

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER DIVISION
MARCH 2003

STAFF REPORT

A FISH COMMUNITY ASSESSMENT OF THE GRAND RIVER
DOWNSTREAM OF THE CITY OF JACKSON
JACKSON COUNTY, MICHIGAN
OCTOBER 10, 2003

Introduction

The fish community of the Grand River down stream of the City of Jackson was assessed, using the Michigan Department of Environmental Quality's (MDEQ's) Procedure 51 (MDEQ, 2002), to reassess the current quality of the fish community.

A 25 mile TMDL reach of the Grand River and Portage River, a major tributary to the Grand River, both warmwater designated water bodies, are located in Jackson County due north of the City of Jackson (Figure 1). The TMDL reach is identified in Michigan's Year 2002 Section 303(d) report (Creal and Wuycheck, 2002) as follows:

GRAND RIVER AND PORTAGE RIVER

WBID# 082816H

County: JACKSON

USGS HUC: 04050004 Size: 25 M

Location: Grand River from Tompkins Road upstream to the City of Jackson
and Portage River from the Grand River confluence u/s to Wooster Road.

Problem: Untreated sewage discharge, pathogens (Rule 100); WQS
exceedances for D.O.; Macroinvertebrate and fish communities
rated poor.

TMDL Year(s): 2003

RF3RchID: 4050004

The presence of a poor rated fish and/or macroinvertebrate community in the TMDL reach was a basis for including the Grand River reach on Michigan's Year 2002 Clean Water Act Section 303(d) list of impaired water bodies requiring the development of a TMDL. In addition, both a dissolved oxygen and *Escherichia coli* (*E. coli*) bacteria TMDLs are being developed for about a 25 mile reach due to WQS exceedances in each case.

The Grand River is designated for the protection of a warm water fishery and other indigenous aquatic life as provided by Michigan's Water Quality Standards (Rule 100(1)). This document represents the basis for the development of a Biota TMDL that focuses on the restoration of the biological communities of the impacted reach so as to meet Michigan's Water Quality Standards designated use and support criteria. The Biota TMDL reach, as herein described, extends upstream about 8 miles from US-127 to the confluence of Portage River (Figure 1).

Biological community assessments of fish and/or macroinvertebrate communities of the upper Grand River watershed during 1991, 1996, 2001 and 2002 (Oemke, 1992; Kosek, 1997; Goodwin, 2000; Rockafellow, 2003 – in draft; and Wuycheck, 2002) were used to define the reach with impaired biological communities. The Grand River from the confluence of Portage River down stream to U.S.-127, an eight mile reach, was determined to be impaired due to poor biological communities.

Survey Methods

Procedure 51 (MDEQ, 2002) was used to assess the fish community at two stations of the Grand River to reassess stream quality in the zone of impaired stream quality. Fish were collected using electro-fishing techniques. A Procedure 51 fish community assessment score range of 5 to 9 is interpreted as excellent in supporting aquatic life related designated uses; a -4 to +4 score range is considered acceptable (supports aquatic life related designated uses) with a score of -4 being minimally acceptable. A score range of -5 to -9 indicates a "poor" rating and nonsupport of aquatic life-related designated uses.

Findings

Qualitative fish community assessments were conducted at two stations, Maple Grove Road (Station 1) and Tompkins Road (Station 2). Digital photographs taken during the stream survey are maintained in the Surface Water Quality Assessment Section's raw data file.

The fish community assessment at Maple Grove Road was 23 minutes in duration during which 12 fish taxa (62 individuals) were collected. The assessment at Tompkins Road was 47 minutes in duration during which 16 fish taxa (237 individuals) were collected. Using Procedure 51, the fish community at Maple Grove Road scored a -5 with a rating of poor and the fish community score was 2 with a rating of acceptable (Tables 1A and 1B).

Siltation of fine particulates on the numerous deadfalls present in stream and overall and deposition of fines on the stream channel in general are sufficient to impair colonization by acceptable macroinvertebrate and use by desired fish communities. The gradient of the river in the Maple Grove Road reach is about 0.85 feet/mile commonly resulting in languid flow velocities of less than 0.5 feet/sec. during stable flow conditions.

