

2016 Impaired Waters Documentation Sheet

Author:		Date Prepared:	
Waterbody Name:		Segment:	
WADRS ID:	WBIC:	Use i-SWDV (CTRL + Click) to find ID numbers	

Choose from the following to indicate what you are recommending:

Proposed new **impaired water** listing
 Proposed change to **DRAFT list**

Proposed new **watch water** listing

Proposed changes for water already on 303(d) list (check type of change below) → TMDL ID #: _____

Proposed change to existing list (new pollutants, impairments, mileages, etc.)

Proposed for de-listing

General 303(d) documentation for water already on list

Description of waterbody segment

Start Mile:	Detail (describe segment using road crossings, convergence with other waterbodies, etc.):
End Mile:	
Total miles:	
Lake Acres:	

Use Designation Categories	List use designation & data source for each category.
Current (Existing) Fish & Aquatic Life Use:	
Attainable (Potential) Fish & Aquatic Life Use:	
Designated (Codified) Fish & Aquatic Life Use:	

Is it supporting its FAL Attainable Use? Fully Supporting Not Supporting Not Assessed

Is it supporting its Recreational Use? Fully Supporting Not Supporting Not Assessed

Does a *Specific* Fish Consumption Advisory Exist? Yes No Don't know

If so, what is the specific advisory:

Pollutants & Impairments

Pollutants: (Place an X next to all pollutants that you are recommending for listing or de-listing, or "watch water" monitoring needs.)

Phosphorus	Sediment	Bacteria	PAHs	PCBs
NH ₃ (Ammonia)	Thermal	Hg	Creosote	Metals
Unknown	Other Pollutants:			

Impairments: (Place an X next to all impairments that you are recommending for listing, de-listing, or "watch water" monitoring needs.)

Degraded Habitat	Eutrophication	Temperature
Contaminated Fish Tissue	Chronic Toxicity	Aquatic Toxicity
Unknown	Degraded Biological Community	

Specific causes of impairment: (Describe to the best of your ability what you think is contributing to the impairment.)

Information is based on:

Monitoring data collected on/after January 1, 2003? YES NO

If 'NO' then provide justification for using data from the long term record:

Monitoring & Listing Data

Monitoring Study, Date, Results. List water quality exceedances indicating magnitude, duration and frequency (attach additional sheets, if needed).

Monitoring Studies:

Exceedances:

Stations:

Parameters:

Database where data is stored (Fish Database, SWIMS, FishSED, Personal PC):

Narrative on why you are proposing this waterbody to be listed or de-listed?

List and attach any additional reports, updated watershed tables, analyses etc. including use designation survey.

- 1.
- 2.
- 3.
- 4.

