

Missouri Clean Water Commission Meeting
Department of Natural Resources
Lewis and Clark State Office Building
1101 Riverside Drive
Jefferson City, Missouri

April 6, 2016

2016 303(d) Impaired Waters List (rev.)

Issue: The Federal Water Pollution Control Act, Section 303(d) requires states to biennially (once every two years) submit to the U.S. Environmental Protection Agency (EPA) a list of impaired waters for which adequate pollution controls have not yet been required.

Background: The Commission approved the 2016 Listing Methodology Document (LMD) on July 9, 2014. The department used this document to assess waters for the draft 2016 303(d) list of impaired waters. The draft 2016 303(d) List was placed on public notice from October 1, 2015 through January 31, 2016.

During the public comment period, the department held two public availability meetings to discuss the draft 303(d) list. These meetings were held November 3, 2015 and December 1, 2015. A list of attendees and a summary of the meetings are posted on the department's website (<http://dnr.mo.gov/env/wpp/waterquality/303d/303d.htm>). A public hearing was held on January 6, 2016.

Public Comments: The department received and responded to eight (8) written comments on the draft 2016 303(d) list. Comments were received from the city of Independence, city of Springfield, Boone County, Missouri Department of Conservation, EPA, and Newman, Comley & Ruth, P.C (3 comments). All public comments, along with the department's responses, are provided here and are also available on the department's website. As a result of the comments, the department recommends that seven (7) waterbody pollutant pairs be removed from the draft list, three (3) be retained or added to the list, and two (2) pollutants be revised.

Overview of Proposed 303(d) List

There are a total of 448 water body/pollutant pairs on the proposed 2016 303(d) List. Seventy-five (75) of these listings are new to the list in 2016, and the remaining 373 water body/pollutant pairs continue from the EPA approved 2014 303(d) list.

A total of twenty-seven (27) water body/pollutant pairs from the 2014 303(d) List are being proposed for de-listing. Of the twenty-six (26) waters proposed for de-listing, nineteen (19) now meet water quality standards, three (3) were originally listed in error, three (3) are a result of re-segmentation of the water body or revised assessment method, one (1) due to a wastewater treatment facility upgrade and one (1) removed because the stream segment is impaired by pollution (habitat or hydrologic alteration) and not by a discrete pollutant.

The six most common pollutant categories on the list are: bacteria (105 listings), heavy metals in water or sediments (64), low dissolved oxygen (66), mercury in fish tissue (59), chloride (18), and biological impairments based on biomonitoring (18).

The top six (5) most common source categories on the list are: rural and undefined nonpoint sources (98), unknown sources (74), mining, milling and smelting (66), atmospheric deposition (59), and urban runoff/storm sewers (52).

Updates to the administrative record that were completed following the public comment period include:

- Several assessment worksheets were updated to include a statement indicating newly proposed 2016 303(d) listings that contained data older than seven (7) years.
- Several assessment worksheets were updated to either remove the worksheet, or relabel the worksheet tab to remove information that a TMDL was developed and approved.
- Fish tissue assessment worksheets were updated to remove a citation presented in a draft document.
- Pearson Creek (WBID 2373) assessment worksheet was updated to include missing habitat scores.
- Middle Fork Black River (WBID 2744) listed as impaired for aquatic life was removed as a result of a listing error.
- Little Cedar Creek (WBID 0744) listed as impaired for low dissolved oxygen was removed due to a sample location error.
- Spring Branch (WBID 5004) listed as impaired for low dissolved oxygen was removed due to U.S. Geological Survey continuous data being rated as poor and not representative of instream site conditions.
- Ward Branch (WBID 2374) listed as impaired for pH was removed because the sample was not collected or analyzed following EPA procedures.
- Barker Creek (WBID 4083) listed as impaired for pH and sulfate was removed as a result of a listing error.
- Bee Fork (WBID 2760) listed as impaired for lead in sediment was revised to be listed as impaired for lead in water.
- Black Creek (WBID 3184) listed as impaired for total dissolved solids was revised to be listed as impaired for chloride plus sulfate.
- Brush Creek (WBID 1371) listed as impaired for total suspended solids was removed as a result of a listing error.
- Brush Creek (WBID 3986) listed as impaired for chrysene, phenanthrene, and pyrene in sediment was updated to include fluoranthene in sediment due to a data download error.
- Center Creek (WBID 3203) proposed to be delisted for lead in sediment was retained on the impaired list due to assessing the upstream sites separately from lower stream sites.

- Flat Creek (WBID 2168) listed as impaired for lead in fish tissue was removed as a result of a listing error.
- Joplin Creek (WBID 5006) listed as impaired for lead in water was removed as a result of a listing error.
- Mississippi River (WBID 1707.03) truncated waterbody identification number was corrected.
- Peruque Creek (WBID 0216) justification for delisting the waterbody was revised, along with a request to place this waterbody in to a 4C Category as being impaired by pollution and not a pollutant.
- Wilsons Creek (WBID 2375) proposed for delisting for Benzo[a]anthracene, chrysene, fluoranthene, phenanthrene, and pyrene in sediment will be retained on the impaired list due to a correction in the data set that was downloaded from the EPA STORET database.

Recommended Action: The department recommends the Commission approve the proposed 2016 303(d) List with the recommended changes.

Suggested Motion Language: None

List of Attachments:

- Proposed 2016 303(d) List
- List of waters on the 2014 303(d) List proposed for removal from the proposed 2016 303(d) list
- Responses to Public Comments
- Official Transcript
- Public Comments

Assessment worksheets are available on the Department's Website at:
<http://dnr.mo.gov/env/wpp/waterquality/303d.htm>



Missouri Department of Natural Resources
2016 CWC Section 303(d) Listed Waters

Year	WBID	Waterbody	Cls	Imp Size	WB Size	Units	Pollutant	Source	IU	OU	U/D County	Up X	Up Y	Down X	Down Y	WBD 8	Comments
2012	2188.00	Antire Cr.	P	1.9	1.9	Mi.	Escherichia coli (W)	Urban Runoff/Storm Sewers	WBC B	AQL, IRR, LWW, SCR, HHP	St. Louis	712454	4264477	710077	4264450	07140102	1
2012	2188.00	Antire Cr.	P	1.9	1.9	Mi.	pH (W)	Source Unknown	AQL	IRR, LWW, SCR, WBC B, HHP	St. Louis	712454	4264477	710077	4264450	07140102	1
2010	7627.00	August A Busch Lake No. 37	UL	30.0	30.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	GEN		St. Charles	692006	4287346	692006	4287346	07110009	1, 7
2016	4083.00	Barker Creek tributary	C	1.2	1.2	Mi.	Oxygen, Dissolved (W)	Source Unknown	AQL	IRR, LWW, SCR, WBC B, HHP	Henry	449610	4251789	450292	4250266	10290108	1
2012	752.00	Bass Cr.	C	4.4	4.4	Mi.	Escherichia coli (W)	Rural NPS	WBC A	AQL, IRR, LWW, SCR, HHP	Boone	565032	4297418	561523	4298649	10300102	1
2012	3240.00	Baynham Br.	P	4.0	4.0	Mi.	Escherichia coli (W)	Rural NPS	WBC B	AQL, IRR, LWW, SCR, HHP	Newton	379681	4092596	374809	4091661	11070207	1
2006	2760.00	Bee Fk.	C	1.4	8.7	Mi.	Lead (W)	Fletcher Lead Mine/Mill	AQL	CLF, IRR, LWW, SCR, WBC A, HHP	Reynolds	668683	4145627	670778	4145985	11010007	1
2014	7309.00	Bee Tree Lake	L3	10.0	10.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, IRR, LWW, SCR, WBC B	St. Louis	732843	4254646	732843	4254646	07140102	1
2014	3224.00	Beef Br.	P	2.5	2.5	Mi.	Cadmium (S)	Mill Tailings	AQL	IRR, LWW, SCR, WBC B, HHP	Newton	366623	4094312	366294	4097417	11070207	1
2014	3224.00	Beef Br.	P	2.5	2.5	Mi.	Cadmium (W)	Mill Tailings	AQL	IRR, LWW, SCR, WBC B, HHP	Newton	366623	4094312	366294	4097417	11070207	1
2014	3224.00	Beef Br.	P	2.5	2.5	Mi.	Lead (S)	Mill Tailings	AQL	IRR, LWW, SCR, WBC B, HHP	Newton	366623	4094312	366294	4097417	11070207	1
2014	3224.00	Beef Br.	P	2.5	2.5	Mi.	Zinc (S)	Mill Tailings	AQL	IRR, LWW, SCR, WBC B, HHP	Newton	366623	4094312	366294	4097417	11070207	1
2014	3224.00	Beef Br.	P	2.5	2.5	Mi.	Zinc (W)	Mill Tailings	AQL	IRR, LWW, SCR, WBC B, HHP	Newton	366623	4094312	366294	4097417	11070207	1
2006	7365.00	Belcher Branch Lake	L3	42.0	42.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, IRR, LWW, SCR, WBC B	Buchanan	351264	4382887	351264	4382887	10240012	1
2014	3980.00	Bens Branch	C	5.8	5.8	Mi.	Cadmium (S)	Oronogo/Duenweg Mining Belt	AQL	IRR, LWW, SCR, WBC B, HHP	Jasper	371061	4111567	370851	4115306	11070207	1
2014	3980.00	Bens Branch	C	5.8	5.8	Mi.	Lead (S)	Oronogo/Duenweg Mining Belt	AQL	IRR, LWW, SCR, WBC B, HHP	Jasper	371061	4111569	370856	4115293	11070207	1
2014	3980.00	Bens Branch	C	5.8	5.8	Mi.	Zinc (S)	Oronogo/Duenweg Mining Belt	AQL	IRR, LWW, SCR, WBC B, HHP	Jasper	371058	4111554	370855	4115296	11070207	1
2016	3980.00	Bens Branch	C	5.8	5.8	Mi.	Zinc (W)	Oronogo/Duenweg Mining Belt	AQL	IRR, LWW, SCR, WBC B, HHP	Jasper	371058	4111554	370856	4115293	11070207	1
1998	2916.00	Big Cr.	P	1.8	34.1	Mi.	Cadmium (S)	Glover smelter	AQL	CLF, IRR, LWW, SCR, WBC A, HHP	Iron	704416	4150529	704726	4147921	08020202	1
1998	2916.00	Big Cr.	P	1.8	34.1	Mi.	Lead (S)	Glover smelter	AQL	CLF, IRR, LWW, SCR, WBC A, HHP	Iron	704405	4150532	704724	4147919	08020202	1
2010	1578.00	Big Piney R.	P	4.0	7.8	Mi.	Oxygen, Dissolved (W)	Source Unknown	AQL	DWS, IRR, LWW, SCR, WBC A, HHP	Texas	583132	4112464	579840	4108439	10290202	1, 5
2006	2080.00	Big R.	P	52.8	81.3	Mi.	Cadmium (S)	Old Lead Belt tailings	AQL	IND, IRR, LWW, SCR, WBC A, HHP	St. Francois/Jefferson	712112	4194396	701042	4226033	07140104	1
2010	2080.00	Big R.	P	52.3	81.3	Mi.	Lead (S)	Mill Tailings	AQL	IND, IRR, LWW, SCR, WBC A, HHP	St. Francois/Jefferson	712625	4193891	701044	4226032	07140104	1
2016	2080.00	Big R.	P	81.3	81.3	Mi.	Lead (T)	Mine Tailings	HHP	AQL, IND, IRR, LWW, SCR, WBC A	Washington/Jefferson	701036	4226038	686672	4181275	07140104	1
2012	111.00	Black Cr.	P	19.4	19.4	Mi.	Escherichia coli (W)	Shelbyville WWTF, Nonpoint Source	WBC B	AQL, IRR, LWW, SCR, HHP	Shelby	581883	4405278	593138	4393283	07110005	1
2006	3825.00	Black Cr.	P	1.6	1.6	Mi.	Chloride (W)	Urban Runoff/Storm Sewers	AQL	IRR, LWW, SCR, WBC B, HHP	St. Louis	731266	4278180	732023	4276834	07140101	1
2012	3825.00	Black Cr.	P	1.6	1.6	Mi.	Escherichia coli (W)	Urban Runoff/Storm Sewers	WBC B, SCR	AQL, IRR, LWW, HHP	St. Louis	731266	4278180	732023	4276834	07140101	1



Missouri Department of Natural Resources
2016 CWC Section 303(d) Listed Waters

Year	WBID	Waterbody	Cls	Imp Size	WB Size	Units	Pollutant	Source	IU	OU	U/D County	Up X	Up Y	Down X	Down Y	WBD 8	Comments
2002	2769.00	Black R.	P	47.1	47.1	Mi.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, CLF, DWS, IRR, LWV, SCR, WBC A	Butler	729372	4042276	729886	4078610	11010007	1, 5
2002	2784.00	Black R.	P	39.0	39.0	Mi.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, CLF, DWS, IRR, LWV, SCR, WBC A	Wayne/Butler	729886	4078610	697890	4112203	11010007	1, 5
2006	3184.00	Blackberry Cr.	C	3.5	6.5	Mi.	Chloride (W)	Asbury Power Plant	AQL	IRR, LWV, SCR, WBC B, HHP	Jasper	360861	4132403	361580	4127893	11070207	1
2016	3184.00	Blackberry Cr.	C	6.5	6.5	Mi.	Oxygen, Dissolved (W)	Ind. Point Source Discharge and NPS	AQL	IRR, LWV, SCR, WBC B, HHP	Jasper	362347	4123848	360861	4132404	11070207	1
2008	3184.00	Blackberry Cr.	C	3.5	6.5	Mi.	Sulfate + Chloride	Asbury Power Plant	AQL	IRR, LWV, SCR, WBC B, HHP	Jasper	360856	4132395	361579	4127903	11070207	1
2016	417.00	Blue R.	P	4.4	4.4	Mi.	Escherichia coli (W)	Urban Runoff/Storm Sewers	WBC B, SCR	AQL, IND, IRR, LWV, HHP	Jackson	373047	4332253	372990	4332130	10300101	1
2016	418.00	Blue R.	P	9.4	9.4	Mi.	Escherichia coli (W)	Urban Runoff/Storm Sewers	WBC B, SCR	AQL, IND, IRR, LWV, HHP	Jackson	371184	4329015	368400	4319633	10300101	1
2006	419.00	Blue R.	P	7.7	7.7	Mi.	Escherichia coli (W)	Urban Runoff/Storm Sewers	WBC A	AQL, IRR, LWV, SCR, HHP	Jackson	364588	4312669	368400	4319633	10300101	1
2012	1701.00	Bonhomme Cr.	C	2.5	2.5	Mi.	Escherichia coli (W)	Urban Runoff/Storm Sewers	WBC B	AQL, IRR, LWV, SCR, HHP	St. Louis	709512	4282258	711491	4284301	10300200	1
2012	1701.00	Bonhomme Cr.	C	2.5	2.5	Mi.	pH (W)	Source Unknown	AQL	IRR, LWV, SCR, WBC B, HHP	St. Louis	709512	4282258	711491	4284301	10300200	1
2006	750.00	Bonne Femme Cr.	P	7.8	7.8	Mi.	Escherichia coli (W)	Rural NPS	WBC A	AQL, IRR, LWV, SCR, HHP	Boone	560346	4298772	553749	4294435	10300102	1
2012	753.00	Bonne Femme Cr.	C	7.0	7.0	Mi.	Escherichia coli (W)	Rural NPS	WBC B	AQL, IRR, LWV, SCR, HHP	Boone	565633	4303361	560346	4298772	10300102	1
2002	2034.00	Bourbeuse R.	P	136.7	136.7	Mi.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, CLF, DWS, IRR, LWV, SCR, WBC A	Phelps/Franklin	684343	4252206	622849	4221417	07140103	1, 5
2014	7003.00	Bowling Green Lake - Old	L1	7.0	7.0	Ac.	Chlorophyll-a (W)	Rural NPS	AQL	DWS, IRR, LWV, SCR, WBC B, HHP	Pike	658498	4356565	658498	4356565	07110004	1, 4, 5
2012	7003.00	Bowling Green Lake - Old	L1	7.0	7.0	Ac.	Nitrogen, Total (W)	Rural NPS	AQL	DWS, IRR, LWV, SCR, WBC B, HHP	Pike	658497	4356565	658497	4356565	07110004	1, 4, 5
2012	7003.00	Bowling Green Lake - Old	L1	7.0	7.0	Ac.	Phosphorus, Total (W)	Rural NPS	AQL	DWS, IRR, LWV, SCR, WBC B, HHP	Pike	658502	4356562	658502	4356562	07110004	1, 4, 5
2012	1796.00	Brazeau Cr.	P	10.8	10.8	Mi.	Escherichia coli (W)	Rural NPS	WBC B	AQL, IRR, LWV, SCR, HHP	Perry	798229	4172491	807335	4172833	07140105	1
2002	1371.00	Brush Cr.	P	4.7	4.7	Mi.	Oxygen, Dissolved (W)	Humansville WWTP	AQL	IRR, LWV, SCR, WBC B, HHP	Polk/St. Clair	448632	4182404	444769	4187320	10290106	1
2014	3986.00	Brush Creek	C	5.4	5.4	Mi.	Chrysene, C1-C4 (S)	Nonpoint Source	AQL	IRR, LWV, SCR, WBC B, HHP	Jackson	360868	4321755	368399	4322178	10300101	1
2016	3986.00	Brush Creek	C	5.4	5.4	Mi.	Escherichia coli (W)	Urban Runoff/Storm Sewers	WBC B	AQL, IRR, LWV, SCR, HHP	Jackson	360866	4321755	368394	4322174	10300101	1
2016	3986.00	Brush Creek	C	5.4	5.4	Mi.	Fluoranthene (S)	Nonpoint Source	AQL	IRR, LWV, SCR, WBC B, HHP	Jackson	360870	4321755	368399	4322178	10300101	1
2016	3986.00	Brush Creek	C	5.4	5.4	Mi.	Oxygen, Dissolved (W)	Nonpoint Source	AQL	IRR, LWV, SCR, WBC B, HHP	Jackson	360859	4321756	368396	4322176	10300101	1
2014	3986.00	Brush Creek	C	5.4	5.4	Mi.	Phenanthrene (S)	Nonpoint Source	AQL	IRR, LWV, SCR, WBC B, HHP	Jackson	360869	4321755	368399	4322178	10300101	1
2014	3986.00	Brush Creek	C	5.4	5.4	Mi.	Pyrene (S)	Nonpoint Source	AQL	IRR, LWV, SCR, WBC B, HHP	Jackson	360868	4321755	368399	4322178	10300101	1
2016	7117.00	Buffalo Bill Lake	L3	45.0	45.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, IRR, LWV, SCR, WBC B	DeKalb	381664	4408121	381664	4408121	10280101	1
2012	3273.00	Buffalo Cr.	P	8.0	8.0	Mi.	Fishes Bioassessments/Unknown	Source Unknown	AQL	CLF, IRR, LWV, SCR, WBC A, HHP	Newton/McDonald	369204	4075685	363942	4068061	11070208	1, 8
2006	1865.00	Burgher Br.	C	1.5	1.5	Mi.	Oxygen, Dissolved (W)	Source Unknown	AQL	IRR, LWV, SCR, WBC B, HHP	Phelps	610212	4200283	611960	4199017	07140102	1



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2016 CWC Section 303(d) Listed Waters

Year	WBID	Waterbody	Cls	Imp Size	WB Size	Units	Pollutant	Source	IU	OU	U/D County	Up X	Up Y	Down X	Down Y	WBD 8	Comments
2006	7057.00	Busch W.A. No. 35 Lake	L3	51.0	51.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, IRR, LWW, SCR, WBC B	St. Charles	697833	4288214	697833	4288214	07110009	1
2006	3234.00	Capps Cr.	P	5.0	5.0	Mi.	Escherichia coli (W)	Rural NPS	WBC A	AQL, CDF, IRR, LWW, SCR, HHP	Barry/Newton	408562	4082428	402563	4083044	11070207	1
2016	3241.00	Carver Br.	P	3.0	3.0	Mi.	Escherichia coli (W)	Nonpoint Source	WBC A	AQL, IRR, LWW, SCR, HHP	Newton	377023	4093362	373377	4092653	11070207	1
2010	2288.00	Castor R.	P	7.5	7.5	Mi.	Escherichia coli (W)	Rural NPS	WBC A	AQL, IRR, LWW, SCR, HHP	Bollinger	760131	4115294	766484	4110895	07140107	1, 2
2008	737.00	Cedar Cr.	C	7.9	37.4	Mi.	Aquatic Macroinvertebrate Bioassessments/Unknown	Source Unknown	AQL	IRR, LWW, SCR, WBC B, HHP	Boone	574525	4320028	573573	4311774	10300102	1, 8
2008	1344.00	Cedar Cr.	P	10.9	31.0	Mi.	Aquatic Macroinvertebrate Bioassessments/Unknown	Source Unknown	AQL	IRR, LWW, SCR, WBC A, HHP	Cedar	419908	4170049	422735	4179340	10290106	1, 8
2016	1344.00	Cedar Cr.	P	31.0	31.0	Mi.	Escherichia coli (W)	Rural NPS	WBC A	AQL, IRR, LWW, SCR, HHP	Cedar	427580	4189524	419820	4170283	10290106	1
2010	1344.00	Cedar Cr.	P	10.9	31.0	Mi.	Oxygen, Dissolved (W)	Source Unknown	AQL	IRR, LWW, SCR, WBC A, HHP	Cedar	419909	4170046	422734	4179339	10290106	1
2010	1357.00	Cedar Cr.	C	16.2	16.2	Mi.	Aquatic Macroinvertebrate Bioassessments/Unknown	Source Unknown	AQL	IRR, LWW, SCR, WBC B, HHP	Dade/Cedar	412791	4154079	419820	4170283	10290106	1, 8
2008	1357.00	Cedar Cr.	C	16.2	16.2	Mi.	Oxygen, Dissolved (W)	Source Unknown	AQL	IRR, LWW, SCR, WBC B, HHP	Dade/Cedar	412791	4154079	419820	4170283	10290106	1
2006	3203.00	Center Cr.	P	19.0	26.8	Mi.	Cadmium (S)	Tri-State Mining District	AQL	CLF, IND, IRR, LWW, SCR, WBC A, HHP	Jasper	377334	4111754	356381	4112856	11070207	1
2006	3203.00	Center Cr.	P	19.0	26.8	Mi.	Cadmium (W)	Tri-State Mining District	AQL	CLF, IND, IRR, LWW, SCR, WBC A, HHP	Jasper	377331	4111756	356399	4112875	11070207	1
2006	3203.00	Center Cr.	P	19.0	26.8	Mi.	Lead (S)	Tri-State Mining District	AQL	CLF, IND, IRR, LWW, SCR, WBC A, HHP	Jasper	377333	4111754	356377	4112853	11070207	1
2008	3210.00	Center Cr.	P	21.0	21.0	Mi.	Escherichia coli (W)	Rural NPS	WBC A	AQL, IND, IRR, LWW, SCR, HHP	Newton/Jasper	404365	4099517	383685	4107350	11070207	1
2010	3214.00	Center Cr.	P	4.9	4.9	Mi.	Escherichia coli (W)	Rural NPS	WBC A	AQL, CDF, IND, IRR, LWW, SCR, HHP	Lawrence/Newton	410298	4100642	404365	4099517	11070207	1
2016	5003.00	Center Creek tributary	C	2.7	2.7	Mi.	Cadmium (W)	Oronogo/Dunegweg Mining Belt	AQL	IRR, LWW, SCR, WBC B, HHP	Jasper	369452	4117204	369217	4116017	11070207	1
2016	5003.00	Center Creek tributary	C	2.7	2.7	Mi.	Zinc (W)	Oronogo/Dunegweg Mining Belt	AQL	IRR, LWW, SCR, WBC B, HHP	Jasper	369455	4117204	369223	4116018	11070207	1
2012	3963.00	Chat Creek tributary	US	0.9	0.9	Mi.	Cadmium (W)	Baldwin Park Mine	GEN		Lawrence	437560	4092547	436382	4092417	11070207	1, 7
2012	3963.00	Chat Creek tributary	US	0.9	0.9	Mi.	Zinc (W)	Baldwin Park Mine	GEN		Lawrence	437560	4092547	436382	4092415	11070207	1, 7
2014	7634.00	Chaumiere Lake	UL	3.4	3.4	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	GEN		Clay	367178	4337088	367178	4337088	10300101	1, 7
2012	1781.00	Cinque Hommes Cr.	P	17.1	17.1	Mi.	Escherichia coli (W)	Rural NPS	WBC B, SCR	AQL, IRR, LWW, HHP	Perry	793403	4183726	779350	4178434	07140105	1
2006	1333.00	Clear Cr.	P	28.2	28.2	Mi.	Oxygen, Dissolved (W)	Source Unknown	AQL	IRR, LWW, SCR, WBC A, HHP	Vernon/St. Clair	402340	4186711	417795	4205727	10290105	1
2006	1336.00	Clear Cr.	C	22.3	22.3	Mi.	Oxygen, Dissolved (W)	Source Unknown	AQL	IRR, LWW, SCR, WBC B, HHP	Vernon	391921	4172771	402340	4186711	10290105	1
2006	3238.00	Clear Cr.	P	11.1	11.1	Mi.	Escherichia coli (W)	Rural NPS	WBC B	AQL, IRR, LWW, SCR, HHP	Lawrence/Newton	410980	4088931	397639	4088317	11070207	1
2002	3239.00	Clear Cr.	C	3.5	3.5	Mi.	Nutrient/Eutrophication Biol. Indicators (W)	Monett WWTP	AQL	IRR, LWW, SCR, WBC B, HHP	Barry/Lawrence	415495	4086458	410980	4088931	11070207	1, 4



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Year	WBID	Waterbody	Cls	Imp Size	WB Size	Units	Pollutant	Source	IU	OU	U/D County	Up X	Up Y	Down X	Down Y	WBD 8	Comments
2002	3239.00	Clear Cr.	C	3.5	3.5	Mi.	Oxygen, Dissolved (W)	Monett WWTP	AQL	IRR, LWW, SCR, WBC B, HHP	Barry/Lawrence	415495	4086458	410980	4088931	11070207	1
2006	935.00	Clear Fk.	P	3.1	25.8	Mi.	Oxygen, Dissolved (W)	Knob Noster WWTP, Nonpoint Source	AQL	IRR, LWW, SCR, WBC B, HHP	Johnson	448495	4291442	448650	4293696	10300104	1
2014	7326.00	Clearwater Lake	L2	1635.0	1635.0	Ac.	Chlorophyll-a (W)	Rural NPS	AQL	IRR, LWW, SCR, WBC A, HHP	Wayne/Reynolds	697891	4112203	697891	4112203	11010007	1, 4
2002	7326.00	Clearwater Lake	L2	1635.0	1635.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, IRR, LWW, SCR, WBC A	Wayne/Reynolds	697891	4112203	697891	4112203	11010007	1
2016	7326.00	Clearwater Lake	L2	1635.0	1635.0	Ac.	Phosphorus, Total (W)	Nonpoint Source	AQL	IRR, LWW, SCR, WBC A, HHP	Wayne/Reynolds	697891	4112203	697891	4112203	11010007	1, 4
2006	1706.00	Coldwater Cr.	C	6.9	6.9	Mi.	Chloride (W)	Urban Runoff/Storm Sewers	AQL	IND, IRR, LWW, SCR, WBC B, HHP	St. Louis	735014	4299849	741449	4301962	10300200	1
2016	1706.00	Coldwater Cr.	C	6.9	6.9	Mi.	Escherichia coli (W)	Urban Runoff/Storm Sewers	WBC B, SCR	AQL, IND, IRR, LWW, HHP	St. Louis	741425	4301794	735014	4299849	10300200	1
2012	2177.00	Coonville Cr.	C	1.3	1.3	Mi.	Lead (W)	Source Unknown	AQL	IRR, LWW, SCR, WBC B, HHP	St. Francois	717474	4206559	716589	4204963	07140104	1
2016	7378.00	Coot Lake	L3	20.0	20.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, IRR, LWW, SCR, WBC B	Jackson	383770	4303154	383770	4303154	10290108	1
2016	7379.00	Cottontail Lake	L3	22.0	22.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, IRR, LWW, SCR, WBC B	Jackson	385814	4304634	385814	4304634	10290108	1
2006	1943.00	Courtois Cr.	P	2.6	32.0	Mi.	Lead (S)	Doe Run Viburnum Division Lead mine	AQL	CLF, IRR, LWW, SCR, WBC A, HHP	Washington	669868	4181478	670865	4184583	07140102	1
2006	1943.00	Courtois Cr.	P	2.6	32.0	Mi.	Zinc (S)	Doe Run Viburnum Division Lead mine	AQL	CLF, IRR, LWW, SCR, WBC A, HHP	Washington	669862	4181470	670877	4184596	07140102	1
2012	2382.00	Crane Cr.	P	13.2	13.2	Mi.	Aquatic Macroinvertebrate Bioassessments/Unknown	Source Unknown	AQL	CDF, IRR, LWW, SCR, WBC A, HHP	Stone	445954	4088238	456895	4081483	11010002	1, 8
2016	7334.00	Crane Lake	L3	109.0	109.0	Ac.	Chlorophyll-a (W)	Source Unknown	AQL	IRR, LWW, SCR, WBC B, HHP	Iron	710853	4143902	710853	4143902	08020202	1, 4
2016	7334.00	Crane Lake	L3	109.0	109.0	Ac.	Phosphorus, Total (W)	Source Unknown	AQL	IRR, LWW, SCR, WBC B, HHP	Iron	710853	4143896	710853	4143896	08020202	1, 4
2012	2816.00	Craven Ditch	C	11.6	11.6	Mi.	Oxygen, Dissolved (W)	Source Unknown	AQL	IRR, LWW, SCR, HHP	Butler	730995	4068609	730730	4052473	11010007	1
2006	1703.00	Creve Coeur Cr.	C	3.8	3.8	Mi.	Chloride (W)	Urban Runoff/Storm Sewers	AQL	IRR, LWW, SCR, WBC B, HHP	St. Louis	718172	4283167	718455	4287491	10300200	1
2006	1703.00	Creve Coeur Cr.	C	3.8	3.8	Mi.	Escherichia coli (W)	Urban Runoff/Storm Sewers	WBC B	AQL, IRR, LWW, SCR, HHP	St. Louis	718172	4283167	718455	4287491	10300200	1
2006	1703.00	Creve Coeur Cr.	C	3.8	3.8	Mi.	Oxygen, Dissolved (W)	Source Unknown	AQL	IRR, LWW, SCR, WBC B, HHP	St. Louis	718172	4283167	718455	4287491	10300200	1
2006	1928.00	Crooked Cr.	P	3.5	3.5	Mi.	Cadmium (S)	Buick Lead Smelter	AQL	CLF, IRR, LWW, SCR, WBC A, HHP	Crawford	662216	4173989	658201	4175646	07140102	1
2006	1928.00	Crooked Cr.	P	3.5	3.5	Mi.	Cadmium (W)	Buick Lead Smelter	AQL	CLF, IRR, LWW, SCR, WBC A, HHP	Crawford	662216	4173989	658201	4175646	07140102	1
2006	1928.00	Crooked Cr.	P	3.5	3.5	Mi.	Lead (S)	Buick Lead Smelter	AQL	CLF, IRR, LWW, SCR, WBC A, HHP	Crawford	662216	4173989	658201	4175646	07140102	1
2008	3961.00	Crooked Creek	C	6.5	6.5	Mi.	Cadmium (W)	Buick Lead Smelter	GEN	AQL, IRR, LWW, SCR, WBC B, HHP	Iron/Dent	664596	4168505	662197	4173781	07140102	1, 7
2010	3961.00	Crooked Creek	C	6.5	6.5	Mi.	Copper (W)	Buick Lead Smelter	GEN	AQL, IRR, LWW, SCR, WBC B, HHP	Iron/Dent	664588	4168517	662197	4173782	07140102	1, 7
2016	7135.00	Crowder St. Park Lake	L3	18.0	18.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, IRR, LWW, SCR, WBC A	Grundy	443780	4438588	443780	4438588	10280102	1
2006	2636.00	Current R.	P	124.0	124.0	Mi.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, CLF, IRR, LWW, SCR, WBC A	Shannon/Ripley	628633	4137638	696824	4041492	11010008	1
2006	219.00	Dardenne Cr.	P1	7.0	7.0	Mi.	Oxygen, Dissolved (W)	Source Unknown	AQL	IRR, LWW, SCR, WBC B, HHP	St. Charles	708078	4300264	713786	4304316	07110009	1



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2006	3826.00	Deer Cr.	P	1.6	1.6	Mi.	Chloride (W)	Urban Runoff/Storm Sewers	AQL	IRR, LWW, SCR, WBC A, HHP	St. Louis/St. Louis City	732023	4276834	733741	4275807	07140101	1
2012	3826.00	Deer Cr.	P	1.6	1.6	Mi.	Escherichia coli (W)	Urban Runoff/Storm Sewers	WBC A, SCR	AQL, IRR, LWW, HHP	St. Louis/St. Louis City	732023	4276834	733741	4275807	07140101	1
2002	7015.00	Deer Ridge Community Lake	L3	39.0	39.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, IRR, LWW, SCR, WBC B	Lewis	599831	4448447	599831	4448447	07110002	1
2006	3109.00	Ditch #36	P	7.8	7.8	Mi.	Oxygen, Dissolved (W)	Source Unknown	AQL	IRR, LWW, SCR, WBC B, HHP	Dunklin	770137	4018408	767863	4007224	08020204	1
2006	3810.00	Douger Br.	C	2.8	2.8	Mi.	Lead (S)	Aurora Lead Mining District	AQL	IRR, LWW, SCR, WBC B, HHP	Lawrence	432983	4092649	428971	4092384	11070207	1
2006	3810.00	Douger Br.	C	2.8	2.8	Mi.	Zinc (S)	Aurora Lead Mining District	AQL	IRR, LWW, SCR, WBC B, HHP	Lawrence	432983	4092649	428971	4092384	11070207	1
2006	1180.00	Dousinbury Cr.	P	3.9	3.9	Mi.	Escherichia coli (W)	Rural NPS	WBC B	AQL, IRR, LWW, SCR, HHP	Dallas	506028	4158604	501716	4160952	10290110	1
2016	1792.00	Dry Fk.	C	3.2	3.2	Mi.	Escherichia coli (W)	Source Unknown	WBC B	AQL, IRR, LWW, SCR, HHP	Perry	786085	4185603	786022	4182315	07140105	1
2008	3189.00	Dry Fk.	C	10.2	10.2	Mi.	Escherichia coli (W)	Rural NPS	WBC A	AQL, IRR, LWW, SCR, HHP	Jasper	391617	4123451	379518	4128240	11070207	1
2016	3163.00	Dry Hollow	C	0.5	0.5	Mi.	Escherichia coli (W)	Source Unknown	SCR	AQL, IRR, LWW, HHP	Lawrence	413360	4110027	413000	4110463	11070207	1
2006	3569.00	Dutro Carter Cr.	P	0.5	1.5	Mi.	Oxygen, Dissolved (W)	Rolla SE WWTP	AQL	IRR, LWW, SCR, WBC B, HHP	Phelps	611946	4199021	612708	4199006	07140102	1
2016	3570.00	Dutro Carter Cr.	C	0.5	0.5	Mi.	Escherichia coli (W)	Source Unknown	WBC B, SCR	AQL, IRR, LWW, HHP	Phelps	610611	4198782	610120	4198788	07140102	1
2016	3199.00	Duval Cr.	C	7.0	7.0	Mi.	Escherichia coli (W)	Nonpoint Source	WBC B	AQL, IRR, LWW, SCR, HHP	Jasper	375229	4135004	368784	4127596	11070207	1
2010	372.00	E. Fk. Crooked R.	P	19.9	19.9	Mi.	Oxygen, Dissolved (W)	Source Unknown	AQL	IRR, LWW, SCR, WBC B, HHP	Ray	418043	4367620	423049	4349970	10300101	1
2006	457.00	E. Fk. Grand R.	P	28.7	28.7	Mi.	Escherichia coli (W)	Rural NPS	WBC A	AQL, DWS, IRR, LWW, SCR, HHP	Worth/Gentry	388817	4483394	384234	4450462	10280101	1, 2, 5
2008	608.00	E. Fk. Locust Cr.	P	16.7	16.7	Mi.	Escherichia coli (W)	Municipal Point Source Discharges, Nonpoint Source	WBC B	AQL, IRR, LWW, SCR, HHP	Sullivan	490788	4450893	485177	4432656	10280103	1
2008	610.00	E. Fk. Locust Cr.	C	15.7	15.7	Mi.	Escherichia coli (W)	Rural NPS	WBC A	AQL, IRR, LWW, SCR, HHP	Sullivan	492641	4468112	490788	4450893	10280103	1
2008	610.00	E. Fk. Locust Cr.	C	14.8	15.7	Mi.	Oxygen, Dissolved (W)	Rural NPS	AQL	IRR, LWW, SCR, WBC A, HHP	Sullivan	492629	4468112	490930	4451859	10280103	1
2006	1282.00	E. Fk. Tebo Cr.	C	10.4	14.5	Mi.	Oxygen, Dissolved (W)	Windsor SW WWTP	AQL	IRR, LWW, SCR, WBC B, HHP	Henry	453388	4263004	446906	4257222	10290108	1
1998	3964.00	East Whetstone Cr.	C	0.3	3.1	Mi.	Ammonia, Total (W)	Mountain Grove Lagoon	AQL	IRR, LWW, SCR, WBC B, HHP	Wright	564365	4111477	564856	4111385	10290201	1
2006	2166.00	Eaton Br.	C	1.2	1.2	Mi.	Cadmium (S)	Leadwood tailings pond	AQL	IRR, LWW, SCR, HHP	St. Francois	710945	4193695	712097	4194409	07140104	1
2006	2166.00	Eaton Br.	C	1.2	1.2	Mi.	Cadmium (W)	Leadwood tailings pond	AQL	IRR, LWW, SCR, HHP	St. Francois	710945	4193695	712097	4194409	07140104	1
2006	2166.00	Eaton Br.	C	1.2	1.2	Mi.	Lead (S)	Leadwood tailings pond	AQL	IRR, LWW, SCR, HHP	St. Francois	710945	4193695	712097	4194409	07140104	1
2006	2166.00	Eaton Br.	C	1.2	1.2	Mi.	Zinc (S)	Leadwood tailings pond	AQL	IRR, LWW, SCR, HHP	St. Francois	710945	4193695	712097	4194409	07140104	1
2006	2166.00	Eaton Br.	C	1.2	1.2	Mi.	Zinc (W)	Leadwood tailings pond	AQL	IRR, LWW, SCR, HHP	St. Francois	710945	4193695	712097	4194409	07140104	1
2002	2593.00	Eleven Point R.	P	22.7	22.7	Mi.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, CLF, IRR, LWW, SCR, WBC A	Oregon	663687	4040687	658823	4067446	11010011	1
2006	2597.00	Eleven Point R.	P	11.4	11.4	Mi.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, CDF, IRR, LWW, SCR, WBC A	Oregon	658823	4067446	648216	4073792	11010011	1
2008	2601.00	Eleven Point R.	P	22.3	22.3	Mi.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, CLF, IRR, LWW, SCR, WBC A	Oregon	648216	4073792	626147	4076649	11010011	1
1998	189.00	Elkhorn Cr.	C	17.6	21.4	Mi.	Oxygen, Dissolved (W)	Montgomery City East WWTF	AQL	IRR, LWW, SCR, WBC B, HHP	Montgomery	644641	4327885	631724	4317736	07110008	1
2006	1283.00	Elm Br.	C	3.0	3.0	Mi.	Oxygen, Dissolved (W)	Windsor SE WWTP	AQL	IRR, LWW, SCR, WBC B, HHP	Henry	455758	4264046	453816	4261489	10290108	1



