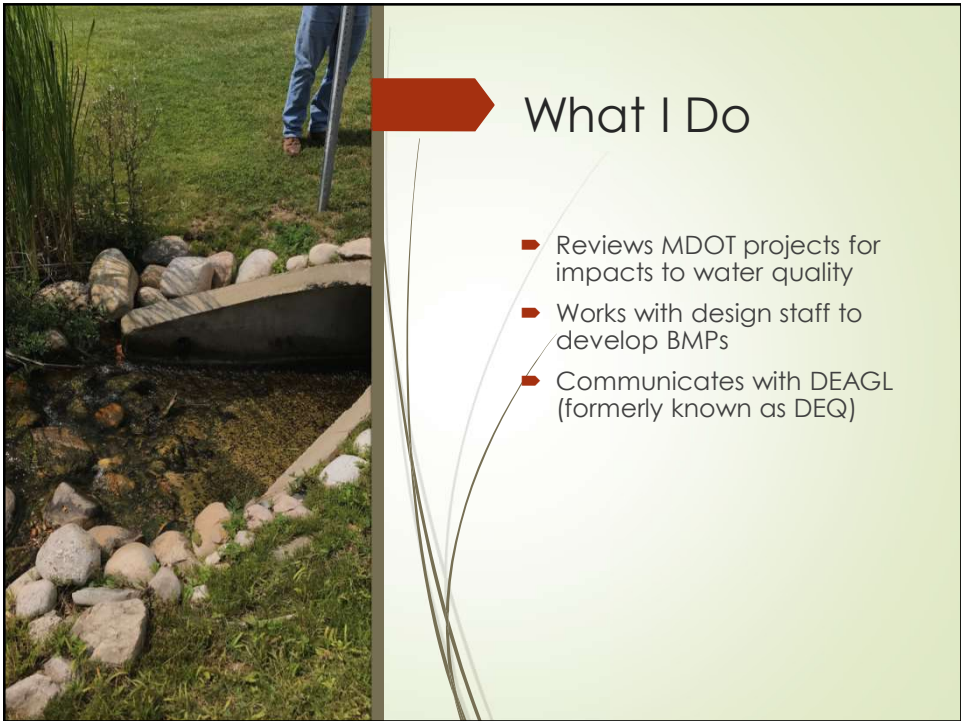




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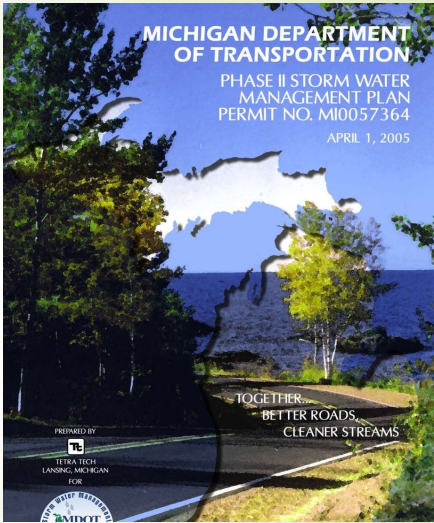
1972

The Clean Water Act's long-range goal is zero discharge of pollutants.

3

MDOT Stormwater Management Program

- National Pollutant Discharge Elimination System (NPDES) Permit took effect on April 1, 2005
- New permit application in 2013
- Expecting new permit 2019



4

New Stormwater Permit Standards


- Water Quality
- Channel Protection

A composite image. On the left, a white dog is shown in profile, barking with its mouth wide open. On the right, a figure from Edvard Munch's 'The Scream' is depicted, with a pale, featureless face and hands raised to the head in a gesture of distress. The background consists of swirling, turbulent water in shades of blue and purple.


5

What Are Water Quality Standards?

State rules established to protect the Great Lakes, the connecting waters, and all other surface waters

A close-up photograph of a dark, circular storm drain cover set into asphalt. The cover has a logo that reads 'PROTECT OUR WATERSHED' in a stylized font. The logo includes a fish and a tree. The text 'PROTECT' is at the top, 'OUR' is in the middle, and 'WATERSHED' is at the bottom.

