



## Maumee River Basin Commission – IN

# A Multi-Objective Management Approach to Flood Mitigation and Water Quality Improvement



by:

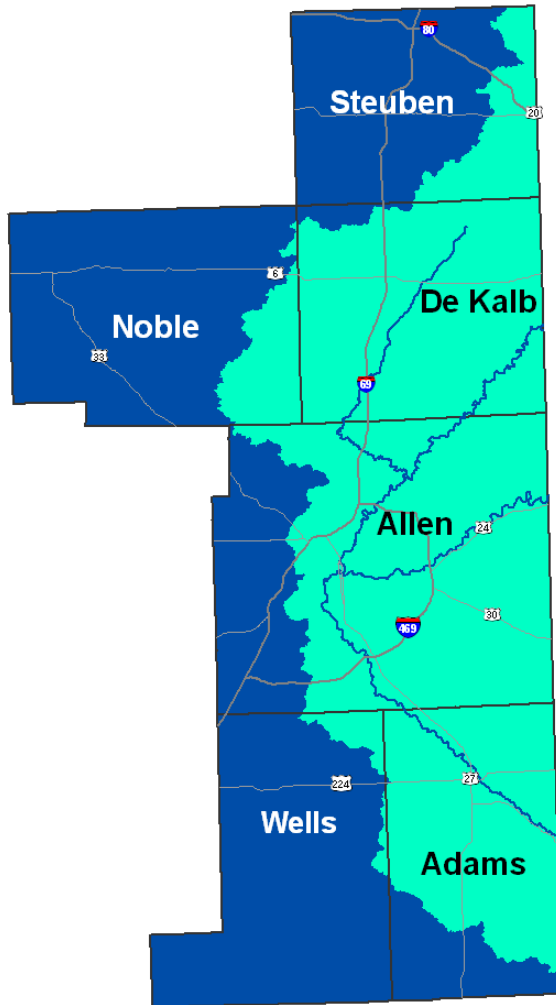
Rodney Renkenberger, PS, CFM

Executive Director,

Maumee River Basin Commission



# UPPER MAUMEE WATERSHED





# CATALYST – 2 MAJOR FLOODS IN 4 YEARS

1978 – Major Flooding (basin-wide)

1982 – Major Flooding (basin-wide)

“Record Flood” on Maumee River

Millions \$\$ in Flood Damages

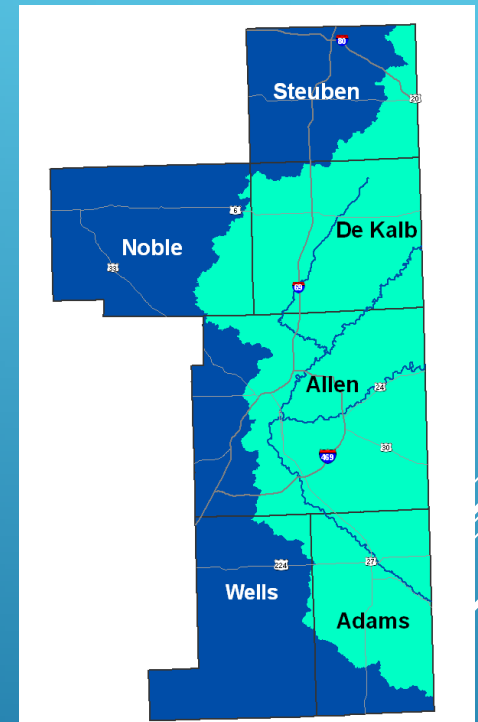
Community Leaders Recognize  
Need to Address Flooding on a  
Regional – Watershed Basis





# A REGIONAL WATERSHED APPROACH

- MRBC established in 1986
- Provides regional leadership
- Coordinated and comprehensive planning and implementing approach.
- Quantity and Quality – a **marriage that must be recognized;**



# MRBC ORGANIZATIONAL CHART

STATE  
OF  
INDIANA



## Counties Represented:

(Adams, Allen, DeKalb, Noble, Steuben & Wells\*)

\*Well County Joined in 2009

## 30-Member Board

Each County is Represented by:

3 – Commissioners

1 – Surveyor

1 – Soil & Water Conservation District Representative

IDNR Tech Adv

Executive Director

Engineer

Legal Counsel

Secretary\*

\*Vacant for past 8 yrs.