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2012	1704.00	Fee Fee Cr. (new)	P	1.5	1.5	Mi.	Chloride (W)	Urban Runoff/Storm Sewers	AQL	IRR, LWW, SCR, WBC B, HHP	St. Louis	720613	4290506	718639	4290795	10300200	1
2012	1704.00	Fee Fee Cr. (new)	P	1.5	1.5	Mi.	Escherichia coli (W)	Urban Runoff/Storm Sewers	WBC B, SCR	AQL, IRR, LWW, HHP	St. Louis	720613	4290506	718639	4290795	10300200	1
2012	7237.00	Fellows Lake	L1	800.0	800.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, DWS, IRR, LWW, SCR, WBC A	Greene	479590	4129879	479590	4129879	10290106	1, 5
2016	3595.00	Fenton Cr.	P	0.5	0.5	Mi.	Chloride (W)	Source Unknown	AQL	IRR, LWW, SCR, WBC B, HHP	St. Louis	724629	4265304	723865	4265429	07140102	1
2012	3595.00	Fenton Cr.	P	0.5	0.5	Mi.	Escherichia coli (W)	Urban Runoff/Storm Sewers	WBC B	AQL, IRR, LWW, SCR, HHP	St. Louis	723865	4265429	724629	4265304	07140102	1
2012	2186.00	Fishpot Cr.	P	3.5	3.5	Mi.	Chloride (W)	Urban Runoff/Storm Sewers	AQL	IRR, LWW, SCR, WBC B, HHP	St. Louis	715611	4270777	718256	4269401	07140102	1
2008	2186.00	Fishpot Cr.	P	3.5	3.5	Mi.	Escherichia coli (W)	Urban Runoff/Storm Sewers	WBC B	AQL, IRR, LWW, SCR, HHP	St. Louis	715611	4270777	718256	4269401	07140102	1
2016	3220.00	Fivemile Cr.	P	4.9	5.0	Mi.	Escherichia coli (W)	Rural NPS	WBC B	AQL, IRR, LWW, SCR, HHP	Newton	362116	4091122	355991	4093715	11070207	1
2016	864.00	Flat Cr.	P	23.7	23.7	Mi.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, IRR, LWW, SCR, WBC B	Pettis/Morgan	504073	4279987	484807	4279832	10300103	1
2006	2168.00	Flat River Cr.	C	4.7	10.0	Mi.	Cadmium (W)	Old Lead Belt tailings	AQL	IRR, LWW, SCR, WBC B, HHP	St. Francois	717605	4190862	719860	4196746	07140104	1
2010	7151.00	Forest Lake	L1	580.0	580.0	Ac.	Chlorophyll-a (W)	Rural NPS	AQL	DWS, IRR, LWW, SCR, WBC A, HHP	Adair	529118	4446686	529118	4446686	10280202	1, 4, 5
2016	7151.00	Forest Lake	L1	580.0	580.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, DWS, IRR, LWW, SCR, WBC A	Adair	529120	4446689	529120	4446689	10280202	1, 5
2010	7151.00	Forest Lake	L1	580.0	580.0	Ac.	Nitrogen, Total (W)	Rural NPS	AQL	DWS, IRR, LWW, SCR, WBC A, HHP	Adair	529118	4446688	529118	4446688	10280202	1, 4, 5
2010	7151.00	Forest Lake	L1	580.0	580.0	Ac.	Phosphorus, Total (W)	Rural NPS	AQL	DWS, IRR, LWW, SCR, WBC A, HHP	Adair	529120	4446689	529120	4446689	10280202	1, 4, 5
2016	3943.00	Foster Branch tributary	C	0.2	2.0	Mi.	Oxygen, Dissolved (W)	Ashland WWTF	AQL	IRR, LWW, SCR, WBC B, HHP	Boone	564696	4290774	564814	4290588	10300102	1
2006	747.00	Fowler Cr.	C	6.0	6.0	Mi.	Oxygen, Dissolved (W)	Source Unknown	AQL	IRR, LWW, SCR, WBC B, HHP	Boone	567705	4291358	568085	4285215	10300102	1
2012	1842.00	Fox Cr.	P	7.2	7.2	Mi.	Aquatic Macroinvertebrate Bioassessments/Unknown	Source Unknown	AQL	IRR, LWW, SCR, WBC B, HHP	St. Louis	698956	4266805	702113	4258893	07140102	1, 8
2008	38.00	Fox R.	P	42.0	42.0	Mi.	Escherichia coli (W)	Rural NPS	WBC B	AQL, IRR, LWW, SCR, HHP	Clark	591716	4495662	619844	4469932	07110001	1
2014	7008.00	Fox Valley Lake	L3	89.0	89.0	Ac.	Chlorophyll-a (W)	Rural NPS	AQL	IRR, LWW, SCR, WBC B, HHP	Clark	604601	4483675	604601	4483675	07110001	1, 4
2014	7008.00	Fox Valley Lake	L3	89.0	89.0	Ac.	Nitrogen, Total (W)	Rural NPS	AQL	IRR, LWW, SCR, WBC B, HHP	Clark	604599	4483679	604599	4483679	07110001	1, 4
2010	7008.00	Fox Valley Lake	L3	89.0	89.0	Ac.	Phosphorus, Total (W)	Rural NPS	AQL	IRR, LWW, SCR, WBC B, HHP	Clark	604600	4483686	604600	4483686	07110001	1, 4
2010	7382.00	Foxboro Lake	L3	22.0	22.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, IRR, LWW, SCR, WBC B	Franklin	644992	4249660	644992	4249660	07140103	1
2002	7280.00	Frisco Lake	L3	5.0	5.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, IRR, LWW, SCR, WBC B	Phelps	608326	4201524	608326	4201524	07140102	1
2016	4061.00	Gailey Branch	C	3.2	3.2	Mi.	Oxygen, Dissolved (W)	Source Unknown	AQL	IRR, LWW, SCR, WBC B, HHP	Pike	653189	4361304	650012	4364278	07110007	1
2012	1004.00	Gans Cr.	C	5.5	5.5	Mi.	Escherichia coli (W)	Rural NPS	WBC A	AQL, IRR, LWW, SCR, HHP	Boone	562859	4305362	558288	4303469	10300102	1
2002	1455.00	Gasconade R.	P	264.0	264.0	Mi.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, CLF, DWS, IRR, LWW, SCR, WBC A	Pulaski	626331	4281831	543608	4120607	10290201	1, 5



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Year	WBID	Waterbody	Cls	Imp Size	WB Size	Units	Pollutant	Source	IU	OU	U/D County	Up X	Up Y	Down X	Down Y	WBD 8	Comments
2006	2184.00	Grand Glaize Cr.	C	4.0	4.0	Mi.	Chloride (W)	Urban Runoff/Storm Sewers	AQL	IRR, LWW, SCR, WBC B, HHP	St. Louis	720447	4272244	721056	4270200	07140102	1
2008	2184.00	Grand Glaize Cr.	C	4.0	4.0	Mi.	Escherichia coli (W)	Urban Runoff/Storm Sewers	WBC B	AQL, IRR, LWW, SCR, HHP	St. Louis	720447	4272244	721056	4270200	07140102	1
2002	2184.00	Grand Glaize Cr.	C	4.0	4.0	Mi.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, IRR, LWW, SCR, WBC B	St. Louis	721056	4270200	720447	4272244	07140102	1
2006	593.00	Grand R.	P	56.0	56.0	Mi.	Escherichia coli (W)	Rural NPS	WBC A	AQL, DWS, IRR, LWW, SCR, HHP	Livingston/Chariton	454151	4399076	490791	4359355	10280103	1, 5
2008	1712.00	Gravois Cr.	P	2.3	2.3	Mi.	Chloride (W)	Urban Runoff/Storm Sewers	AQL	IRR, LWW, SCR, WBC B, HHP	St. Louis/St. Louis City	735408	4269269	737783	4270129	07140101	1
2006	1712.00	Gravois Cr.	P	2.3	2.3	Mi.	Escherichia coli (W)	Urban Runoff/Storm Sewers	WBC B	AQL, IRR, LWW, SCR, HHP	St. Louis/St. Louis City	735408	4269269	737783	4270129	07140101	1
2006	1713.00	Gravois Cr.	C	6.0	6.0	Mi.	Chloride (W)	Urban Runoff/Storm Sewers	AQL	IRR, LWW, SCR, WBC B, HHP	St. Louis	731101	4269870	735408	4269269	07140101	1
2006	1713.00	Gravois Cr.	C	6.0	6.0	Mi.	Escherichia coli (W)	Urban Runoff/Storm Sewers	WBC B	AQL, IRR, LWW, SCR, HHP	St. Louis	731101	4269870	735408	4269269	07140101	1
2016	4051.00	Gravois Creek tributary	C	1.9	1.9	Mi.	Escherichia coli (W)	Municipal, Urbanized High Density Area, Urban Runoff/Storm Sewers	WBC B	AQL, IRR, LWW, SCR, HHP	St. Louis	727153	4269299	729316	4270942	07140101	1
2006	1009.00	Grindstone Cr.	C	2.5	2.5	Mi.	Escherichia coli (W)	Rural NPS, Urban Runoff/Storm Sewers	WBC A	AQL, IRR, LWW, SCR, HHP	Boone	561330	4309115	558769	4308985	10300102	1
2014	7386.00	Harrison County Lake	L1	280.0	280.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, DWS, IRR, LWW, SCR, WBC B	Harrison	407761	4472463	407761	4472463	10280101	1, 5
2010	7152.00	Hazel Creek Lake	L1	453.0	453.0	Ac.	Chlorophyll-a (W)	Rural NPS	AQL	DWS, IRR, LWW, SCR, WBC B, HHP	Adair	531556	4461098	531556	4461098	10280201	1, 4, 5
2008	7152.00	Hazel Creek Lake	L1	453.0	453.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, DWS, IRR, LWW, SCR, WBC B	Adair	531552	4461098	531552	4461098	10280201	1, 5
2016	2196.00	Headwater Div. Chan.	P	20.3	20.3	Mi.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, DWS, IRR, LWW, SCR, WBC A	Cape Girardeau	809134	4128554	780746	4123627	07140107	1, 5
2008	848.00	Heaths Cr.	P	21.0	21.0	Mi.	Oxygen, Dissolved (W)	Source Unknown	AQL	CLF, IRR, LWW, SCR, WBC B, HHP	Pettis/Cooper	481311	4306305	498383	4308084	10300103	1
2014	596.00	Hickory Br.	C	6.8	6.8	Mi.	Oxygen, Dissolved (W)	Rural NPS	AQL	IRR, LWW, SCR, WBC B, HHP	Chariton	492740	4382070	484609	4381385	10280103	1
2006	3226.00	Hickory Cr.	P	4.9	4.9	Mi.	Escherichia coli (W)	Rural NPS	WBC A	AQL, IRR, LWW, SCR, HHP	Newton	381782	4079307	377855	4083987	11070207	1
2016	1007.00	Hinkson Cr.	P	7.6	7.6	Mi.	Escherichia coli (W)	Nonpoint Source	WBC B	AQL, IRR, LWW, SCR, HHP	Boone	557308	4308963	550730	4308257	10300102	1
2012	1008.00	Hinkson Cr.	C	18.8	18.8	Mi.	Escherichia coli (W)	Nonpoint Source	WBC A	AQL, IRR, LWW, SCR, HHP	Boone	567735	4324925	557308	4308963	10300102	1
2016	7193.00	Holden City Lake	L1	290.2	290.2	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, DWS, IRR, LWW, SCR, WBC B	Johnson	410151	4290703	410151	4290703	10300104	1, 5
2012	1011.00	Hominy Br.	C	1.0	1.0	Mi.	Escherichia coli (W)	Rural NPS, Urban Runoff/Storm Sewers	WBC B	AQL, IRR, LWW, SCR, HHP	Boone	561244	4310832	560154	4310816	10300102	1
2010	3169.00	Honey Cr.	P	16.5	16.5	Mi.	Escherichia coli (W)	Rural NPS	WBC B	AQL, IRR, LWW, SCR, HHP	Lawrence	441810	4098909	423404	4104004	11070207	1
2010	3170.00	Honey Cr.	C	2.7	2.7	Mi.	Escherichia coli (W)	Rural NPS	WBC B	AQL, IRR, LWW, SCR, HHP	Lawrence	443610	4095816	441810	4098909	11070207	1
2010	1348.00	Horse Cr.	P	27.7	27.7	Mi.	Aquatic Macroinvertebrate Bioassessments/Unknown	Source Unknown	AQL	IRR, LWW, SCR, WBC B, HHP	Vernon/Cedar	405029	4166750	422134	4180183	10290106	1, 8
2008	1348.00	Horse Cr.	P	27.7	27.7	Mi.	Oxygen, Dissolved (W)	Source Unknown	AQL	IRR, LWW, SCR, WBC B, HHP	Vernon/Cedar	405029	4166750	422134	4180183	10290106	1
2014	3413.00	Horseshoe Cr.	C	5.8	5.8	Mi.	Oxygen, Dissolved (W)	Source Unknown	AQL	IRR, LWW, SCR, WBC B, HHP	Lafayette/Jackson	404067	4315232	403598	4321954	10300101	1



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Year	WBID	Waterbody	Cls	Imp Size	WB Size	Units	Pollutant	Source	IU	OU	U/D County	Up X	Up Y	Down X	Down Y	WBD 8	Comments
2002	7388.00	Hough Park Lake	L3	10.0	10.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, IRR, LWW, SCR, WBC B	Cole	571170	4266161	571170	4266161	10300102	1
2012	7029.00	Hunnewell Lake	L3	228.0	228.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, IRR, LWW, SCR, WBC B	Shelby	597506	4395783	597506	4395783	07110004	1
2010	420.00	Indian Cr.	C	3.4	3.4	Mi.	Chloride (W)	Road/Bridge Runoff, Non-construction	AQL	IND, IRR, LWW, SCR, WBC A, HHP	Jackson	364588	4312669	360621	4311182	10300101	1
2002	420.00	Indian Cr.	C	3.4	3.4	Mi.	Escherichia coli (W)	Leawood, KS WWTP, Urban Runoff/Storm Sewers	WBC A	AQL, IND, IRR, LWW, SCR, HHP	Jackson	360621	4311182	364588	4312669	10300101	1
2012	1946.00	Indian Cr.	P	1.9	1.9	Mi.	Lead (S)	Doe Run Viburnum Division Lead mine	AQL	IRR, LWW, SCR, WBC B, HHP	Washington	668798	4178896	669872	4181483	07140102	1
2010	1946.00	Indian Cr.	P	1.9	1.9	Mi.	Zinc (S)	Doe Run Viburnum Division Lead mine	AQL	IRR, LWW, SCR, WBC B, HHP	Washington	668798	4178896	669872	4181483	07140102	1
2006	3256.00	Indian Cr.	P	9.7	30.8	Mi.	Escherichia coli (W)	Rural NPS	WBC A	AQL, CLF, IRR, LWW, SCR, HHP	Newton/McDonald	390072	4072826	381952	4065143	11070208	1
2008	7389.00	Indian Creek Community Lake	L3	185.0	185.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, IRR, LWW, SCR, WBC B	Livingston	440537	4416530	440537	4416530	10280101	1
2014	3223.00	Jacobs Br.	P	1.6	1.6	Mi.	Cadmium (S)	Tri-State Mining District	AQL	IRR, LWW, SCR, WBC B, HHP	Newton	365485	4095641	365862	4097358	11070207	1
2014	3223.00	Jacobs Br.	P	1.6	1.6	Mi.	Cadmium (W)	Tri-State Mining District	AQL	IRR, LWW, SCR, WBC B, HHP	Newton	365485	4095641	365862	4097358	11070207	1
2014	3223.00	Jacobs Br.	P	1.6	1.6	Mi.	Lead (S)	Tri-State Mining District	AQL	IRR, LWW, SCR, WBC B, HHP	Newton	365485	4095641	365862	4097358	11070207	1
2014	3223.00	Jacobs Br.	P	1.6	1.6	Mi.	Zinc (S)	Tri-State Mining District	AQL	IRR, LWW, SCR, WBC B, HHP	Newton	365485	4095641	365862	4097358	11070207	1
2012	3223.00	Jacobs Br.	P	1.6	1.6	Mi.	Zinc (W)	Tri-State Mining District	AQL	IRR, LWW, SCR, WBC B, HHP	Newton	365485	4095641	365862	4097358	11070207	1
2012	3207.00	Jenkins Cr.	P	2.8	2.8	Mi.	Escherichia coli (W)	Rural NPS	WBC A	AQL, IRR, LWW, SCR, HHP	Jasper	389303	4103152	386194	4105401	11070207	1
2014	3208.00	Jenkins Cr.	C	4.8	4.8	Mi.	Escherichia coli (W)	Rural NPS	WBC A	AQL, IRR, LWW, SCR, HHP	Newton/Jasper	393119	4101129	389303	4103152	11070207	1
2012	3205.00	Jones Cr.	P	7.5	7.5	Mi.	Escherichia coli (W)	Rural NPS	WBC A	AQL, CLF, IRR, LWW, SCR, HHP	Newton/Jasper	388104	4099353	383685	4107350	11070207	1
2016	5006.00	Joplin Creek	C	3.9	3.9	Mi.	Cadmium (W)	Mill Tailings	AQL	IRR, LWW, SCR, WBC B, HHP	Jasper	365334	4107354	364802	4108238	11070207	1
2014	3374.00	Jordan Cr.	P	3.8	3.8	Mi.	Benzo-a-anthracene (S)	Urban NPS	AQL	IRR, LWW, SCR, WBC B, HHP	Greene	471023	4115738	472704	4118162	11010002	1
2014	3374.00	Jordan Cr.	P	3.8	3.8	Mi.	Benzo-a-pyrene -PAHs (S)	Urban NPS	AQL	IRR, LWW, SCR, WBC B, HHP	Greene	471023	4115738	472704	4118162	11010002	1
2014	3374.00	Jordan Cr.	P	3.8	3.8	Mi.	Chrysene, C1-C4 (S)	Urban NPS	AQL	IRR, LWW, SCR, WBC B, HHP	Greene	471023	4115738	472704	4118162	11010002	1
2016	3374.00	Jordan Cr.	P	3.8	3.8	Mi.	Fluoranthene (S)	Urban NPS	AQL	IRR, LWW, SCR, WBC B, HHP	Greene	472704	4118162	471023	4115738	11010002	1
2014	3374.00	Jordan Cr.	P	3.8	3.8	Mi.	Phenanthrene (S)	Urban NPS	AQL	IRR, LWW, SCR, WBC B, HHP	Greene	471023	4115738	472704	4118162	11010002	1
2014	3374.00	Jordan Cr.	P	3.8	3.8	Mi.	Pyrene (S)	Urban NPS	AQL	IRR, LWW, SCR, WBC B, HHP	Greene	471023	4115738	472704	4118162	11010002	1
2012	3592.00	Keifer Cr.	P	1.2	1.2	Mi.	Chloride (W)	Road/Bridge Runoff, Non-construction	AQL	IRR, LWW, SCR, WBC A, HHP	St. Louis	713475	4270033	714845	4269588	07140102	1
2012	3592.00	Keifer Cr.	P	1.2	1.2	Mi.	Escherichia coli (W)	Rural NPS	WBC A	AQL, IRR, LWW, SCR, HHP	St. Louis	713475	4270033	714845	4269588	07140102	1
2016	7657.00	Knox Village Lake	L3	3.0	3.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, IRR, LWW, SCR, WBC B	Jackson	377551	4309113	377551	4309113	10300101	1
2016	2171.00	Koen Cr.	C	1.0	1.0	Mi.	Lead (S)	Mine Tailings	AQL	IRR, LWW, SCR, WBC B, HHP	St. Francois	719760	4194283	720089	4193029	07140104	1



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2014	1529.00	L. Beaver Cr.	C	3.5	3.5	Mi.	Escherichia coli (W)	Municipal Point Source Discharges	WBC A	AQL, IRR, LWW, SCR, HHP	Phelps	602527	4199503	600308	4195828	10290203	1
2008	1529.00	L. Beaver Cr.	C	3.5	3.5	Mi.	Sedimentation/Siltation (S)	Smith Sand and Gravel	AQL	IRR, LWW, SCR, WBC A, HHP	Phelps	602527	4199503	600308	4195828	10290203	1
2012	422.00	L. Blue R.	P	35.1	35.1	Mi.	Escherichia coli (W)	Urban Runoff/Storm Sewers	WBC B	AQL, IRR, LWW, SCR, HHP	Jackson	372712	4309259	394916	4340608	10300101	1
2012	1003.00	L. Bonne Femme Cr.	P	9.0	9.0	Mi.	Escherichia coli (W)	Source Unknown	WBC B	AQL, IRR, LWW, SCR, HHP	Boone	558288	4303469	553242	4296685	10300102	1
2006	1863.00	L. Dry Fk.	P	1.0	5.2	Mi.	Oxygen, Dissolved (W)	Rolla SE WWTP	AQL	IRR, LWW, SCR, WBC B, HHP	Phelps	613267	4199796	614362	4200448	07140102	1
2006	1864.00	L. Dry Fk.	C	0.6	4.7	Mi.	Oxygen, Dissolved (W)	Rolla SE WWTP	AQL	IRR, LWW, SCR, WBC B, HHP	Phelps	612755	4198995	613258	4199800	07140102	1
2008	1864.00	L. Dry Fk.	C	4.7	4.7	Mi.	Oxygen, Dissolved (W)	Source Unknown	AQL	IRR, LWW, SCR, WBC B, HHP	Phelps	613005	4192818	612727	4198982	07140102	1
2006	1325.00	L. Dry Wood Cr.	P	20.5	20.5	Mi.	Oxygen, Dissolved (W)	Source Unknown	AQL	IRR, LWW, SCR, WBC B, HHP	Vernon	376904	4174682	376740	4191482	10290104	1
2010	1326.00	L. Dry Wood Cr.	C	15.6	15.6	Mi.	Oxygen, Dissolved (W)	Source Unknown	AQL	IRR, LWW, SCR, WBC B, HHP	Barton/Vernon	379798	4162808	376904	4174682	10290104	1
2010	3279.00	L. Lost Cr.	P	5.8	5.8	Mi.	Escherichia coli (W)	Rural NPS	WBC B	AQL, IRR, LWW, SCR, HHP	Newton	362556	4080613	355717	4078288	11070206	1
2006	623.00	L. Medicine Cr.	P	19.8	39.8	Mi.	Aquatic Macroinvertebrate Bioassessments/Unknown	Source Unknown	AQL	IRR, LWW, SCR, WBC B, HHP	Mercer	463960	4492230	465770	4469240	10280103	1, 8
2006	623.00	L. Medicine Cr.	P	39.8	39.8	Mi.	Escherichia coli (W)	Rural NPS	WBC B	AQL, IRR, LWW, SCR, HHP	Mercer/Grundy	464025	4492224	467988	4439145	10280103	1
2004	3652.00	L. Osage R.	C	23.6	23.6	Mi.	Escherichia coli (W)	Rural NPS	WBC B	AQL, IRR, LWW, SCR, HHP	Vernon	358279	4206140	378073	4204995	10290103	1
2014	2854.00	L. St. Francis R.	P	24.2	32.4	Mi.	Lead (S)	Catherine Lead Mine, pos. Mine La Motte	AQL	CLF, DWS, IRR, LWW, SCR, WBC A, HHP	Madison	735771	4165598	726082	4157726	08020202	1, 5
2016	7023.00	Labelle Lake #2	L1	98.0	98.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, DWS, IRR, LWW, SCR, WBC B	Lewis	593770	4438441	593770	4438441	07110003	1, 5
2016	7659.00	Lake Boutin	L3	20.0	20.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, IRR, LWW, SCR, WBC B	Cape Girardeau	810663	4150835	810663	4150835	07140105	1
2002	7469.00	Lake Buteo	L3	7.0	7.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, IRR, LWW, SCR, WBC A	Johnson	449404	4289087	449404	4289087	10300104	1
2002	7436.00	Lake of the Woods	L3	3.0	3.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, IRR, LWW, SCR, WBC B	Boone	565931	4313648	565931	4313648	10300102	1
2008	7629.00	Lake of the Woods	UL	7.0	7.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	GEN		Jackson	368315	4317421	368315	4317421	10300101	1, 7
2016	7132.00	Lake Paho	L3	273.0	273.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, IRR, LWW, SCR, WBC B	Mercer	444295	4472261	444295	4472261	10280102	1
2010	7054.00	Lake St. Louis	L3	444.0	444.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, IRR, LWW, SCR, WBC A	St. Charles	694062	4297112	694062	4297112	07110009	1
2014	7055.00	Lake Ste. Louise	L3	71.0	71.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, IRR, LWW, SCR, WBC A	St. Charles	691847	4296920	691847	4296920	07110009	1
2016	7035.00	Lake Tom Sawyer	L3	4.0	4.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, IRR, LWW, SCR, WBC A	Monroe	603785	4371568	603785	4371568	07110006	1
2010	7212.00	Lake Winnebago	L3	272.0	272.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, IRR, LWW, SCR, WBC A	Cass	382311	4297455	382311	4297455	10290108	1
2006	847.00	Lamine R.	P	64.0	64.0	Mi.	Escherichia coli (W)	Rural NPS	WBC A	AQL, IRR, LWW, SCR, HHP	Morgan/Cooper	504073	4279987	513022	4314616	10300103	1
2006	3105.00	Lateral #2 Main Ditch	P	11.5	11.5	Mi.	Oxygen, Dissolved (W)	Source Unknown	AQL	IRR, LWW, SCR, WBC B, HHP	Stoddard	774316	4075750	773639	4058046	08020204	1



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2008	3105.00	Lateral #2 Main Ditch	P	11.5	11.5	Mi.	Temperature, water (W)	Channelization	AQL	IRR, LWW, SCR, WBC B, HHP	Stoddard	774316	4075750	773639	4058046	08020204	1
2012	3137.00	Lee Rowe Ditch	C	6.0	6.0	Mi.	Oxygen, Dissolved (W)	Source Unknown	AQL	IRR, LWW, SCR, WBC B, HHP	Mississippi	824366	4076900	824243	4068035	08020201	1
2002	7020.00	Lewistown Lake	L1	35.0	35.0	Ac.	Atrazine (W)	Rural NPS	DWS	AQL, IRR, LWW, SCR, WBC B, HHP	Lewis	600676	4439291	600676	4439291	07110002	1, 2
2012	3575.00	Line Cr.	C	7.0	7.0	Mi.	Escherichia coli (W)	Urban Runoff/Storm Sewers	WBC B	AQL, IRR, LWW, SCR, HHP	Platte	358975	4343373	360133	4335563	10240011	1
2006	606.00	Locust Cr.	P	37.7	91.7	Mi.	Escherichia coli (W)	Rural NPS	WBC B, SCR	AQL, DWS, IRR, LWW, HHP	Putnam/Sullivan	488061	4492447	485932	4450780	10280103	1, 5
2012	2763.00	Logan Cr.	P	6.1	36.0	Mi.	Lead (S)	Sweetwater Lead Mine/Mill	AQL	IRR, LWW, SCR, WBC A, HHP	Reynolds	666297	4135268	666165	4127460	11010007	1
2006	696.00	Long Branch Cr.	C	1.8	14.8	Mi.	Oxygen, Dissolved (W)	Atlanta WWTP	AQL	IRR, LWW, SCR, WBC B, HHP	Macon	543323	4416546	543605	4414156	10280203	1
2002	7097.00	Longview Lake	L2	953.0	953.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, IRR, LWW, SCR, WBC A	Jackson	372710	4309263	372710	4309263	10300101	1
2006	3278.00	Lost Cr.	P	8.5	8.5	Mi.	Escherichia coli (W)	Rural NPS	WBC A	AQL, CLF, IRR, LWW, SCR, HHP	Newton	365739	4083856	355717	4078288	11070206	1
2010	123.00	M. Fk. Salt R.	C	11.4	25.4	Mi.	Oxygen, Dissolved (W)	Macon WWTP	AQL	IRR, LWW, SCR, WBC B, HHP	Macon	550935	4400206	554273	4390082	07110006	1
2006	2814.00	Main Ditch	C	13.0	13.0	Mi.	pH (W)	Poplar Bluff WWTP	AQL	IRR, LWW, SCR, WBC B, HHP	Butler	732529	4068029	728374	4048617	11010007	1
2006	2814.00	Main Ditch	C	13.0	13.0	Mi.	Temperature, water (W)	Channelization	AQL	IRR, LWW, SCR, WBC B, HHP	Butler	732529	4068029	728374	4048617	11010007	1
2012	1709.00	Maline Cr.	C	0.6	0.6	Mi.	Escherichia coli (W)	Urban Runoff/Storm Sewers	WBC B	AQL, IRR, LWW, SCR, HHP	St. Louis/St. Louis City	741069	4291198	741513	4290475	07140101	1
2012	3839.00	Maline Cr.	C	0.5	0.5	Mi.	Chloride (W)	Urban Runoff/Storm Sewers	AQL	IRR, LWW, SCR, HHP	St. Louis City	741513	4290475	743767	4287000	07140101	1
2016	3839.00	Maline Cr.	C	0.5	0.5	Mi.	Escherichia coli (W)	Urban Runoff/Storm Sewers	SCR	AQL, IRR, LWW, HHP	St. Louis City	741513	4290475	742145	4290147	07140101	1
2016	7398.00	Maple Leaf Lake	L3	127.0	127.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, IRR, LWW, SCR, WBC B	Lafayette	432403	4315820	432403	4315820	10300104	1
2010	3140.00	Maple Slough	C	18.2	18.2	Mi.	Oxygen, Dissolved (W)	Source Unknown	AQL	IRR, LWW, SCR, WBC B, HHP	Mississippi/New Madrid	820609	4090553	816878	4062805	08020201	1
2002	7033.00	Mark Twain Lake	L2	18132.0	18132.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, DWS, IRR, LWW, SCR, WBC A	Ralls	616551	4375852	616551	4375852	07110007	1, 5
2014	3596.00	Mattese Cr.	P	1.1	1.1	Mi.	Chloride (W)	Urban Runoff/Storm Sewers	AQL	IRR, LWW, SCR, WBC B, HHP	St. Louis	733139	4260643	732308	4259650	07140102	1
2014	3596.00	Mattese Cr.	P	1.1	1.1	Mi.	Escherichia coli (W)	Urban Runoff/Storm Sewers	WBC B	AQL, IRR, LWW, SCR, HHP	St. Louis	733139	4260643	732308	4259650	07140102	1
2016	1786.00	McClanahan Cr.	C	2.5	2.5	Mi.	Escherichia coli (W)	Source Unknown	WBC B, SCR	AQL, IRR, LWW, HHP	Perry	783842	4188859	782791	4187697	07140105	1
2016	214.00	McCoy Cr.	C	4.5	4.5	Mi.	Oxygen, Dissolved (W)	Source Unknown	AQL	IRR, LWW, SCR, WBC B, HHP	St. Charles	687440	4304532	682397	4302617	07110008	1
2006	619.00	Medicine Cr.	P	43.8	43.8	Mi.	Escherichia coli (W)	Rural NPS	WBC B	AQL, IRR, LWW, SCR, HHP	Putnam/Grundy	471740	4492250	467988	4439145	10280103	1
2016	2183.00	Meramec R.	P	22.8	22.8	Mi.	Escherichia coli (W)	Source Unknown	WBC A	AQL, DWS, IND, IRR, LWW, SCR, HHP	St. Louis	718256	4269401	731939	4252470	07140102	1, 5
2008	2183.00	Meramec R.	P	22.8	22.8	Mi.	Lead (S)	Old Lead belt tailings	AQL	DWS, IND, IRR, LWW, SCR, WBC A, HHP	St. Louis	718256	4269401	732150	4252184	07140102	1, 5
2008	2185.00	Meramec R.	P	15.7	15.7	Mi.	Lead (S)	Old Lead Belt tailings	AQL	CLF, DWS, IND, IRR, LWW, SCR, WBC A, HHP	Jefferson/St. Louis	707821	4260833	718256	4269401	07140102	1, 5
1994	1299.00	Miami Cr.	P	19.6	19.6	Mi.	Oxygen, Dissolved (W)	Source Unknown	AQL	IRR, LWW, SCR, WBC B, HHP	Bates	372360	4240637	383003	4222753	10290102	1
2006	468.00	Middle Fk. Grand R.	P	27.5	27.5	Mi.	Escherichia coli (W)	Rural NPS	WBC A	AQL, IRR, LWW, SCR, HHP	Worth/Gentry	385572	4488578	381803	4452419	10280101	1



