



Maumee River Basin Commission



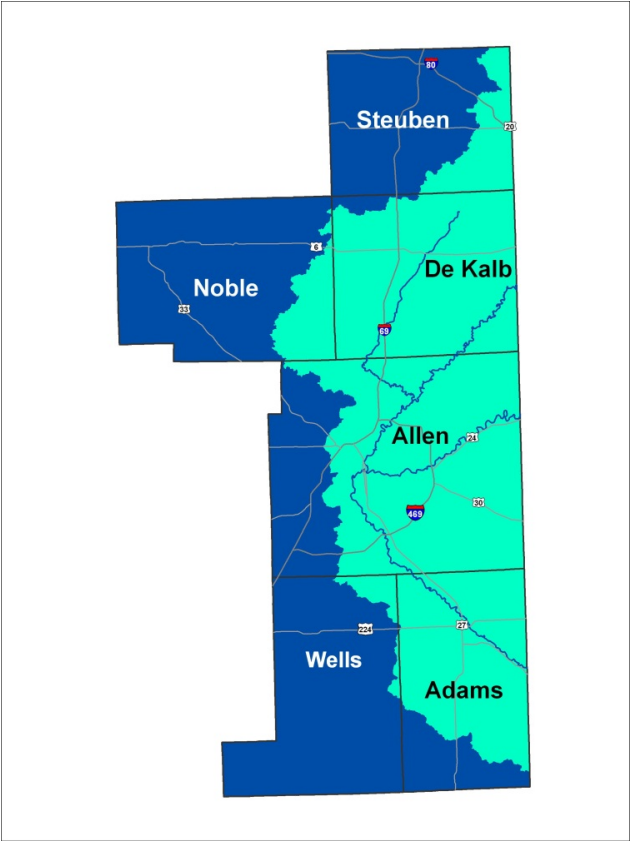
*MAUMEE
RIVER
BASIN
COMMISSION*



MRBC – Established by Indiana General Assembly in 1986

Charged with mitigating flood damages and improving water quality
in Maumee River Basin (IN portion)

