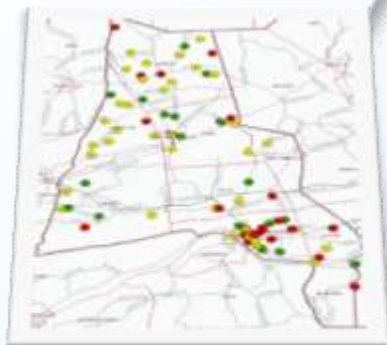




[BUILDING RELATIONSHIPS.
DESIGNING SOLUTIONS.]



Managing Risk Beyond the Floodplain

Using
Stormwater Master Planning
and Existing Problem Areas
to Reduce Adverse Impacts
from New Development

Presented by
Brad Newlin, PE, CFM
Project Manager

**MAFSM's 6th Annual Conference
New Maps, New Regs, Reducing Flood and Stormwater Impacts in Maryland
October 21, 2010**

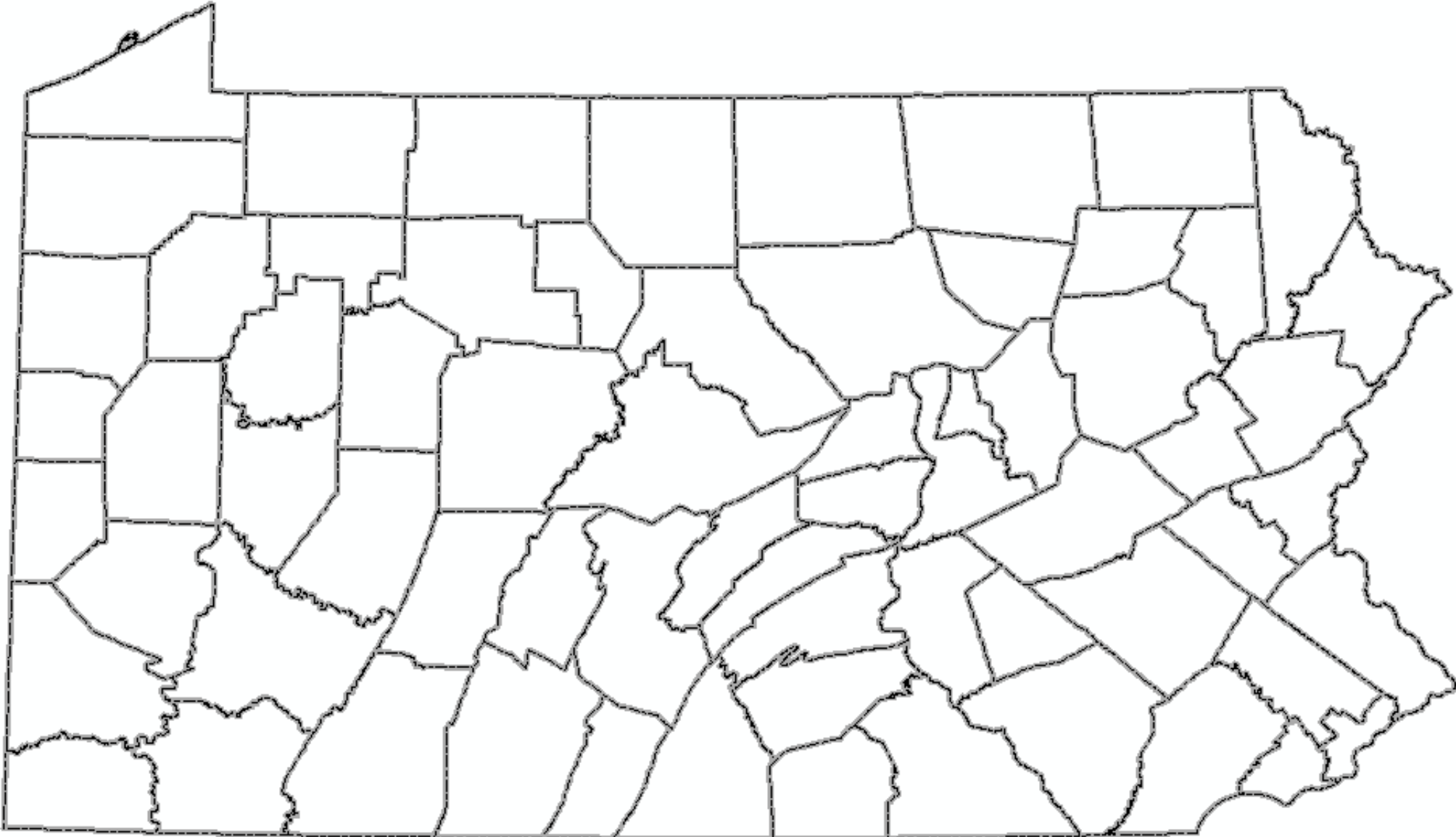
Background

- **Background**
 - **Governmental Units in PA**
 - **Act 167 History**
 - **Stormwater Master Planning**
- **Problem Area Identification**
- **Problem Area Prioritization**
- **Connection to the overall watershed**
- **Correcting the problem...**

