Montgomery
Soil & Water
Conservation
District

Storm Water Management and Storm Water Pollution Prevention

City of Brookville

January 30, 2018

Presented by: District Staff
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Montgomery Soil & Water Conservation District (SWCD)

- 1930s, The 'Great Dust Bowl'
  - 150,000 square miles in the 'Great Plains'
  - 5 five (Texas, Oklahoma, Kansas, Colorado, New Mexico)
- Causes: poor farming practices & drought
- Lost lives
- Lost topsoil
- Lost fertility
- Lost farm ground
- Lost livelihoods

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- 1935: 'Soil Conservation Service' created by the U.S. government (today's Natural Resources Conservation Service)
- 1941: Soil Conservation Districts created by Ohio grassroots efforts (Ohio Conservation District Law)
- 1949: Local farmers organized the Montgomery SWCD
- 1963: 'Water' added to the name and mission

What is Storm Water?

Storm water runoff is generated when precipitation from rainfall and snowmelt events flows over land or impervious surfaces and does not percolate into the ground.

Up to 98% of the rainfall over an impervious area becomes storm water runoff, for example, just 1 inch of rainfall over 1 acre of pavement can generate almost 27,000 gallons of storm water runoff (over 1 million gallons in a year's rainfall)

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Brookville Storm Water History

FLOODS OF 1959 IN THE UNITED STATES

- JANUARY-FEBRUARY 1959 IN OHIO AND ADJACENT STATES
- The floods of January 21-24, 1959, were the greatest of record in a widespread area in Ohio and Indiana and were of large magnitude in western Pennsylvania and southwestern New York.
- **On some streams the stages and discharges: exceeded those of 1913.**

HISTORIC STORMS AND FLOODS

- On January 20th and 21st, 1959 a large storm event occurred over much of southwestern Ohio, including the Wolf Creek Basin. This event produced 4.81 inches of rainfall that resulted in record flooding along Wolf Creek and its tributaries.

- On May 27th and 28th, 2004 another storm event occurred producing 4.5 inches of rainfall, resulting in near record flooding along Wolf Creek and its tributaries.

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1959 Rain Event & Damages

- Heavy rains on January 20-21 exceeded 6 inches in a belt extending from the southwestern corner of Indiana through the southwestern corner of Ohio.

- Thirty-two lives were reported lost and total damage was estimated at $100 million. About 20,000 buildings were flooded, and more than 50,000 persons were evacuated.

Mean Monthly Precipitation

Precipitation in the Wolf Creek basin is fairly well distributed throughout the year.

The average annual precipitation approximately 39.4 inches, with most months having about 2.4 inches.

- Month Precipitation
- (Inches)
- January 2.65
- February 2.37
- March 3.08
- April 4.04
- May 4.38
- June 4.17
- July 3.93
- August 3.28
- September 2.61
- October 2.69
- November 3.27
- December 2.94
- Average Annual – 39.41”

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Annual Peak Discharges/Events

- Wolf Creek at Dayton USGS gauge was the only gauge that was operating during both events

- Based on that gauge:
  - The 1959 event had a discharge that was approximately 3,000cfs greater than the 2004 event
  - Produced a water surface elevation approximately 1.8 feet higher

