Purple Font Color: Recommended Standard							

* For long-term datasets, the WI Department of Natural Resources uses an E. coli geometric mean calculation of at least five samples per month. If any calculation exceeds 126 MPN/100 ml, the waterbody is in violation of the state standards for E. coli. For single samples, >235 MPN/100 ml is the threshold criteria for the water body to be under advisory condition.

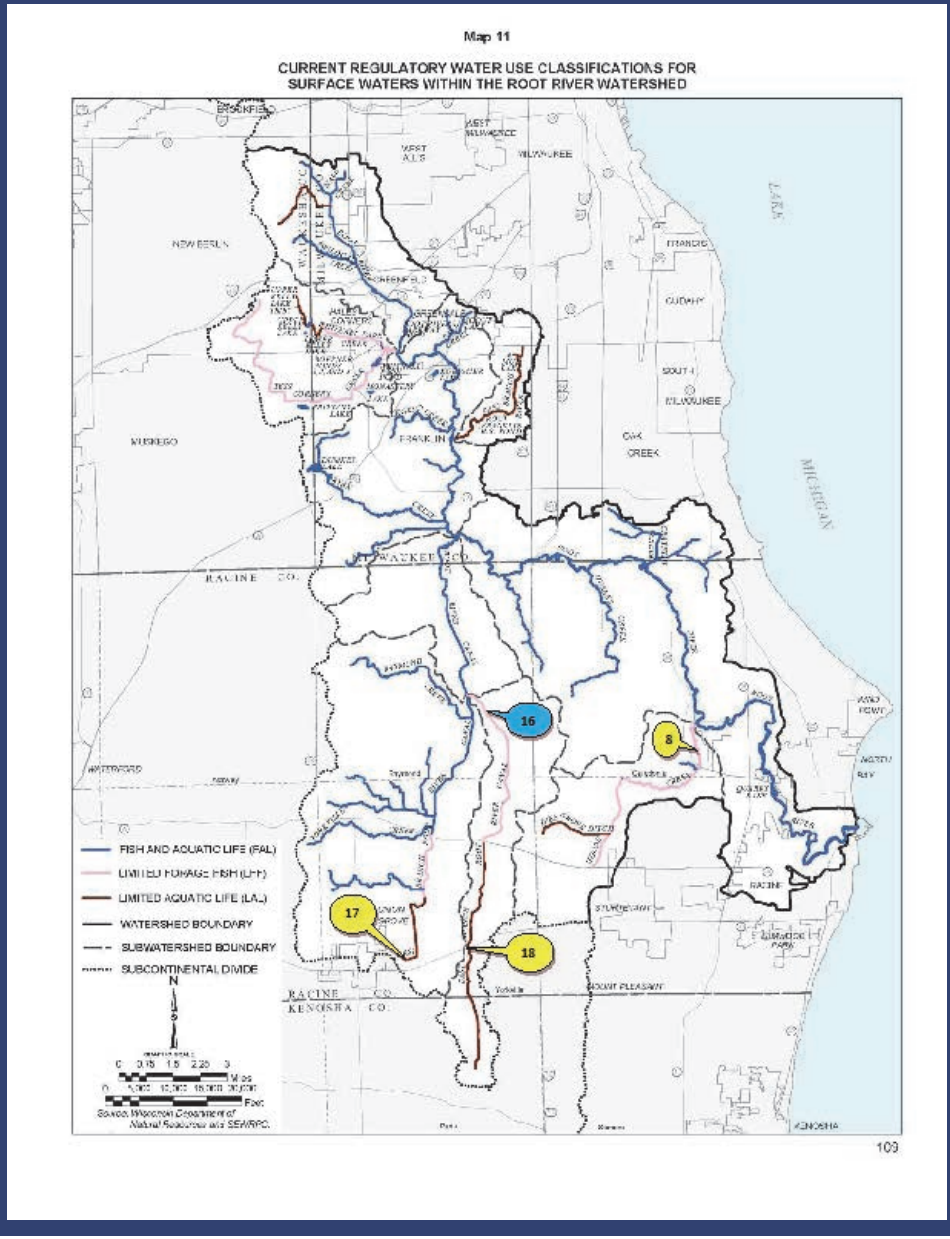
Sources: Water Use Classifications and State Standards: NR 102 and NR 104, DNR personnel; Recommended Standards: EPA

Root River Sampling Sites, Water Use Classifications, and Pollutants: Impairments

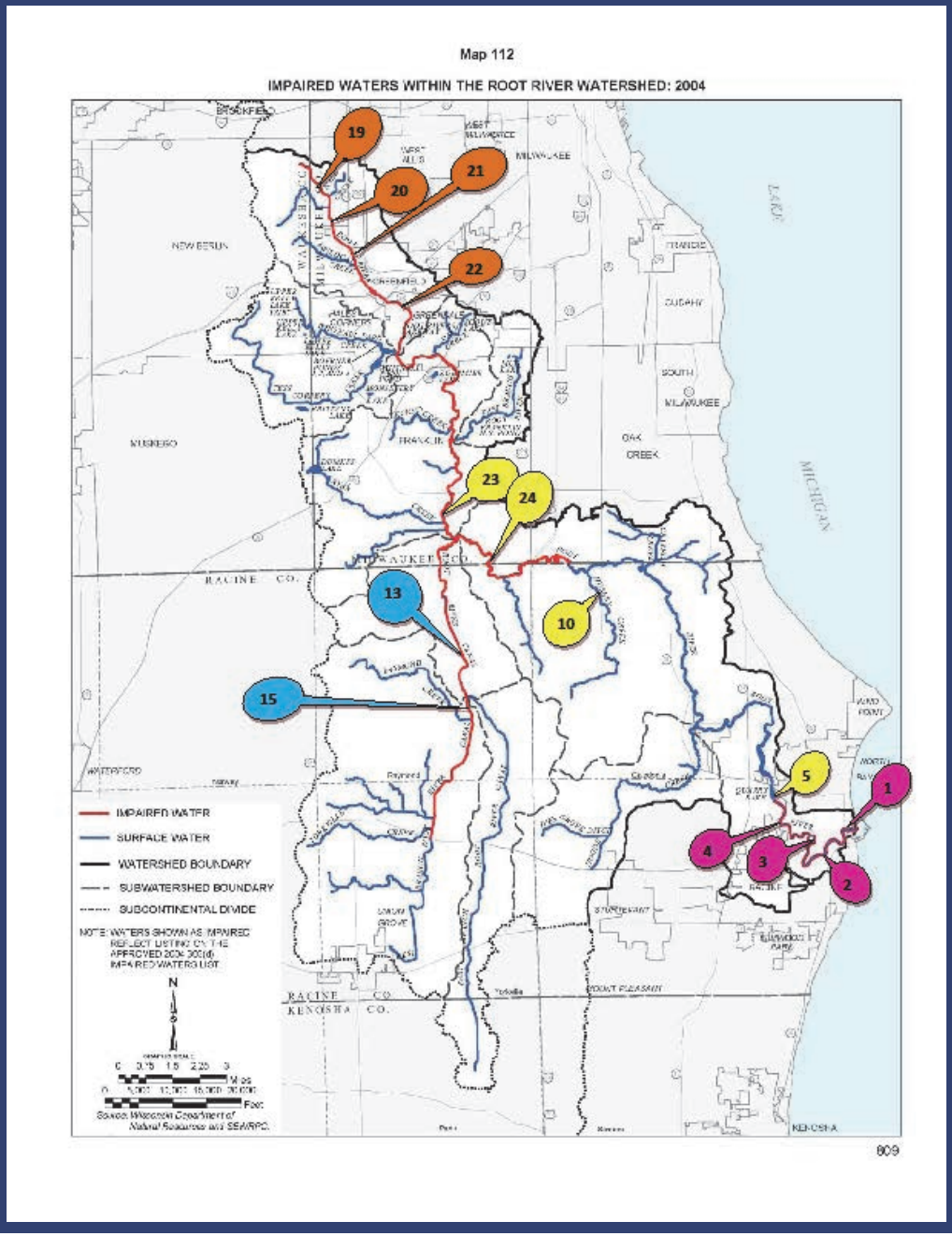
Site #	Name	Water Use Classification	Pollutant:	Impairment
RHD Sampling Sites				
#1	Chartroom	(FAL, Full Rec.)	Polychlorinated Biphenyls	Contaminated Fish Tissue
#2	REC	(FAL, Full Rec.)	Polychlorinated Biphenyls	Contaminated Fish Tissue
#3	Liberty St. Bridge	(FAL, Full Rec.)	Polychlorinated Biphenyls	Contaminated Fish Tissue
#4	Steelhead Facility	(FAL, Full Rec.)	Polychlorinated Biphenyls	Contaminated Fish Tissue
#5	Horlick Dam	(FAL, Full Rec.)	Polychlorinated Biphenyls	Contaminated Fish Tissue
#6	31 and 4 Mile	(FAL, Full Rec.)	Total Phosphorus*	Degraded Biological Community*
#7	Johnson Park	(FAL, Full Rec.)	Total Phosphorus*	Degraded Biological Community*
#8	Hood's Creek	(LFF, Lim. Rec.)	-	None
#9	5 Mile Rd	(FAL, Full Rec.)	Total Phosphorus*	Degraded Biological Community*
#10	Husher Creek	(FAL, Full Rec.)	Total Phosphorus*	Degraded Biological Community*
#11	38 at MKE Co Line	(FAL, Full Rec.)	Total Phosphorus*	Degraded Biological Community*
#12	Legend Creek	(FAL, Full Rec.)	-	None
#13	RRC-Main	(FAL, Full Rec.)	Sediments/Total Suspended Solids; Total Phosphorus	Low Dissolved Oxygen
#14	Raymond Creek	(FAL, Full Rec.)	-	None
#15	RRC-W	(FAL, Full Rec.)	Sediments/Total Suspended Solids; Total Phosphorus	Low Dissolved Oxygen
#16	RRC-E	(LFF, Lim. Rec.)	-	None
#17	RRC-UG	(LAL, Lim. Rec.)	-	None
#18	RRC-Fonk's	(LAL, Lim. Rec.)	-	None
MMSD Sampling Sites				
#19	Cleveland Ave	(FAL, Full Rec.)	Sediments/Total Suspended Solids; Total Phosphorus	Low Dissolved Oxygen, Degraded Biological Community
#20	National & Oklahoma	(FAL, Full Rec.)	Sediments/Total Suspended Solids; Total Phosphorus	Low Dissolved Oxygen, Degraded Biological Community
#21	Coldspring Rd	(FAL, Full Rec.)	Sediments/Total Suspended Solids; Total Phosphorus	Low Dissolved Oxygen, Degraded Biological Community
#22	Grange Ave	(FAL, Full Rec.)	Sediments/Total Suspended Solids; Total Phosphorus	Low Dissolved Oxygen, Degraded Biological Community
#23	W. Puetz Rd	(FAL, Full Rec.)	Sediments/Total Suspended Solids; Total Phosphorus	Low Dissolved Oxygen, Degraded Biological Community
#24	8 Mile Rd	(FAL, Full Rec.)	Sediments/Total Suspended Solids; Total Phosphorus	Low Dissolved Oxygen, Degraded Biological Community

