Southern Indiana Stormwater Advisory Committee

Presents

Qualified Professional Inspector

John Ricketts, PE/Stantec Consulting Services

Stantec

Course Instructor-John Ricketts

- Instructor for
  - Alabama's Qualified Credentialed Inspection Professional Course
  - Kentucky Erosion Prevention and Sediment Control (KEPSC) Qualified Inspector Course
- 22 years experience in stormwater management

Common Language

- IDEM – Indiana Department of Environmental Management
- USEPA – United States Environmental Protection Agency
- NPDES - National Pollutant Discharge Elimination System
- EPSC - Erosion Prevention and Sediment Control
- BMPs - Best Management Practices

Common Language

- PCP – Perimeter Control Plan
- PPP – Perimeter/Outfall Protection Permit
- SWPPP - Stormwater Pollution Prevention Plan
- SWQMP – Stormwater Quality Management Permit
- LMOA – Long-term Maintenance and Operations Agreement
- MS4 – Municipal Separate Storm Sewer System

Common Language

- Rule 5 – NPDES Stormwater General Permit for Construction Activity
- Rule 13 – NPDES Stormwater Permit for MS4
- USACE – United States Army Corps of Engineers
- SPCC – Spill Prevention Control and Countermeasure
- NOI – Notice of Intent
- NOT – Notice of Termination

Overview of the Day

- Instruction and dialogue in the morning
- Lunch
- Complete instruction and dialogue
- Afternoon exercise
- Q&A
- Exam

Why is Course Needed?

- Rule 5 requires inspection be conducted by "trained individual"
- Southern Indiana SWAC realized need for consistent approach
- Course provides basis for defining "trained individual"

Purpose of Course

- Train you so that you can:
  - Help keep pollutant laden runoff from entering waters of the State
  - Help keep the permit holder in compliance with their permit
  - Pass the exam and receive the title of "Qualified Professional Inspector"

Morning Overview

- Qualified Professional Inspector Program
- Permitting overview
- Water quality control design overview
- Inspector's roles and responsibilities

Afternoon Overview

- Use an example project to learn how to:
  - Read and interpret SWPPP
  - Complete an inspection form
  - Communicate the inspection findings to the appropriate persons
- Questions & Answers

Registration and Licensure

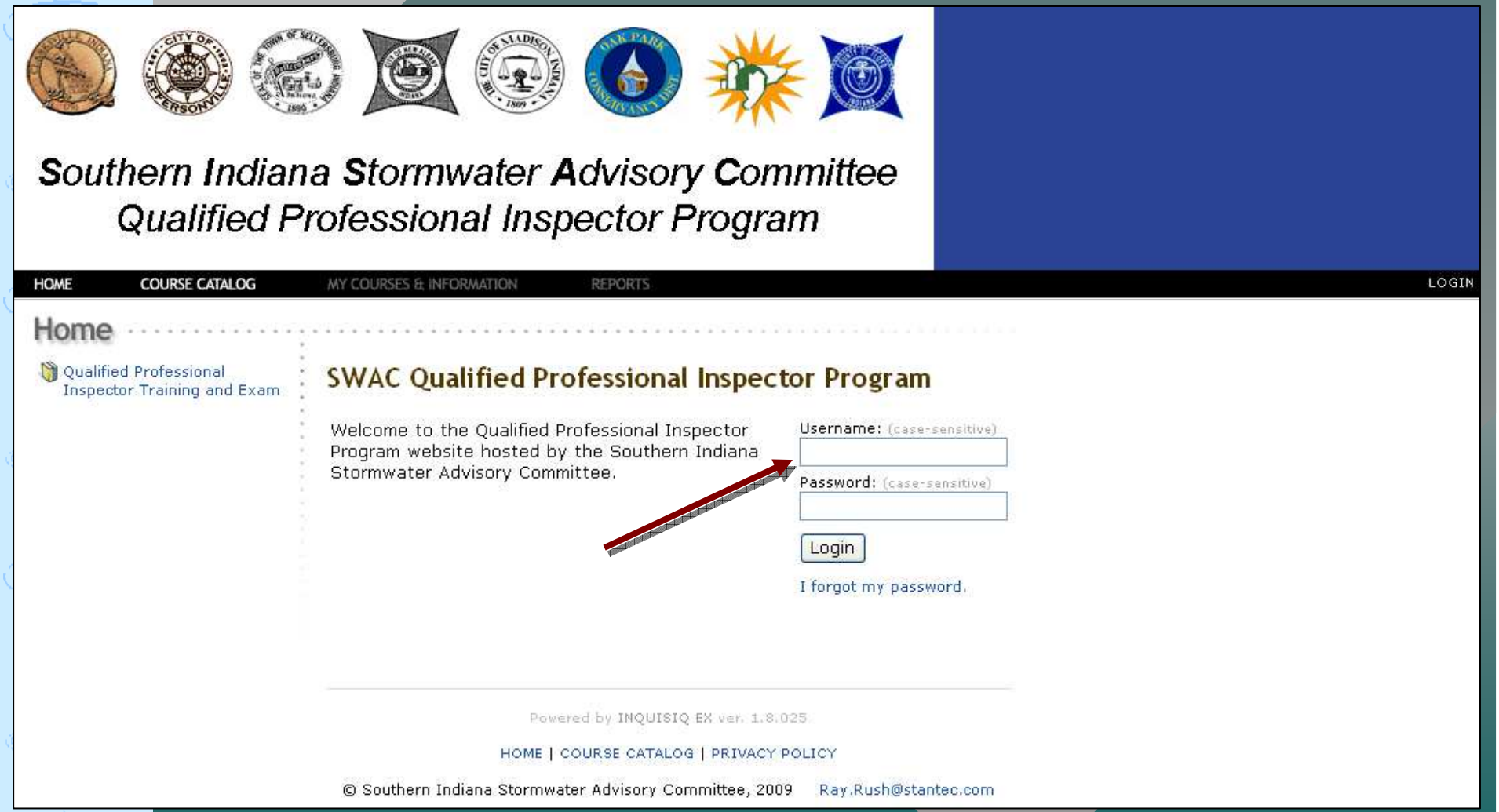
Course Completion Overview

- Be present for at least 90% of today's class time to be considered attending
- Pass QPI exam
- Written notification of pass/fail status provided to you and participating community
- Register/License with participating community

Taking Exam

- Two options for taking exam
  - Paper version at the end of today
  - On-line anytime
- On-line information was provided with registration confirmation letter