Otter Creek

WBIC = 923300

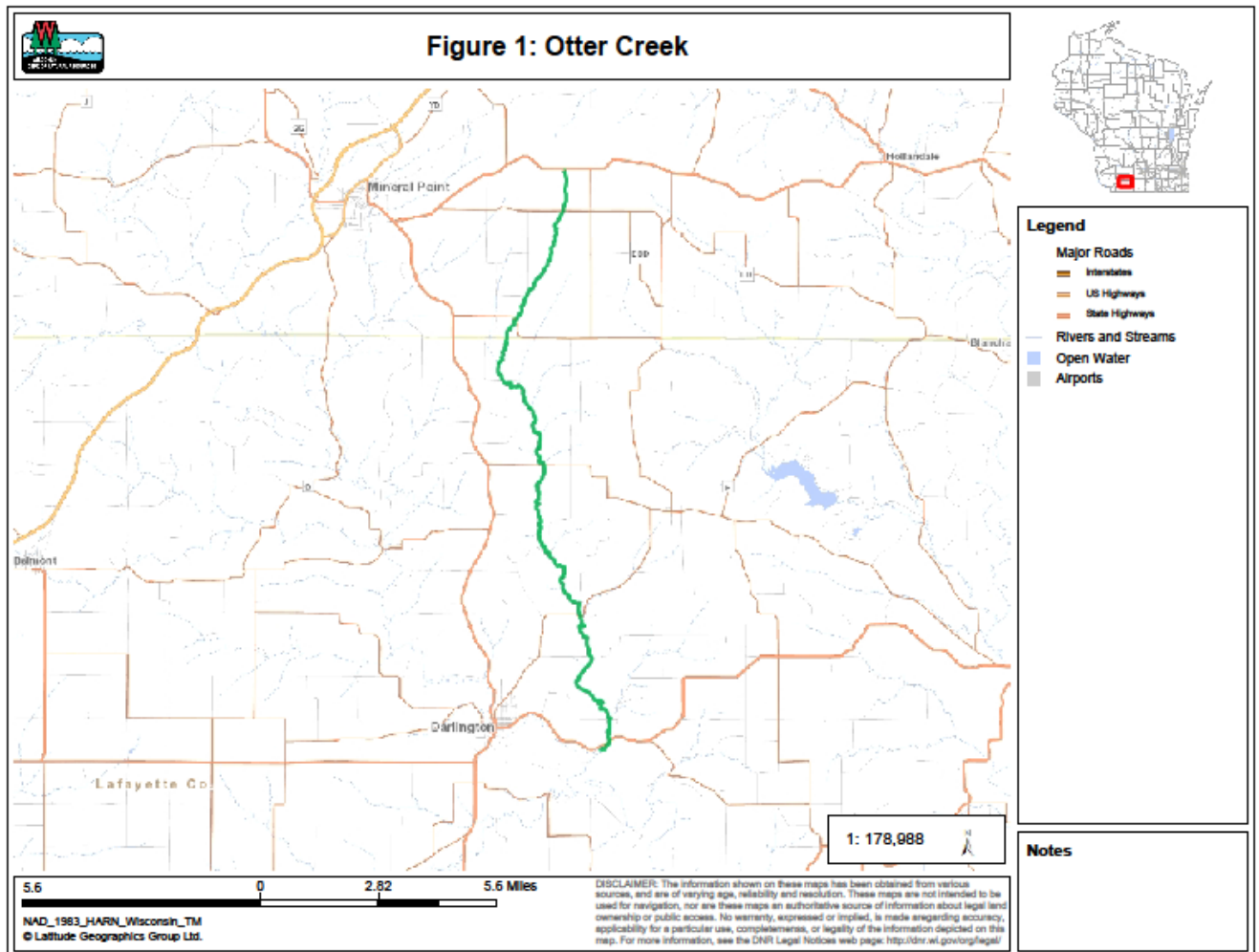
Lafayette County



An assessment of the health of the stream following periodic fish kills
And a proposal for addition to the State's 303(d) list of impaired waters

By James Amrhein
Water Quality Biologist – Water District South
November, 2015

Otter Creek is an 18 mile long stream that originates in southern Iowa County approximately 4 miles east of Mineral Point. It flows southerly until joining the Pecatonica River a few miles east of Darlington (Figure 1). Historically Otter Creek supported a fishable population of smallmouth bass and channel catfish (WDNR, 1967; WDNR, unpublished data). Since the late 1980's, periodic releases of manure into the creek have altered the fishery to the point where the stream no longer supports a fishable population of gamefish. Because of this, the department is proposing to list Otter Creek on the state's 303(d) list of impaired waters.



The department has periodically monitored the fishery of Otter Creek at various stations on the lower ½ of the stream. These surveys have documented the numbers of fish and variety of fish species in the stream over the years. Additionally, the Bureau of Research has conducted annual monitoring of smallmouth bass populations on Otter Creek and at other streams in southwestern Wisconsin since 1990 (Lyons and Kanehl, 2015).

Fish kills have been reported on Otter Creek in 1988 (Van Dyck, 1988), 2001 (WDNR, 2003), 2004 (WDNR, 2015), and most recently, in September, 2015 (Ibid).

Otter Creek is designated as a default warmwater sportfish stream (WDNR, 2003). It is modeled to be a cool-cold mainstem for much of its length (Lyons, 2008). However,

species assemblages show the stream tends to reflect a cool-warm mainstem (Lyons, 2013). Because Otter Creek is a tributary to the Pecatonica River and because of its watershed size (flow), the lower half of the creek contains a mixture of small and medium stream species as well as some large river species. Rivers provide a source of species recruitment as well as a refuge for species during winter, low water years, or even perhaps in times of stress (low water quality). The coolwater index of biotic integrity (IBI) developed by Lyons (2012) was applied to the fish assemblages collected in 2000 and 2008. The cool-warm IBIs were between 70 and 90, or excellent (see table below). This is due to the variety of quality native species that were found in the stream. There were typically 18-22 species found in surveys in 2000 and 2008. The number of individual gamefish collected is not taken into account in this index.