* Proposed for Impairment

Sampling Sites in River Segments with Different Water Use Classifications



Sampling Sites in River Segments with Impairments



#1: Chartroom Charlie's

#1: Chartroom Charlie's							
Water Use Classification: Fish and Aquatic Life, Full Recreational Use							
Impairment: Contaminated Fish Tissue Pollutant: PCBs							
8/3/11 - 8/1/12 Results (64 Events, *8 Events)							
	***E. coli* (MPN/100 mL)**	**DO (mg/L)**	**DO (% sat.)**	**pH (1-14)**	**Conductivity (µS/cm)**	**Turbidity (NTU)**	***Phosphorus (mg/L)**
Mean	190	8.3	83.3		709	11.25	0.082
Med.	50	8.5	86.8	8.01	675	7.14	0.071
St. Dev.	507	2.6	18.5		199	10.23	0.031
Min.	5	3.3	39.0	7.58	342	1.75	0.054
Max.	3,873	14.6	118.8	8.66	1,053	44.00	0.136
State/ Rec'd Standard	**≤ 235 MPN/100mL**	**5.0-10.0 mg/L**		**6.00-9.00**	**150-1500 (µS/cm)**	**10-25 NTU**	**≤0.075 mg/L**
% Below Standard	83	11		0	0	64	50
% Above Standard	17	22		0	0	11	50

#2: Root River Env. Ed. Community Center (REC)

#2: Root River Environmental Education Community Center (REC)							
Water Use Classification: Fish and Aquatic Life, Full Recreational Use							
Impairment: Contaminated Fish Tissue Pollutant: PCBs							
8/3/11 - 8/1/12 Results (64 Events, *8 Events)							
	***E. coli* (MPN/100 mL)**	**DO (mg/L)**	**DO (% sat.)**	**pH (1-14)**	**Conductivity (µS/cm)**	**Turbidity (NTU)**	***Phosphorus (mg/L)**
Mean	387	9.6	99.2		932	16.43	0.144
Med.	100	9.3	96.8	8.25	954	11.60	0.106
St. Dev.	922	2.5	21.7		125	13.80	0.091
Min.	10	3.5	44.8	7.71	561	4.21	0.071
Max.	6,440	15.4	168.6	9.13	1,155	71.10	0.337
State/ Rec'd Standard	**≤ 235 MPN/100mL**	**5.0-10.0 mg/L**		**6.00-9.00**	**150-1500 (µS/cm)**	**10-25 NTU**	**≤0.075 mg/L**
% Below Standard	69	3		0	0	33	25
% Above Standard	31	42		2	0	14	75

#3: Liberty Street Bridge (LSB)

#3: Liberty Street Bridge (LSB)							
Water Use Classification: Fish and Aquatic Life, Full Recreational Use *Impairment: Contaminated Fish Tissue Pollutant: PCBs* 8/3/11 - 8/1/12 Results (64 Events, *8 Events)							
	***E. coli* (MPN/100 mL)**	**DO (mg/L)**	**DO (% sat.)**	**pH (1-14)**	**Conductivity (µS/cm)**	**Turbidity (NTU)**	***Phosphorus (mg/L)**
Mean	692	9.6	96.2		949	14.14	0.128
Med.	346	9.2	98.8	8.17	969	10.20	0.091
St. Dev.	1,145	2.7	21.4		105	9.97	0.080
Min.	50	4.6	52.1	7.78	626	4.02	0.063
Max.	6,760	16.5	157.7	8.53	1,179	48.90	0.290
State/ Rec'd Standard	**≤ 235 MPN/100mL**	**5.0-10.0 mg/L**		**6.00-9.00**	**150-1500 (µS/cm)**	**10-25 NTU**	**≤0.075 mg/L**
% Below Standard	42	3		0	0	47	38
% Above Standard	58	44		0	0	11	63

#4: Steelhead Facility (SHF)

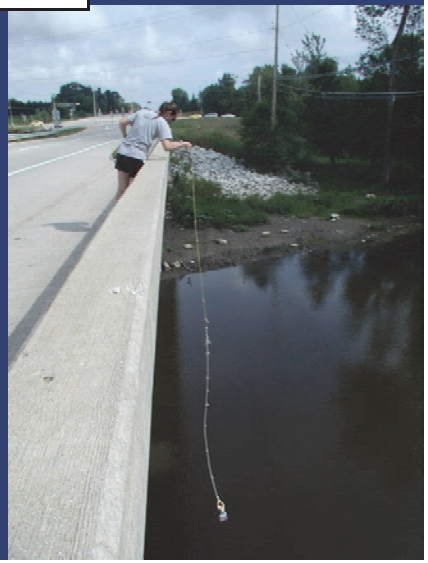
#4: Steelhead Facility (SHF)							
Water Use Classification: Fish and Aquatic Life, Full Recreational Use *Impairment: Contaminated Fish Tissue Pollutant: PCBs* 8/3/11 - 8/1/12 Results (64 Events, *8 Events)							
	***E. coli* (MPN/100 mL)**	**DO (mg/L)**	**DO (% sat.)**	**pH (1-14)**	**Conductivity (µS/cm)**	**Turbidity (NTU)**	***Phosphorus (mg/L)**
Mean	268	9.5	94.2		953	14.52	0.121
Med.	135	8.9	96.1	8.16	966	11.55	0.095
St. Dev.	419	2.6	22.1		95	9.55	0.081
Min.	50	5.0	8.4	7.78	630	4.52	0.047
Max.	2,850	16.6	147.7	8.54	1,152	47.90	0.287
State/ Rec'd Standard	**≤ 235 MPN/100mL**	**5.0-10.0 mg/L**		**6.00-9.00**	**150-1500 (µS/cm)**	**10-25 NTU**	**≤0.075 mg/L**
% Below Standard	69	2		0	0	39	38
% Above Standard	31	41		0	0	14	63

#5: Horlick Dam

#5: Horlick Dam							
Water Use Classification: Fish and Aquatic Life, Full Recreational Use							
Impairment: Contaminated Fish Tissue Pollutant: PCBs							
8/3/11 - 8/1/12 Results (65 Events, *8 Events)							
	***E. coli* (MPN/100 mL)**	**DO (mg/L)**	**DO (% sat.)**	**pH (1-14)**	**Conductivity (µS/cm)**	**Turbidity (NTU)**	***Phosphorus (mg/L)**
Mean	2,127	9.4	97.4		961	21.60	0.130
Med.	50	9.2	95.5	8.22	976	18.40	0.093
St. Dev.	16,105	1.8	10.2		104	16.67	0.092
Min.	5	6.6	76.6	7.80	628	5.45	0.051
Max.	129,965	14.2	127.0	8.81	1,164	136.00	0.326
State/ Rec'd Standard	**≤ 235 MPN/100mL**	**5.0-10.0 mg/L**		**6.00-9.00**	**150-1500 (µS/cm)**	**10-25 NTU**	**≤0.075 mg/L**
% Below Standard	86	0		0	0	8	25
% Above Standard	14	38		0	0	26	75