6



Water Quality Goals Defined by State Rules

- Uses of the lakes and streams
- Safe levels to protect the uses
- Procedures to protect high quality waters

7

Designated Uses of Michigan's Waters

- Other indigenous aquatic life and wildlife
- Coldwater and warmwater fisheries
- Total and partial body contact
- Fish consumption



8

Surface Waters of the State

- ▀ Lakes
- ▀ Ponds
- ▀ Rivers
- ▀ Streams
- ▀ Drains
- ▀ Wetlands



9

OUTSTANDING STATE WATERS

- ▀ Trout Streams and Coldwater Lakes
- ▀ Natural Rivers
- ▀ Wild and Scenic Rivers
- ▀ National Parks and Lakeshores



10

Impairments

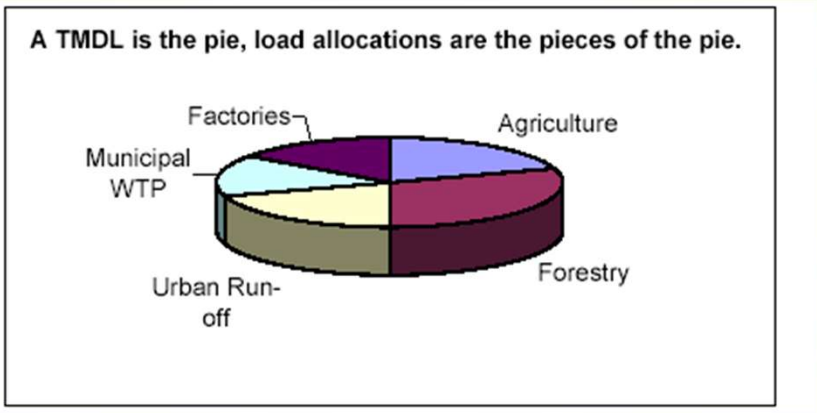
- E. coli
- **Sedimentation/Siltation**
- Mercury
- **Gas and Oil**
- **Other substrate alteration**
- **Nitrogen**
- Low dissolved oxygen
- Phosphorous
- PCBs



11

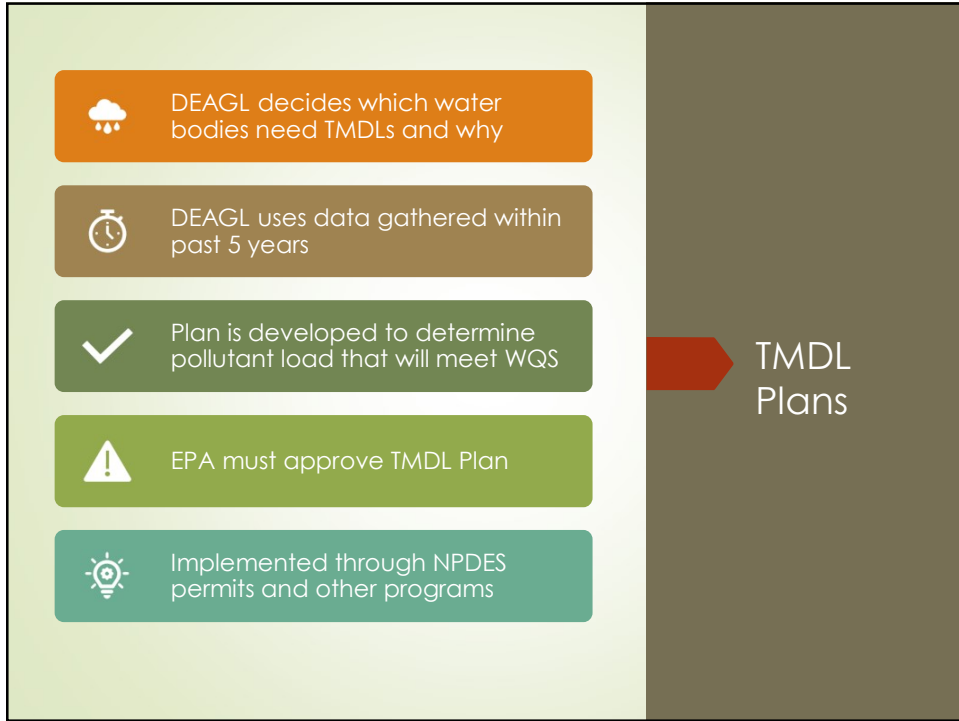
TMDLs - Total **M**aximum **D**aily **L**oad

A TMDL is the pie, load allocations are the pieces of the pie.



Source	Color
Municipal WTP	Cyan
Factories	Purple
Agriculture	Blue
Forestry	Maroon
Urban Run-off	Yellow

12



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Channel Protection Standard

- Protects streams from erosion
- Applies if we increase impervious surface
- No increase in volume
- Retention – 2 year/24 hour storm event

14

Review Process Overview

- Is the permit applicable?
- Look at scope of work – can we do anything?
- Identify surface waters that might be impacted
- Identify TMDLs (Total Maximum Daily Load)
- Identify potential impacts of project to water quality



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The Water Quality Review Process

Question 1

Does the Permit Apply?

