Stantec

Miami Conservancy District
Benefit Assessment Study

BOA Meeting

November 6, 2024

Agenda

1. Progress Report on Tasks 1 & 2
   - Current Methodology
   - Indirect Benefits
2. Benchmarking Summary
3. Preliminary Alternatives for Consideration

Overview of Study Tasks

Task 1 – Current Benefit Methodology

Task 2 – Benefits to Broader Community

Task 3 – Benchmarking Analysis

Task 4 – Alt. Methodology & Funding Strategies

Task 1 – Evaluate Current Benefit Methodology

- Does the existing benefit appraisal methodology fairly and equitably allocate benefits to properties?
  - Use of 1913 flood depth vs. range of flood events and existing topography
  - Use of a single flood factor curve vs. varying by land use class
  - Use of building and property damages only vs. including displacement costs, business losses, social impacts

- Scope includes:
  - Hydraulic modeling of Great Miami River with and without project
  - Application of FEMA methodology* for benefits determination
  - Development of Pilot Areas to extrapolate calculations
  - Comparison of current benefits calculation vs. alternate method (FEMA methodology)

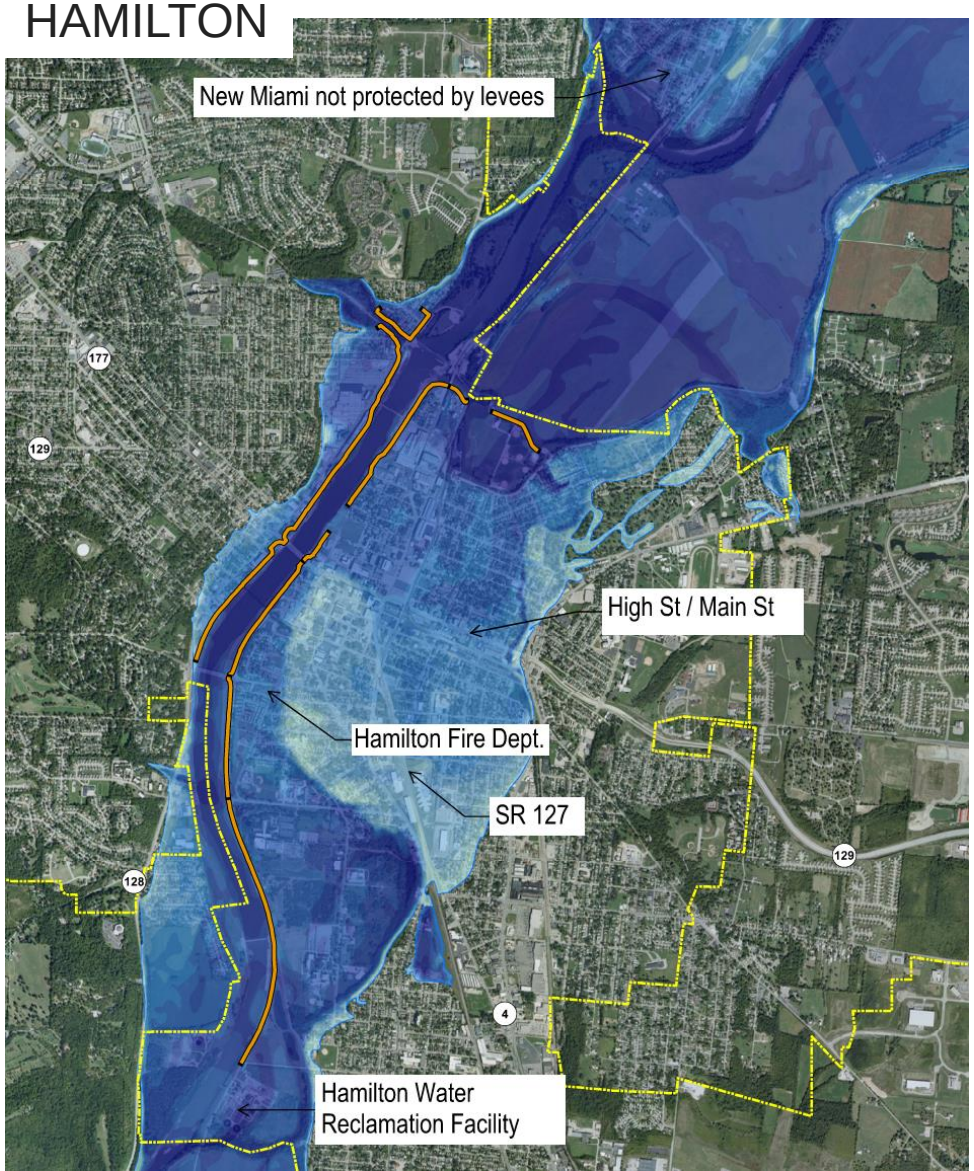
* FEMA Benefit Cost Analysis Reference Guide (June, 2009)

Task 1 Status

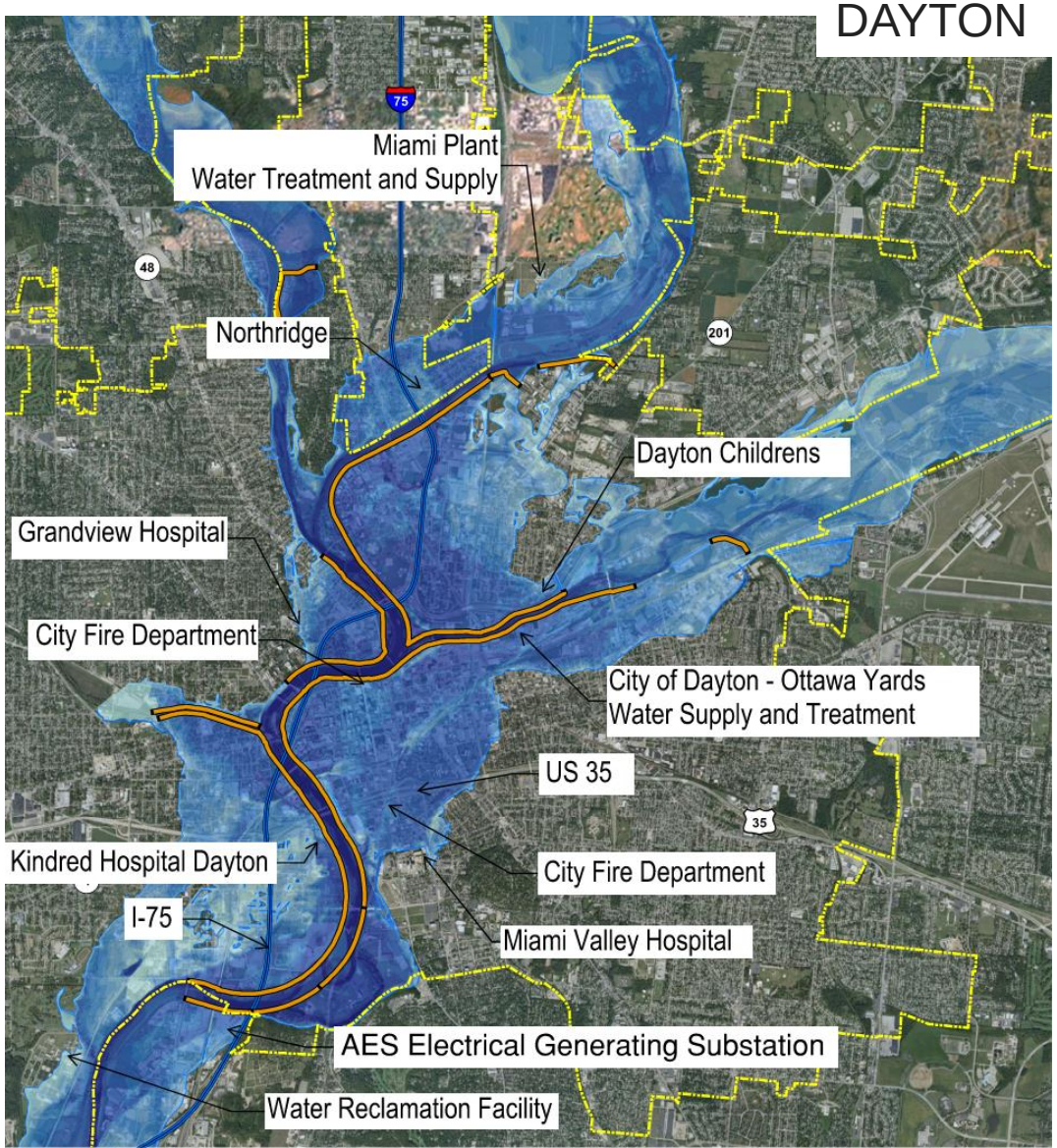
- Results of hydraulic modeling review
  - Sample Pilot area (Dayton)
- Demonstrate calculation of damages avoided (benefits), normalization of benefits
  - Sample damages to building at three flood levels
- Compare against MCD flood factors