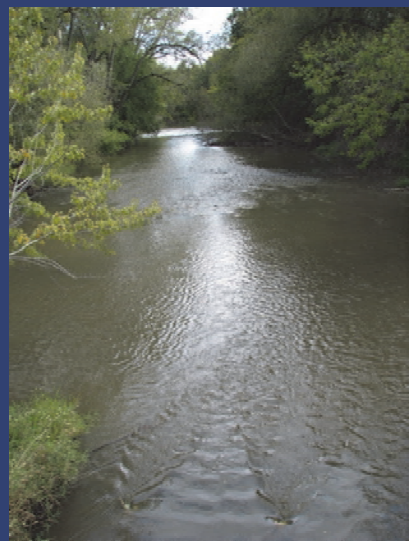
#6: Highway 31 and 4 Mile Road

#6: Highway 31 and 4 Mile Road							
Water Use Classification: Fish and Aquatic Life, Full Recreational Use							
Proposed for Impairment: Degraded Biological Community Pollutant: Total Phosphorus							
8/3/11 - 8/1/12 Results (64 Events, *8 Events)							
	***E. coli* (MPN/100 mL)**	**DO (mg/L)**	**DO (% sat.)**	**pH (1-14)**	**Conductivity (µS/cm)**	**Turbidity (NTU)**	***Phosphorus (mg/L)**
Mean	238	7.6	73.3		991	10.39	0.133
Med.	110	6.9	72.1	7.97	1,002	7.72	0.066
St. Dev.	283	2.6	14.7		107	7.28	0.147
Min.	20	3.4	41.0	7.55	638	3.71	0.046
Max.	1,340	13.7	102.8	8.25	1,201	38.40	0.477
State/ Rec'd Standard	**≤ 235 MPN/100mL**	**5.0-10.0 mg/L**		**6.00-9.00**	**150-1500 (µS/cm)**	**10-25 NTU**	**≤0.075 mg/L**
% Below Standard	72	14		0	0	5	38
% Above Standard	28	20		0	0	63	63



#7: Johnson Park

#7: Johnson Park							
Water Use Classification: Fish and Aquatic Life, Full Recreational Use							
Proposed for Impairment: Degraded Biological Community Pollutant: Total Phosphorus							
8/3/11 - 8/1/12 Results (64 Events, *8 Events)							
	***E. coli* (MPN/100 mL)**	**DO (mg/L)**	**DO (% sat.)**	**pH (1-14)**	**Conductivity (µS/cm)**	**Turbidity (NTU)**	***Phosphorus (mg/L)**
Mean	302	9.7	97.7		989	10.88	0.133
Med.	100	9.8	95.9	8.10	1,011	7.65	0.069
St. Dev.	564	2.9	28.9		110	10.10	0.144
Min.	20	3.2	39.0	7.72	638	2.71	0.045
Max.	3,270	19.6	243.0	8.81	1,175	60.90	0.467
State/ Rec'd Standard	**≤ 235 MPN/100mL**	**5.0-10.0 mg/L**		**6.00-9.00**	**150-1500 (µS/cm)**	**10-25 NTU**	**≤0.075 mg/L**
% Below Standard	75	5		0	0	69	63
% Above Standard	25	47		0	0	8	38

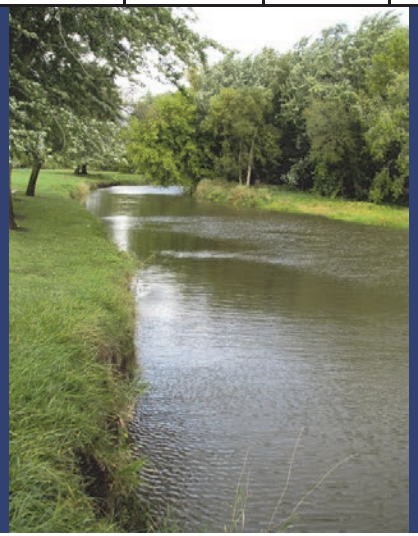


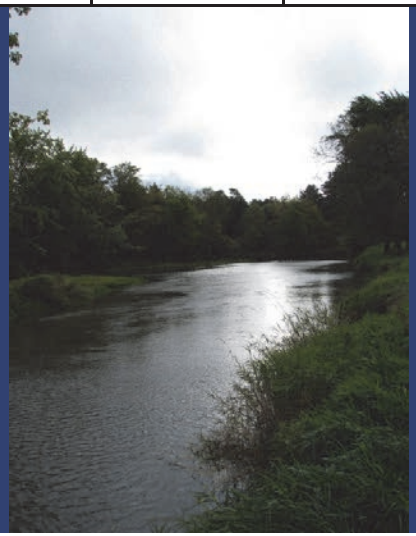
#8: Hood's Creek

#8: Hood's Creek							
Water Use Classification: Limited Forage Fish, Limited Recreational Use							
No Impairments							
8/3/11 - 8/1/12 Results (64 Events, *8 Events)							
	***E. coli* (MPN/100 mL)**	**DO (mg/L)**	**DO (% sat.)**	**pH (1-14)**	**Conductivity (mS/cm)**	**Turbidity (NTU)**	***Phosphorus (mg/L)**
Mean	626	7.8	74.4		1,165	18.63	0.233
Med.	200	7.2	73.7	7.93	1,141	14.40	0.125
St. Dev.	1,734	2.5	16.0		103	17.72	0.250
Min.	50	3.0	33.3	7.77	941	4.37	0.060
Max.	13,540	13.1	102.0	8.27	1,441	130.00	0.797
Variance Standard	**N/A**	**3.0-10.0 mg/L**		**6.00-9.00**	**N/A**	**N/A**	**≤0.075 mg/L**
% Below Standard	-	2		0	-	-	13
% Above Standard	-	23		0	-	-	88
Rec'd Standard	**≤ 235 MPN/100mL**	**5.0-10.0 mg/L**		**6.00-9.00**	**150-1500 (µS/cm)**	**10-25 NTU**	**≤0.075 mg/L**
% Below Standard	61	8		0	0	23	13
% Above Standard	39	23		0	0	19	88

#9: 5 Mile Road and Root River Parkway

#9: 5 Mile Road and Root River Parkway							
Water Use Classification: Fish and Aquatic Life, Full Recreational Use ***Proposed for Impairment: Degraded Biological Community Pollutant: Total Phosphorus*** 8/3/11 - 8/1/12 Results (64 Events, *8 Events)							
	***E. coli* (MPN/100 mL)**	**DO (mg/L)**	**DO (% sat.)**	**pH (1-14)**	**Conductivity (µS/cm)**	**Turbidity (NTU)**	***Phosphorus (mg/L)**
Mean	263	7.5	73.2		989	15.77	0.139
Med.	100	7.4	74.0	7.94	1,008	14.05	0.085
St. Dev.	386	2.4	17.1		119	9.58	0.151
Min.	10	2.6	32.1	7.59	652	4.62	0.045
Max.	1,970	13.1	138.0	8.62	1,235	63.60	0.497
State/ Rec'd Standard	**≤ 235 MPN/100mL**	**5.0-10.0 mg/L**		**6.00-9.00**	**150-1500 (µS/cm)**	**10-25 NTU**	**≤0.075 mg/L**
% Below Standard	69	14		0	0	25	38
% Above Standard	31	20		0	0	11	50





#10: Husher Creek

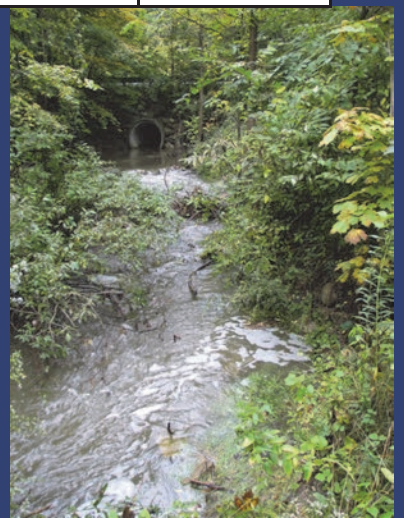
#10: Husher Creek							
Water Use Classification: Fish and Aquatic Life, Full Recreational Use ***Proposed for Impairment: Degraded Biological Community Pollutant: Total Phosphorus*** 8/3/11 - 8/1/12 Results (64 Events, *8 Events)							
	***E. coli* (MPN/100 mL)**	**DO (mg/L)**	**DO (% sat.)**	**pH (1-14)**	**Conductivity (µS/cm)**	**Turbidity (NTU)**	***Phosphorus (mg/L)**
Mean	1,125	7.4	69.0		971	26.20	0.130
Med.	630	7.1	71.4	7.96	902	27.25	0.094
St. Dev.	2,488	2.8	19.6		168	17.34	0.114
Min.	50	1.3	15.5	7.60	672	5.46	0.043
Max.	19,560	12.9	102.2	8.73	1,333	92.20	0.376
State/ Rec'd Standard	**≤ 235 MPN/100mL**	**5.0-10.0 mg/L**		**6.00-9.00**	**150-1500 (µS/cm)**	**10-25 NTU**	**≤0.075 mg/L**
% Below Standard	23	19		0	0	53	50
% Above Standard	77	22		0	0	28	50

#11: Highway 38 at Milwaukee Co. Line

#11: Highway 38 at Milwaukee County Line							
Water Use Classification: Fish and Aquatic Life, Full Recreational Use							
Proposed for Impairment: Degraded Biological Community Pollutant: Total Phosphorus							
8/3/11 - 8/1/12 Results (64 Events, *8 Events)							
	***E. coli* (MPN/100 mL)**	**DO (mg/L)**	**DO (% sat.)**	**pH (1-14)**	**Conductivity (µS/cm)**	**Turbidity (NTU)**	***Phosphorus (mg/L)**
Mean	337	7.0	68.3		1,005	15.35	0.155
Med.	115	6.4	69.1	7.89	1,019	12.90	0.086
St. Dev.	530	2.9	23.2		130	8.90	0.182
Min.	31	1.7	19.1	7.58	600	4.97	0.047
Max.	3,090	13.0	159.0	8.64	1,311	62.70	0.592
State/ Rec'd Standard	**≤ 235 MPN/100mL**	**5.0-10.0 mg/L**		**6.00-9.00**	**150-1500 (µS/cm)**	**10-25 NTU**	**≤0.075 mg/L**
% Below Standard	70	20		0	0	25	25
% Above Standard	30	20		0	0	9	75