How to Start Exam



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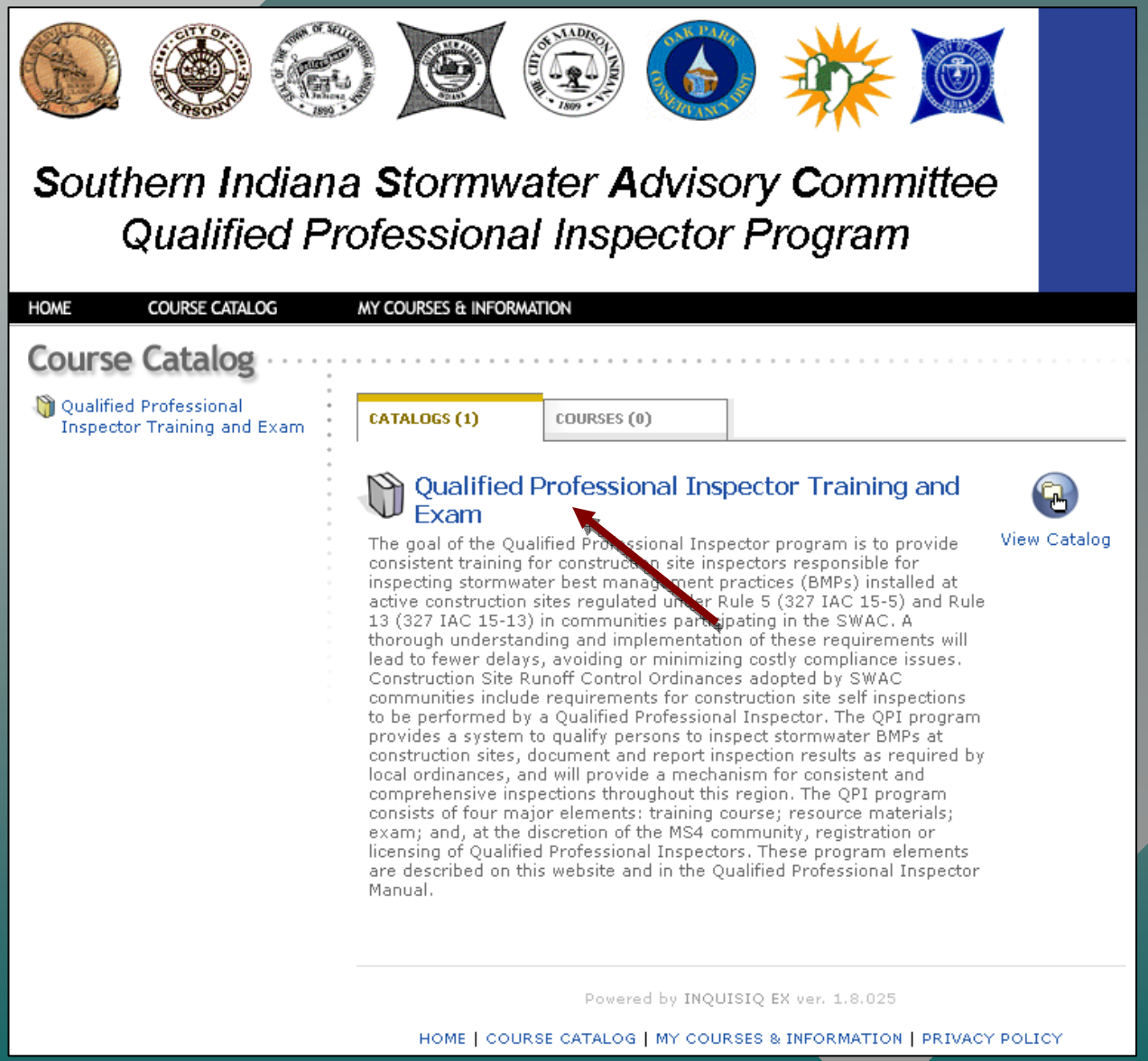

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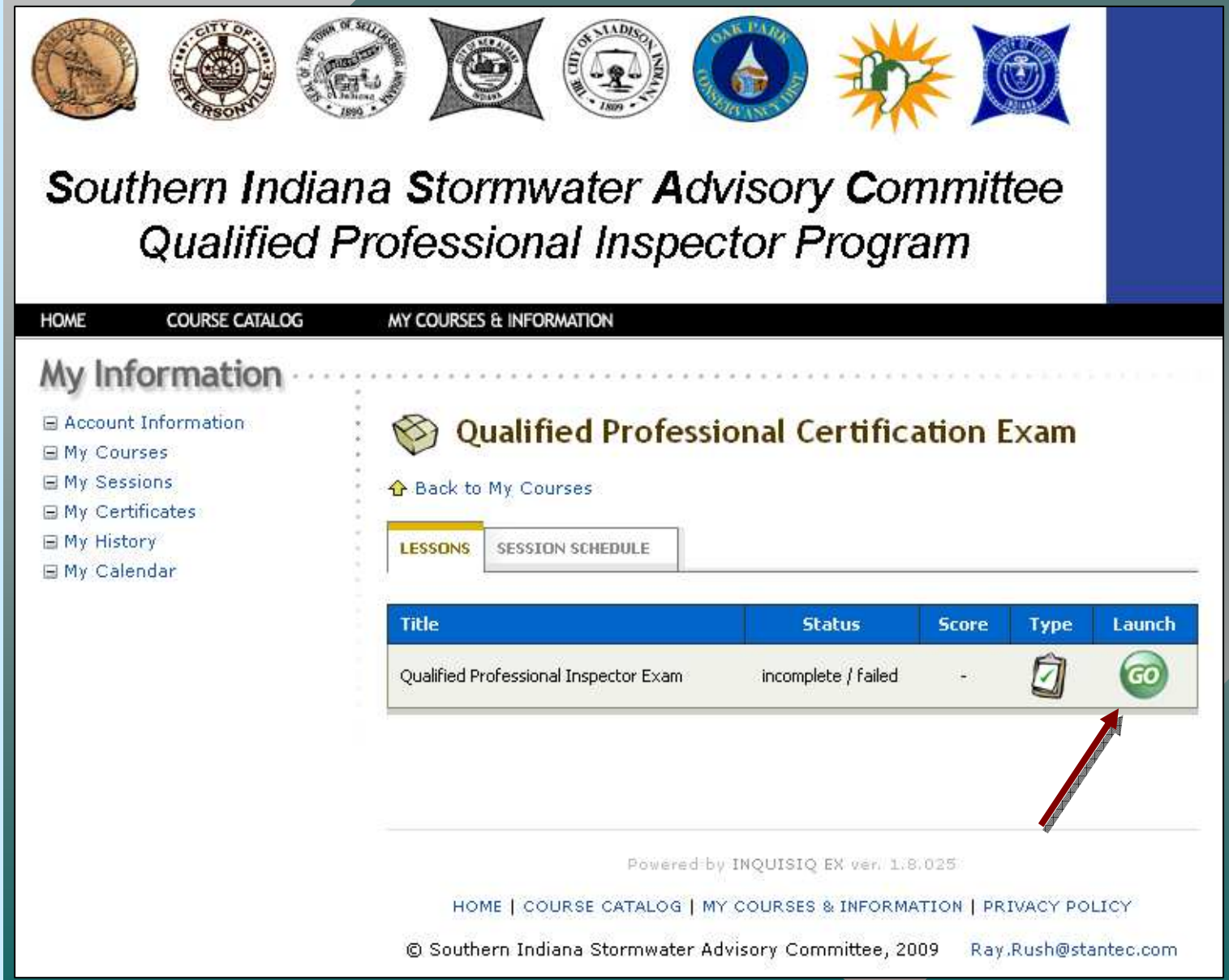


How to Start Exam

Exam

- Have to get minimum of 75% correct to pass
- 50 questions
- Consists of four parts
  - General permitting
  - BMPs
  - SWPPP Review
  - Inspection

Re-examination

- If failed and did not attend class, then register for class, attend and take exam again
- If failed and did attend class, then register for class, attend and take exam again
- Registration fee may be waived if attend class and take exam within 6 months of initial exam attempt

Licensure/Registration

- Once pass exam, each participating community may require their own license/registration to perform inspections
- Fees may be required for licensure/ registration
- License/registration duration is community specific and stated in ordinance
- Local ordinance will also state reasons for revoking licensure/registration