The coolwater fishery IBIs conducted on data collected September 25, 2015 - after the most recent reported kill - ranged from 20 (poor) at the initial kill site to 70 (excellent) upstream of the kill site. In this most recent survey only 6-11 species were found and populations of the species present were depressed. No game species were found in this survey and the assemblage was dominated by tolerant species, namely white sucker.

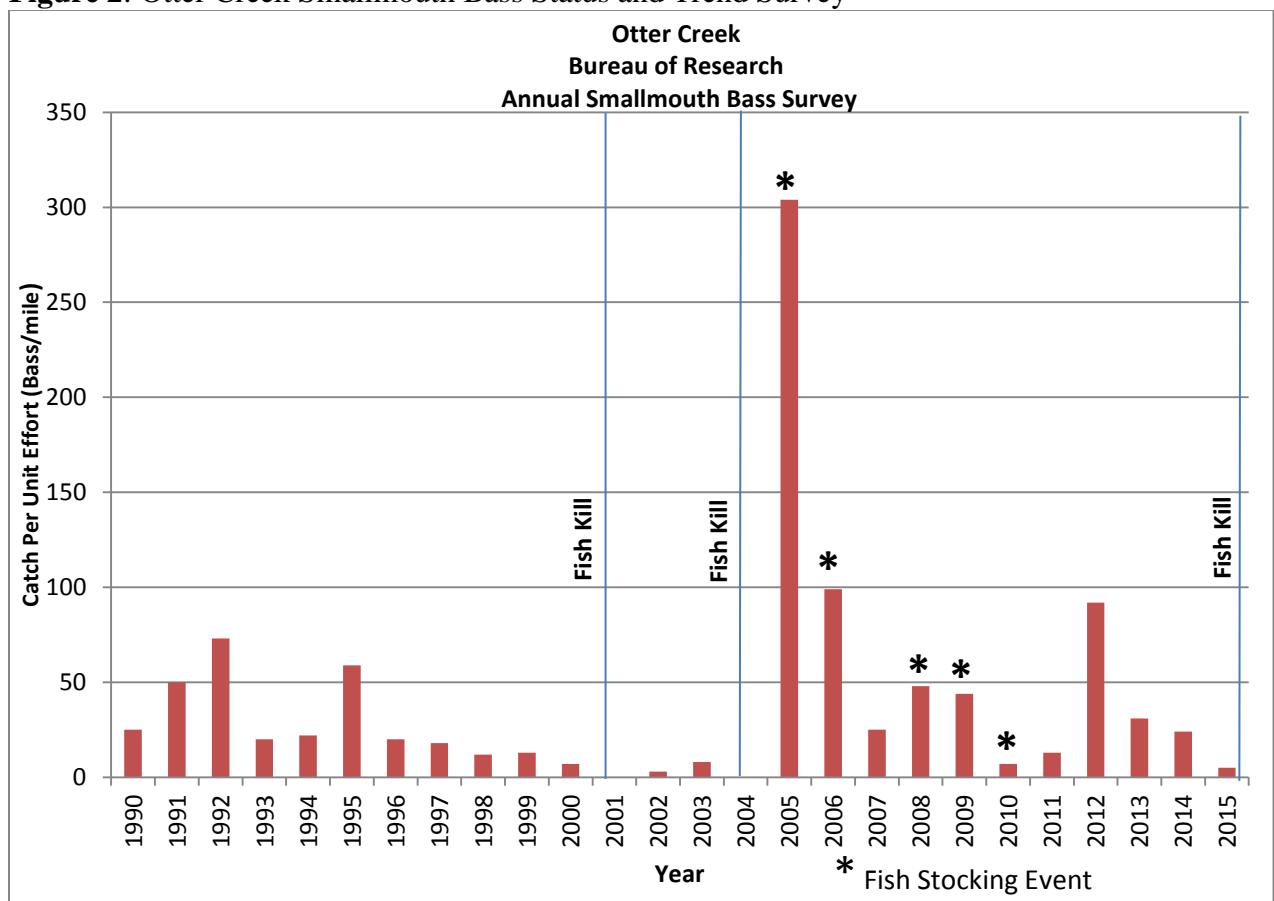
Otter Creek Fishery Surveys

Species	Site (year)							
	STH 81 (2000)	Woodbury Rd (2000)	Furnace Hill Rd (2000)	STH 81 (2008)	Furnace Hill Rd (2008)	Wildcat Rd (2015)	Woodbury Rd (2015)	CTH F (2015)
Banded Darter				2				
Black Bullhead								1
Blackside Darter				1	1			
Bluegill		1	2	16		1	1	
Bluntnose Minnow	27	48	27	3	14			1
Brook Stickleback						1		
Brown Trout					1			
Central Stoneroller		13	69		7	3		31
Channel Catfish		1						
Common Carp	16	2		2				
Common Shiner	10	99	44	2	50	31	13	83
Creek Chub	2	9	44		36	7	2	1
Fantail Darter		12	195	24	16	2		6
Fathead Minnow	3	12	24					
Goldfish		8	3					
Gizzard Shad	6	5						
Golden Redhorse	1			2				
Green Sunfish	1			1				
Hornyhead Chub	1	12	15	30	10	2	4	4
Johnny Darter	1	8	27	2	3	2	1	5
Largemouth Bass		1	1	1				
Northern Pike				2				
Quillback	3							
Rockbass		1						
Rosyface/Carmine Shiner	2	2		17	3	3		1
Shorthead Redhorse	61	9		5				
Silver Redhorse	25	2		1				
Smallmouth Bass	1	1	2	11	14			
Southern Redbelly Dace			2					
Spotfin Shiner				11				
Stonecat	2		3	8	1			
Suckermouth Minnow	5	2	1	1	2			2
Walleye	2							
W. Blacknose Dace	22	7						
White Sucker	26	147	150	88	149	73	60	109
Cool-Warm IBI	90 (Excellent)	80 (Excellent)	80 (Excellent)	80 (Excellent)	70 (Excellent)	60 (Good)	20 (Poor)	70 (Excellent)

Annual surveys conducted by the bureau of research have tracked populations of bass since 1990 (Figure 2). After the two fish kills in 2001 and 2004, the department began