HRG

Herbert, Rowland & Grubic, Inc.
Engineering & Related Services

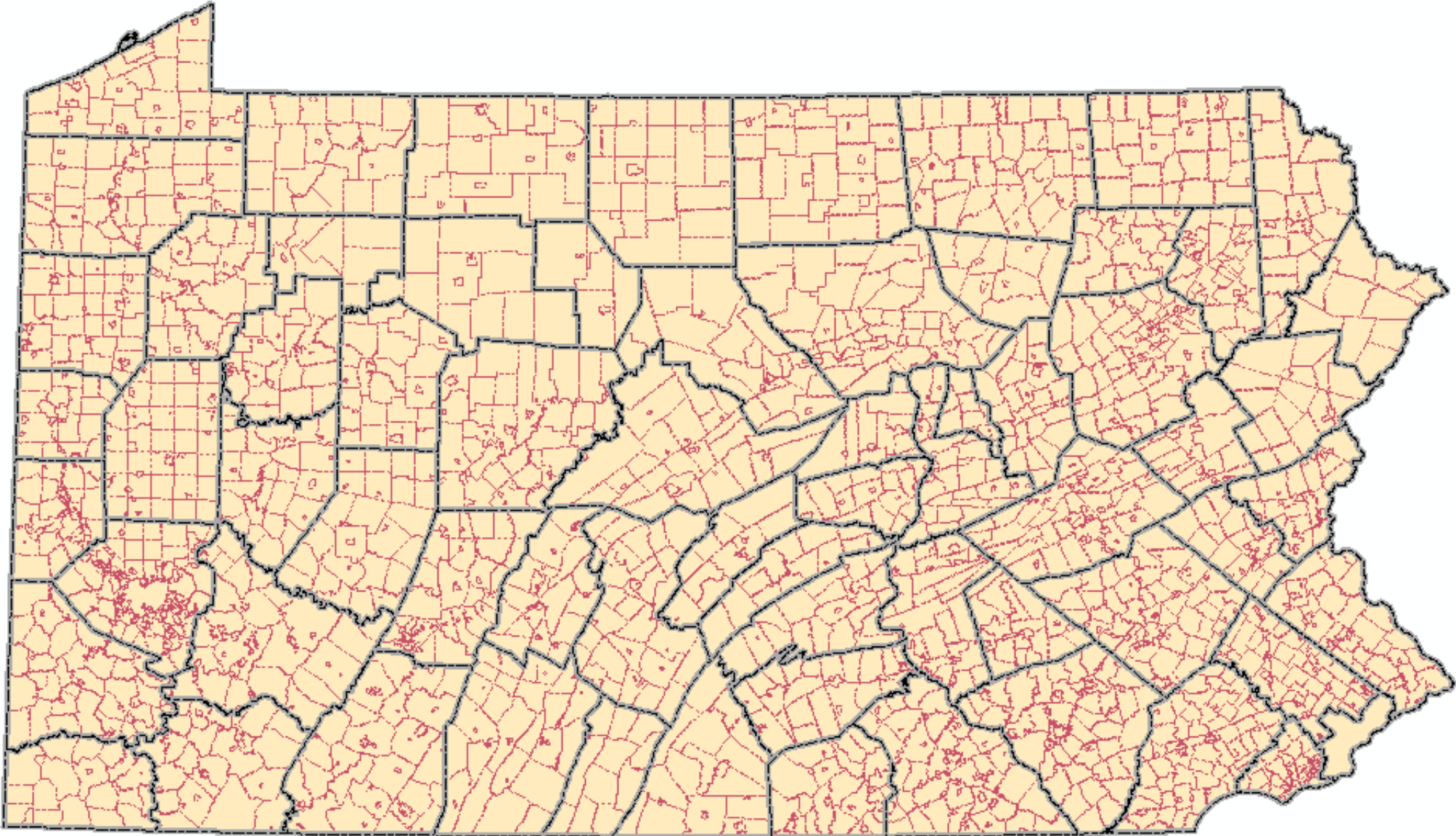
Background



HRG

Herbert, Rowland & Grubic, Inc.
Engineering & Related Services

Background



Background

Act 167 Section 3: Purpose and Policy

- (1) Encourage planning in each watershed to promote sound land use practices.

SOUND water and land use policy

- (2) Authorize a coordinated management plan for the carrying capacity of the maximum sustainable regimes and natural water of the Commonwealth; and to protect and conserve ground waters and groundwater recharge areas.

PRESERVE and RESTORE

- (3) Encourage local water conservation of natural resources, the preservation of recreational areas.

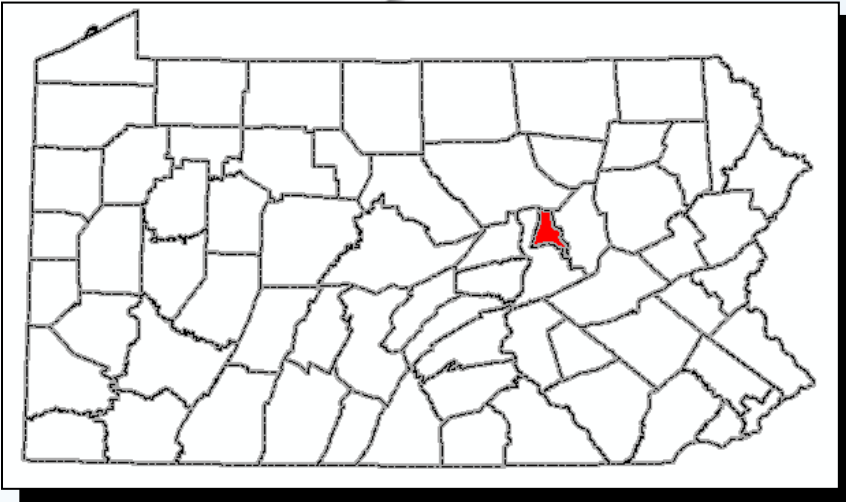
LOCAL

Background



Background

Montour County Example



Storm Event	Number of Buildings at Least Moderately Damaged	Total Economic Loss
10	12	\$7.0 million
50	20	\$10.3 million
100	23	\$14.1 million

Source: PEMA (2009)