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Year	WBID	Waterbody	Cls	Imp Size	WB Size	Units	Pollutant	Source	IU	OU	U/D County	Up X	Up Y	Down X	Down Y	WBD 8	Comments
2010	3262.00	Middle Indian Cr.	C	3.5	3.5	Mi.	Aquatic Macroinvertebrate Bioassessments/Unknown	Source Unknown	AQL	IRR, LWW, SCR, WBC A, HHP	Newton	400092	4074869	395454	4074061	11070208	1, 8
2010	3263.00	Middle Indian Cr.	P	2.2	2.2	Mi.	Aquatic Macroinvertebrate Bioassessments/Unknown	Source Unknown	AQL	IRR, LWW, SCR, WBC B, HHP	Newton	395454	4074061	392652	4075387	11070208	1, 8
2008	3263.00	Middle Indian Cr.	P	2.2	2.2	Mi.	Escherichia coli (W)	Rural NPS	WBC B	AQL, IRR, LWW, SCR, HHP	Newton	395454	4074061	392652	4075387	11070208	1
2016	4066.00	Mill Creek	C	3.4	3.4	Mi.	Escherichia coli (W)	Urban Runoff/Storm Sewers	WBC B, SCR	AQL, IRR, LWW, HHP	Jackson	363936	4318005	366400	4322065	10300101	1
2016	4066.00	Mill Creek	C	3.4	3.4	Mi.	Oxygen, Dissolved (W)	Urban Runoff/Storm Sewers	AQL	IRR, LWW, SCR, WBC B, HHP	Jackson	363935	4318002	366400	4322065	10300101	1
2014	1707.03	Mississippi R.	P	44.6	44.6	Mi.	Escherichia coli (W)	Municipal Point Source Discharges, Nonpoint Source	WBC B	AQL, DWS, IND, IRR, LWW, SCR, HHP	St. Louis/Ste. Genevieve	732150	4252184	769132	4207187	07140101	1, 5
2010	226.00	Missouri R.	P	184.5	184.5	Mi.	Escherichia coli (W)	Municipal Point Source Discharges, Nonpoint Source	WBC B	AQL, DWS, IND, IRR, LWW, SCR, HHP	Atchison/Jackson	265899	4496416	361019	4330707	10240001	1, 5
2012	356.00	Missouri R.	P	129.0	129.0	Mi.	Escherichia coli (W)	Municipal Point Source Discharges, Nonpoint Source	WBC B, SCR	AQL, DWS, IND, IRR, LWW, HHP	Jackson/Chariton	361019	4330707	503487	4351401	10300101	1, 5
2008	1604.00	Missouri R.	P	33.9	104.5	Mi.	Escherichia coli (W)	Municipal Point Source Discharges, Nonpoint Source	WBC B	AQL, DWS, IND, IRR, LWW, SCR, HHP	St. Charles/St. Louis	714448	4289612	750286	4299158	10300200	1, 5
2014	7031.00	Monroe City Lake	L1	94.0	94.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, DWS, IRR, LWW, SCR, WBC A	Ralls	614620	4384921	614620	4384921	07110007	1, 5
2016	7301.00	Monsanto Lake	L3	18.0	18.0	Ac.	Nitrogen, Total (W)	Source Unknown	AQL	IRR, LWW, SCR, WBC A, HHP	St. Francois	719988	4187888	719988	4187888	07140104	1, 4, 6
2010	7402.00	Mozingo Lake	L1	898.0	898.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, DWS, IRR, LWW, SCR, WBC B	Nodaway	348761	4467999	348761	4467999	10240013	1, 5
2008	853.00	Muddy Cr.	P	62.2	62.2	Mi.	Aquatic Macroinvertebrate Bioassessments/Unknown	Source Unknown	AQL	IRR, LWW, SCR, WBC B, HHP	Pettis	458149	4281754	495127	4299752	10300103	1, 8
2006	674.00	Mussel Fk.	C	29.0	29.0	Mi.	Escherichia coli (W)	Rural NPS	WBC B, SCR	AQL, DWS, IRR, LWW, HHP	Sullivan/Macon	509539	4450637	513872	4410410	10280202	1, 5
2016	158.00	N. Fk. Cuivre R.	P	25.1	25.1	Mi.	Escherichia coli (W)	Rural NPS	WBC A	AQL, IRR, LWW, SCR, HHP	Pike/Lincoln	673823	4320571	656791	4337025	07110008	1
2008	170.00	N. Fk. Cuivre R.	C	10.0	10.0	Mi.	Escherichia coli (W)	Source Unknown	WBC B	AQL, IRR, LWW, SCR, HHP	Pike	656791	4337025	651658	4345253	07110008	1, 2
2008	3186.00	N. Fk. Spring R.	P	17.4	17.4	Mi.	Escherichia coli (W)	Rural NPS	WBC B	AQL, IRR, LWW, SCR, HHP	Jasper	379518	4128240	363884	4125753	11070207	1
2006	3188.00	N. Fk. Spring R.	C	1.1	55.9	Mi.	Ammonia, Total (W)	Lamar WWTP	AQL	IRR, LWW, SCR, WBC B, HHP	Barton	386254	4148800	386721	4148123	11070207	1
2008	3188.00	N. Fk. Spring R.	C	55.9	55.9	Mi.	Escherichia coli (W)	Rural NPS	WBC B	AQL, IRR, LWW, SCR, HHP	Dade/Jasper	408705	4131497	379518	4128240	11070207	1
2006	3188.00	N. Fk. Spring R.	C	55.9	55.9	Mi.	Oxygen, Dissolved (W)	Source Unknown	AQL	IRR, LWW, SCR, WBC B, HHP	Dade/Jasper	408705	4131497	379518	4128240	11070207	1
2012	3260.00	N. Indian Cr.	P	5.2	5.2	Mi.	Aquatic Macroinvertebrate Bioassessments/Unknown	Source Unknown	AQL	IRR, LWW, SCR, WBC B, HHP	Newton	395488	4077540	390081	4072821	11070208	1, 8
2008	3260.00	N. Indian Cr.	P	5.2	5.2	Mi.	Escherichia coli (W)	Rural NPS	WBC B	AQL, IRR, LWW, SCR, HHP	Newton	395488	4077540	390081	4072821	11070208	1
2006	1170.00	Niangua R.	P	56.0	56.0	Mi.	Escherichia coli (W)	Rural NPS	WBC A	AQL, CLF, IRR, LWW, SCR, HHP	Webster/Dallas	507117	4144345	512225	4176338	10290110	1



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Year	WBID	Waterbody	Cls	Imp Size	WB Size	Units	Pollutant	Source	IU	OU	U/D County	Up X	Up Y	Down X	Down Y	WBD 8	Comments
2014	227.00	Nishnabotna R.	P	10.2	10.2	Mi.	Escherichia coli (W)	Rural NPS	WBC B	AQL, DWS, IRR, LWW, SCR, HHP	Atchison	276742	4495889	271481	4484915	10240004	1, 5
2006	550.00	No Cr.	P	28.7	28.7	Mi.	Escherichia coli (W)	Rural NPS	WBC B	AQL, IRR, LWW, SCR, HHP	Grundy/Livingston	461790	4446877	451131	4415226	10280102	1
2010	550.00	No Cr.	P	28.7	28.7	Mi.	Oxygen, Dissolved (W)	Source Unknown	AQL	IRR, LWW, SCR, WBC B, HHP	Grundy/Livingston	461790	4446877	451131	4415226	10280102	1
2014	7316.00	Noblett Lake	L3	26.0	26.0	Ac.	Chlorophyll-a (W)	Nonpoint Source	AQL	IRR, LWW, SCR, WBC A, HHP	Douglas	579888	4085045	579888	4085045	11010006	1, 4
2002	7316.00	Noblett Lake	L3	26.0	26.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, IRR, LWW, SCR, WBC A	Douglas	579874	4085060	579874	4085060	11010006	1
2014	7316.00	Noblett Lake	L3	26.0	26.0	Ac.	Phosphorus, Total (W)	Nonpoint Source	AQL	IRR, LWW, SCR, WBC A, HHP	Douglas	579889	4085046	579889	4085046	11010006	1, 4
2010	279.00	Nodaway R.	P	59.3	59.3	Mi.	Escherichia coli (W)	Rural NPS	WBC B	AQL, IRR, LWW, SCR, HHP	Nodaway/Andrew	328881	4493666	331916	4418596	10240010	1
2016	7317.00	Norfolk Lake	L2	1000.0	1000.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, IRR, LWW, SCR, WBC A	Ozark	566331	4039451	566331	4039451	11010006	1
2010	7109.00	North Bethany City Reservoir	L3	78.0	78.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, IRR, LWW, SCR, WBC A	Harrison	412395	4463013	412395	4463013	10280101	1
2014	3811.00	North Branch Wilsons Cr.	P	3.8	3.8	Mi.	Zinc (S)	Urban NPS	AQL	IRR, LWW, SCR, WBC B, HHP	Greene	468778	4116745	469345	4119828	11010002	1
2016	1794.00	Omete Cr.	C	1.2	1.2	Mi.	Escherichia coli (W)	Source Unknown	WBC B, SCR	AQL, IRR, LWW, HHP	Perry	791333	4181836	791241	4180095	07140105	1
2016	1293.00	Osage R.	P	50.7	50.7	Mi.	Escherichia coli (W)	Source Unknown	WBC A	AQL, IRR, LWW, SCR, HHP	Vernon/St. Clair	436430	4210316	390841	4209576	10290105	1
2010	1293.00	Osage R.	P	50.7	50.7	Mi.	Oxygen, Dissolved (W)	Source Unknown	AQL	IRR, LWW, SCR, WBC A, HHP	Vernon/St. Clair	436430	4210316	390841	4209576	10290105	1
2016	7441.00	Palmer Lake	L3	102.0	102.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, IRR, LWW, SCR, WBC A	Washington	682914	4188125	682914	4188125	07140102	1
2006	1373.00	Panther Cr.	C	9.7	9.7	Mi.	Oxygen, Dissolved (W)	Source Unknown	AQL	IRR, LWW, SCR, WBC B, HHP	Polk/St. Clair	453742	4183206	444279	4187593	10290106	1
2008	2373.00	Pearson Cr.	P	8.0	8.0	Mi.	Aquatic Macroinvertebrate Bioassessments/Unknown	Source Unknown	AQL	IRR, LWW, SCR, WBC A, HHP	Greene	482571	4113045	486612	4121328	11010002	1, 8
2006	2373.00	Pearson Cr.	P	8.0	8.0	Mi.	Escherichia coli (W)	Rural NPS, Urban Runoff/Storm Sewers	WBC A	AQL, IRR, LWW, SCR, HHP	Greene	486612	4121328	482571	4113045	11010002	1
2016	99.00	Peno Cr.	C	14.4	14.4	Mi.	Oxygen, Dissolved (W)	Northeast Correctional Center WWTP, Source Unknown	AQL	CLF, IRR, LWW, SCR, WBC B, HHP	Pike	648754	4377841	649992	4364284	07110007	1
2016	7273.00	Perry County Community Lake	L3	89.0	89.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, IRR, LWW, SCR, WBC B	Perry	771936	4179754	771936	4179754	07140105	1
2008	7628.00	Perry Phillips Lake	UL	32.0	32.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	GEN		Boone	561236	4305581	561236	4305581	10300102	1, 7
2012	215.00	Peruque Cr.	P1	9.6	9.6	Mi.	Oxygen, Dissolved (W)	Source Unknown	AQL	IRR, LWW, SCR, WBC B, HHP	St. Charles	700317	4301742	705352	4308025	07110009	1
2002	217.00	Peruque Cr.	P	4.0	4.0	Mi.	Fishes Bioassessments/Unknown	Nonpoint Source	AQL	IRR, LWW, SCR, WBC B, HHP	St. Charles	686322	4296816	690798	4295430	07110009	1, 8
2002	218.00	Peruque Cr.	C	10.9	10.9	Mi.	Fishes Bioassessments/Unknown	Nonpoint Source	AQL	IRR, LWW, SCR, WBC B, HHP	Warren/St. Charles	674302	4297979	686322	4296816	07110009	1, 8
2016	218.00	Peruque Cr.	C	10.9	10.9	Mi.	Oxygen, Dissolved (W)	Source Unknown	AQL	IRR, LWW, SCR, WBC B, HHP	Warren/St. Charles	686322	4296816	674302	4297979	07110009	1
2010	2815.00	Pike Cr.	C	6.0	6.0	Mi.	Oxygen, Dissolved (W)	Source Unknown	AQL	IRR, LWW, SCR, HHP	Butler	727556	4074154	732529	4068029	11010007	1
2010	312.00	Platte R.	P	142.4	142.4	Mi.	Escherichia coli (W)	Rural NPS	WBC B	AQL, DWS, IRR, LWW, SCR, HHP	Worth/Platte	370620	4492569	341432	4347540	10240012	1, 5



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Year	WBID	Waterbody	Cls	Imp Size	WB Size	Units	Pollutant	Source	IU	OU	U/D County	Up X	Up Y	Down X	Down Y	WBD 8	Comments
2012	1327.00	Pleasant Run Cr.	C	7.6	7.6	Mi.	Oxygen, Dissolved (W)	Source Unknown	AQL	IRR, LWV, SCR, WBC B, HHP	Vernon	381362	4169529	376904	4174682	10290104	1
2006	3120.00	Pole Cat Slough	P	12.6	12.6	Mi.	Oxygen, Dissolved (W)	Source Unknown	AQL	IRR, LWV, SCR, WBC B, HHP	Dunklin	763796	4013691	755748	3998563	08020204	1
2014	3120.00	Pole Cat Slough	P	12.6	12.6	Mi.	Temperature, water (W)	Source Unknown	AQL	IRR, LWV, SCR, WBC B, HHP	Dunklin	763796	4013691	755748	3998563	08020204	1
2014	1440.00	Pomme de Terre R.	P	69.1	69.1	Mi.	Escherichia coli (W)	Rural NPS	WBC A	AQL, IRR, LWV, SCR, HHP	Webster/Polk	506083	4131874	465307	4180755	10290107	1
2006	2038.00	Red Oak Cr.	C	10.1	10.0	Mi.	Oxygen, Dissolved (W)	Owensville WWTP	AQL	IRR, LWV, SCR, WBC B, HHP	Gasconade	631423	4239850	642015	4246717	07140103	1
2016	7204.00	Rinquelin Trail Community Lake	L3	27.0	27.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, IRR, LWV, SCR, WBC B	Maries	574600	4215520	574600	4215520	10290111	1
2006	1710.00	River des Peres	P	2.6	2.6	Mi.	Chloride (W)	Urban Runoff/Storm Sewers	AQL	IRR, LWV, SCR, HHP	St. Louis City	738751	4268514	736562	4271521	07140101	1
2012	1710.00	River des Peres	P	2.6	2.6	Mi.	Escherichia coli (W)	Urban Runoff/Storm Sewers	SCR	AQL, IRR, LWV, HHP	St. Louis City	738751	4268514	736562	4271521	07140101	1
2010	1710.00	River des Peres	P	2.6	2.6	Mi.	Oxygen, Dissolved (W)	Urban Runoff/Storm Sewers	AQL	IRR, LWV, SCR, HHP	St. Louis City	738751	4268514	736562	4271521	07140101	1
2006	3972.00	River des Peres	C	13.6	13.6	Mi.	Chloride (W)	Urban Runoff/Storm Sewers	AQL	IRR, LWV, SCR, WBC B, HHP	St. Louis	731228	4283838	734090	4282681	07140101	1
2016	3972.00	River des Peres	C	13.6	13.6	Mi.	Escherichia coli (W)	Urban Runoff/Storm Sewers	WBC B, SCR	AQL, IRR, LWV, HHP	St. Louis	731230	4283832	734091	4282681	07140101	1
2006	655.00	S. Blackbird Cr.	C	13.0	13.0	Mi.	Ammonia, Total (W)	Source Unknown	AQL	IRR, LWV, SCR, WBC B, HHP	Putnam	503682	4475363	518712	4469745	10280201	1
1994	142.00	S. Fk. Salt R.	C	20.1	40.1	Mi.	Oxygen, Dissolved (W)	Mexico WWTP, Rural Nonpoint Source	AQL	IRR, LWV, SCR, WBC B, HHP	Callaway/Audrain	600364	4322884	596694	4341638	07110006	1
2006	1249.00	S. Grand R.	P	66.8	66.8	Mi.	Escherichia coli (W)	Rural NPS	WBC B	AQL, IRR, LWV, SCR, HHP	Cass/Henry	366728	4281000	429978	4242884	10290108	1
2012	3259.00	S. Indian Cr.	P	8.7	8.7	Mi.	Aquatic Macroinvertebrate Bioassessments/Unknown	Source Unknown	AQL	CDF, IRR, LWV, SCR, WBC B, HHP	McDonald/Newton	399208	4067538	390081	4072821	11070208	1, 8
2008	3259.00	S. Indian Cr.	P	8.7	8.7	Mi.	Escherichia coli (W)	Rural NPS	WBC B	AQL, CDF, IRR, LWV, SCR, HHP	McDonald/Newton	399208	4067538	390081	4072821	11070208	1
2010	594.00	Salt Cr.	C	14.9	14.9	Mi.	Oxygen, Dissolved (W)	Source Unknown	AQL	IRR, LWV, SCR, WBC B, HHP	Chariton	491540	4377934	485852	4365132	10280103	1
2014	893.00	Salt Fk.	P	13.3	26.7	Mi.	Oxygen, Dissolved (W)	Source Unknown	AQL	IRR, LWV, SCR, WBC B, HHP	Saline	472648	4336520	486215	4328728	10300104	1
2012	2113.00	Salt Pine Cr.	C	1.2	1.2	Mi.	Aquatic Macroinvertebrate Bioassessments/Unknown	Barite tailings pond	AQL	IRR, LWV, SCR, WBC B, HHP	Washington	698656	4214467	697844	4216050	07140104	1, 8
2008	91.00	Salt R.	P	29.0	29.0	Mi.	Oxygen, Dissolved (W)	Mark Twain Lake re-regulation dam	AQL	DWS, IRR, LWV, SCR, WBC A, HHP	Ralls/Pike	622770	4380470	654484	4376225	07110007	1, 5
2012	103.00	Salt R.	P1	9.3	9.3	Mi.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, DWS, IRR, LWV, SCR, WBC A	Ralls	622770	4380470	616554	4375853	07110007	1, 5
2014	103.00	Salt R.	P1	9.3	9.3	Mi.	Oxygen, Dissolved (W)	Cannon Dam	AQL	DWS, IRR, LWV, SCR, WBC A, HHP	Ralls	616554	4375853	622770	4380500	07110007	1, 5
2014	2119.00	Shibboleth Br.	P	1.0	1.0	Mi.	Lead (S)	Mill Tailings	AQL	IRR, LWV, SCR, WBC B, HHP	Washington	705148	4210760	706311	4210501	07140104	1
2014	2119.00	Shibboleth Br.	P	1.0	1.0	Mi.	Zinc (S)	Mill Tailings	AQL	IRR, LWV, SCR, WBC B, HHP	Washington	705148	4210760	706311	4210501	07140104	1
2014	3222.00	Shoal Cr.	P	3.8	50.5	Mi.	Zinc (S)	Mill Tailings	AQL	CLF, DWS, IND, IRR, LWV, SCR, WBC A, HHP	Newton	360972	4100172	356106	4099741	11070207	1, 5
2014	3754.00	Slater Br.	C	3.7	3.7	Mi.	Escherichia coli (W)	Nonpoint Source	WBC B	AQL, IRR, LWV, SCR, HHP	Jasper	372935	4129976	369417	4127684	11070207	1
2006	399.00	Sni-a-bar Cr.	P	36.6	36.6	Mi.	Oxygen, Dissolved (W)	Source Unknown	AQL	IRR, LWV, SCR, WBC B, HHP	Jackson/Lafayette	398859	4311016	416463	4333103	10300101	1



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2012	224.00	Spencer Cr.	C	1.5	1.5	Mi.	Chloride (W)	Road/Bridge Runoff, Non-construction	AQL	IRR, LWW, SCR, HHP	St. Charles	708205	4298105	709432	4300121	07110009	1
2016	5007.00	Spring Branch	C	1.4	3.1	Mi.	Escherichia coli (W)	Source Unknown	WBC B	AQL, IRR, LWW, SCR, HHP	St. Louis	711579	4270614	713449	4270031	07140102	1
2006	3160.00	Spring R.	P	61.7	61.7	Mi.	Escherichia coli (W)	Rural NPS	WBC A	AQL, CLF, IND, IRR, LWW, SCR, HHP	Lawrence/Jasper	420405	4108691	356380	4117694	11070207	1
2010	3164.00	Spring R.	P	8.8	8.8	Mi.	Escherichia coli (W)	Rural NPS	WBC A	AQL, CDF, IND, IRR, LWW, SCR, HHP	Lawrence	425936	4100897	420405	4108691	11070207	1
2010	3165.00	Spring R.	P	11.9	11.9	Mi.	Escherichia coli (W)	Rural NPS	WBC A	AQL, IRR, LWW, SCR, HHP	Lawrence	430983	4088423	425936	4100897	11070207	1
2012	2835.00	St. Francis R.	P	8.4	93.1	Mi.	Temperature, water (W)	Source Unknown	CLF	AQL, IRR, LWW, SCR, WBC A, HHP	St. Francois	725310	4181290	728440	4173621	08020202	1
2006	3138.00	St. Johns Ditch	P	15.3	15.3	Mi.	Escherichia coli (W)	Rural NPS, Urban Runoff/Storm Sewers	WBC B	AQL, IRR, LWW, SCR, HHP	New Madrid	807943	4079163	817828	4057590	08020201	1
2006	3138.00	St. Johns Ditch	P	15.3	15.3	Mi.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, IRR, LWW, SCR, WBC B	New Madrid	817828	4057590	807943	4079163	08020201	1
2006	3135.00	Stevenson Bayou	C	6.4	6.4	Mi.	Oxygen, Dissolved (W)	Source Unknown	AQL	IRR, LWW, SCR, WBC B, HHP	Mississippi	833337	4094443	831489	4086239	08020201	1
2006	959.00	Straight Fk.	C	6.0	6.0	Mi.	Oxygen, Dissolved (W)	Versailles WWTP	AQL	IRR, LWW, SCR, WBC B, HHP	Morgan	513048	4255154	514134	4262987	10300102	1
2014	2751.00	Strother Cr.	P	6.0	6.0	Mi.	Aquatic Macroinvertebrate Bioassessments/Unknown	Buick Lead Mine/Mill	AQL	CLF, IRR, LWW, SCR, WBC B, HHP	Iron/Reynolds	672401	4162649	680292	4163603	11010007	1, 8
2008	2751.00	Strother Cr.	P	6.0	6.0	Mi.	Lead (S)	Buick Lead Mine/Mill	AQL	CLF, IRR, LWW, SCR, WBC B, HHP	Iron/Reynolds	672401	4162649	680292	4163603	11010007	1
2010	2751.00	Strother Cr.	P	6.0	6.0	Mi.	Lead (W)	Buick Lead Mine/Mill	AQL	CLF, IRR, LWW, SCR, WBC B, HHP	Iron/Reynolds	672401	4162649	680292	4163603	11010007	1
2008	2751.00	Strother Cr.	P	6.0	6.0	Mi.	Nickel (S)	Buick Lead Mine/Mill	AQL	CLF, IRR, LWW, SCR, WBC B, HHP	Iron/Reynolds	672401	4162649	680292	4163603	11010007	1
2006	2751.00	Strother Cr.	P	6.0	6.0	Mi.	Zinc (S)	Buick Lead Mine/Mill	AQL	CLF, IRR, LWW, SCR, WBC B, HHP	Iron/Reynolds	672401	4162649	680292	4163603	11010007	1
2010	2751.00	Strother Cr.	P	6.0	6.0	Mi.	Zinc (W)	Buick Lead Mine/Mill	AQL	CLF, IRR, LWW, SCR, WBC B, HHP	Iron/Reynolds	672401	4162649	680292	4163603	11010007	1
2008	3965.00	Strother Cr.	US	0.9	0.9	Mi.	Arsenic (S)	Buick Lead Mine/Mill	GEN		Reynolds/Iron	671133	4161733	672400	4162646	11010007	1, 7
2008	3965.00	Strother Cr.	US	0.9	0.9	Mi.	Lead (S)	Buick Lead Mine/Mill	GEN		Reynolds/Iron	671133	4161733	672402	4162649	11010007	1, 7
2008	3965.00	Strother Cr.	US	0.9	0.9	Mi.	Nickel (S)	Buick Lead Mine/Mill	GEN		Reynolds/Iron	671139	4161736	672405	4162651	11010007	1, 7
2006	3965.00	Strother Cr.	US	0.9	0.9	Mi.	Zinc (S)	Buick Lead Mine/Mill	GEN		Reynolds/Iron	671143	4161738	672403	4162650	11010007	1, 7
2012	3965.00	Strother Cr.	US	0.9	0.9	Mi.	Zinc (W)	Buick Lead Mine/Mill	GEN		Reynolds/Iron	671137	4161735	672405	4162650	11010007	1, 7
2006	686.00	Sugar Cr.	P	6.8	6.8	Mi.	Oxygen, Dissolved (W)	Source Unknown	AQL	IRR, LWW, SCR, WBC B, HHP	Randolph	544656	4369584	538213	4368067	10280203	1
2014	7166.00	Sugar Creek Lake	L1	308.0	308.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, DWS, IRR, LWW, SCR, WBC B	Randolph	544674	4369569	544674	4369569	10280203	1, 5
2006	7399.00	Sunset Lake	L3	6.0	6.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, IRR, LWW, SCR, WBC B	Cole	569966	4268303	569966	4268303	10300102	1
2002	7313.00	Table Rock Lake	L2	24218.0	41747.0	Ac.	Chlorophyll-a (W)	Municipal Point Source Discharges, Nonpoint Source	AQL	IRR, LWW, SCR, WBC A, HHP	Taney	472136	4050038	472136	4050038	11010001	1, 4
2002	7313.00	Table Rock Lake	L2	24216.0	41747.0	Ac.	Nitrogen, Total (W)	Municipal Point Source Discharges, Nonpoint Source	AQL	IRR, LWW, SCR, WBC A, HHP	Taney	472138	4050042	472138	4050042	11010001	1, 4
2002	7313.00	Table Rock Lake	L2	41747.0	41747.0	Ac.	Nutrient/Eutrophication Biol. Indicators (W)	Municipal Point Source Discharges, Nonpoint Source	AQL	IRR, LWW, SCR, WBC A, HHP	Taney	472135	4050041	472135	4050041	11010001	1, 4
2010	7297.00	Terre Du Lac Lakes	L3	103.0	371.4	Ac.	Nitrogen, Total (W)	Terre du Lac Subdivision	AQL	IRR, LWW, SCR, WBC A, HHP	St. Francois	708570	4197151	708570	4197151	07140104	1, 4, 9
2016	7352.00	Thirtyfour Corner Blue Hole	L3	9.0	9.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, IRR, LWW, SCR, WBC B	Mississippi	841119	4076619	841119	4076619	08010100	1



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2008	549.00	Thompson R.	P	5.2	70.6	Mi.	Escherichia coli (W)	Rural NPS	WBC B	AQL, DWS, IRR, LWW, SCR, HHP	Harrison	432172	4492124	430916	4488363	10280102	1, 5
2012	3243.00	Thurman Cr.	P	3.0	3.0	Mi.	Escherichia coli (W)	Rural NPS	WBC B	AQL, IRR, LWW, SCR, HHP	Newton	369319	4099003	367458	4097252	11070207	1
2010	2114.00	Trib. Old Mines Cr.	C	1.5	1.5	Mi.	Sedimentation/Siltation (S)	Barite tailings pond	GEN	AQL, IRR, LWW, SCR, WBC B, HHP	Washington	699696	4215163	698452	4216961	07140104	1, 7
2010	133.00	Trib. to Coon Cr.	C	2.0	2.0	Mi.	Oxygen, Dissolved (W)	Source Unknown	AQL	IRR, LWW, SCR, WBC B, HHP	Randolph	552198	4364074	554325	4364132	07110006	1
2011	3938.00	Trib. to Flat R.	US	0.3	0.3	Mi.	Zinc (W)	Elvins Chat Pile	GEN		St. Francois	717153	4191147	717584	4190839	07140104	1, 7
2010	1420.00	Trib. to Goose Cr.	C	3.0	3.0	Mi.	Escherichia coli (W)	Rural NPS	WBC B	AQL, IRR, LWW, SCR, HHP	Lawrence	437166	4110190	440767	4112989	10290106	1
2006	3490.00	Trib. to L. Muddy Cr.	C	1.0	1.0	Mi.	Chloride (W)	Tyson Foods	AQL	IRR, LWW, SCR, WBC B, HHP	Pettis	473618	4290951	474708	4291640	10300103	1
2006	3360.00	Trib. to Red Oak Cr.	P	0.5	0.5	Mi.	Oxygen, Dissolved (W)	Owensville WWTP	AQL	IRR, LWW, SCR, WBC B, HHP	Gasconade	635575	4245150	636297	4244762	07140103	1
2006	3361.00	Trib. to Red Oak Cr.	C	1.9	1.9	Mi.	Oxygen, Dissolved (W)	Owensville WWTP, Source Unknown	AQL	IRR, LWW, SCR, HHP	Gasconade	632983	4245771	635575	4245150	07140103	1
2014	3981.00	Trib. to Shoal Cr.	US	1.6	1.6	Mi.	Cadmium (W)	Tanyard Hollow Pits	GEN		Jasper/Newton	360497	4102911	360999	4100170	11070207	1, 7
2014	3981.00	Trib. to Shoal Cr.	US	1.6	1.6	Mi.	Zinc (W)	Tanyard Hollow Pits	GEN		Jasper/Newton	360493	4102902	360998	4100170	11070207	1, 7
2014	3982.00	Trib. to Shoal Cr.	US	2.2	2.2	Mi.	Zinc (W)	Maiden Lane Pits	GEN		Jasper/Newton	363556	4103320	363401	4100264	11070207	1, 7
2014	3983.00	Trib. to Turkey Cr.	US	2.9	2.9	Mi.	Cadmium (S)	Abandoned Smelter Site	GEN		Jasper	364260	4105805	364073	4108154	11070207	1, 7
2016	3983.00	Trib. to Turkey Cr.	US	2.9	2.9	Mi.	Cadmium (W)	Abandoned Smelter Site	GEN		Jasper	364620	4106681	364060	4108161	11070207	1, 7
2014	3983.00	Trib. to Turkey Cr.	US	2.9	2.9	Mi.	Lead (S)	Abandoned Smelter Site	GEN		Jasper	364259	4105803	364073	4108154	11070207	1, 7
2014	3983.00	Trib. to Turkey Cr.	US	2.9	2.9	Mi.	Zinc (S)	Abandoned Smelter Site	GEN		Jasper	364261	4105805	364069	4108156	11070207	1, 7
2014	3983.00	Trib. to Turkey Cr.	US	2.9	2.9	Mi.	Zinc (W)	Abandoned Smelter Site	GEN		Jasper	364060	4108161	364262	4105804	11070207	1, 7
2016	3984.00	Trib. to Turkey Cr.	US	2.2	2.2	Mi.	Cadmium (W)	Mill Tailings	GEN		Jasper	362859	4108609	362490	4105692	11070207	1, 7
2014	3984.00	Trib. to Turkey Cr.	US	2.2	2.2	Mi.	Zinc (W)	Leadwood Hollow pits	GEN		Jasper	362856	4108621	362494	4105702	11070207	1, 7
2014	3985.00	Trib. to Turkey Cr.	US	1.6	1.6	Mi.	Zinc (W)	Chitwood Hollow pits	GEN		Jasper	361695	4107018	361609	4109130	11070207	1, 7
2006	956.00	Trib. to Willow Fk.	C	0.5	0.5	Mi.	Oxygen, Dissolved (W)	Source Unknown	AQL	IRR, LWW, SCR, HHP	Moniteau	520018	4276045	520577	4275439	10300102	1
2006	3589.00	Trib. to Wolf Cr.	C	1.5	1.5	Mi.	Oxygen, Dissolved (W)	Source Unknown	AQL	IRR, LWW, SCR, WBC B, HHP	St. Francois	727181	4185394	729121	4184284	08020202	1
2006	74.00	Troublesome Cr.	C	6.1	41.3	Mi.	Oxygen, Dissolved (W)	Source Unknown	AQL	IRR, LWW, SCR, WBC B, HHP	Knox	581617	4441608	586195	4437679	07110003	1
2012	74.00	Troublesome Cr.	C	41.3	41.3	Mi.	Sedimentation/Siltation (S)	Habitat Mod. - other than Hydromod.	AQL	IRR, LWW, SCR, WBC B, HHP	Knox/Marion	581617	4441608	613693	4417997	07110003	1
2016	3174.00	Truitt Cr.	P	1.5	1.5	Mi.	Escherichia coli (W)	Rural NPS	WBC B	AQL, IRR, LWW, SCR, HHP	Lawrence	424213	4108968	423882	4106865	11070207	1
2012	3175.00	Truitt Cr.	C	6.4	6.4	Mi.	Escherichia coli (W)	Rural NPS	SCR	AQL, IRR, LWW, HHP	Lawrence	424213	4108968	429512	4115867	11070207	1
2012	751.00	Turkey Cr.	C	6.3	6.3	Mi.	Escherichia coli (W)	Source Unknown	WBC A	AQL, IRR, LWW, SCR, HHP	Boone	565489	4300829	560346	4298772	10300102	1
2006	3216.00	Turkey Cr.	P	7.7	7.7	Mi.	Cadmium (S)	Tri-State Mining District	AQL	IRR, LWW, SCR, WBC B, HHP	Jasper	366144	4107717	356267	4109959	11070207	1
2006	3216.00	Turkey Cr.	P	7.7	7.7	Mi.	Cadmium (W)	Tri-State Mining District	AQL	IRR, LWW, SCR, WBC B, HHP	Jasper	366144	4107717	356267	4109959	11070207	1
2008	3216.00	Turkey Cr.	P	7.7	7.7	Mi.	Lead (S)	Tri-State Mining District	AQL	IRR, LWW, SCR, WBC B, HHP	Jasper	366144	4107717	356267	4109959	11070207	1
2006	3216.00	Turkey Cr.	P	7.7	7.7	Mi.	Zinc (S)	Tri-State Mining District	AQL	IRR, LWW, SCR, WBC B, HHP	Jasper	366144	4107717	356267	4109959	11070207	1
2006	3217.00	Turkey Cr.	P	6.1	6.1	Mi.	Cadmium (S)	Tri-State Mining District	AQL	IRR, LWW, SCR, WBC A, HHP	Jasper	373143	4104208	366144	4107717	11070207	1
2006	3217.00	Turkey Cr.	P	6.1	6.1	Mi.	Escherichia coli (W)	Urban Runoff/Storm Sewers	WBC A	AQL, IRR, LWW, SCR, HHP	Jasper	373143	4104208	366144	4107717	11070207	1
2006	3217.00	Turkey Cr.	P	6.1	6.1	Mi.	Zinc (S)	Tri-State Mining District	AQL	IRR, LWW, SCR, WBC A, HHP	Jasper	373143	4104208	366144	4107717	11070207	1