YES


- If it impacts 1 acre or more of soil

HOWEVER...


- Less than one acre of soil disturbance – TMDL requirements still apply if present

16

Post-Construction Permit Exemptions



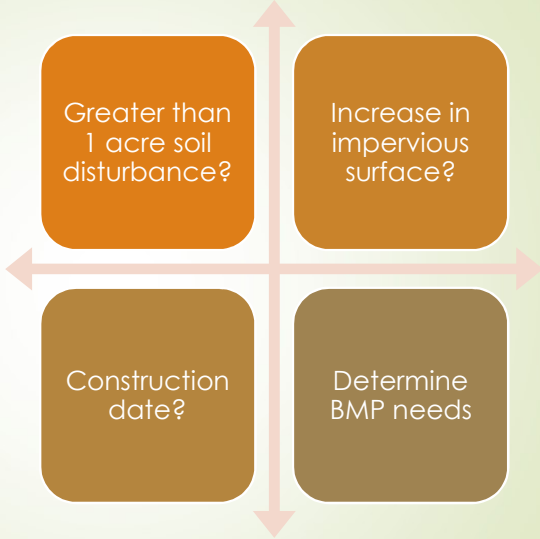
Stormwater is discharged into a combined storm sewer (CSS) or is treated at a waste water treatment plant



Channel Protection does not apply if water is discharged to certain water bodies.

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Questions for Project Manager



- Greater than 1 acre soil disturbance?
- Increase in impervious surface?
- Construction date?
- Determine BMP needs

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Follow-up Questions for Project Manager

-  Request information on BMP selection
-  Provide guidance on potential BMPs
-  Direct PM to others for assistance
-  Frequent reminders because...

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Mitigation Measures

Need proposed BMPs to meet anticipated new permit conditions before sign-off

- Sediment removal
- Retention if required
- TMDL requirements

20

BMP Determination Factors

- ▀ Volume
- ▀ Flow rates
- ▀ Site conditions
- ▀ ROW availability
- ▀ Constituents of stormwater



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Some Common BMPs

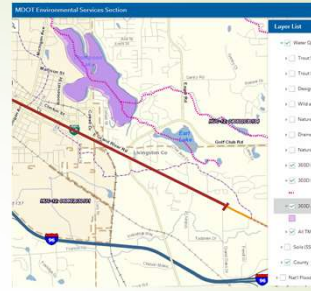
- ▀ Grassy swales
- ▀ Detention/retention basins
- ▀ Widen ditches to reduce velocities and provide increased filtration
- ▀ Swirl separators
- ▀ Green infrastructure



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Scoping Tool

- BMP online scoping tool
- Excel spreadsheet
- GIS map with applicable features
- Allows budgeting considerations



Post-Construction BMP - Scoping Level Planning Tool

Site Characteristics

This section asks the user to input characteristics about the site in Column C. For guidance, refer to comments in cells in Column B.

Total Site Area		
Proposed Impervious Area (Treatment Area)		
Existing Impervious Area		
New Impervious Area		
Are there existing structural BMPs onsite?	Yes	
How many acres are existing BMPs cover?		
Impervious Area (Treatment Area) Adjusted for Existing BMPs		
Hydrologic Soil Group		
Urban or Rural?		

Water Quality Requirements

This section asks the user to input the water quality requirements for project must meet. Water quality requirements based on runoff/erosion requirements. Refer to the [SIT/State Water Quality](#) table.

TSS removal	Yes	
Setback	Yes	
Total Phosphorus	Yes	
Total Nitrogen	Yes	
Prevention Hydrocarbons	Yes	
Bacteria	Yes	

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BMP Scoping Tool Summary

- Tool assists during scoping for five year plan
- Coarse filter to allow for BMP budgeting
- Supports NPDES compliance
- Easy to use
- Second phase – more detail for design

