



Mississippi River 2024 Cycle Assessment

WBIC	721000
Prior Cycle Status	Impaired Waters List, Category 5A
Recommended Changes	- Add Observed Effect of 'Excess Algal Growth' to Reaches 1, 3, 4, 5, and 6. - Add Observed Effect of 'Mercury Contaminated Fish Tissue' under Fish Consumption Use for all reaches but 4 (Pool 9) (clarity on fish consumption advisories, already listed for Mercury).
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Table 1. 2022 Cycle Mississippi River Assessment Units (AUs) and listings.

AU ID	Counties	AU Name	AU Length (miles)	Pollutants	Observed Effects	
892119	Pepin, Pierce	Mississippi (Reach 1) St. Croix R to Chippewa R (Pools 3- lower Pool 4, Lake Pepin)	48	Mercury, PCBs, PFOS, Sediment/Total Suspended Solids, Total Phosphorus	Impairment Unknown, PCBs Contaminated Fish Tissue, PFOS Contaminated Fish Tissue Degraded Biological Community, Degraded Submerged Aquatic Vegetation (SAV)	
892047	Buffalo, La Crosse, Pepin, Trempealeau	Mississippi (Reach 2) Chippewa River to LD 6 (lower Pool 4 to Pool 6)	49	Mercury, PCBs, PFOS, Total Phosphorus	Impairment Unknown, PCBs Contaminated Fish Tissue, PFOS Contaminated Fish Tissue	
892011	La Crosse, Trempealeau	Mississippi (Reach 3) LD 6 to MN Root River (Pool 7 to upper Pool 8)	21	Mercury, PCBs, Total Phosphorus	Impairment Unknown, PCBs Contaminated Fish Tissue	
1848773	La Crosse, Vernon	Mississippi (Reach 4) MN Root R to LD 8 (Pool 8 portion)	15			
1848750	Crawford, Vernon	Mississippi (Reach 4) LD 8 to LD 9 (Pool 9 portion)	31		Mercury, PCBs, Total Phosphorus	Impairment Unknown, Mercury Contaminated Fish Tissue, PCBs Contaminated Fish Tissue
891939	Crawford, Grant	Mississippi (Reach 4) LD 9 to Wis R (Pool 10 portion)	17			
16323	Crawford, Grant	Mississippi (Reach 5) Wisconsin River to LD 11 (mid Pool 10 to LD 12)	48			Impairment Unknown, PCBs Contaminated Fish Tissue
18638	Grant	Mississippi (Reach 6) LD 11 to Wisconsin State Line (upper Pool 12)	2			