# BASIC PRINCIPLES

- ✓ Flooding - a Natural Process
- ✓ Altered Hydrology – Impacts Flooding
- ✓ Accountability – Protecting Natural Resources
- ✓ Agree to Disagree – Positive Relationships
- ✓ Political Boundaries - Not Recognized
- ✓ A Common Goal -Working Together



# BASIC PRINCIPLES

## **No Adverse Impact (NAI) Initiative** **“Good Neighbor Policy”**

*Prevent Adverse Impacts to neighboring properties  
(upstream, downstream, and adjacent)*

Promoting Low Impact Development (LID) Principles



# FLOOD MITIGATION MASTER PLAN

Going  
Green

## MRBC's Non-Structural Approach

Multi-Objective – Multiple Benefits

Nine (9) Key Components

Flood Damage Reduction Benefits

**AND**

Water Quality Improvement Benefits





# COMPONENTS

1. **Public Education & Outreach**
2. **Ordinances - Regulating:**

- **Flood Hazard Areas**

- Floodplain and Open Space Preservation
- Compensatory Storage Requirement
- Building Protection Standards

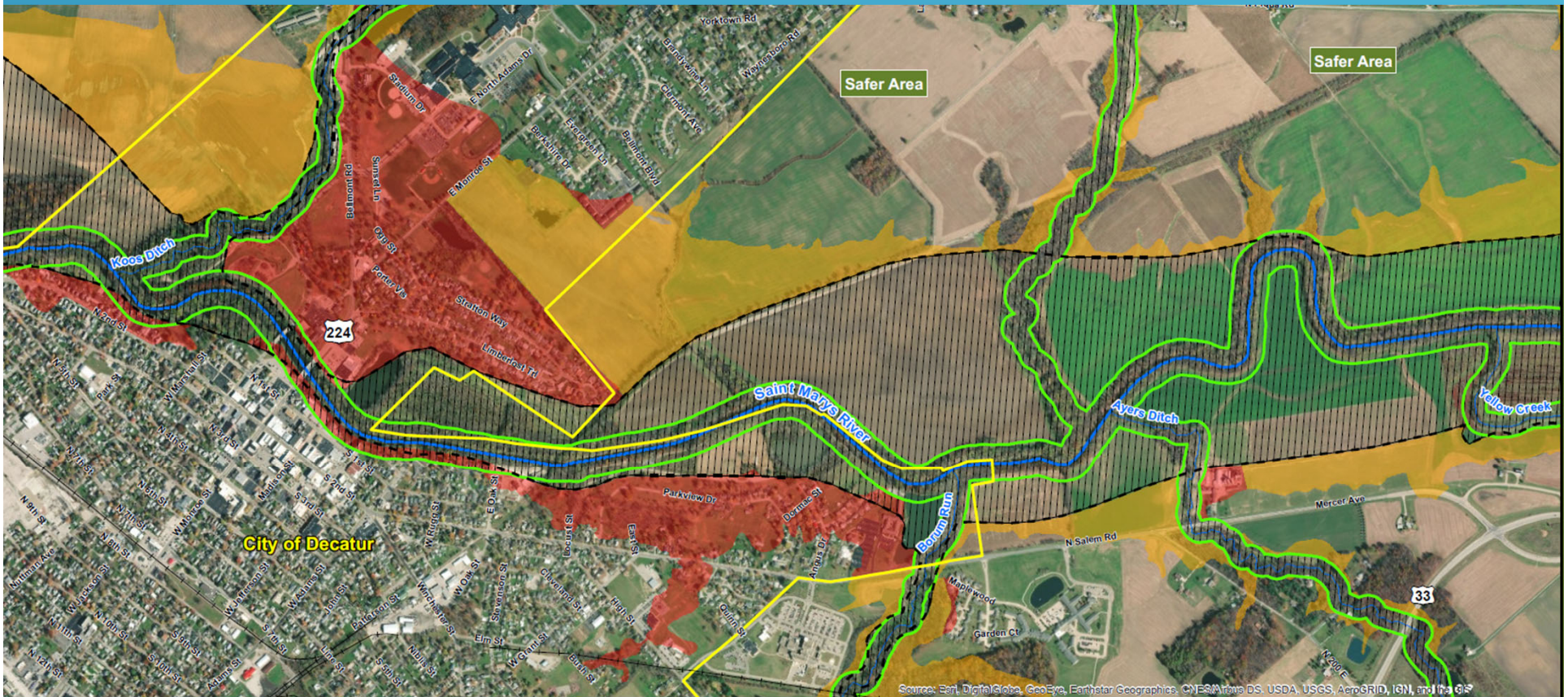
- **Stormwater Management & Erosion Control**