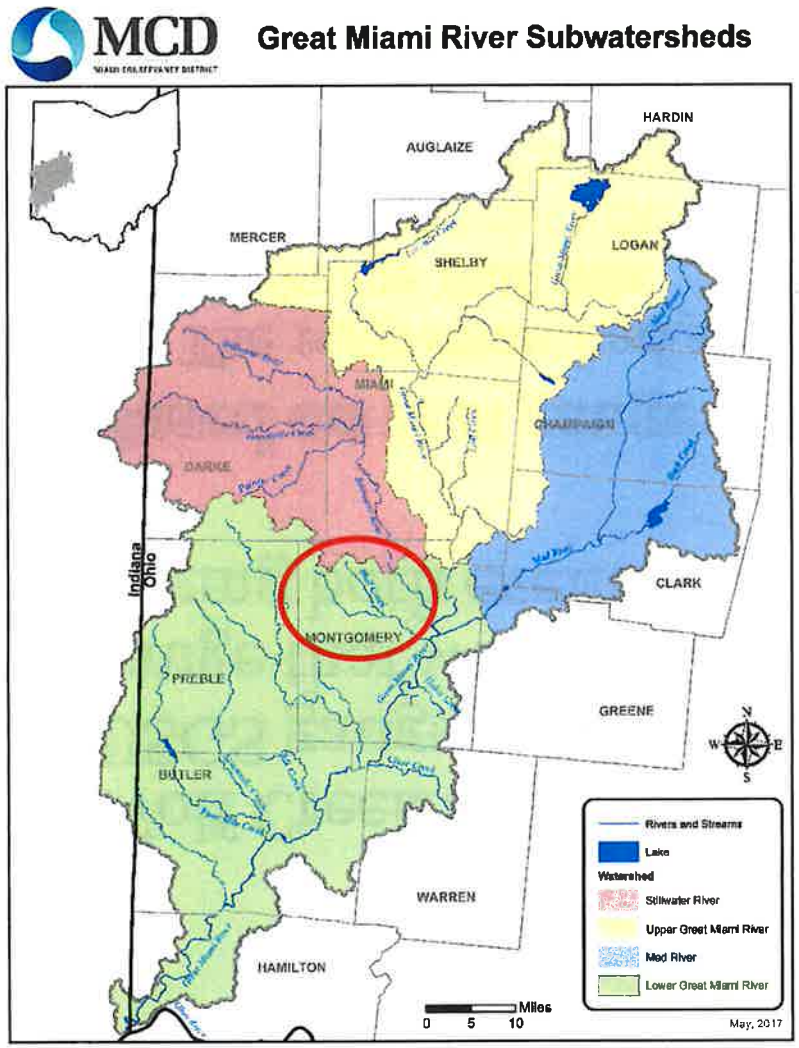
1959 Flood

- **Jan. 21, 1959**
- **12,500cfs**
- **755.1 Peak Elev.**

2004 Flood

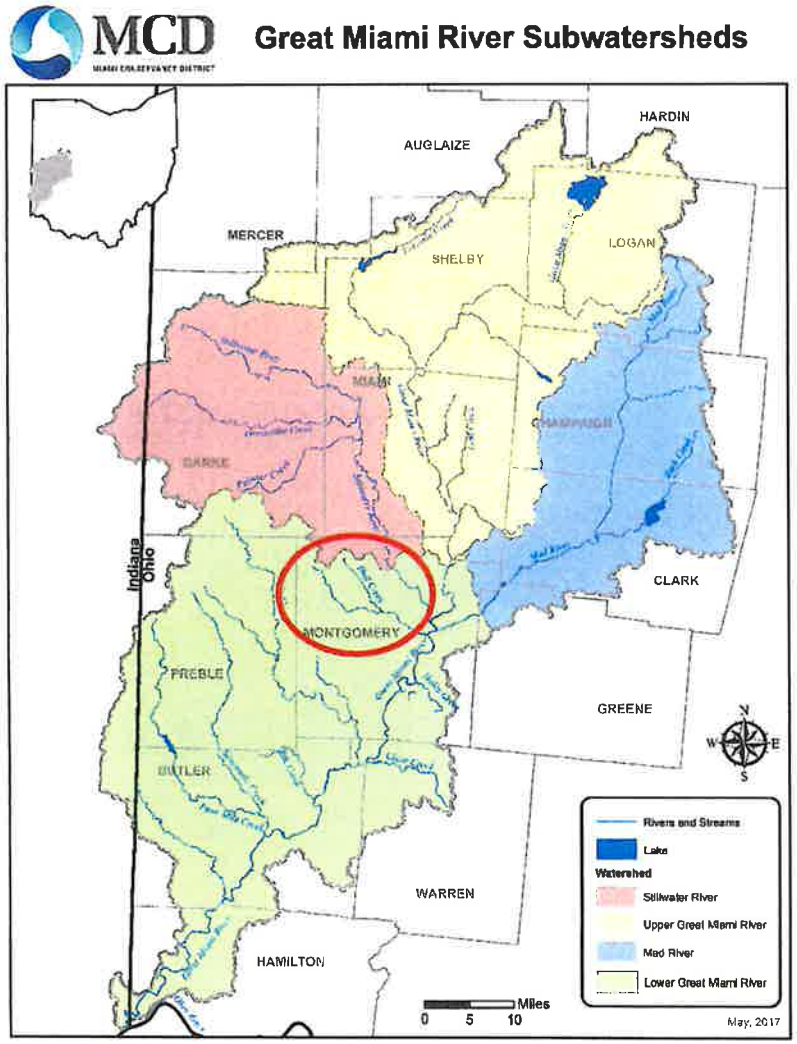
- **May 28, 2004**
- **9,420cfs**
- **753.33 Peak Elev.**

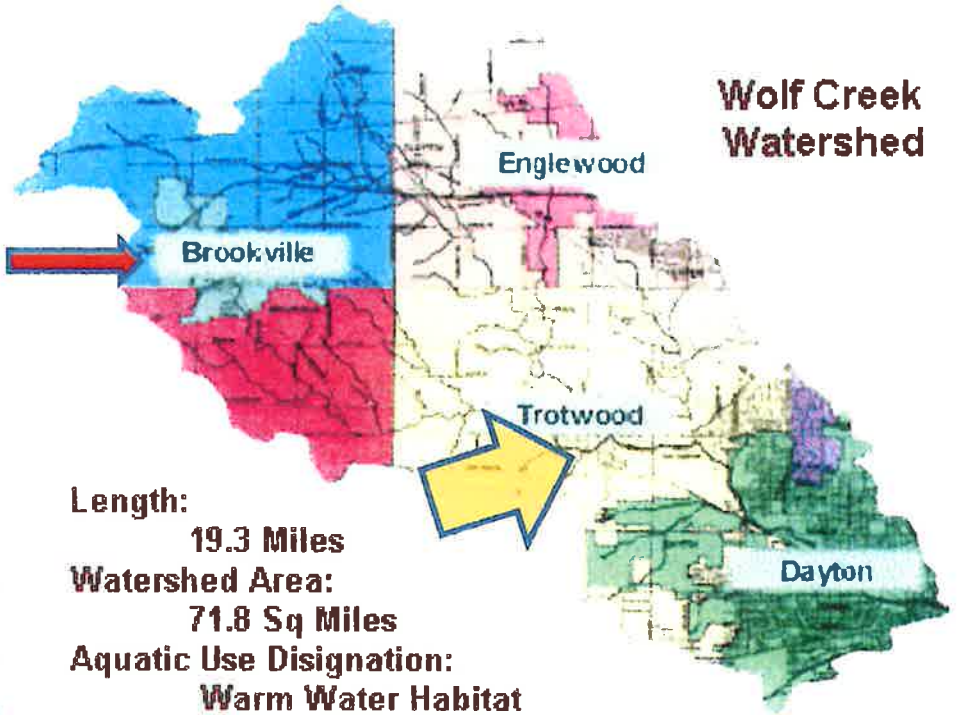
Wolf Creek Watershed



Length:
19.3 Miles
Watershed Area:
71.8 Sq Miles
Aquatic Use Disignation:
Warm Water Habitat