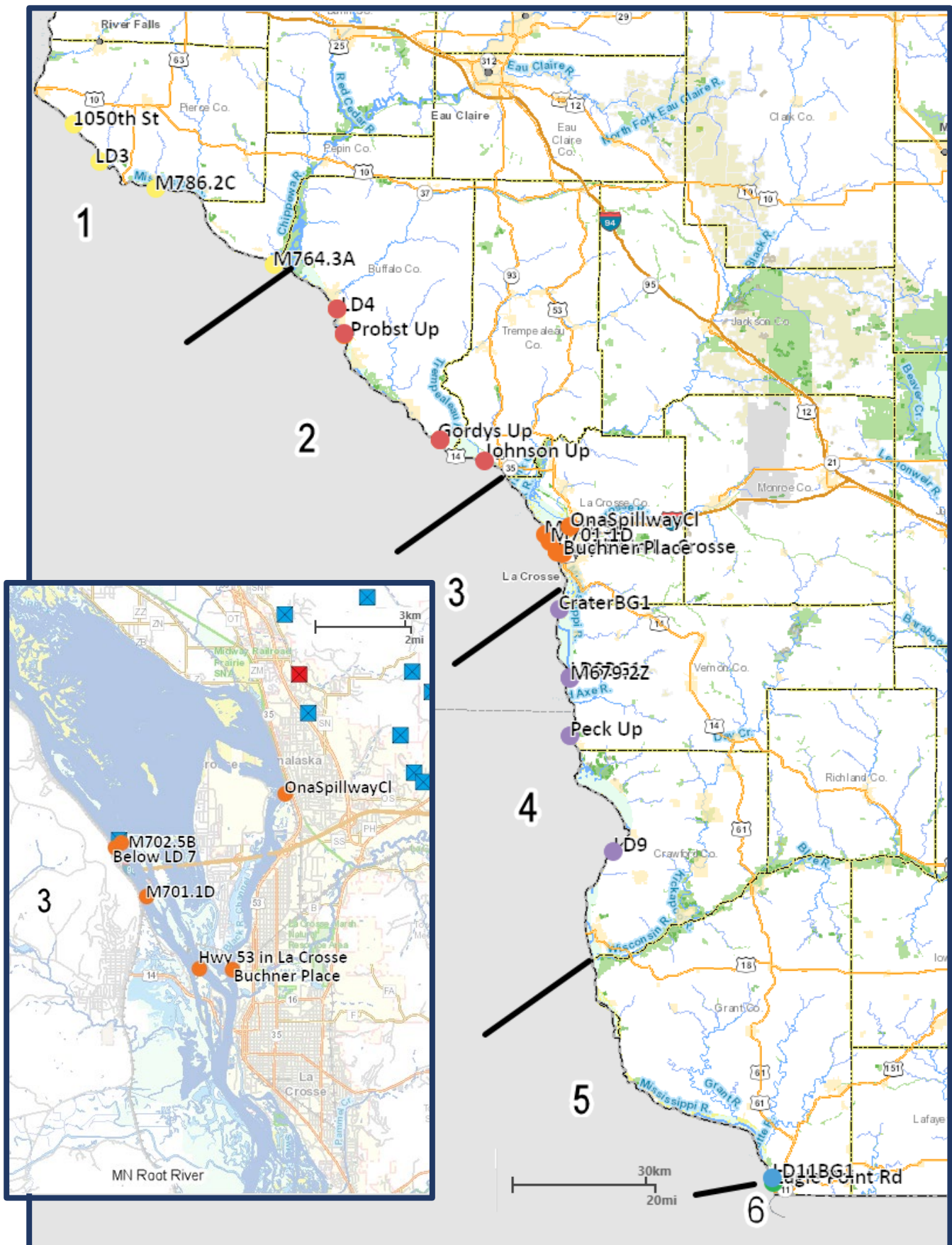


Figure 1. Map of stations along the Mississippi River, color coded by reach, with a closer view of reach 3 stations.

Total Phosphorus (Aquatic Life and Recreation Uses)

All segments of the Mississippi have Total Phosphorus (TP) identified as a pollutant. Data from the DNR, USGS-LTRM, MN PCA, and MN Metropolitan Council sampling were used to reevaluate phosphorus. This evaluation confirmed the TP levels are still above criteria. Stations with fewer than 6 samples (N) did not meet minimum data requirements but were still evaluated as supplemental information.

Table 2. Total Phosphorus assessment results by station by reach, in order of downstream flow. The TP threshold for the Mississippi is 100 ug/L.

