

# Soil Erosion and Sedimentation Control in Michigan: A Local Program

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Michigan Lake and Stream Leader's Institute

Bengal Wildlife Center May 18, 2002



# **Sediment Is The Greatest Pollutant By Volume Entering Lakes And Streams**





**Every year, 4.5 billion tons of dirt goes into our nation's waters from a lack of soil erosion and sedimentation control. That is enough dirt to cover 100 football fields, 4 1/4 miles high -- higher than Mt. Denali (McKinley).**



# Cost To Correct the Effects of Erosion and Sedimentation



**\$6-13 Billion/Year**



# Soil Erosion & Sedimentation Impacts to Water



# **Destruction of Habitat for Aquatic Organisms**



**smothered spawning, rearing, feeding habitat**



# Flattening of Streambeds & Filling of Water Bodies



- **Increasing Flood Potential and Frequency**
- **Increasing Shoreline Damage**
- **Reducing Navigability**

# Altered Water Chemistry and Water Quality

## Chemicals Attached to Soil Particles Carried in Runoff

- organic pollutants
- soluble nutrients
- heavy metals





# Depleted Oxygen from Growth of Aquatic Vegetation



**fish & other aquatic organisms become stressed or die**

# **Turbidity of Water**



- **Altered Light and Temperature Conditions**
- **Reduced Recreational & Aesthetic Value**
- **Damaged Water Supplies**

# Best Sedimentation Control is Erosion Control

- **Erosion** - Process by which the land surface is worn away by the action of wind, water, ice, or gravity. Can be natural or accelerated. Soil particles are dislodged and put into motion.
- **Sediment** - Eroded soil particles suspended in water or air.
- **Sedimentation** - Process whereby the detached soil particles generated by erosion are deposited elsewhere on land or in water.



# Major Factors affecting Erosion

## Climate

- Rainfall amts, intensity, frequency
- Temperature

## Vegetative cover

- Binds soil & shields soil from raindrops
- Provides organic matter, slows runoff, & filters sediment

## Slope length & steepness

- Longer & steeper slopes speed runoff

## Soil

- Physical characteristics affect erodibility & settlement rate

# Soil Factors affecting Erosion & Sedimentation

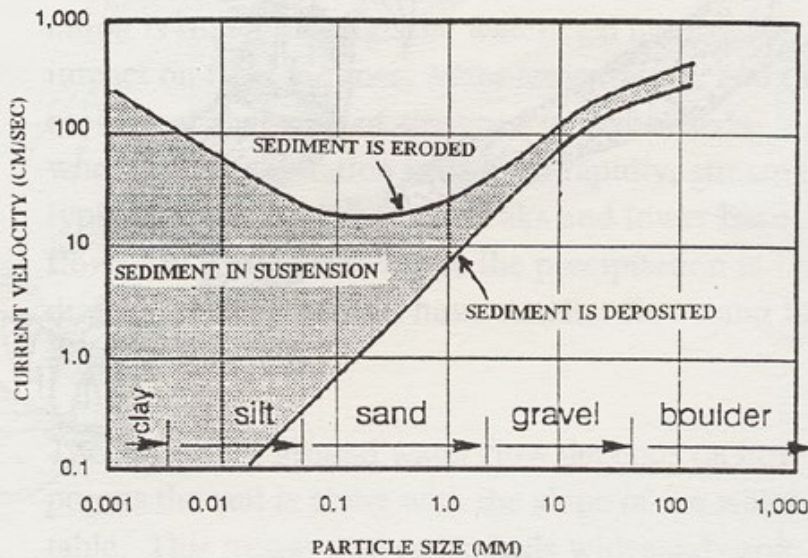


Figure 1: Erodibility of different soil types by streamflow.