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2016	3282.00	Turkey Cr.	P	2.4	2.4	Mi.	Cadmium (S)	Bonne Terre chat pile	AQL	IRR, LWW, SCR, WBC B, HHP	St. Francois	715493	4200128	714636	4203638	07140104	1
2006	3282.00	Turkey Cr.	P	2.4	2.4	Mi.	Cadmium (W)	Bonne Terre chat pile	AQL	IRR, LWW, SCR, WBC B, HHP	St. Francois	715493	4200128	714636	4203638	07140104	1
2016	3282.00	Turkey Cr.	P	2.4	2.4	Mi.	Copper (S)	Bonne Terre chat pile	AQL	IRR, LWW, SCR, WBC B, HHP	St. Francois	715493	4200128	714636	4203638	07140104	1
2016	3282.00	Turkey Cr.	P	2.4	2.4	Mi.	Lead (S)	Bonne Terre chat pile	AQL	IRR, LWW, SCR, WBC B, HHP	St. Francois	715493	4200128	714636	4203638	07140104	1
2006	3282.00	Turkey Cr.	P	2.4	2.4	Mi.	Lead (W)	Bonne Terre chat pile	AQL	IRR, LWW, SCR, WBC B, HHP	St. Francois	715493	4200128	714636	4203638	07140104	1
2016	3282.00	Turkey Cr.	P	2.4	2.4	Mi.	Nickel (S)	Bonne Terre chat pile	AQL	IRR, LWW, SCR, WBC B, HHP	St. Francois	715493	4200128	714636	4203638	07140104	1
2016	3282.00	Turkey Cr.	P	2.4	2.4	Mi.	Zinc (S)	Bonne Terre chat pile	AQL	IRR, LWW, SCR, WBC B, HHP	St. Francois	715493	4200128	714636	4203638	07140104	1
2006	3282.00	Turkey Cr.	P	1.2	2.4	Mi.	Zinc (W)	Bonne Terre chat pile	AQL	IRR, LWW, SCR, WBC B, HHP	St. Francois	715072	4201827	715495	4200135	07140104	1
2010	1414.00	Turnback Cr.	P	19.9	19.9	Mi.	Escherichia coli (W)	Rural NPS	WBC A	AQL, CDF, IRR, LWW, SCR, HHP	Lawrence/Dade	445684	4108548	432264	4127720	10290106	1
2016	4079.00	Twomile Creek	C	5.6	5.6	Mi.	Escherichia coli (W)	Urban Runoff/Storm Sewers	WBC B	AQL, IRR, LWW, SCR, HHP	St. Louis	721592	4277889	728708	4277778	07140101	1
2016	7099.00	Unity Village Lake #2	L1	26.0	26.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, DWS, IRR, LWW, SCR, WBC B	Jackson	379080	4313288	379080	4313288	10300101	1, 5
2008	2755.00	W. Fk. Black R.	P	2.1	32.3	Mi.	Lead (S)	West Fork Lead Mine/Mill	AQL	CLF, IRR, LWW, SCR, WBC A, HHP	Reynolds	667310	4151001	669784	4151630	11010007	1
2008	2755.00	W. Fk. Black R.	P	2.1	32.3	Mi.	Nickel (S)	West Fork Lead Mine/Mill	AQL	CLF, IRR, LWW, SCR, WBC A, HHP	Reynolds	667305	4151008	669785	4151637	11010007	1
2006	1317.00	W. Fk. Dry Wood Cr.	C	8.1	8.1	Mi.	Oxygen, Dissolved (W)	Source Unknown	AQL	IRR, LWW, SCR, WBC B, HHP	Vernon	357350	4172196	363431	4175252	10290104	1
2006	2579.00	Warm Fk. Spring R.	P	13.8	13.8	Mi.	Fecal Coliform (W)	Source Unknown	WBC A	AQL, IRR, LWW, SCR, HHP	Oregon	627789	4054485	631878	4040300	11010010	1, 2
2006	1708.00	Watkins Cr.	C	1.4	1.4	Mi.	Chloride (W)	Urban Runoff/Storm Sewers	AQL	IRR, LWW, SCR, WBC B, HHP	St. Louis/St. Louis City	744084	4294764	745936	4294861	07140101	1
2006	1708.00	Watkins Cr.	C	1.4	1.4	Mi.	Escherichia coli (W)	Urban Runoff/Storm Sewers	WBC B	AQL, IRR, LWW, SCR, HHP	St. Louis/St. Louis City	744084	4294764	745936	4294861	07140101	1
2016	4097.00	Watkins Creek tributary	C	1.2	1.2	Mi.	Escherichia coli (W)	Urban Runoff/Storm Sewers	WBC B, SCR	AQL, IRR, LWW, HHP	St. Louis	740625	4297157	741049	4295353	07140101	1
2016	4098.00	Watkins Creek tributary	C	1.2	1.2	Mi.	Escherichia coli (W)	Urban Runoff/Storm Sewers	WBC B, SCR	AQL, IRR, LWW, HHP	St. Louis	743158	4295677	742995	4294040	07140101	1
2012	7071.00	Weatherby Lake	L3	185.0	185.0	Ac.	Chlorophyll-a (W)	Urban Runoff/Storm Sewers	AQL	IRR, LWW, SCR, WBC A, HHP	Platte	352913	4343568	352913	4343568	10240011	1, 4
2012	7071.00	Weatherby Lake	L3	185.0	185.0	Ac.	Mercury in Fish Tissue (T)	Atmospheric Deposition - Toxics	HHP	AQL, IRR, LWW, SCR, WBC A	Platte	352894	4343566	352894	4343566	10240011	1
2010	7071.00	Weatherby Lake	L3	185.0	185.0	Ac.	Nitrogen, Total (W)	Urban Runoff/Storm Sewers	AQL	IRR, LWW, SCR, WBC A, HHP	Platte	352918	4343554	352918	4343554	10240011	1, 4
2014	7071.00	Weatherby Lake	L3	185.0	185.0	Ac.	Phosphorus, Total (W)	Urban Runoff/Storm Sewers	AQL	IRR, LWW, SCR, WBC A, HHP	Platte	352909	4343562	352909	4343562	10240011	1, 4
2006	560.00	Weldon R.	P	43.4	43.4	Mi.	Escherichia coli (W)	Rural NPS	WBC B	AQL, IRR, LWW, SCR, HHP	Mercer/Grundy	448318	4492214	444714	4439341	10280102	1
2008	1504.00	Whetstone Cr.	P	12.2	12.2	Mi.	Oxygen, Dissolved (W)	Rural NPS	AQL	CLF, IRR, LWW, SCR, WBC B, HHP	Wright	556418	4116032	553965	4129663	10290201	1
2010	3182.00	White Oak Cr.	C	18.0	18.0	Mi.	Escherichia coli (W)	Rural NPS	WBC A	AQL, IRR, LWW, SCR, HHP	Lawrence/Jasper	415932	4124150	396440	4113581	11070207	1
2012	1700.00	Wildhorse Cr.	C	3.9	3.9	Mi.	Escherichia coli (W)	Rural, Residential Areas	WBC B	AQL, IRR, LWW, SCR, HHP	St. Louis	699002	4276141	699384	4279922	10300200	1



Missouri Department of Natural Resources
2016 CWC Section 303(d) Listed Waters

Year	WBID	Waterbody	Cls	Imp Size	WB Size	Units	Pollutant	Source	IU	OU	U/D County	Up X	Up Y	Down X	Down Y	WBD 8	Comments
2010	3171.00	Williams Cr.	P	1.0	1.0	Mi.	Escherichia coli (W)	Rural NPS	WBC A	AQL, CDF, IRR, LWV, SCR, HHP	Lawrence	421759	4107281	420777	4107593	11070207	1
2010	3172.00	Williams Cr.	P	8.5	8.5	Mi.	Escherichia coli (W)	Rural NPS	WBC A	AQL, IRR, LWV, SCR, HHP	Lawrence	432044	4105526	421759	4107281	11070207	1
2012	3594.00	Williams Cr.	P	1.0	1.0	Mi.	Escherichia coli (W)	Rural NPS	WBC B, SCR	AQL, IRR, LWV, HHP	St. Louis	716804	4268162	716672	4269382	07140102	1
2010	3280.00	Willow Br.	P	2.2	2.2	Mi.	Escherichia coli (W)	Rural NPS	WBC B	AQL, IRR, LWV, SCR, HHP	Newton	366154	4086266	364028	4084114	11070206	1
2014	3280.00	Willow Br.	P	2.2	2.2	Mi.	Zinc (S)	Mill Tailings	AQL	IRR, LWV, SCR, WBC B, HHP	Newton	366154	4086266	364028	4084114	11070206	1
2006	955.00	Willow Fk.	C	6.8	6.8	Mi.	Oxygen, Dissolved (W)	Tipton WWTP, Source Unknown	AQL	IRR, LWV, SCR, WBC B, HHP	Moniteau	515565	4276527	522997	4273676	10300102	1
2014	2375.00	Wilsons Cr.	P	2.9	14.0	Mi.	Benzo-a-anthracene (S)	Nonpoint Source	AQL	IRR, LWV, SCR, WBC B, HHP	Greene	471019	4115737	467546	4115846	11010002	1
2006	2375.00	Wilsons Cr.	P	11.9	14.0	Mi.	Escherichia coli (W)	Nonpoint Source	WBC B	AQL, IRR, LWV, SCR, HHP	Greene/Christian	468463	4116799	464366	4102525	11010002	1
2014	2375.00	Wilsons Cr.	P	2.9	14.0	Mi.	Chrysene, C1-C4 (S)	Nonpoint Source	AQL	IRR, LWV, SCR, WBC B, HHP	Greene	471019	4115737	467546	4115846	11010002	1
2014	2375.00	Wilsons Cr.	P	2.9	14.0	Mi.	Fluoranthene (S)	Nonpoint Source	AQL	IRR, LWV, SCR, WBC B, HHP	Greene	471019	4115737	467546	4115846	11010002	1
2014	2375.00	Wilsons Cr.	P	2.9	14.0	Mi.	Phenanthrene (S)	Nonpoint Source	AQL	IRR, LWV, SCR, WBC B, HHP	Greene	471019	4115737	467546	4115846	11010002	1
2014	2375.00	Wilsons Cr.	P	2.9	14.0	Mi.	Pyrene (S)	Nonpoint Source	AQL	IRR, LWV, SCR, WBC B, HHP	Greene	471019	4115737	467546	4115846	11010002	1
2014	2429.00	Woods Fk.	C	5.5	5.5	Mi.	Fishes Bioassessments/Unknown	Source Unknown	AQL	IRR, LWV, SCR, WBC B, HHP	Christian	480105	4082576	483619	4077550	11010003	1, 8

Water quality data summaries for waters on this list can be found on the department's 303(d) Web site at:

<http://www.dnr.mo.gov/env/wpp/waterquality/303d.htm>

Key to List

Year= Year this water body/pollutant was added to the 303(d) List

WBID= Unique water body identification number

WB Size= Size of the entire waterbody

Cls= Water body classification in state water quality standards: P= permanently flowing waters, C= intermittent streams, L1= Drinking water lakes, L2= large multi-purpose lakes, L3= other recreational lakes, US= unclassified stream, UL= unclassified lake

Pollutant = Reason the water is impaired.

pH= degree of acidity or alkalinity of water, Hydromod.= Hydromodification, which is typically related to the operation of dams.

(W) pollutant is in the water, (S) pollutant is in the sediment, (T) pollutant is in fish tissue.

If none of these three options are shown, the pollutant is in the water.

Sources = The pollutant source causing the impairment. WWTP= Wastewater treatment plant, PP= Power Plant, Unk.= Unknown, Aban. = Abandoned, Atmospheric Dep. = Atmospheric deposition (primarily rainfall), Mult.= Multiple, NPS= Non-point source, Pt.= Point Source, Rereg. Dam= Reregulation Dam - a low dam downstream of a larger hydroelectric dam.

IU = Impaired Beneficial Use(s). Those beneficial uses, assigned to this water in state water quality standards, that are not being met due to water pollution.

OU= Other Beneficial Use(s). Those beneficial uses assigned to this water in state water quality standard, that are not affected by the pollution.

Use codes for IU and OU columns are: GEN= General Criteria, HHP= Human Health-Fish Consumption, AQL= Protection of

aquatic life, WBC A and B = Whole Body Contact Recreation, DWS= Public Drinking Water Supply, LWV = Livestock and Wildlife Watering, SCR= Secondary

Contact Recreation (Fishing and Boating), IRR= Irrigation, IND= Industrial Water

Up X = X coordinate of upstream end of impaired water body (in UTM)

Up Y = Y coordinate of upstream end of impaired water body (in UTM)

Down X = X coordinate of downstream end of impaired water body (in UTM)

Down Y = Y coordinate of downstream end of impaired water body (in UTM)

County U/D = County the impaired segment is in. If the impaired segment is more than one county, the county of the upstream and downstream ends



Missouri Department of Natural Resources
2016 CWC Section 303(d) Listed Waters

Year	WBID	Waterbody	Cls	Imp Size	WB Size	Units	Pollutant	Source	IU	OU	U/D County	Up X	Up Y	Down X	Down Y	WBD 8	Comments
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of the impaired segment are given

Comment:

- 1= 2016 Assessment indicates impairment
- 2= Assessment shows existing data insufficient to show 'good cause' for de-listing.
- 3= Biological data does not support de-listing
- 4= Nutrient Related Impairment
- 5= Water is a Public Drinking Water Supply
- 6= Monsanto Lake is part of St. Joe State Park Lakes
- 7= Genral Use pertaining to Aquatic Life
- 8=These waters are listed as either "Aquatic Macroinvertebrate Bioassessment/Unknown" or "Fishes Bioassessment/Unknown" . These waters lack the necessary information to point to a discrete pollutant and also do not show signs of habitat impairment. Since we currently cannot point to a specific pollutant as the cause we are listing the reason as to why the water is believed to be impaired.
- 9= Only Lac Capri is imapired.

Missouri Department of Natural Resources, Water Protection Program
 03/30/16



Missouri Department of Natural Resources
2016 CWC Section 303(d) Delisted Waters

Year	WBD	Water Body Name	Pollutant	Delist Date	Delisting Reason	Delisting Comments
2016	444	Big Cr.	Oxygen, Dissolved (W)	8/7/2015	WQS attained; recovery reason unknown	Recent data shows no impairment, Invert data good.
2016	444	Big Cr.	Ammonia, Total (W)	8/7/2015	WQS attained; recovery reason unknown	Recent data shows no impairment, Invert data good.
2016	1250	Big Cr.	Escherichia coli (W)	7/21/2015	WQS attained; recovery reason unknown	Recent data in 2011, 2013, and 2014 shows meeting WQ Standards.
2016	111	Black Cr.	Oxygen, Dissolved (W)	5/1/2015	WQS attained; recovery reason unknown	Additional samples in 2013 and 2014 raised Type One Error rate above the 0.1 threshold for impairment.
2016	421	Blue R.	Escherichia coli (W)	5/26/2015	WQS attained; recovery reason unknown	Recent data indicates water is now meeting WQS.
2016	1371	Brush Cr.	Total Suspended Solids - TSS (W)	1/1/2012	WQS attained; recovery reason unknown	Recent data shows no sediment (VSS) or BOD impairment. originally delisted in 2012.
2016	3986	Brush Creek	Benzo-a-pyrene -PAHs	2/26/2016	WQS attained; original listing incorrect	New data shows the geometric mean for Brush Cr. on Missouri side is below 150% of the PEC value.
2016	1592	Brushy Cr.	Dissolved oxygen saturation (W)	7/27/2015	WQS attained; due to restoration action	New plant constructed in 2010, DO now meeting standards.
2016	3203	Center Cr.	Escherichia coli (W)	8/5/2015	WQS attained; recovery reason unknown	Additional data indicates WQS is being met
2016	221	Dardenne Cr.	Sedimentation/Siltation (S)	8/7/2015	WQS attained; recovery reason unknown	Data shows no impairment.
2016	221	Dardenne Cr.	Aquatic Macroinvertebrate Bioassessments (W)	8/7/2015	WQS attained; recovery reason unknown	New Invert scores show sustaining community when using now rain and drought influenced scores.
2016	1314	Dry Wood Cr.	Total Dissolved Solids (W)	5/11/2015	WQS attained; recovery reason unknown	Cl and SO4 levels have remained less than 1000 mg/L for the last 3 years of data.
2016	593	Grand R.	Escherichia coli (W)	7/14/2015	WQS attained; recovery reason unknown	Delisting for Secondary Contact use, still listed for Whole Body Contact.
2016	1189	L. Niangua R.	Oxygen, Dissolved (W)	6/19/2015	WQS attained; recovery reason unknown	Addn. data collected in 2013-14. Now meets LMD definition of unimpaired stream.
2016	2229	L. Whitewater Cr.	Aquatic Macroinvertebrate Bioassessments (W)	5/20/2015	WQS attained; recovery reason unknown	More recent data indicate that the macroinvertebrate community is not impaired. Five of 8 samples scored 16 or greater on MSC Index, as compared to 18 of 25 for the EDU.
2016	2744	Middle Fk. Black R.	Aquatic Macroinvertebrate Bioassessments (W)	8/26/2014	Status unknown - Orig listing in error	Assessment did not include an assessment of habitat conditions when the crayfish survival experiments were conducted.
2016	3701	Mississippi R.	Escherichia coli (W)	8/5/2015	WQS attained; original listing incorrect	Exceedance in 2009 resulted from calculation error. Data from 2012 - 2014 do not exceed standards.
2016	216	Peruque Cr.	Cause Unknown (W)	5/27/2015	4C - Not caused by a pollutant	Two fish kills in 2010, but none reported since. Fish kills results of habitat and hydrologic alternations. Move to 4C Category: Impaired by pollution and not a pollutant.
2016	1755	Pickle Cr.	pH (W)	8/4/2015	WQS attained; recovery reason unknown	New data shows water meeting water quality standards.
2016	71	S. Fabius R.	Escherichia coli (W)	4/10/2015	WQS attained; recovery reason unknown	New data for 2012-2014 shows standards being attained.
2016	3222	Shoal Cr.	Escherichia coli (W)	8/28/2015	WQS attained; recovery reason unknown	Recent data indicates waterbody is meeting criteria
2016	7297	Terre Du Lac Lakes	Chlorophyll-a (W)	8/31/2015	WQS attained; recovery reason unknown	Total Chlorophyll data shows lake is now meeting standards.
2016	3217	Turkey Cr.	Lead (S)	8/7/2015	WQS attained; new assessment method	According to the listing methodology, the geometric mean does not exceed 150% of the PEC.
2016	3216	Turkey Cr.	Escherichia coli (W)	8/7/2015	WQS attained; recovery reason unknown	Following the LMD, the data collected between 2010 and 2014 met water quality standards.
2016	3280	Willow Br.	Cadmium (S)	8/7/2015	WQS attained; original listing incorrect	Sediment measurements recalculated using the geometric mean instead of arithmetic mean
2016	3280	Willow Br.	Lead (S)	8/7/2015	WQS attained; original listing incorrect	Sediment measurements recalculated using the geometric mean instead of arithmetic mean
2016	2375	Wilsons Cr.	Benzo-a-pyrene -PAHs (S)	6/19/2015	WQS attained; recovery reason unknown	Additional data resulted in geomean less than 150 percent of PEC.

1 BEFORE THE MISSOURI DEPARTMENT OF NATURAL RESOURCES
 MISSOURI CLEAN WATER COMMISSION

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 PUBLIC HEARING
 Draft 2016 303(d) List

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 January 6, 2016
 Lewis and Clark State Office Building
 1101 Riverside Drive
 Jefferson City, MO 65102

10

11 Before:

12 Todd Parnell - Chair
 Buddy Bennett - Vice Chair
13 John Cowherd - Commissioner
 Samuel Leake - Commissioner
14 Ashley McCarty - Commissioner
 Wallis Warren - Commission

15

16 THE COURT REPORTER:

17 Jenna Petree
 MIDWEST LITIGATION SERVICES
18 2511 Broadway Bluffs
 Columbia, MO 65201
19 573-449-0561

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1 PROCEEDINGS

2 CHAIRMAN PARNELL: The Commission will begin
3 the public hearing on the proposed 2016 303(d) Impaired
4 Water List. The purpose of this public hearing is to
5 provide the Department opportunity to present testimony and
6 to provide both the Department and the public the
7 opportunity to comment on the impaired waters list.

8 This public hearing is not a forum for debate
9 or resolution of issues. The Commission ask that those
10 commenting limit their testimony to five minutes and not
11 repeat comments that others have already made. The
12 Commission will first hear testimony from the Department.
13 Following the Department's testimony, the Commission will
14 give the public an opportunity to comment. We ask that all
15 individuals present fill out an attendance card so our
16 records are complete. If you wish to present verbal
17 testimony, please indicate that on your attendance as well.

18 When you come forward to present your
19 testimony, please speak into the microphone and begin by
20 identifying yourself to the court reporter.

21 Following the public hearing today, the
22 Commission will review testimony presented and make
23 appropriate modifications to the proposed documents. The
24 Commission plans to take final action at the April 1, 2016
25 meeting.

1 The court reporter will now swear in anyone
2 wishing to testimony at this hearing. Will all those
3 wishing to comment, please stand.

4 The following individuals, TRISH RIELLY and LESLIE
5 HOLLOWAY, were duly sworn and present the following
6 testimony:

7 CHAIRMAN PARNELL: Thank you. All right. I
8 will call forward Trish Rielly, please.

9 MS. RIELLY: Good morning, Commissioners.
10 Again, my name is Trish Rielly. I'm the supervisor of the
11 Monitoring and Assessment Unit within the Watershed
12 Protection Section of the Water Protection Program. Again,
13 today I will be providing information on the draft 2016
14 303(d) List of impaired waters currently posted on the
15 Department's website for public comment.

16 The Federal Water Pollution Control Act,
17 Section 303(d), requires states to biennially -- two times
18 a year -- submit to the U.S. Environmental Protection
19 Agency a list of impaired waters for which adequate
20 pollution controls have not yet been met -- or have not
21 been required.

22 The Commission approved the 2016 Listing
23 Methodology on July 9 of 2014, which was followed to assess
24 the water on this draft 2016 303(d) List. The list was
25 placed on public notice on October 1, 2015 and continues

1 through January 31 of 2016 -- did I say that right? Was
2 put on public notice October 1, 2015 and then continues
3 through January 31 of 2016.

4 The Department has held two public
5 availability meetings to discuss the draft 303(d) List.
6 These meetings were held on November 3rd of 2015 and
7 December 1st of 2015. A list of attendees and the summary
8 of the meetings can be found on the Department's website.

9 To date, the Department has received four
10 written comments on the draft 2016 303(d) List. The
11 comments were received from the City of Independence, the
12 Newman, Comley & Ruth Law Firm, Boone County, and the USEPA
13 Region 7. Written comments will continue to be received
14 through January 31st of 2016. All public comments -- all
15 public comments, along with the Department's responses,
16 will be -- become part of the public administrative record
17 and will be available on the Department's website.

18 A summary of the draft 2016 list of impaired
19 waters: The draft 2016 303(d) List being presented today
20 is composed of 448 waterbody/pollutant pairs;
21 fifty-seven -- or I'm sorry -- 75 of these are new to the
22 2016 list; and the remaining 373 listings are carried over
23 from the EPA approved 2014 303(d) List.

24 Of the 75 new listings, 21 streams and 2 lakes
25 were assessed under the new stream classification system at

1 the 1:100,000 scale National Hydrography Dataset. The
2 specific uses that were assessed under this provision
3 included; aquatic habitat protection, human health
4 protection, which is for fish consumption, and whole-body
5 contact recreation under Category B, and secondary
6 recreation.

7 Twenty-five lakes that are maintained on the
8 site-specific criteria for nutrients in Table M of the Code
9 of State Regulations; eleven of these lakes were assessed
10 as having nutrient impairments.

11 Six of the most common pollutants on the list
12 include: 125 listings for bacteria, 92 for heavy metals in
13 water or sediment, 73 for low dissolved oxygen, 62 for
14 mercury in fish tissue, 21 for biological impairments based
15 on bio-monitoring, and 20 for chloride.

16 Five of the most common sources were: mining
17 and smelting, which was 96, 87 due to unknown, 86 for rural
18 nonpoint source, 73 for urban runoff, and 62 due to
19 atmospheric deposition.

20 A summary of the proposed waters for
21 delisting. A total of 29 waterbody pollutant pairs from
22 the 2014 303(d) List are being proposed for de-listing. Of
23 the 29 proposed for delisting, 24 now meet water quality
24 standards; three due to being originally listed in error,
25 and one due to wastewater facility update, and two are

1 being delisted for re-segmentation of a waterbody or the
2 assessment method had changed.

3 Again, the purpose of today's hearing is to
4 introduce the draft 2016 303(d) list of impaired waters and
5 allow the public to provide comments. The Department
6 request the Commission's approval of the document at the
7 April Commission meeting. And that's all I have.

8 COMMISSIONER PARNELL: Thank you, Trish.

9 MS. RIELLY: I'm sorry, one more thing.
10 Information that's available on the Department's website is
11 the draft 2016 303(d) List and the assessment worksheet, a
12 list of the waters on the 2014 303(d) List that are being
13 proposed for removal on the 2016 list, along with the
14 corresponding assessment worksheets, and a summary of the
15 public availability meeting discussions that were held on
16 November 3rd and December 1st of 2015. That's it.

17 COMMISSIONER PARNELL: Thank you.

18 MS. RIELLY: Thank you.

19 CHAIRMAN PARNELL: Commissioners, do you have
20 any questions at this point?

21 COMMISSIONER BENNETT: Yes, I would have a
22 question maybe more directed maybe at John. You referenced
23 going to the website to find this information. Those of us
24 that are not as qualified to browse a website to try to
25 find issues like this is mind boggling. So could we get an

1 e-mail from you that tells us where that is on the website,
2 John?

3 MR. MADRAS: Absolutely. Sure.

4 COMMISSIONER BENNETT: We would appreciate it
5 because I have searched and searched and sometimes I end up
6 in Thailand. Appreciate it.

7 CHAIRMAN PARNELL: Thanks, Trish. Comments
8 from the floor, Leslie Holloway representing the Missouri
9 Farm Bureau.

10 MS. HOLLOWAY: Good morning and happy New
11 Year. Leslie Holloway representing Missouri Farm Bureau.
12 I would like to first give you all a handout before I
13 actually make my comments.

14 Following up on the overview that Trish just
15 gave and having participated in some of the public
16 discussions, the public meetings that she referenced, I
17 thought that I would like to just share with you some
18 information about some of the specific waterbodies that
19 we've discussed and why some of those came to my attention
20 and others. But kind of following up on Commissioner
21 Bennett's comment about the finding information on the
22 website sometimes can be difficult and it's definitely time
23 consuming if you want to try to go through, you know, each
24 of these worksheets. So what you have are copies of the
25 worksheets from just a few of these waterbodies to give you

1 an example of what some of us have been talking with the
2 Department about.

3 The first one, Barker Creek, the discussion
4 that we've had there pertaining to the dissolved oxygen
5 impairment. What struck me about that particular waterbody
6 is the data is from between 2001 and 2007 on dissolved
7 oxygen. There are -- there were eight samples where there
8 were exceedances where that standard was not met out of 22.
9 Now, over the course of -- you know, that's over the course
10 of six years -- eight exceedances; six of out of those
11 eight were samples that were done in June, two out of those
12 eight were done in October. So, my question has been to
13 DNR staff about, you know, how do you look at the timing?
14 What's the protocol of the timing of the sampling? As well
15 as the age of the data. And the methodology says that if
16 the department uses data to make a list decision that
17 predates the date the list is initially developed by more
18 than seven years, the Department will provide a written
19 justification for the use of data. So I have asked the
20 Department about how they plan to handle that. It's my
21 understanding that there will be some additional written
22 explanation of using that kind of data.

23 In the proposed methodology, there is also
24 some discussion of dissolved oxygen and a footnote that
25 would apply to the proposed methodology pertaining to

1 dissolved oxygen that indicates that I guess some seasonal
2 sampling protocols need to be applied in some cases. I
3 don't know if this is one of those cases, but that's one of
4 the things that I'll discuss further with the Department
5 staff.

6 I would like to move then to the second
7 worksheet, which pertains to Horse Creek. And there are
8 two different pollutants there for which Horse Creek is
9 evaluated. One being the aquatic invertebrate monitoring,
10 and then the second being dissolved oxygen. But the
11 macro-invertebrate sampling, this is not a newly listed
12 waterbody, but the question that I have is if you look at
13 the dates there on the data; 1995, 2000, 2006, and 2007.
14 So again, questions about the age of the data and also
15 relative to the numbers of samples that, you know, were
16 taken upon which that listing is based. The dissolved
17 oxygen sampling also is kind of a unique situation,
18 although I think there some other waterbodies with similar
19 data sheets. But the sampling, as you can see, they've --
20 there are three time periods for sampling that are listed
21 on the dissolved oxygen. Samples taken from 2000 to 2004
22 where two out of eight of those samples showed exceedances.
23 And then the second listing, as you can see, says
24 August 28, 2006, September 1, 2006; so that's over a course
25 of five days where there are 392 samples listed. And then

1 the final sampling period, 2007 to 2011, where you have 17
2 samples and no exceedances in that time period. So those
3 raised questions in my mind relative to the sampling
4 protocol and how those -- how those are handled.

5 COMMISSIONER BENNETT: Question, Leslie, on
6 that. Pardon me. The -- on the left-hand of that column
7 you have the origin I suppose MDNR and MEC that did the 392
8 samples. Who is MEC?

9 MS. HOLLOWAY: I am not sure. I'm sure that
10 staff can provide that information.

11 MR. VOSS: Midwest Environmental Consultants.

12 MS. HOLLOWAY: All right. Then -- were there
13 other questions on that? Okay. Then I would like to move
14 on to the Dry Hollow, which is the next worksheet. This is
15 a new listing and looking at -- new listing for bacteria.
16 So looking at the age of the data here, we have samples
17 from 2007, 2010, and 2011. If there is an exceedance
18 underlined on the worksheet at the bottom there, the
19 narrative, last three years of available data, 2011, 2010,
20 2007 the criteria was exceeded. But if you look at where
21 the criteria was exceeded it was in 2007, not in 2010 or
22 2011, the more recent data.

23 Looking then at the next worksheets, there are
24 a couple of worksheets there pertaining to waterbodies
25 listed for mercury; Buffalo Bill Lake and Cottontail Lake,

1 just as examples of some of those. There are 42 that were
2 already listed and then 20 that are being added under the
3 proposed list. The worksheets reference a study by
4 Department of Conservation and there is an asterisk by the
5 description of that information there, "Sport-caught Fish
6 Consumption In Missouri 2002 Male Survey" talking about
7 found that Missourians eat sport-caught fish mixture of
8 species. This data is not in a publicly available format
9 at this point. I understand from the Department of
10 Conservation that it will be available shortly. But when
11 the proposed listing came out, I requested a copy of that
12 and it was not publicly available at the time. They were
13 in the process of putting it into final form. The
14 narrative on that worksheet then at the next asterisk talks
15 about that the value exceeds the federal criteria of .3.
16 Additionally the fish consumption rate for Missourians that
17 eat sport-caught fish is much greater than the fish
18 consumption estimate used for the federal criteria and
19 therefore this waterbody is judged to be impaired by
20 mercury and fish tissue. Now, from the discussions in the
21 public meeting it's my understanding that this waterbody
22 would be listed regardless of the information from
23 Department of Conservation. So I am under the impression
24 then that no listing decisions have actually been made
25 based on any of the Department of Conversation information

1 solely at this point in time. So the fact that that
2 information is not publicly available has not resulted --
3 is not as, I guess troublesome, because there hasn't been a
4 listing based simply on the conservation data yet, but that
5 is something that we would certainly want to see made
6 publicly available. And on Cottontail, similar narrative,
7 same description of the Department of Conservation data.
8 And the narrative below where the second asterisk is, is
9 slightly different. Some of the waterbodies listed for
10 mercury are one way and some of them are the other way.
11 But this particular narrative says that this value is
12 greater than the federal criteria, therefore this lake is
13 judged to be impaired by mercury. However, the fish
14 consumption rate for Missourians that eat sport-caught fish
15 is much greater than fish consumption estimate used for the
16 federal criteria, therefore mercury is still considered to
17 be a contaminant of concern in this lake.

18 That's a little bit, I think, confusing. I
19 mean mercury, I guess, would be a concern if it's listed as
20 an impairment. So I'm not sure however it's still
21 considered a contaminant of concern refers to in addition
22 to the fact that it's already listed as impaired.

23 Then I would like to go to one last worksheet
24 and that's for Crane Lake, which is newly listed
25 site-specific criteria. The samples are 1997 through 2009

1 and there are four samples per year. My question, I guess,
2 in part was why would this be listed now? And in some
3 cases apparently there is a lag in data that causes a
4 waterbody to be impaired. The data may be older than the
5 current year, but if for whatever reason it hasn't come up
6 in what I understand to be the rotation of analysis or
7 whatever would prompt the analysis evaluation for that
8 year, it might not be listed for another couple of years.
9 But looking at this particular waterbody it appears -- and
10 I mean just as a very cursory, you know review -- if you
11 look at averages for instance for phosphorous and
12 chlorophyll, which is what the basis of the listing is in
13 this case, the number appear to be improving through that
14 time period. If you go from each year looking at averages.
15 I just looked at averages just as a rough means. And so it
16 would seem to me that there needs to be some more recent
17 evaluation of what's going on in that lake before it would
18 be added to the list as it was this year.

19 So that really concludes the information I
20 wanted to present to you. I think just as an overall kind
21 of, you know, statement that I think is important for us,
22 or for anybody who is talking about this information
23 publicly, is to be able to help people understand that the
24 fact that there were 75 new listings, you know, this year;
25 you can't conclude then that there are 75 waterbodies that

1 are worse off this year than they were last year this time
2 around because there is a lag in the data. There are
3 changes in standards, and there are some listings that are
4 actually adding an impairment this time around that was not
5 listed. So, in other words, a water body that was already
6 on the list for something, dissolved oxygen or whatever,
7 there might have been an addition of another pollutant for
8 that same water body that would be also be considered a new
9 listing. So I would be happy to answer any questions?

10 COMMISSIONER BENNETT: I have a question.
11 Crane Lake is that in Crane, Missouri?

12 MS. HOLLOWAY: I can't say where the location
13 is. All I did was look at worksheets and I am not familiar
14 enough with these waterbodies to comment further.

15 COMMISSIONER BENNETT: This leads to my
16 question: Are there any of these impaired waters that are
17 used for drinking water supplies?

18 COMMISSIONER LEAKE: Then the answer to that
19 is yes. Mark Twain Lake is a drinking water supply list.

20 MR. VOSS: I'm Robert Voss, I work under
21 Trish. There is an additional column on the 303(d) List of
22 other uses. There is a column for the impaired list and
23 other uses. In that column of other uses, there should be
24 a "DWS" for drinking water supply if it's used for drinking
25 water supply.

1 COMMISSIONER BENNETT: Thank you.

2 CHAIRMAN PARNELL: Thank you. Any other
3 questions of Leslie? Leslie, I have a question, a general
4 one, is the point of sharing this information, the last two
5 sentences you said or have you asked for specific responses
6 to each of these from the Department?

7 MS. HOLLOWAY: Yes, I have asked -- or had
8 discussions I should say with the Department -- and in some
9 cases there have been responses or explanations, for
10 instance, of the lag in the data and that's why we are
11 listing it now. So it's not that there was necessarily a
12 change in the standard, but it's just that there is a lag
13 time in getting through some of the data that's submitted
14 depending on when it's submitted and that kind of thing.
15 So I guess in combination, I'm wanting to share that
16 information so that you have a better feel for what's in
17 the summaries of the public discussions that you have.

18 CHAIRMAN PARNELL: I think our concern was
19 just to make sure that the Department is responding to you
20 on a timely basis.

21 MS. HOLLOWAY: Yes. I would say yes. In
22 fact, I would commend the Department on being very open
23 with information and willing to discuss it.

24 CHAIRMAN PARNELL: Thank you.

25 MS. HOLLOWAY: Thank you.

1 CHAIRMAN PARNELL: Anybody else? Any other
2 comments on this section, this agenda item? Okay. I have
3 a closing statement I will read. The Commission will
4 accept comments on the proposed document until 5:00 p.m.
5 January 31, 2016. Comments can be submitted to the
6 Department's Water Protection Program by mail to the
7 Department's Water Protection Program, Attention: Trish
8 Rielly, P.O. Box 176, Jefferson City, 65102-0176, e-mail
9 directly to trish.rielly@dnr.mo.gov, hand-delivered to the
10 receptionist at the Lewis and Clark State Office Building,
11 1101 Riverside Drive in Jefferson City, mark comments with
12 "Attention to Trish Rielly, Water Protection Program."

13 On behalf of the Commission, I thank everyone
14 who has participated in this process and this hearing is
15 now closed.

16 (Hearing concluded at 10:24 a.m.)

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1 CERTIFICATE OF REPORTER

2 STATE OF MISSOURI)

) ss.

3 COUNTY OF COLE)

4 I, Jenna Petree, do hereby certify that the
5 witness whose testimony appears in the foregoing deposition
6 was taken by me to the best of my ability and thereafter
7 reduced to typewriting under my direction; that I am
8 neither counsel for, related to, nor employed by any of the
9 parties to the action in which this deposition was taken,
10 and further that I am not a relative or employee of any
11 attorney or counsel employed by the parties thereto, nor
12 financially or otherwise interested in the outcome of the
13 action.