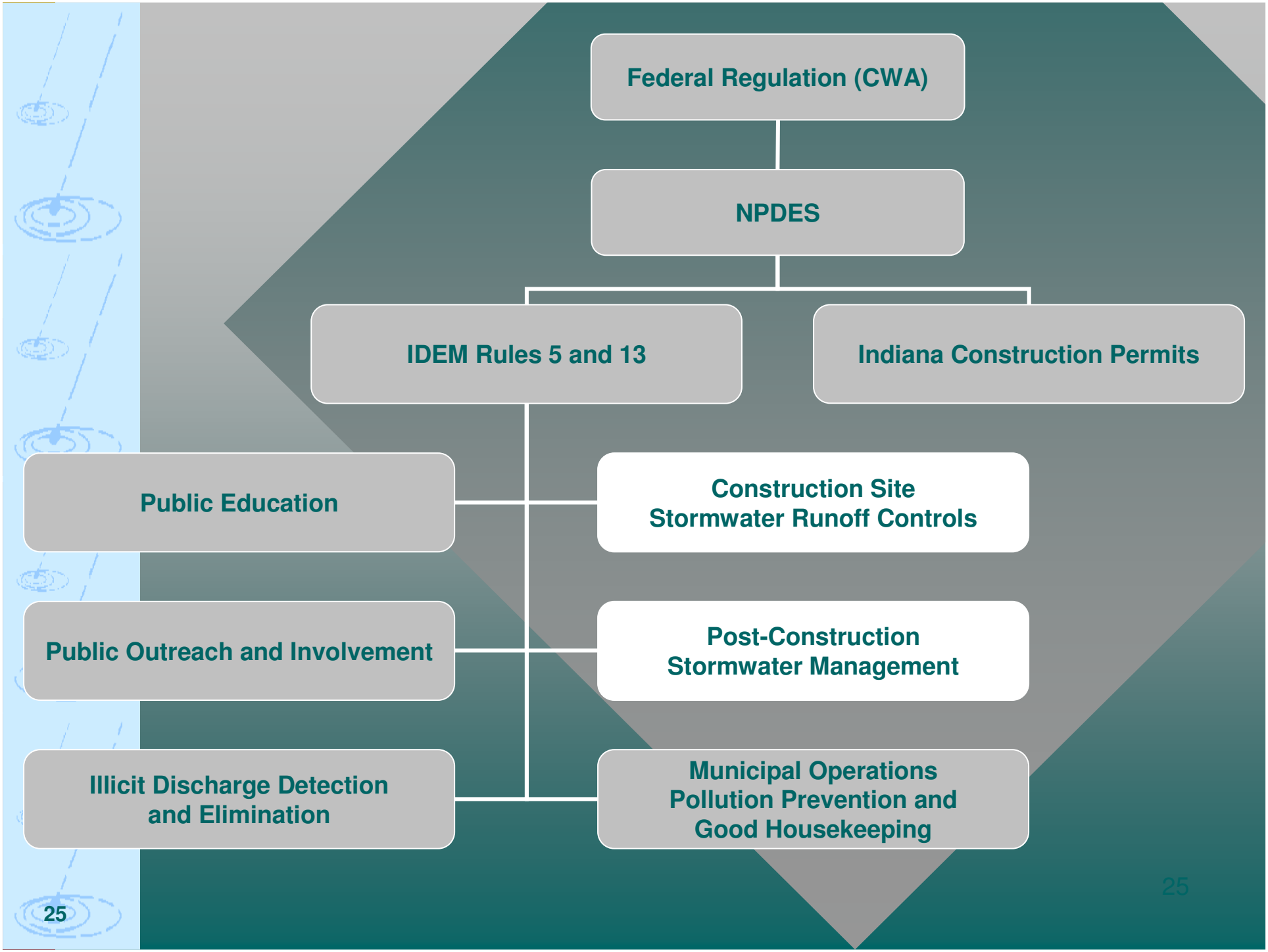
Permitting

Regulations and Permitting Process

- Goals:
  - To learn about the state and local agencies involved with erosion prevention and sediment control
  - To learn about the construction stormwater permitting process

Regulations That Apply

- Clean Water Act (CWA)
- National Pollution Discharge Elimination System (NPDES)
- Indiana Department of Environmental Management (IDEM) Rules 5 and 13
- Local ordinances


Federal Regulation (CWA)
NPDES
IDEM Rules 5 and 13
Indiana Construction Permits
Public Education
Construction Site Stormwater Runoff Controls
Public Outreach and Involvement
Post-Construction Stormwater Management
Illicit Discharge Detection and Elimination
Municipal Operations Pollution Prevention and Good Housekeeping

25

Clean Water Act

- To restore and maintain chemical, physical, and biological integrity of US waters
- To support the protection of fish, shellfish, and wildlife and recreation in and on the water
- Protects surface water quality by
  - Reducing direct pollutant discharges into waters
  - Financing wastewater treatment facilities
  - Managing polluted runoff

National Pollution Discharge Elimination System (NPDES)

- EPA program designed to control water pollution by regulating point sources that discharge pollutants into US waters
- Now regulates non-point sources including construction sites and urban storm sewers
- Indiana Rules 5 and 13 designed to regulate on the state level

IDEM Rule 5

- Requires construction sites one (1) acre or greater or smaller sites that are part of a common plan of sale or development that disturb one acre or more to obtain a permit
  - Notice of Intent (NOI)
  - Construction Plan – Includes project description and layout, grading plan, drainage plan, storm water pollution prevention plan, and post-construction plan

IDEM Rule 13

- Affects construction in MS4 areas
- Requires MS4s to create construction and post-construction ordinances regulating stormwater runoff

Local Ordinances

- Check with your municipality for specific ordinances
- Local MS4 communities have passed construction ordinances
- Post-construction ordinances have passed or are in the works for 2009

Permitting Process: Pre-construction

- Public Notice
- Plan Submission and approval
- Notice of intent (NOI)
- Filing fee

Permitting Process: Site Preparation

- Perimeter Control Plan (PCP)
  - Helps keep sediment from leaving site
  - Addresses specific solutions for construction entrances and exits, outfalls, and buffer zones
- Perimeter/Outfall Protection Permit (PPP)
  - Grants permission to break ground to implement PCP at perimeter and outfalls
  - DOES NOT grant permission to break soil for whole site

Permitting Process: Active Construction

- Stormwater Pollution Prevention Plan
  - Helps keep sediment and other pollutants from leaving site
  - Addresses controls for specific pollutants
  - Includes construction and control sequencing
- Grading Plan
  - Shows how proposed construction will impact topography of site

Permitting Process: Active Construction

- Drainage Plan
  - Shows drainage pattern after major grading on site has occurred
- Stormwater Quality Management Permit (SWQMP)
  - Grants permission to break ground on remainder of site

Permitting Process: Future Management

- Post-construction SWPPP
  - Description of proposed land use including impervious area
  - Describes pollutant sources and how pollutants will be treated (post-construction BMPs)
- Notice of Termination (NOT)
  - Land disturbing activities are complete
  - Temporary BMPs removed
  - Permanent BMPs are in and working