stocking Otter Creek with smallmouth bass in order to “jump-start” the populations. From 2005-2010, 18,600 smallmouth bass – at a cost of approximately \$18,000 - were placed in Otter Creek. Indeed, the first survey by research after stocking in 2005 reflected this stocking. However, subsequent stocking events did not result in a more robust bass population. By 2010 and 2011, smallmouth catch per unit effort (CPE) rates were back down to the pre-stocking/post fish kill populations. The 2012 survey showed a moderate rebound buoyed by the enhanced class of young-of-the-year bass resulting from excellent (warm, dry) climatic conditions during the bass spawning period. The population has resumed its steady decline since then. The most recent survey conducted by research occurred one week prior to the most recent kill. That survey found 4 smallmouth bass for a CPE of 5 bass per mile. One dead smallmouth was found during the fish kill investigation and, as was noted earlier, no bass were found in the subsequent electrofishing survey.

Figure 2: Otter Creek Smallmouth Bass Status and Trend Survey



Data derived from: Lyons and Kanehl, 2015

Smallmouth bass populations in southwest Wisconsin are somewhat variable and dependent on climatic conditions, especially in May and June (Lyons, et. al., 1987). However, a comparison with Ames Branch, a stream located in the same watershed and of similar size and land use, shows Ames Branch to have a more robust and consistent population throughout the same period of time (see appendix). While Ames Branch routinely reports fish of age 3 or more, Otter Creek rarely sees any age 3+ fish, even since the advent of stocking.

In summary, Otter Creek is a stream that historically supported fishable populations of gamefish, namely smallmouth bass and channel catfish. Over the past several decades, a series of anthropogenic fish kills resulting from mismanagement of manure in the watershed has caused multiple acute events that have decreased gamefish populations to the point where they no longer support a viable fishery. Additionally, most recent fishery surveys indicate that the biotic integrity of the stream is also compromised.

