

Missouri Department of Natural Resources

Total Maximum Daily Load Information Sheet

East Brush Creek

Water Body Segment at a Glance:

County: Moniteau
Nearby Cities: California
Length of impairment: 1.0 miles
Pollutant: Nutrients, Biochemical Oxygen Demand (BOD), Volatile Suspended Solids (VSS)
Source: California North Wastewater Treatment Plant (WWTP)



State map showing location of watershed

TMDL Priority Ranking: Permit in lieu of a TMDL approved 2006

Description of the Problem

Beneficial uses of East Brush Creek

- Livestock and Wildlife Watering
- Protection of Warm Water Aquatic Life
- Human Health Protection (Fish Consumption)

Use that is impaired

- Protection of Warm Water Aquatic Life

Standards that apply

- The Missouri Water Quality Standard, found in 10 CSR 20-7.031 Table A, for dissolved oxygen (related to Biochemical Oxygen Demand, or BOD) in streams is 5.0 mg/L (milligrams per liter or parts per million).
- Standards for Volatile Suspended Solids (VSS) may be found in the general criteria section of the Water Quality Standards, 10 CSR 20-7.031(3)(A) and (C) where it states:
 - Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses.
 - Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses.
- Currently there are no numeric standards for nutrients, so the general criteria apply as above.