	ERODIBILITY	RUNOFF POTENTIAL	SETTLEMENT RATE
<u>SILTY SOILS</u> silt, silt loam	H	M	L
<u>CLAYEY SOILS</u> clay, clay loam	M	H	L
<u>LOAMY SOILS</u> loam, sandy loam	M	M	M
<u>SANDY SOILS</u> sand	L	L	H

HIGH H    MODERATE M    LOW L

# Sources of Soil Erosion & Sedimentation

## Natural (geologic) Erosion:

- Result of natural process: water, wind, ice, gravity
- 30% of erosion of all sediment in US

## Accelerated Erosion:

- Result of human activity
- 70% of erosion of all sediment in US



# Natural (geologic) Erosion



**Water**

# Natural (geologic) Erosion



**Wind**



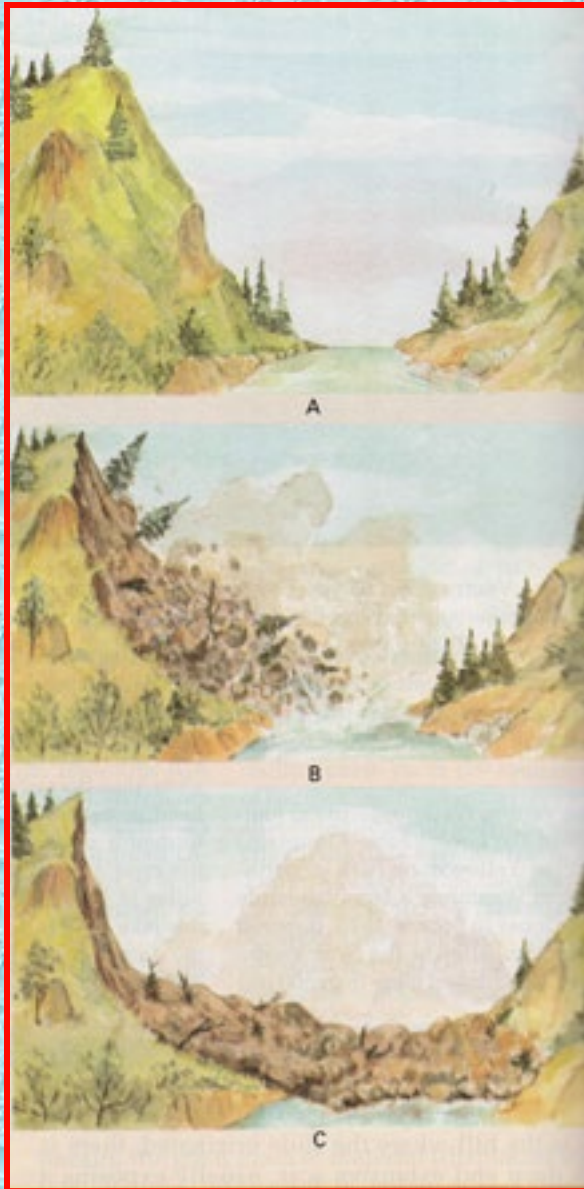
# Natural (geologic) Erosion



**Ice**



# Natural (geologic) Erosion



Gravity

# Accelerated Erosion: Agriculture



**Under a conservation plan, a farm will reduce sediment loss from 15-25 tons/acre/year to less than 5 tons/acre/year**

# Accelerated Erosion: Logging & Mining





# Accelerated Erosion: Construction



**Without proper planning & management, construction sites can contribute > 100 tons/acre/year of sediment**

# Accelerated Erosion: Landscape Modification



Major causes of erosive velocities of water: Parking lots & devegetation



# Point of Entry From Parking Lots





# Brief History of Michigan Soil Erosion and Sedimentation Control Regulation & the Federal Clean Water Act

- **1948: Federal Water Pollution Control Act (FWPCA) adopted**
  - Prescribed regulatory system mainly of state-developed ambient water quality standards applicable to interstate/ navigable waters
- **1972: FWPCA amended**
  - Established a system of standards, permits, and enforcement for “achieving fishable and swimmable waters” by 1983 & total elimination of pollutant discharges into navigable water by 1995
- **1972: Michigan adopts Soil Erosion and Sedimentation Control Act, 1972 PA 347**
  - State of Michigan at forefront nationally on nonpoint-source pollution, adopting SESC regulation 15 years before federal requirements on nonpoint-source pollution

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## Brief History (continued)

- **1977: FWPCA renamed Clean Water Act (CWA)**
- **1987: CWA amended**
  - Amendments recognized that point-sources of pollution were being adequately controlled, and that nonpoint-sources were causing most of the remaining water quality problems
  - Amendments required all states to conduct assessment of nonpoint-sources and develop a strategy to address problems
- **1988: Federal Enforcement (Section 309)**
  - Citizens allowed to institute civil actions against any person, the US, EPA, or other governmental agency for violation of effluent standards or failure to perform duty
  - Sediment releases classified as criminal acts