Pilot Areas

HAMILTON

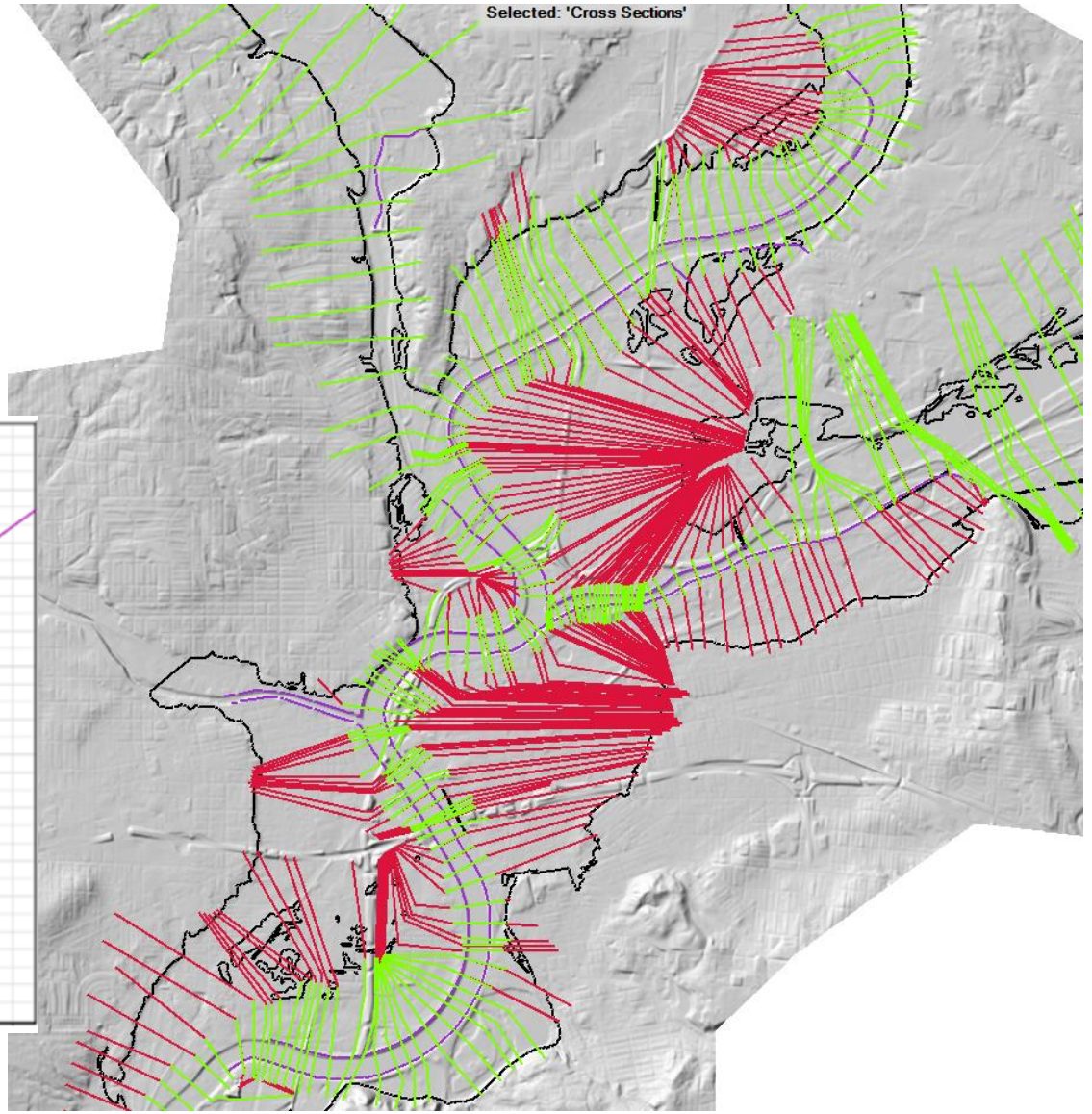


DAYTON



Task 1 – Evaluate Current Benefit Methodology

- Hydraulic Model Revisions
  - Cross Section Extensions
  - Levee
  - Channel Mods (Hamilton)



Task 1 – Evaluate Current Benefit Methodology

- Hydrology (Flows)
  - 10-,50-,100-,500-Year; OPF; 1913 Discharge

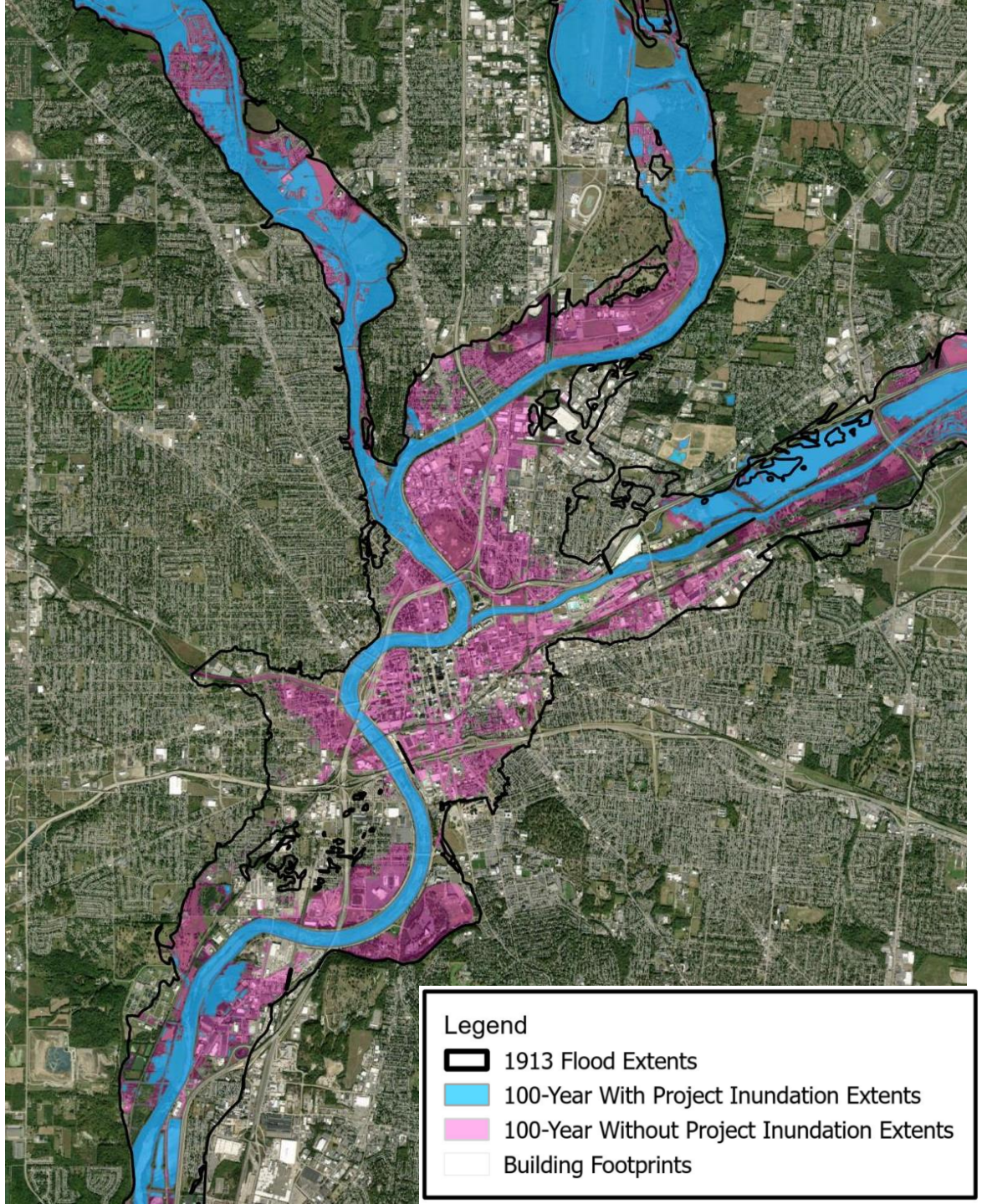
MCD Feature or location	1913 Flood discharge	1913 Flood event with MCD dams	1913 peak Q x 1.4 (40% Increase)	OPF Discharge with Dams
Dayton GMR between Mad Rvr and Wolf Crk	252,000	95,000	352,800	110,000
Hamilton	352,000	165,000	492,800	200,000

MCD Feature or location	Without Project 100-year Flow	100-year With Dams	Without Project 500-year Flow	500-year With Dams
Dayton GMR between Mad Rvr and Wolf Crk	117,000	58,200	147,000	68,500
Hamilton	142,000	94,000	178,000	110,000

* All flow rates reported in cubic feet per second (CFS)