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Court Reporter

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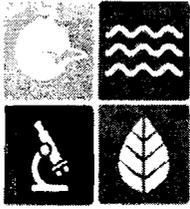
<p>A</p> <p>ability 17:6 able 13:23 Absolutely 7:3 accept 16:4 Act 3:16 action 2:24 17:9 17:13 added 11:2 13:18 adding 14:4 addition 12:21 14:7 additional 8:21 14:21 Additionally 11:16 adequate 3:19 administrative 4:16 age 8:15 9:14 10:16 Agency 3:19 agenda 16:2 allow 6:5 analysis 13:6,7 answer 14:9,18 anybody 13:22 16:1 apparently 13:3 appear 13:13 appears 13:9 17:5 applied 9:2 apply 8:25 appreciate 7:4,6 appropriate 2:23 approval 6:6 approved 3:22 4:23 April 2:24 6:7 aquatic 5:3 9:9 Ashley 1:14 asked 8:19 15:5,7 assess 3:23 assessed 4:25 5:2 5:9</p>	<p>assessment 3:11 6:2,11,14 asterisk 11:4,14 12:8 atmospheric 5:19 attendance 2:15 2:17 attendees 4:7 attention 7:19 16:7,12 attorney 17:11 August 9:24 availability 4:5 6:15 available 4:17 6:10 10:19 11:8 11:10,12 12:2,6 averages 13:11 13:14,15 a.m 16:16</p> <p style="text-align: center;">B</p> <p>B 5:5 bacteria 5:12 10:15 Barker 8:3 based 5:14 9:16 11:25 12:4 basis 13:12 15:20 behalf 16:13 Bennett 1:12 6:21 7:4 10:5 14:10,15 15:1 Bennett's 7:21 best 17:6 better 15:16 biennially 3:17 Bill 10:25 biological 5:14 bio-monitoring 5:15 bit 12:18 Bluffs 1:18 body 14:5,8 boggling 6:25</p>	<p>Boone 4:12 bottom 10:18 Box 16:8 Broadway 1:18 browse 6:24 Buddy 1:12 Buffalo 10:25 Building 1:8 16:10 Bureau 7:9,11</p> <p style="text-align: center;">C</p> <p>call 3:8 card 2:15 carried 4:22 case 13:13 cases 9:2,3 13:3 15:9 Category 5:5 causes 13:3 certainly 12:5 CERTIFICATE 17:1 certify 17:4 Chair 1:12,12 CHAIRMAN 2:2 3:7 6:19 7:7 15:2,18,24 16:1 change 15:12 changed 6:2 changes 14:3 chloride 5:15 chlorophyll 13:12 City 1:9 4:11 16:8,11 Clark 1:8 16:10 classification 4:25 CLEAN 1:1 closed 16:15 closing 16:3 Code 5:8 COLE 17:3 Columbia 1:18 column 10:6</p>	<p>14:21,22,23 combination 15:15 come 2:18 13:5 Comley 4:12 commend 15:22 comment 2:7,14 3:3,15 7:21 14:14 commenting 2:10 comments 2:11 4:10,11,13,14 4:15 6:5 7:7,13 16:2,4,5,11 Commission 1:1 1:14 2:2,9,12 2:13,22,24 3:22 6:7 16:3,13 Commissioner 1:13,13,14 6:8 6:17,21 7:4,20 10:5 14:10,15 14:18 15:1 Commissioners 3:9 6:19 Commission's 6:6 common 5:11,16 complete 2:16 composed 4:20 concern 12:17,19 12:21 15:18 conclude 13:25 concluded 16:16 concludes 13:19 confusing 12:18 conservation 11:4,10,23 12:4 12:7 considered 12:16 12:21 14:8 Consultants 10:11 consuming 7:23 consumption 5:4 11:6,16,18</p>	<p>12:14,15 contact 5:5 contaminant 12:17,21 continue 4:13 continues 3:25 4:2 Control 3:16 controls 3:20 Conversation 11:25 copies 7:24 copy 11:11 corresponding 6:14 Cottontail 10:25 12:6 counsel 17:8,11 County 4:12 17:3 couple 10:24 13:8 course 8:9,9 9:24 court 1:16 2:20 3:1 17:16 Cowherd 1:13 Crane 12:24 14:11,11 Creek 8:3 9:7,8 criteria 5:8 10:20 10:21 11:15,18 12:12,16,25 current 13:5 currently 3:14 cursor 13:10</p> <p style="text-align: center;">D</p> <p>data 8:6,15,16,19 8:22 9:13,14,19 10:16,19,22 11:8 12:4,7 13:3,4 14:2 15:10,13 Dataset 5:1 date 4:9 8:17 dates 9:13 days 9:25</p>
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MISSOURI
DEPARTMENT OF
NATURAL RESOURCES

**2016 303(d) List
RESPONSES TO PUBLIC COMMENTS**

**Public Notice
October 1, 2015 – January 31, 2016**

**Missouri Department of Natural Resources
Water Protection Program
PO Box 176
Jefferson City, MO 65102-0176
800-361-4827 / 573-751-1300**

INTRODUCTION

Pursuant to 40 CFR 130.7, States, Territories and authorized Tribes must submit biennially to the U.S. Environmental Protection Agency (EPA) a list of water-quality limited (impaired) segments, pollutants causing impairment, and the priority ranking of waters targeted for Total Maximum Daily Load (TMDL) development. The Missouri Department of Natural Resources (department) placed the draft 2016 303(d) List of impaired waters on public notice from Oct. 1, 2015 to Jan. 31, 2016. All original comments received during this public notice period are available online on the department's website at <http://dnr.mo.gov/env/wpp/waterquality/303d/303d.htm>. Comments were received from the following groups or individuals:

Newman, Comley and Ruth P.C. Law Firm
City of Independence
Boone County
City of Springfield
EPA, Region 7
Missouri Department of Conservation

This document summarizes and paraphrases the comments received, provides the department's responses to those comments, and notes any changes made to the final draft 2016 303(d) List of Impaired Waters or supporting documentation. A priority ranking of impaired waters for TMDL development will be produced and placed on public notice following approval of the 2016 303(d) List by the Missouri Clean Water Commission.

Newman, Comley and Ruth comments

Cave Springs Branch (WBID 3245U-01) – Category 4A water body

No data was offered to support the 1998 impairment listing for Cave Springs Branch other than a suggestion the watercourse had unsightly bottom deposits. In 2010, the Clean Water Commission approved the removal of Cave Springs Branch from the Missouri impaired waters list, but the EPA reinstated the listing without any additional data to suggest unsightly bottom deposits persisted. A discussion regarding wastewater treatment facility upgrades completed by Simmons Foods, in addition to chemical and biological report summaries were provided as evidence the watercourse is no longer impaired for unsightly bottom deposits. It is recommended that Cave Springs Branch be removed from the 303(d) List and the TMDL be rescinded.

Department Response

Cave Springs Branch has not been included on the draft 2016 303(d) List of impaired waters and therefore cannot be "removed" from the list. The department recognizes and appreciates the facility upgrades completed by Simmons Foods to improve their

wastewater treatment processes. In 2010, CSB was moved from Category 5 (i.e., the 303(d) List) of Missouri's Integrated Report to Category 4A, due to EPA approval of the Cave Springs Branch TMDL to address total nitrogen and total phosphorus attributed to cause the excess production of benthic (bottom growing) algae (<http://dnr.mo.gov/env/wpp/tmdl/docs/3245u-01-cave-springs-br-tmdl.pdf>). The TMDL recognizes that improvements to the wastewater treatment facilities at Simmons Foods, Inc., have improved water quality in CSB and, as the comment references, the department has monitored these improvements. However, land application of poultry litter and fertilizer can and do continue to cause or contribute to nutrient loading in the Cave Springs Branch watershed. In this respect, the TMDL should not be considered invalid and reductions in nutrient loading, particularly through reductions from nonpoint sources, are still relevant and implementable to meet TMDL targets.

Furthermore, the purpose of a TMDL is to determine the pollutant loading a water body can assimilate without exceeding Missouri's Water Quality Standards. The EPA guidance document "Considerations for Revising and Withdrawing TMDLs," recommends that "existing TMDLs not be withdrawn simply because the load and wasteload allocations have been implemented successfully and the water is now attaining water quality standards. EPA recommends that such "successful" TMDLs remain in place to ensure that water quality standards continue to be maintained in the future, and that their water quality analyses and allocation targets continue to inform permit writers' and stakeholders' efforts to maintain those water quality standards." As discussed previously with Simmons Foods and its consultants, a successful water quality attainment demonstration would place Cave Springs Branch in an attaining category within Missouri's Integrated Report and future enhancement to the facility with regard to nutrients may not be necessary. Should Simmons Foods wish to pursue this option further, please contact the department's Watershed Protection Section, Monitoring and Assessment Unit. No changes were made to the proposed 2016 303(d) List as a result of this comment.

Middle Fork Black River (WBID 2744)

This water body was originally listed in 2012, but was removed from the 303(d) List during the 2014 listing cycle. Documentation was provided that supported the 2014 delisting decision.

Department Response

The department appreciates Newman, Comley and Ruth bringing this oversight to the department's attention. This water body was inadvertently added back to the impaired waters list during the current listing cycle. The waterbody will be reinstated into

Category 2B within Missouri's Integrated Report for the aquatic life protection use. A comment was added to the Middle Fork Black River assessment worksheet and the department's assessment database to note this change.

West Fork Black River (WBID 2755) – Category 4A water body

The Doe Run Company requests the department remove the West Fork Black River nutrient impairment from the 303(d) List. The West Fork Black River was placed on the 1998 impaired list for nutrients 0.2 miles downstream of the West Fork Mine. A department study completed in 2002 and 2003 found low levels of chlorophyll in the stream, and the West Fork Doe Run discharge cannot be determined conclusively as contributing a significant nutrient load resulting in increased periphyton growth. To date, the department nor EPA has produced any studies to document the general criteria or recreational uses have been impaired by nutrients in the West Fork Black River, nor evidence that benthic algae is impairing recreational uses.

Department Response

West Fork Black River has not been included on the draft 2016 303(d) List of impaired waters for nutrient impairment and therefore cannot be “removed” from the list. During the 2008 303(d) listing cycle, the department recommended removing the West Fork Black River from the impaired waters list for nutrients. The recommendation for delisting was not approved by EPA. In 2010, WFBR was moved from Category 5 (i.e., the 303(d) List) of Missouri's Integrated Report to *Category 4A*, due to EPA establishing a TMDL for nutrients to address the impairment. The TMDL was developed by EPA, Region 7 as a result of a 2001 consent decree, *American Canoe Association, et al. v. EPA, No.98-1195-CV-W in consolidation with No. 98-4282-CV-W, February 27, 2001*. The TMDL is based upon water quality measurements for total nitrogen, total phosphorus, chlorophyll, and flow data collected from 2001 to 2009. The nutrient data is attached as Appendix A of the West Fork Black River TMDL <http://dnr.mo.gov/env/wpp/tmdl/docs/2755-w-fk-black-r-tmdl.pdf>.

The department agrees that available studies and information suggest that West Fork Black River is on a path toward attaining applicable water quality standards. As discussed previously with the Doe Run Company and its consultants, a successful water quality attainment demonstration would place West Fork Black River in an attaining category within Missouri's Integrated Report and future enhancement to the facility with regard to nutrients may not be necessary. Should the Doe Run Company wish to pursue this option further, please contact the department's Watershed Protection Section, Monitoring and Assessment Unit. No changes were made to the proposed 2016 303(d) List as a result of this comment.

The City of Independence comments

Little Blue River (WBID 0422)

Additional U.S. Geological Survey (USGS) bacterial data is available for the Little Blue River at 39th Street (site number 06893910) from 2006 to 2009. The USGS has been sampling the Little Blue River and other waters under a cooperative agreement with the City of Independence to satisfy requirements of the City's Municipal Separate Storm Sewer System (MS4) permit. This site is located upstream from most of the City of Independence's MS4.

Department Response

The department was unaware this data existed and appreciates the information. The department will include the site information and data in future listing cycles. No changes were made to the proposed 2016 303(d) List as a result of this comment.

The City of Independence also provided a comment that relates to the TMDL development, rather than the listing process itself, due to concerns about future TMDL requirements that may be established for the Independence MS4. Based upon a USGS report, increased bacteria densities correlated with increased suspended sediment during storms at all sites. Therefore, when the department develops the Little Blue River TMDL, please keep the following in mind:

- *If storm water influenced samples are included, the Little Blue River exceeds the bacteria standard for whole body contact before the river enters the City of Independence.*
- *TMDL development efforts may require a broader scope beyond the MS4 to address non-human sources of bacteria.*

Because of the predominance of non-human sources and re-suspension issues, the department should make TMDL development for this section of the Little Blue River a low priority.

Department Response

The department appreciates the comment and will share it with the Water Protection Program, Watershed Protection Section, TMDL/Modeling Unit. No changes were made to the proposed 2016 303(d) List as a result of this comment.

Spring Branch (WBID 5004)

The City of Independence provided a comment regarding the USGS gage located on the bridge at Holke Road. Dissolved oxygen data was collected from this site for a number of years from 2005-2007, but the data was rated as “poor” by the USGS and not representative of the stream due to rip rap catching debris and sediment. The monitoring site was subsequently relocated downstream. The USGS also provided follow-up information about this site and agreed the data was not representative of instream conditions.

Department Response

The department appreciates the information. This monitoring site was removed from the assessment worksheet and the data reassessed. The revised assessment indicates that Spring Branch is unimpaired by low dissolved oxygen, and therefore will be removed from the draft 2016 303(d) List.

Boone County comments

Little Cedar Creek (WBID 0744)

The Little Cedar Creek at Zaring Road is located far upstream from the section of stream that is proposed for listing on the 2016 303(d) List. This site appears to be located below a box culvert where the stream only flows following precipitation events. During baseflow conditions, a pool of water is retained below the box culvert, and the county believes this is an inappropriate site for sampling dissolved oxygen. In addition, during the informational meeting it was discussed that USGS stream flow data was not included. Therefore, there are no indications that flow patterns in the Little Cedar Creek were different during 1999 to 2002.

Department Response

Based upon the comment, and information provided during the Nov. 3, 2015 public availability meeting, department staff confirmed the site location provided on the draft 2016 303(d) List was incorrect. Further investigation revealed the dissolved oxygen data was not collected from Little Cedar Creek, thereby making the assessment invalid. This water body will be removed from the draft 2016 303(d) List due to these assessment errors.

The City of Springfield comments

Ward Branch (WBID 2374)

The City provided a comment and supporting information regarding the impairment listing on Ward Branch for pH. The City believes the listing should be removed for multiple reasons. The pH data were collected following a first flush event, and were not measured according to EPA procedures. In addition, other data collected as part of a Section 319 Nonpoint Source grant project did not indicate a pH impairment in Ward Branch.

Department Response

The department appreciates the clarification regarding how pH data was collected and analyzed from Ward Branch. Since the data are not considered representative of annual ambient conditions, and were not collected or analyzed following EPA protocols, the data will not be used for assessing Ward Branch. Therefore, this water body will be removed from the draft 2016 303(d) List and a comment will be added to the Ward Branch assessment worksheet for future reference.

Regarding the Ward Branch assessment workbook, the City recommended that the department should either completely remove the tab labeled "Inverts" or clearly note that until such time appropriate reference stream data are collected, existing biological data cannot be used for impairment decisions, and references to macroinvertebrate score criteria and explicit statements of impairment should also be removed.

Department Response

The department agrees with the City in this instance, but would like to note that other chemical or biological data are often provided as supplemental information to support a listing or delisting determination. Since the pH impairment listing will be removed from the draft 2016 303(d) List, the Ward Branch assessment workbook will be removed from the department's webpage as it is no longer applicable.

Wilsons Creek (WBID 2375)

The City of Springfield provided a comment in favor of delisting Wilsons Creek for polycyclic aromatic hydrocarbons (PAHs) based upon additional data resulting in a geometric mean less than 150 percent of the probable effect concentration (PEC) threshold. Additionally, toxicity data recently made available on EPA's Storage and Retrieval (STORET) website provides strong evidence that there are no toxicity issues in

Wilsons Creek. In addition, the "Sediment PAHs" assessment worksheet states that PAHs exceeded 150 percent of the PEC thresholds upstream of the Southwest Treatment Plant. However, this assertion is not supported by the data table, which shows the PAH geometric mean is below 150 percent upstream of the Southwest Treatment Plant. The City requests the department correct this issue in the listing worksheet.

Department Response

Department staff reviewed the information and agrees the data is promising with respect to water quality status of the creek. However, the department would like some additional information and further evaluation of this data before supporting a de-listing decision. The department agrees that an assessment worksheet for sediment should not have been included with the impairment listing for E. coli. However, it should be noted that the EPA also provided a comment regarding Wilsons Creek which required a correction to the sediment assessment worksheet. A department response addressing the correction can be found under EPA comments for this water body.

In addition, the City provided a comment that the department should either completely remove the tab labeled "Inverts" or clearly note that until such time appropriate reference stream data are collected, existing biological data cannot be used for impairment decisions. References to macroinvertebrate score criteria and explicit statements of impairment should be removed. The City also finds the use of fish Index of Biotic Integrity (IBI) metrics questionable and suggests renaming the tab labeled "Community-4A", which incorrectly suggests that Wilsons Creek is currently on the 305(b) category 4A and has a completed TMDL.

Department Response

As previously noted in the response for Ward Branch, other chemical or biological data are often included to support a listing or delisting decision. The department agrees, however, that the assessment worksheet for "Inverts" should not have been included with the impairment listing for Escherichia coli, or E. coli. Biological data does not directly support a bacteriological impairment, therefore, the assessment worksheet should have been removed under these circumstances. However, as previously stated EPA also provided a comment on Wilsons Creek that caused the community tab to be retained. Therefore, in response to this comment, the department has added a note to the assessment worksheet stating the TDML was vacated and the assessment worksheet tab was also relabeled.

Jordan Creek (WBID 3374)

The City of Springfield finds that the department's rationale for listing Jordan Creek as impaired does not meet the weight of evidence requirements outlined in the 2016 Listing Methodology Document (LMD). The draft list identifies Jordan Creek as impaired based upon sediment samples that exceeded the 150 percent of the PEC threshold for PAH compounds. However, sediment data alone is not sufficient for listing Jordan Creek as impaired.

Department Response

Department staff reviewed the information and agrees the data is promising with respect to water quality status of the creek. However, the department would like some additional information and further evaluation of this data before supporting a de-listing decision.

The 2013 sediment data was not previously assessed by the department due to the timing of when the data became available during the 2014 listing cycle. The 2013 sediment data was collected and assessed by EPA. Benthic sediment data was collected to determine if pollutants within the sediments were contributing to the aquatic life impairment. The EPA placed Jordan Creek on the 2014 303(d) List for PAHs in sediment following the 2014 LMD approved by the Clean Water Commission May 2, 2012 (2014 EPA approval memo: <http://dnr.mo.gov/env/wpp/waterquality/docs/2014-epa-approval-memo.pdf>). In reviewing the available data during the 2016 listing cycle, the category 5 (303(d) List) decision was retained by the department. As stated, the geometric mean of sediment data was assessed following the 2014 LMD at 150 percent of the PEC thresholds for PAH compounds. The 150 percent PEC verses the 100 percent PEC threshold provides a conservative assessment of sediment toxicity and its potential for toxicity to aquatic life. In reviewing the sediment data collected in 2013, the geometric mean for the PAH compounds exceeded the 150 percent thresholds anywhere between 50 percent and 106 percent, indicating an increased potential for sediment toxicity.

The City of Springfield also commented that the department includes aquatic biological data as part of its rationale. The City states the data should not be used until such time as appropriate reference stream data is available. The City believes it is inappropriate to make listing decisions based on such data. Either completely remove the tab labeled "Community-4A" or clearly note that until such time appropriate reference stream data is collected, existing biological data cannot be used for impairment decisions. In addition, fish IBI scores only apply to streams of 3rd to 5th order in size in the Ozark ecoregion. The Community-4A tab incorrectly suggests that Jordan Creek is currently in 305(b) category 4A and has a completed TMDL.

Department Response

The department would like to reiterate that other chemical or biological data are often provided as supplemental information to support a listing or delisting determination.

In February 2013, the US District Courts vacated the Wilsons Creek and Jordan Creek TMDLs (<http://dnr.mo.gov/env/wpp/tmdl/2375-wilsons-3374-jordan-cks-record.htm>). These water bodies should have been reinstated into a category 5 listing and retained on the 303(d) List. However, during the 2014 listing cycle EPA approved the department's request for Jordan Creek to be moved from a Category 5 listing to Category 3B (available data suggested noncompliance but there is insufficient data to conduct a full assessment in accordance with the LMD - 2014 EPA approval memo: <http://dnr.mo.gov/env/wpp/waterquality/docs/2014-epa-approval-memo.pdf>). In response to this comment, the department has added a note to the assessment worksheet stating the TMDL was vacated and the worksheet tab was re-labeled.

Regarding the Fish IBI scores provided on the Jordan Creek assessment worksheet, it appears this information has been provided on the assessment worksheet since 2010. This information was based upon data presented in a Springfield City Utilities study report. The results of this study were used to support the original placement of Jordan Creek in a Category 5 listing due to a decline in biodiversity in the aquatic community.

Per the City of Springfield, recent toxicity data is available from the EPA Storage and Retrieval (STORET) website and provides strong evidence there are no toxicity issues in Jordan Creek. The City also provided a summary of toxicity data collected from Jordan Creek and a biocriteria reference site on May 19, 2015 and June 23, 2015.

Department Response

The department was unaware that 2015 data was uploaded to the EPA STORET website. For the 2016 assessment cycle, the EPA STORET website was queried and all available data was downloaded in October, 2014. Any data uploaded to the EPA STORET website after this time was not available for the 2016 assessment. No changes were made to the proposed 2016 303(d) List as a result of these comments.

North Branch Wilsons Creek (WBID 3811)

The City of Springfield provided a comment stating it finds the department's supporting rationale for listing North Branch Wilsons Creek as impaired does not meet the weight of evidence requirements outlined in the 2016 LMD. North Branch Wilsons Creek is

impaired for zinc based on sediment data that exceeds 150 percent of the PEC. Missouri's LMD states the department will use a weight of evidence analysis for evaluating all narrative criteria and in the case of toxic chemicals occurring in benthic sediment rather than water, the numeric thresholds used to determine the need for further evaluation will be the PEC. Accordingly, exceedences of PEC values should only be used to place water bodies in category 3B of the LMD, or as part of the weight of evidence analysis. Without additional data or biological or toxicity data, there is insufficient evidence that North Branch Wilsons Creek is impaired. The city requests North Branch Wilsons Creek be delisted.

Department Response

The 2013 sediment data was not previously assessed by the department due to the timing of when the data became available during the 2014 listing cycle. The 2013 sediment data were collected and assessed by EPA. The EPA placed North Branch Wilsons Creek on the 2014 303(d) List for elevated zinc in sediment following the 2014 LMD approved by the Clean Water Commission on May 2, 2012. New information was not available at the time of the 2016 assessment cycle to justify a change to the listing determination. This water body will be prioritized for additional monitoring. No changes were made to the proposed 2016 303(d) List as a result of this comment.

Pearson Creek (WBID 2373)

The City of Springfield does not support the department's listing of Pearson Creek for an aquatic life impairment stating the department compared Pearson Creek biological data to inappropriate reference stream data. In addition, the worksheet tab labeled "Invert-5" should be either removed or all reference to impairment decision be deleted along with references to macroinvertebrate score criteria. It should be noted until such time that appropriate reference stream data is collected, existing biological data cannot be used for impairment decisions.

Department Response

Pearson Creek was originally placed in Category 5 during the 2002 assessment cycle due to reduced aquatic biodiversity caused by unknown toxicity. In 2011 a TMDL was developed by EPA, but was later vacated (see below response for additional information). During the 2014 listing cycle, the department requested the water body be removed from Category 5 and placed into Category 3B (available data suggested noncompliance but there is insufficient data to conduct a full assessment in accordance with the LMD) based on a public comment received from the City of Springfield that the aquatic macroinvertebrate community was inappropriately assessed against biological reference

streams provided within Table I of Missouri's Water Quality Standards. EPA rejected the delisting of Pearson Creek because it was originally listed as impaired for a documented decline in biotic diversity due to unknown pollutants. This cause of impairment was not dependent upon an assessment of the state's Macroinvertebrate Stream Condition Index (MSCI) score procedure (<http://dnr.mo.gov/env/wpp/waterquality/docs/2014-epa-approval-memo.pdf>). Additional studies by the department have been scheduled to determine if the biotic diversity in Pearson Creek has improved since its original listing.

The City of Springfield also had questions and concerns regarding a biological study completed by URS Corporation and the methodology followed.

Department Response

The Pearson Creek biological study was completed by URS Corporation in 2009 under contract with EPA. A copy of the report was obtained from EPA and provided to the City. According to the report, titled "Sampling for Consent Decree Waters In Missouri: Pearson Creek Springfield, MO Task Order No. 2008-54", the aquatic macroinvertebrates were collected following the departments sampling and enumeration protocols for field work and analysis [footnote: MoDNR Semi-Quantitative Macroinvertebrate Stream Bioassessment Project Procedure and MoDNR Stream Habitat Assessment Project Procedure]. The macroinvertebrate samples were then sorted, and identification and calculation of performance metrics were completed, by the Ozarks Environmental and Water Resources Institute (OEWRI) in accordance with department protocols.

The City of Springfield noted the assessment worksheet only presents one habitat score and it is unclear what the value in the worksheet represents.

Department Response

Following the department's protocol, one habitat assessment is completed once per site per season (fall or spring). The department's habitat scores have been added to the assessment worksheet. The URS report provided habit scores, but the department was uncertain how these scores compared to reference stream conditions. A specific reference stream was not discussed in the URS report, and therefore, the URS data was removed from the Pearson Creek assessment worksheet. This revision did not change the Category 5 listing determination.

The City of Springfield commented that the assessment worksheet indicates that 95 percent of the reference streams score 16 or higher. Does this mean that on the

assessment date 8/7/2015, 95 percent of the streams scored 16 or above, or is the value adjusted over time? It would seem likely that the percentage would change over time.

Department Response

The department appreciates the question and opportunity for clarification. Additional information and details have been added to the assessment worksheet to explain the reference stream percentage scores per sampling season.

The City of Springfield noted that four of the samples are more than seven (7) years old from the original listing date (2014). The department is supposed to provide a written justification for using the data on the assessment worksheets.

Department Response

The 2004, 2005, 2009, and 2014 macroinvertebrate studies have not indicated changes in the watershed that would cause the “older” data to no longer be considered representative of current conditions. Without additional information indicating the data is no longer representative, it is reasonable to assume the older data is still representative. According to EPA guidance, the data should not automatically be treated as unrepresentative of relevant segment conditions solely on the basis of age without supporting information indicating that the data are not a good indicator of current conditions. An explanation for utilizing the "older" data has been added to the Pearson Creek assessment worksheet.

Per the City of Springfield recent toxicity data available for the EPA STORET website provides strong evidence that there are no toxicity issues in Pearson Creek. The City provided a summary of the toxicity data from Pearson Creek and a biocriteria reference site for samples collected on May 19, 2015 and June 23, 2015.

Department Response

The department was unaware that 2015 data was uploaded to the EPA STORET website. For the 2016 assessment cycle, the EPA STORET website was queried and all available data downloaded in October 2014. Any data uploaded to the EPA STORET website after this time was not available for the 2016 assessment. No changes were made to the proposed 2016 303(d) List as a result of these comments.

Although many of the Springfield area waters will remain on the impaired waters list, current and future efforts by the city will help inform the prioritization of these waters for future watershed restoration efforts. Where long-term strategies exist for the pollutants of concern, the department has flexibility to delay Total Maximum Daily Load (TMDL) development in lieu of other administrative measures, such as Category 5-Alt, on the state’s integrated report. Upon approval of the 2016 303(d) list by the commission, the

department will begin prioritization of impaired waters for future watershed restoration efforts.

The department appreciates the efforts of the City of Springfield toward developing comprehensive, long-term strategies for addressing water quality concerns as part of their Integrated Plan for the Environment. The city's efforts to address storm water quantity and quality through infrastructure improvements, best management practices and citizen education are positive steps toward management of storm water and the pollutants it carries. *Implementation of the city's plan indicates strong, positive commitment on the part of the city toward addressing short and long term storm water issues.* The department looks forward to working collaboratively with the city toward betterment of water quality in southwest Missouri.

EPA Region 7 comments

Barker Creek Tributary (WBID 4083)

EPA provided a comment stating this water body is proposed to be newly listed for impairment due to an excursion of the EPA-approved Missouri water quality criterion for dissolved oxygen. In review of the state supplied assessment spreadsheet, it was noted that the assessment also recommended impairment by chloride plus sulfate and pH. However, the draft list does not include those two impairments.

Department Response

The Barker Creek Tributary was originally placed in Category 5 due to a violation of the general criteria during the 1998 listing cycle. In 2004, the water body was moved from Category 5 to Category 4A due to the approval of a TMDL for pH and sulfate that addressed the pollutant impairment. This water body will be removed from the proposed 2016 list and reinstated into Category 4A. A comment has been added to the Barker Creek Tributary assessment worksheet and the department's assessment database.

Bee Fork (WBID 2760)

EPA commented that this water body is proposed to be listed for contaminated sediments (lead). This water body was previously listed for lead in water and the supplied assessment spreadsheet also identifies lead in water, not sediment.

Department Response

The department appreciates the comment and EPA bringing this oversight to the department's attention. The pollutant for Bee Fork was inadvertently listed as impaired for lead in sediment, when the correct Category 5 listing should be lead in water. The pollutant matrix listing has been corrected on the proposed 2016 303(d) List.

Blackberry Creek (WBID 3184)

EPA stated this water body is proposed for listing due to a total dissolved solids impairment. It was previously listed for an excursion of the chloride plus sulfate criterion. The EPA-approved Missouri Water Quality Standards do not have a criterion for total dissolved solids but do for chloride plus sulfate. Under section 303(d), a state's waters are assessed against the state's EPA-approved water quality standards. In this case a listing for total dissolved solids could be an assessment of the state's narrative criteria, however, the state must still assess against the criterion of chloride plus sulfate. In its action on the 2014 Missouri Section 303(d) List, the EPA added this water body to the list for chloride plus sulfate.

Department Response

The department appreciates the comment and will correct the pollutant listing for Blackberry Creek. The chloride plus sulfate pollutant is not available as a dropdown option within the electronic reporting system, and therefore, total dissolved solids was selected as a place holder for the pollutant until the chloride plus sulfate pollutant can be manually entered into the system as the proper pollutant. The department will update the pollutant listing for Blackberry Creek to chloride plus sulfate. This correction was missed during the 2016 listing cycle, and was revised on the proposed 2016 303(d) List.

Brush Creek (WBID 1371)

EPA stated this water body is proposed to continue to be listed for dissolved oxygen. For the 2016 cycle an additional cause of total suspended solids has been added. In a review of the provided assessment spreadsheet it is noted that the assessment does not indicate an impairment for total suspended solids. The sheet explicitly states there are low levels of total suspended solids.

Department Response

The department appreciates the comment and EPA bringing this listing error to the department's attention. This pollutant was approved by EPA to be delisted during the

2012 listing cycle. This information was corrected in the department's database and the water body removed from the proposed 2016 303(d) List.

Brush Creek (WBID 3986, previously 418U of Blue River)

EPA commented that the assessments (sic) sheet has errors. The calculations are not in the same column as the data being assessed. The state did not use the same data that was used by EPA to list this water for PAHs in sediment. New data for this water body available at the KCwaters.org web site (the source was identified to the state during the 2014 listing cycle and, therefore, should be considered readily available) but was not used in the 2016 cycle assessment.

Department Response

The department accessed the data from KCwaters web site and updated the Brush Creek assessment worksheet. Following the department's methodology, the PAHs that exceeded the 150 percent PEC threshold in sediment, and match with the EPA 2014 Category 5 listing, include chrysene, phenanthrene, and pyrene. The department also assessed fluoranthene as exceeding the 150 percent PEC threshold.

Supplemental sediment data was also reviewed from Brushy Creek just across the state line in Kansas. This data indicated the PAHs that also exceeded the 150 percent PEC threshold were Benzo[a]anthracene, and benzo[a]pyrene.

Center Creek (WBID 3203)

EPA commented that this water body is proposed for delisting of lead contaminated sediments due to a change in the state's methodology for assessing potentially toxic sediments. While the geometric mean of all sediment samples now falls below the narrative threshold, all samples collected from mile 1 through 11.6 are greater than the threshold. This indicates that the new methodology results in an overall average of nontoxic sediments, while all samples from the area located within historic mining areas still indicate potential toxicity based on the methodology. As such, the ten mile portion of this assessment unit with toxic sediments greater than the state's narrative threshold is masked and not acknowledged by this proposal.

Department Response

In reviewing the site locations, three of the sites are located upstream of the historical mining areas (e.g. Webb City and Oronogo Mines). Bracketing river miles to assess the upstream and downstream sites separately does cause the lower reach of Center Creek

(approximately 13 miles) to exceed the 150 percent PEC threshold for lead in sediment. The department has revised the assessment worksheet to retain lead in sediment as part of the Category 5 listing and have added this water body/pollutant pair to the proposed 2016 303(d) List.

Flat River Creek (WBID 2168)

EPA commented that this water body is proposed to have the impairment cause of lead in fish tissue added for the 2016 listing cycle. A review of the EPA-approved TMDL for this water body (Big River TMDL, approved 3/24/2010) shows the TMDL targets specifically identified lead in fish tissue. As such, that TMDL applies to this cause and the water body/pollutant combination already has a TMDL. Additionally, the cadmium impairment has been shifted from water to sediment while the assessment spreadsheet indicates that the impairment remains in water and not sediment.

Department Response

The department appreciates the comment and EPA bringing this oversight to the department's attention. The department will reinstate the Category 4A listing for lead in fish tissue for this water body and remove the listing from the proposed 2016 303(d) List. A comment has been added to the assessment worksheet to note the EPA approved TMDL for Flat River.

Joplin Creek (WBID 5006)

EPA commented that this water body is proposed for listing with causes of lead and cadmium. In review of the assessment spreadsheet, no lead impairment is shown. The assessment identifies cadmium and zinc as impairments for this water body. However, there is only one excursion of zinc criteria shown in the sheet. One excursion does not require the state to identify an impairment. The assessment target is typically more than one excursion in three years on average.

Department Response

The department reviewed the assessment worksheet for Joplin Creek, and noted there were no chronic or acute exceedences for dissolved lead, one acute/chronic event for dissolved zinc, and seven chronic exceedences for dissolved cadmium. The assessment worksheet for Joplin Creek has been corrected, and the Category 5 listing for dissolved lead removed from the proposed 2016 303(d) List.

Mississippi River (WBID 1707, 1707.03)

EPA commented that this water body is proposed to continue its listing for E. coli. The water body identification number is not consistent between the 2014 list and the 2016 proposal.

Department Response

The department reviewed the draft 2016 303(d) List and found the error was due to rounding in Microsoft Excel. The Water Body ID (WBID) for the Mississippi River (WBID 1707.03) has been corrected on the draft 2016 303(d) List.

Peruque Creek (WBID 0216)

This water body is proposed for delisting based on a lack of fish kills since 2010. There is no information presented that indicates the fish population have recovered within the water body assessment unit. As such, a delisting may be premature if the fish community is absent. Time itself is not considered "good cause" for delisting an assessment unit.

Department Response

The department contacted the Missouri Department of Conservation to determine if any fish community data was available to support a delisting decision. It was communicated that no fish community studies have been completed within this stream reach, however, the fish kills in 2010 were most likely due to habitat and hydrologic alterations. Therefore, the department believes it would be appropriate to move this water body to the 4C category as being impaired by pollution and not a pollutant.

Turkey Creek (WBID 3217)

EPA commented that the department has proposed delisting this water body for lead in sediment. EPA stated the portion of the assessment unit between Hwy 66 and Hwy 249 are consistently above the target for listing with one exception. In addition, contaminated sediments using the new averaging methodology continue for cadmium and zinc. These multiple lines of evidence suggest continued impairment of this assessment unit. The department's proposal to delist this water body pollutant combination was originally disapproved by EPA during Missouri's 2014 listing cycle but was retained on the list by the EPA.

Department Response

The department reviewed the assessment worksheet for Turkey Creek. It was noted that sediment data collected in 1976 was retained in the dataset during the assessment cycle. This data is important for historical reasons, however, it may not be applicable to more recent site conditions. The historical data was placed within a separate data table on the assessment worksheet. In addition, the department reassessed the water body to bracket sites upstream of Hwy 66 separately from sites located between Hwy 66 and Hwy 43. It is important to note, the revised assessment does not indicate that lead exceeded 150 percent of the PEC threshold between Hwy 66 and Hwy 43. In addition, the use of the geometric mean calculation is consistent with how the PEC thresholds were developed. As a result of these analyses, the department will retain the request for lead in sediment to be delisted for this water body. No changes were made to the proposed 2016 303(d) List as a result of this comment.