Maumee River Basin Commission



Maumee River Watershed

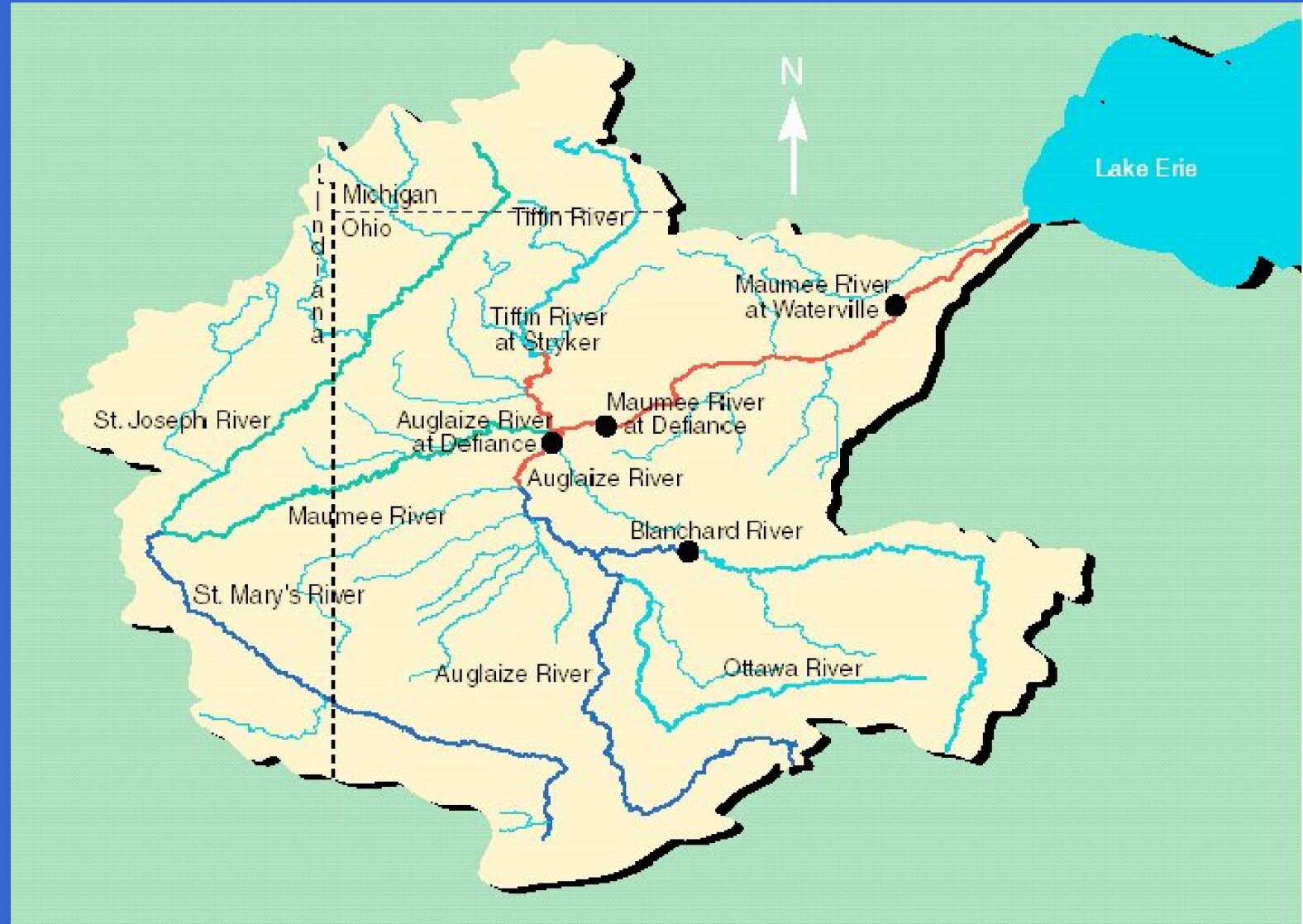
Three Rivers

2 main feeders:

St. Joseph River (Lake Erie)

St. Marys River

Feeders join to form
Maumee River



Drainage Areas

**Drainage area in the State of Indiana is
1,330 square miles**

Joseph River at mouth in Fort Wayne	1,086 square miles
St. Mary's River at mouth in Fort Wayne	839 square miles
Maumee River at Indiana-Ohio boundary	2,100 square miles
Maumee River at mouth in Toledo	6,608 square miles



We Have a Flooding Problem – So Where Do We Go From Here?

Recipe for a Successful Flood Mitigation Program

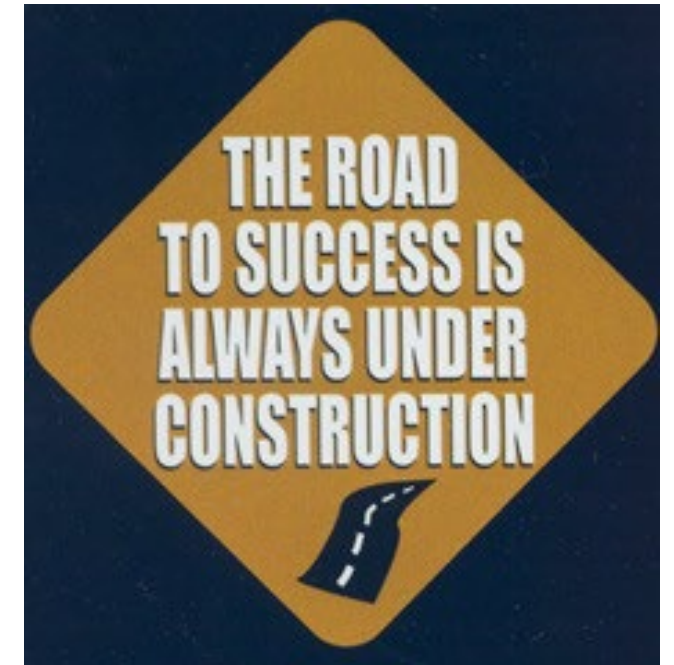


Rodney Renkenberger, PLS, CFM
Executive Director



FLOOD CONTROL MASTER PLAN (circa 1995) FLOOD MITIGATION MASTER PLAN (2008 & 2014 Updates to Original MP)