AU Name	Station ID	Station Name/ Location	Data Source	N	Years	Median (ug/L)	LCL (ug/L)	UCL (ug/L)	Comparison to Criteria
Reach 1	UM7969	LD 3	MC	60	2013 - 2022	120	111	122	Clearly Exceeds
	10048601	LD3BG1	DNR	4	2017	125	99	197	May Exceed
	M786.2C	Above Lake Pepin	LTRM	59	2013 - 2022	126	116	127	Clearly Exceeds
	M764.3A	Below Lake Pepin				120	106	121	
Reach 2	10048602	LD4BG1	DNR	4	2017	118	104	130	Clearly Exceeds
	10054875	Probst Up		5	2021	128	94	144	May Exceed
	MNPCA-S000-096	Winona	MPCA	53	2014 - 2022	109	98	109	May Exceed
	10054878	Gordys Up	DNR	5	2021	120	86	136	May Exceed
	10053789	Johnson Up		4	2020	116	101	128	Clearly Exceeds
Reach 3	M702.5B	LD7	DNR	6	2017	95	74	108	May Exceed
	M701.1D	La Crosse	LTRM	59	2013 - 2022	119	107	119	Clearly Exceeds
Reach 4	10048603	LD8BG1	DNR	4	2017	116	92	135	May Exceed
	M679.2Z	LD 8	LTRM	58	2013 - 2022	123	118	126	Clearly Exceeds
	10054881	Peck Up	DNR	6	2021	157	119	166	
	123016	LD 9	DNR	59	2013 - 2022	122	118	126	
Reach 5	10048604	LD11BG1	DNR	5	2017	132	107	146	Clearly Exceeds
Reach 6	M556.4A	LD 12	LTRM	60	2013 - 2022	134	127	141	Clearly Exceeds

Chlorophyll-a (Recreation Use)

The large river Recreation Use chlorophyll-a criterion was approved prior to the cycle and so used for the first time in assessments. The DNR calculations were done within the SWIMS database and the LTRM data were evaluated using Excel. Based on these data, Reaches 1, 3, 4, 5, and 6 should have the observed effect of ‘Excess Algal Growth’ added to its listing details.

Table 3. Chlorophyll-a assessment results by station by reach, in order of downstream flow, with a river threshold of no greater than 30% of days at 20 ug/L of chl-a.

AU Name	Station ID	Station Name/ Location	Data Source	N	Years	Median (% Days)	LCL (% Days)	UCL (% Days)	Comparison to Criteria
Reach 1	UM7969	LD 3	MC	30	2013 - 2022	86	76	93	Clearly Exceeds
	10048601	LD3BG1	DNR	3	2017	57	22	87	May Exceed
	M786.2C	Above Lake Pepin	LTRM	30	2013 - 2022	12	6	21	Clearly Meets
	M764.3A	Below Lake Pepin				31	42	54	Clearly Exceeds
Reach 2	10048602	LD4BG1	DNR	3	2017	46	14	80	May Exceed
	10054875	Probst Up			2021	20	2	62	May Meet
	MNPCA-S000-096	Winona	MPCA		2016	55	21	86	May Exceed
	10054878	Gordys Up	DNR		2021	26	4	67	May Meet
	10053789	Johnson Up			2020	44	13	79	May Exceed
Reach 3	M702.5B	LD7	DNR	3	2017	59	23	88	May Exceed
	323131	Below LD 7	DNR	14	2018 - 2022	48	32	66	Clearly Exceeds
	M701.1D	La Crosse	LTRM	30	2013 - 2022	71	47	88	
Reach 4	10048603	LD8BG1	DNR	3	2017	86	43	99	Clearly Exceeds
	M679.2Z	LD 8	LTRM	30	2013 - 2022	11	19	30	May Meet
	10054881	Peck Up	DNR	3	2021	45	14	79	May Exceed
	123016	LD 9	DNR	14	2018 - 2022	1	0	5	Clearly Meets
Reach 5	10048604	LD11BG1	DNR	3	2017	71	31	95	Clearly Exceeds
Reach 6	M556.4A	LD 12	LTRM	24	2013 - 2022	53	39	66	Clearly Exceeds

E. coli (Recreation Use)

The data for reaches 1, 2, and 3 were assessed against Recreation criteria for *E. coli* and no exceedances were found.

Table 4. *E. coli* general assessment for reach 2 at Winona and reach 4 at Lock & Dam 9.