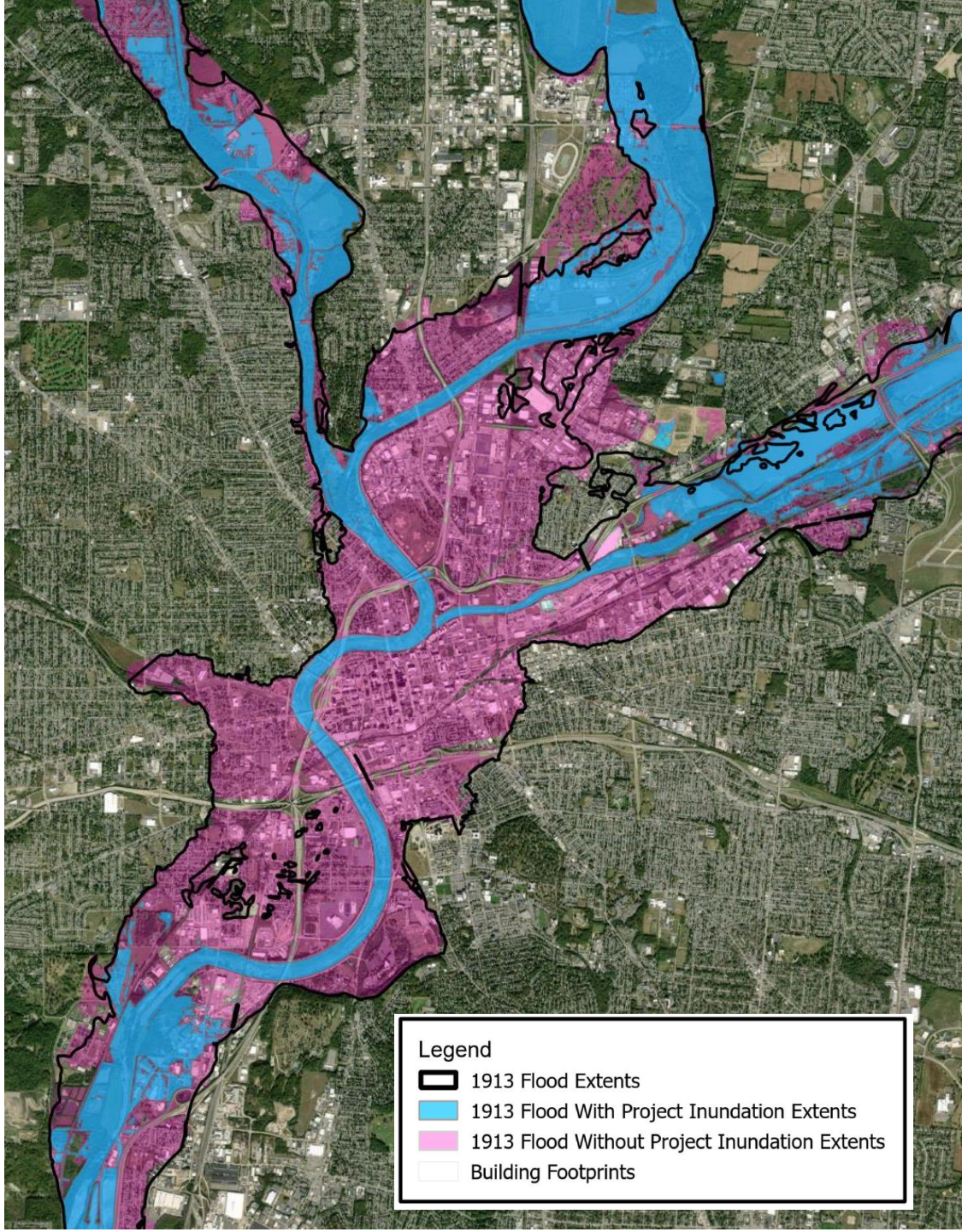
Pilot Areas

- Dayton
  - 100-Year Event
  - With-Project & Without Project



Pilot Areas

- Dayton
  - MCD 1913 Flood Extents
  - With and Without project modeled extents

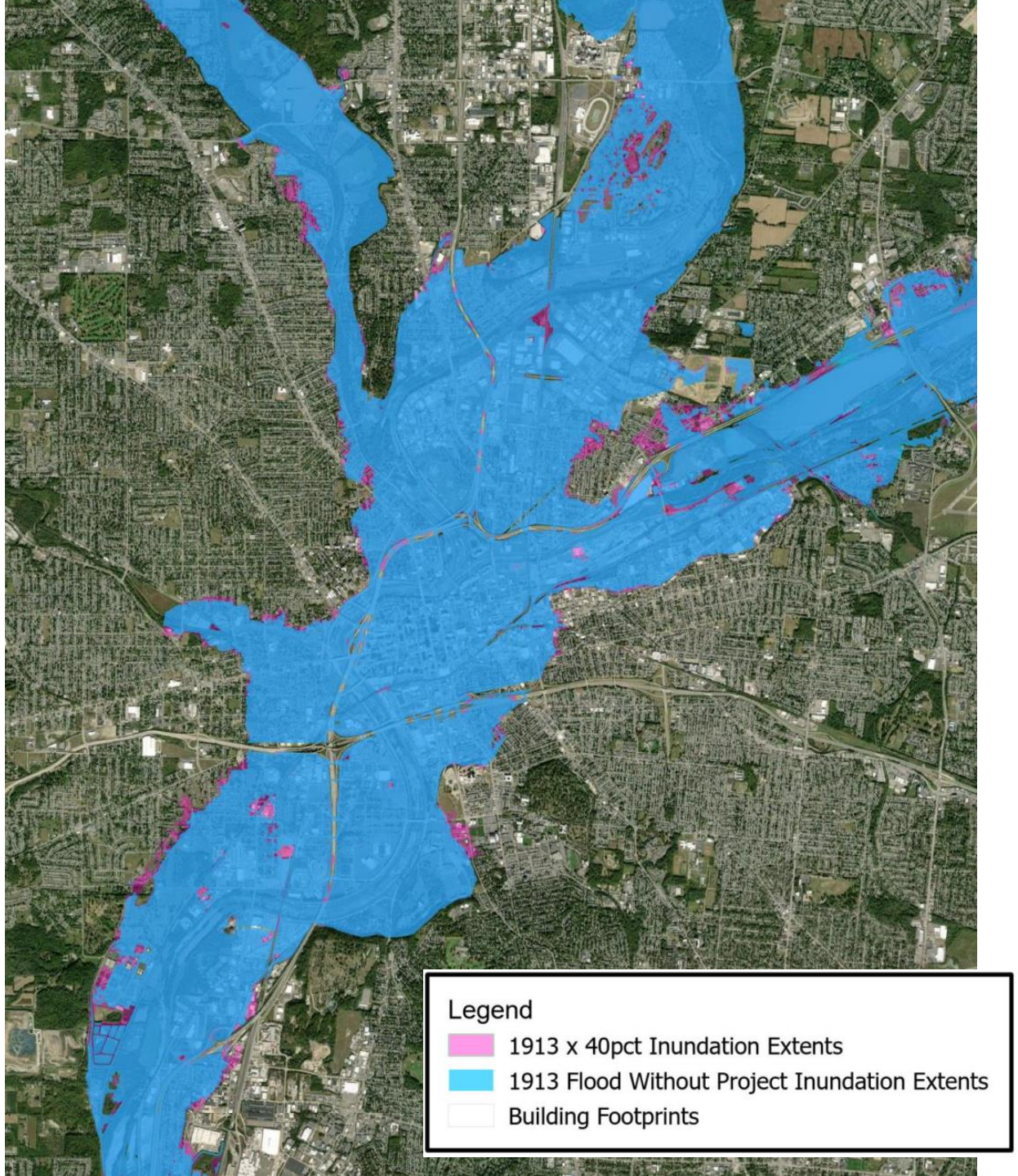


Pilot Areas

- Dayton
  - 1913 + 40% Peak Flow
  - Without project inundation extents shown

- Inundation Area (Dayton)
  - 1913 = 10,500 acres
  - 1913 + 40pct Q = 11,150 ac.

- Parcels Impacted (Dayton)
  - 1913 = 19,050
  - 1913 + 40pct Q = 20,315

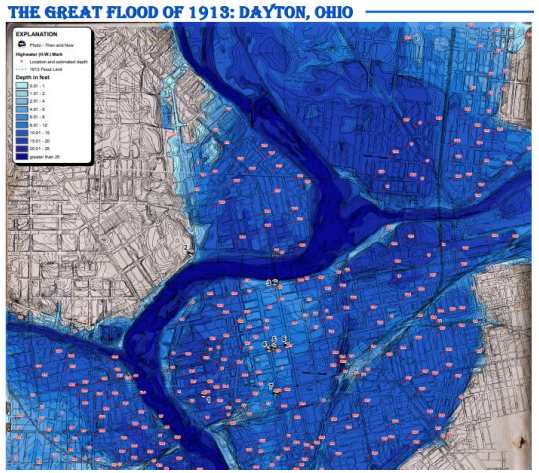


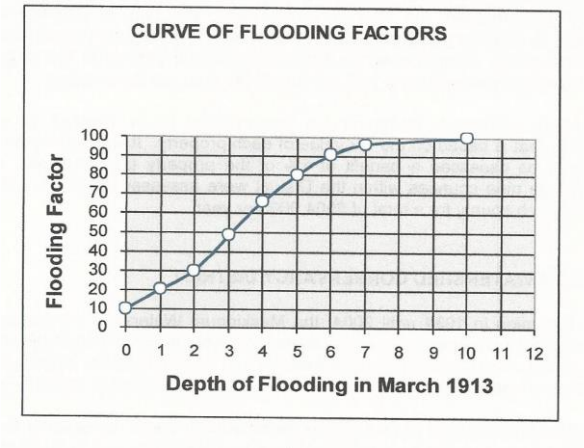
Process for Benefits Appraisal

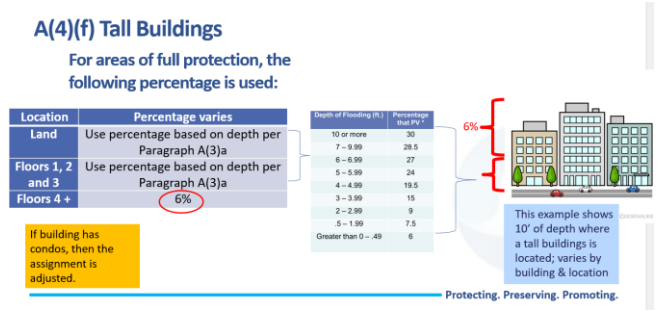
Determine Flood Risk Reduction Provided by District