Road Map to Success





COMPREHENSIVE FLOOD MITIGATION MASTER PLAN

Basic Principles:

- Non-Structural Approach
- Multi-Objective Management (MOM)
- No Adverse Impact (NAI)
- Establish Solid Relationships with key partners: Federal: FEMA, USGS, NWS, USEPA
State: IDNR-DOW, IDHS, IDEM
- Solicit Support of State Legislature
- Solicit Community Support
- Solicit Public Support
- Solutions Must Support National Objective; State MHMP
- Evaluate Proposed Solutions to Ensure No Adverse Impact to Other Solutions
- **Example:** Expanding a two-lane highway to a 4-lane highway to accommodate heavy traffic volume, but roadway expansion leads to increased runoff, flooding homes in the immediate area which never flooded before.



COMPREHENSIVE FLOOD MITIGATION MASTER PLAN

Ordinances - Master Plan Foundation:

Flood Hazard Area Ordinances w/ higher standards

- Compensatory Storage Requirement for fill placed in SFHA
- 40% Substantial Damage Threshold
- Cumulative Damage / Cumulative Improvement Tracking for Substantial Threshold
- Critical Structures must be located outside of 0.20% (500-yr) SFHA

Storm Water & Erosion Control Ordinances w/ higher standards

- Detention required for difference in 5-yr Pre-developed / 100-yr Post-developed runoff
- Cumulative Floodway Encroachment Monitoring so surcharge doesn't exceed 0.14' ft.
- Advocate larger lots and / or open space areas incorporated into developments

Fluvial Erosion Hazard Corridor Protection

- Encourage Local Planning Commissions to adopt Fluvial Erosion Hazard Ordinance



COMPREHENSIVE FLOOD MITIGATION MASTER PLAN

EDUCATION & OUTREACH PROGRAM

- Annual Flood Safety Awareness Week Campaign
- CRS Program (Flood Insurance Premium Discounts)
- Continuous Promotion of Purchasing Flood Insurance
- Promote Purchase of PRP for homes outside of SFHA (25% of damage occurs outside SFHA)
- Hi-light Tools Available For Toolbox:
 - FEMA National Flood Hazard Layer (NFHL)
 - FEMA Map Service Center (MSC)
 - IDNR-DOW's Indiana Floodplain Information Portal (INFIP)
 - Local County GIS Websites (SFHA and CONTOUR layers)



COMPREHENSIVE FLOOD MITIGATION MASTER PLAN

EDUCATION & OUTREACH PROGRAM

- Promotion of Flood Risk Analysis for Homeowners
- Continuing Education Seminars – Local Officials
- Promote Adoption of Higher Standards – NAI Principles
- Continuing Education Seminars – Professional Surveyors
- Continuing Education Seminars – Appraisers, Lenders, & Realtors
- Educational Seminars for general public

An ounce of prevention is worth a pound of cure!



COMPREHENSIVE FLOOD MITIGATION MASTER PLAN

FLOOD HAZARD IDENTIFICATION / REDELINEATION PROGRAM

- MRBC is a FEMA Cooperating Technical Partner (CTP)
- Flood Hazard Identification Program – Flood Insurance Studies up to 1 Sq. Mi. cutoff
- Update Flood Insurance Studies found to be in error
- Flood Hazard Redelineation Program – Use new DEMs to increase map accuracy
- High Water Mark Data Collection – Establish HWM protocol / HWM Teams
- Calibrate Hydraulic HEC-RAS Models after large or record flooding events to improve accuracy