Current Blizzard Run



Blizzard Run Floodplains



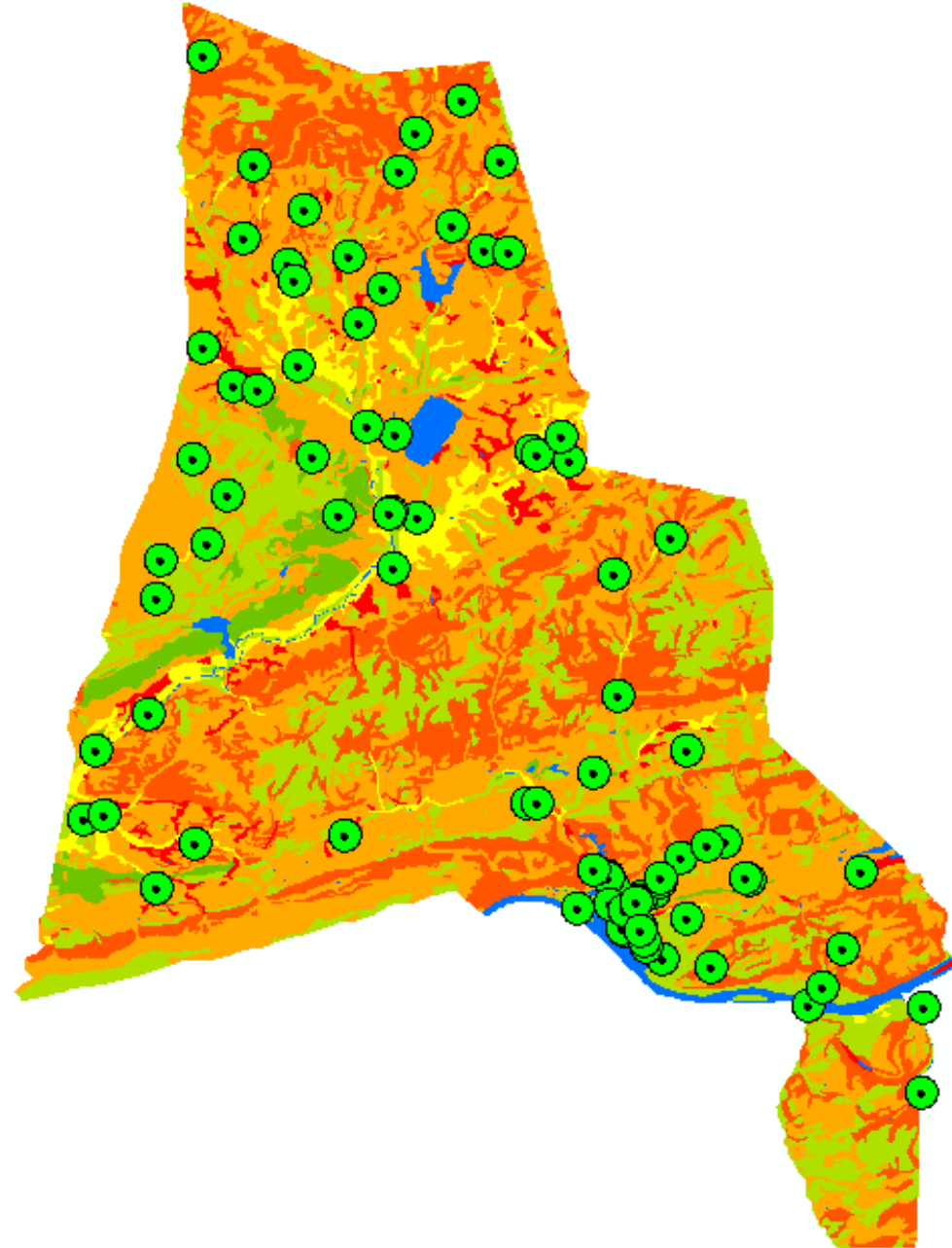
Identification

- Available Data: GIS
 - NRCS Soils

Low Runoff Potential



High Runoff Potential



Identification

- Phase 1: Identification and Scope

COUNTY WATERSHEDS

Act 167 Stormwater Management Plan

QUESTIONNAIRE

PLEASE COMPLETE THE FOLLOWING AND RETURN THE QUESTIONNAIRE AND MARKED UP MAP TO:

DISTRICT MANAGER	
556 Route 402, Suite 1 Hazlet, PA 16828 (570) 226-8220	(An addressed envelope with postage is provided for your convenience)

Person completing questionnaire

Municipality	
Name	
Phone	
e-mail	


1. Does your municipality have?

	Yes	No	Location/Date
Comprehensive Plan	<input type="checkbox"/>	<input type="checkbox"/>	
Zoning Ordinance	<input type="checkbox"/>	<input type="checkbox"/>	
Subdivision/Land Development Ordinance	<input type="checkbox"/>	<input type="checkbox"/>	
Floodplain Regulations *	<input type="checkbox"/>	<input type="checkbox"/>	
Stormwater Management Regulations *	<input type="checkbox"/>	<input type="checkbox"/>	
Erosion Control Regulations *	<input type="checkbox"/>	<input type="checkbox"/>	
Drainage Regulations *	<input type="checkbox"/>	<input type="checkbox"/>	

*For the above regulations, please list where the regulation is found in the "Location" column.
Use the following abbreviations:
CP = comprehensive plan ZO = zoning ordinance
BC = building code SO = separate ordinance
SL = subdivision/land development ordinance

Identification

- Phase 2:
Field Visits

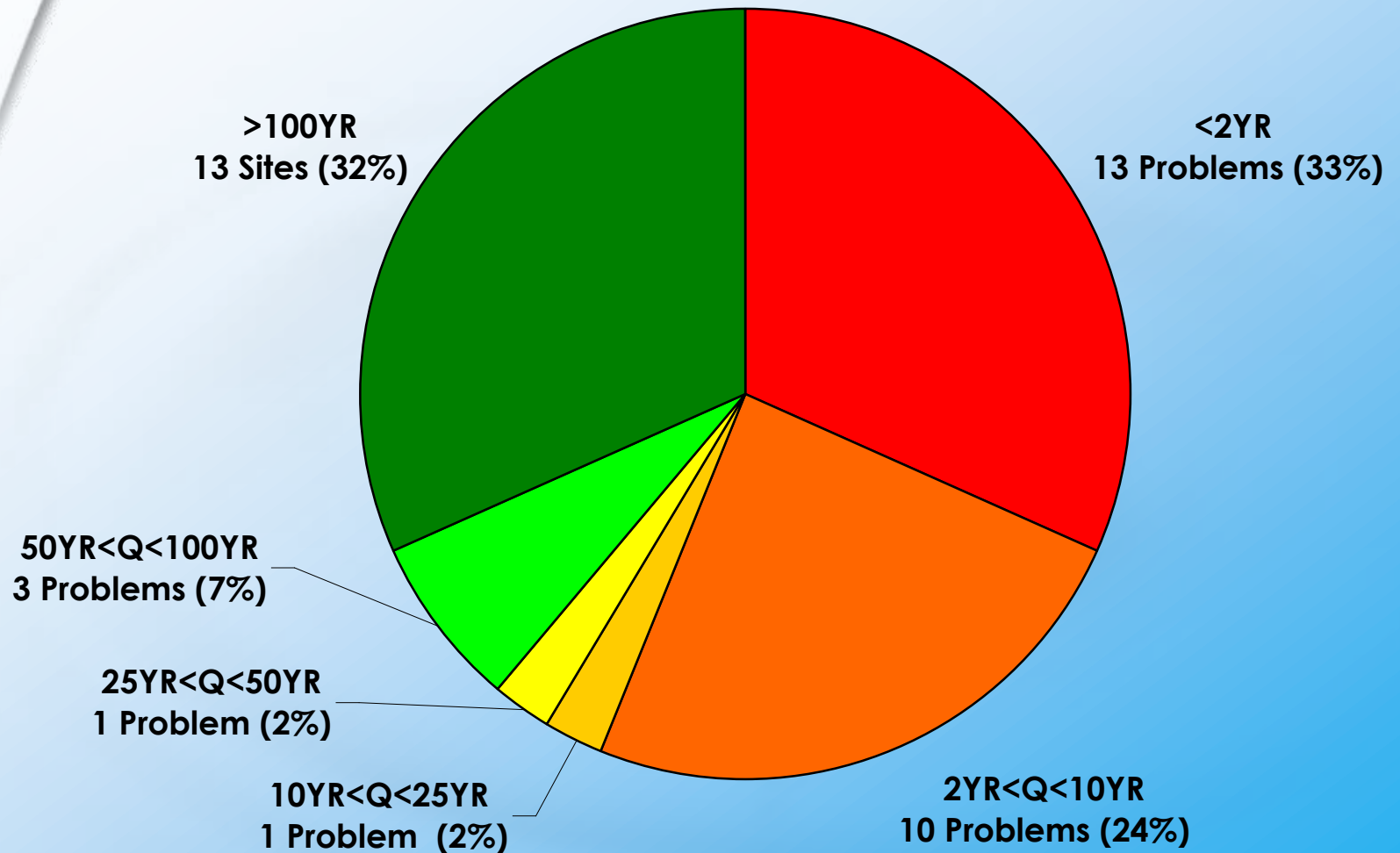
Montour County Act 167 Plan	
Municipality: <u>Anthony Township</u>	ID: <u>P1</u>
Problem Description: The existing culvert does not appear to provide sufficient conveyance capacity. No defined downstream channel.	
	