#12: Legend Creek

#12: Legend Creek							
Water Use Classification: Fish and Aquatic Life, Full Recreational Use							
No Impairments							
8/3/11 - 8/1/12 Results (64 Events, *8 Events)							
	***E. coli* (MPN/100 mL)**	**DO (mg/L)**	**DO (% sat.)**	**pH (1-14)**	**Conductivity (µS/cm)**	**Turbidity (NTU)**	***Phosphorus (mg/L)**
Mean	1,236	7.8	73.5		1,056	10.61	0.075
Med.	200	7.5	74.3	7.93	1,091	8.79	0.063
St. Dev.	3,754	3.1	22.2		173	8.37	0.055
Min.	5	1.9	21.1	6.68	420	1.64	0.019
Max.	24,192	13.7	112.2	8.42	1,323	47.50	0.178
State/ Rec'd Standard	**≤ 235 MPN/100mL**	**5.0-10.0 mg/L**		**6.00-9.00**	**150-1500 (µS/cm)**	**10-25 NTU**	**≤0.075 mg/L**
% Below Standard	55	19		0	0	56	50
% Above Standard	45	28		0	0	5	50

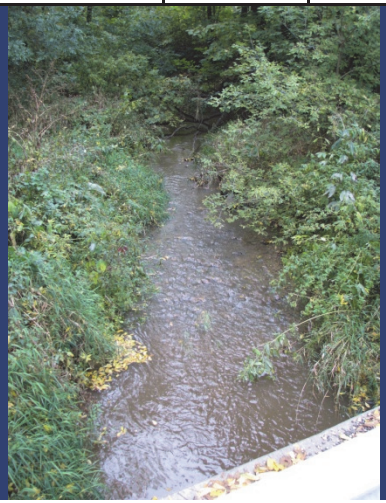


#13: Root River Canal - Main

#13: Root River Canal - Main							
Water Use Classification: Fish and Aquatic Life, Full Recreational Use ***Impairment: Low DO Pollutants: Sediment/Total Suspended Solids, Total Phosphorus*** 8/3/11 - 8/1/12 Results (64 Events, *8 Events)							
	***E. coli* (MPN/100 mL)**	**DO (mg/L)**	**DO (% sat.)**	**pH (1-14)**	**Conductivity (µS/cm)**	**Turbidity (NTU)**	***Phosphorus (mg/L)**
Mean	764	11.4	119.4		1,167	19.08	0.222
Med.	122	10.0	88.3	7.99	1,125	17.75	0.118
St. Dev.	3,095	5.4	70.1		287	10.27	0.281
Min.	20	3.0	31.5	7.43	733	4.94	0.068
Max.	23,820	27.5	365.0	9.43	1,950	55.60	0.892
State/ Rec'd Standard	**≤ 235 MPN/100mL**	**5.0-10.0 mg/L**		**6.00-9.00**	**150-1500 (µS/cm)**	**10-25 NTU**	**≤0.075 mg/L**
% Below Standard	73	6		0	0	20	38
% Above Standard	27	48		6	16	20	63

#14: Raymond Creek

#14: Raymond Creek							
Water Use Classification: Fish and Aquatic Life, Full Recreational Use							
No Impairments							
8/3/11 - 8/1/12 Results (64 Events, *8 Events)							
	***E. coli* (MPN/100 mL)**	**DO (mg/L)**	**DO (% sat.)**	**pH (1-14)**	**Conductivity (µS/cm)**	**Turbidity (NTU)**	***Phosphorus (mg/L)**
Mean	3,486	8.2	75.0		1,060	21.34	0.393
Med.	369	8.1	80.4	8.04	912	10.10	0.048
St. Dev.	20,171	4.6	37.3		330	27.97	0.660
Min.	50	0.1	1.2	7.39	661	1.16	0.028
Max.	161,600	17.1	134.5	8.98	1,949	109.00	1.810
State/ Rec'd Standard	**≤ 235 MPN/100mL**	**5.0-10.0 mg/L**		**6.00-9.00**	**150-1500 (µS/cm)**	**10-25 NTU**	**≤0.075 mg/L**
% Below Standard	41	28		0	0	48	63
% Above Standard	59	39		0	16	19	38



#15: Root River Canal - West Branch (N)

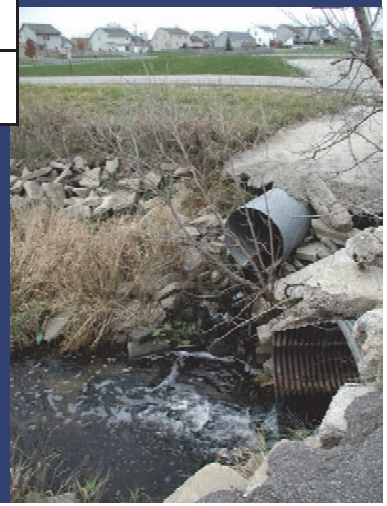
#15: Root River Canal - West Branch (N)							
Water Use Classification: Fish and Aquatic Life, Full Recreational Use ***Impairment: Low DO Pollutants: Sediment/Total Suspended Solids, Total Phosphorus*** 8/3/11 - 8/1/12 Results (64 Events, *8 Events)							
	***E. coli* (MPN/100 mL)**	**DO (mg/L)**	**DO (% sat.)**	**pH (1-14)**	**Conductivity (µS/cm)**	**Turbidity (NTU)**	***Phosphorus (mg/L)**
Mean	4,288	10.6	106.6		1,293	13.38	0.200
Med.	207	9.7	90.4	7.98	1,292	9.61	0.160
St. Dev.	30,192	3.9	48.5		386	15.51	0.159
Min.	10	4.5	49.4	7.58	748	2.15	0.077
Max.	241,920	23.3	286.0	9.25	2,150	87.90	0.566
State/ Rec'd Standard	**≤ 235 MPN/100mL**	**5.0-10.0 mg/L**		**6.00-9.00**	**150-1500 (µS/cm)**	**10-25 NTU**	**≤0.075 mg/L**
% Below Standard	52	2		0	0	52	0
% Above Standard	48	41		2	31	8	100

#16: Root River Canal - East Branch (N)

#16: Root River Canal - East Branch (N)							
Water Use Classification: Limited Forage Fish, Limited Recreational Use ***No Impairments*** **8/3/11 - 8/1/12 Results (64 Events, *8 Events)**							
	E. coli (MPN/100 mL)	**DO (mg/L)**	**DO (% sat.)**	**pH (1-14)**	**Conductivity (mS/cm)**	**Turbidity (NTU)**	***Phosphorus (mg/L)**
Mean	232	6.8	63.3		912	12.16	0.255
Med.	99	6.5	69.6	7.90	891	9.38	0.104
St. Dev.	479	3.5	27.9		128	10.02	0.368
Min.	20	1.0	12.0	7.62	516	2.26	0.040
Max.	3,180	14.5	115.0	8.34	1,333	44.30	1.100
Variance Standard	**N/A**	**3.0-10.0 mg/L**		**6.00-9.00**	**N/A**	**N/A**	**≤0.075 mg/L**
% Below Standard	-	17		0	-	-	38
% Above Standard	-	22		0	-	-	63
Rec'd Standard	**≤ 235 MPN/100mL**	**5.0-10.0 mg/L**		**6.00-9.00**	**150-1500 (µS/cm)**	**10-25 NTU**	**≤0.075 mg/L**
% Below Standard	80	34		0	0	55	38
% Above Standard	20	22		0	0	14	63

#17: Root River Canal West Branch (S): Union Grove WWTP

#17: Root River Canal West Branch (S): Union Grove WWTP							
Water Use Classification: Limited Aquatic Life, Limited Recreational Use							
No Impairments							
8/3/11 - 8/1/12 Results (64 Events, *8 Events)							
	E. coli (MPN/100 mL)	**DO (mg/L)**	**DO (% sat.)**	**pH (1-14)**	**Conductivity (mS/cm)**	**Turbidity (NTU)**	***Phosphorus (mg/L)**
Mean	4,616	8.4	84.9		1,836	8.20	0.338
Med.	3,210	8.6	84.5	7.83	1,913	4.01	0.310
St. Dev.	5,800	1.6	14.9		526	17.70	0.154
Min.	200	5.3	56.0	7.58	431	0.82	0.159
Max.	32,550	13.1	146.0	8.33	2,710	129.00	0.618
Variance Standard	**N/A**	**1.0-10.0 mg/L**		**6.00-9.00**	**N/A**	**N/A**	**N/A**
% Below Standard	-	0		0	-	-	-
% Above Standard	-	14		0	-	-	-
Rec'd Standard	**≤ 235 MPN/100mL**	**5.0-10.0 mg/L**		**6.00-9.00**	**150-1500 (µS/cm)**	**10-25 NTU**	**≤0.075 mg/L**
% Below Standard	2	0		0	0	89	0
% Above Standard	98	14		0	69	6	100