COMPREHENSIVE FLOOD MITIGATION MASTER PLAN

Voluntary Flood Buyout Program

For Highest Risk – Most Vulnerable Structures

- FEMA HMA Grant Programs: HMGP, FMA, BRIC
- Buyouts:
 - Create additional flood storage area
 - Create Open Green Space
 - Are a permanent solution
 - Buyouts provide major water quality benefits



COMPREHENSIVE FLOOD MITIGATION MASTER PLAN

MRBC Flood Mitigation Master Plan – key to timely FEMA HMA Grant Application(s)

Plan,
Prepare,
Protect

- Create Comprehensive Structure Inventory – based on flood depth
- Prioritize structures identified for acquisition
- Damage Assessment Protocol; Historical Data
- Populate data in advance
- Identify local funding source



COMPREHENSIVE FLOOD MITIGATION MASTER PLAN

Voluntary Floodproofing / Retrofitting Program*

- Elevation in Place to BFE + 2' – 3' Freeboard
- Relocation
- Utilizing Increased Cost of Compliance (ICC funds)
- Wet Floodproofing
- Installation of Engineered Flood Vents
- Elevation of Machinery & Equipment to FPG

*Floodproofing Does Not Always Eliminate Need For Evacuation



ICC – Most Under-used Resource

Three losses within a ten-year period.....

ICC Grant Mitigates Recurring Losses





COMPREHENSIVE FLOOD MITIGATION MASTER PLAN

Voluntary Agricultural Areas Land-Use Conversion Program

- Riparian Corridor Protection – stream buffers
- 20-Year Conservation Easements
 - USDA Programs
 - NGO's – Conservation Acquisition Programs (TNC)
- Wetland Restorations
 - US Fish & Wildlife Service (USFWS)
- Water Quality Improvement BMPs – Stream Buffers, Cover crops, Filter Strips



COMPREHENSIVE FLOOD MITIGATION MASTER PLAN

Stream Obstruction Removal Program

Removal of Class III and Class IV Log Jams

- Reduces Streambank Erosion When Flow is Re-directed
- Helps Improve Water Quality When Causing Erosion
- Reduces Agricultural Flooding*

*Does Not Reduce Major Flooding – Bank-full Condition



COMPREHENSIVE FLOOD MITIGATION MASTER PLAN

Flood Warning System

- Stream gage partnership with USGS – discharge & stage or stage only
- NWS Forecast Point – AHPS (Advanced Hydrologic Prediction Service) Website
- Used by USACE for Flood Inundation Mapping / Flood Warning
- Early Flood Warning Notice for Homeowners
- High Water Marks for Model Calibration
- Water Level Sensors – a much cheaper option for stage only
- Water Level Sensors – Rating Curve* “may” be established if protocols in place and advanced coordination with USGS or Private Consultant

*Rating Curve Required for Discharge Determination



COMPREHENSIVE FLOOD MITIGATION MASTER PLAN

INDIANA'S DISASTER ACTION PLAN (DAP)

- Western Lake Erie Basin (WLEB) Water Quality Concerns
- MRBC Director serves on IN-DAP Steering Committee

Water Quality Degradation – Who's to Blame?

OH – Believes it's Indiana

IN – Takes Actions to Protect Itself – Water Quality Baseline Established

USGS Super Gages Installed in Vicinity of State Line to Monitor Water Quality

Indiana Communities step of Water Quality Monitoring Efforts

MRBC to Install Stream Water Level Sensors at Monitoring Sites to determine discharge for load calcs.

MRBC Performs Comprehensive Stream Assessment Studies / Fluvial Erosion Hazard Analysis

All data used to identify major contributors of Non-Point and Point Source Contaminants



COMPREHENSIVE FLOOD MITIGATION MASTER PLAN

Plan

Rodney Renkenberger, PS, CFM
Executive Director
Maumee River Basin Commission

Prepare

Email: MRBC.Director@gmail.com
Phone: 260.449.7226

Protect