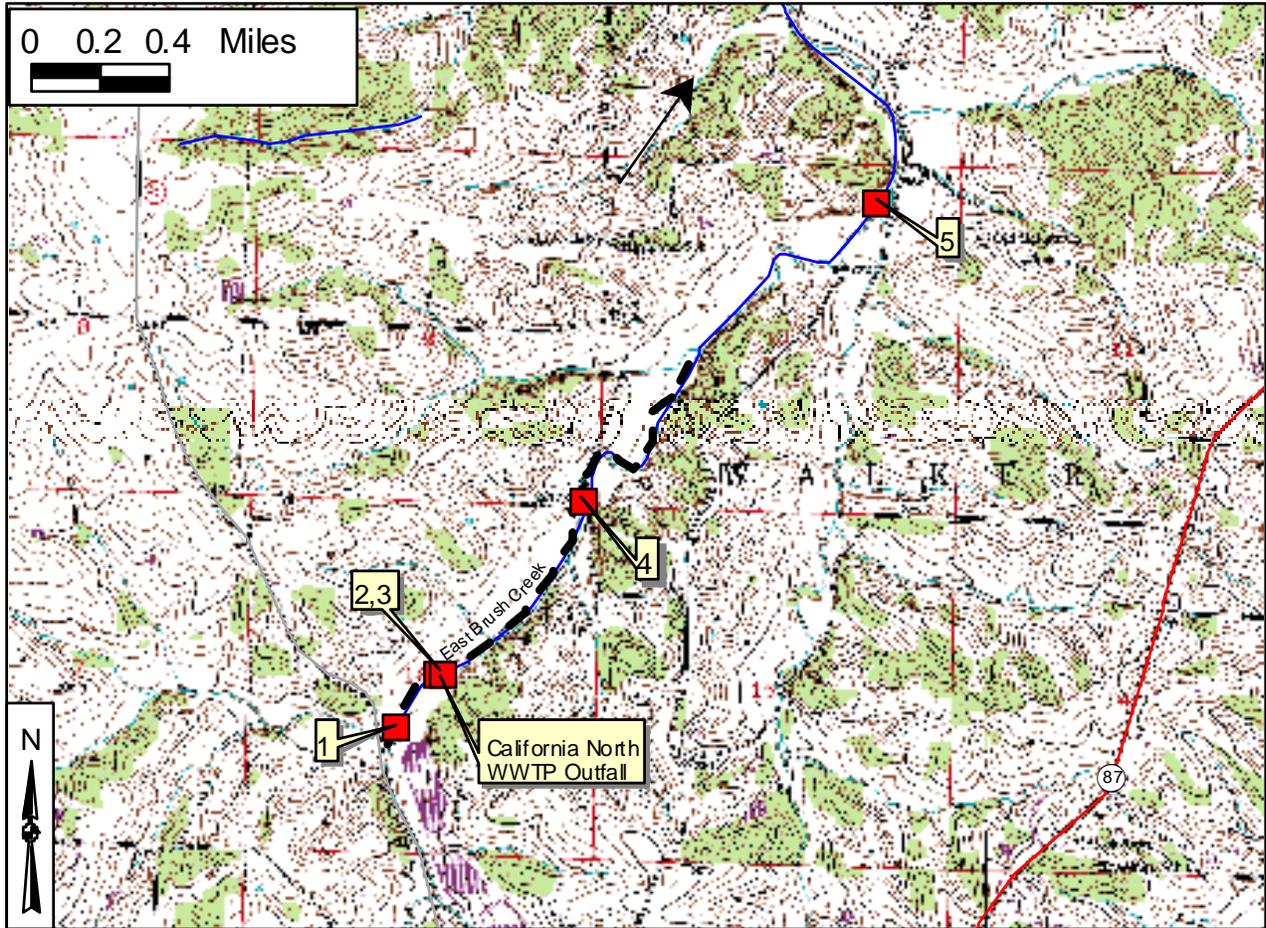
Background Information

The dissolved oxygen in this stream is very low at the treatment plant outfall. The stream also shows excessive algae growth downstream from the California North Wastewater Treatment Plant (WWTP) lagoon. VSS identifies the organic portion of suspended solids (algae or sludge). VSS can be caused by nutrients (nitrates and phosphates) and sunlight on the lagoon promoting algal growth. In addition, blue-green algae (cyanobacteria) can fix nitrogen from the atmosphere and deposit it into the lagoon. Many aquatic organisms (macroinvertebrates and fish) require high levels of dissolved oxygen to survive. These organisms are robbed of dissolved oxygen when it is used to decompose excess algae.

Like all wastewater discharges in Missouri, the California North WWTP lagoon must meet the requirements of a discharge permit issued by Missouri Department of Natural Resources. Water quality studies conducted in 2004 and 2005 show that East Brush Creek is not meeting water quality standards for dissolved oxygen (DO). During low flow conditions, such as in the September 2004 data listed below, when the lagoon is not discharging, the stream can meet the standards for VSS. However, during the period when the treatment plant is discharging from the lagoon, such as in the June 2005 data, VSS is very high. The department revised the City of California's discharge permit to provide better protection of the stream. The city must construct improvements to the wastewater system that will be able to meet the revised effluent limits and improve the water quality of East Brush Creek. The department submitted California North's revised permit in lieu (PIL) of a TMDL. The Environmental Protection Agency (EPA) approved this PIL December 11, 2006.

A map of the stream segment and sampling sites, as well as the water quality data from 2004-2005, is included below.

Impaired Portion of East Brush Creek, Moniteau County, Missouri



--- Impaired Segment → Direction of flow

Sample Site Locations

- 1 – E. Brush Cr. Tributary NW of lagoon
- 2 – E. Brush Cr. above outfall
- 3 – E. Brush Cr. below outfall
- 4 – E. Brush Cr. at Old Swiss Road
- 5 – E. Brush Cr. at Side Road Crossing