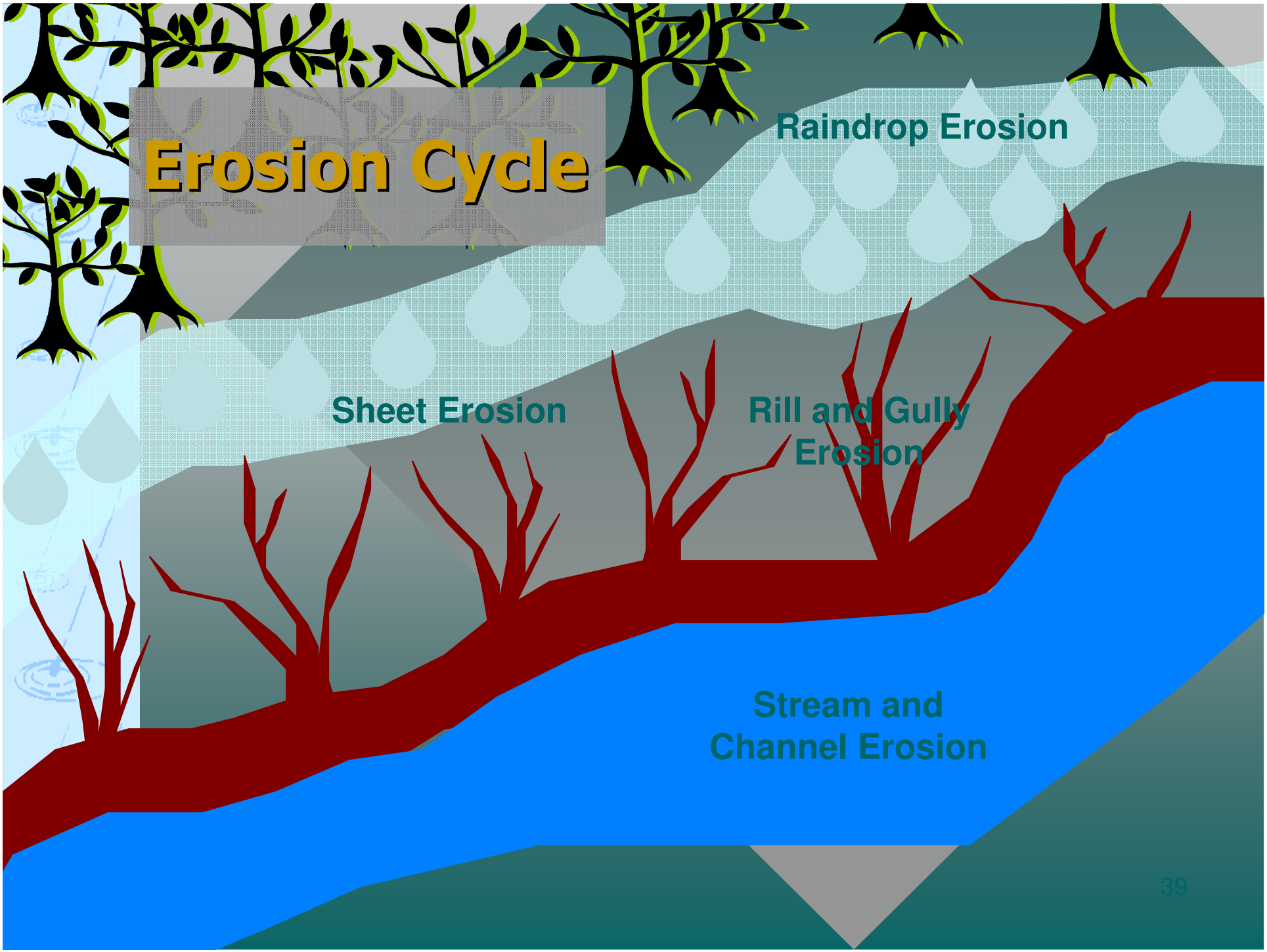
Permitting Process: Future Management

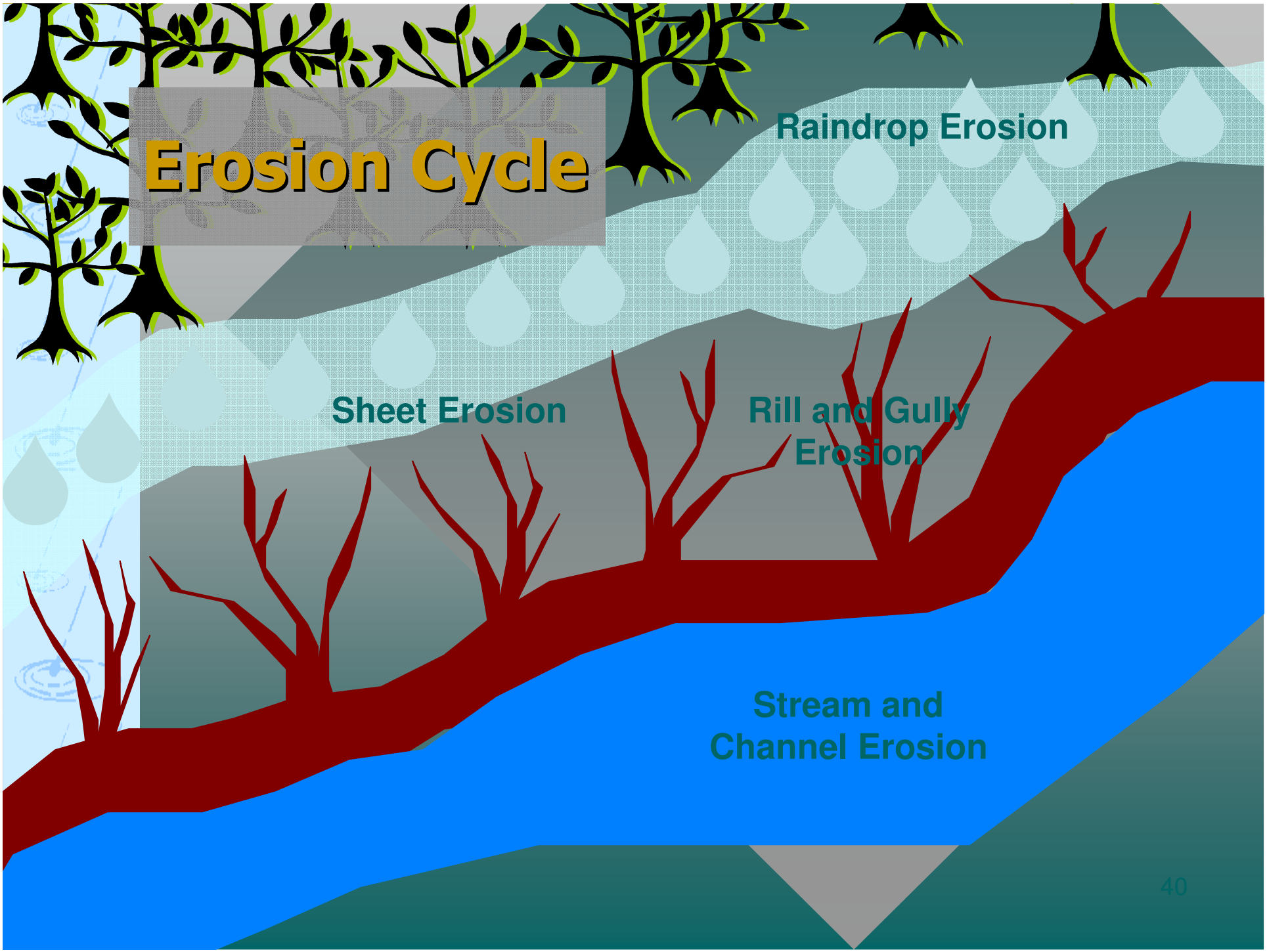
- Long Term Operations and Maintenance Agreement (LTOMA)
  - Maintenance guidelines for post-construction BMPs
  - Contract between MS4 and owner
  - Recorded with deed

Water Quality Control Design

Erosion

- Raindrop (splash) – breaks down soil structure
- Sheet - loss of sediment over an entire area due to slope runoff
- Rill - sheet flow concentrated into tiny channels
- Gully - volume of runoff is highly concentrated


Erosion Cycle
Raindrop Erosion
Sheet Erosion
Rill and Gully Erosion
Stream and Channel Erosion


