



Missouri Department of Natural Resources
Willow Fork - WBID 0955, Tributary to Willow Fork - WBID 0956
Water Chemistry data by MoDNR 2003-2004

Org	Site	Site Name	Yr	Mo	Dy	Time	Flow	C	DO	pH	SC	KJN	NH3N	TP	CBOD
MoDNR	955/2.4	Willow Fk. ab. Trib. From Tipton WWTP	2003	8	6	635	0	22.5	3.3	7.7	644				
MoDNR	955/2.4	Willow Fk. ab. Trib. From Tipton WWTP	2003	8	7	636		21	3.5	7.7	650				
MoDNR	955/2.4	Willow Fk. ab. Trib. From Tipton WWTP	2004	8	18	710	0.01	20.2	4.3	7.5	349	0.7	0.01499	0.1	0.99
MoDNR	955/2.4	Willow Fk. ab. Trib. From Tipton WWTP	2004	8	18	1240		24.1	8	7.6	350	0.69	0.01499	0.09	0.99
MoDNR	955/2.4	Willow Fk. ab. Trib. From Tipton WWTP	2004	8	19	1240		21.6	6.3	7.6	344	0.64	0.01499	0.1	0.99
MoDNR	956/0.2/0.4	Trib. Willow Fk. 0.1 mi.ab. Tipton WWTP	2004	8	18	630	0		4.8	7.2	345	0.63	0.01499	0.08	0.99
MoDNR	956/0.2/0.4	Trib. Willow Fk. 0.1 mi.ab. Tipton WWTP	2004	8	18	1305		23.4	8.9	7.6	347	0.78	0.01499	0.11	3.4
MoDNR	956/0.2/0.4	Trib. Willow Fk. 0.1 mi.ab. Tipton WWTP	2004	8	19	1305		20.4	8.2	7.7	348	0.54	0.01499	0.1	0.99
MoDNR	956/0.2/0.3	Tipton WWTP Outfall 001	2003	8	5	1220		26	6.8	7.7	1271	2.33	1.02	3.85	2.58
MoDNR	956/0.2/0.3	Tipton WWTP Outfall 001	2003	8	5	1335	0.35	25	6	7.6	1360	7.88	6.22	3.59	2.08
MoDNR	956/0.2/0.3	Tipton WWTP Outfall 001	2003	8	6	655		24	3.9	7.8	1256	2.58	1.33	3.88	3.19
MoDNR	956/0.2/0.3	Tipton WWTP Outfall 001	2003	8	7	655		24.5	4.3	7.7	1316	2.6	1.3	5.07	0.99
MoDNR	956/0.2/0.3	Tipton WWTP Outfall 001	2004	8	18	640		22.6	5.8	7.5	1010				
MoDNR	956/0.2/0.3	Tipton WWTP Outfall 001	2004	8	18	1320		25.1	6.8	7.8	1030	1.19	0.01499	3.22	0.99
MoDNR	956/0.2/0.3	Tipton WWTP Outfall 001	2004	8	19	1320		23.3	6	7.6	1080	0.05	0.01499	3.5	0.99
MoDNR	956/0.2	Trib. Willow Fk. 0.3 mi.bl. Tipton WWTP	2003	8	5	1320	0.35	25	6.2	7.8	1352	7.66	6.11	4.51	0.99
MoDNR	956/0.2	Trib. Willow Fk. 0.3 mi.bl. Tipton WWTP	2003	8	6	645		23	1.4	7.6	1322	3.22	2.02	4.09	0.99
MoDNR	956/0.2	Trib. Willow Fk. 0.3 mi.bl. Tipton WWTP	2003	8	6	1235		25	6.6	7.8	1265	1.33	0.58	3.89	0.99
MoDNR	956/0.2	Trib. Willow Fk. 0.3 mi.bl. Tipton WWTP	2003	8	7	645		22	2.1	7.6	1360	1.4	0.32	4.26	0.99
MoDNR	956/0.2	Trib. Willow Fk. 0.3 mi.bl. Tipton WWTP	2004	8	18	655		22	4.3	7.8	998	0.02499	0.07	3.25	3.3
MoDNR	956/0.2	Trib. Willow Fk. 0.3 mi.bl. Tipton WWTP	2004	8	18	655	0.52	21.4	5.1	7.7	1000	0.02499	0.01499	3.03	0.99
MoDNR	956/0.2	Trib. Willow Fk. 0.3 mi.bl. Tipton WWTP	2004	8	18	1250		23.4	10	8	1010	1.28	0.01499	2.87	0.99
MoDNR	956/0.2	Trib. Willow Fk. 0.3 mi.bl. Tipton WWTP	2004	8	19	1205		21.8	7.5	7.9	1000	0.02499	0.04	3.25	0.99
MoDNR	955/0.2	Willow Fk. 2.6 mi.bl. Tipton WWTP	2003	8	5	1230	0.2	24	5.8	8.5	1174	1.62	0.01499	1.52	4.67
MoDNR	955/0.2	Willow Fk. 2.6 mi.bl. Tipton WWTP	2003	8	5	1250		24.5	11.2	8.6	1175	2.11	0.01499	1.6	7.49
MoDNR	955/0.2	Willow Fk. 2.6 mi.bl. Tipton WWTP	2003	8	6	550		23.5	8.4	8.8	1176	0.93	0.01499	1.44	0.99
MoDNR	955/0.2	Willow Fk. 2.6 mi.bl. Tipton WWTP	2003	8	7	555		23	8.3	8.7	1190	0.83	0.01499	1.46	0.99
MoDNR	955/0.2	Willow Fk. 2.6 mi.bl. Tipton WWTP	2004	8	18	628	0.57	20.9	7.6	8.2	743	1.15	0.01499	0.6	0.99
MoDNR	955/0.2	Willow Fk. 2.6 mi.bl. Tipton WWTP	2004	8	18	1230	0.57	23.8	9.5	8.5	738	1.12	0.01499	0.58	0.99
MoDNR	955/0.2	Willow Fk. 2.6 mi.bl. Tipton WWTP	2004	8	19	620	0.57	21.8	7.2	8.2	756	1.1	0.01499	0.62	0.99
MoDNR	955/0.2	Willow Fk. 2.6 mi.bl. Tipton WWTP	2004	8	19	1220	0.57	22.1	8.7	8.3	750	0.92	0.01499	0.61	0.99
MoDNR	954/1.5	Willow Fk. 3.9 mi.bl. Tipton WWTP	2003	8	5	1250	0.3	28	6.8	7.9	770	0.51	0.01499	0.4	0.99
MoDNR	954/1.5	Willow Fk. 3.9 mi.bl. Tipton WWTP	2003	8	5	1315		29	7.1	7.8	817	0.45	0.01499	0.41	0.99
MoDNR	954/1.5	Willow Fk. 3.9 mi.bl. Tipton WWTP	2003	8	6	610		25.5	2.8	7.8	814	0.5	0.01499	0.42	0.99