Root River Canal West Sampling Results - 6/13/12

72-hrs of 0.00" of precipitation

	Sample Site	E. coli Count (MPN/100ml)	Water (°C)	DO (mg/L)	pH (1-14)	Conductivity (µS/cm)	Turbidity (NTU)
	W. Puetz before Legend	203	18.9	3.1	7.7	1,418	18.3
Downstream	At 38	148	18.8	3.6	7.7	1,195	16.3
	RRC-M	148	20.4	18.0	8.7	1,180	15.8
	RRC-W	201	18.9	9.6	7.8	1,506	4.9
	Ray	683	15.7	6.9	7.9	945	9.3
	RRCW-3 mile	187	19.2	14.2	8.2	1,644	8.5
	50th Rd tributary	259	17.4	15.1	8.3	1,064	31.9
	Yorkville Creek @Hwy 20	203	24.2	15.0	8.4	1,028	19.0
	RRCW @Hwy 20	134	21.3	22.5	8.7	1,719	10.9
	UG trib. @61st Dr	1,153	16.9	17.0	8.1	745	2.6
	RRCW @Oakdale Rd	313	20.2	10.0	8.0	1,970	5.3
	UG	24,192	19.4	9.3	7.8	2,620	3.6
	UG Effl.	24,192	18.7	8.3	7.8	2,620	4.2
Upstream	UG US of Effl. (A)	359	15.2	9.8	8.0	1,837	5.4

Applicable State and Recommended Standards to Different Surface Water Classifications in the Root River Watershed

The values listed in this table represent standard violations and poor water quality.

State Standard Recommended Standard

Surface Water Classification	E. coli Count (MPN/100ml)	Water (°C)	DO (mg/L)	pH (1-14)	Conductivity (µS/cm)	Turbidity (NTU)
All Other Surface Waters	> 235	> 28.9	< 5.0	< 6.0; > 9.0	< 150; > 1,500	< 10; > 25
Limited Forage Fish	N/A	> 28.9	< 3.0	< 6.0; > 9.0	< 150; > 1,500	< 10; > 25
Limited Aquatic Life	N/A	> 28.9	< 1.0	< 6.0; > 9.0	< 150; > 1,500	< 10; > 25

N/A: Not applicable

Impaired for Low Dissolved Oxygen (DO), due to high levels of Total Phosphorus and Sediment/Total Suspended Solids

Root River Canal West Sampling Results - 6/27/12

72-hrs of 0.00" of precipitation

	Sample Site	E. coli Count (MPN/100ml)	Water (˚C)	DO (mg/L)	pH (1-14)	Conductivity (µS/cm)	Turbidity (NTU)
Downstream	At 38	249	19.7	6.3	8.2	1,038	10.3
	RRC-M	52	21.3	13.1	8.3	1,339	12.2
	RRC-W	160	20.0	4.5	7.7	1,597	2.2
	Raymond Creek	10,462	17.2	6.9	8.1	905	13.6
	RRCW-3 mile	161	20.5	8.2	7.9	1,628	1.2
	50th Rd tributary	305	20.0	9.4	8.2	1,294	4.6
	Yorkville Creek @Hwy 20	4,611	24.0	0.8	7.7	1,432	99.9
	RRCW @Hwy 20	573	20.7	12.6	8.0	1,950	4.1
	UG trib. @61st Dr	441	16.2	10.2	7.5	747	1.5
	RRCW @Oakdale Rd	331	21.8	10.3	7.8	2,280	1.5
	UG	4,106	20.9	9.5	7.9	2,370	3.1
	UG Effl.	10,462	19.7	8.7	7.7	2,330	2.4
	UG US of Effl. (A)	813	20.7	9.5	7.9	1,888	4.8
Upstream	UG US of Effl. (B)	NO FLOW					

Applicable State and Recommended Standards to Different Surface Water Classifications in the Root River Watershed

The values listed in this table represent standard violations and poor water quality.

State Standard Recommended Standard

Surface Water Classification	E. coli Count (MPN/100ml)	Water (˚C)	DO (mg/L)	pH (1-14)	Conductivity (µS/cm)	Turbidity (NTU)
All Other Surface Waters	> 235	> 28.9	< 5.0	< 6.0; > 9.0	< 150; > 1,500	< 10; > 25
Limited Forage Fish	N/A	> 28.9	< 3.0	< 6.0; > 9.0	< 150; > 1,500	< 10; > 25
Limited Aquatic Life	N/A	> 28.9	< 1.0	< 6.0; > 9.0	< 150; > 1,500	< 10; > 25

N/A: Not applicable

Impaired for Low Dissolved Oxygen (DO), due to high levels of Total Phosphorus and Sediment/Total Suspended Solids

#18: Root River Canal East Branch (S): Fonk's Home Center

#18: Root River Canal East Branch (S): Fonk's Home Center							
Water Use Classification: Limited Aquatic Life, Limited Recreational Use							
No Impairments							
8/3/11 - 8/1/12 Results (64 Events, *8 Events)							
	E. coli (MPN/100 mL)	**DO (mg/L)**	**DO (% sat.)**	**pH (1-14)**	**Conductivity (mS/cm)**	**Turbidity (NTU)**	***Phosphorus (mg/L)**
Mean	1,678	6.9	65.6		1,060	23.82	1.283
Med.	657	7.2	71.0	7.65	1,023	12.55	0.254
St. Dev.	3,791	2.4	19.3		262	29.74	1.561
Min.	50	2.8	31.0	7.12	360	4.48	0.172
Max.	29,090	12.3	120.0	8.08	1,483	178.00	4.210
Variance Standard	**N/A**	**1.0-10.0 mg/L**		**6.00-9.00**	**N/A**	**N/A**	**N/A**
% Below Standard	-	0		0	-	-	-
% Above Standard	-	9		0	-	-	-
Rec'd Standard	**≤ 235 MPN/100mL**	**5.0-10.0 mg/L**		**6.00-9.00**	**150-1500 (µS/cm)**	**10-25 NTU**	**≤0.075 mg/L**
% Below Standard	14	34		0	0	19	0
% Above Standard	86	9		0	0	22	100

Root River Canal East Sampling Results - 6/13/12

72-hrs of 0.00" of precipitation

	Sample Site	E. coli Count (mpn/100ml)	Water (˚C)	DO (mg/L)	pH (1-14)	Conductivity (µS/cm)	Turbidity (NTU)
US of Canals	W. Puetz before Legend	203	18.9	3.1	7.7	1,418	18.3
Downstream	At 38	148	18.8	3.6	7.7	1,195	16.3
	RRC-M	148	20.4	18.0	8.7	1,180	15.8
	RRC-E	20	17.7	1.3	7.7	953	2.7
	RRCE-3 mile	74	20.5	2.0	7.8	997	4.0
	RRCE @Hwy 20	213	16.8	7.5	8.2	968	4.5
	Fonk's	504	17.2	7.8	7.9	1,262	11.3
	Fonk's Effl.	4,352	16.5	-	7.0	1,547	1.4
Upstream	Fonk's US of Effl.	135	16.5	1.4	7.8	934	11.4

Applicable State and Recommended Standards to Different Surface Water Classifications in the Root River Watershed

The values listed in this table represent standard violations and poor water quality.

State Standard Recommended Standard

Surface Water Classification	E. coli Count (MPN/100ml)	Water (˚C)	DO (mg/L)	pH (1-14)	Conductivity (µS/cm)	Turbidity (NTU)
All Other Surface Waters	> 235	> 28.9	< 5.0	< 6.0; > 9.0	< 150; > 1,500	< 10; > 25
Limited Forage Fish	N/A	> 28.9	< 3.0	< 6.0; > 9.0	< 150; > 1,500	< 10; > 25
Limited Aquatic Life	N/A	> 28.9	< 1.0	< 6.0; > 9.0	< 150; > 1,500	< 10; > 25

N/A: Not applicable

Impaired for Low Dissolved Oxygen (DO), due to high levels of Total Phosphorus and Sediment/Total Suspended Solids

Root River Canal East Sampling Results - 6/27/12

72-hrs of 0.00" of precipitation

	Sample Site	E. coli Count (mpn/100ml)	Water (˚C)	DO (mg/L)	pH (1-14)	Conductivity (µS/cm)	Turbidity (NTU)
Downstream	At 38	249	19.7	6.3	8.2	1,038	10.3
	RRC-M	52	21.3	13.1	8.3	1,339	12.2
	RRC-E	97	19.6	3.7	8.0	843	8.9
	RRCE @Hwy 20	3,076	18.1	7.0	8.1	1,053	8.6
	Fonk's	2,481	20.7	8.6	8.1	1,062	13.7
	Fonk's Effl.	2,187	20.4	8.9	7.0	1,472	2.6
Upstream	Fonk's US of Effl.	4,106	20.5	5.5	8.0	987	25.6

Applicable State and Recommended Standards to Different Surface Water Classifications in the Root River Watershed

The values listed in this table represent standard violations and poor water quality.