Wolf Creek Watershed





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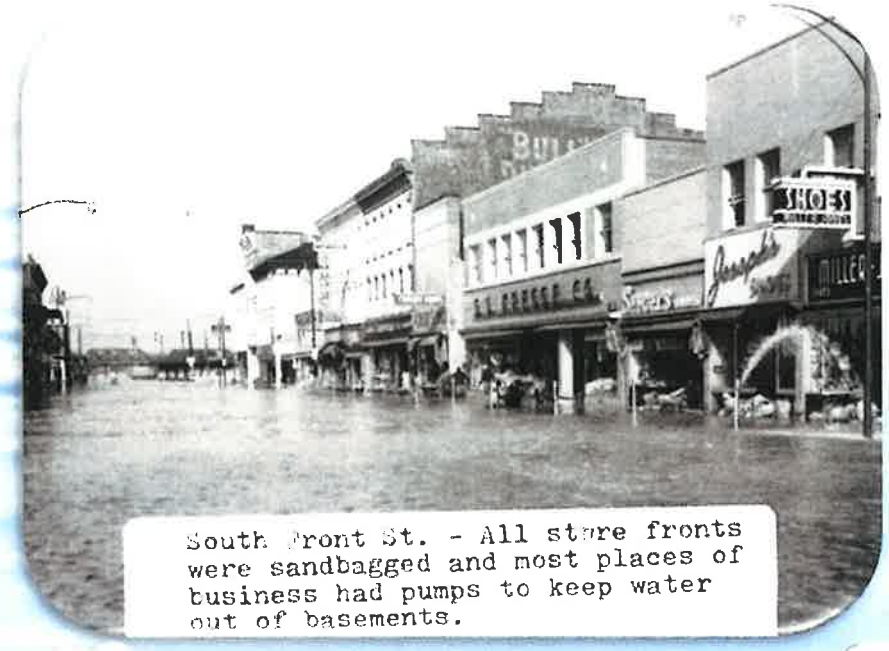
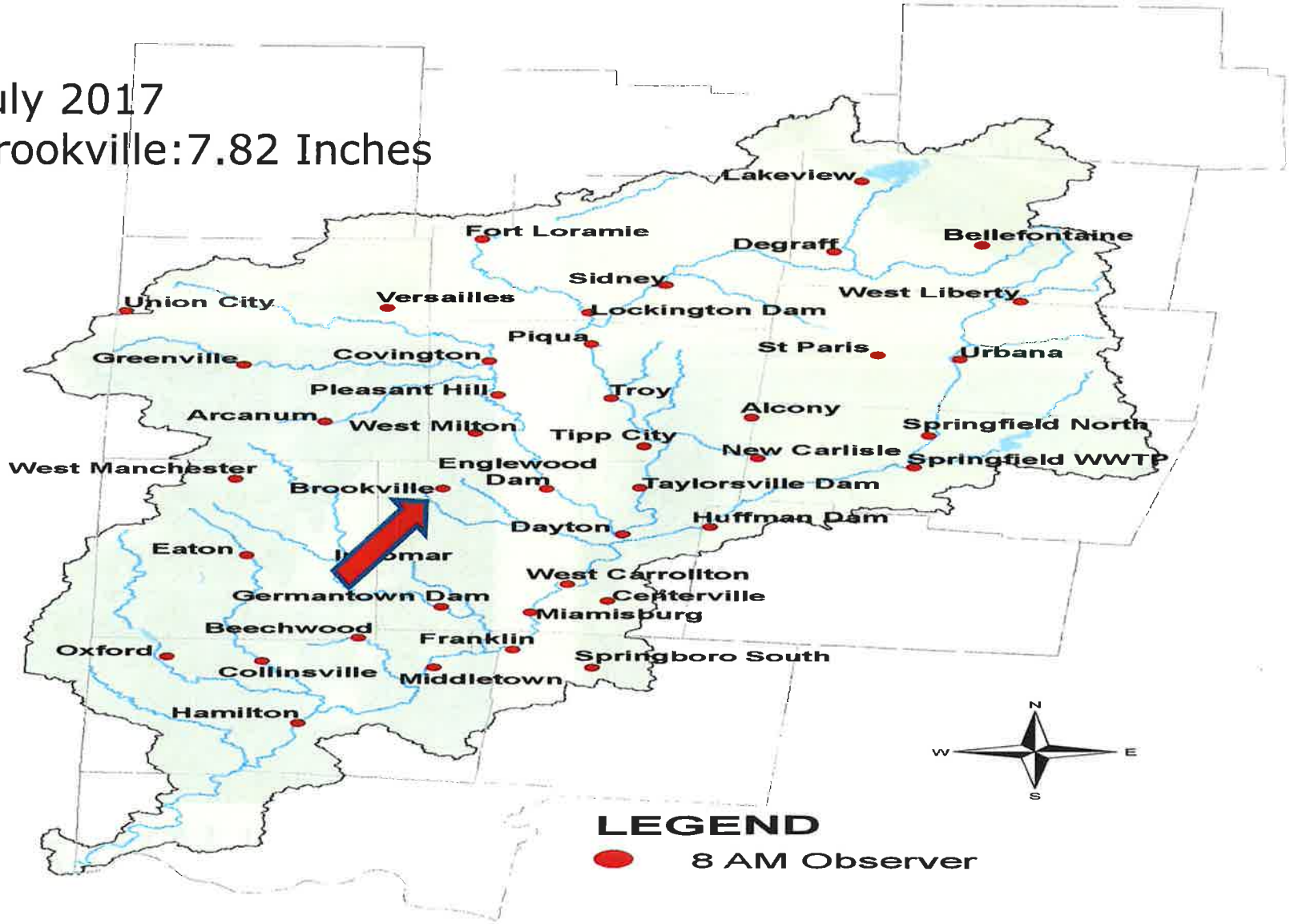
Indiana/Ohio - 1959 Flood



South Front St. - All store fronts were sandbagged and most places of business had pumps to keep water out of basements.