In comparison to a nearby stream of similar nature, Otter Creek no longer supports its recreational use as a sport fishery. Therefore, **Otter Creek - from its confluence with the Pecatonica River upstream 10.6 miles to CTH G - should be placed on the state's 303(d) list of impaired waters for a degraded biological community.**

References:

- Lyons, John, A.M. Forbes, and M. Staggs. 1987. Fish Species Assemblages in Southwestern Wisconsin Streams with Implications for Smallmouth Bass Management. WDNR. Tech. Bull. No. 161. 25 pp.
- Lyons, 2008. Using the Wisconsin Stream Model to Estimate the Potential Natural Community of Wisconsin Streams (DRAFT). Wisconsin Department of Natural Resources Fish and Aquatic Life Research Section. November, 2008.
- Lyons, 2012. Development and Validation of Two Fish-based Indices of Biotic Integrity for Assessing Perennial Coolwater Streams in Wisconsin, USA. *Ecological Indicators* 23 (2012) 402-412.
- Lyons, John. 2013. Methodology for Using Field Data to Identify and Correct Wisconsin Stream “Natural Community” Misclassifications. Version 4. May 16, 2013. IN DRAFT.
- Lyons, John and Paul Kanehl. 2015. Status and Trends in Sportfish Populations of Southwestern Wisconsin Warmwater Streams. Bureau of Integrated Science Services. Fisheries and Habitat Research Section. Project: F-95-P.
- Van Dyck, Gene. 1988. Cost Associated with Fish Kill Investigation Clean-up on Otter Creek, Lafayette County. Correspondence/Memorandum to Tom Wrasse. July 28, 1988.
- WDNR. 1967. Surface Water Resources of Lafayette County. By Ronald Piening, Ronald Poff, and C.W. Threinen. Wisconsin Department of Natural Resources. Division of Conservation. Madison, WI.
- WDNR. 2003. The State of the Sugar and Pecatonica River Basins. Wisconsin Department of Natural Resources.
- WDNR. 2015. Wisconsin Department of Natural Resources. Bureau of Fisheries Management. Fish Kill Database.

Appendix: Comparison of Smallmouth Bass Trends in Otter Creek and Ames Branch.

Table 2. Total catch of smallmouth bass, and catch per 100 m shocked broken down by total length (TL) and age, from seven streams in southwestern Wisconsin.

Stream	Year	Month	Day	Distance Shocked (m)	Total Catch	Catch per 100 m, by TL (mm)			Catch per 100 m, by age					
						<204	204-354	>354	0	I	II	III	IV	>IV
Ames Branch	91	8	30	1430	169	7.4	4.2	0.2	7.1	0.3	2.4	1.5	0.3	0.1
Ames Branch	92	8	26	1430	171	8.8	3.0	0.1	0.1	9.1	0.1	1.3	1.1	0.2
Ames Branch	93	8	24	1430	43	1.2	1.7	0.1	0.0	0.1	1.5	0.2	0.8	0.3
Ames Branch	94	8	30	1430	40	2.1	0.7	0.0	2.1	0.0	0.0	0.3	0.3	0.1
Ames Branch	95	8	24	1430	39	1.8	0.9	0.0	0.1	1.7	0.0	0.0	0.9	0.0
Ames Branch	96	8	26	1430	36	1.1	1.3	0.1	0.0	0.0	1.7	0.0	0.3	0.4
Ames Branch	97	8	20	1430	28	0.3	1.5	0.1	0.2	0.0	0.1	1.3	0.1	0.2
Ames Branch	98	8	25	1430	52	2.0	1.6	0.1	0.1	2.0	0.1	0.5	0.9	0.1
Ames Branch	99	9	10	1430	57	1.4	2.4	0.1	0.2	0.0	2.8	0.2	0.4	0.3
Ames Branch	00	8	30	1430	52	0.1	3.4	0.2	0.0	0.1	0.0	2.7	0.2	0.6
Ames Branch	01	9	17	1430	28	0.5	1.4	0.1	0.2	0.0	0.3	0.1	1.2	0.1
Ames Branch	02	8	28	1430	34	1.0	1.0	0.3	0.3	0.4	0.4	0.1	0.7	0.3
Ames Branch	03	9	04	1430	159	7.2	3.4	0.5	3.9	3.1	2.9	0.2	0.3	0.7
Ames Branch	04	9	09	1430	66	2.5	1.7	0.3	0.1	2.3	0.7	1.0	0.1	0.5
Ames Branch	05	9	09	1430	138	4.2	4.7	0.8	2.4	0.0	3.9	1.8	0.8	0.7
Ames Branch	06	9	22	1430	76	1.3	3.9	0.1	0.0	1.5	0.1	3.1	0.6	0.1
Ames Branch ⁴	07	10	31	1430	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ames Branch	08	9	02	1430	27	0.1	1.4	0.3	0.0	0.1	0.1	1.0	0.1	0.6
Ames Branch	09	9	09	1430	6	0.0	0.4	0.0	0.0	0.0	0.0	0.1	0.2	0.1
Ames Branch	10	8	18	1430	10	0.0	0.6	0.1	0.0	0.0	0.0	0.2	0.3	0.2
Ames Branch	11	9	12	1430	54	1.4	1.7	0.6	1.3	0.0	0.7	0.3	0.5	1.0
Ames Branch	12	9	7	1430	283	15.7	3.1	0.9	11.0	6.5	0.8	0.4	0.0	1.1
Ames Branch	13	9	18	1430	107	4.3	2.9	0.3	0.3	4.3	2.2	0.3	0.1	0.3
Ames Branch	14	8	19	1430	65	0.4	4.1	0.1	0.1	0.1	2.6	1.3	0.4	0.0