Willow Branch (WBID 3280)

This water body is proposed for delisting of the causes of cadmium and lead contaminated sediments based on a new listing methodology. The listing is retained for zinc contaminated sediments. Similar to Turkey Creek (see above) this water body exhibits sediment concentrations of cadmium and lead in portions of the assessment unit that consistently exceed the concentration targets for listing. By taking the geometric mean of all samples this condition is masked.

Department Response

As previously mentioned, the use of the geometric mean for determining sediment pollutant concentrations is consistent with how the PEC thresholds were developed. In reviewing the assessment worksheet, the department noted an error in the 2014 site code and site description. This information has been corrected to reflect where the sediment sample was actually collected. The correction did not change the department's listing decision for this water body. As of 2014, the department has scheduled this water body for follow-up sediment monitoring.

Wilsons Creek (WBID 2375)

The data presented for delisting of PAH contaminated sediments in this water body do not agree with the data collected by EPA. It seems there have been mix ups in the location of some of the samples as data is attributed to sites on dates where no samples

were collected at those sites. If the state would like, EPA could resupply the original data for reassessment.

Department Response

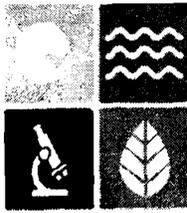
The department reviewed the data provided by EPA and noted the original data did not download correctly from the EPA STORET. The assessment worksheet for Wilsons Creek was revised with the correct information and reassessed. Benzo[a]anthracene, chrysene, fluoranthene, phenanthrene, and pyrene exceeded the 150 percent threshold for PECs. These pollutants were in concentrations between 15 to 61 percent greater than the 150 percent PEC thresholds. Therefore, this water body will be retained as a Category 5 listing for these pollutants on the proposed 2016 303(d) List.

Missouri Department of Conservation's (MDC) comment

MDC recommended information provided on supporting 303(d) fish tissue assessment worksheets that referenced the "McKee, 2002 (Sport-Caught Fish Consumption in Missouri – 2002 Mail Survey)" citation be removed because the report cited was a draft report. The final report is in final preparations and the cited information contained on the 303(d) assessment worksheets will not appear in the final report.

Department Response

The department appreciates the comment. Since this citation was included as supplemental information and did not change the assessment determinations, the citation was removed from the fish tissue assessment worksheets.



MISSOURI
DEPARTMENT OF
NATURAL RESOURCES

Draft 2016 303(d) List
PUBLIC COMMENTS

Public Notice
October 1, 2015 – January 31, 2016

Missouri Department of Natural Resources
Water Protection Program
PO Box 176
Jefferson City, MO 65102-0176
800-361-4827 / 573-751-1300



Boone County Resource Management

ROGER B. WILSON BOONE COUNTY GOVERNMENT CENTER
801 E. WALNUT ROOM 315 COLUMBIA, MO 65201-7730
(573) 886-4330 FAX (573) 886-4340

STAN SHAWVER, DIRECTOR

PLANNING – INSPECTIONS – ENGINEERING

DERIN CAMPBELL, CHIEF ENGINEER

November 6, 2015

Trish Rielly
Monitoring and Assessment Unit
Water Protection Program
Missouri Department of Natural Resources
1101 Riverside Drive
Jefferson City, Missouri 65101

RE: Comments on proposed listing of Little Cedar Creek (WBID 744) on 2016 303(d) list

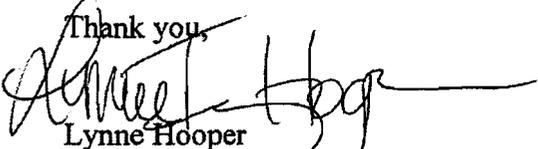
Dear Ms. Rielly,

As per our discussion at the public information session on Tuesday, Boone County is disputing the listing of Little Cedar Creek (WBID 744) on the 2016 303(d) list of impaired waters for failure to meet the dissolved oxygen standard. The reasons for the dispute are as follows:

- 1) The sampling point listed as “L Cedar Ck @ Zaring Rd” (actually near the intersection of Route Z and Maupin Lane) appears to only have flow following precipitation events. There is a pool in Little Cedar Creek immediately below a box culvert on Maupin Lane which retains water during baseflow conditions, but clearly this is not an appropriate site for sampling of dissolved oxygen. The “headwater stream” character of Little Cedar Creek (absence of baseflow) persists at least as far south as Judy School Road. I have photographs of the view upstream and downstream at both the Maupin Road and Judy School Road locations (with GIS coordinates embedded in the properties) available if they would be useful.
- 2) You indicated at the informational meeting that the USGS data did not include flow data, so we do not have any indication that flow patterns in Little Cedar Creek were different during the sampling years 1999 through 2002.
- 3) The sampling point listed as “L Cedar Ck @ Zaring Rd” is located far upstream from the section of the stream that is proposed for listing on the 2016 303(d) list. The proposed impaired section is from E. Carter School Road south of Interstate

70 to the mouth of Little Cedar Creek at Cedar Creek. There does not seem to be any rational basis for using the upstream data to list the downstream section.

Please let me know if you will need any additional information in this regard.

Thank you,

Lynne Hooper
Urban Hydrologist

Rielly, Trish

From: Mike McKee <Mike.McKee@mdc.mo.gov>
Sent: Thursday, December 10, 2015 10:38 AM
To: Voss, Robert
Cc: Rielly, Trish; Bataille, Karen
Subject: RE: Proposed 303(d) List/Worksheets - Sport Caught Fish Reference

Robert,

I would like to request that the information in the 303(d) Worksheets based on the citation "McKee, 2002 (Sport-Caught Fish Consumption in Missouri—2002 Mail Survey)" be removed. The reason for removing the information is because the report cited was a draft report. The final report is in preparation and the cited information in the 303(d) Worksheets will not appear in the final report (i.e. distributional analysis of g/day total fish consumption). The information was removed because total fish consumption (g/day) was not measured as part of the survey (only consumption rates for some individual species).

The draft report is in the final review process within MDC and I anticipate the final report being available in January/February 2016. I will send you a copy when finalized.

Thanks and let me know if you have questions.

Mike McKee
Missouri Department of Conservation

From: Voss, Robert [<mailto:robert.voss@dnr.mo.gov>]
Sent: Thursday, December 10, 2015 8:52 AM
To: Mike McKee
Cc: Rielly, Trish; Karen Bataille
Subject: RE: Proposed 303(d) List/Worksheets - Sport Caught Fish Reference

Mike, That won't be a problem. We can take the reference out completely if you want us to; it was only put in as additional justification of the EPA document meal size and to show that it may be a conservative number for those who may eat more than the amount EPA suggests. If you want us to leave a reference in then we could discuss what you think would be a more appropriate summary of the document.

Thanks,

Robert Voss
Environmental Specialist
Water Protection Program\Monitoring and Assessment Unit
Missouri Department of Natural Resources
(573) 522-4505
robert.voss@dnr.mo.gov

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From: Mike McKee [<mailto:Mike.McKee@mdc.mo.gov>]
Sent: Wednesday, December 09, 2015 12:03 PM
To: Voss, Robert
Cc: Rielly, Trish; Bataille, Karen
Subject: RE: Proposed 303(d) List/Worksheets - Sport Caught Fish Reference

Robert,

As I look at this issue more closely, I see that DNR has referred to the 50 g/day median fish consumption rate that was in the draft report that I shared with John Ford several years ago. In the final version of the report, the distribution analysis will be eliminated and only species specific estimates included. I did not realize that the 50 g/day value from the draft report was included in the Worksheets. What would need to happen to get the text removed regarding this?

I am still in the process of finalizing the report, so have not provided a copy to Leslie yet. It will probably be a couple of more weeks before I get the report finalized. After we figure out how to handle the Worksheets, we probably should update her.

Thanks

Mike

From: Voss, Robert [<mailto:robert.voss@dnr.mo.gov>]
Sent: Friday, October 23, 2015 8:27 AM
To: Mike McKee
Cc: Rielly, Trish
Subject: Proposed 303(d) List/Worksheets - Sport Caught Fish Reference

Mike, see Leslie's e-mail below. I misspoke on the phone, I don't think the survey is referenced in the LMD, but in our worksheets on fish tissue. See the attached worksheet for Bee Tree Lake for an example.

Thanks,

Robert Voss
Environmental Specialist
Water Protection Program\Monitoring and Assessment Unit
Missouri Department of Natural Resources
(573) 522-4505
robert.voss@dnr.mo.gov

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From: Rielly, Trish
Sent: Thursday, October 22, 2015 4:57 PM
To: Voss, Robert; McCord, Samuel
Cc: Rielly, Trish
Subject: FW: Proposed 303(d) List/Worksheets

From: Holloway, Leslie [lholloway@mofb.com]
Sent: Thursday, October 22, 2015 1:27 PM
To: Rielly, Trish
Subject: Proposed 303(d) List/Worksheets

Trish: Unless I missed something, I did not find the worksheets for Bens Branch (3980) and Mill Creek (4066) posted. Also, could you please tell me how to access the reference document "Sport-Caught Fish Consumption in Missouri—2002 Mail Survey"? Thanks—Leslie



Leslie Holloway | Director, Regulatory Affairs | Missouri Farm Bureau Federation
PO Box 658 | Jefferson City, MO 65102 | Ph: 573-893-1409 | Cell: 573-619-5250 | Fax: 573-893-1560



City of Independence

WATER POLLUTION CONTROL DEPARTMENT

P.O. BOX 1019 • INDEPENDENCE, MISSOURI 64051-0519 • (816) 325-7711 • FAX (816) 325-7722

AN EQUAL OPPORTUNITY EMPLOYER

November 13, 2015

Ms. Trish Rielly
Missouri Department of Natural Resources
Water Protection Program
P.O. Box 176
Jefferson City, Missouri 65102

RECEIVED

NOV 20 2015

Water Protection Program

Re: Proposed 2016 303(d) listing for Spring Branch – WBID 5004

Dear Ms. Rielly:

The following comments regarding the proposed 303(d) listing for Spring Branch are submitted on behalf of the City of Independence Water Pollution Control Department.

The United States Geological Survey (USGS) has provided us with the following information:

1. On Spring Branch dissolved oxygen (DO) values, the Department of Natural Resources (Department) appears to have chosen the minimum daily value to use from USGS continuous monitoring data. With DO having a diurnal value due to the algae, this may not be very representative. Out of the 96 values taken each day only one was used.
2. The first 3 years of data (2005, 2006, & 2007) are bringing the DO values down. When USGS monitoring began it was on the new bridge at Holke Road. USGS subsequently relocated their gauging station downstream by approximately 1/8 mile after it was determined that the samples collected at the original site were not representative of the stream due to all the rip rap catching debris and sediment.
3. USGS rates their data as excellent, good, fair, or poor. Data that is rated poor may be off as much as $\pm 30\%$. Since the Department may have used the data without conferring with USGS, the quality of the data values being used may not have been taken into consideration.

Water Pollution Control requests the following:

1. The Department should use all the available DO sample data, not just the minimum daily value. The data should be statistically evaluated in accordance with the 2016 Listing Methodology Document, which states that for DO, a water body is deemed to be in full compliance with Water Quality Standards for protection of aquatic life if no more than

A COMMUNITY IN EASTERN JACKSON COUNTY



WATER POLLUTION CONTROL

- 10% of all samples exceed criterion.
2. The Department should not use USGS continuous water quality data collected at the Holke Road site prior to relocation of the gauging station in August 2007 for listing of Spring Branch Creek. The older data were not representative of overall stream water quality.
 3. The Department may want to take into consideration USGS quality ratings of continuous water quality data.
 4. We request that Spring Branch be removed from the 303 (d) list.

Thank you for considering our comments. If you have any questions, please feel free to contact me. Eric Christensen, USGS, can provide more information about USGS data. His telephone number is (816) 554-3489 ext. 204; email is echriste@usgs.gov.

Sincerely,



Karla Pierce
Environmental Compliance Manager

c: Dick Champion, Jr.
Eric Christensen, USGS

Rielly, Trish

From: Perkins, Bruce <Perkins.Bruce@epa.gov>
Sent: Monday, November 30, 2015 8:01 AM
To: Rielly, Trish
Subject: Comments on the 2016 MO draft 303(d) list

Trish,

Here are the EPA's comments on your draft list. Also one on the 2018 methodology. Let me know if you have any questions.

EPA comments on the draft 2016 Missouri Section 303(d) List

The following comments are presented alphabetically by the water body name as it is expressed in the public notice draft version.

Barker Creek Tributary (WBID 4083) - This water body is proposed to be newly listed for impairment due to an excursion of the EPA-approved Missouri water quality criterion for dissolved oxygen. In review of the state supplied assessment spreadsheet, it was noted that the assessment also recommended impairment by chloride plus sulfate and pH. However, the draft list does not include those two impairments.

Bee Fork (WBID 2760) – This water is proposed to be listed for contaminated sediments (Lead). This water was previously listed for lead in water and the supplied assessment spreadsheet also identifies lead in water not sediment.

Blackberry Creek (WBID 3184) – This water body is proposed for listing due to an impairment cause of Total Dissolved Solids. It was previously listed for excursion of the chloride plus sulfate criterion. The EPA-approved Missouri water quality standards do not have a criterion for total dissolved solids but do for chloride plus sulfate, under section 303(d) a state's waters are assessed against the state's EPA-approved water quality standards. In this case a listing for total dissolved solids could be an assessment of the state's narrative criteria, however, the state must still assess against the criterion of chloride plus sulfate. In its action on the 2014 Missouri section 303(d) List, the EPA added this water body to the list for chloride plus sulfate.

Brush Creek (WBID 1371) -This water body is proposed to continue to be listed for the cause of dissolved oxygen. For the 2016 cycle an additional cause of total suspended solids has been added. In a review of the provided assessment spreadsheet it is noted that the assessment does not indicate an impairment for total suspended solids. The sheet explicitly states there are low levels of total suspended solids.

Brush Creek (WBID 3986) – The assessments sheet has errors. The calculations are not in the same column as the data being assessed. The state did not use the same data that was used by the EPA to list this water for PAHs in sediment. New data for this water body available at the KCwaters web site (the source was identified to the state during the 2014 listing cycle and therefore should be considered readily available) was not used in the 2016 cycle assessment.

Center Creek (WBID 3203) – This water body is proposed for delisting of lead contaminated sediments due to a change in the states methodology for assessing potentially toxic sediments. While the geometric mean of all sediment samples now falls below the narrative threshold, all samples collected from mile 1 through 11.6 are greater that the threshold. This indicates that the new methodology results in an overall average of nontoxic sediments, while all samples from the area located within historic mining areas still indicate potential toxicity based on the methodology. As such, the ten mile portion of this assessment unit with toxic sediments greater that the state's narrative threshold is masked and not acknowledged by this proposal.

Flat River Creek (WBID 2168) – This water body is proposed to have the cause lead in fish tissue added for the 2016 listing cycle. A review of the EPA-approved TMDL for this water body (Big River TMDL approved 3/24/2010) shows the TMDL targets specifically identified lead in fish tissue. As such, that TMDL applies to this cause and the water body / pollutant combination already has a TMDL. Additionally, the cadmium impairment has been shifted from water to sediment while the assessment spreadsheet indicates that the impairment remains in water and not sediment.

Joplin Creek (WBID 5006) - This water body is proposed for listing with causes of lead and cadmium. In review of the assessment spreadsheet no lead impairment is shown. The assessment identifies cadmium and zinc as impairments for

this water body. However, there is only one excursion of zinc criteria shown in the sheet. One excursion does not require the state to identify an impairment, the assessment target is typically more than one excursion in three years on average.

Mississippi River (WBID 1707, 1707.03) – This water body is proposed to continue its listing for *Escherichia coli*. The water body identification number is not consistent between the 2014 list and the 2016 proposal.

Peruque Creek (WBID 0216) – This water body is proposed for delisting based on a lack of fish kills since 2010. There is no information presented that the fish population has recovered so that there are any fish in the assessment unit. As such a delisting may be premature if the fish community is absent. Time itself is not considered “good cause” for delisting an assessment unit.

Turkey Creek (WBID 3217) – This water body is proposed for delisting of the cause lead contaminated sediment. The portion of the assessment unit between Hwy 66 and Hwy 249 are consistently above the target for listing with one exception. In addition, contaminated sediments using the new averaging methodology continue for cadmium and zinc. These multiple lines of evidence suggest continued impairment of this assessment unit. A proposal to delist this water body pollutant combination was disapproved by the EPA for Missouri’s 2014 cycle list and it was listed by the EPA.

Willow Branch (WBID 3280) – This water body is proposed for delisting of the causes cadmium and lead contaminated sediments based on a new listing methodology. The listing is retained for zinc contaminated sediments. Similar to Turkey Creek (see above) this water body exhibits sediment concentrations of cadmium and lead in portions of the assessment unit that consistently exceed the concentration targets for listing. By taking the geometric mean of all samples this condition is masked.

Wilsons Creek (WBID 2375) – The data presented for delisting of PAH contaminated sediments in this water body do not agree with the data collected by the EPA. It seems there have been mix ups in the location of some of the samples as data is attributed to sites on dates where no samples were collected at those sites. If the state would like, the EPA could resupply the original data for reassessment.

General Comment

Please provide an edited Table H with the extent of assessed water bodies for those previously only identified as 8-20-13 MUDD V1.0.

Comment on 2018 listing methodology.

Hardness is defined in the state’s EPA-approved WQS. A state’s 303(d) list is based on water quality standards and is reviewed by the EPA based on standards.

Bruce Perkins
Regional Integrated Report Coordinator
US EPA Region 7
Water Wetlands and Pesticides Division
Water Quality Management Branch
11201 Renner Blvd.
Lenexa, KS 66219
(913) 551 7067

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January 29, 2016

Ms. Trish Rielly
Water Protection Program
Missouri Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102

Subject: Public Comments Regarding the Proposed 2016 Section 303(d) List

Ms. Rielly:

The City of Springfield, Missouri (City) submits the following comments regarding the proposed 2016 303(d) List of impaired waters placed on public notice by the Missouri Department of Natural Resources (MDNR or Department) on October 1, 2015.

Ward Branch 303(d) Listing for pH

Ward Branch (WBID 2374) is newly listed on the proposed 2016 303(d) list for pH in water. According to the Department's data sheet for Ward Branch, this listing is based on the City's MS4 first flush monitoring data collected from 2009-2013. The City believes that Ward Branch should be removed from the 303(d) list for the following reasons: (1) first flush pH data were not measured according to USEPA procedures and should not be used for impairment decisions; (2) first flush data are not suitable for direct comparison with water quality criteria; and (3) data gathered as part of a 319 grant project show that Ward Branch does not have a pH impairment. The City respectfully provides the following information on these three issues.

1. Analytical methods for pH measurements specified in EPA Method 150.1 require that pH be measured as soon as possible, preferably in the field at the time of sampling. Measurement of pH of these first flush samples in the field at the time of sampling or soon after is not feasible. Depending on the time of day and length of the storm, the sample retrieval may be several hours up to 24 hours after the samples have collected. The samples are transported to the lab and pH measurement is taken using a benchtop probe. In addition, the City wishes to note that the laboratory pH measurements made for the 7/30/09 and 10/23/09 sampling events may not be valid. As noted in the City's MS4 annual report that year, first flush samples from all stream sites sampled during 4 separate events from July -October 2009 measured high for pH, ranging from 9.2-10.8, including the field blank. This likely indicates an issue with the pH meter. Therefore, MDNR should exclude our MS4 pH data for impairment decisions.

Office of the Director
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Springfield, Missouri 65802 • 417-864-1919 • springfieldmo.gov/recycling



2. As required and approved by the Department, the City's MS4 in-stream monitoring program is designed to collect first flush samples using in-stream stage samplers that fill as the stream level rises and are retrieved after the stream level recedes. First flush storm event samples are not representative of stormwater contributions over the entire storm event. Rather than an event mean concentration, the first flush samples are taken as one way to assess potential stormwater runoff influences on in-stream water quality conditions and aid in detecting illicit discharges. These pollutant concentrations are short-term and not suitable for direct comparison with most water quality criteria. For example, water quality criteria are typically expressed in terms of 24-hour (acute) or 4- to 30-day (chronic) exposures, in particular the pH criterion range should be considered at least a 4-day average exposure. First flush samples represent a transient conditions that are not representative of water quality conditions over the 24-hour or 4-day exposure timeframes. Therefore, direct comparisons with water quality criteria should not be made.

3. The Ozarks Environmental and Water Resources Institute (OEWRI) completed pre- and post-construction monitoring from 2004 through 2007 for the Ward Branch Stream Restoration Project, a Section 319 Nonpoint Source Pollution Grant project funded by the Department. During the pre-construction monitoring period, 30 pH measurements were taken at 5 sites on Ward Branch from November 2004 through March 2006. These were field measurements taken at the time of stormwater grab sampling, which likely do not reflect stable, representative conditions for aquatic life impacts (i.e., long-term or chronic exposure). The pH ranged from 6.6 - 7.6. During the post-construction monitoring period, 42 pH measurements were taken at 5 sites on Ward Branch from February through August 2007. These were field measurements taken at the time of stormwater grab sampling. There were two measurements outside of the pH criteria range of 6.5-9. These were 6.3 and 6.1. The remaining 40 measurements ranged from 6.5-8.1. These reports are available at <http://oewri.missouristate.edu/45204.htm>. Based on these data, Ward Branch is not impaired because less than 10% of the samples fail to meet the water quality criteria range. Furthermore, this comparison to the pH criteria range is conservative as these data are likely not representative of pH conditions over the criteria duration.

Wilsons Creek 303(d) Delisting for PAHs

The City strongly supports MDNR's decision to delist Wilsons Creek for PAHs based on additional data resulting in a geomean less than 150 percent of the Probable Effect Concentration (PEC). While listing waterbodies solely based on sediment quality data is not justified in the first place, the additional data only further illustrates the lack of evidence that Wilsons Creek is impaired for aquatic life. Additionally and of much greater significance, toxicity data recently made available on the U.S. Environmental Protection Agencies' (USEPA) STORET website provides strong evidence that there are no toxicity issues in Wilsons Creek. As summarized in Table 1 below, survival rates in Wilsons Creek ranged from 92.5% to 100%, which should be considered excellent. Measured survival rates meet or even exceed those found in the Bull Creek biocriteria reference stream on the same dates. The USEPA toxicity data also shows evidence of growth, which is also suggestive of a healthy aquatic ecosystem.

Table 1. Toxicity Data from Wilsons Creek and Biocriteria Reference Site

Site	Date	Percent Survival		Biomass (mg)	
		Chironomus	Hyalella azteca	Chironomus	Hyalella azteca
Wilson 1	May 19, 2015	92.5%	100%	1.43	0.15
	June 23, 2015	92.5%	100%	1.08	0.16
Wilson 3	May 19, 2015	92.5%	97.5%	0.78	0.12
	June 23, 2015	92.5%	100%	1.16	0.15
Bull Creek-Dry Hollow Rd*	May 19, 2015	92.5%	85%	1.23	0.13
	June 23, 2015	92.5%	82.5%	1.10	0.11

*MDNR Biocriteria Reference Site

Pearson Creek 303(d) Listing for Aquatic Life Impairment

The City finds that the Department’s rationale does not support listing Pearson Creek as impaired for 303(d) listing purposes. We have repeatedly commented that it is extremely important to identify and sample appropriate reference streams for biological comparison as required by the 2016 LMD and Missouri regulations (10 CSR 7.031). To that end, in April 2015, the City provided MDNR a report of potential reference streams for Wilsons, Jordan, and Pearson Creek. On January 25, 2016, the City received comments from MDNR on that report. We appreciate those comments but it appears that the Department intends to continue comparing Pearson Creek biological data to inappropriate reference stream data. The City looks forward to meeting with MDNR to discuss this issue in greater detail. At the meeting, we also hope to gain clarity on a number of items related to the collection and analysis of macroinvertebrate data presented in the assessment worksheet. These items include the following:

- We briefly reviewed the July 2010 URS report¹ which is the source of Spring 2009 data presented in the worksheets and noted several items of concern. First, the report refers to 10 reference streams that were used to make data comparisons but does not specify the streams. As we have already mentioned, we believe the selection of appropriate reference streams is critical to this evaluation. We also have concerns about the methodology used. The report indicates that the quantitative similarity index for taxa (QSIT) score calculated on the duplicate sample was well below the 70% required by MDNR’s methodology. Furthermore, the report states that the target number of organisms for each habitat (600 for riffles and 300 for other habitats, +/- 10%) was not reached for all of the samples. We request the opportunity to discuss this report in more detail to better understand how these and other issues may have impacted the final results.
- In the assessment worksheet, only one habitat score (133) is presented. Our understanding of the methodology is that each sample in the test and reference streams is assigned a habitat score. Therefore, it is not clear what the value in the worksheet represents.
- The assessment worksheet indicates that 95% of the reference streams score 16 or higher. Does that mean that on the assessment date (8/7/15), 95% of the streams scored 16 or

¹ 2010. URS Corporation. Sampling for Consent Decree Waters in Missouri, Pearson Creek, Springfield, MO. Task Order No. 2008-54.

above, or is the value adjusted over time? Given that some of the data are almost 12 years old, it seems likely that the percentage would change over time.

- Four of the samples used in the sheet are more than seven years old from the original listing date (2014). We note that the LMD states that if MDNR uses data that predates the original listing by more than seven years, the Department is supposed to provide a written justification for using the data. Written justification was not provided in the worksheet. In the absence of justification, MDNR is compelled by the LMD to avoid using these data in the listing decision.

Additionally, toxicity data recently made available on the U.S. Environmental Protection Agencies' (USEPA) STORET website provides strong evidence that there are no toxicity issues in Pearson Creek. As summarized in Table 2 below, survival rates in Pearson Creek ranged from 92.5% to 100%, which should be considered excellent. Measured survival rates meet or even exceed those found in the Bull Creek biocriteria reference stream on the same dates. The USEPA toxicity data also shows evidence of growth, which is also suggestive of a healthy aquatic ecosystem. Therefore, the City requests that biologically-based impairment decisions be delayed until such time that appropriate reference stream data are available for comparison.

Table 2. Toxicity Data from Pearson Creek and Biocriteria Reference Site

Site	Date	Percent Survival		Biomass (mg)	
		Chironomus	Hyaella azteca	Chironomus	Hyaella azteca
Pearson 1	May 19, 2015	92.5%	97.5%	1.59	0.15
	June 23, 2015	92.5%	97.5%	1.66	0.14
Pearson 3	May 19, 2015	92.5%	100%	1.28	0.16
	June 23, 2015	92.5%	95%	1.48	0.17
Bull Creek-Dry Hollow Rd*	May 19, 2015	92.5%	85%	1.23	0.13
	June 23, 2015	92.5%	82.5%	1.10	0.11

*MDNR Biocriteria Reference Site

Jordan Creek 303(d) Listing for PAHs in Sediment

The City finds that MDNR's rationale for listing Jordan Creek as impaired does not meet the weight of evidence requirements outlined in the 2016 LMD. The draft 2016 303(d) List identifies Jordan Creek as impaired based on sediment samples that exceed 150 percent of the Probable Effect Concentration (PEC) for PAH compounds. However, sediment data alone is not sufficient for listing Jordan Creek as impaired as PEC criteria have not been addressed in Missouri's Water Quality Standards and narrative criteria require multiple lines of evidence, such as representative biological or toxicity data. While MDNR includes aquatic biological data as part of its rationale, as previously commented on above, until such time that appropriate reference stream data are available, it is inappropriate to making listing decisions based on such data.

Additionally, toxicity data recently made available on the U.S. Environmental Protection Agencies' (USEPA) STORET website provides strong evidence that there are no toxicity issues in Jordan Creek. As summarized in Table 3 below, survival rates in Jordan Creek ranged from 92.5% to 100%, which should be considered excellent. Measured survival rates meet or even exceed those found in the Bull Creek biocriteria reference stream on the same dates. The USEPA toxicity data also shows evidence of growth,

which is also suggestive of a healthy aquatic ecosystem. Therefore, without additional evidence and per the LMD, the existing data do not support listing Jordan Creek as impaired.

Table 3. Toxicity Data from Jordan Creek and Biocriteria Reference Site

Site	Date	Percent Survival		Biomass (mg)	
		Chironomus	Hyalella azteca	Chironomus	Hyalella azteca
Jordan 1	May 19, 2015	92.5%	100%	1.79	0.12
	June 23, 2015	92.5%	97.5%	0.77	0.12
Bull Creek-Dry Hollow Rd*	May 19, 2015	92.5%	85%	1.23	0.13
	June 23, 2015	92.5%	82.5%	1.10	0.11

*MDNR Biocriteria Reference Site

North Branch Wilsons Creek 303d Listing for Zinc in Sediment

The City finds the Department’s supporting rationale for listing North Branch Wilsons Creek as impaired does not meet the weight of evidence requirements outlined in the 2016 LMD. The Department’s Listing Worksheet indicates that North Branch Wilsons Creek is impaired for zinc based on sediment data that exceeds 150 percent of the PEC. Missouri’s LMD states that the “Department will use a weight of evidence analysis for evaluating all narrative criteria” and “[i]n the case of toxic chemicals occurring in benthic sediment rather than in water, the numeric thresholds used to determine the *need for further evaluation* [emphasis added] will be the Probable Effect Concentration” Accordingly, exceedances of PEC values should only be used to place water bodies in Category 3 of the LMD, or as part of a weight of evidence analysis. Additionally, the true impact of sediment pollutant concentrations (i.e., the primary measure of sediment toxicity) is complicated by the actual bioavailability of contaminants, which can vary based upon site conditions. Without other relevant environmental data the toxicity of metals in sediment remains unclear. To better understand potential toxicity, other relevant physical and chemical data are required (e.g., carbon-normalized equilibrium sediment benchmarks (ESBs) for non-ionizable organic chemicals (NIOCs), porewater concentrations and simultaneously extracted metals/acid-volatile sulfide). Without these additional data or biological or toxicity data, there is insufficient evidence that North Branch Wilsons Creek is impaired. Therefore, consistent with the 2016 LMD, the City requests North Branch Wilsons Creek be delisted.

Requested Corrections to the 303d Assessment Worksheets

The Department’s assessment worksheets include impairment decisions not reflected within the 303d List and that are inconsistent with the 2016 LMD and Missouri’s Water Quality Standards. In particular, the assessment worksheets for Jordan Creek (3374), Pearson Creek (2373), Ward Branch (2374), and Wilsons Creek (2375) include findings of impairment based on inappropriate comparisons of macroinvertebrate and/or fish data to reference streams. The Department has rightfully disregarded these assessments in the 303d List (with the exception of Pearson Creek), but the worksheets need to be revised for purposes of clarity and to avoid any confusion. Therefore, the City requests the Department make the following revisions to address these and other concerns:

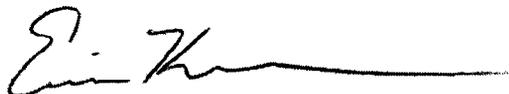
- **Jordan Creek (3374)** – Either completely remove tab “Community-4A” or clearly note that until such time that appropriate reference stream data are collected, existing biological data cannot

be used for impairment decisions. Additionally, references to macroinvertebrate score criteria (i.e., 16) and explicit statements of impairment should also be removed. Per the 2016 LMD, the City also notes that fish IBI scores only apply to streams 3rd to 5th order in size in the Ozark ecoregion. As Jordan Creek is at most a 2nd order stream, the worksheet should reflect that fish metrics do not apply. The City also suggests renaming tab "Community-4A", which incorrectly suggests that Jordan Creek is currently in 305b category 4A and has a completed TMDL.

- **Pearson Creek (2374)** – As previously discussed in this letter, the City requests that biologically-based impairment decisions be delayed until such time that appropriate reference stream data are available for comparison. Consistent with this request, worksheet tab "Invert-5" should either be removed or all references to impairment decisions should be deleted along with references to macroinvertebrate score criteria (i.e., 16). It should also be clearly noted that until such time that appropriate reference stream data are collected, existing biological data cannot be used for impairment decisions.
- **Ward Branch (2374)** - Either completely remove tab "Inverts" or clearly note that until such time that appropriate reference stream data are collected, existing biological data cannot be used for impairment decisions. Additionally, references to macroinvertebrate score criteria (i.e., 16) and explicit statements of impairment should also be removed.
- **Wilsons Creek (2375)** - Either completely remove tab "Community-4A" or clearly note that until such time that appropriate reference stream data are collected, existing biological data cannot be used for impairment decisions. Additionally, references to macroinvertebrate score criteria (i.e., 16) and explicit statements of impairment should also be removed. The City also finds the use of fish IBI metrics questionable and suggests renaming tab "Community-4A", which incorrectly suggests that Wilsons Creek is currently in 305b category 4A and has a completed TMDL.
- **Wilsons Creek (2375)** - The "Sediment PAHs" tab notes that PAHs exceed 150% of the PEC upstream of the Southwest Treatment Plant. However, this assertion is not supported by the data table, which shows the PAH geomean is below 150% upstream of the Southwest Treatment Plant. The City requests MDNR correct this issue in the Listing Worksheet.

The City appreciates the opportunity to provide public comment and looks forward to your thoughtful consideration of these comments. Please feel free to contact me at anytime to discuss any of these issues.

Sincerely,



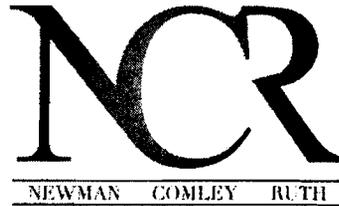
Errin Kemper, P.E.

Assistant Director – Environmental Services
City of Springfield Missouri

CC:

Steve Meyer, P.E. – Director
Jan Y. Millington – Assistant City Attorney
Paul Calamita – Aqualaw
Trent Stober, P.E. - HDR

ROBERT J. BRUNDAGE
EDWARD C. CLAUSEN
MARK W. COMLEY
JOSHUA L. HILL
CATHLEEN A. MARTIN



STEPHEN G. NEWMAN
JOHN A. RUTH
NICOLE L. SUBLETT
ALICIA EMBLEY TURNER

January 29, 2016

Via Email

Missouri Department of Natural Resources
Attn.: Trish Rielly
Water Protection Program
P.O. Box 176, Jefferson City, MO 65102
trish.rielly@dnr.mo.gov

Re: Comment on Proposed 2016 303(d) List
Cave Springs Branch (WBID 3245U-01)

Dear Trish:

I am writing you on behalf of Simmons Foods, Inc. regarding the 303(d) listing for Cave Springs Branch (CSB). This letter requests the Missouri Department of Natural Resources recommend to the Clean Water Commission that Cave Springs Branch be removed from Missouri's 303d list as the TMDL be rescinded because the CSB is no longer impaired.

Simmons Foods operates a chicken processing and rendering plant near Southwest City, Missouri. The facility has a wastewater treatment plant that discharges to CSB pursuant to Missouri State Operating Permit MO-0036773. Simmons' plant employs approximately 1,400 employees who take pride in providing consumers with quality protein products while working to provide environmental protections.

Cave Springs Branch first appeared on the 303(d) List in 1998. No data was offered to support the listing other than a suggestion the watercourse had unsightly bottom deposits. These unsightly bottom deposits were likely comprised of filamentous algae. In 2010, the Clean Water Commission removed Cave Springs Branch (WBID 3245U-01) from Missouri's 303d list because the stream was no longer impaired. Unfortunately, EPA reinstated the listing without any additional data to suggest unsightly bottom deposits persisted.

As discussed below, changes at the Simmons Foods' treatment plant resulted in very clean effluent being discharged into Cave Springs Branch and the virtual elimination of filamentous in the watercourse. As a result, the watercourse is no longer impaired for unsightly bottom deposits.

In 1998 and 1999, Simmons Foods made a commitment to research, design and construct new and additional, state-of-the art treatment facilities to improve the quality of water in CSB.

ATTORNEYS AT LAW

601 Monroe Street, Suite 301 ♦ P.O. Box 537 ♦ Jefferson City, Missouri 65102
(573) 634-2266 ♦ FAX: (573) 636-3306 ♦ www.ncrpc.com

Simmons is proud to say that it delivered on its commitment. For more than a decade Simmons Foods' wastewater treatment plant has produced a high-quality effluent that reduced ammonia and nutrient loadings to such an extent that it is now an industry leader in wastewater treatment.