Problem Solution: Replace the existing culvert with a new culvert that is sufficient to safely convey the flow.	

Identification

Problem Type	Total
Decaying Infrastructure	4
Excessive Ponding	5
Flooding (within floodplain)	14
Insufficient Hydraulic Capacity	39
Maintenance Required	2
No Discharge Point	2
Pollution - agriculture	1
Pollution - industrial	0
Pollution - mining	0
Runoff Directed to Neighboring Properties	4
Sediment Deposition	3
Stream Erosion	12
No Problem Identified	3

Prioritization

Overview of Problem Area Conveyance Capacity All Municipalities in Montour County



Problem Area Prioritization

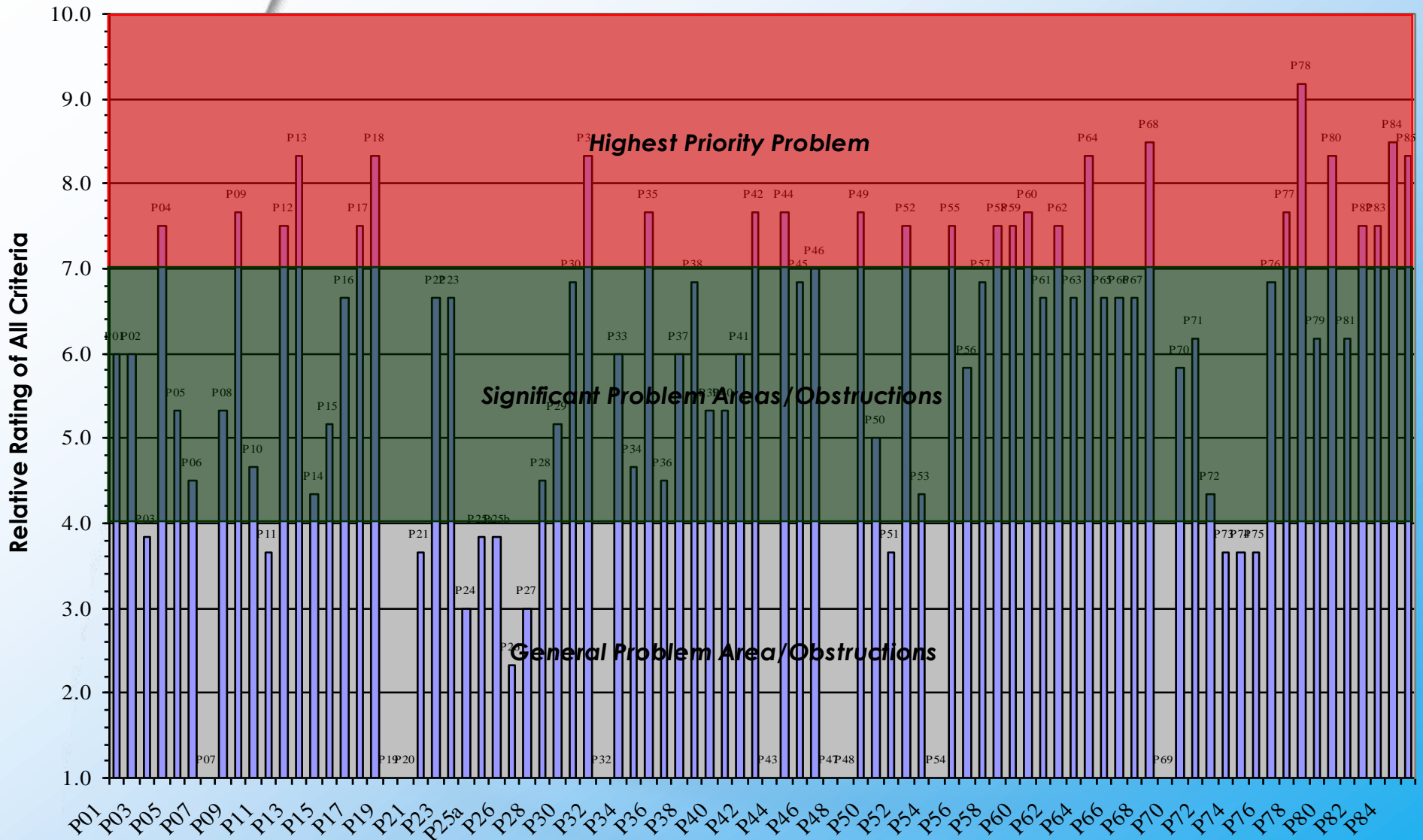
Prioritization of Problem Areas

- Prioritization Criteria
- Rating
- Classifications
 - High Priority (7-10)
 - Significant Problem Areas (4-6.9)
 - General Problem Areas (1-3.9)