AU Name	Station ID	Station Name/ Location	Data Source	N	Years	90-day Rolling Periods (Count)	Geomean Exceeds (Count)	STV Exceeds (%)	Comparison to Criteria
Reach 1	UM7969	LD 3	MC	253	2013 - 2022	20	0	0	Attains
Reach 2	MNPCA-S000-096	Winona	MPCA	10	2016	2	0	NA	Attains
Reach 4	123016	LD 9	DNR	26	2018 - 2022	9	0	NA	Attains

Chloride (Aquatic Life Use)

Where available, all chloride samples were below both chronic and acute criteria.

Table 5. Chloride assessments by station within each reach of the Mississippi.

AU Name	Station ID	Station Name/ Location	Data Source	N	Years	Exceeds Chronic (Count)	Exceeds Acute (Count)	Comparison to Criteria
Reach 1	UM7969	LD 3	MC	417	2013 - 2022	0	0	Attains
	M786.2C	Above Lake Pepin	LTRM	40	2020 - 2022	0	0	Attains
	M764.3A	Below Lake Pepin						
Reach 2	MNPCA-S000-096	Winona	MPCA	17	2016 - 2017	0	0	Attains
Reach 3	M701.1D	La Crosse	LTRM	40	2020 - 2022	0	0	Attains
	10053802	La Crosse at Buchner Place	DNR	6	2020 - 2021			
	10053811	OnaSpillwayCl						
Reach 4	M679.2Z	LD 8	LTRM	40	2020 - 2022	0	0	Attains
	123016	LD 9	DNR	114	2013 - 2022			
Reach 6	M556.4A	LD 12	LTRM	38	2020 - 2022	0	0	Attains

pH (Aquatic Life Use)

For pH an exceedance is a value outside the range of 6.0 – 9.0; when 10% of seasonal samples exceed the set range, then the AU is considered impaired for pH. Reaches 1, 3, 4 (Pool 10), and 6 had few to no exceedances over the course of 10 years; these reaches attain pH standards.

Table 6. Evaluation of pH data by station within each reach.

AU Name	Station ID	Station Name/ Location	Data Source	N	Years	Exceeds (Count)	Highest Seasonal % Exceeding	Comparison to Criteria
Reach 1	UM7969	LD 3	MC	420	2013 - 2022	0	0%	Attains
	M786.2C	Above Lake Pepin	LTRM	155	2013 - 2022	0		
	M764.3A	Below Lake Pepin				2	6%	
Reach 2	MNPCA-S000-096	Winona	MPCA	46	2013 - 2022	0	0%	Attains
Reach 3	M701.1D	La Crosse	LTRM	156	2013 - 2022	1	6%	Attains
Reach 4	M679.2Z	LD 8	LTRM	154	2013 - 2022	0	0%	Attains
	123016	LD 9	DNR	116				
Reach 6	M556.4A	LD 12	LTRM	138	2013 - 2022	1	7%	Attains

Fish Indices (Aquatic Life Use)

Based off of the most recent USGS Mississippi River status and trend report the diversity of fish species is high in Pool 8 (<https://pubs.usgs.gov/of/2022/1039/ofr20221039.pdf>). According to the report, “the fish community has remained faunistically intact over the period of observation by LTRM”, which includes 1993 – 2019. Based on this information the fish community attains narrative criteria for Aquatic Life Use.

Fish Consumption Advisories (Fish Consumption Use)

The entire Mississippi River has fish consumption advisories (FCAs) for Mercury and PCBs. While all segments are listed for Mercury, the Observed Effects did not match the methodology used for FCAs. The Observed Effect ‘Mercury Contaminated Fish Tissue’ was added to all segments where it was missing.

Temperature (Aquatic Life Use - General Assessment)

There is insufficient temperature data (not continuous or 20 daily values within a calendar month) to do a full assessment according to WisCALM protocols. Available from USGS and DNR sampling are discrete temperature values across the calendar years. These values were compared to the Mississippi River temperature criteria as a general assessment. No exceedances were found, suggesting temperature is attaining standards.

Table 7. General temperature assessments by station within reaches of the Mississippi. The Mississippi River has specific month-temperature thresholds.