Prior to wastewater treatment improvements made in 1995/1996 and again in 1999, the Simmons Foods' wastewater treatment plant ("Simmons' plant") discharged effluent containing upwards of 50 mg/L ammonia, 20 mg/L total phosphorus (TP) and 158 mg/L nitrate/nitrite nitrogen. After the new treatment systems were placed online, ammonia, TP and nitrate/nitrite levels dropped precipitously. Figure 1, below, demonstrates the dramatic reduction in total phosphorus in Simmons' effluent. This reduction, in addition to changes in watershed land-use practices has resulted in a virtual elimination of filamentous algae growths in CSB.

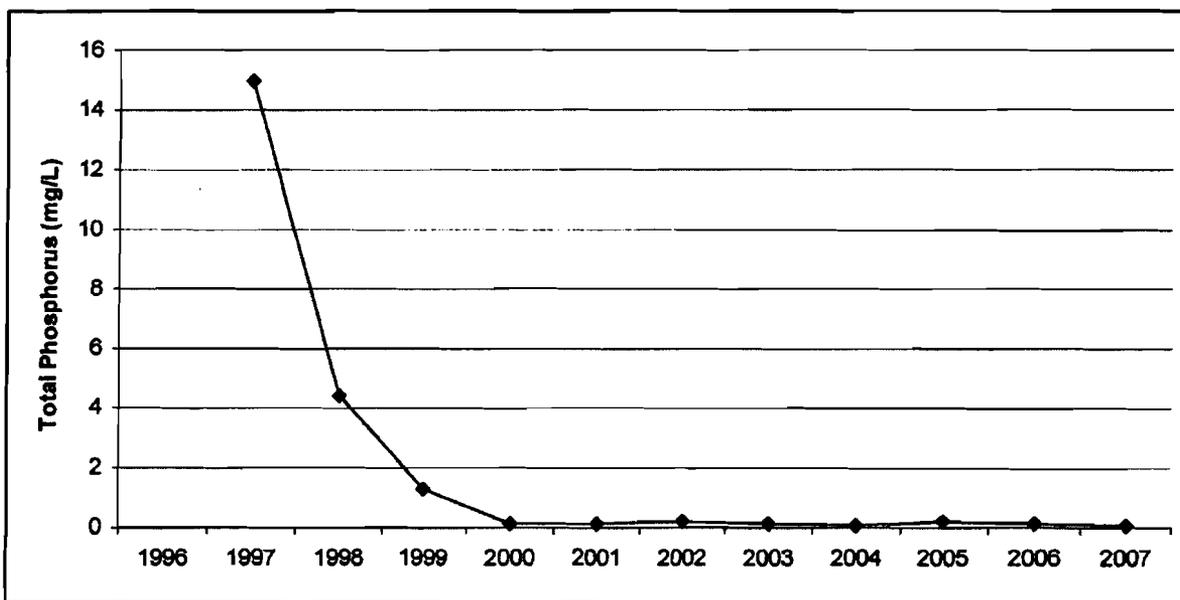


Figure 1: Total Phosphorous data from 1998-2007

MDNR Data and Observations Recommend Delisting

In 2004, the Department published a document discussing Nutrient Trends in Cave Springs Branch. The document is enclosed as Attachment 1. In this document, the Department stated:

There have been large reductions in the amount of nutrients discharged to Cave Spring Branch beginning in 1999. These reductions are due primarily to improvement in wastewater treatment at the Simmons poultry processing plant ... In August 2004, the Missouri DNR conducted a visual and benthic survey of Cave Spring Branch ... There is currently no evidence of exceedance of narrative water quality standards.

In 2008, MDNR released another Nutrient Trends in Cave Springs Branch document and again stated, "There is currently no evidence of exceedance of narrative water quality standards." This document is also enclosed as Attachment 2.

The 1998 decision to list Cave Springs Branch may have relied in part on the results of a 1992 stream survey that noted heavy filamentous algae growth on rocks and substrate on the bottom of the stream. This filamentous algae growth was characterized as "objectionable bottom deposits," in Cave Springs Branch near the Simmons' facility. GBM^c & Associates' 2000 Bioassessment Study (previously submitted to MDNR) also noted heavy coverage of long-stranded filamentous algae. However, since 2000, growths of long, filamentous algae have all but disappeared.

In GBM^c & Associates' 2010 bioassessment study (Attachment 3), almost no filamentous algae was observed. Instead, a small amount of filamentous algae was observed (approximately 5 percent of the channel bottom), and what was observed was short-stranded, not long-stranded, algae. Additionally, no objectionable bottom deposits, surface sheens, or unusual water or sediment odors were observed. Overall, there was a vast improvement in the presence of filamentous algae.¹

In conclusion, based on MDNR's repeated assertion that Cave Springs Branch does not exceed water quality standards and the elimination of filamentous algae, Simmons Foods requests CSB be removed from the 303d list and the TMDL be rescinded. Thank you for the opportunity to comment. Should you wish to discuss these comments further, feel free to contact me.

Sincerely,

NEWMAN, COMLEY & RUTH P.C.

By: 

Robert J. Brundage
rbrundage@ncrpc.com

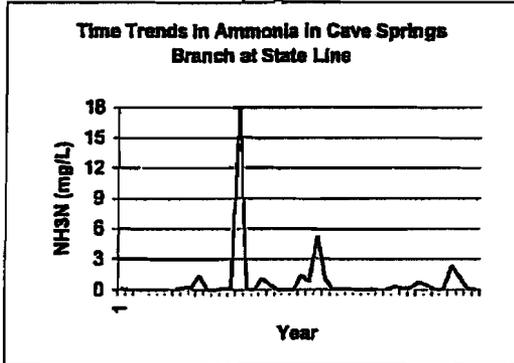
Enclosures

cc: Simmons Foods, Inc. (w/encls.)
John Elrod (w/encls.)
John Hoke (w/encls.)
John Madras (w/encls.)

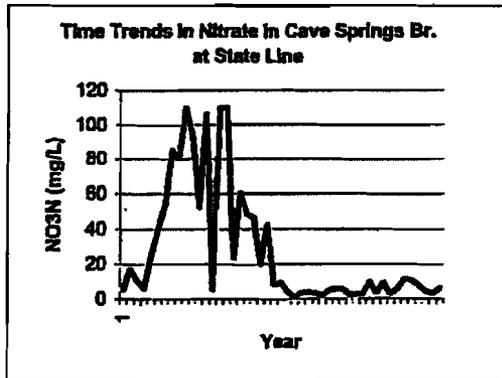
¹ This is also consistent with a 2004 MDNR visual and benthic survey of Cave Springs Branch, which found "the aquatic invertebrate community and levels of algae in the stream appeared to be similar to other streams viewed in this area on the same date," and MDNR's response to Simmons' comments on the Cave Springs Branch TMDL, which stated, "Water quality has improved such that algae production in the stream has been reduced and objectionable bottom deposits have also been reduced or eliminated."

Cave Spring Branch - WBID9002 (unclassified)

Nutrient Trends in Cave Spring Branch at State Line

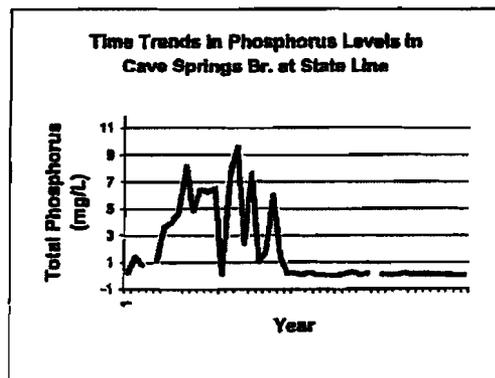


There have been large reductions in the amount of nutrients discharged to Cave Spring Branch beginning in 1999. These reductions are due primarily to improvements in wastewater treatment at the Simmons poultry processing plant. Monitoring of fishes was done by Oklahoma DEQ in October, 1998. This study found a good diversity of fish species in the creek and concluded the stream had recovered from the acute pollution events that occurred in July 1997.



In August 2004, the Missouri DNR conducted a visual and benthic survey of Cave Spring Branch for the first four miles below the Simmons facility. The aquatic invertebrate community and levels of algae in the stream appeared to be similar to other streams viewed in this area on the same date.

There is currently no evidence of exceedence of narrative water quality standards. In addition, the Listing Methodology document does not include criteria for listing waters for protection of aquatic life.



Recommendation: delete this stream from the 2004 303(d) list.

Missouri Department of Natural Resources
 Water Protection Program
 573/751-1300

Cave Springs Branch at State Line -WBID 9002 unclassified

Water Chemistry Data by Mo. DNR and Oklahoma DEQ

Org	Yr	Mo	Dy	NH3N	NOSN	TP	Org	Yr	Mo	Dy	NH3N	NOSN	TP
MDNR	1998	3	5		5.17	0.16	OKDEQ	1997	1		0.7	26.4	14.4
MDNR	1998	3	15	0.13	17.4	1.42	OKDEQ	1997	2		0.3	38.7	15.5
MDNR	1998	3	18	0.02499	10.8	0.82	OKDEQ	1998	1	28	0.93	30.39	2.71
MDNR	1998	3	26	0	5.87		OKDEQ	1998	2	4	0.4	7.36	0.13
MDNR	1998	4	6	0	25.1	1.16	OKDEQ	1998	2	11	0.86	29.49	2.88
MDNR	1998	4	14	0	40.3	3.83	OKDEQ	1998	2	18	1.11	39.38	4.89
MDNR	1998	4	30	0.04	53.8	3.98	OKDEQ	1998	2	22	2.15	44.32	6.12
MDNR	1998	5	19	0.02499	85.4	4.63	OKDEQ	1998	2	25	0.05	5.1	0.201
MDNR	1998	5	29	0.05	80.4	8.1	OKDEQ	1998	3	1	0.05	5.02	0.229
MDNR	1998	6	3	0.21	109.88	4.83	OKDEQ	1998	3	4	0.05	4.938	0.738
MDNR	1998	6	8	0.26	83.61	6.44	OKDEQ	1998	3	11	0.05	6.55	0.051
MDNR	1998	6	30	1.45	52.33	6.23	OKDEQ	1998	3	18	0.05	11.42	0.888
MDNR	1998	7	18	0.03	106.39	6.5	OKDEQ	1998	3	28	0.05	15.05	0.025
MDNR	1998	7	28	0.02499	5.35	0.09	OKDEQ	1998	4	1	0.07	17.5	1.51
MDNR	1998	8	27	0.11	110	7.56	OKDEQ	1998	4	7	0.12	22.06	1.159
MDNR	1998	9	10	0.13	110.43	9.61	OKDEQ	1998	4	15	0.05	45.56	4.223
MDNR	1998	10	8	18.2	23.43	2.37	OKDEQ	1998	4	22	0.05	61.57	6.178
MDNR	1998	10	20	0.12	60.7	7.82	OKDEQ	1998	4	29	0.18	52.5	4.985
MDNR	1998	12	9	0.02499	48.5	1.02	OKDEQ	1998	5	8	0.2	87.27	8.75
MDNR	1998	12	29	1.16	46.5	1.89	OKDEQ	1998	5	11	0.13	70.31	7.16
MDNR	1999	1	19	0.499	20	6	OKDEQ	1998	6	10	0.12	97.72	7.44
MDNR	1999	2	2	0.02499	42.6	1.38	OKDEQ	1998	7	15	0.28	89.41	10.66
MDNR	1999	6	3	0.0499	8.33	0.19	OKDEQ	1998	7	29	0.09	116	8.61
MDNR	1999	9	25	0.02499	9.88	0.2	OKDEQ	1998	8	6	0.16	65.48	4.72
MDNR	1999	12	29	1.44	4.56	0.06	OKDEQ	1998	8	19	0.1	92.99	9.424
MDNR	2000	2		0.83	1.14	0.21	OKDEQ	1998	9	16	0.16	59.33	6.271
MDNR	2000	2		5.26	3.8	0.06	OKDEQ	1998	9	30	0.24	82.98	19.61
MDNR	2000	3		1.15	3.96	0.05	OKDEQ	1998	10	14	0.33	37.08	3.303
MDNR	2000	3		0.0499	3.29	0.03	OKDEQ	1998	11	18	0.39	84.94	5.954
MDNR	2000	4	19	0.02499	2.05	0.06	OKDEQ	1998	12	9	0.12	55.94	1.507
MDNR	2000	6	29	0.05	5.29	0.15	OKDEQ	1998	12	16	0.45	68.79	6.821
MDNR	2000	7	13	0.02499	5.85	0.3	OKDEQ	1999	1	6	0.4	34.22	1.919
MDNR	2000	8	3	0.02499	5.77	0.06	OKDEQ	1999	1	20	0.65	49.02	4.469
MDNR	2000	8	14	0.08	2.4	0.18	OKDEQ	1999	2	3	0.05	47.67	2.817
MDNR	2000	8	31	0.02499	2.5		OKDEQ	1999	2	17	0.05	45.66	5.816
MDNR	2000	9	7	0.02499	2.97	0.1	OKDEQ	1999	3	10	0.1	13.54	1.106
MDNR	2000	9	19	0.4	9.93	0.12	OKDEQ	1999	3	24	0.18	5.74	1.194
MDNR	2001	6	14	0.13	3.89	0.05	OKDEQ	1999	4	4	0.05	9.47	0.253
MDNR	2002	8	4	0.23	9.57	0.22	OKDEQ	1999	4	5	0.07	7.85	2.157
MDNR	2003	1	8	0.76	2.82	0.11	OKDEQ	1999	4	21	0.05	9.47	0.25
MDNR	2003	8	17	0.44	5.97	0.12	OKDEQ	1999	5	5	0.05	3.69	0.46
MDNR	2003	7	31	0.01499	11.6	0.11	OKDEQ	1999	5	19	0.45	3.92	0.392
MDNR	2003	9	23	0.04	10.8	0.11	OKDEQ	1999	5	21	0.05	3.69	0.46
MDNR	2003	10	14	2.32	8.04	0.09	OKDEQ	1999	6	7	0.05	5.93	0.146
MDNR	2003	12	17	1.3	4.2	0.05	OKDEQ	1999	6	23	0.32	0.52	5.53
MDNR	2004	1	14	0.16	2.92	0.02	OKDEQ	1999	7	7	0.16	3.47	0.205
MDNR	2004	3	23	0.01499	5.61	0.02	OKDEQ	1999	8	4	0.14	2.62	0.162

Missouri Department of Natural Resources
 Water Protection Program
 573/751-1300

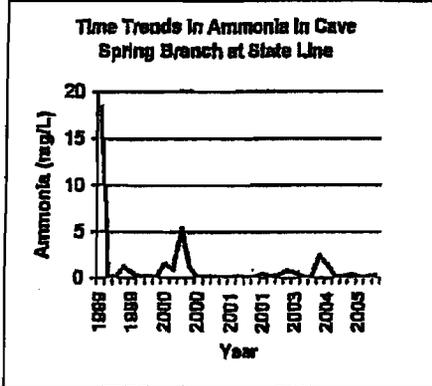
Org	Yr	Mo	Dy	NH3N	NO3N	TP
OKDEC	1999	8	25	0.06	16.33	0.115
OKDEC	1999	9	15	0.05	13.99	0.124
OKDEC	1999	10	8	0.32	14.66	
OKDEC	1999	10	20	0.16	12.38	0.17
OKDEC	1999	11	3	0.45	0.82	0.041
OKDEC	1999	11	17	0.1	1.03	0.202
OKDEC	1999	12	1	0.36	6.27	0.134
OKDEC	1999	12	15	0.35	3.97	0.13
OKDEC	2000	1	12	0.05	3.36	0.198
OKDEC	2000	2	9	1.22	1.69	0.171
OKDEC	2000	3	22	0.19	4.72	0.064
OKDEC	2000	5	3	0.16	3.77	0.148
OKDEC	2000	5	31	0.05	1.38	0.131
OKDEC	2000	6	28	0.13	3.77	0.242
OKDEC	2000	7	26	0.07	2.89	0.104
OKDEC	2000	8	23	0.14	4.05	0.167
OKDEC	2000	8	20	1.24	2.23	0.192
OKDEC	2000	10	18	0.23	1.01	0.118
OKDEC	2000	11	15	0.28	3.45	0.068
OKDEC	2001	1	3	4.9	2.99	0.16
OKDEC	2001	1	24	3.8	11.54	0.046
OKDEC	2001	2	7	3.64	9.87	0.084
OKDEC	2001	3	21	2.74	7.89	0.048
OKDEC	2001	4	18	0.25	2.47	0.057
OKDEC	2001	5	23	0.15	6.1	0.05
OKDEC	2001	6	13	0.15	1.96	0.058
OKDEC	2001	7	18	0.51	2.28	0.084
OKDEC	2001	8	22	0.13	6.17	0.105
OKDEC	2001	9	19	0.15	3.66	0.123
OKDEC	2001	10	13	0.25	2.36	0.079
OKDEC	2001	12	5	0.33	1.44	0.301
OKDEC	2001	12	19	0.1	4.41	0.409

Note: The quality assurance program of Oklahoma DEQ has not yet been reviewed by Mo. DNR.



Missouri Department of Natural Resources
Cave Spring Branch - WBD 3245U001 (unclassified)
Water Chemistry Data by MoDNR and Oklahoma DEQ

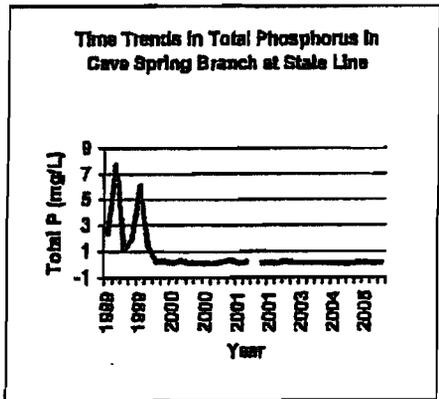
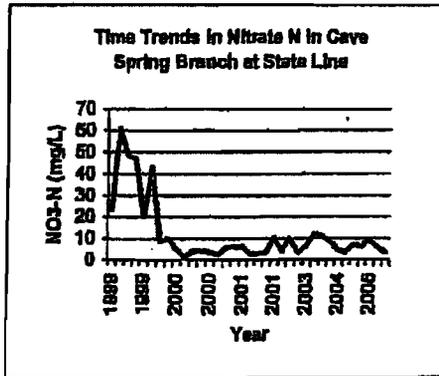
Nutrient Trends In Cave Spring Branch at State Line. Assessment date July 25, 2006



There have been large reductions in the amount of nutrients discharged to Cave Spring Branch beginning in 1999. These reductions are due primarily to improvements in wastewater treatment at the Simmons poultry processing plant. Monitoring of fishes was done by Oklahoma DEQ in October, 1998. This study found a good diversity of fish species in the creek and concluded the stream had recovered from the acute pollution events that occurred in July 1987.

In August 2004, the Missouri Department of Natural Resources conducted a visual and benthic survey of Cave Spring Branch for the first four miles below the Simmons facility. The aquatic invertebrate community and levels of algae in the stream appeared to be similar to other streams viewed in this area on the same date.

There is currently no evidence of exceedences of narrative water quality standards.



Missouri Department of Natural Resources, Water Pollution Control Branch, www.dnr.mo.gov, 573-751-1300
1/18/2006 jf

GBM^{INC}



**Simmons Foods, Inc.
Bioassessment of Reach CSB-1 on
Cave Springs Branch**

October 28, 2010

GBM^{INC} & Associates
Strategic Environmental Services

Attachment 3

Bioassessment of Reach CSB-1 on Cave Springs Branch

Prepared for:

Simmons Foods, Inc.
P.O. Box 121
Southwest City, MO 64863

Prepared by:

GBM^c & Associates
219 Brown Lane
Bryant, AR 72022

October 28, 2008

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ATTACHMENT

Attachment A – Macroinvertebrates collected in 2000 and 2010 from Cave Springs Branch.

Bioassessment of Reach CSB-1 on Cave Springs Branch

Summary of Findings

Benthic macroinvertebrate sampling and habitat assessment were completed in Cave Springs Branch at CSB-1, upstream of the Missouri/Oklahoma state line on September 29, 2010. Collection and processing of macroinvertebrates were completed in a manner to replicate a previous assessment of the creek. Habitat assessment was completed to evaluate the potential effect of habitat on the macroinvertebrate community and as a comparison with the habitat assessment conducted in 2000 that found habitat conditions degraded by heavy cattle use at the site. The community collected in 2010 shows vast improvement over that collected in 2000. Each community characteristic assessed in 2010 scored better, indicating improvement, compared to that of 2000. Most noteworthy is the shift from a community dominated by flatworms and dipterans in 2000 to one dominated by Ephemeroptera and Trichoptera in 2010. Overall, the community depicted by the CSB-1 collection in 2010 appears typical for small Ozark Highland streams in the late summer/early fall seasonal period. The habitat was also found to have improved over time and no active use of stream or riparian zone by cattle was noted. Periphyton coverage was greatly reduced compared to 2000 (and almost no filamentous algae was observed), stream banks were better protected by vegetation, and the riparian areas showed no evidence of cattle impacts.

Macroinvertebrate Sampling and Analysis

Benthic macroinvertebrates inhabit the sediment or live on the bottom substrates of streams, rivers and lakes. The presence of these organisms and their diversity and tolerance to environmental perturbation at an expected level reflects the maintenance of a systems biological integrity. Monitoring these assemblages is useful in assessing the aquatic life status of the water body and detecting trends in ecological condition.

Benthic macroinvertebrate sampling was completed in Cave Springs Branch at CSB-1, upstream of the Missouri/Oklahoma state line on September 29, 2010. Cave Springs Branch was sampled as a riffle/pool predominant stream; and the samples were

collected in gravel and cobble riffles only. Collection and processing of macroinvertebrates were completed in a manner to replicate the work presented in the September 8, 2000 *Stream Assessment Report on Cave Springs Branch and Honey Creek* (GBM^c & Associates, 2000). Collection and sample processing was completed according to GBM^c SOP's and EPA protocols (Barbour, 1999) and are generally considered semi-quantitative.

Samples were condensed and processed in the field. Macroinvertebrate samples were processed according to GBM^c QAP protocol (GBM^c & Associates, 2008). The condensed sample was rinsed and a portion of it placed in a sorting tray. Organisms were picked randomly from the sample and preserved in 70% ethanol in small jars. One hundred organisms (+/- 10%) were picked from the sample in an effort to mimic observed abundance while still locating and removing a representative number of large or rare specimens. All organisms from the sample were identified to appropriate taxonomic levels (generally to genus). Identifications were completed using widely accepted taxonomic references including *An Introduction to the Aquatic Insects of North America* (Merritt and Cummins, 1996) and *Fresh Water Invertebrates of the United States* (Pennak, 1989). A series of biometrics were analyzed for each collection. The primary biometrics assessed were taxa richness (number of different taxa), EPT (Ephemeroptera, Plecoptera, and Trichoptera) richness, biotic index, Shannon-Weiner Diversity Index (base-e), percent EPT, and community ordinal and trophic composition structure. The biotic index was calculated following the formula developed by Hilsenhoff (EPA, 1989). Tolerance values used in the calculations were from a Missouri Department Natural Resources database (Sarver, 2001) which is based on tolerance values developed by Lenat, Hilsenhoff, Bode, and others, or from those provided in *Rapid Bioassessment Protocols for Use in Wadeable Streams and Rivers*, (EPA, 1999). A comprehensive listing of the macroinvertebrate taxa identified from the 2000 and 2010 samples are presented as an attachment to this letter. A summary of the biometric scores are presented in Table 1.

Table 1. Summary of macroinvertebrates metrics from collections at CSB-1.

Parameter	CSB-1 (2010)	CSB-1 (2000)
COMMUNITY MEASURES		
Total number of Taxa (Richness)	19	11
EPT Richness	5	0
EPT % Abundance	61.9	0.0
Diversity Indices (Shannon-Wiener)	2.33	1.85
Total % of 5 Dominant Taxa	83	87
PERCENTAGE OF THE 4 DOMINANT ORDINAL GROUPS		
Ephemeroptera	37	—
Trichoptera	25	—
Diptera	9	35
Crustacea	9	—
Turbellaria	—	34
Annelida	—	16
Megaloptera	—	10
FUNCTIONAL FEEDING ASSEMBLAGES %		
Shredders	0	0
Scrapers	4	2
Filterers	25	7
Collectors	59	55
Predators	13	36
Biometric Score*	5.8	7.2

CSB-1 2010 Collection

The sample from Station CSB-1 collected in 2010 was dominated by Ephemeropterans (37%) and Trichopterans (25%). Taxa richness (total number of different taxa identified) and EPT richness (number of taxa representatives from the orders Ephemeroptera, Plecoptera and Trichoptera, which are generally considered to be more sensitive to water quality and habitat perturbation) were 19 and 5, respectively. The Biotic Index (a measure of macroinvertebrate tolerance to environmental perturbation) resulted in a value of 5.8 which portrays a somewhat intolerant community to water quality and habitat perturbation (value scored from 0-10, with 0 being the most intolerant). The lower the biotic index score the more indication that a community is healthy and experiencing no adverse impacts from water quality or habitat perturbation. Scores below 6 are common in healthy highland streams. A Shannon-Weiner Diversity Index (base-e) was calculated and resulted in a value of 2.33. The trophic structure of the community was dominated by collectors (55%) and filterers (25%) with

representatives present from each functional feeding group with the exception of shredders, which were absent.

CSB-1 2000 Collection

The CSB-1 sample collected in 2000 was dominated by Dipterans (35%) and Turbellarians (34%). Taxa richness and EPT richness were 11 and 0, respectively. The Biotic Index resulted in a value of 7.2 which portrays a community somewhat tolerant to water quality and habitat perturbation. A Shannon-Weiner Diversity Index (base-e) was calculated and resulted in a value of 1.85. The trophic structure of the community was dominated by collectors (55%) and predators (36%) with representatives present from each functional feeding group, including shredders which had 1% of the collection.

Comparison of 2010 and 2000 Collections

The community collected in 2010 shows vast improvement over that collected in 2000. Most noteworthy is the shift from a community dominated by the facultative flatworms and dipterans in 2000 to one dominated by the more desirable orders Ephemeroptera and Trichoptera in 2010 (Figure 1). The recent collection included 5 taxa representatives from the EPT that comprised 62% of the community while the 2000 collection had none (0) of these representatives. The biotic index decreased from 7.2 to 5.8 indicating an improved community that has become composed of more of intolerant (sensitive) taxa over the past 10 years. Additionally, taxa richness increased from 11 to 19, a positive increase of nearly 75% (Figure 2). A large increase in species diversity was observed in the 2010 collection as species diversity increased from 1.85 in 2000 to 2.33 in 2010. Overall the improved community depicted by the CSB-1 collection in 2010 appears typical for small Ozark Highland streams in the late summer/early fall seasonal period.

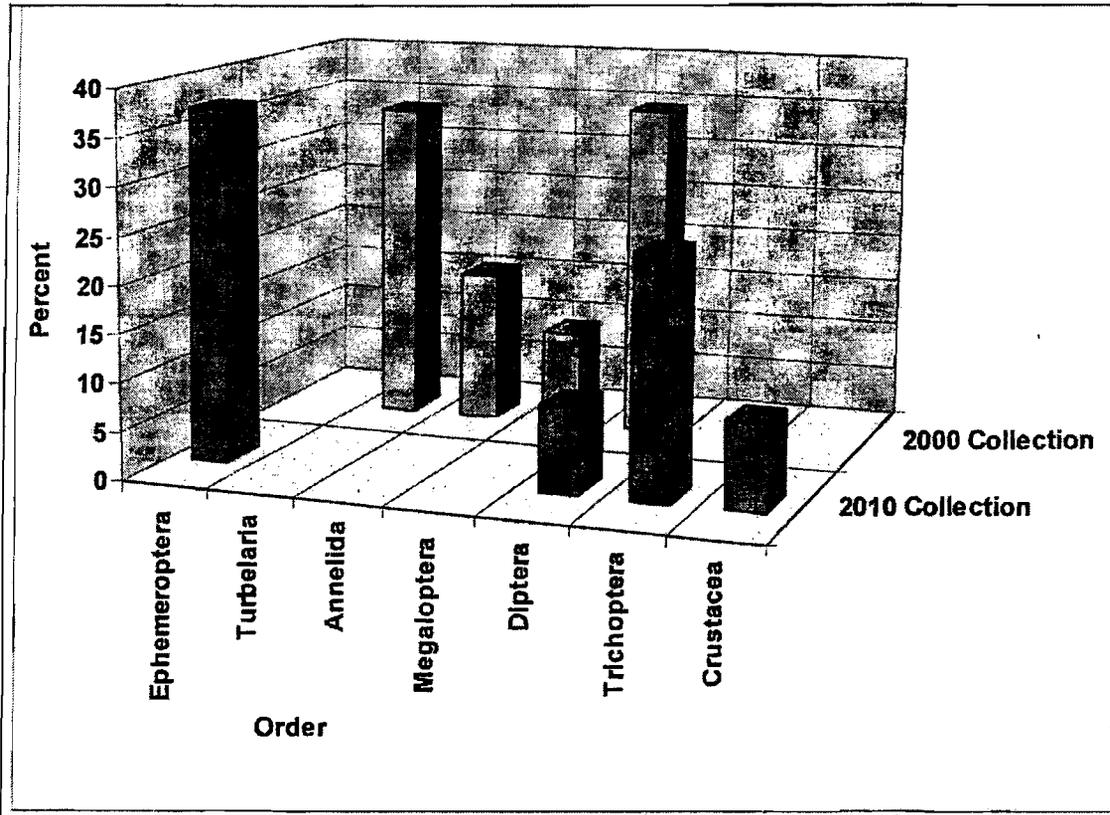


Figure 1. Comparison of dominant ordinal groups between collections.

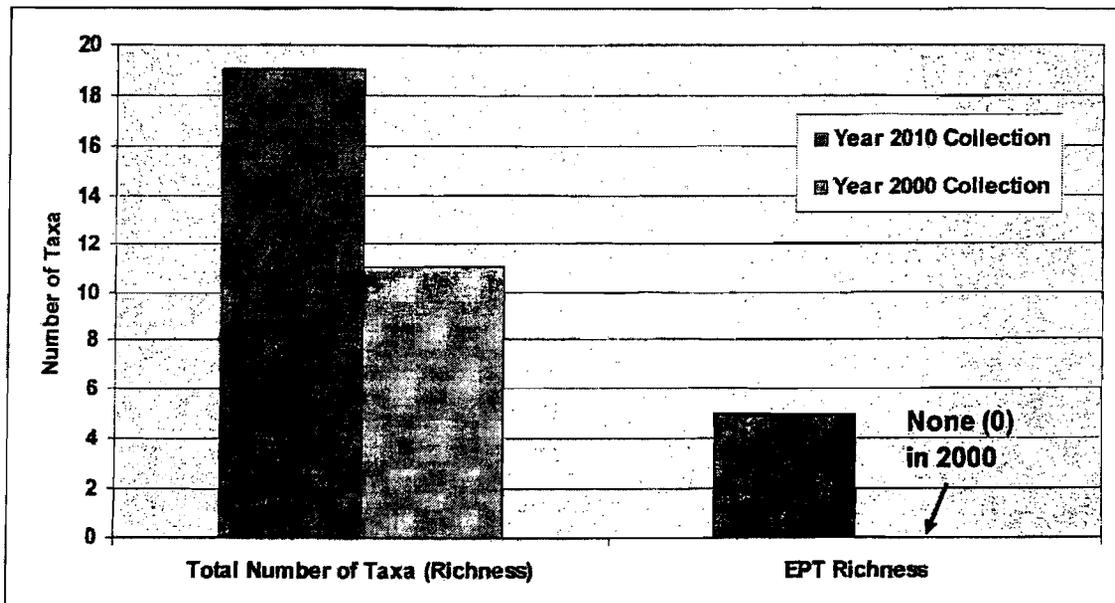


Figure 2. Depiction of richness data.

Stream Habitat Assessment

A semi-quantitative habitat assessment was completed on Cave Springs Branch in the CSB-1 reach. The assessment included visual and measured features of the stream reach as listed below.

1) Channel Morphology

- a) Reach Length Determination**
- b) Riffle-Pool Sequence**
- c) Depth and Width Regime**

2) In-Stream Structure

- a) Epifaunal substrate**
- b) Instream Habitat**
- c) Substrate Characterization**
- d) Embeddedness**
- e) Sediment Deposition**
- f) Aquatic Macrophytes and Periphyton coverage**

3) Riparian Characteristics

- a) Canopy Cover**
- b) Bank Stability and slope**
- c) Vegetative Protection**
- d) Riparian Vegetative Zone Width**
- e) Land-use Stream Impacts**

The stream can be described as a second order riffle-pool complex that is intermittent (bordering on ephemeral) in nature. The reach assessed contains water perennially due only to the presence of the Simmons Foods effluent discharge. The reach assessed is 38% riffle, 39% run and 23% shallow pool with a channel substrate of primarily cobble.

No objectionable bottom deposits (sludge, oils, foam, etc.), surface sheens or unusual water or sediment odors were noted. The heavy coverage of long strands of filamentous algae observed in 2000 was absent in 2010.

Emergent aquatic macrophytes were observed in the channel but coverage was minimal at only about 5% of the channel bottom. A submerged aquatic macrophyte believed to be a water moss (*Fontinalis* sp.) was fairly prominent on cobbles in the riffles and shallow runs but was often hard to distinguish from periphyton until observed from directly above. Its overall coverage is generally included in the periphyton estimates as it grows on the same rocky substrates along with the periphyton. Overall periphyton coverage on the channel bottom was about 68%. The majority of the periphyton was green algae and diatoms, with very little (less than 5%) filamentous algae observed. What filamentous algae were noted was short stranded (less than 2 inches in length).

The riparian area was dominated by immature forest on the right bank and grasses and wildflowers on the left bank. Riparian forest canopy shaded only 30% of the stream channel in the reach assessed, primarily due to the lack of mature trees on the left bank. Banks were about 75% covered by vegetation and no recent evidence was observed of cattle access to the stream or of grazing in the adjacent field. It appeared that there had been no grazing in the immediate vicinity of the stream in the past few years.

Habitat quality appears to have improved considerably since 2000. In the *Stream Assessment report on Cave Springs Branch and Honey Creek* (GBM^c & Associates, 2000) it was reported that "Cattle trails leading from the adjacent riparian zone directly to the stream caused the unstable and eroded areas of steam bank. Riparian cover was primarily grasses and the surrounding land use was pasture. Much of the riparian area close to the stream banks was littered with cow manure and was heavily trampled, suggesting high use of the area by cattle." The adverse impacts of heavy cattle use on habitat at CSB-1 upstream of the state line were not found in the 2010 assessment and the resulting habitat improvements undoubtedly contributed to improvements in the macroinvertebrate community.