Org	Site	Site Name	Yr	Mo	Dy	Time	Flow	C	DO	pH	SC	KJN	NH3N	TP	CBOD
MoDNR	954/1.5	Willow Fk. 3.9 mi.bl. Tipton WWTP	2003	8	7	615		24.5	2.5	7.7	852	0.46	0.01499	0.4	0.99
MoDNR	954/1.5	Willow Fk. 3.9 mi.bl. Tipton WWTP	2004	8	18	650	0.32	22.6	6.5	8.4	594	1.19	0.01499	0.36	4.4
MoDNR	954/1.5	Willow Fk. 3.9 mi.bl. Tipton WWTP	2004	8	18	1255	0.31	26.8	11.4	8.4	610	0.96	0.01499	0.33	4.1
MoDNR	954/1.5	Willow Fk. 3.9 mi.bl. Tipton WWTP	2004	8	19	647	0.31	23.5	5.9	8.2	604	1.15	0.01499	0.34	4.7
MoDNR	954/1.5	Willow Fk. 3.9 mi.bl. Tipton WWTP	2004	8	19	1240	0.31	23.3	7.6	8.2	615	1.11	0.01499	0.34	4.2

The water quality standard for protection of aquatic life for dissolved oxygen is 5.0 mg/L. For dissolved oxygen, the Listing Methodology Document allows a water to be judged as impaired if the water quality standard is not met on more than 10 percent of the days on which measurements are taken. Three of four daily measurements on Willow Fork, upstream of the tributary from the Tipton wastewater treatment plant, failed to meet the standard. Three of five daily measurements on Tributary to Willow Fork, downstream of the treatment plant, failed to meet the standard. For a water with a 10 percent frequency of exceedence of a standard, these frequencies have binomial probability Type One error rates of 0.000 and 0.001, respectively. Since these probabilities are less than the minimum allowable Type One error rate of 0.1, these two stream segments are judged to be **impaired** by low dissolved oxygen.

The Missouri Department of Natural Resources collected and analyzed aquatic invertebrate samples. Staff followed the department's Environmental Services Program's written standard operating methods contained in "Semi-Quantitative Macroinvertebrate Stream Bioassessment" by R. Sarver, 2003. Invertebrate communities are judged to be impaired if the percent of sampling sites receiving a score of 16 or more is significantly less than for reference streams in the same ecological drainage unit. Scores of 16 or more are considered to reflect unimpaired macroinvertebrate communities.

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