Criteria	Description	Rating
Health & Safety	To what extent will the problem endanger human life?	1 to 10
Non-health & Safety Human Impact	How will the problem affect financial aspects of the surrounding areas?	1 to 10
Environmental Impact	To what extent will the problem contribute to erosion and sediment pollution?	1 to 10
Expected Life of Existing System	When will the system associated with the problem fail?	1 to 10
Frequency of Problem	How likely will the problem occur based on a 2yr storm event?	1 to 10
Cost of Solution	Will the solution cost thousand's, hundred's of thousands, or millions of dollars to resolve?	1 to 10

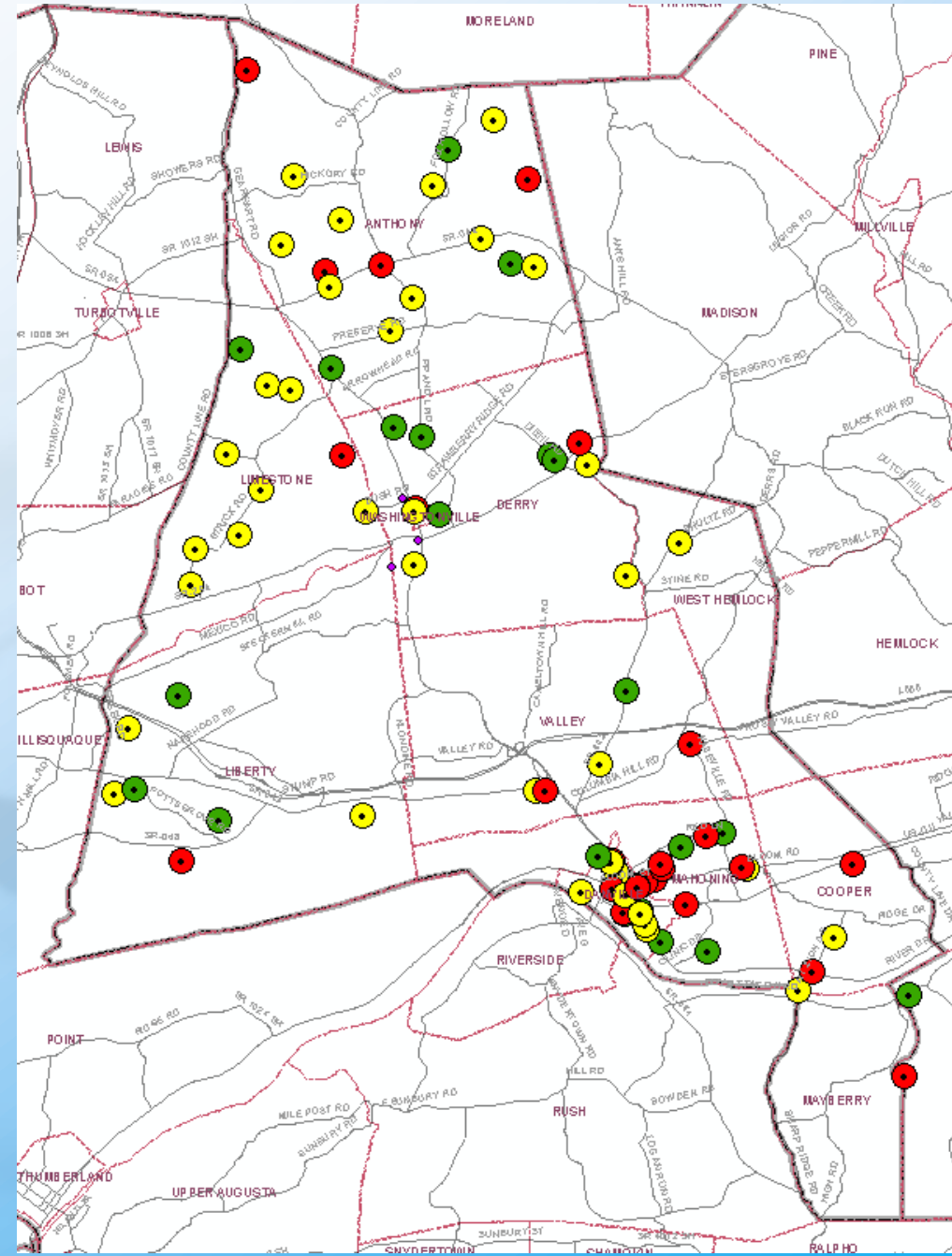
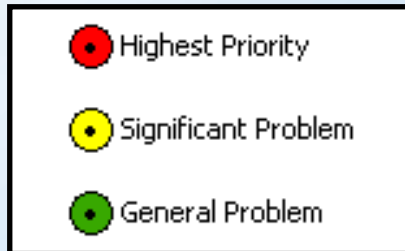
Problem Area Prioritization