- On-site stormwater detention
- Regional Detention
- New & Post Construction Stormwater Quality Mgmt



## 2. Ordinances - Regulating:

- **Fluvial Erosion Hazard Areas**
  - Riparian Corridor Protection





# COMPONENTS

## 3. Voluntary Agricultural Land Use Conversion

- Riparian Corridor Protection
- Wetland Restoration
- Surface Water Inlet Buffer Zones
- Tile Inlet Conversion to French Drains
- Reforestation
- Stream Buffer Zones
- Tile Inlet Buffer Zones





# COMPONENTS

## 4. Localized Flood Mitigation Erosion Control

### □ Two-stage Ditch Benefits:

- In-channel storage
- Lower Flood Crest
- Reduced Velocity
- Reduced Sedimentation
- Improved Water Quality
- Filters Nutrients





# COMPONENTS

## 5. Voluntary Flood Buyouts

- ❑ Open Green Space for future floodwater storage
- ❑ Green Riparian Corridor for Water Quality Improvement
- ❑ Area Incorporated in Decatur Parks System
- ❑ Recreational Benefits – Frisbee Golf
- ❑ +300 homes acquired between MRBC and its communities
- ❑ Mitigation pays - 7:1 Cost-benefit Ratio





Decatur, IN – July 9, 2003





Decatur, IN – December 31, 2020





Decatur, IN

–

December 31, 2020



## OPEN GREEN SPACE

- 92 homes purchased
- 1 Five-wing Assisted Living Facility





# COMPONENTS

## 6. Flood Hazard Identification –

- **Map Modernization – Risk MAP**
  - MRBC is a FEMA Cooperating Technical Partner (CTP)
- **Identify Flood-risk Areas**
  - Study 350 miles of unstudied streams\*
  - Update 300 stream miles of outdated studies<sup>+</sup>
- **Update FEMA Flood-risk Maps**
  - Local Aerial Base Map
  - Updated Hydraulic Studies
  - Accurate contour data



