

## Marengo River Bacteria Sampling and Listing Recommendations

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Bacteriological monitoring of the Marengo River and tributaries by the Bad River Watershed Association and the Bad River Natural Resource Dept. has shown high levels of *E. coli* are often present, especially during runoff events. Since 2007, BRWA has sampled *E. coli* on 162 sampling events across 20 locations in the Marengo River watershed. *E. coli* levels exceeded 126 colonies/100 ml on 70 occasions at 12 of those sites. *E. coli* levels exceeded 1000 colonies on 15 occasions at 7 of those sites.

The objective of this project was to conduct additional bacteria monitoring consistent with NR 102 to determine if water quality standards are being exceeded, and if so, to consider adding a section(s) of the river to the 303d list of impaired waters. WDNR sampled three locations (four sites) on the Marengo River and its tributaries. Samples were tested for both fecal coliforms and *E. coli* to provide data for the existing fecal coliform based criteria, and potential future use of *E. coli* as criteria in lotic systems. Sampling results and listing recommendations are provided for each site below.

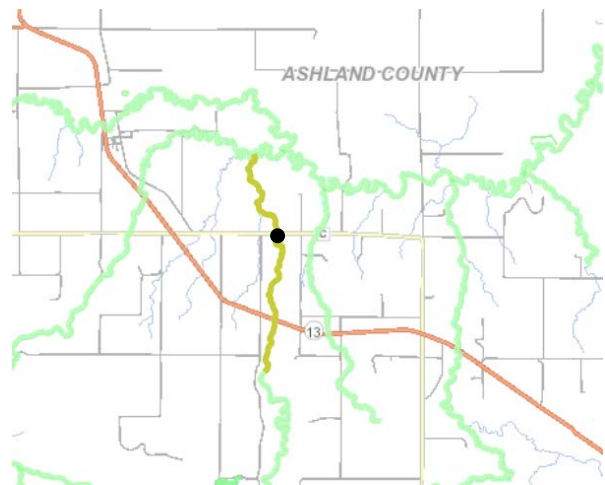
### Trout Brook

Trout Brook (WBIC 2913900) at County Hwy C (Station ID 10022077) was sampled 5 times in May and 5 times during a one month period in later July/early August (Table 1). The 400 CFU/100 ml threshold for listing was exceeded on August 6, 2015. This sampling site (black dot in the map below, Figure 1) represents the lower reaches of Trout Brook, in Assessment Unit 17721 that is recommended for listing.

Table 1. Trout Brook bacteria sampling results, 2015.

Sample Date	Fecal coliform CFU/100 ml	<i>E. coli</i> CFU/100 ml
05/06/2015	160	125
05/07/2015	70	47
05/20/2015	50	22
05/27/2015	90	96
05/28/2015	50	32
07/23/2015	140	225
07/27/2015	140	130
08/03/2015	330	435
08/06/2015	<b>670</b>	579
08/10/2015	170	411

Figure 1. Assessment Unit 17721 and sampling site 10022077 in lower Trout Brook.