State Standard Recommended Standard

Surface Water Classification	E. coli Count (MPN/100ml)	Water (˚C)	DO (mg/L)	pH (1-14)	Conductivity (µS/cm)	Turbidity (NTU)
All Other Surface Water	> 235	> 28.9	< 5.0	< 6.0; > 9.0	< 150; > 1,500	< 10; > 25
Limited Forage Fish	N/A	> 28.9	< 3.0	< 6.0; > 9.0	< 150; > 1,500	< 10; > 25
Limited Aquatic Life	N/A	> 28.9	< 1.0	< 6.0; > 9.0	< 150; > 1,500	< 10; > 25

N/A: Not applicable

Impaired for Low Dissolved Oxygen (DO), due to high levels of Total Phosphorus and Sediment/Total Suspended Solids

Long-Term Dataset Evaluation* of *E. coli* Compliance with WI DNR Recreational Use Criterion

*Utilizes a Geometric Mean (GM) Calculation of at least five samples in a month to determine compliance with 126 MPN/100 ml or less of *E. coli* bacteria. In contrast to the single sample maximum criterion of 235 MPN/100 ml, this calculation assesses for chronic conditions of high bacteria levels that present a human health risk and impede recreational use.

#	Site	GM Criterion (MPN/100 ml)	# of Exceedances/ 24 Valid Calculations	% of Exceedances	# of Months with Exceedances, Out of 7 Eligible	Which Months with Exceedances (8, 9, 11, 4, 5, 6, 7 possible*)
#1	Chartroom	> 126	3	13	2	4,5
#2	REC	> 126	13	54	6	8, 9, 11, 4, 5, 6, 7
#3	Liberty St. Bridge	> 126	15	63	5	8, 9, 11, 6, 7
#4	Steelhead Facility	> 126	14	58	4	8, 9, 6, 7
#5	Horlick Dam	> 126	9	36	2	8, 7
#6	31 and 4 Mile	> 126	15	63	5	8, 9, 4, 6, 7
#7	Johnson Park	> 126	16	67	5	8, 9, 5, 6, 7
#8	Hood's Creek	N/A	14	58	5	8, 9, 5, 6, 7
#9	5 Mile Rd	> 126	15	63	5	8, 9, 4, 5, 6
#10	Husher Creek	> 126	24	100	7	8, 9, 11, 4, 5, 6, 7
#11	38 at MKE Co Line	> 126	16	67	6	8, 9, 11, 5, 6, 7
#12	Legend Creek	> 126	18	75	7	8, 9, 11, 4, 5, 6, 7
#13	RRC-Main	> 126	17	71	7	8, 9, 11, 4, 5, 6, 7
#14	Raymond Creek	> 126	21	88	7	8, 9, 11, 4, 5, 6, 7
#15	RRC-W	> 126	21	88	7	8, 9, 11, 4, 5, 6, 7
#16	RRC-E	N/A	6	25	3	9, 4, 5
#17	RRC-UG	N/A	24	100	7	8, 9, 11, 4, 5, 6, 7
#18	RRC-Fonk's	N/A	24	100	7	8, 9, 11, 4, 5, 6, 7

All sites during Oct, Dec., 2011-March, 2012 did not have ≥ 5 samples for this calculation

Limited Forage Fish Variance, Limited Recreational Use

Limited Aquatic Life Variance, Limited Recreational Use

* Numbers equate to calendar months, i.e 8: August; 4: April

Ranked *E. coli* (MPN/100mL) Summary Data by Site (by median, then mean)
8.3.11 - 8.1.12

Site #	Site	Mean	Median	St. Dev.	Minimum	Maximum
#17	RRC-UG	4,616	3,210	5,800	200	32,550
#18	RRC-Fonk's	1,678	657	3,791	50	29,090
#10	Husher	1,125	630	2,488	50	19,560
#14	Raymond	3,486	369	20,171	50	161,600
#3	LSB	692	346	1,145	50	6,760
#15	RRC-West	4,288	207	30,192	10	241,920
#12	Legend	1,236	200	3,754	5	24,192
#8	Hood's	626	200	1,734	50	13,540
#4	SHF	268	135	419	50	2,850
#13	RRC-Main	764	122	3,095	20	23,820
#11	At Hwy 38	337	115	530	31	3,090
#6	At Hwy 31	238	110	283	20	1,340
#2	REC	387	100	922	10	6,440
#7	JP	302	100	564	20	3,270
#9	At 5 Mile	263	100	386	10	1,970
#16	RRC-East	232	99	479	20	3,180
#5	HDM	2,127	50	16,105	5	129,965
#1	CR	190	50	507	5	3,873
	Mean	1,270	378	5,131	36	39,389
	Median	659	128	1,439	20	10,150
	St. Dev.	1,436	729	8,361	45	67,464
	Minimum	190	50	283	5	1,340
	Maximum	4,616	3,210	30,192	200	241,920
Limited Aquatic Life, Limited Rec. Use Variances; No state bacterial standards at these sites						
Limited Forage Fish, Limited Rec. Use Variances; No state bacterial standards at these sites						

Ranked Total Phosphorus (mg/L) Summary Data by Site

(by mean, then median) 8.3.11 - 8.1.12

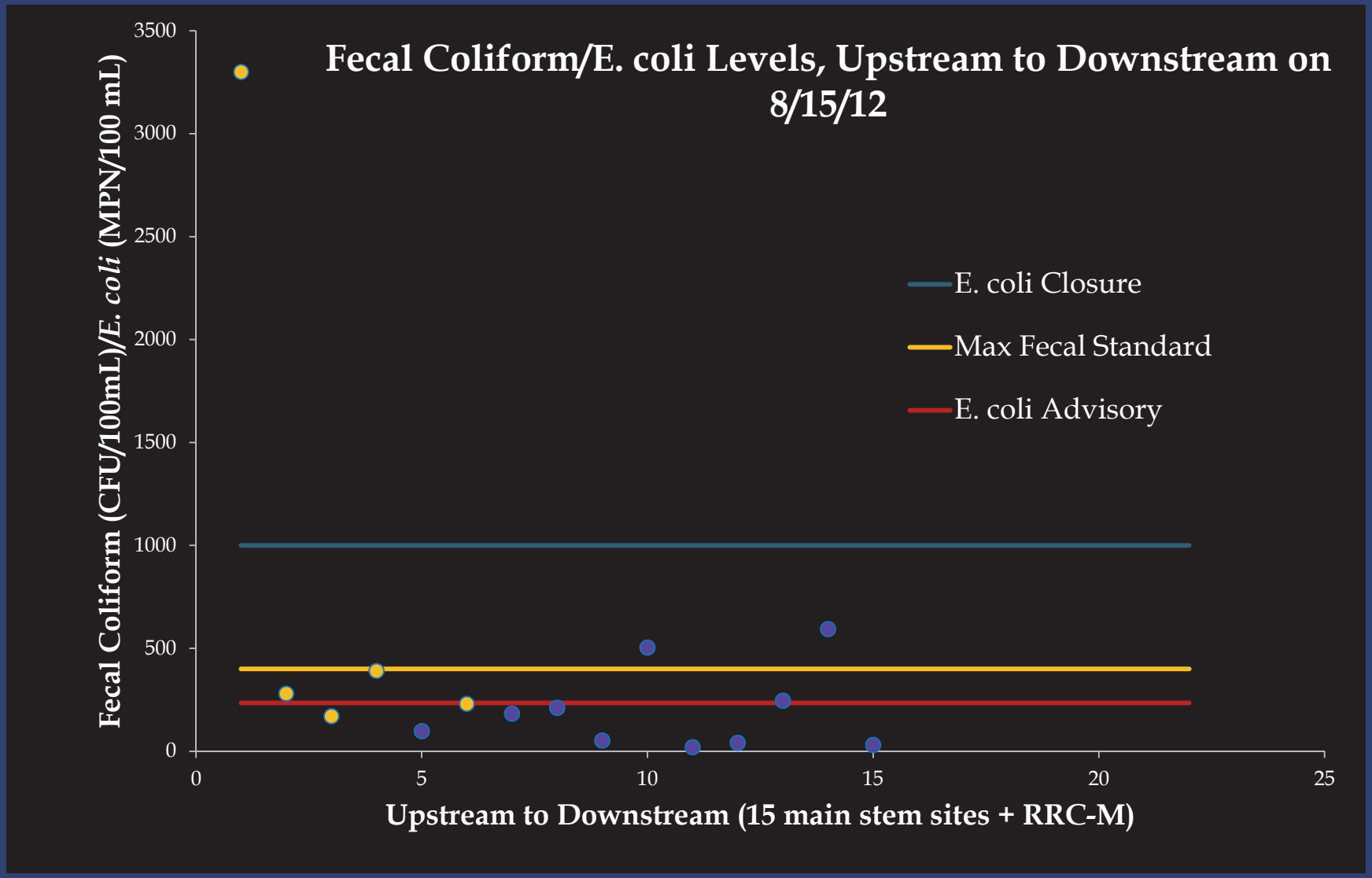
Site #	Site	Mean	Median	St. Dev.	Minimum	Maximum
#18	RRC-Fonk's	1.283	0.254	1.561	0.172	4.210
#14	Raymond	0.393	0.048	0.660	0.028	1.810
#17	RRC-UG	0.338	0.310	0.154	0.159	0.618
#16	RRC-East	0.255	0.104	0.368	0.040	1.100
#8	Hood's	0.233	0.125	0.250	0.060	0.797
#13	RRC-Main	0.222	0.118	0.281	0.068	0.892
#15	RRC-West	0.200	0.160	0.159	0.077	0.566
#11	At Hwy 38	0.155	0.086	0.182	0.047	0.592
#2	REC	0.144	0.106	0.091	0.071	0.337
#9	At 5 Mile	0.139	0.085	0.151	0.045	0.497
#6	At Hwy 31	0.133	0.066	0.147	0.046	0.477
#7	JP	0.133	0.069	0.144	0.045	0.467
#5	HDM	0.130	0.093	0.092	0.051	0.326
#10	Husher	0.130	0.094	0.114	0.043	0.376
#3	LSB	0.128	0.091	0.080	0.063	0.290
#4	SHF	0.121	0.095	0.081	0.047	0.287
#1	CR	0.082	0.071	0.031	0.054	0.136
#12	Legend	0.075	0.063	0.055	0.019	0.178
	Mean	0.239	0.113	0.256	0.063	0.775
	Median	0.141	0.093	0.149	0.049	0.487
	St. Dev.	0.274	0.067	0.357	0.040	0.944
	Minimum	0.075	0.048	0.031	0.019	0.136
	Maximum	1.283	0.310	1.561	0.172	4.210