Problem Area/Obstruction Rating

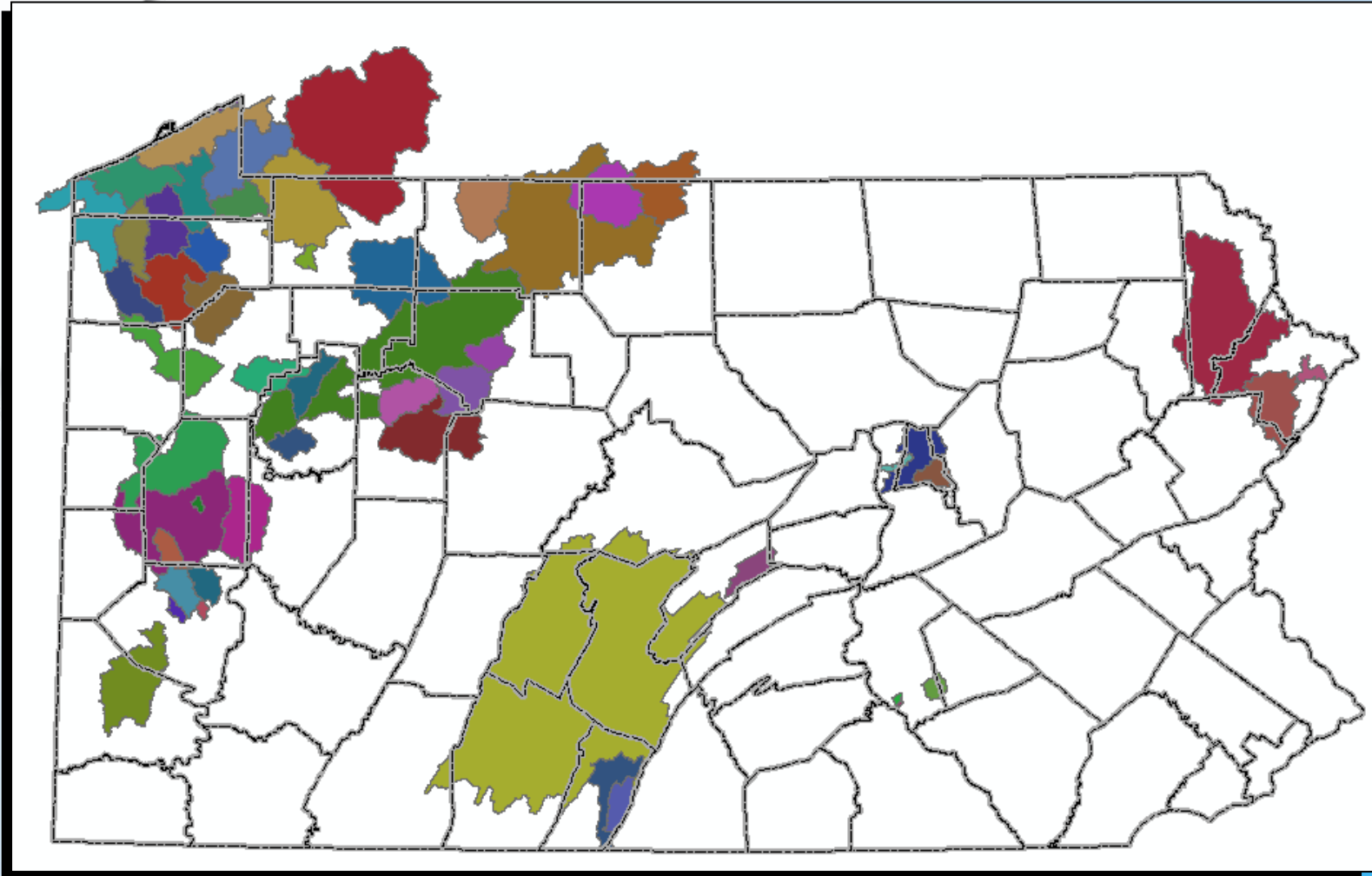


Prioritization

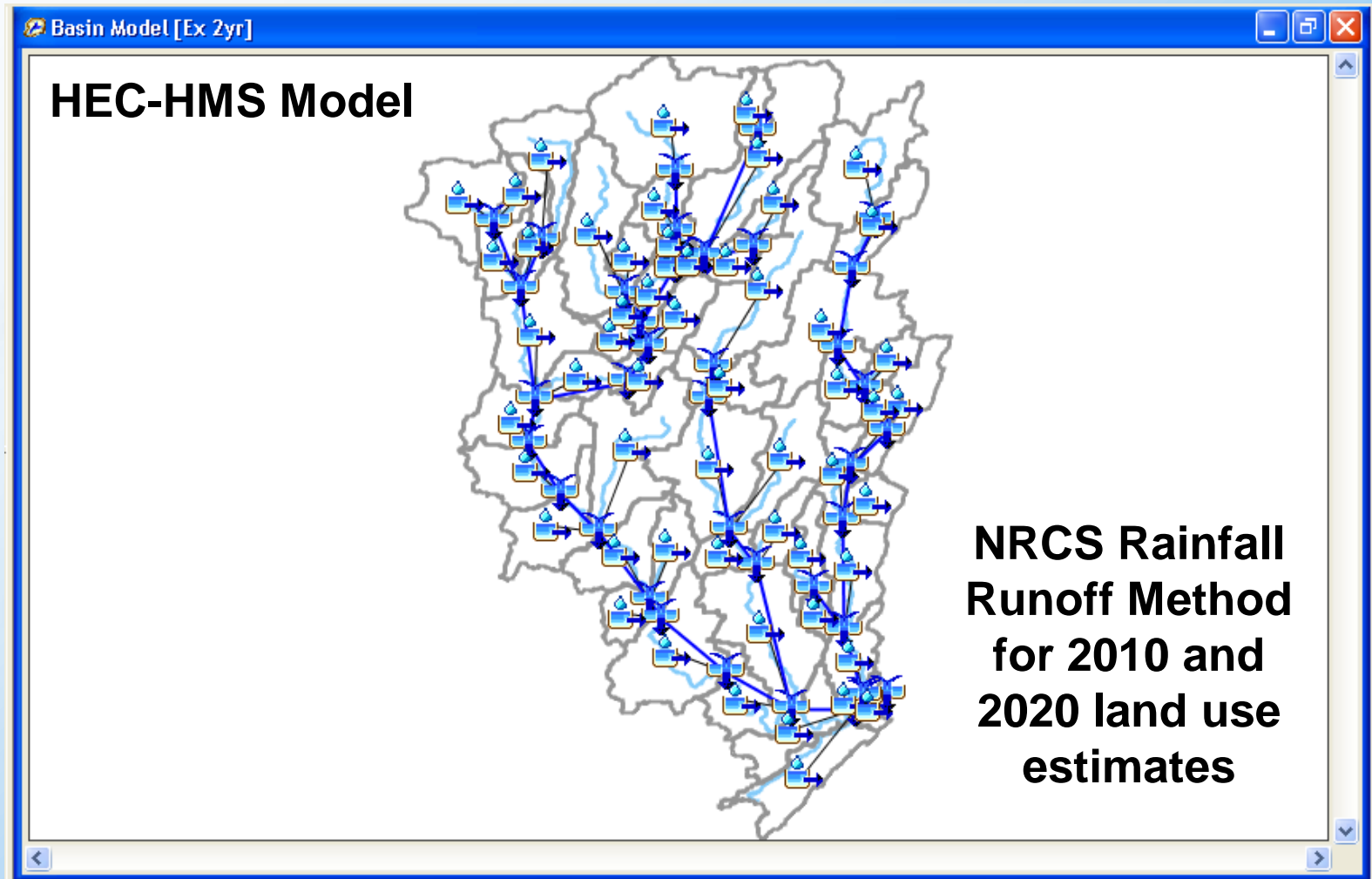