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References:

Creal, W. and J. Wuycheck. 2002. Federal Clean Water Act Section 303(d) List Michigan Submittal for Year 2002. MDEQ Report #MI/DEQ/SWQ-02/013 (available at the following web site address:

<http://deg@michigan.gov/emi/0,1303,7-102---S,00.html>

Goodwin, K. 2000. Biological Assessment of the Upper Grand River, Jackson and Eaton Counties, Michigan, September 10-13, 1996. MDEQ Report: MI/DEQ/SWQ-00/052.

Kosek, S. 1997. A Biological Survey of the Portage River and Tributaries, Ingham and Jackson Counties, August 12-14, 1996. MDEQ Report No. MI/DEQ/SWQ-97/001.

MDEQ. 2002. GLEAS Procedure 51. Qualitative Biological and Habitat Survey Protocols for Wadable Streams and Rivers. Report #MI/DEQ/SWQ-02/013 as Revised May 2002.

Oemke, M. 1992. A Biological Survey of the Grand River from Jackson to Lansing. Jackson and Ingham Counties, Michigan. September 5-25, 1991. MDEQ Report No. MI/DNR/SWQ-92/200.

Rockafellow, D. 2003 – in draft. A Biological Survey of the Grand River, Jackson, Ingham, Eaton, Clinton and Ionia Counties, Michigan August 2001. MDEQ Report Number MI/DEQWD-03/024.