AU Name	Station ID	Station Name/ Location	Data Source	N	Years	Exceeds (Count)	Comparison to Criteria
Reach 1	UM7969	LD 3	MC	420	2013 - 2022	0	Attains
	M786.2C	Above Lake Pepin	LTRM	155	2013 - 2022	0	Attains
	M764.3A	Below Lake Pepin					
Reach 2	MNPCA-S000-096	Winona	MPCA	45	2013 - 2022	0	Attains
Reach 3	M701.1D	La Crosse	LTRM	156	2013 - 2022	0	Attains
Reach 4	M679.2Z	LD 8	LTRM	154	2013 - 2022	0	Attains
	123016	LD 9	DNR	119			
Reach 6	M556.4A	LD 12	LTRM	138	2013 - 2022	0	Attains

Mercury (Wildlife Use)

New water column mercury samples confirmed the listings on reaches 1 and 2.

Table 10. Evaluation of water column mercury data in reaches 1 and 2 of the Mississippi.

AU Name	Station ID	Station Name/ Location	Data Source	N	Years	Exceedance Count	Comparison to Criteria
Reach 1	483027	LD 3	DNR	18	2018 - 2022	11	Not Attained
	UM7969	LD 3	MC	47	2013 - 2022	40	
Reach 2	63029	LD 4	DNR	17	2018 - 2022	11	Not Attained
	MNPCA-S000-096	Winona	MPCA	18	2016 - 2021	14	

Microcystin (Public Health & Welfare Use)

Available data from 2014, 2017, and 2019 were evaluated against the Public Health and Welfare (PHW) use threshold for microcystin; no exceedances were found. All reaches are attaining PHW use.

Table 8. Evaluation of the single station with recent microcystin data in reach 2 of the Mississippi.

AU Name	Station ID	Station Name/ Location	Data Source	N	Years	Exceedance Count	Comparison to Criteria
Reach 1	10042217	1050th St near Diamond Bluff WI	DNR	4	2014, 2019	0	Attains
	10048601	LD3BG1		5	2017		
	10048611	M786.2C (Pepin)		7			
	10048612	M764.3A					
Reach 2	10048602	LD4BG1	DNR	5	2017	0	Attains
Reach 3	10048613	M702.5B	DNR	7	2017	0	Attains
	10042208	Hwy 53 in La Crosse		2	2014, 2019		
Reach 4	10048603	LD8BG1	DNR	5	2017	0	Attains
	10048600	CraterBG1					
	10048614	M679.2Z					
Reach 5	10048604	LD11BG1	DNR	5	2017	0	Attains
Reach 6	10042195	Eagle Point Rd	DNR	2	2014, 2019	0	Attains

Cylindrospermopsin (Public Health & Welfare Use)

Data from 2017 and 2019 were evaluated against the Public Health and Welfare use threshold for cylindrospermopsin; no exceedances were found. All reaches are attaining PHW use.

Table 9. Evaluation of cylindrospermopsin levels by station and reach. No exceedances were found.

AU Name	Station ID	Station Name/ Location	Data Source	N	Years	Exceedance Count	Comparison to Criteria
Reach 1	10042217	1050th St near Diamond Bluff WI	DNR	2	2019	0	Attains
	10048601	LD3BG1		5	2017		
	10048611	M786.2C (Pepin)		7	2017		
	10048612	M764.3A			2017		
Reach 2	10048602	LD4BG1	DNR	5	2017	0	Attains
Reach 3	10048613	M702.5B	DNR	7	2017	0	Attains
	10042208	Hwy 53 in La Crosse		1	2019		
Reach 4	10048603	LD8BG1	DNR	5	2017	0	Attains
	10048614	M679.2Z		7	2017		
Reach 5	10048604	LD11BG1	DNR	5	2017	0	Attains
Reach 6	10042195	Eagle Point Rd	DNR	1	2019	0	Attains

Assessment Determination

Phosphorus data confirmed the standing TP listings for the Mississippi River. New thresholds for chlorophyll-a were used; based on the available data an Observed Effect of “Excess Algal Growth” under Recreation Use should be added to the AUs for reaches 1, 3, 4, 5, and 6. For listing consistency the Observed Effect “Mercury Contaminated Fish Tissue” is recommended for all reaches but 4 as that AU already has this identified.