Erosion Cycle
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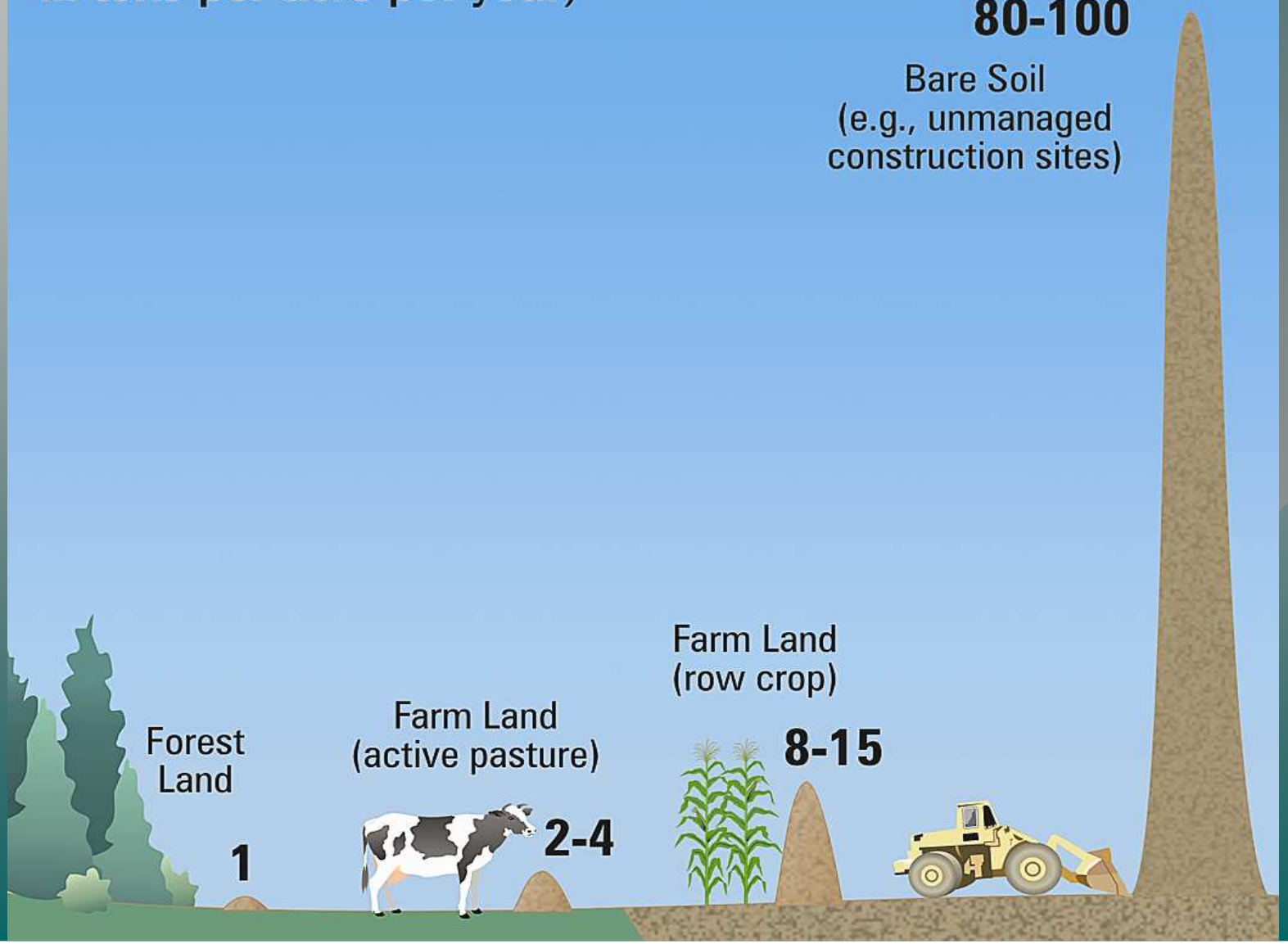
Typical erosion rates for land-based activities

(soil loss from various land areas, in tons per acre per year)



What is Erosion Prevention?

- Keeping soil from being dislodged and moving
- Five measures to prevent erosion
  - Site preparation measures
  - Soil stabilization measures
  - Slope protection measures
  - Channel stabilization measures
  - Stream protection measures

What is Sediment Control?

- Sediment control refers to trapping sediment particles that have become dislodged during rainfall, before the sediment leaves the construction site
- Sediment control BMPs remove pollutants from runoff by
  - filtering the runoff to remove participles
  - slowing or trapping runoff to allow heavy particles to settle out

Pollution is Not Just Dirt

- Oil, grease, and fuels
- Nutrients from fertilizers, pesticides, construction chemicals
- Heavy metals from galvanized metals
- Paint

Effects of Development

- More impervious surface area
- Increases runoff rate and volume
- Decreases infiltration into soils
- Runoff exposed to more pollutants


Undeveloped
Rainfall
Infiltration
flow
time
gage


Developing
flow
time
gage


Post-Development
Runoff
flow
time
gage

Water Quality and Environmental Effects

- Threatens groundwater supplies
- Increases rate and severity of flooding
- Impairs stream habitat
- Increases stream temperature
- Affects organisms in the water, decreasing their habitat and populations, even total kills

Soils and Erosion Prevention

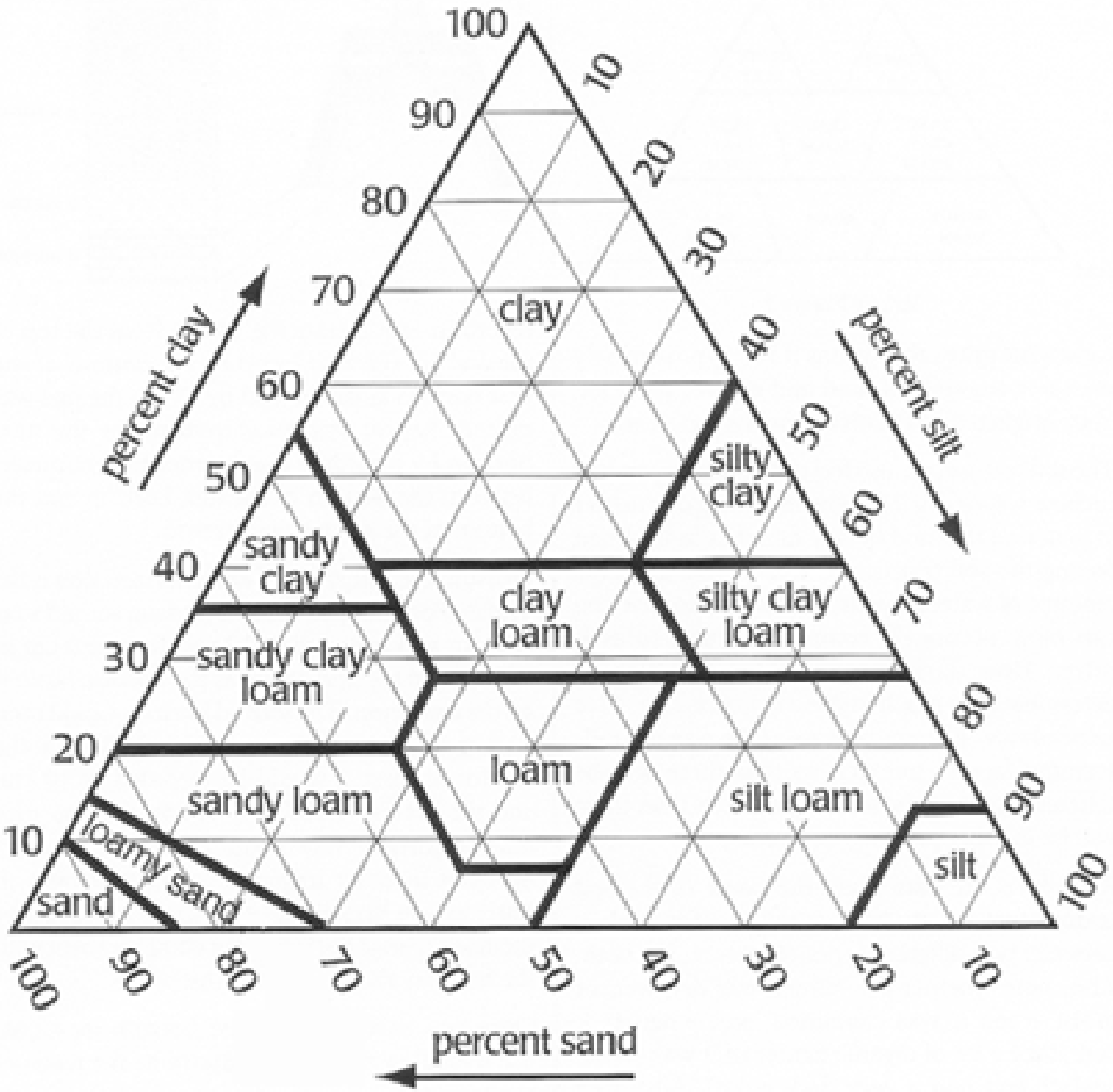
- Knowing what kind of soil is present will help you implement SWPPP
- Important soil properties include particle size, texture, and runoff potential
- Soils are made up of particle size classes