24



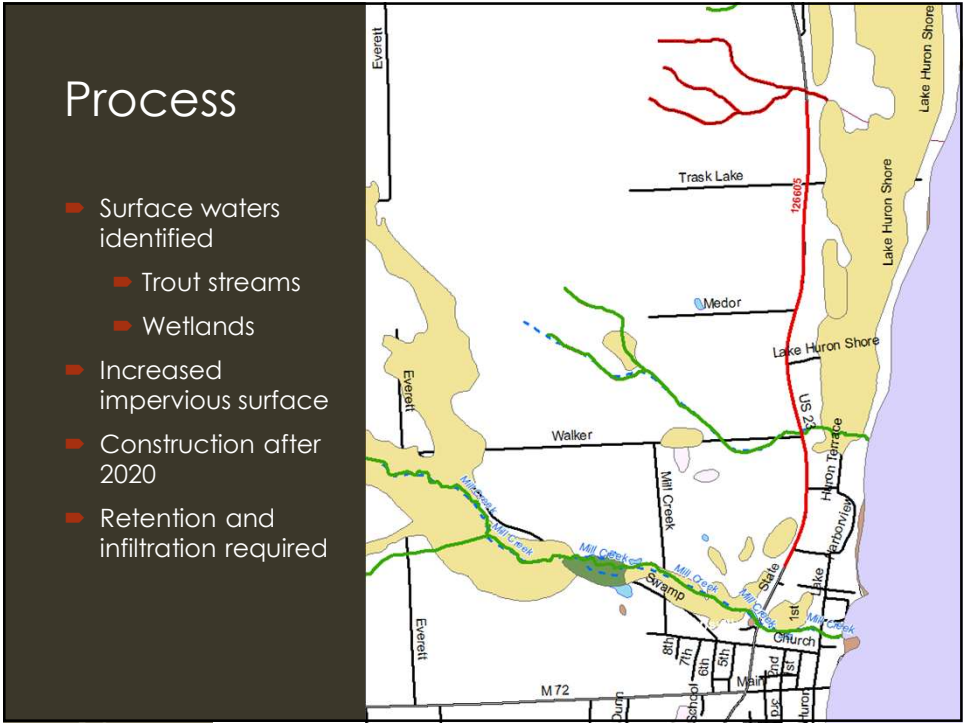
25

US-23 Bay Region
JN 126605

- HMA reconstruction with ditching
- 2021 scheduled construction
- Widening of paved shoulders

The map displays the US-23 corridor in the Bay Region of Michigan. Key locations marked include St Ignace, Mackinaw City, Charlevoix, Gaylord, Atlanta, Hillman, Alpena, Traverse City, Kalkaska, Grayling, Mio, Rosebush, West Branch, Tawas City, and Bay City. State forest areas like Gaylord State Forest, Atlanta State Forest, and Roscommon State Forest are also shown. A red pin on the map indicates the specific project location at the intersection of North US 23 and Washington Street.

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BMP Development

- Calculated how much water to retain
- Designed retention trench
- Used vegetated ditches for sediment removal

US-23 Additional Runoff
Proposed Runoff Calculations

Onsite Devel. Runoff Coeff. = 0.90
 Offsite Runoff Coeff. = 0.00
 Tc (onsite) = 1440.0 min
 Tc (offsite) = 0.0 min
 Onsite area to basin = 1.16 acres
 Offsite area to basin = 0.00 acres
 Total area to basin, AD = 1.16 acres

Design of Detention/Retention Basin(s)
 Basin Vol. Provided = 3,480 cft
 Direct Release Allowed = 0.00 cfs
 Perc. Rate, P = 1 in/hr Assumed saturated soils.
 Infiltrating Basin Area, AB = 8,700 sft Assumed infiltration along sides of trench.

Storage Required, $S_2 = V_2 - Q_r \cdot t_d = c \cdot I^2 \cdot t_d - 0.13 \cdot AD - P \cdot (AB/AD) \cdot t_d$
 $S_2 = c \cdot I^2 \cdot t_d - ((Q_{allow}/AD) \cdot t_d) - P \cdot (AB/AD) \cdot t_d$
 Storm Event: 2 yr (pick 100, 50, 25, 10, 5, 3, or 2)
 9

Detention Calcs, Onsite Offsite Total

12 yr	Storage	Storage	Storage
t _d (min)	(in/hr)	(in)	(in)
15	2.22	0.46	0.00
30	1.60	0.63	0.00
60	1.03	0.75	0.00
120	0.63	0.79	0.00
180	0.46	0.73	0.00
360	0.27	0.43	0.00
720	0.16	-0.38	0.00
1440	0.09	-2.19	0.00

0.79
Vol. Required 3,317 cft
 0.08 acre-ft
Vol. Supplied 3,480 cft **OK**
PROPOSED DETENTION STORAGE
 Volume (A x L) 8,700 CFT
 Depth 2.0 FT
 Void Ratio 40.0 %
 Storage Area 1,740 SFT
 Storage Volume 3,480 CFT
 Perforated Pipe Volume CFT
 Drywell Storage Volume CFT
Net Storage Capacity 3,480 CFT

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Can't Meet Requirements?

- Site conditions most common reason
- New permit may allow
 - Mitigation
 - Payment in lieu



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We can
build good
roads
and
protect the
water.



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Questions?

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517-241-2311