- Prioritization



Watershed Approach



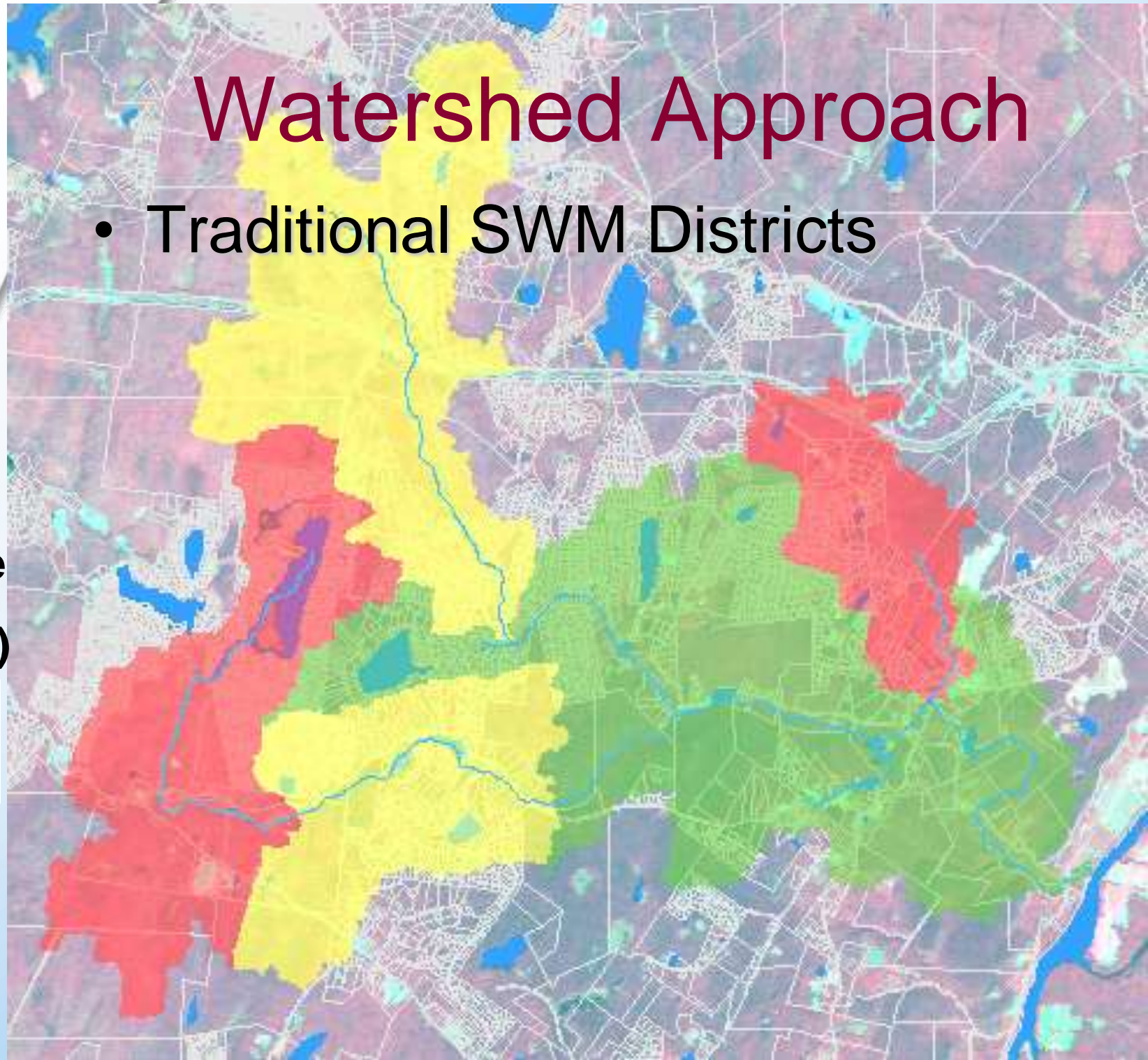
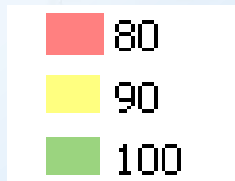
Watershed Approach