Calculate Benefits Provided to People, Corporations and Other Public Entities

Appraise Benefits to Real Property and/or Political Subdivision

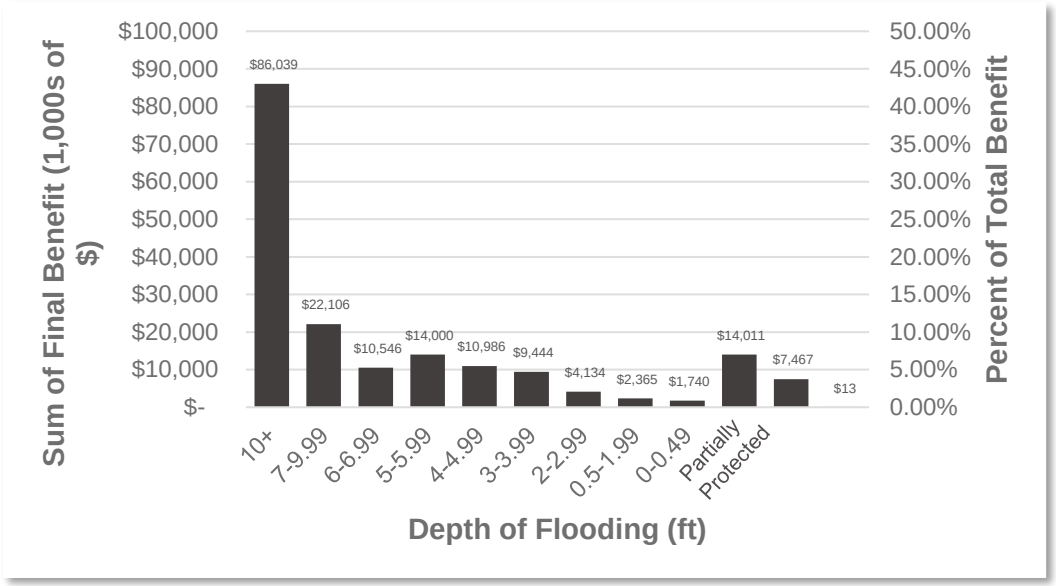


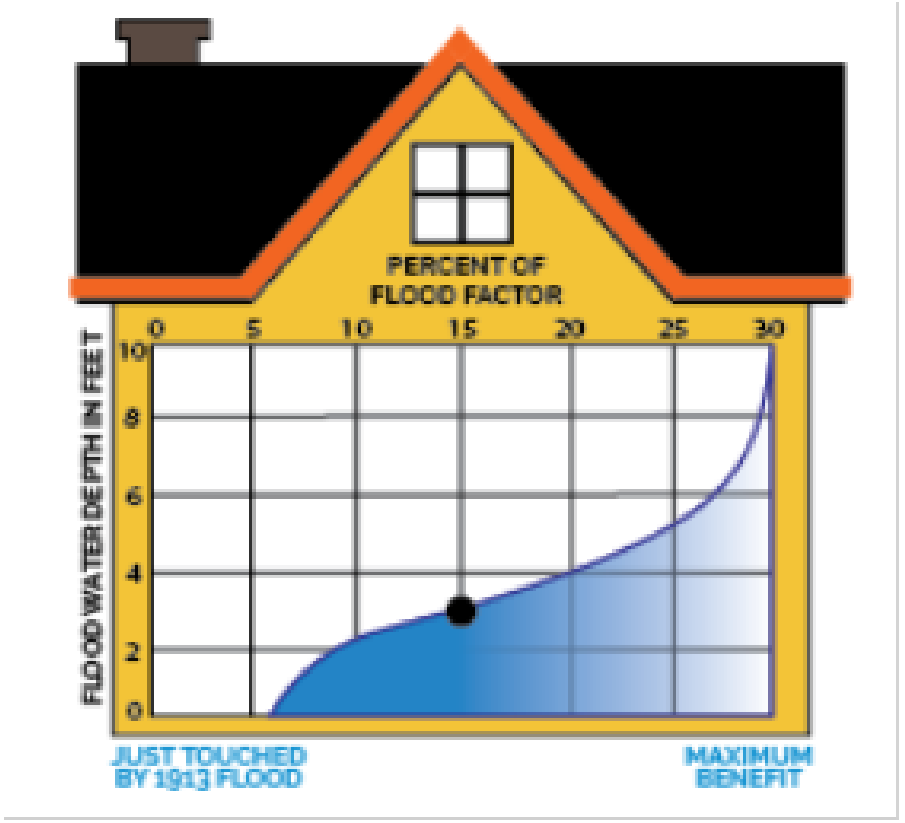




Direct Benefits Calculation Comparison of Steps

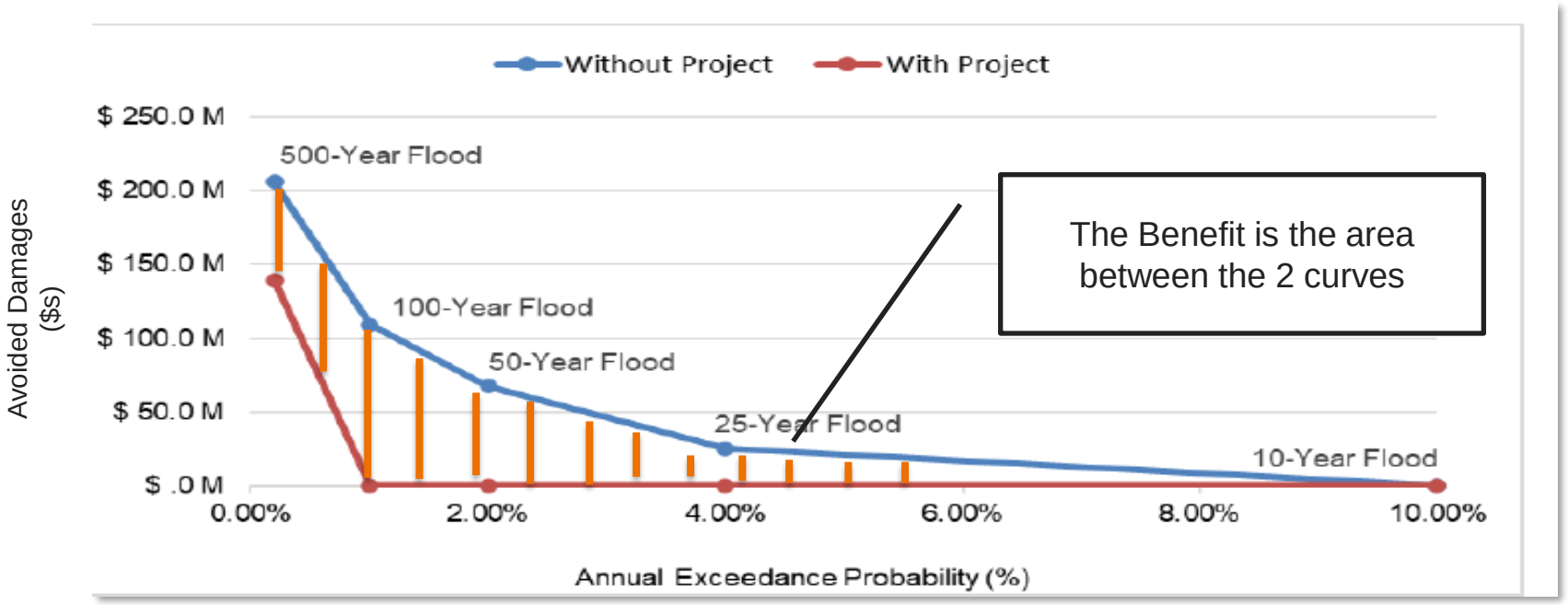
Current Flood Benefit Calculation
(6th Appraisal Record)





Direct Benefits Calculation Comparison of Steps

Example FEMA Benefits Estimation



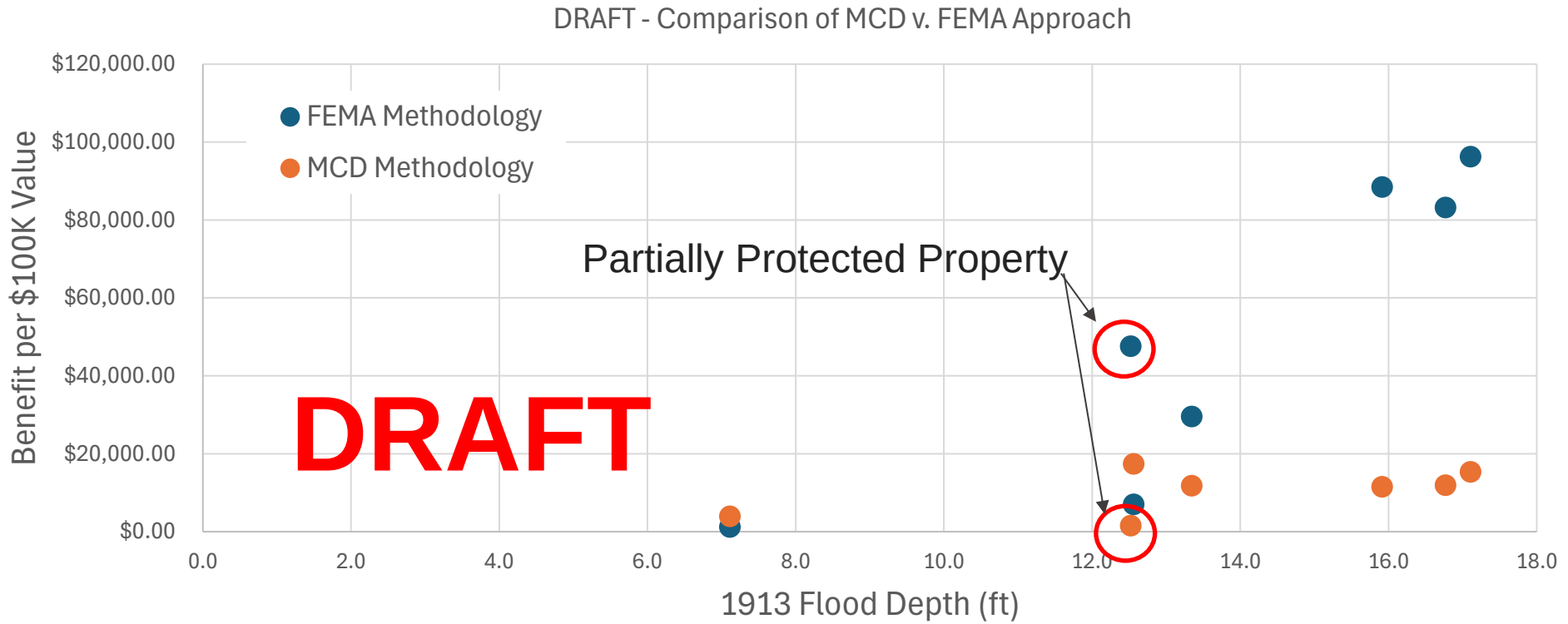
FEMA Estimation Example:

- Estimate of Total Direct Benefits = sum of avoided damage costs for all property located within the pilot areas

- After total benefits are estimated, the allocation of benefits to parcel level creates the assessment

Comparison of FEMA and MCD Methods

- Selected 7 properties within the City of Dayton
- Calculated benefit utilizing MCD method vs. FEMA method
- Normalized the results based off of $100k property value
- Preliminary results indicate that MCD methods undervalue total benefit and likely undervalue partial protection benefit



Task 2 – Evaluate Benefits to the Broader Community

- How do the indirect benefits received by the entire community compare to the direct benefits currently appraised?