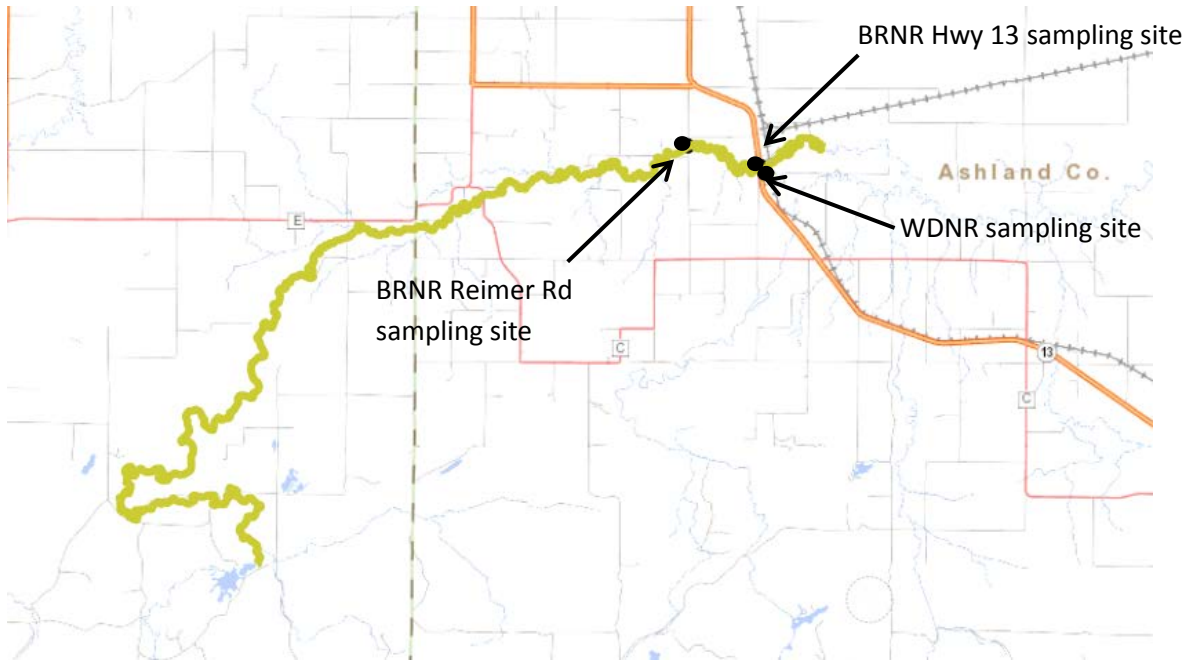
## Marengo River

The Marengo River downstream of Highway 13 was sampled by WDNR staff 5 times in May and 5 times during a one month period in later July/early August (Table 1). The Marengo River was also sampled at Hwy 13 (just upstream of the WDNR's sampling site) and Reimer Road (an additional 2 miles upstream) by Bad River Natural Resources (BRNR) staff in 2013 and 2014. BRNR data is collected in accordance with their EPA-approved Surface Water Monitoring QAPP (the most recent version of this QAPP was approved in March 2014). Water samples are analyzed in the Tribal laboratory utilizing the Coliscan method to analyze water samples collected from rivers for fecal coliform and E. coli. BRNR samples monthly during open water and typically conduct one winter sampling event. The BRNR April 2014 data represents a sampling event associated with snowmelt. Results from both agencies sampling are presented in Table 2. The 400 CFU fecal coliform criteria was exceeded on 9 sampling events. AU 17712 is recommended for listing.

Table 2. Marengo River bacteria sampling by WDNR and BRNR 2013-2015.

Sampling Date	Fecal coliform CFU / 100ml	E. coli CFU / 100 ml
<b>Downstream Hwy 13 ID 10043557</b>		
05/06/2015	60	49
05/07/2015	100	63
05/20/2015	70	45
05/27/2015	<b>510</b>	299
05/28/2015	60	196
07/23/2015	140	162
07/27/2015	160	167
08/03/2015	70	82
08/06/2015	30	78
08/10/2015	50	91
<b>BRNR Hwy 13 Station ID 10033482</b>		
10/03/2013	<b>600</b>	340
10/03/2013	<b>600</b>	340
10/03/2013	<b>1440</b>	1120
01/23/2014	0	0
04/23/2014	0	0
06/03/2014	<b>880</b>	880
07/02/2014	100	80
08/08/2014	40	0
09/04/2014	<b>440</b>	240
<b>BRNR Reimer Rd. Station ID 10012278</b>		
10/07/2013	<b>500</b>	410
01/22/2014	20	20
04/23/2014	0	0
06/03/2014	<b>620</b>	390
07/02/2014	300	60
08/08/2014	240	80
09/04/2014	<b>440</b>	240

Figure 2. WDNR and BRNR bacteria monitoring sites on the mainstem Marengo River and Assessment Unit 17712.



### Unnamed Marengo River Tributaries

Two unnamed tributaries to the Marengo River near Four Corners Road were sampled in 2015. Unnamed tributary WBIC 2919600 was sampled at Station ID 10043556 5 times in May. The 1 sample in 5 during one month that exceeds 400 CFU/ml fecal coliform criteria was exceeded on May 6, 2015. An Assessment Unit needs to be created for the stream segment on unnamed tributary with WBIC 2919600 as noted in red in the map below (Figure 3). This segment is recommended for listing. Unnamed tributary WBIC 2919700 was sampled at station ID 10043805 5 times during the one month period from the end of July to mid-August. Neither the 400 CFU/10 ml criteria or the geometric mean of 200 CFU/100 ml criteria were exceeded for this site (Table 3). This segment is not recommended for listing.

Table 3. Bacteria sampling results for two unnamed tributaries to the Marengo River, 2015.

Sampling Date	Fecal coliform CFU / 100ml	E. coli CFU / 100 ml
Unnamed Trib 2919600      Station ID 10043805		
05/06/2015	<b>410</b>	387
05/07/2015	180	161
05/20/2015	10	43
05/27/2015	370	579
05/28/2015	190	166
Unnamed Trib 2919700      Station ID 10043805		
07/23/2015	60	131
07/27/2015	140	185
08/03/2015	280	435
08/06/2015	110	214
08/10/2015	60	111

Figure 3. Monitoring locations and needed assessment unit on two unnamed tributaries to the Marengo River.