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Attachment A

macroinvert

Macroinvertebrates collected in 2000 and 2010 from Cave Springs Branch

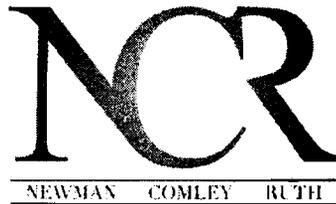
Family	2000	2010	2000	2010
Planariidae	8	GC	34	
HYMENOPTERA				
<i>Hirudinea</i>	7.8	PR	16	3
<i>Oligochaeta</i>	9.2	GC		
COLEOPTERA				
<i>Elmia</i>	2.5	SC		
<i>Glossosoma</i>	—	SC		
<i>Gyraulus</i>	8	SC	2	
<i>Hydrobiidae</i>	8	SC		
<i>Lymnaeidae</i>	—	SC		
<i>Physella</i>	9.1	SC		1
<i>Planorbidae</i>	—	SC		
CRUSTACEA				
<i>Corbicula</i>	6.3	FC		
<i>Pelecypoda Sp1</i>	—	FC		
<i>Sphaeriidae</i>	7.7	FC		
AMPHIPODA				
<i>Amphipoda</i>	—	GC		9
<i>Cambaridae</i>	—	GC	1	2
<i>Isopoda</i>	7.7	GC		
<i>Palaeomonetes</i>	—	GC		
ACARINA				
<i>Acarina</i>	—	PR		
BAETA				
<i>Baets</i>	6	GC		32
<i>Caenis</i>	7.6	GC		11
<i>Callibaetis</i>	9.3	GC		
<i>Centroptilum</i>	6.3	GC		
<i>Choroterpes</i>	2	GC		
<i>Falcocon</i>	6	GC		
<i>Heptagenia</i>	2.8	SC		
<i>Isonychia</i>	3.8	FC		
<i>Paraleptophlebia</i>	1.2	GC		
<i>Ephemera</i>	2.2	GC		
<i>Ephemera</i>	1.7	GC		
<i>Ephemeroptera Species1</i>	—	GC		
<i>Eurylophella</i>	3	GC		
<i>Stenacron</i>	7.1	GC		
<i>Stenonema</i>	3.4	SC		1
<i>Tricorythodes</i>	5.4	GC		
MEGALOPTERA				
<i>Aechnidae</i>	8	PR		
<i>Aeshna</i>	6.4	PR		
<i>Argia</i>	8.7	PR		3
<i>Argomphus</i>	6.4	PR		
<i>Boyeria</i>	6.3	PR		
<i>Calopteryx</i>	8.3	PR		3
<i>Celithemis</i>	3.7	PR		
<i>Cordulia</i>	5	PR		
<i>Corduligaster</i>	6.1	PR		
<i>Dromogomphus</i>	6.3	PR		
<i>Dythemis</i>	3.7	PR		
<i>Enallagma</i>	9	PR		
<i>Epithica (Epicordulia)</i>	5.6	PR		
<i>Epelogomphus</i>	5.5	PR		
<i>Erythemis</i>	7.7	PR		
<i>Gomphus</i>	6.2	PR		1
<i>Hagenius</i>	4	PR	1	
<i>Hesperagrion</i>	—	PR		
<i>Hetaerina</i>	6.2	PR		
<i>Ischnura</i>	9.4	PR		
<i>Ladona</i>	—	PR		

macroinvert

Macroinvertebrates collected in 2000 and 2010 from Cave Springs Branch

Order/Station ID	2000	2010	2000	2010
<i>Libellula</i>	9.8	PR		
<i>Macromia</i>	6.7	PR		
<i>Miathyria</i>	—	PR		
<i>Nasiaeschna (Aeschnidae)</i>	8	PR		
<i>Neurocordulia</i>	4	PR		
<i>Pachydiplax</i>	9.6	PR		
<i>Perithemis</i>	10	PR		
<i>Progomphus</i>	8.7	PR		
<i>Somatochlora</i>	8.9	PR		
<i>Stylogomphus</i>	4.8	PR		
<i>Stylurus</i>	4	PR		
<i>Sympetrum</i>	7.3	PR		
<i>Tramea</i>	—	PR		
<i>Acroeuria</i>	1.4	PR		
<i>Alocapnia</i>	2.8	SH		
<i>Attaneuria</i>	2.75	PR		
<i>Haploperla</i>	1.3	PR		
<i>Isoperla</i>	2	PR		
<i>Neoperla</i>	1.6	PR		
<i>Perlenta</i>	0	PR		
<i>Phasgonophora (Agnatina)</i>	2	PR		
<i>Zealeuctra</i>	0	SH		
<i>Belostoma</i>	9.8	PR		
<i>Corixidae</i>	6	PR		
<i>Halobates</i>	—	PR		
<i>Hydrotetra</i>	7.3	PR		
<i>Mesovelia</i>	8.4	PR		
<i>Metrobates</i>	6.4	PR		
<i>Microvelia</i>	6.4	PR	1	
<i>Neopela</i>	5.5	PR		
<i>Notonecta</i>	5.5	PR		
<i>Notonectidae</i>	5.5	PR		
<i>Ranatra</i>	7.5	PR		
<i>Rhagovelia</i>	7.3	PR		1
<i>Rheumatobates</i>	6.4	PR		
<i>Steinvelia</i>	—			
<i>Tropobates</i>	6.4	PR		
<i>Trichochorixa</i>	5.5	PR		
<i>Chauliodes</i>	4	PR		
<i>Corydalis</i>	5.6	PR	10	3
<i>Stalis</i>	7.5	PR		1
<i>Chematopsyche</i>	6.6	FC		22
<i>Ceracles</i>	2.3	GC		
<i>Chimarra</i>	2.8	FC		7
<i>Glyphopsyche</i>	—	SH		
<i>Helicopsyche</i>	0	SC		
<i>Hydropsyche</i>	4	FC		
<i>Hydroptila</i>	6.2	SC		
<i>Mystacides</i>	3.5	SH		
<i>Nectopsyche</i>	4.1	SH		
<i>Oecetes</i>	5.1	PR		
<i>Potamyia</i>	5	FC		
<i>Polycentropus</i>	3.5	PR		
<i>Pycnopsyche</i>	2.3	SH		
<i>Trianodes</i>	3.7	SH		
<i>Petrophila</i>	1.8	SC		
<i>Agabus</i>	5	PR		

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January 29, 2016

Missouri Department of Natural Resources
Attn.: Trish Rielly
Water Protection Program
P.O. Box 176, Jefferson City, MO 65102
trish.rielly@dnr.mo.gov

Re: Comment on Proposed 2016 303(d) List

Dear Trish:

I am writing you on behalf of The Doe Run Company requesting that the West Fork Black Rivers nutrient impairment be removed from the 303(d) list.

West Fork Black River first appeared on the 303(d) List in 1998 based upon a citizen complaint about the aesthetics of a small "swimming hole" located downstream of the West Fork Mine. To my knowledge, there were no photographs or other objective measurements taken to document any perceived condition in the river. As you are also aware, in 1998 there was no listing methodology, no recreational criteria or any other objective standards, other than the general criteria, on which to base a recreational listing. The department is aware there were a number of water bodies added to the 1998 list that were later determined to be in error or based upon little or no data.

The 1998 303(d) list only listed 0.2 miles of the river purportedly impaired by "nutrients" from the West Fork Mine. In response to this listing, the Department of Natural Resources initiated a study during 2002 and 2003. The department prepared the enclosed study titled *Stream Survey Sampling Report*. The Department performed an algae and nutrient study of West Fork Black River. The purpose of the survey was to "quantify benthic algal" (periphyton) density, identify dominant periphyton taxa, and quantify nutrient loading from the Doe Run West Fork Mine drainage."

Generally speaking, the department found low levels of chlorophyll in the stream. The report reported that "West Fork Black Doe Run discharge cannot be determined conclusively as contributing a significant nutrient load resulting in an increase in periphyton growth." The study "provides no evidence to support keeping the 0.2 mile of stream below West Fork Doe Run discharge on the 303(d) list of impaired waters for nutrients."

ATTORNEYS AT LAW

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To date, neither the department nor EPA has produced any studies that document that the recreational use has been impaired by nutrients in the West Fork Black River. Furthermore, since Missouri does not have numeric nutrient criteria for recreational use, the general criteria have not been documented to be impaired in this stream. To the contrary, there is no evidence that benthic algae is impairing recreational uses on the river.

In conclusion, Doe Run respectfully requests the Department recommend to the Missouri Clean Water Commission that the West Fork Black River be removed from the 303(d) List in regards to its purported recreational use impairment.

Thank you for the opportunity to comment. Should you wish to discuss these comments further, feel free to contact me.

Sincerely,

NEWMAN, COMLEY & RUTH P.C.

By:



Robert J. Brundage

Enclosure

Stream Survey Sampling Report

**West Fork Black River Near Doe Run West Fork Mine
Bunker, Missouri
Reynolds County**

**July 15-29, 2002,
October 3, 2002,
January 8-28, 2003,
and
April 23, 2003**

Prepared For:

**Missouri Department of Natural Resources
Water Protection and Soil Conservation Division
Water Pollution Control Program**

Prepared By:

**Missouri Department of Natural Resources
Air and Land Protection Division
Environmental Services Program**

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Attachments Located at end of report

Appendix A – Site Map and Photos

Appendix B – Quarterly Water Quality Chemical and Field Data

Appendix C – Chlorophyll a Data

Appendix D – Periphyton Taxa

1.0 Introduction

At the request of the Water Protection and Soil Conservation Division, the Environmental Services Program (ESP) conducted an algae and nutrient study of West Fork Black River near the Doe Run West Fork Mine drainage. The purpose of the survey was to quantify benthic algal (periphyton) density, identify dominant periphyton taxa, and quantify nutrient loading from the Doe Run West Fork Mine drainage. Algae sampling was conducted during minimal summer and winter stream flows and water quality sampling was conducted quarterly. Artificial algae substrates were deployed several days prior to sampling. Algae and water quality sampling were conducted on July 29, 2002 and January 28, 2003 and water quality only sampling was conducted on October 3, 2002 and April 23, 2003. Sampling was conducted by Brian Nodine, Patricia Rielly, and Carl Wakefield of the ESP, Air and Land Protection Division.

2.0 Background

According to the 1998 list of waters designated under section 303(d) of the Federal Clean Water Act, 0.2 mile along West Fork Black River located in Reynolds County near Bunker is listed as impaired for nutrients. The Doe Run West Fork Mine discharge is listed as the source of impairment. In past years, landowners downstream of the discharge have complained about algae blooms in that segment of stream. A total maximum daily load (TMDL) for this segment of stream was scheduled for FY 2003 with a low priority.

West Fork Black River at the Doe Run West Fork Mine has been the subject of previous studies including a study of algal growth by Dr. Nord Gale from the University of Missouri at Rolla (UMR). In addition, at the request of the Water Pollution Control Program (WCPC), sampling was conducted for a variety of metals and nutrients in April 1997.

3.0 Study Area

West Fork Black River originates in the northwest corner of Reynolds County approximately eight miles northwest of Bunker, Missouri. It is located within the Ozark/Current/Black ecological drainage unit (EDU). The stream flows in a west-southwest direction and joins East Fork Black River where it becomes the Black River at SW $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 21, T. 32 N., R. 2 E. The stream reach surveyed is a class "P" stream and its beneficial use designations are "livestock and wildlife watering and protection of warm water aquatic life and human health - fish consumption, cool water fishery, and whole body contact". Land use within the study area was predominantly mining along the south bank and forest with some residential use on the north side. See Appendix A for a study area map.

3.1 Site Descriptions

Four closely spaced sites (all sec. 1, T. 32 N., R. 2 W.) were sampled for periphyton density and dominant taxa assessment. Two sites were upstream from the Doe Run West Fork Mine discharge and two were downstream from the discharge. Quarterly water

quality samples were collected at the sites immediately upstream and downstream from the discharge.

Sites were selected to provide conditions that were as consistent as possible with regard to light, flow velocity, and depth to minimize variables that affect algae growth. All sampling sites were situated in areas with the least amount of canopy cover possible. All four sites were in runs whose maximum depths ranged from approximately 0.8 to 2.4 feet. Maximum flow velocities were approximately 0.5 to 1.0 feet per second.

Site 1 (GPS Lat. 37° 29' 35.8"N, Long. 91° 06' 30.9"W) is the most upstream site. It is along the lower end of a long gravel bar that extended approximately 200 to 300 yards downstream of the Highway KK crossing. Based on the appearance of the gravel bar, it was likely gravel mined in the past. The stream channel width at this site is approximately 50 feet with a maximum depth of approximately 1.5 feet. West Fork Black River at this site appeared clear and colorless with no observable odor. Substrate was mostly loose gravel with some cobble. Because water samples were not collected at this site, stream flow was not routinely measured. Flow was measured, however, on January 28, 2003 and was calculated at 14.2 cubic feet per second (cfs).

Site 2 (GPS Lat. 37° 29' 28.6"N, Long. 91° 06' 27.9"W) is the most immediate upstream site from the Doe Run West Fork Mine discharge. The stream channel width at this site is approximately 50 feet with a maximum depth of approximately 1.3 feet. The stream at this site appeared clear and colorless with no observable odor. The substrate is gravel, cobble, and some small boulders that are more compacted than at Site 1. Stream flow calculations were 12.9 cfs on July 29, 2002, 12.9 cfs on October 3, 2002, 13.3 cfs on January 28, 2003, and 33.1 cfs on April 23, 2003.

Site 3 (GPS Lat. 37° 29' 23.1"N, Long. 91° 06' 23.5"W) is immediately downstream of the Doe Run West Fork Mine discharge. Stream channel width at this site is approximately 40 feet with a maximum depth of 2.4 feet. The substrate is gravel, cobble, and boulders that are considerably compacted. There is a layer of deposits on the bottom at this site that are mostly rust colored with smaller amounts of black spreading from just past the outfall to the other side of the stream and downstream for several yards. The black deposits appeared more widespread during the final sampling day in the spring. Upon retrieval, the Plexiglas plates used for artificial substrates at this site were heavily incorporated with the reddish rust color while plates from all other sites remained mostly clear. With the exception of observable suspended deposits floating over the substrate, the water at this site appears clear, colorless, and without apparent odor. Stream flow calculations were 17.1 cfs on July 29, 2002, 16.3 cfs on October 3, 2002, 19.7 cfs on January 28, 2003, and 41.2 cfs on April 23, 2003.

Site 4 (GPS Lat. 37° 29' 25.5"N, Long. 91° 06' 12.2"W) is approximately one quarter mile downstream of the Doe Run West Fork Mine discharge. This site is beyond mining land use and is mostly forested. Immediately below this site, CR 844, a gravel road, closely parallels the stream at the high end of the north bank. Stream channel width at

this site is approximately 53 feet and the maximum depth is approximately 0.8 feet. The stream at this site was clear and colorless with no apparent odor. The substrate was loose gravel. Because water samples were not collected at this site, stream flow was not routinely measured, however, on January 28, 2003 stream flow was calculated at 18.7 cfs.

4.0 Methods

4.1 Field Procedures

Prior to sample collections, the ESP field personnel calibrated their water quality field instruments (pH, specific conductivity, and dissolved oxygen) per manufacturers' specifications. The ESP personnel determined the pH, specific conductivity, dissolved oxygen, and temperature of all water grab samples at the time of collection. Refer to Appendix B for chemical and field results.

4.1.1 Surface Water Samples

Surface water grab samples at sites 2 and 3 were collected on July 29 and October 3, 2002 and January 28 and April 23, 2003. The stream samples were collected mid-stream by immersing the sample containers directly into the stream.

4.1.2 Flow Measurements

Stream discharges were measured during quarterly water quality sampling at sites 2 and 3 and were measured at periphyton sites 1 and 4 during winter algae sampling. All discharge measurements were made using a Marsh McBirney digital flow meter.

4.2 Periphyton Sample Collection

The periphyton sample collection, field handling, and sample preservation procedures were conducted according to the MDNR standard operating procedure, which is consistent with procedures described in the 20th Edition of Standard Methods. Periphyton samples were collected during summer and winter low flow periods for chlorophyll a analysis to assess biomass density and for dominant taxa assessment.

Plexiglas plates (8" X 10") were deployed on July 15, 2002 and January 8, 2003 to provide artificial substrate for periphyton growth to assess biomass density (refer to Appendix A for photo). The plates were mounted to rebar that had been driven into the substrate. Sections of PVC pipe were installed around the rebar under the plates to keep the plates approximately two to four inches above the substrate to reduce effects of sedimentation. At each site, five plates were deployed with the exception of site 1 during the January 2003 sampling where only four plates were installed. On each plate were grids of 48 numbered squares of four square centimeters each. Periphyton samples were collected on July 29, 2002 (14-day exposure) and January 28, 2003 (20-day exposure). Periphyton samples were collected by scraping randomly selected squares of the substrate surface with a razor blade (refer to Appendix A for photo). At each site the samples were rinsed from the substrate and field filtered through a 1.0 μm (nominal) pore size glass

fiber filter. These filters were then folded into a four-inch paper filter, labeled, placed in a container of desiccant, and kept cool until they could be frozen upon return to the ESP laboratory.

The periphyton samples collected from each artificial substrate sampler were analyzed and reported separately. Two replicate areas were collected from every other artificial substrate plate. The replicates were analyzed separately then averaged to obtain the chlorophyll a value in mg/m^2 for that plate. Mean chlorophyll a values for each site were determined by averaging values of each filtered area (refer to the charts in Appendix C).

Periphyton was also collected for dominant taxa analysis on July 29, 2002 and January 28, 2003. Substrate that was representative of the composition along the cross section of each site was collected and placed into a plastic pan. Algae were scraped from the collected substrate with an Exacto-knife into vials. Slurry from the pan was also collected in the vials. The algae samples were preserved with a few drops of Lugol's solution in each vial and identified at the ESP laboratory.

4.3 Chain-of-Custody

All samples were given numbered labels. All samples except those for taxonomic identification were placed on ice in a cooler. The corresponding label number was entered onto a chain-of-custody form indicating the date, time, the location of sample collection, and parameters to be analyzed. Custody of the samples was maintained by the ESP field personnel until relinquishing them to the laboratory sample custodian within the ESP in Jefferson City, Missouri for analyses.

4.4 Chemical Analyses Requested

Quarterly water quality grab samples were collected and submitted for ammonia as nitrogen, nitrate plus nitrite as nitrogen, total kjeldahl nitrogen (TKN), and total phosphorus. Summer and winter periphyton samples were collected and submitted for chlorophyll a analyses. The chemical analysis results are attached in Appendix B.

4.5 Quality Assurance/Quality Control (QA/QC)

4.5.1 QA/QC Methods

All ESP analyses were conducted in accordance with the Fiscal Year 2003 Quality Assurance Project Plan for "Wasteload Allocations".

5.0 Results

5.1 Periphyton Analysis and Results

Periphyton samples collected from artificial substrates were analyzed using the Turner Designs model TD-700 Laboratory Fluorometer using an ethanol extraction method that

generally followed the EPA Method 445.0 without grinding. Refer to Appendix C for chlorophyll a results.

Pinnate diatoms were the dominant algal taxa collected with the exception of a dominance of filamentous *Spirogyra* at site 1 during summer sampling and filamentous *Mougeotia* at site 2 during winter sampling. There appeared to be high diatom diversity at all sites during summer and winter sampling. Refer to Appendix D for lists of identified periphyton genera for each site.

5.2 Nutrient Data Analysis and Results

Total phosphorus and ammonia as nitrogen results were all below detectable limits of 0.05 mg/L (due to an error, ammonia was not analyzed in spring samples). With the exception of a result of 0.21 mg/L at site 3 during summer sampling, all TKN results were below detectable limits of 0.2 mg/L. The maximum level of nitrate plus nitrite as nitrogen was 0.32 mg/L at site 3 during winter sampling. Tabular data for nutrients and field measurements are attached in Appendix B.

6.0 Observations

All surface water samples collected from West Fork Black River appeared clear and colorless with no observable odors or particulate (sediment) matter except at site 3 (see section 2.1).

The weather during July sampling was hot and humid with temperatures reaching the 90s (Fahrenheit). The day of sampling in July was overcast with thunderstorms in the area, however, it did not start raining at the study area until all sampling was completed.

The weather during the October sampling was warm with temperatures in the 80s (Fahrenheit) and partly cloudy. The weather the day the artificial substrates were deployed on January 8, 2003 was unseasonably warm with the temperature near 70° F. Between the deployment day and the sampling day temperatures dropped considerably, forming ice along the streamside and in back water areas. An attempt was made to collect samples on January 22, 2003, but ice formed on wet surfaces exposed to the air almost immediately. Because of a concern of ice crystals damaging algae cells during retrieval and filtration, sampling was postponed until the following week. On January 29, 2003, the day of sampling, the weather was cool with temperatures in the 40s (Fahrenheit) and over cast. During the spring sampling on April 23, 2003, the air temperature was approximately 70° F and the sky was clear.

7.0 Discussion

According to both chlorophyll a and water chemistry data of this study, the West Fork Black Doe Run discharge cannot be determined conclusively as contributing a significant nutrient load resulting in an increase in periphyton growth. The gradual increase in chlorophyll a concentrations from the most upstream to the most downstream sites does

not suggest an abrupt difference in periphyton biomass based on influence from the West Fork Black Doe Run discharge. The greatest measurable increase in nutrients between upstream and downstream sites was only 0.04 mg/L of nitrate plus nitrite as nitrogen during winter sampling.

Dr. Nord Gale of UMR conducted a study on algae growth in West Fork Black River that ran from June 1990 to November 1991 (Gale 1992). In this study, he concluded that intensity and nuisance impact of algae blooms were moderate in comparison with other streams in the area.

During all four seasons, the increase in stream flow from site 2 to site 3 is greater than the contribution of the actual discharge of approximately 2.7 cfs. This is especially true during the spring. The absence of any other observable source of flow into the stream other than the discharge combined with the increase in flow suggests an input of flow near the black and rust colored deposits at site 3. According to the UMR study, there is a spring along the north side of the riverbed in the area of the deposits. The UMR study suggests that after oxidizing, the iron and manganese precipitates, forming the rust colored and black deposits.

Results from water grab samples collected by ESP on April 3, 1997 (unpublished MDNR data, 1997) also provide evidence of an upwelling across from the discharge containing large quantities of iron and manganese. At the upwelling, total recoverable iron and manganese results were 1920 ug/L and 6930 ug/L, respectively. Results from other instream sites for iron and manganese were minimal. In comparison, results for total recoverable iron and manganese from the discharge were only 153 ug/L and 265 ug/L, respectively. Conductivity was 1100 μ mhos/cm at the upwelling site, 829 μ mhos/cm at the outfall, and a maximum of 292 μ mhos/cm at all other instream sites. Nutrient results at the outfall were 1.41 mg/L for nitrate + nitrite as N, 0.299 mg/L for ammonia as N, and 0.03 mg/L for total phosphorus.

8.0 Recommendations

This study provides no evidence to support keeping the 0.2 mile of stream below the West Fork Black Doe Run discharge on the 303(d) list of impaired waters for nutrients. Further studies are needed to document the potential for nutrient impairment that would result in nuisance algae growth. Because of the spring just across from the outfall, further studies should also focus on it as a potential influence on water quality and algae growth at this location.

Several variables besides nutrient loading can affect the rate of periphyton growth in streams. These include light, flow, temperature, water depth, and substrate, for example. One recommended method for evaluating and comparing the productivity of water samples from different locations that eliminates these variables is to measure algal productivity. Methods for measuring biostimulation for algal productivity are found in the 20th Edition of Standard Methods Part 8111 (Standard Methods, 1998).

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9.0 References

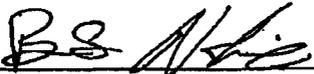
Gale, N.L., 1992, Algal Growth Problem in West Fork of the Black River. 44p.

Unpublished MDNR data, 1997.

Standard Methods for the Examination of Water and Wastewater, 1998, 20th Edition Part 8111.

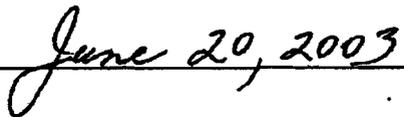
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Date:



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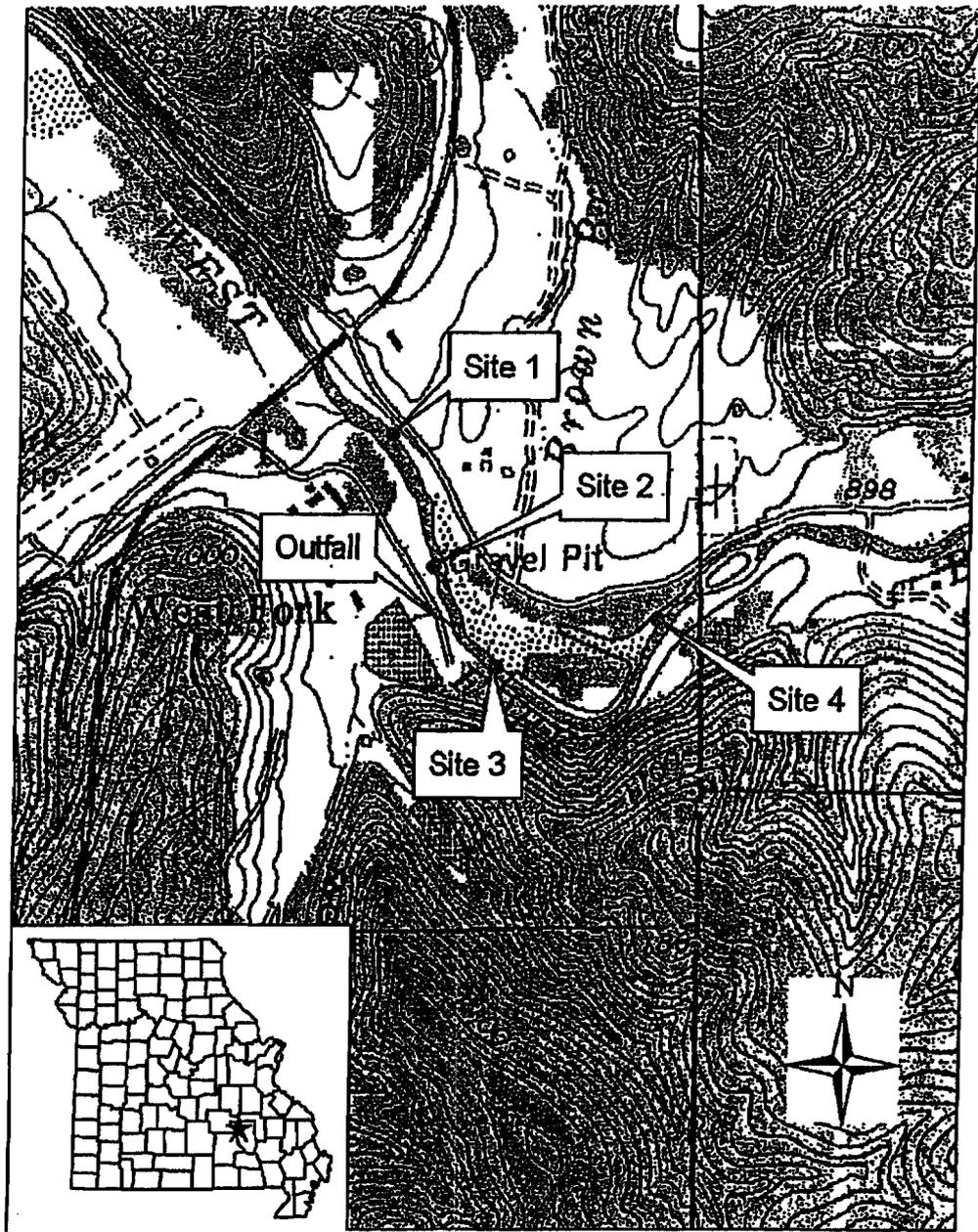
- c: Gary Gaines, Director, Southeast Regional Office
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Appendix A

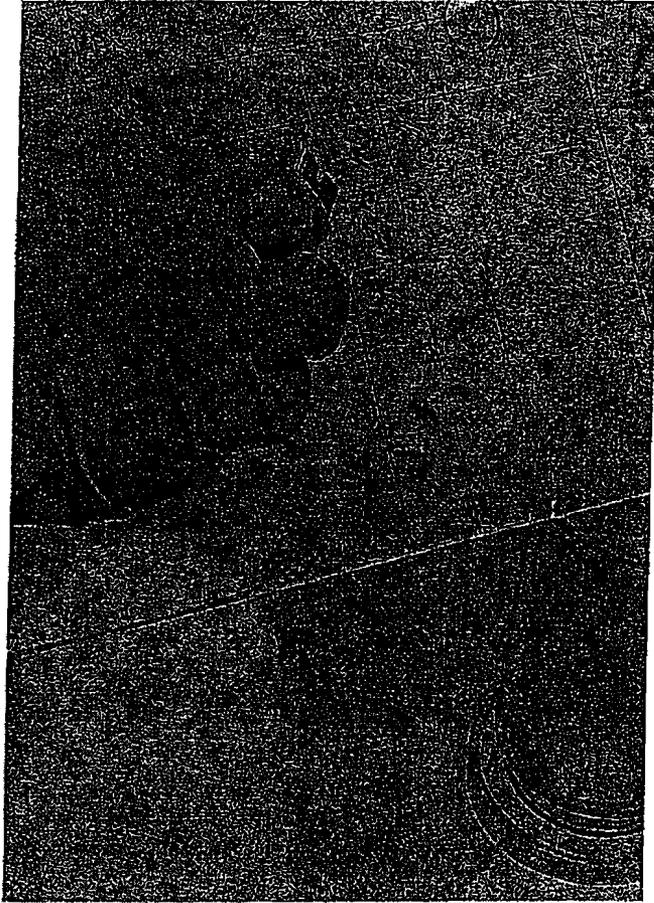
Site Map and Photos

West Fork Black River Near Doe Run West Fork Mine

Appendix A
Figure A-1
West Fork Black Nutrient and Periphyton Survey Site Map



Appendix A
Figure A-3
Periphyton (chlorophyll a) collection



Appendix B

Quarterly Water Quality Chemical and Field Data

West Fork Black River Near Doe Run West Fork Mine

Appendix B
 FY 2003 West Fork Black Quarterly Water Quality Chemical and Field Data

Site #	Sample #	Date	Time	Temp (C)	Dissolved Oxygen (mg/L)	Specific Conductivity (umhos/cm)	pH	Stream Flow (cfs)	Nitrate + Nitrite as N (mg/L)	Ammonia as N (mg/L)	Total Kjeldahl Nitrogen (mg/L)	Total Phosphorus (mg/L)
2	0226300	7/29/02	1255	26.3	9.4	388	8.25	12.9	0.12	<0.05	<0.2	<0.05
3	0226301	7/29/02	1413	26.7	9.2	452	8.40	17.1	0.09	<0.05	0.21	<0.05
2	0228863	10/3/02	1010	21.0	8.5	422	7.97	12.9	0.16	<0.05	<0.2	<0.05
3	0228864	10/3/02	1045	21.5	8.8	471	8.05	16.3	0.13	<0.05	<0.2	<0.05
2	0303950	1/28/03	1310	2.8	14.4	354	8.99	13.3	0.28	<0.05	<0.2	<0.05
3	0303951	1/28/03	1440	3.5	13.8	429	8.85	19.7	0.32	<0.05	<0.2	<0.05
2	0303986	4/23/03	1215	15.5	10.2	325	7.98	33.1	0.21	*	<0.2	<0.05
3	0303987	4/23/03	1230	15.5	10.2	361	8.21	41.2	0.22	*	<0.2	<0.05

* Not analyzed

Appendix C

Chlorophyll a Data

West Fork Black River Near Doe Run West Fork Mine

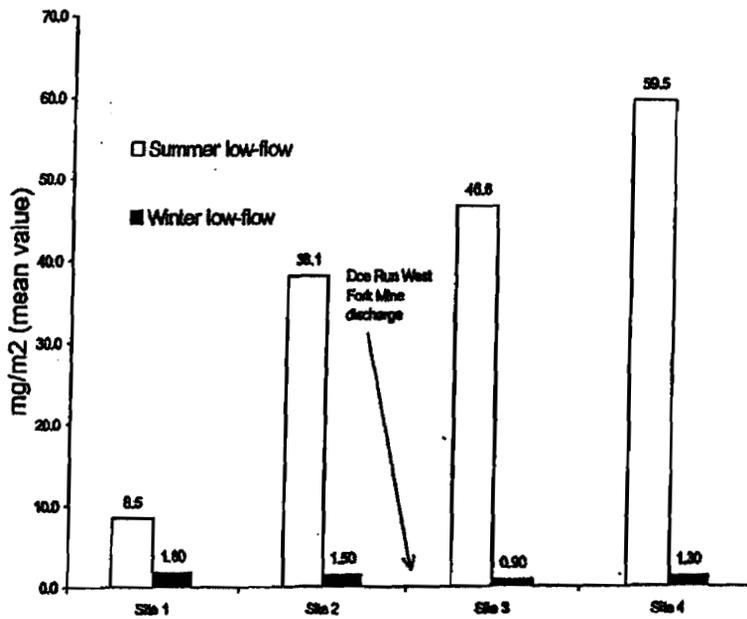
Appendix C
Figure C-1
FY 2003 West Fork Black Summer Low-Flow Chlorophyll a Results
Collected July 29, 2002
Fourteen Day Colonization Period

Site	Plate #	Sample #	Time	Result by replicate (mg/m ³)	Reported result (mg/m ³)
1	1	0226302	1045	17.8	12.3
				6.8	
1	2	0226303	1100	5.2	5.2
1	3	0226304	1105	6.1	12.6
				19.2	
1	4	0226305	1115	5.5	5.5
1	5	0226306	1120	2.8	3.9
				5.0	
2	5	0226307	1215	31.7	31.7
2	4	0226308	1225	44.0	37.2
				30.3	
2	3	0226309	1235	42.9	42.9
2	2	0226310	1240	28.2	31.4
				34.5	
2	1	0226311	1245	55.4	55.4
3	1	0226312	1415	64.3	65.7
				67.1	
3	2	0226313	1430	56.7	56.7
3	3	0226314	1435	38.8	38.8
3	4	0226315	1445	53.7	52.3
				50.8	
3	5	0226316	1455	19.2	20.5
				21.8	
4	1	0226317	1605	33.7	33.7
4	2	0226318	1615	46.0	47.0
				48.0	
4	3	0226319	1620	61.0	61.0
4	4	0226320	1625	52.1	70.7
				89.2	
4	5	0226321	1630	86.2	86.2

Appendix C
Figure C-2
FY 2003 West Fork Black Winter Low-Flow Chlorophyll a Results
Collected January 28, 2002
Twenty Day Colonization Period

Site	Plate #	Sample #	Time	Result by replicate (mg/m ³)	Reported result (mg/m ³)
1	1	0303956	1030	2.0	2.0
				1.9	
1	2	0303957	1040	0.9	1.3
				1.7	
1	3	0303958	1050	1.9	1.6
				1.3	
1	4	0303959	1115	2.2	2.4
				2.6	
2	1	0303960	1230	2.1	1.5
				0.9	
2	2	0303961	1240	3.4	3.4
2	3	0303962	1245	1.5	1.0
				0.4	
2	4	0303963	1250	0.2	0.2
2	5	0303964	1255	0.9	1.6
				2.3	
3	1	0303965	1420	0.8	1.0
				1.1	
3	2	0303966	1425	0.3	0.3
3	3	0303967	1430	1.3	0.8
				0.4	
3	4	0303968	1432	0.9	0.9
3	5	0303969	1435	1.2	1.3
				1.4	
4	1	0303970	1550	1.0	1.0
				1.0	
4	2	0303971	1555	0.9	0.9
4	3	0303972	1600	0.8	0.6
				0.5	
4	4	0303973	1602	1.2	1.2
4	5	0303974	1605	2.9	2.4
				1.8	

Appendix C
Figure C-3
FY 2003 West Fork Black Chlorophyll a Results
Overall Mean Values per Site



Appendix D

Periphyton Taxa

West Fork Black River Near Doe Run West Fork Mine

Appendix D
FY 2003 West Fork Black Periphyton Taxa

	Summer (July 29, 2002)				Winter (January 28, 2003)			
	Site 1	Site 2	Site 3	Site 4	Site 1	Site 2	Site 3	Site 4
Dominant Algal Taxa	Spirogyra	Cymbella	Fragilaria	Fragilaria	Cymbella	Mougeotia	Cymbella	Cymbella
Moderately Present Algal Taxa	Cymbella	Navicula Pithophora	Cymbella Synedra	Cymbella	Gomphonema			
Other Present Algal Taxa	Lynghia Fragilaria Oedogonium Gomphonema Coconeis Oscillatoria Cladophora Cylindrocapsa Amphitrix Calothrix Navicula Acanthes Synedra	Gomphonema Coconeis Fragilaria Spirogyra Bumilleria Scenedesmus Mougeotia Oedogonium Cosmarium Oscillatoria Gleocystis Bulbochaete Synedra	Fragilaria Oedogonium Gleocystis Navicula Scenedesmus Acanthes Mougeotia Cladophora Bulbochaete Spirogyra Coconeis Cosmarium Stigeoclonium Stephanodiscus Rhopalodia Lynghia	Navicula Mougeotia Bulbochaete Scenedesmus Gomphonema Spirotaenia Cosmarium Rhopalodia Nitzschia Acanthes Staurastrum Ceratium Pediastrum Stephanodiscus Closterium Synedra	Fragilaria Coconeis Navicula Synedra Mougeotia Meridion	Cymbella Tabellaria Meridion Gomphonema Synedra Navicula	Meridian Tabellaria Fragilaria Synedra Gomphonema Mougeotia	Closterium Fragilaria Meridian Synedra Coconeis Tabellaria Gomphonema