- Scope includes:
  - Leveraging results of hydraulic modeling from Task 1
  - Review potential indirect benefits of wastewater treatment plants, hospitals, roads, EMS
  - Compare to direct benefits

Task 2 – Evaluate Benefits to the Broader Community

Direct Benefits

- Calculated by using physical building/land damage to parcels per flood event
- Applied to parcels WITHIN the flood protected area (ie. 1913 Flood Boundary or 1913 + 40% boundary)
- Calculated for pilot areas for this study

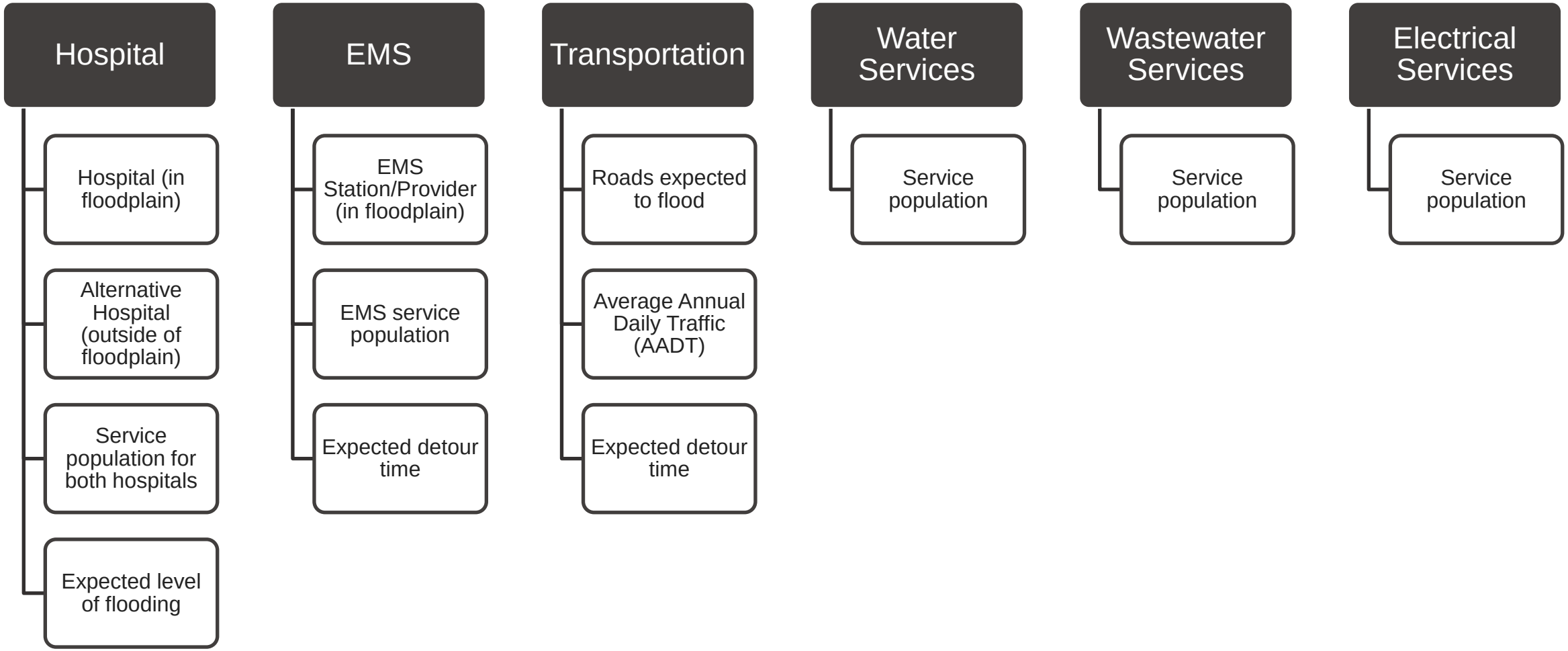
Indirect Benefits

- Per-Person basis
- Individuals both within and outside the current district boundaries
- May be limited to district boundary or outside the current district boundaries
- Not limited to pilot areas for this study

Task 2 – Evaluate Benefits to the Broader Community: Methodology

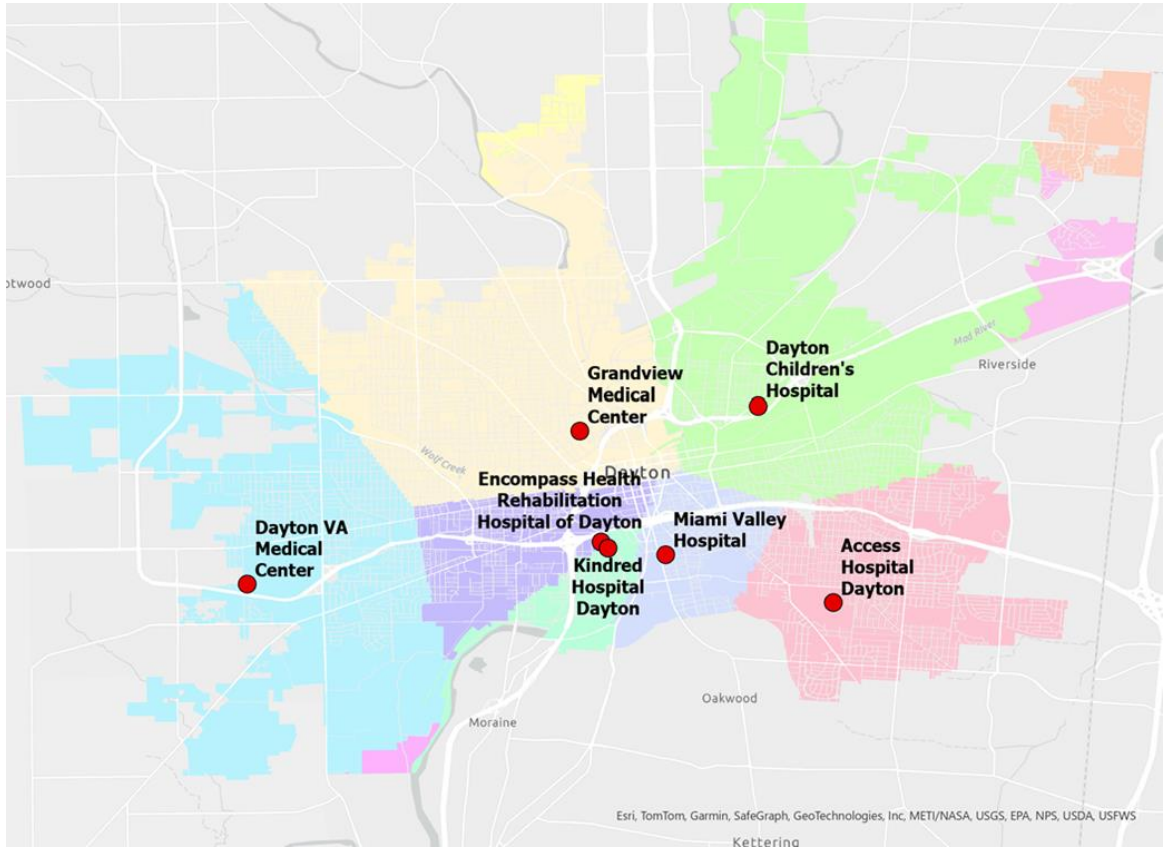
Hospital	• Cost of Extra Distance to Nearest Hospital • Cost of Additional Waiting Time • Potential Cost in Lives due to Extra Travel Time
EMS	• Cost in Lives per day due to Increased EMS Response Time
Transportation	• Cost per Hour of Delay in Traffic
Water Services	• $138 per day, per capita (FEMA)
Wastewater Services	• $66 per day, per capita (FEMA)
Electrical Services	• $199 per day, per capita (FEMA)

Task 2 – Evaluate Benefits to the Broader Community: Inputs

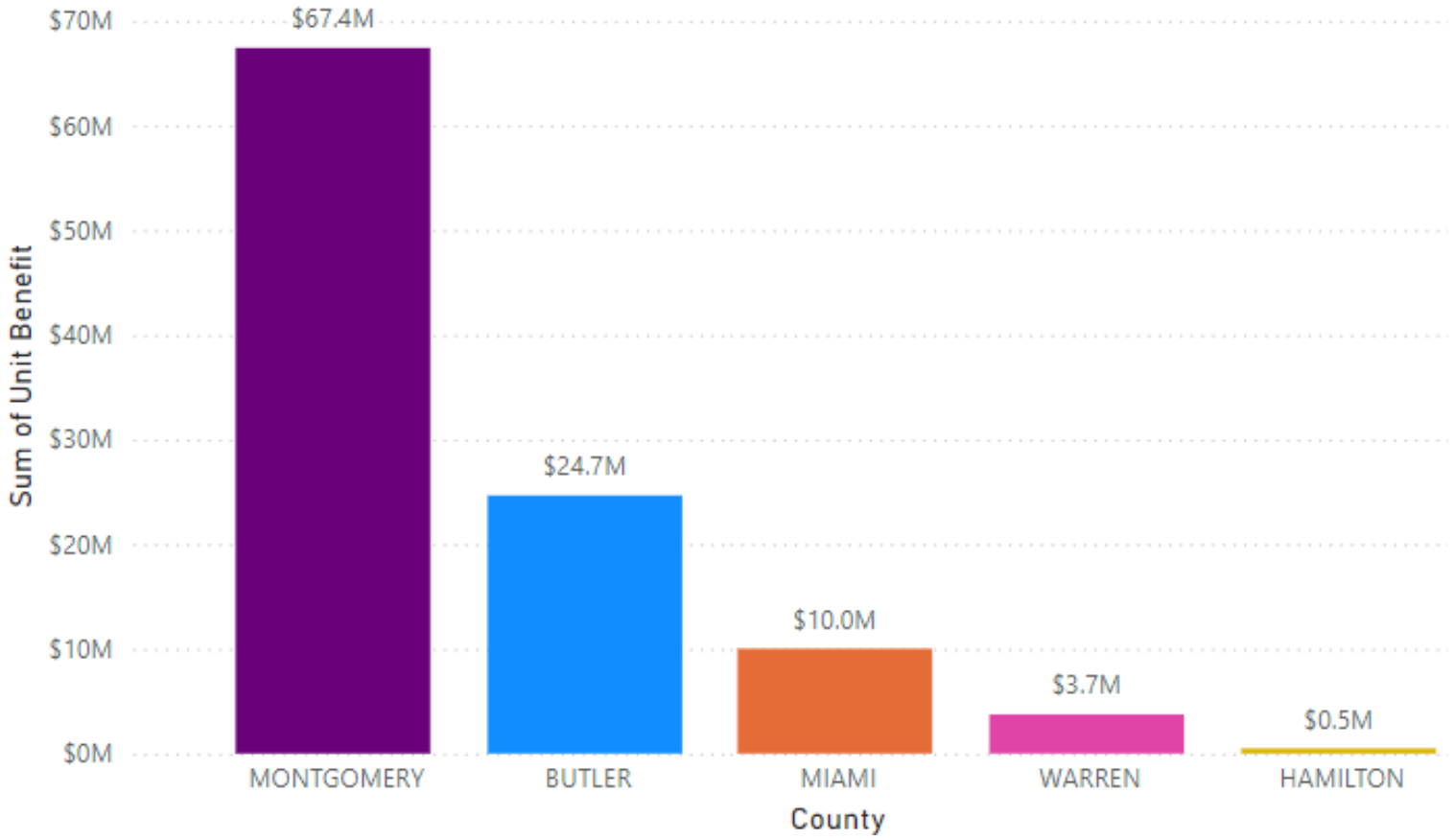


Task 2 Status

- Indirect benefits evaluated by pilot areas but benefits accrue to individuals both inside and outside current MCD flood district boundary
- Indirect benefit categories being considered
  - Hospitals
  - Emergency Medical Services
  - Roads & Bridges
  - Water/Wastewater Treatment