Local Rainfall-2017

July 2017
Brookville:7.82 Inches



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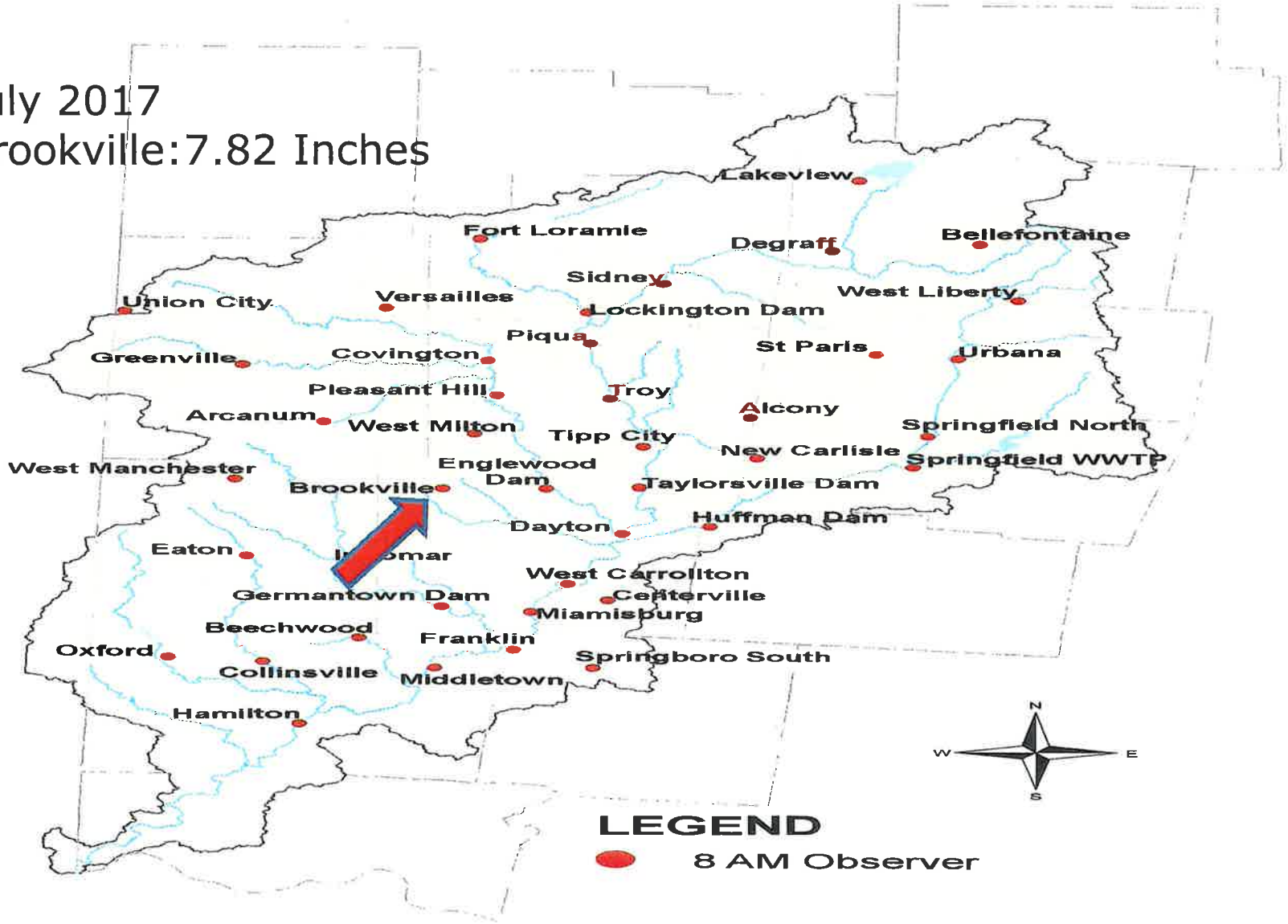
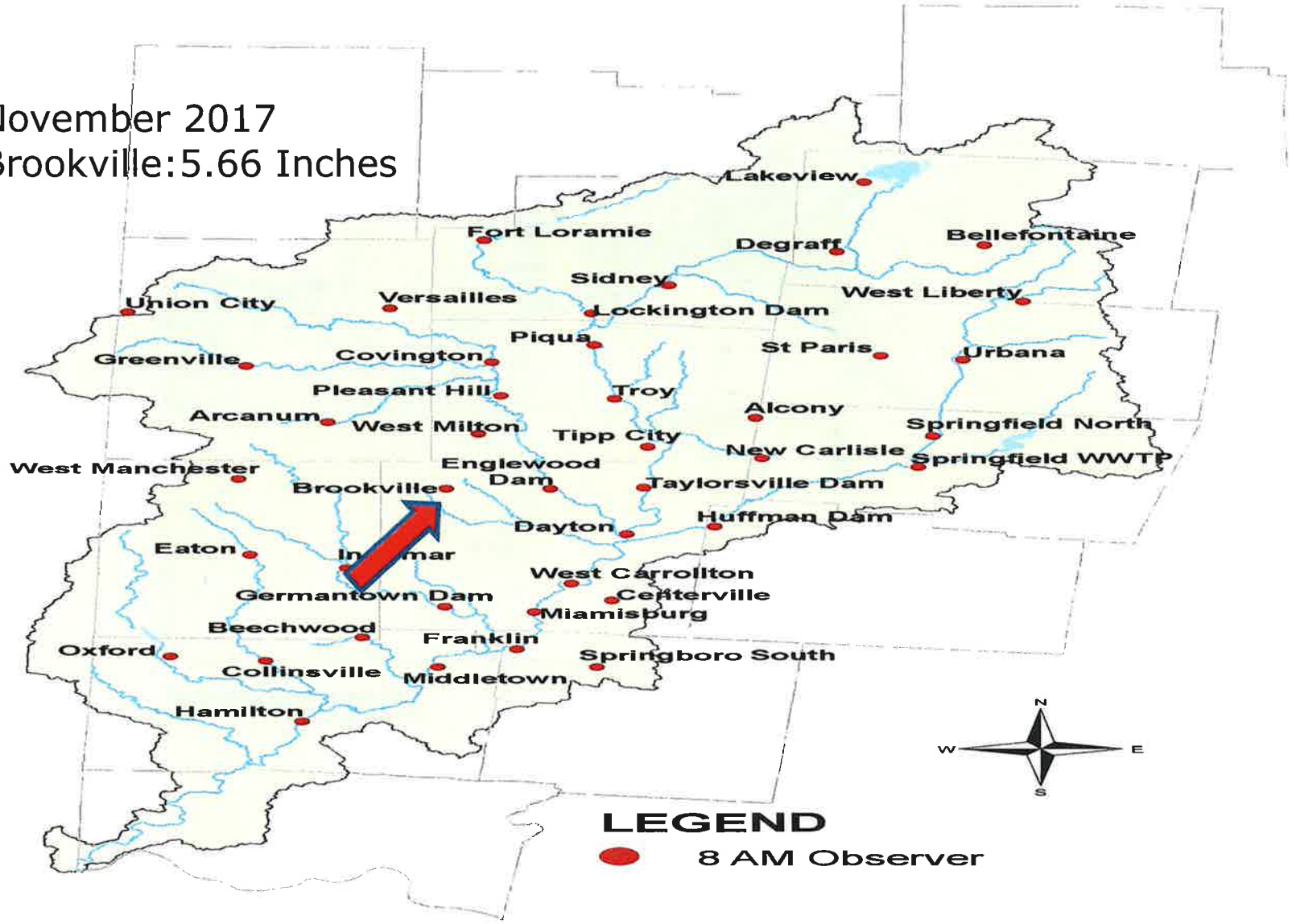