  stone gravel sand silt clay

Soil Textures

- Proportions of these particles determine soil texture, which is an indication of how soils will behave
- Soils can be sandy, loamy, or clayey
- Textural triangle illustrates different classes of texture

Textural Triangle



Hierarchy of Soil Erodibility

Soil Type	Erodibility
Low-Plasticity Silt	Most Erodible
Silty Sand	
Clayey Sand	
High-Plasticity Silt	
Low-Plasticity Organic Soil	
The above soils are much more erodible than the following:	
Low-Plasticity Clay	
Small Clay	
Silty Gravel	
Well-Graded Sand	
Poorly Graded Gravel	
Well-Graded Gravel	Least Erodible

Runoff Potential

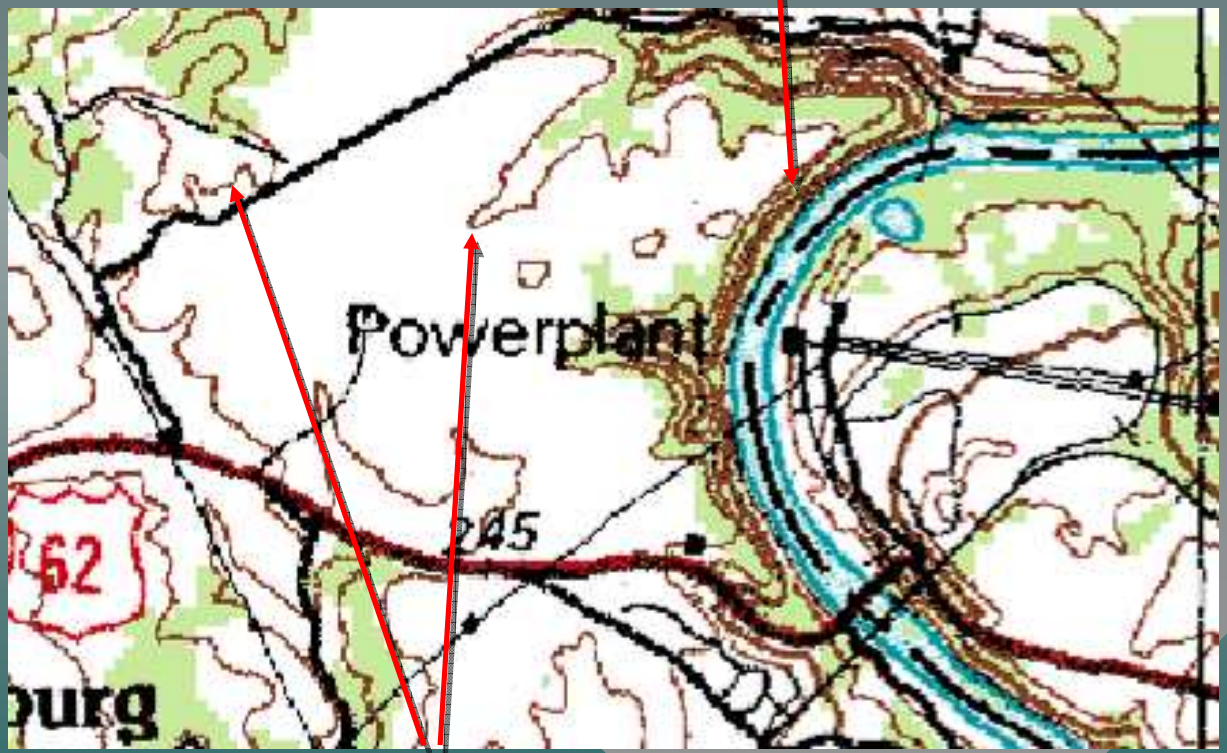
- Soil surveys conducted placing soils in hydrologic groups (HSG), which are based on potential runoff estimates
- Surveys are available in narrative or map form
- Surveys are available online at soils.usda.gov

Site Characteristics

- Topography
- Slope
- Drainage area

Topography and Slope

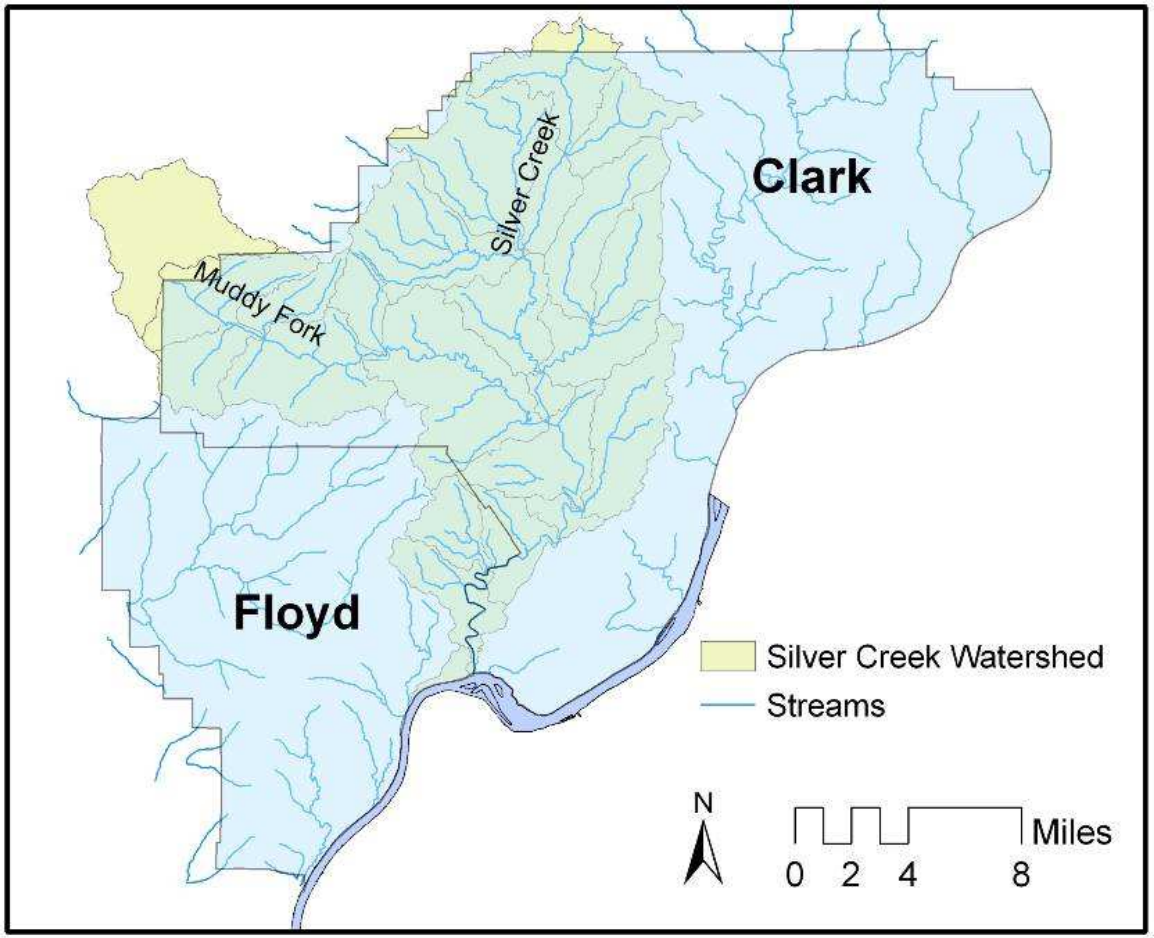
- Closely-clustered contour lines indicate relatively steep slope