Table 2. Continued.

Stream	Year	Month	Day	Distance Shocked (m)	Total Catch	Catch per 100 m, by TL (mm)			Catch per 100 m, by age					
						<204	204-354	>354	0	I	II	III	IV	>IV
Otter Creek	90	9	04	1200	19	0.8	0.8	0.0	0.1	1.3	0.3	0.0	0.0	0.0
Otter Creek	91	8	29	1200	38	0.6	2.6	0.0	0.0	0.6	1.3	1.3	0.0	0.0
Otter Creek	92	8	25	740	34	1.8	2.5	0.3	1.7	0.0	0.3	2.0	0.3	0.3
Otter Creek	93	8	26	1200	15	0.1	0.9	0.3	0.0	0.0	0.3	0.2	0.7	0.3
Otter Creek	94	8	31	950	13	0.7	0.5	0.1	0.7	0.0	0.0	0.1	0.1	0.5
Otter Creek	95	8	23	950	35	3.2	0.3	0.2	0.6	2.5	0.0	0.0	0.1	0.4
Otter Creek	96	8	21	950	12	0.6	0.5	0.1	0.0	0.3	0.6	0.0	0.0	0.3
Otter Creek	97	8	19	950	11	0.2	0.8	0.1	0.0	0.0	0.2	0.8	0.0	0.1
Otter Creek	98	8	27	950	7	0.0	0.7	0.0	0.0	0.0	0.2	0.4	0.1	0.0
Otter Creek	99	8	30	950	8	0.2	0.6	0.0	0.1	0.0	0.5	0.2	0.0	0.0
Otter Creek	00	8	28	950	4	0.1	0.2	0.1	0.0	0.1	0.0	0.2	0.0	0.1
Otter Creek	01	9	17	950	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Otter Creek	02	9	09	950	2	0.2	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0
Otter Creek	03	9	03	950	5	0.3	0.2	0.0	0.0	0.3	0.1	0.1	0.0	0.0
Otter Creek	04	9	10	950	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Otter Creek ¹	05	9	08	950	181	18.7	0.1	0.2	18.6	0.1	0.0	0.0	0.2	0.1
Otter Creek ²	06	10	10	1200	74	5.8	0.4	0.0	2.3	3.8	0.1	0.0	0.0	0.0
Otter Creek	07	9	04	1200	19	1.2	0.4	0.0	0.3	0.8	0.5	0.0	0.0	0.0
Otter Creek ³	08	9	04	1200	36	0.8	2.3	0.0	0.0	0.3	0.7	2.1	0.0	0.0
Otter Creek ⁶	09	9	08	1200	33	2.5	0.3	0.0	2.4	0.0	0.1	0.1	0.2	0.0
Otter Creek ⁷	10	9	08	1200	5	0.3	0.1	0.0	0.0	0.3	0.0	0.0	0.1	0.0
Otter Creek	11	9	14	1200	10	0.5	0.3	0.0	0.0	0.3	0.4	0.0	0.0	0.1
Otter Creek	12	9	10	1200	69	5.6	0.2	0.0	5.6	0.0	0.2	0.0	0.0	0.0
Otter Creek	13	9	19	1200	23	1.7	0.3	0.0	0.1	1.6	0.2	0.1	0.0	0.0
Otter Creek	14	9	05	1200	18	0.3	1.2	0.0	0.1	0.1	1.3	0.1	0.0	0.0

From: Lyons, John and Paul Kanehl. 2015. Status and Trends in Sportfish Populations of Southwestern Wisconsin Warmwater Streams. Bureau of Integrated Science Services. Fisheries and Habitat Research Section. Project: F-95-P.