Local Rainfall-November 2017

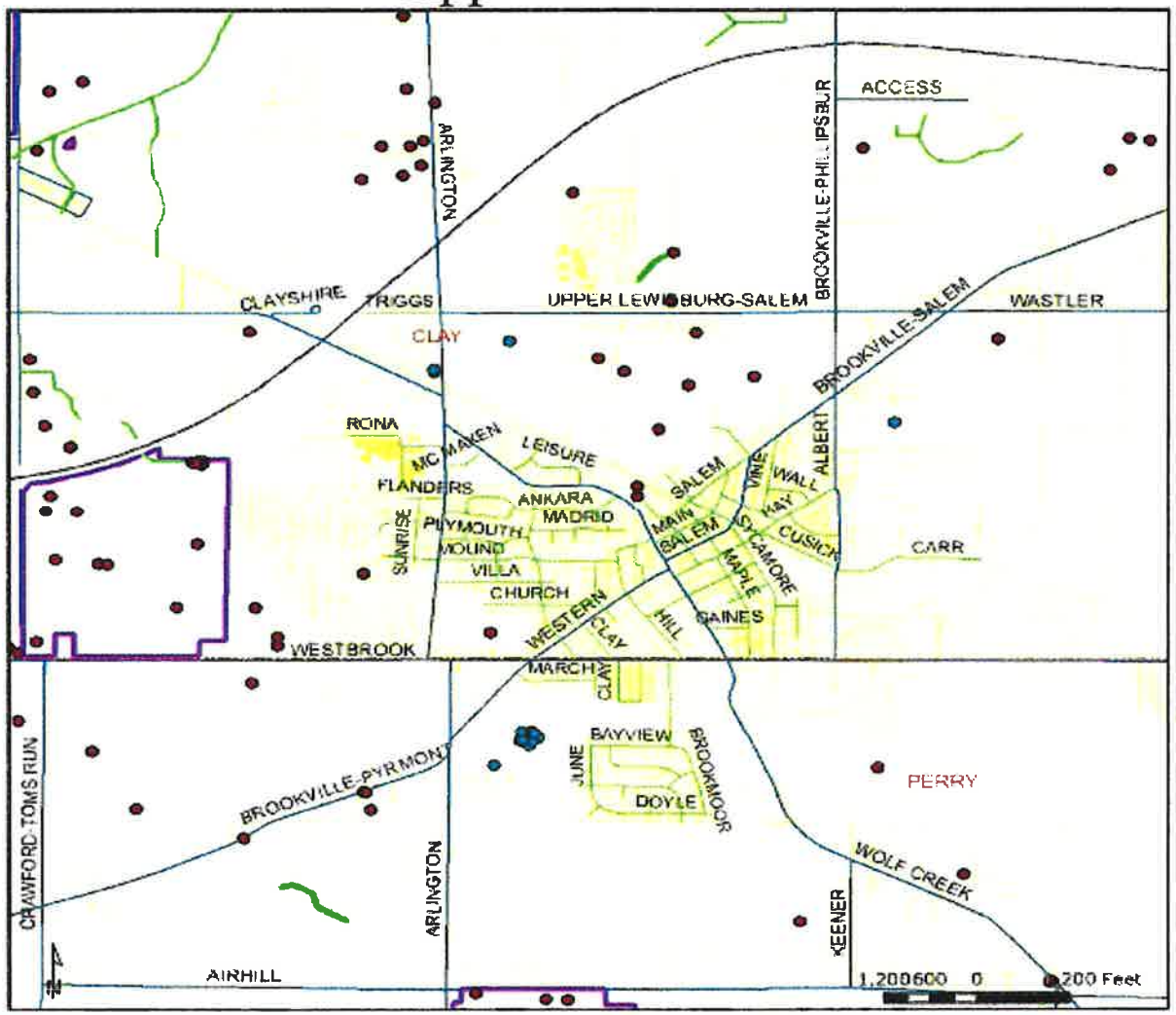
November 2017
Brookville:5.66 Inches



MSWCD Site Visits within Brookville region

Brookville

Approx. 60 sites



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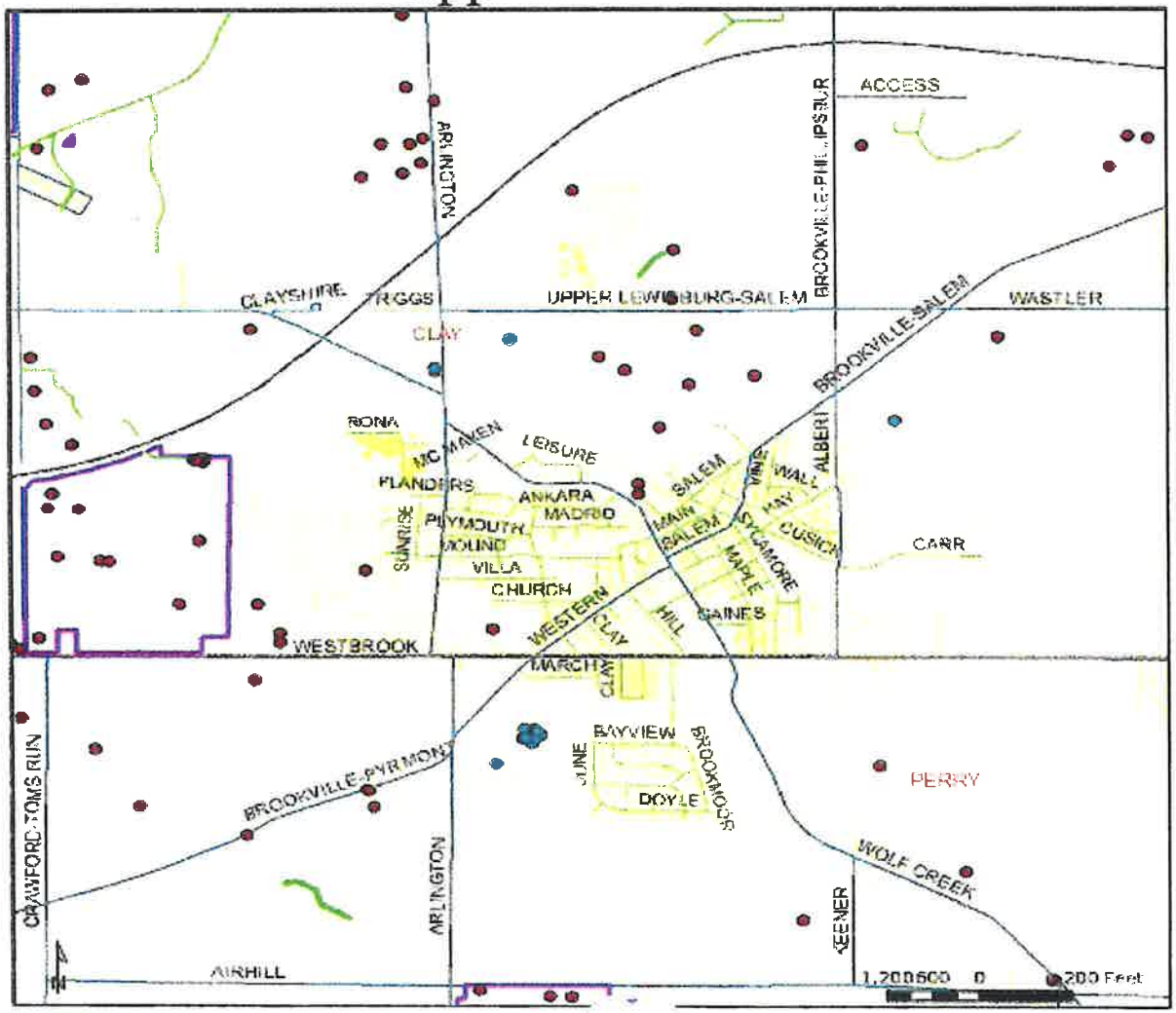