- Distant contour lines indicate relatively flat slope

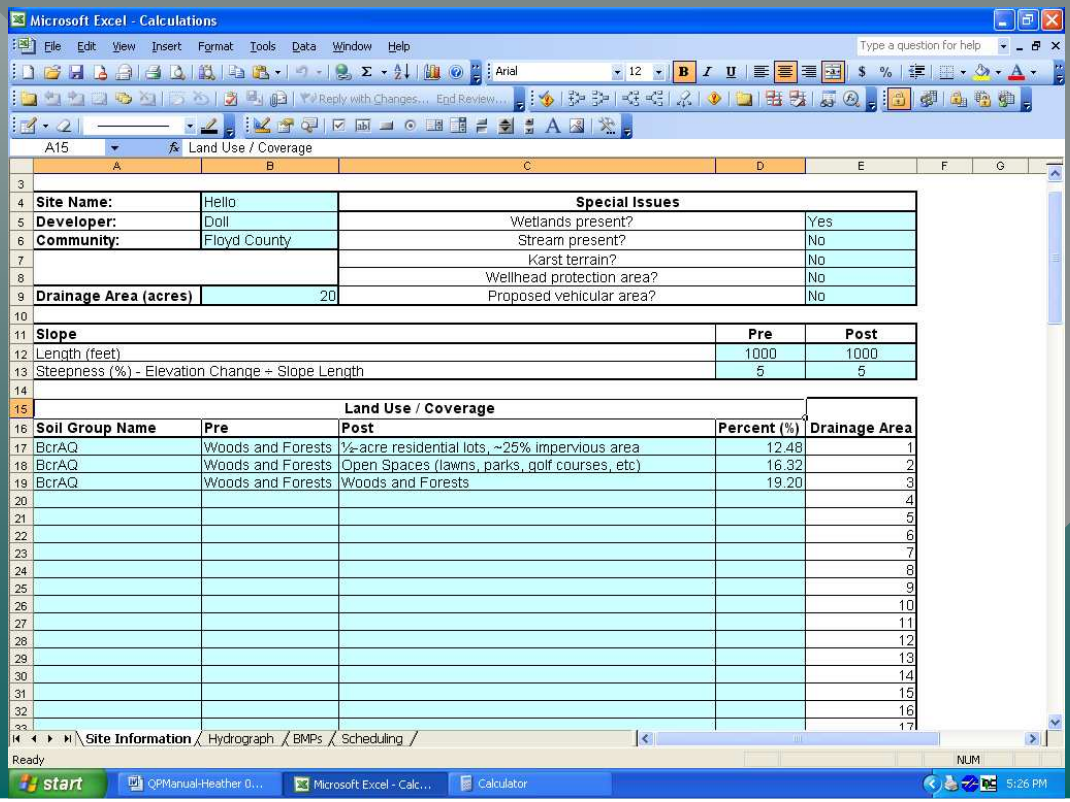
Drainage Area

An area of land that drains into a single location, such as a stream, lake or river.



BMP Design Tool

- Can download from SWCD's website
- Input: four different spreadsheets
- Output: anticipated soil loss from site



Role of QPI

Role of QPI

- Compliance with permits and regulations
- SWPPP implementation
- Inspections
- Documentation
- Communication of inspection findings

Before Construction Begins

- Obtain copy of SWPPP and review
  - Are BMP's where you would expect them?
  - Are BMP's shown, applicable to situation?
  - Any other questions
- Conduct preconstruction evaluation of project
  - Site conditions: soils, special environmental features
  - Adjoining property conditions
  - Drainageway condition

Preconstruction Meeting

- Purpose: Review SWPPP and discuss how to implement
- Attendees: SWPPP preparer, owner, MS4 inspector, and construction foreman
- Location: Meet onsite so you can physically see where plan will be implemented

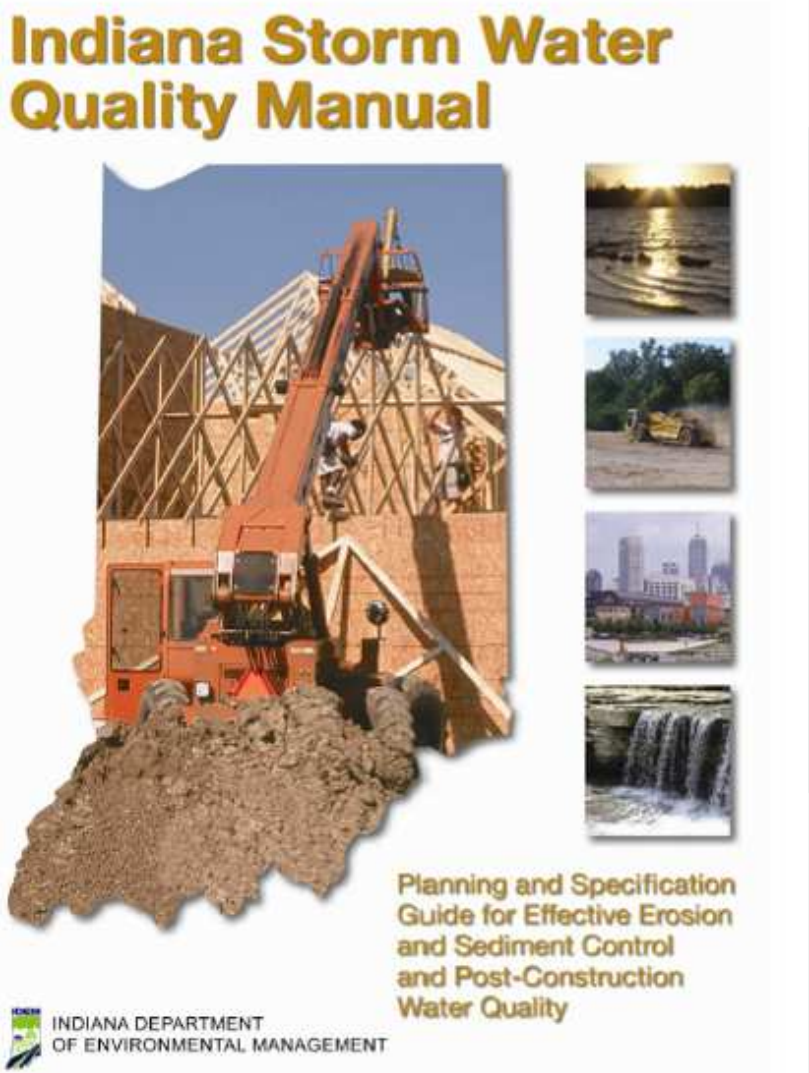
Preconstruction Meeting Discussion Topics