Limited Aquatic Life Variance; No state phosphorus standards at these sites

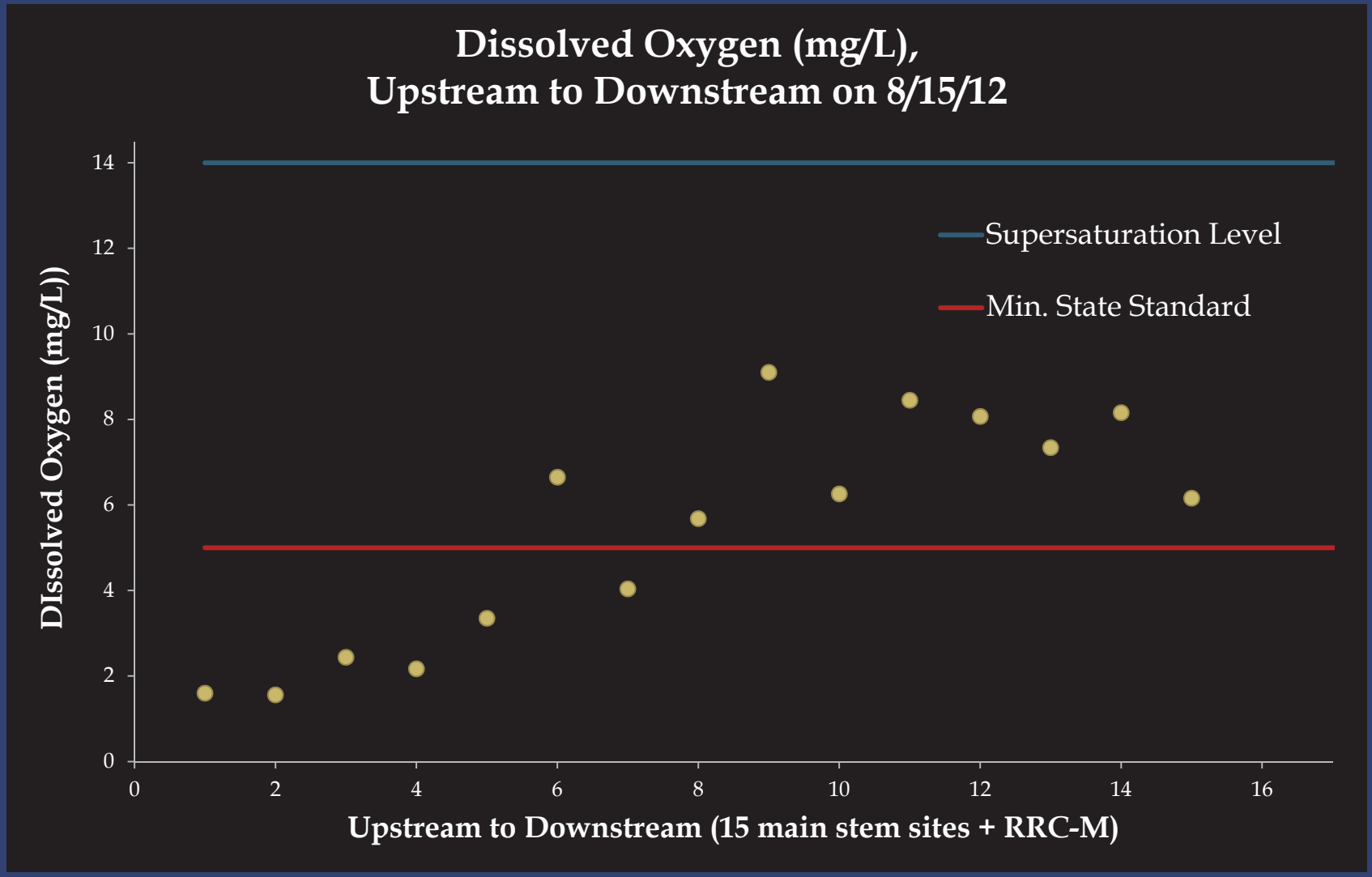
Ranked Total DO (mg/L) Summary (by mean)
8.3.11 - 8.1.12

Site #	Site	Mean	Median	St. Dev.	Minimum	Maximum
#16	RRC-East	6.8	6.5	3.5	1.0	14.5
#18	RRC-Fonk's	6.9	7.2	2.4	2.8	12.3
#11	At Hwy 38	7.0	6.4	2.9	1.7	13.0
#10	Husher	7.4	7.1	2.8	1.3	12.9
#9	At 5 Mile	7.5	7.4	2.4	2.6	13.1
#6	At Hwy 31	7.6	6.9	2.6	3.4	13.7
#12	Legend	7.8	7.5	3.1	1.9	13.7
#8	Hood's	7.8	7.2	2.5	3.0	13.1
#14	Raymond	8.2	8.1	4.6	0.1	17.1
#1	CR	8.3	8.5	2.6	3.3	14.6
#17	RRC-UG	8.4	8.6	1.6	5.3	13.1
#2	REC	9.3	8.9	2.5	3.5	15.4
#5	HDM	9.4	9.2	1.8	6.6	14.2
#4	SHF	9.5	8.9	2.6	5.0	16.6
#3	LSB	9.6	9.2	2.7	4.6	16.5
#7	JP	9.7	9.8	2.9	3.2	19.6
#15	RRC-West	10.6	9.7	3.9	4.5	23.3
#13	RRC-Main	11.4	10.0	5.4	3.0	27.5
	Mean	8.5	8.2	2.9	3.1	15.8
	Median	8.2	8.3	2.7	3.1	14.3
	St. Dev.	1.3	1.2	0.9	1.6	4.0
	Minimum	6.8	6.4	1.6	0.1	12.3
	Maximum	11.4	10.0	5.4	6.6	27.5
Limited Aquatic Life Variance; Minimum DO is 1.0 mg/L (vs. 5.0 mg/L)						
Limited Forage Fish Variance; DO is 3.0 mg/L (vs. 5.0 mg/L)						

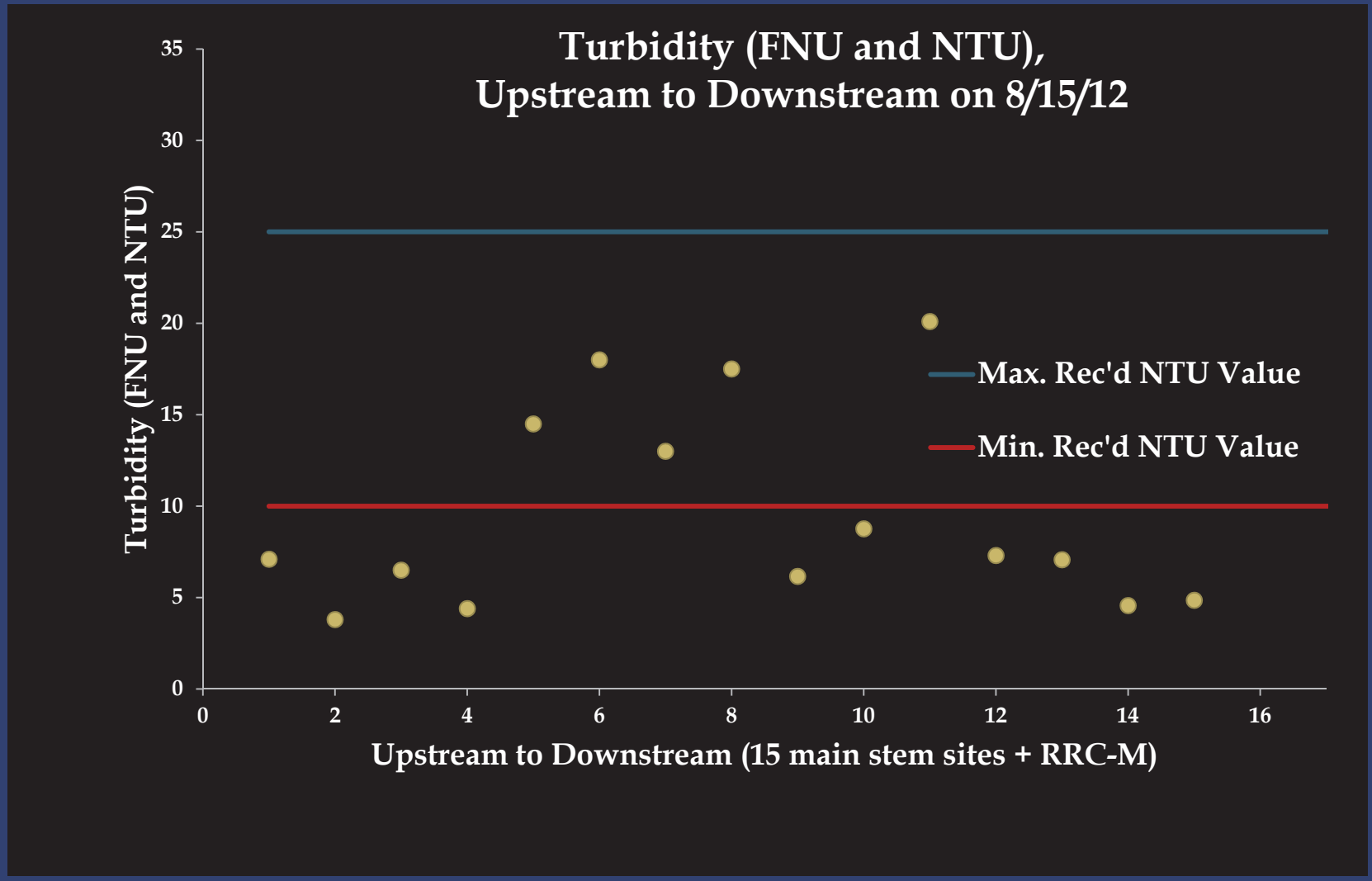
Combined MMSD and RHD Sampling Day August 15, 2012