Task 2 – Evaluate Benefits to the Broader Community: Current Methodology (Unit Benefit)



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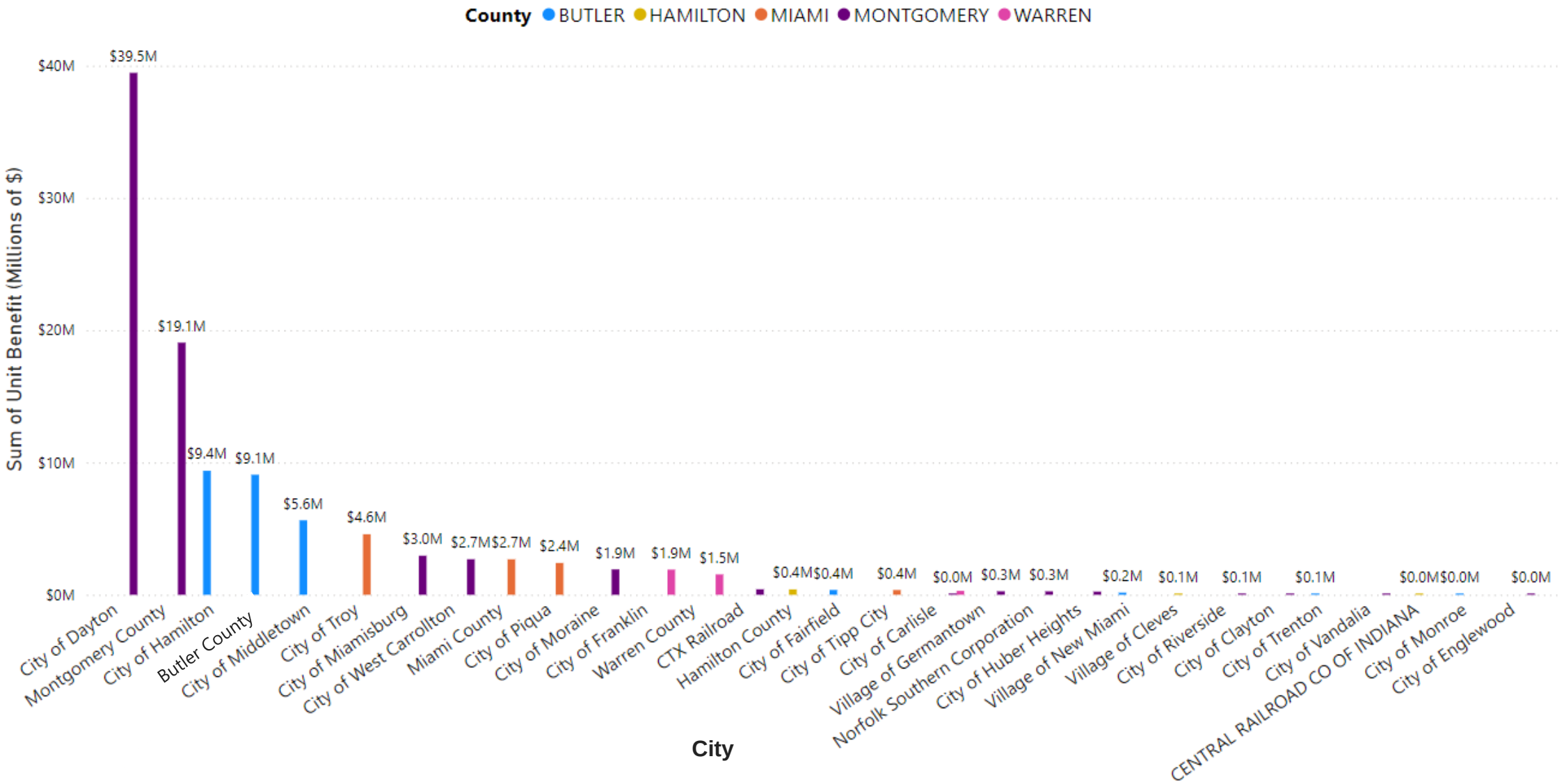


Task 3 – Benchmarking Analysis

- How do peer agencies assess the benefits provided and fund their organization?

- Scope includes:
  - Evaluation of other Ohio Conservancy Districts
  - Evaluation of other peer agencies across the US
  - Note differences across agencies in terms of size, infrastructure, and management structure

Benchmarking Survey Districts

Name of Organization	Location (City, County, State)
Maumee Watershed Conservancy District	Defiance, Defiance, Ohio
Muskingum Watershed Conservancy District	New Philadelphia, Tuscarawas County, Ohio
Chippewa Subdistrict (MWCD)	Seville, Ohio
Hunter's Run Conservancy District	Lancaster, Fairfield, Ohio
Hocking Conservancy District	Athens, Ohio
Margaret Creek Sub-District (HCD)	Athens, Ohio
Miami Conservancy District	Dayton, Ohio
Riverside Co. Flood Control and Water Conservation District	Riverside, CA
Santa Clara Valley Water District	San Jose, CA
Pajaro Regional Flood Management Agency	Watsonville / Pajaro, CA
Mile High Flood District	Denver, Denver, CO
Urban Flood Safety and Water Quality District	Portland, Multnomah County, Oregon
Harris County Flood Control District	Houston, Harris County, Tx
Tarrant Regional Water District	Fort Worth, Tarrant, Texas

Task 3 Status

Benchmark Survey Summary

- Benefits Appraisal Methods
  - Ohio Conservancy District methods vary widely and utilize the following methods
    - No explicit economic calculation – Derived from O&M or Capital requirements
      - Typically as a % of property value
    - Appraised at a District or Subdistrict Level and allocated to properties based on stormwater contribution (Equivalent Residential Unit), land use or location
    - Appraised on an individual property basis (flood risk approach)
      - Flood factors based on flood depth of building / property
  - Benefit appraisals, as conducted by the Miami Conservancy District, as a basis for flood protection assessments are not common nationally

*Benchmark Summary Handouts #1 and #2

*Benchmark Summary Handouts #1 and #2

Task 3 Status

Benchmark Survey Summary

- Assessment Methods
  - Ohio Conservancy District assessment methods also vary widely across the state and include:
    - Direct % of calculated benefit
    - Uniform amount / fixed fee
    - Stormwater contribution (area of impervious and pervious area)

  - Surveyed Districts nationally utilize:
    - Ad Valorem Taxes
    - Special assessments that include:
      - Direct % of calculated benefit
      - Stormwater contribution (area of impervious and pervious area)

Flood Risk Approach

Flood Factors or Flood Depth Considerations

- Considers directly the potential damages avoided at an individual structure
  - May consider depth of flooding, structure type, structure value, land use
  - MCD methodology fits within this approach