- SWPPP
- Permits, including 401/404, floodplain
- How to update SWPPP
- Where latest SWPPP will be kept
- How to track rainfall
- How inspection report communication will occur

Inspection: Sample Preconstruction Form

Tools

- SWPPP
- Indiana Storm Water Quality Manual
- BMP Stormwater Management Manual
- Any local field guides

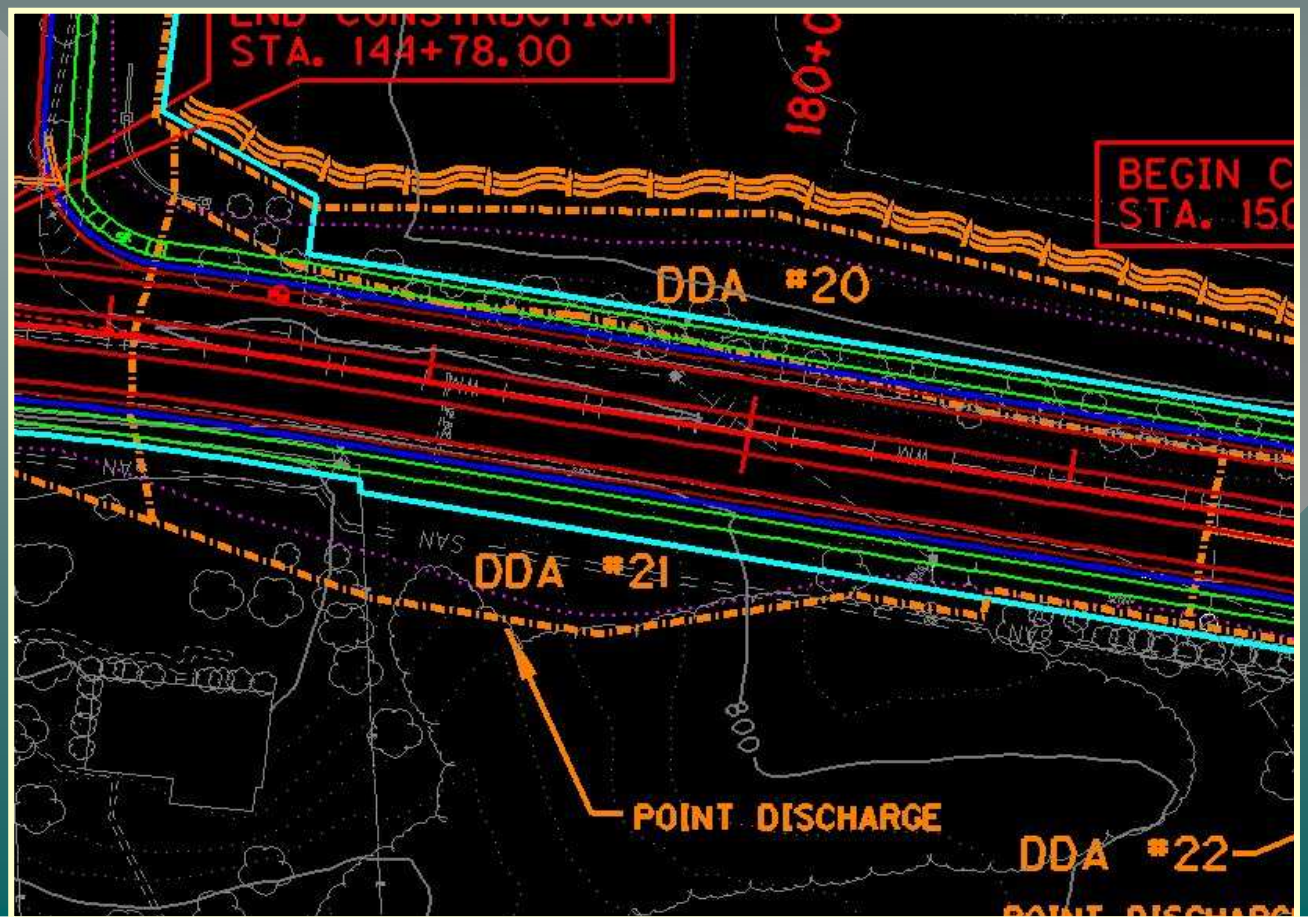


Where To Go For Help

- SWPPP preparer
- Local stormwater coordinator
- SWCD representative
- IDEM

Dividing Site into Manageable Pieces

- Suggest disturbed drainage areas: area that has a single point or overland flow discharge (point discharge example)



Inspection Frequency

- Rule 5 (minimums)
  - At least once every seven days
  - End of the next business day following a rain event of 0.5” or greater
- Local ordinances may vary
- More frequent inspections can ensure proper BMP function, decrease chances of failure and citation

Measuring Rainfall

- Have rain gauge onsite
  - $7 plastic gauge to $100 wireless gauge
  - Must be placed in open area
  - Remember to empty gauge after each rainfall event
  - Document rainfall amounts on report
- Backup to onsite rainfall data can be found on internet
  - Make sure data represents the site location
  - Data can only be seen for the previous day

What to do During Inspection

- Assess correct functioning of EPSC and good housekeeping measures, including maintenance
- Identify additional measures that may be necessary to be in compliance with permit
- Goals
  - Compliance with permit and regulations
  - No pollutant laden stormwater runoff leaving site

How to Conduct Inspection

- Construction entrance/exit
- For each drainage area of site
  - Has land disturbance occurred since last visit?
  - Outlet

    Pollutant laden runoff left site?

    Runoff causing downstream damage?

How to Conduct Inspection

- For each drainage area of site (cont.)
  - Upstream BMP's
    - Installed and operating properly?
    - Maintenance needed?
  - Perimeter Controls
    - Installed and operating properly?
    - Maintenance needed?

- Good housekeeping measures

Documentation

- Regulations say evaluation report must contain:
  - Inspector's name
  - Date of evaluation
  - Problems identified at the site
  - Corrective actions recommended
  - Corrective actions taken by Contractor
- Recommend adding the following:
  - Site location
  - Amount of rainfall
  - Scope of inspection
  - Signature (inspector, and if possible Contractor)

Documentation is Critical!

If there is no report, it's like the inspection *never happened!*

Inspection: Sample Inspection Report

Communicating Inspection Findings

- Communicate inspection results back to SWPPP designer and appropriate site personnel
  - Provide copy of report
  - Verbal

Changing the SWPPP

- Reasons for change
  - Change in site conditions
  - SWPPP is not effective
- Revisions should be performed as determined during Preconstruction Meeting
- Be sure to keep updated SWPPP on site

Post-construction Inspections

- May be asked to perform these as well
- Obtain copy of design of BMP
- Obtain copy of Long Term Operations and Maintenance Agreement (LTOMA)
- Follow local ordinance requirements for inspection