2017 Brookville Ohio Flooding

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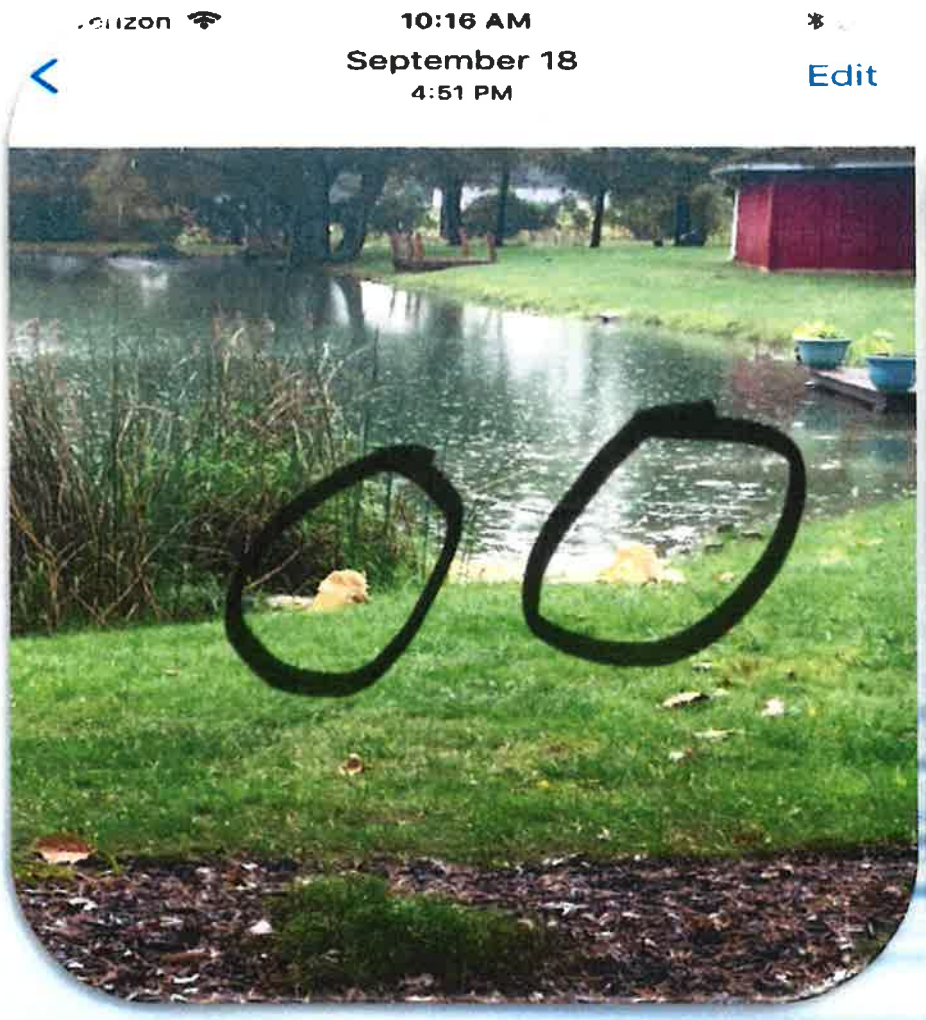

2017 Brookville Aging Private Ditches

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How can we enhance drainage with in Brookville?

- Conservation Works of Improvement ORC-940.19
- An owner of land that is located in a soil and water conservation district may file a petition with the supervisors of the district requesting the construction of a conservation work of improvement. Upon the receipt of such a petition, the supervisors shall make a preliminary determination to accept or reject the petition

Drainage Project
Information Meeting

Agenda

- Protocol
- Costs
- Funding

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Drainage Project
Protocol – Evaluation & Approval

1. Request for Assistance
2. Petition for Assistance
3. View Notification
4. Field View
5. **Hearing Notification**
6. *Public Hearing*
7. Field Survey
8. Project Design
9. Project Approval

Drainage Project
Protocol - Construction

10. Easements
11. Bid & Award
12. Construction

Drainage Project
Protocol - Construction

10. Easements
11. Bid & Award
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Drainage Project
Protocol – Post Construction

13. Assessments
14. Maintenance

Drainage Project
Assessment Criteria (ORC 1515.24)

1. Benefit to the Area
2. Disposal of Water
3. Location of Property Relative to the Project
4. Amount of Water Disposed of
5. Potential Increase in Productivity
6. Value of the Project to the Watershed

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Group Drainage Project Example

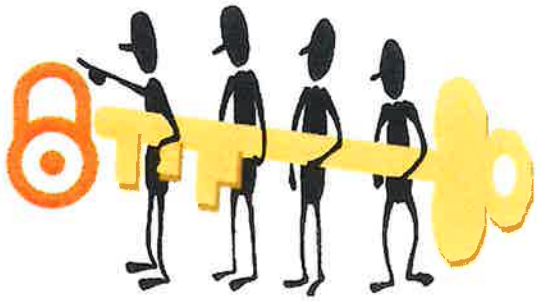
Project Revenue	Funds ($)	%
• OPWC Grant	411,724.00	75
• Landowners	137,241.00	25
Total	548,965.00	100

OWPC $ 411,724.00

Group Drainage Project

- Cooperation and team work is the key to having a successful drainage project!