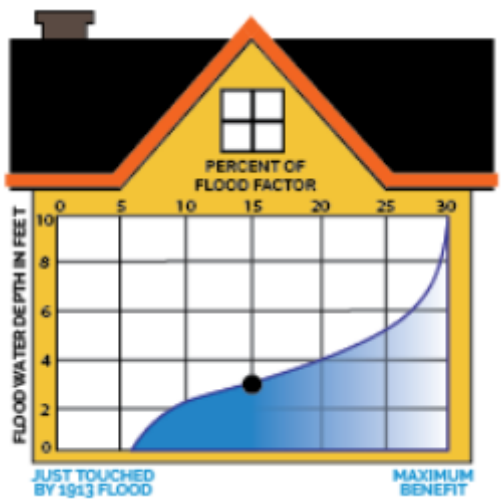
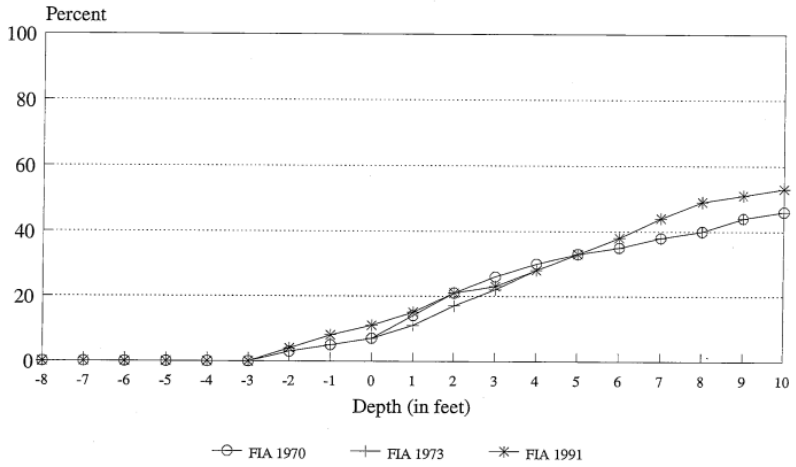
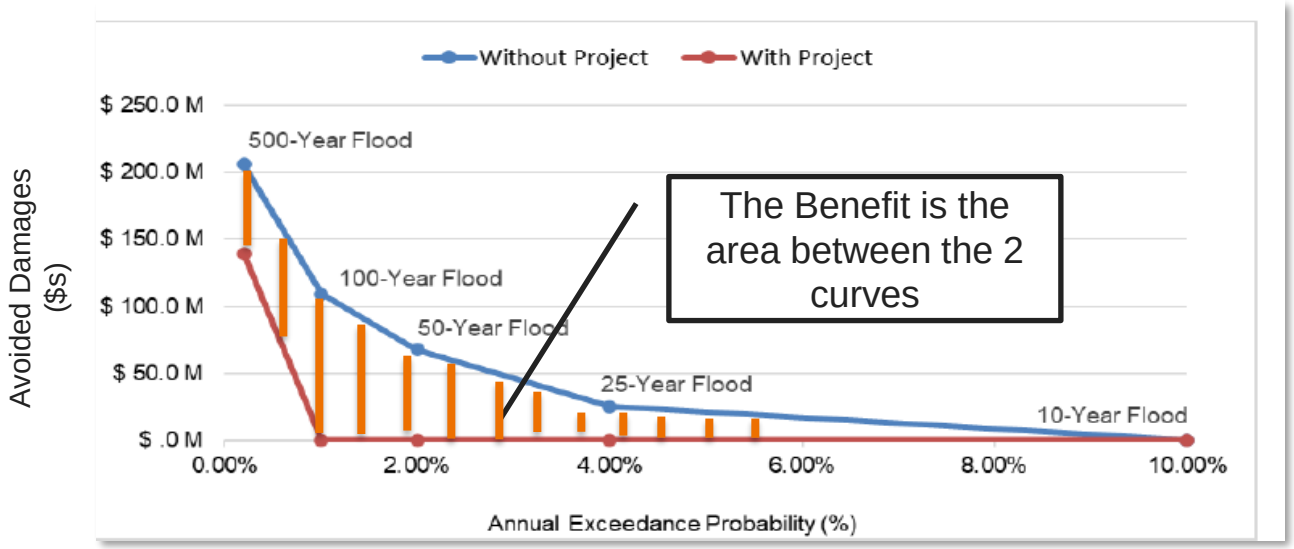


Figure 14

Percent Damage to Structure Value
TWO OR MORE STORIES, WITH BASEMENT



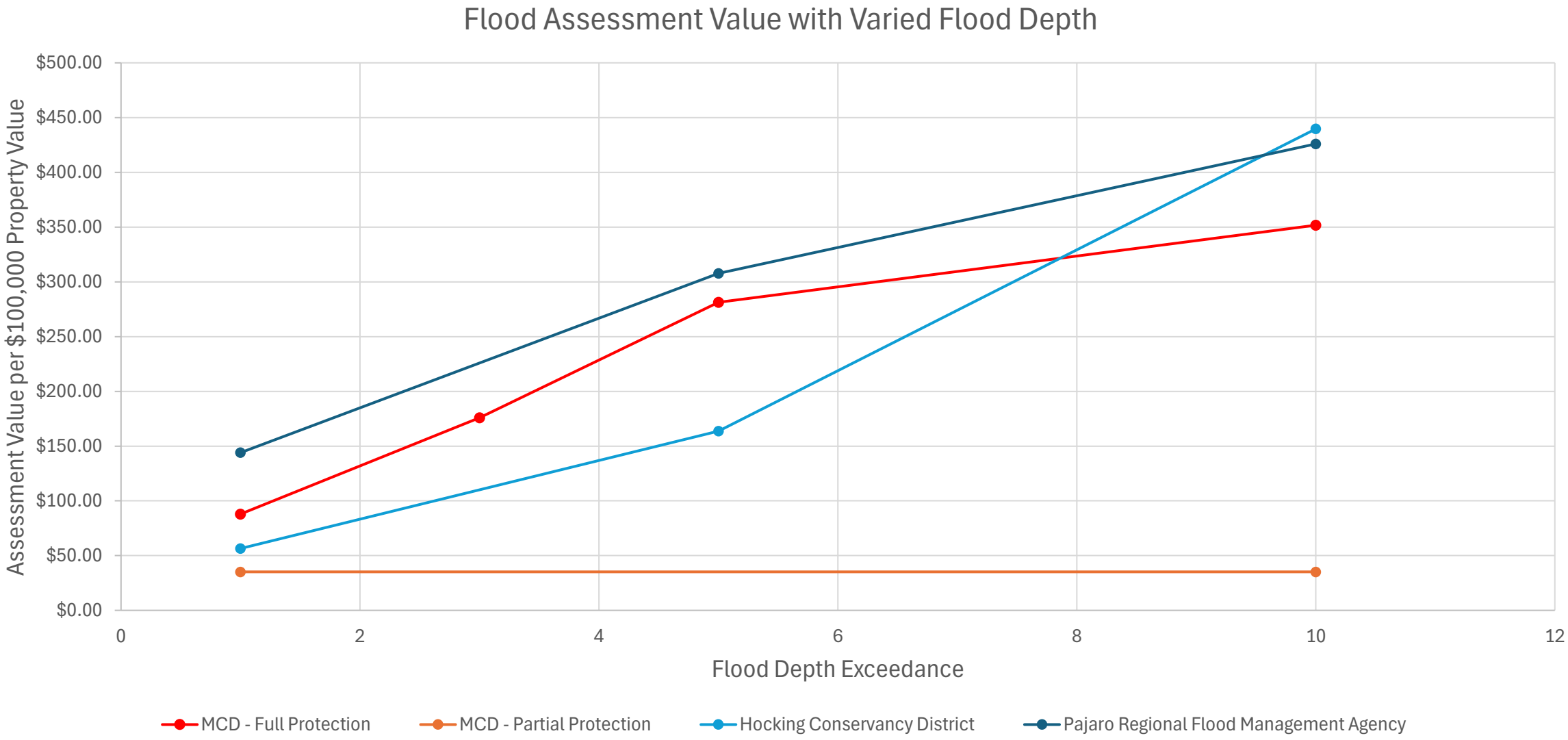


Stormwater Approach

Parcel Area, Impervious Area, or Equivalent Residential Unit

- Considers the contribution of stormwater and flood flows to the system
  - Volume of runoff is directly related to total surface area and to the % of impervious area
  - Impervious area can be directly measured or estimated
    - Directly measured: aerial photos / remote sensing data
    - Equivalent Residential Unit (ERU)
      - Considers an average residential lot size and imperviousness
      - Charges a uniform rate to all residential areas 1 ERU
      - Commercial, industrial and institutional land uses are then determined as multiple of ERUs
        - Directly measured imperviousness and parcel size
        - Multiplier of standard impervious area and then measured parcel size
      - Rate set for 1 ERU and then assessment based on # of ERUs

Preliminary Benchmarking Results



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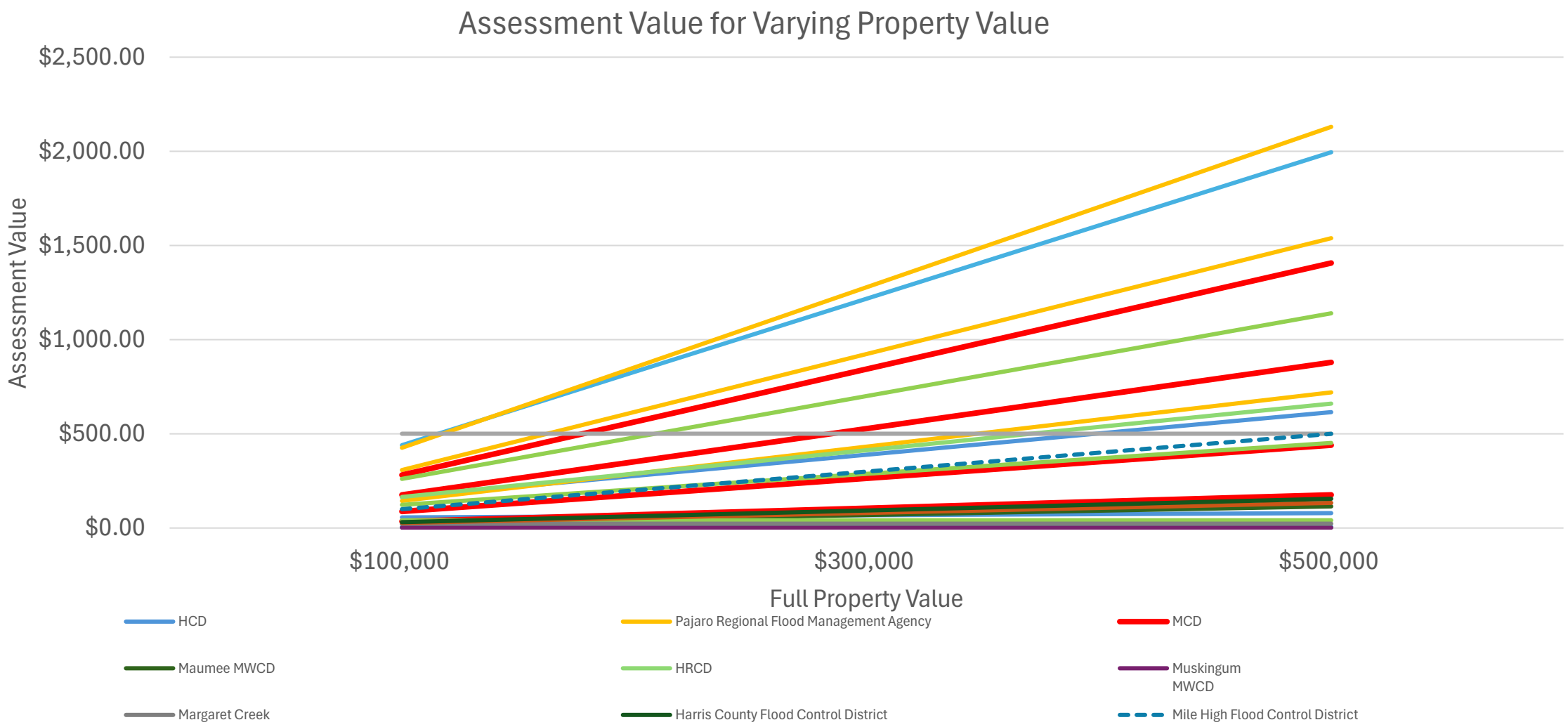