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## **Brief History (Continued)**

- **1994: Natural Resources & Environmental Protection Act, 1994 PA 451**
  - Michigan's environmental statutes codified into one all-inclusive statute
  - Soil Erosion and Sedimentation Control, 1972 PA 347, became Part 91 of 1994 PA 451, with no substantive changes to regulation
- **1998: Revised Part 17 Rules promulgated for Part 91**
  - Rules give greater clarity for Part 91 permit requirements, including requirements for acceptable SESC plan
- **2001: Part 91, 1994 PA 451, amended**
  - Senator Sikkema led effort to amend statute after "Arcadia Bluff" incident
  - Enforcing agencies held more accountable and to a higher standard administering statute
  - Penalties for violations significantly increased



# The Law in Michigan

## Part 91, 1994 PA 451, as amended

### Intent

- Minimize erosion
- Minimize sedimentation off-site & into waters of the State

### Permit required for all earth change activity

- ≥ 1 acre
- Within 500 feet of lake or stream
- Exempted: Plowing & tilling, some logging & mining, & minor disturbances

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# **The Law in Michigan (continued)**

## **Law Is Locally Enforced & Administered County**

- **Responsible for Part 91 unless a municipality has assumed responsibility or the earth change is by an Authorized Public Agency**
- **Must designate a County Enforcing Agency (CEA) by resolution or ordinance to administer & enforce on behalf of county**
- **Can have stricter regulation than State Act through ordinance**

## **Municipality**

- **May opt to administer Part 91 within its jurisdiction by ordinance approved by MDEQ as a Municipal Enforcing Agency (MEA)**
- **Applies to Cities, Villages, Charter Twps & General Law Twps located in a county with > 200,000 population**
- **CEA has no authority over an approved Municipal Enforcing Agency (MEA)**

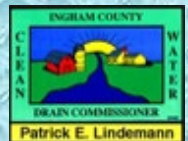
# The Law in Michigan (continued)

## State Agencies & Agencies of Local Units of Government

- May undertake earth change activities on their own projects without SESC permits from CEA or MEA, if approved by MDEQ as Authorized Public Agency (APA)

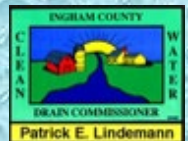
## Michigan Department of Environmental Quality

- Responsible for oversight of SESC program statewide
- Audits local programs, provides training, issues permits when earth disturbance activity crosses jurisdictions of enforcing agencies, takes enforcement action





**Keeping the soil on a site and out of the waters of the State begins with a carefully designed SESC Plan that includes best management practices to fit the site. After that, the key is to maintain, maintain, maintain.**



# Erosion Control BMPs

- **Temporary & Permanent Vegetation**
- **Diversions or Terraces**
- **Check Dams**
- **Special Grading Methods that ↑ Surface Roughness or Scarify Slope**
- **Tackifiers (binds soil together)**
- **Windbreaks**

# Sedimentation Control BMPs

- **Perimeter Barriers like Silt Fence (biodegradable fence available)**
- **Sediment Basins & Traps**
- **Polyacrylamides (PAMs) :Floc Logs™**
- **Aggregate Entrance Driveways**
- **Vegetative Filters**

































*How to find out more about the  
SESC program in Michigan?*

*MDEQ Web Site*

*[www.michigan.gov/deq](http://www.michigan.gov/deq)*





# Department of Environmental Quality



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## Welcome

- [Navigating our new Department of Environmental Quality website](#)  
The new Department of Environmental Quality website represents the latest enhancement to the award-winning Michigan.gov web portal. This site includes many important features designed to increase citizens' access to Michigan's services. These features include a common look-and-feel, search engine, Quick Links and links to Michigan's privacy and security policies. >

## Announcements

- [Marquette Office of the DEQ is moving April 29, 2002](#)  
Marquette Office of the DEQ is moving
- ["State of the Great Lakes 2001 Annual Report" \(pdf file\)](#)  
Each year the Office of the Great Lakes prepares an annual report on the status of progress made toward restoring and protecting the Great Lakes ecosystem.
- [Detroit Office of the DEQ is moving April 17, 2002](#)



# Good Soil Erosion & Sedimentation Control = Clean Water