Watershed Approach

- Traditional SWM Districts

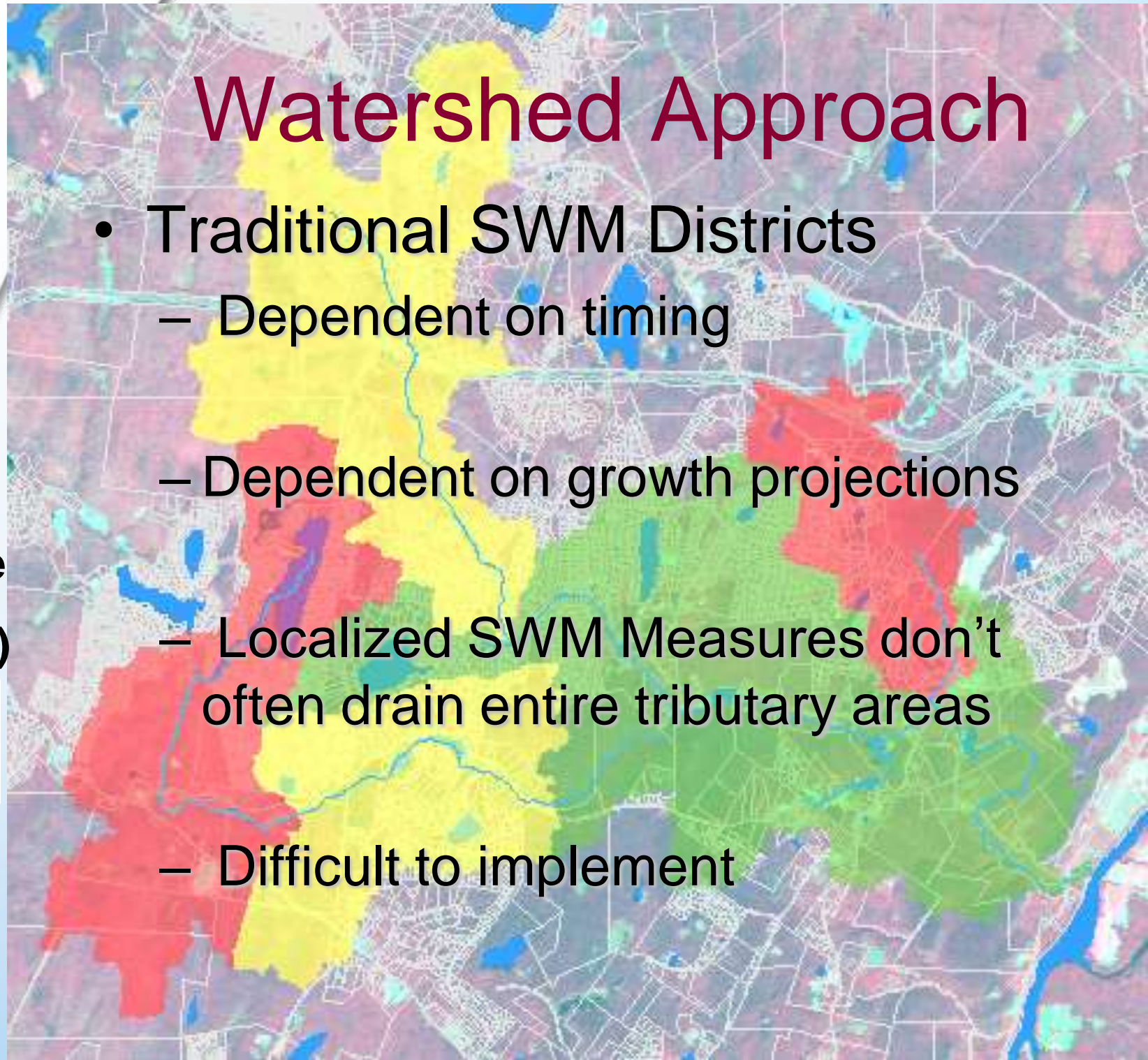
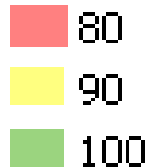
Release
Rate (%)



Watershed Approach

- Traditional SWM Districts
 - Dependent on timing
 - Dependent on growth projections
 - Localized SWM Measures don't often drain entire tributary areas
 - Difficult to implement

**Release
Rate (%)**



Correcting the Problem...

- **Model Ordinance**

Article I - General Provisions

Article II – Definitions

Article III - Stormwater Management Standards

Article IV – E&S Standards

Article V – Protected Watershed Standards

Article VI – Riparian Buffer Standards

Article VII – Design Criteria

Article VIII – SWM Site Plan & Report Standards

Article IX – Easements

Article X – Maintenance Requirements

Article XI – Inspections

Article XII – Enforcement and Penalties

Article XIII – Prohibitions

Article XIV – Fees and Expenses



Correcting the Problem...

- Control Guidance Criteria

- Method 1 CG-1:

- No increase in total runoff volume for the 2-yr/24-hr event **...preserve...**

- Applicable for any size of regulated activity

- Consider existing non-forest pervious area as meadow in good condition

- 20% of existing impervious area considered as meadow in good condition **...restore...**

Section 1. Short title.
This act shall be known and may be cited as the "Storm Water Management Act."

Section 2. Statement of legislative findings.

The General Assembly finds that:
(1) Inadequate management of accelerated runoff of storm water resulting from development throughout a watershed increases flood flows and velocities, contributes to erosion and sedimentation, overtaxes the carrying capacity of streams and storm sewers, greatly increases the cost of public facilities to carry and control storm water, undermines flood plain management and flood control efforts in downstream communities, reduces ground-water recharge, and threatens public health and safety.

(2) A comprehensive program of storm water management, including reasonable regulation of development and activities causing accelerated runoff, is fundamental to the public health, safety and welfare and the protection of the people of the Commonwealth, their resources and the environment.

Section 3. Purpose and policy.

The policy and purpose of this act is to:
(1) Encourage planning and management of storm water runoff in each watershed which is consistent with sound water and land use practices.

(2) Authorize a comprehensive program of storm water management designated to **preserve and restore** the flood carrying capacity of Commonwealth streams: to **preserve** to the maximum extent practicable natural storm water runoff regimes and natural course, current and cross-section of water of the Commonwealth; and to protect and conserve ground waters and ground-water recharge areas.

(3) Encourage local administration and management of storm water consistent with the Commonwealth's duty as trustee of natural resources and the people's constitutional right to the preservation of natural, economic, scenic, aesthetic, recreational and historic values of the environment.

Section 4. Definitions.

The following words and phrases when used in this act shall have, unless the context clearly indicates otherwise, the meanings given to them in this section:

Correcting the Problem...

→ Exemptions ←

- Exemptions can be included for a variety of reasons:
 - Proposed development is minor enough that it can be definitively shown not to have a significant impact.
 - Allow exemption from infiltration requirements if on-site infiltration testing shows infiltration to be impractical.

Section 302
Page-17
In
Draft
Model
Ordinance

2,500 sf

5,000 sf

From rate controls & plan submission

- Suggestion: 250 to 1,000 sf

From rate controls only

- Suggestion: 1,000 sf to 5,000 sf

Correcting the Problem...

“The design of all stormwater management facilities shall incorporate sound engineering principles and practices. The Township shall reserve the right to disapprove any design that would result in the occupancy or continuation of an adverse hydrologic or hydraulic condition within the watershed.”

Correcting the Problem...

“The design of all stormwater management facilities shall incorporate sound engineering principles and practices. The Township shall reserve the right to disapprove any design that would result in the occupancy or continuation of an adverse hydrologic or hydraulic condition within the watershed.”

Addressing the extended risk...

- Problem areas identified in planning efforts are an important consideration when considering assessing a region risk to flooding outside the floodplain.
- More emphasis should be given to problem areas early in the process.
- Make problem area identification more community based.

Acknowledgements



Pike County Conservation District
Montour County Planning Commission

Sources:

PEMA 2009:

Programs and Services, County Flood Study GIS Maps. Pennsylvania Emergency Management Agency,
<<http://www.portal.state.pa.us/portal/server.pt?open=512&objID=4547&&PageID=488615&mode=2>>