Group Drainage Project



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Group Drainage Project-
Approval by SWCD Board

When considering whether to approve or disapprove construction of an improvement, the board shall consider all of the following factors:
(A) The cost of location and construction;
(B) The compensation for land or other property that must be taken;
(C) The benefits to the public welfare;
(D) The benefits to land, public corporations, and the state needing the improvement;
(E) In the case of an improvement involving the drainage of water, the effect on land below the improvement that may be caused by constructing the improvement and the sufficiency or insufficiency of the outlet that receives flow from the improvement;
(F) Any other proper matter that will assist the board in approving or disapproving construction of the improvement.

Completed Ditch Construction-2 sided

The ditch is complete, outlet pipes are replaced and topsoil is graded. The ditch has 2:1 side slopes and a 15 ft maintenance berm.

Below-ditch has been seeded and strawed, to include the maintenance berm.

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What is Storm Water?

As storm water runoff flows over the land or impervious surfaces (paved streets, parking lots, curb gutters), it accumulates debris, oils, greases, chemicals, sediments, or other pollutants that could adversely affect water quality if the runoff is discharged without being treated.

Most storm water runoff is not treated for water quality before it reaches a ditch, stream, or river.

What is Storm Water?

Storm Water Pollution

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In addition, most storm water discharges are considered "point sources" and require coverage under an NPDES permit.

Storm water pollution is any discharge that does not consist entirely of rainwater or groundwater.

The primary method to prevent storm water pollution is the use of best management practices (BMPs).

What is NPDES?

National Pollutant Discharge Elimination System

Began in 1990 to reduce storm water pollution

Federally-mandated EPA regulations addressing both storm water volume and quality

After "Phase II" in 1999, this also applies to small MS4s in Urbanized Areas

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What is an MS4?

Municipal Separate Storm Sewer System

1. Owned by a state, city, town, village, or other public entity that discharges to waters of the U.S.;

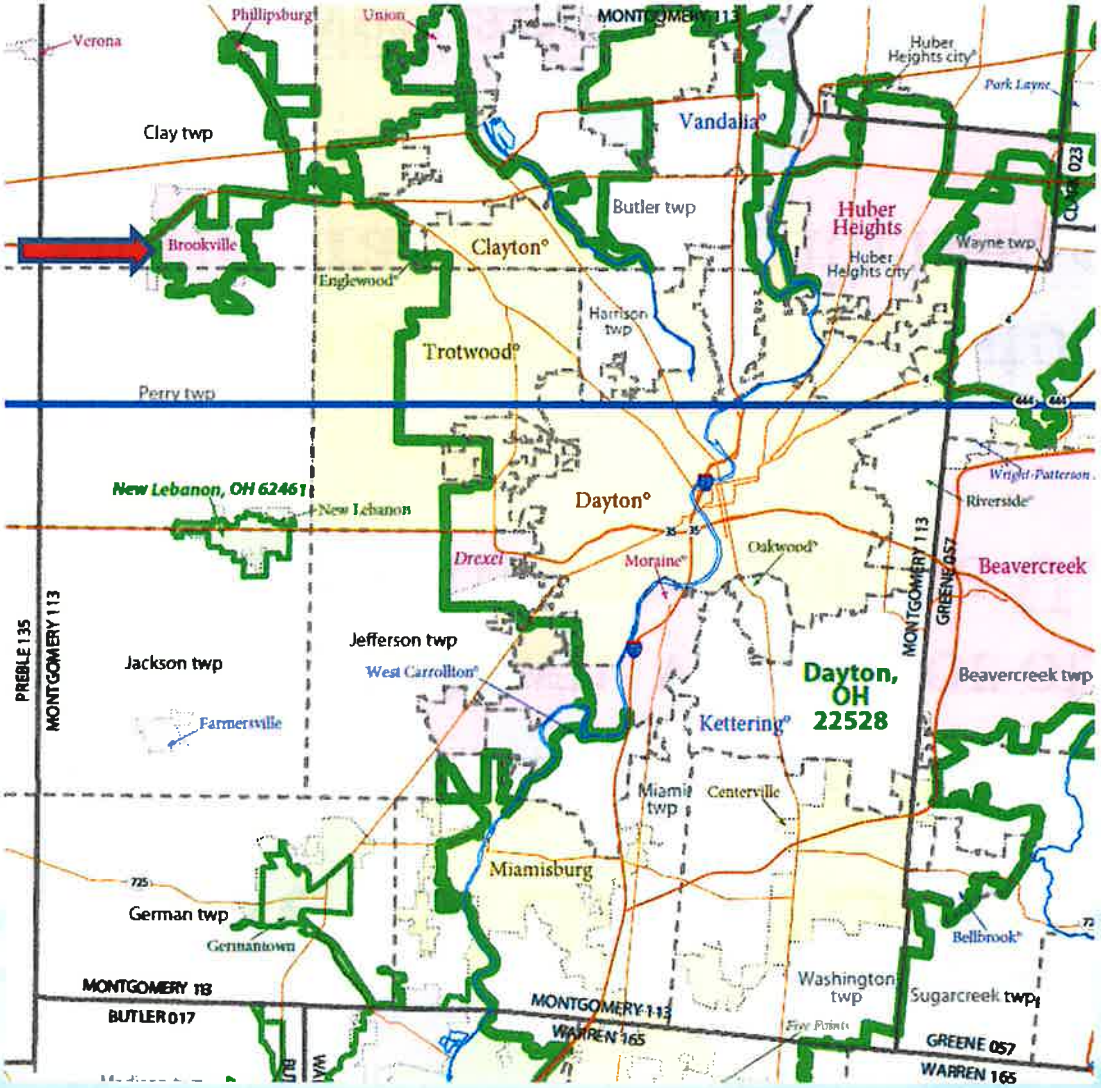
2. Designed or used to collect or convey storm water (including storm drains, pipes, ditches, etc.);