\*Completed  
<sup>+</sup>In-Progress



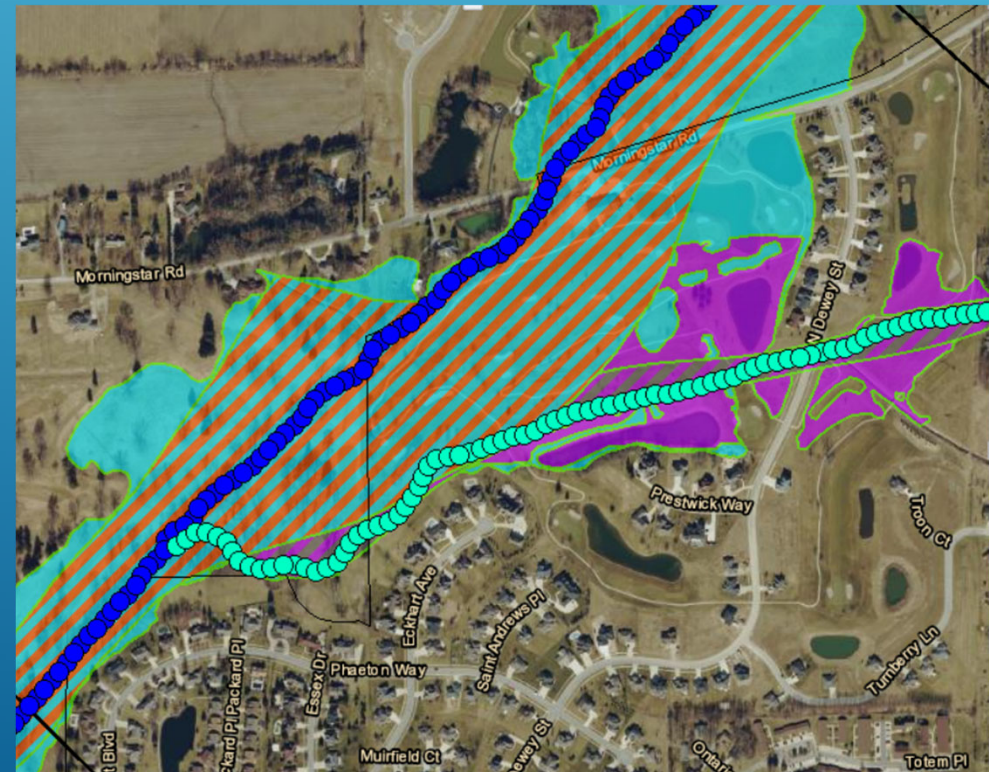
## 6. Flood Hazard Identification

- **IDNR – Floodplain Information Portal (INFIP)**
  - FEMA Detailed Studies
  - MRBC / IDNR Approximate Studies
  - BEST AVAILABLE DATA Layer



### Best Available Flood Zones

- FEMA Zone AE Floodway
- DNR Detailed Floodway
- DNR Approximate Floodway
- FEMA Zone A
- FEMA Zone AE
- DNR Detailed Fringe
- DNR Approximate Fringe
- Additional Floodplain Area
- FEMA Protected by Levee
- FEMA Floodplain - Ponding (Depth)
- FEMA Floodplain - Sheet Flow (Depth)





# COMPONENTS

## 7. Voluntary Relocation and Retrofitting

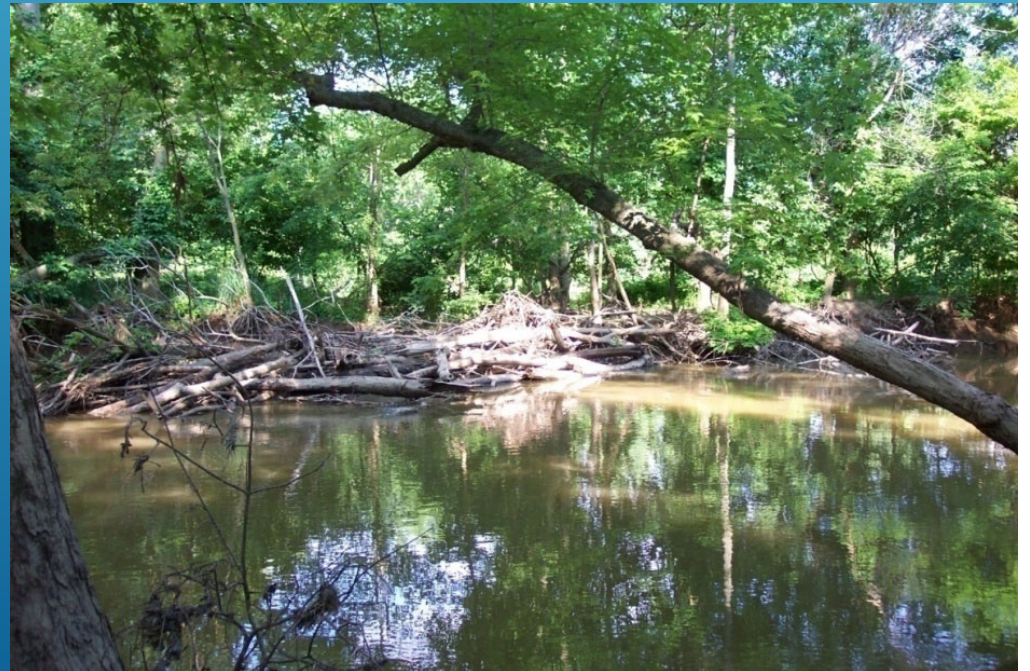
- Relocate moderate-risk residential structures to prevent damage and need for evacuation
- Elevate low-risk residential structures to prevent future damage