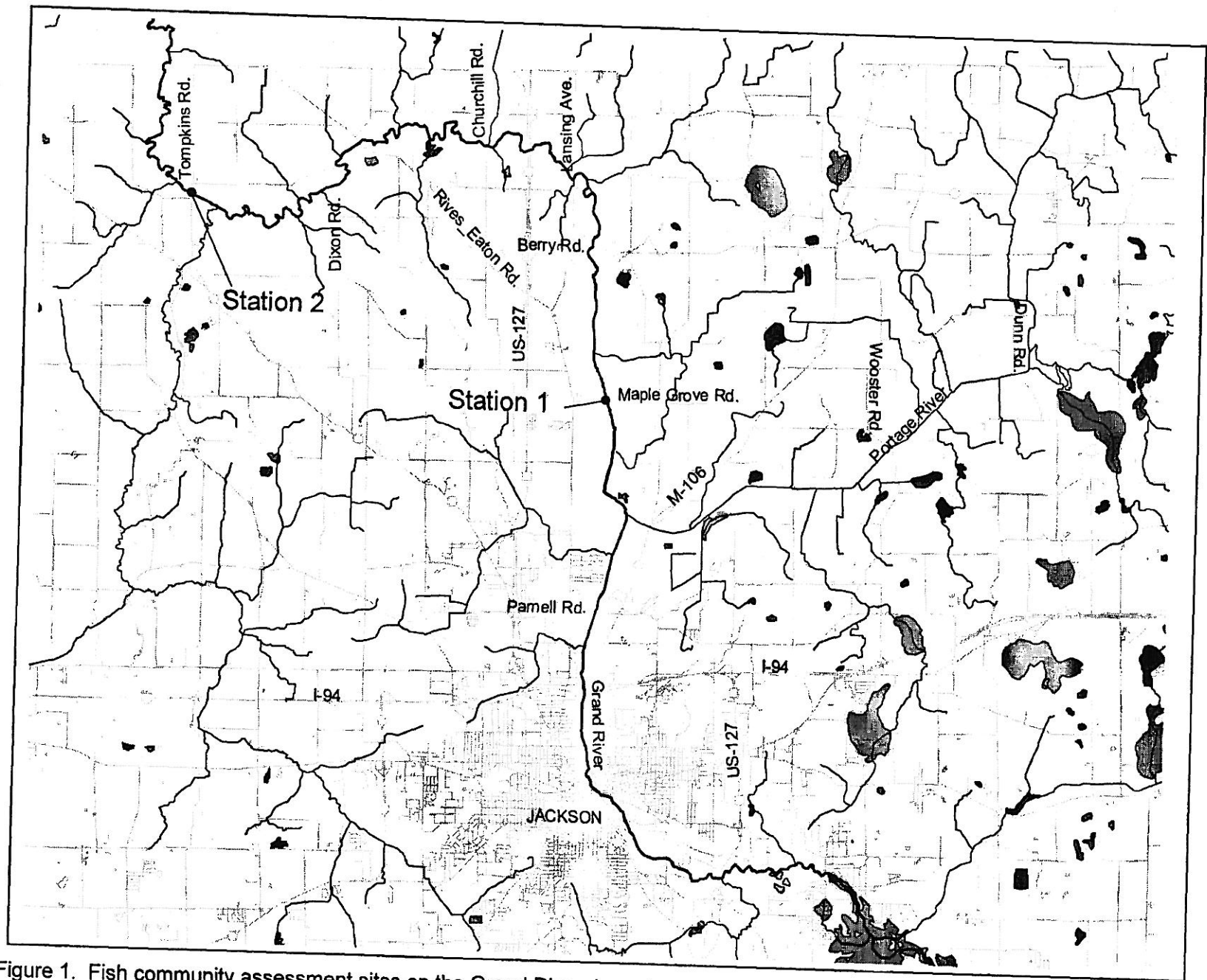


Figure 1. Fish community assessment sites on the Grand River downstream of the City of Jackson and Portage River confluence, Jackson County, Michigan, October 10, 2002.

Table 1A. Qualitative fish sampling results for the Grand River downstream of the City of Jackson, Jackson County, Michigan; October 8, 2002.

TAXA	STATION 1 Maple Grove Road	STATION 2 Tompkins Road
Esocidae (pikes)		
<i>Esox lucius</i> (Northern Pike)	3	3
Cyprinidae (minnows and carps)		
<i>Cyprinus carpio</i> (Carp)	10	
<i>Nocomis biguttatus</i> (Horneyhead)		10
<i>Luxilus cornutus</i> (Common shiner)	1	62
<i>Notropis rubellus</i> (Rosyface sh.)		1
<i>Cyprinella spilopterus</i> (Spotfin sh.)		17
<i>Pimephales notatus</i> (Bluntnose m.)	7	99
<i>Rhinichthys atratulus</i> (Blacknose dace)		2
Catostomidae (suckers)		
<i>Catostomus commersoni</i> (W. sucker)	13	7
<i>Hypentelium nigricans</i> (N. hog sucker)		18
<i>Moxostoma erythrurum</i> (Golden redh.)		3
Ictaluridae (Bullhead, Catfish)		
<i>Ameiurus natalis</i> (Yellow bullhead)	3	
Centrarchidae (sunfish)		
<i>Ambloplites rupestris</i> (Rock bass)	4	5
<i>Lepomis cyanellus</i> (Green sunfish)	6	
<i>Lepomis gibbosus</i> (Pumpkinseed)		1
<i>Lepomis macrochirus</i> (Bluegill)	2	
<i>Micropterus salmoides</i> (Lm. bass)	2	1
<i>Micropterus dolomieu</i> (Sm. bass)		3
Percidae (perch)		
<i>Etheostoma nigrum</i> (Johnny darter)		3
<i>Percina maculata</i> (Blackside darter)		2
<i>Perca flavescens</i> (Yellow perch)	5	
<i>Stizostedion vitreum</i> (Walleye)	6	
TOTAL INDIVIDUALS	62	237
Number of hybrid sunfish	0	0
Number of anomalies	0	0
Percent anomalies	0.000	0.000
Percent salmonids	0.000	0.000
Reach sampled (ft)	600	400
Area sampled (sq ft)	144,000	120,000
Density (# fish/sq ft)	0.000	0.002
Gear	boat shocker	boat shocker

Table 1B. Fish metric evaluation of the Grand River downstream of the City of Jackson, Jackson County, Michigan; October 8, 2002.

METRIC	STATION 1 Maple Grove Road		STATION 2 Tompkins Road	
	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	12	0	16	1
NO. OF DARTER, SCULPIN, MADTOM TAXA	0	-1	2	0
NUMBER OF SUNFISH TAXA	3	0	2	0
NUMBER OF SUCKER TAXA	1	-1	3	1
NUMBER OF INTOLERANT TAXA	1	-1	4	0
PERCENT TOLERANT	62.90	-1	46.84	0
PERCENT OMNIVOROUS TAXA	53.23	-1	45.57	0
PERCENT INSECTIVOROUS TAXA	14.52	-1	49.37	0
PERCENT PISCIVOROUS TAXA	24.19	1	5.06	0
% SIMPLE LITHOPHILIC SPAWNER TAXA	32.26	0	40.08	0
TOTAL SCORE:		-5		2
FISH COMMUNITY RATING:		Poor		Acceptable.