3. Not a combined sewer; and

4. Not part of a Publicly Owned Treatment Works (sewage treatment plant).

Urbanized Areas

2010 "Urbanized Area" in Montgomery County



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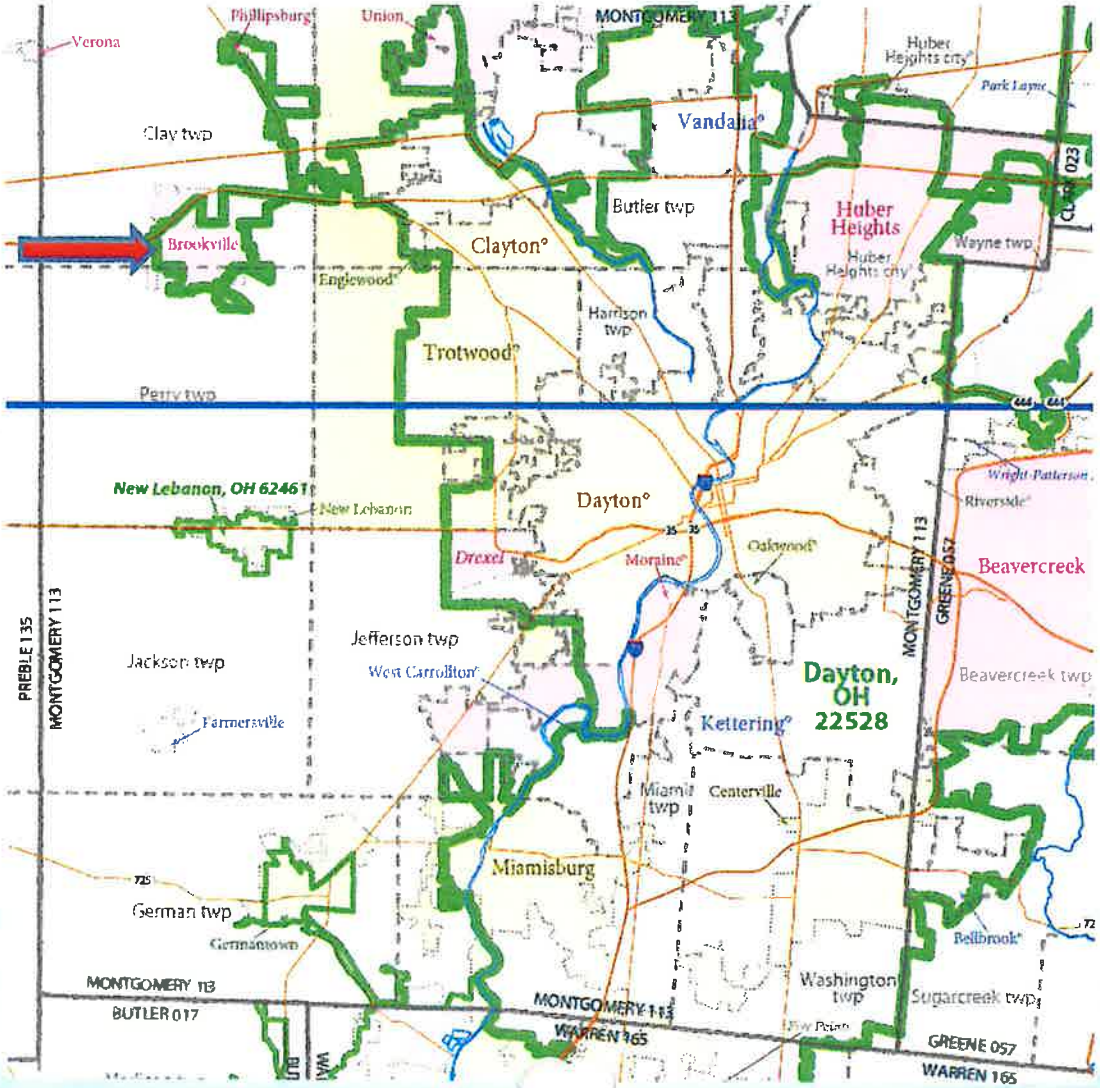

NPDES: What is Required?

A Storm Water Management Plan:

- Should be updated every 5 years
- Facility & Contact Information
- Description of how each Minimum Control Measure is addressed
- Table of Organization
- Details of the 6 Minimum Control Measures
- Map of existing Home Sewage Treatment Systems
- List of any agreements with other agencies

MS4 Requirements

Operation & Maintenance Plan:

1. Prevent or reduce amount of storm water pollution generated by municipal operations.

2. Train employees on pollution prevention/good housekeeping practices, and how to incorporate them into municipal operations.

3. Identify control measures and measureable goals for preventing or reducing storm water pollution.

MS4 Requirements

Operation & Maintenance Plan:

1. Prevent or reduce amount of storm water pollution generated by municipal operations.

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NPDES: What is Required?

The **6** Minimum Control Measures (MCM's):

1. **Public Education & Outreach**
2. **Public Involvement & Participation**
3. **Illicit Discharge Detection and Elimination**
4. *Construction Site Runoff Control
5. *Post-Construction Storm Water Management
6. **Pollution Prevention/Good Housekeeping**

** Montgomery SWCD will do on a site-by-site basis under separate contract*

- OEPA requires that **all of these** are done by the MS4

Next Steps:

1. Identify goals, activities, and responsible parties
2. Document in the Storm Water Management Plan
3. Maintain a Storm Water Pollution Prevention Plan (SWP3) for each facility location

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Best Management Practices

#1 Storm Water Pollution Prevention Plan (SWP3)

- Identify the pollution prevention team
- List of potential pollution sources
- Map of the drainage system of the facility
- List of BMPs used to address pollutants
- Identify any non-storm water discharges
- Regular comprehensive site evaluations

Best Management Practices

#2 Inspections

- Assure the facilities comply with the SWP3
- Make a checklist for each facility
- Set a schedule for inspections
- Provide training to inspectors

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Zoning Requirements

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NPDES Permit Part III B #3

You shall to the extent allowable under state or local law effectively prohibit through ordinance or other regulatory mechanism illicit discharges into your storm sewer system and implement appropriate enforcement procedures and actions.

NPDES Permit Part III B #4

An ordinance or other regulatory mechanism to require erosion and sediment controls as well as sanctions to ensure compliance to the extent allowable under state or local law.

NPDES Permit Part III B #5

You shall use an ordinance or other regulatory mechanism to address post construction runoff from new development and redevelopment projects to the extent allowable under state or local law.

...to be added to ordinances or regulatory mechanisms within two years of when the general permit was granted.

The Bottom Line

- Understand the importance of storm water quality
- Know the pollution risks and how to respond
- Document spills and responses, and training
- Avoid pollution violations and fines
- Set an example for the community to follow

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