# COMPONENTS

## 8. Stream Obstruction Removal

- Reduce Agricultural Flooding
- Prevent Bank Scour and Erosion
- Logs Parallel to Stream Left in Place for Wildlife Habitat
- Improves Water Quality
- Preserves Ecosystem





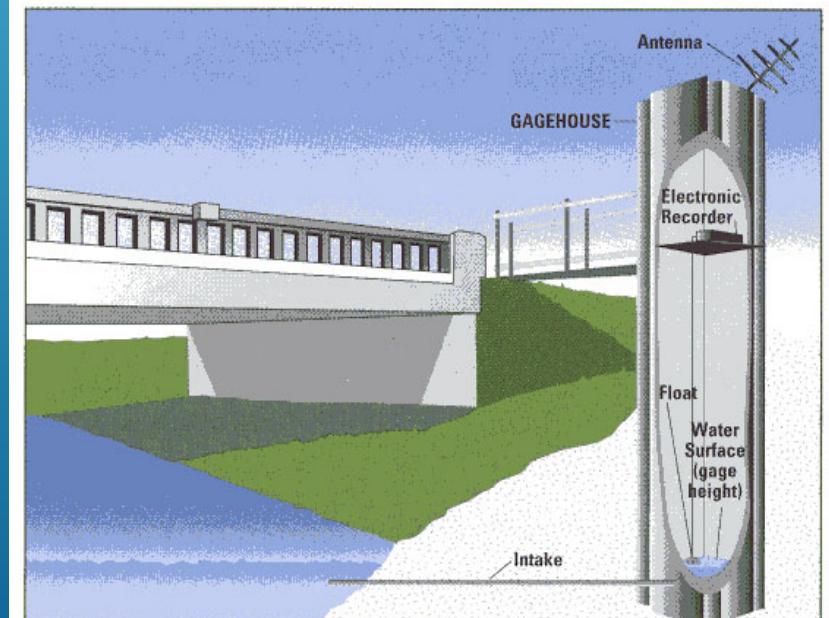
# COMPONENTS

## 9. Early Flood Warning System

- Inundation Mapping



- USGS Gage Network





# CHALLENGES

1. **Climate Change**
2. **Legislation**
3. **Public Support**
4. **Coordination w/ River Basin Commissions**
5. **Solutions with unintended consequences**
6. **Funding**

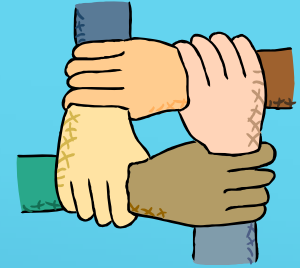
**THANK YOU!**

**[MRBC.Director@gmail.com](mailto:MRBC.Director@gmail.com)**



# MRBC PARTNERING AGENCIES

*Working Together for Success*



St. Marys River  
Watershed Project



The Nature Conservancy   
Protecting nature. Preserving life.™



Soil and Water  
Conservation Districts  
Adams      Allen  
DeKalb      Noble  
Steuben      Wells