Table 11. Summary of parameter results by reach with labels for the uses: Aquatic Life (AL), Recreation (REC), Public Health & Welfare (PHW), Wildlife (WL). Grey indicates the reach was not assessed for that parameter.

	AL & REC	REC		AL				PHW	WL		
AU	TP	Chl-a	<i>E. coli</i>	Fish	Chloride	pH	Temp.	Microcystin & Cylindro.	Mercury		
Reach 1	Not Attained	Not Attained	Attained	Grey	Attained	Attained	Attained	Attained	Not Attained		
Reach 2		Attained									
Reach 3		Not Attained	Grey								
Reach 4			Attained							Attained	
Reach 5			Grey							Grey	Grey
Reach 6			Attained							Attained	Attained

Table 12. Summary of use support with new and existing listing details.

	Uses				
AU	Aquatic Life	Recreation	Public Health & Welfare	Fish Consumption	Wildlife
Reach 1	Not Supporting (TP)	Not Supporting (TP, Algae)	Supporting	Not Supporting (Mercury, PCBs, PFOS, PFOA)	Not Supporting (Mercury)
Reach 2		Not Supporting (TP)			
Reach 3		Not Supporting (TP, Algae)		Not Supporting (TP, Algae)	
Reach 4					
Reach 5					
Reach 6					

Table 13. 2024 Cycle Mississippi River Assessment Units (AUs) and listings. Teal highlight indicates an addition.

AU ID	Counties	AU Name	AU Length (miles)	Pollutants	Observed Effects
892119	Pepin, Pierce	Mississippi (Reach 1) St. Croix R to Chippewa R (Pools 3- lower Pool 4, Lake Pepin)	48	Mercury, PCBs, PFOS, Sediment/Total Suspended Solids, Total Phosphorus	Degraded Biological Community, Degraded Submerged Aquatic Vegetation (SAV), Impairment Unknown, PCBs Contaminated Fish Tissue, PFOS Contaminated Fish Tissue, Mercury Contaminated Fish Tissue, Excess Algal Growth
892047	Buffalo, La Crosse, Pepin, Trempealeau	Mississippi (Reach 2) Chippewa River to LD 6 (lower Pool 4 to Pool 6)	49	Mercury, PCBs, PFOS, Total Phosphorus	Impairment Unknown, PCBs Contaminated Fish Tissue, PFOS Contaminated Fish Tissue, Mercury Contaminated Fish Tissue
892011	La Crosse, Trempealeau	Mississippi (Reach 3) LD 6 to Root River (Pool 7 to upper Pool 8)	21	Mercury, PCBs, Total Phosphorus	Impairment Unknown, PCBs Contaminated Fish Tissue, Excess Algal Growth, Mercury Contaminated Fish Tissue
891939 Formerly: 1848773, 1848750, & 891939	La Crosse, Vernon, Crawford, Grant	Mississippi (Reach 4) Root R to Wis R (Pool 8 to Pool 10)	63		Impairment Unknown, Mercury Contaminated Fish Tissue, PCBs Contaminated Fish Tissue, Excess Algal Growth
16323	Crawford, Grant	Mississippi (Reach 5) Wisconsin River to LD 11 (mid Pool 10 to LD 12)	48		Impairment Unknown, PCBs Contaminated Fish Tissue, Mercury Contaminated Fish Tissue
18638	Grant	Mississippi (Reach 6) LD 11 to Wisconsin State Line (upper Pool 12)	2		Impairment Unknown, PCBs Contaminated Fish Tissue, Mercury Contaminated Fish Tissue, Excess Algal Growth