Water Quality Data for East Brush Creek

Site Name	Yr	Mo	Dy	Time	Flow	C	DO	NO3N	TP	NH3N	CBOD	TSS	VSS	ChlA	
E. Brush Cr. bl. Trib. NW of lagoon	2004	9	9	1250		19.6	10.8	0.01	0.07	0.01499	2.05	5	2.5	0.8	
E. Brush Cr. bl. Trib. NW of lagoon	2004	9	10	625	0.04	15.3	6.6	0.01	0.09	0.01499	2.08				
E. Brush Cr. just below California N. outfall	2004	9	9	1320		18	2.7	0.12	0.1	0.03	0.99	5	2.5	0.3	
E. Brush Cr. just below California N. outfall	2004	9	10	650	0.02	16.2	1.8	0.08	0.11	0.15	0.99				
E. Brush Cr. at Old Swiss Rd.	2004	9	9	1400		20.7	8	0.1	0.12	0.01499	0.99	2.5			
E. Brush Cr. at Old Swiss Rd.	2004	9	10	725	0.06	15.9	6	0.1	0.1	0.01499	0.99				
E. Brush Cr. at side road crossing below Trib.	2004	9	9	1420		23.4	8.8	0.05	0.12	0.01499	0.99	9	2.5		
E. Brush Cr. at side road crossing below Trib.	2004	9	10	740	0.08	16	5.3	0.04	0.11	0.01499	0.99				
Mean Data East Brush Creek	2004					0.1	18.1	6.3	0.06	0.1	0.034	1.259	5.4	2.5	0.6
WQ STANDARDS						32	5			2.5*					
units in mg/L and cfs															
Site Name	Yr	Mo	Dy	Time	Flow	C	DO	NO3N	TP	NH3N	CBOD	TSS	VSS	ChlA	
E. Brush Cr. Above Outfall	2005	6	24	635		25.3	0.5	0.02	0.05	0.01499					
E. Brush Cr. Below Outfall	2005	6	24	640		25.7	2.2	0.02	1.18	1.79					
E. Brush Cr. at Old Swiss Rd.	2005	6	24	715		22.7	2.7	0.12	0.96	2.12					
E. Brush Cr. at side road crossing.	2005	6	24	730		23.4	4.4	0.14	0.24	0.01499					
E. Brush Cr. At side road crossing	2005	6	24	1500	0.3	29.6	9.8	0.13	0.28	0.01499					
E. Brush Cr. at Old Swiss Rd.	2005	6	24	1520	0.3	27.8	7	0.54	0.98	1.3		12	2.5		
E. Brush Cr. Above Outfall	2005	6	24	1550		37.5	4	0.001	0.29	0.01499		36	26		
E. Brush Cr. Below Outfall.	2005	6	24	1555	0.3	32.1	1.8	0.07	0.88	1.29		16	7		
E. Brush Cr. Above Outfall.	2005	6	29	625		25.1	1.4	0.02	0.1	0.01499	0.99	98	63		
E. Brush Cr. Below Outfall	2005	6	29	635		27.4	3.1	0.07	0.88	0.54	10.1				
E. Brush Cr. at Old Swiss Rd.	2005	6	29	700		23.9	2.9	0.14	0.78	0.55	5.5				
E. Brush Cr. At side road crossing	2005	6	29	715		24	4	0.17	0.26	0.01499	0.99				
E. Brush Cr. At side road crossing	2005	6	29	1255	0.4	28.1	8.8	0.16	0.25	0.01499	0.99	7	2.5		
E. Brush Cr. at Old Swiss Rd.	2005	6	29	1315	0.3	28.2	9.4	0.05	0.98	0.27	6.76	32	23		
E. Brush Cr. Below Outfall	2005	6	29	1350	0.4	31.8	2.7	0.05	0.92	0.39	13.2	86	56	181	
E. Brush Cr. Above Outfall	2005	6	29	1400	0	33.4	16.6	0.01	0.07	0.01499	2.11	9	2.5	12.1	
Mean Data East Brush Creek	2005					0.3	27.9	7.3	0.11	0.6	0.523	5.08	37	23	97
WQ STANDARDS						32	5			1.1*					
units in mg/L and cfs															

Source: Department of Natural Resources

*Ammonia is pH and temperature dependent; cfs = cubic feet per second

There are no nutrient WQ standards

For more information call or write:

Missouri Department of Natural Resources

Water Protection Program

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