Total Maximum Daily Loads



What is a Total Maximum Daily Load (TMDL)?



Section 303(d) of the Clean Water Act requires TMDL development

TMDLs -variety of pollutants

How does the TMDL process work?

TMDL-sets standards on how much pollution

DEQ standards to reduce pollutants

What is *E. coli*?

Escherichia coli -sub-set of fecal coliforms whose presence indicates fecal contamination E. coli in warm blooded animal feces and indicates harmful micro-organisms

What are the impacts associated with *E. coli*?

E. coli cause severe sickness

Infect humans through ingestion, skin contact or contaminated fish

How much is too much?

Michigan's WQS for total body contact for E. coli is:

130 *E. coli* per 100 ml (as a 30-day geometric mean), and
no one-time sample shall exceed 300 *E. coli* per 100 ml (as a geometric mean).

Total body contact recreation May 1 to October 31

Risk based number

What are the sources of E. coli?

Two major ones: Point and non-point sources.

Point sources directly discharge to a waterbody via a pipe (WWTP or CSO).

Non-point sources difficult to control (illicit connections, urban litter and runoff, failing septic systems).

Why were TMDLs needed for the Galien River and Deer Creek?

 East Branch of Galien River
Deer Creek west of Three Oaks



Figure 1: 2001 station locations for Galien River and Deer Creek (May to September).



Figure 8. 2001 seasonal mean *E. coli* results for Deer Creek and related waterbodies.

TMDL information

- Galien River TMDL completed in March 2002.
- Deer Creek TMDL completed in August 2002.
- Both were approved by the U.S. Environmental Protection Agency.

Michigan Department of Environmental Quality Surface Water Quality Division August 2002

Total Maximum Daily Load for Escherichia coli for Deer Creek Berrien County, Michigan

INTRODUCTION

Section 303(d) of the federal Clean Water Act and the United States Environmental Protection Agency's (USEPA's) Water Quality Planning and Management Regulations (Title 40 of the Code of Federal Regulations (CFR), Part 130) require states to develop Total Maximum Daily Loads (TMDLs) for waterbodies that are not meeting Water Quality Standards (WQS). The TMDL process establishes the allowable loadings of pollutants for a waterbody based on the relationship between pollution sources and in-stream water quality conditions. TMDLs provide states a basis for determining the pollutant reductions necessary from both point and nonpoint sources to restore and maintain the quality of their water resources. The purpose of this TMDL is to identify the allowable levels of *Escherichia coli* (*E. coli*) that will result in the attainment of the applicable WQS in Deer Creek, a small waterbody with relatively low flows (Table 1) in the Gallen River Watershed, located in Berrien County.

PROBLEM STATEMENT

Deer Creek was first placed on the Section 303(d) list in 1998. This TMDL addresses approximately seven miles of stream. The TMDL reach is on the 2002 Section 303(d) list (Creal and Wuxcheck, 2002) as:

Waterbody: Dee	r Creek		WBID#: 083301D
County: Berrien	HUC:	4040001	Size: 7 M
Location: S.	Br. Galien River confluence u/s to	the headwaters in v	cinity of Three Oaks
Problem: U	ntreated sewage discharge, path	nogens (Rule 100); I	Macroinvertebrate
community rated poor; nuisance algae			
TMDL YEAR(s):	2002 2004	RF3RchID:	4040001 440 0.00

This TMDL addresses pathogens. Deer Creek is also on the Section 303 (d) list for poor macroinvertebrate communities and nuisance algae. These TMDLS are scheduled in 2004.

Deer Creek (Figure 1) was placed on the Section 303(d) list for *E. coli* due to impairment of recreational uses as indicated by the presence of elevated levels of *E. coli*. Recent monitoring data (Appendix 1) collected by the Michigan Department of Environmental Quality (MDEQ) in 2001 documents continued exceedances of the WQS for *E. coli* at all Deer Creek stations sampled (Table 2), with exception of the September sampling at Lakeside Road. Monthly geometric mean *E. coli* concentrations in Deer Creek for 2001 ranged from 74 *E. coli* per 100 milliller (mi) in September at Lakeside Road to 1.273 *E. coli* per 100 mil in June at Basswood RA. (Table 2).

Other waterbodies sampled for this TMDL include Chestnut Drain and the South Branch of the Galien River. Chestnut Drain, a small tributary to the headwaters of Deer Creek, originates in the village of Three Oaks and exhibited the highest *E. coli* concentrations observed in the 2001 sampling (Table 2 and Figure 2). Concentrations ranged from 1,266 *E. coli* per 100 ml in June to 5,794 *E. coli* to Deer Creek. The South Branch of the Galien River was sampled upstream (Forest Lawn Road) and downstream (Lakeside Road) of the confluence with Deer Creek.

Data Summary

TMDL identified potential sources for Galien River Agricultural inputs Illicit discharges to storm drains in the Villages of New Troy and Galien Storm water runoff No known continuous point sources (one) permitted seasonal lagoon discharge—Galien WWSL)

Galien River TMDL Stakeholders

Weesaw Township (43%) Galien Township (27%) Buchanan Township (17%) Baroda Township (7%) Bertrand Township (3%) Three Oaks Township (1%) Chikaming Township (1%) Oronoko Township (1%)

Deer Creek TMDL Potential Sources and Stakeholders

TMDL identified potential sources Storm water from Village of Three Oaks Illicit connections Sewage overflows Agricultural inputs Former Vickers Engineering site Village of Three Oaks WWSL Stakeholders Three Oaks Township (87%) Village of Three Oaks (13%)

there's no drama 'til the septic system goes



Information

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For the full TMDLs, go to: <u>www.michigan.gov/deqwater</u>, click on Water Quality Monitoring, then Assessment of Michigan Waters, then *Total Maximum Daily Loads (TMDLs)*.

Slides adapted from Christine Alexander, DEQ Surface Water Assessment Section