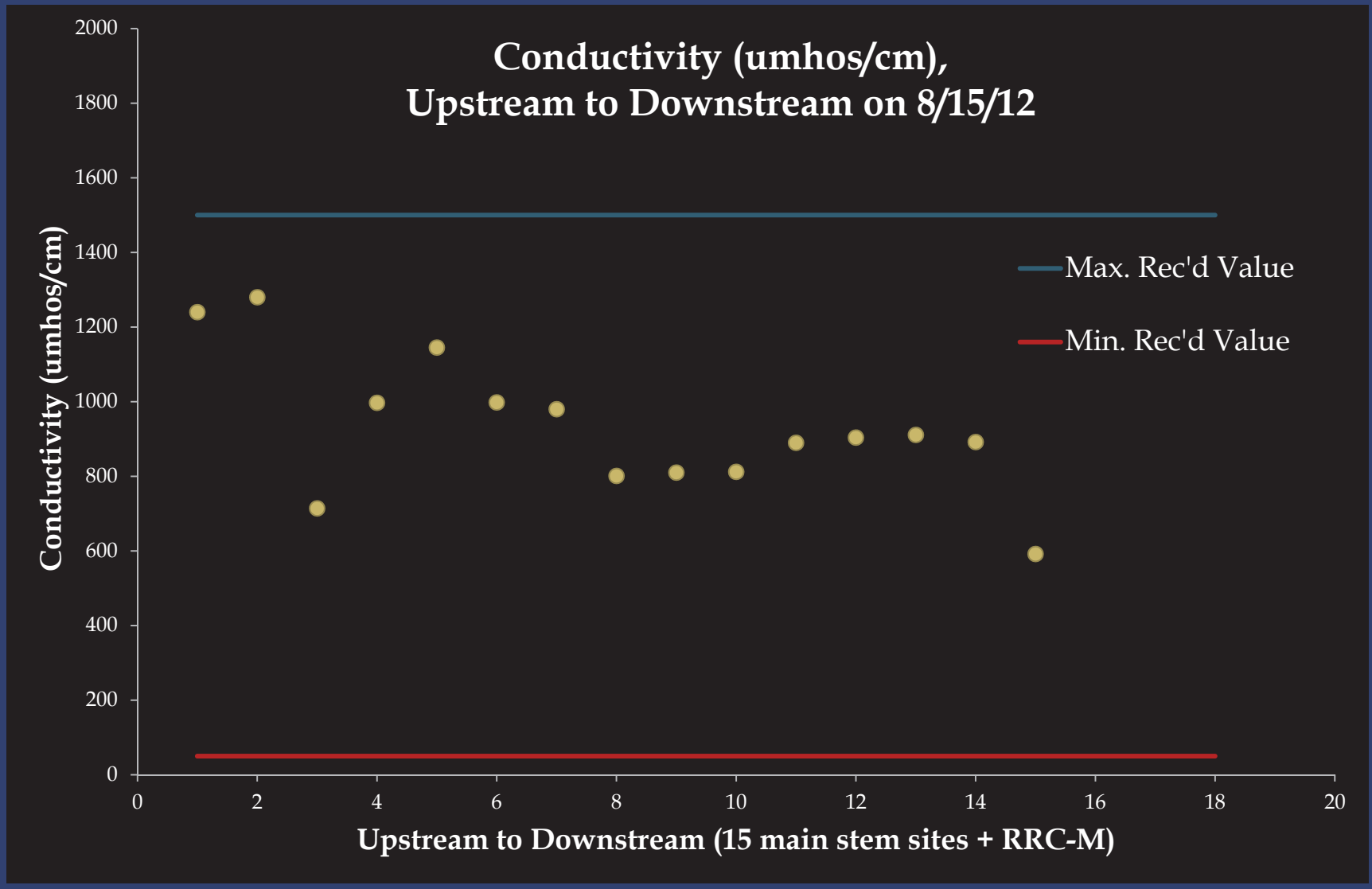
Combined MMSD and RHD Sampling Day August 15, 2012



Combined MMSD and RHD Sampling Day
August 15, 2012



Combined MMSD and RHD Sampling Day August 15, 2012



Combined MMSD and RHD Sampling Day
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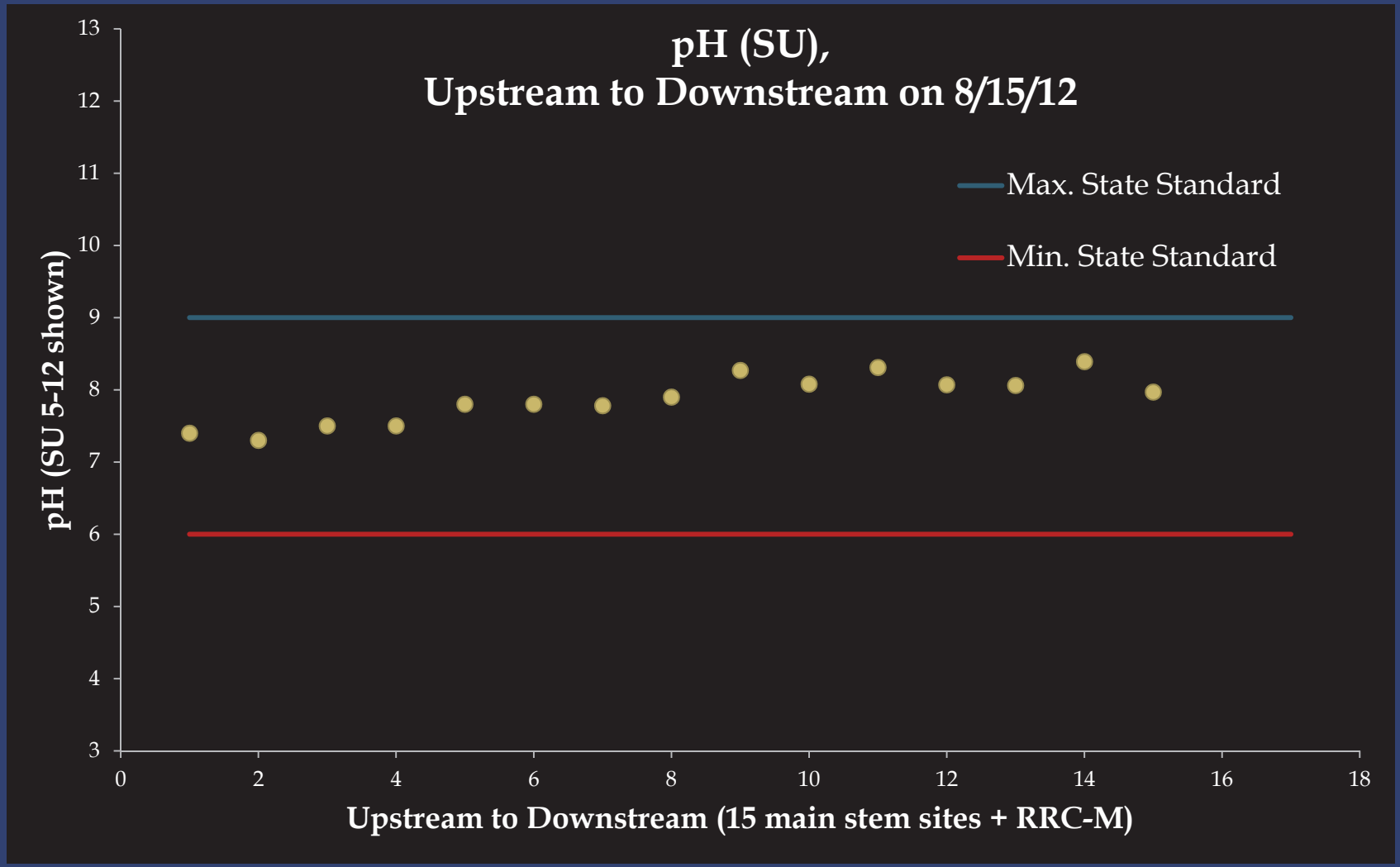

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