Task 4 – Evaluation of Alternate Methodology and Funding Strategies

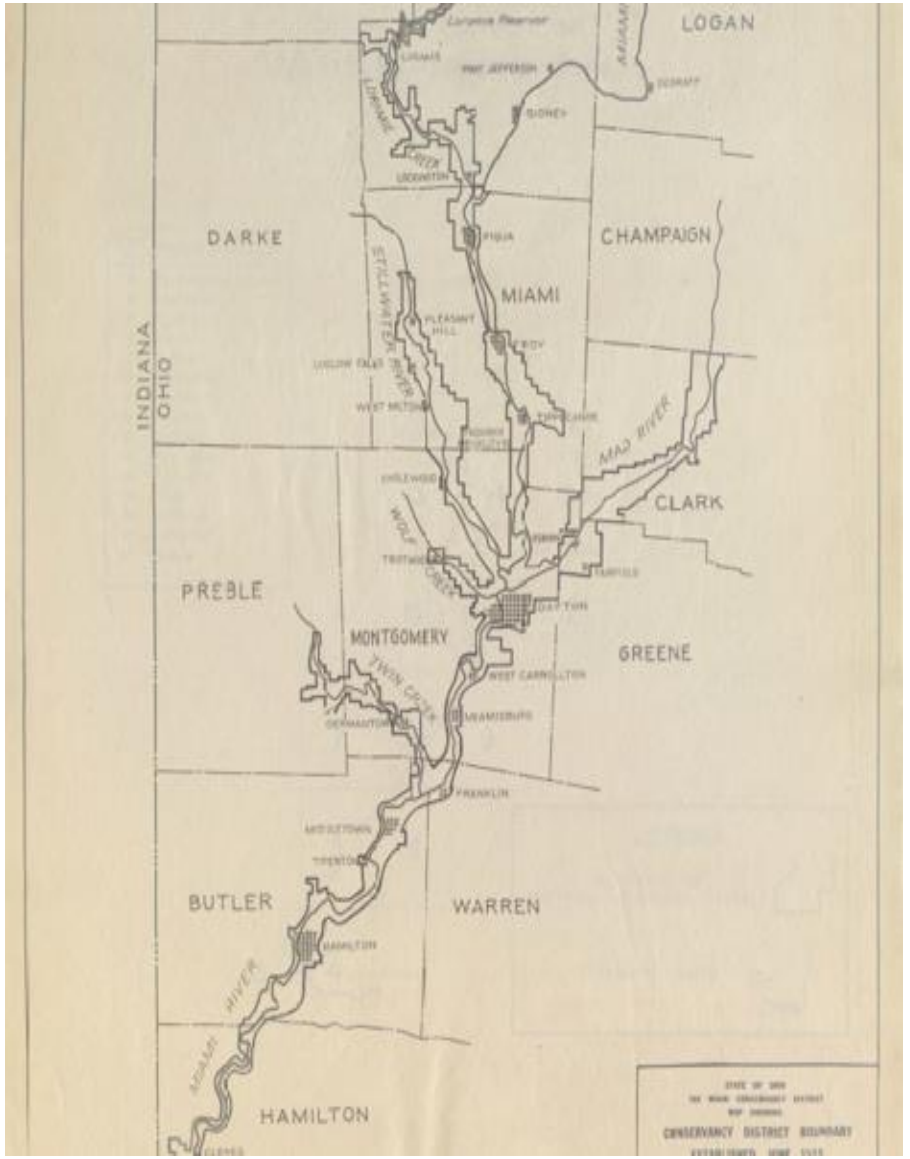
- What are the potential alternate scenarios and how would they impact MCD stakeholders and communities?

- Scope includes:
    - Identification of 4 alternative scenarios
    - Quantitative comparison:
        - Number of parcels impacted
        - Rate statistics (median, min, max, spread)
    - Qualitative comparison:
        - Consistency with peer agencies
        - Perceived public acceptability/survey
        - Economic development effects
        - Socio-economic impacts

Current MCD Flood Protection Boundary – limited to narrow corridor

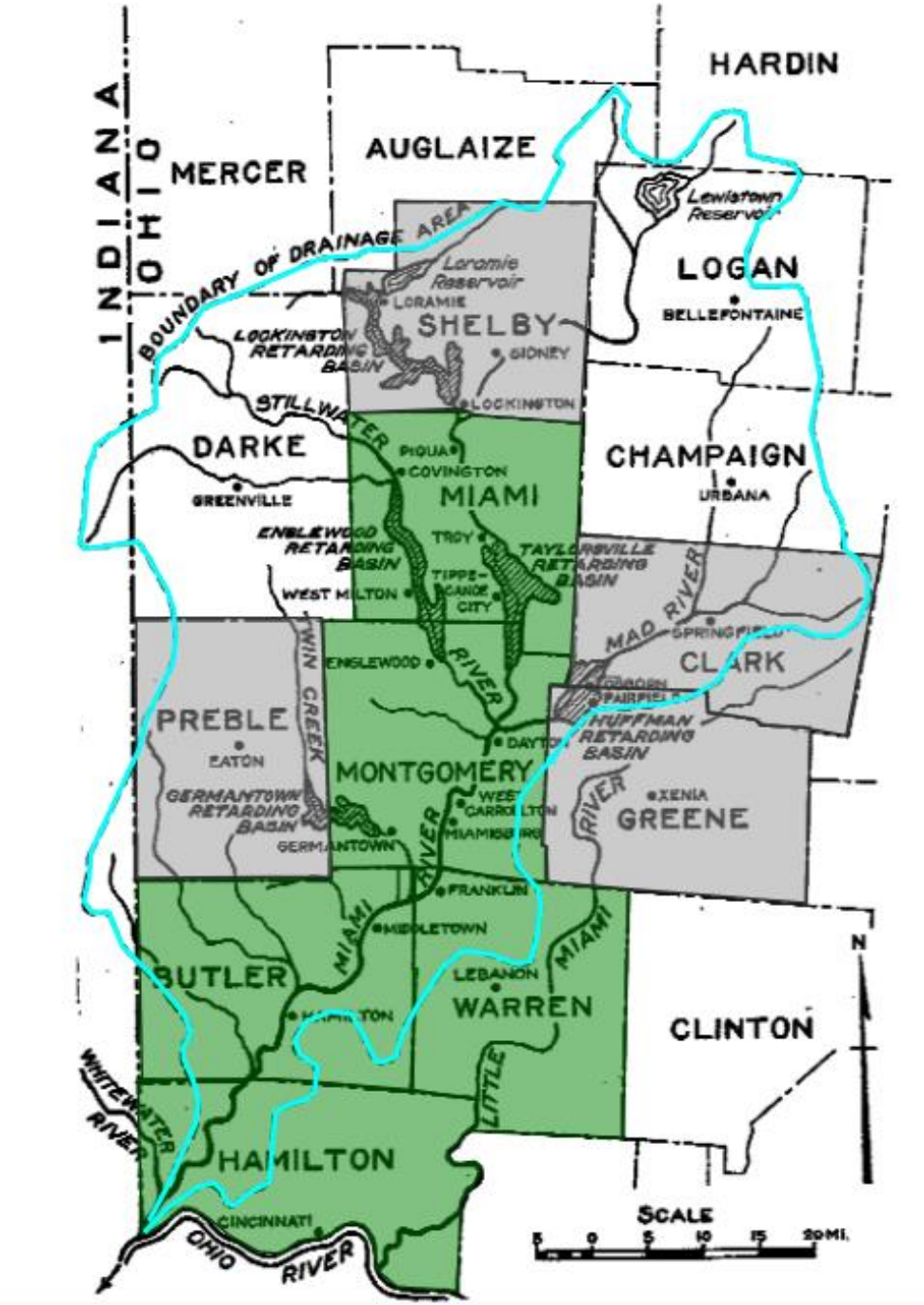
Indirect benefits (avoided damages) are being identified/calculated outside of the currently approved FPS boundary.

To assess benefits outside the current boundary, action is required of the court



MCD District Boundary

- Additional Considerations for Expanded Benefit Assessment
  - 9 Counties in Conservancy Court
    - 5 – Benefit Assessed
      - Hamilton, Butler, Warren, Montgomery and Miami
    - 4 – No Benefit Assessed
      - Preble, Greene, Clark, Shelby
  - 6 Other Counties in Watershed
    - No Benefit Assessed
      - Darke, Mercer, Auglaize, Hardin, Logan and Champaign



Potential Assessment Alternatives for Feedback

- District Watershed Approach*
  - Every parcel in the Great Miami River Watershed within the current 9 counties in the District is assessed.

- Direct and Indirect Combination – Watershed Approach*
  - Appraise Indirect Benefits to every parcel in the Great Miami River Watershed within the current 9 counties in the District, which spreads the benefit across the watershed and as a result, reduce Direct Benefit appraisal.
    - Different gradation of benefits (ie. Create 2-5 regions/zones for Direct and 1-3 zones for indirect)
    - Adjust flood factor curves

- Direct and Indirect Combination – Expanded Community**
  - Reduce Direct Benefit appraisal. Expand Unit Benefit Appraisals for Counties to account for broader community benefits.

- Simplify Benefit Appraisal (use current flood protection boundary)
  - Modify benefit assessment methodology to simplify future updates.
  - No boundary change – may include 40% factor

*Note: Boundary Change needed to include all MCD 9 Counties
**May require a change to boundary

Evaluation Considerations

Category	Evaluation Considerations
Revenue	Revenue Sufficiency
Legal	Legal Defensibility
Proportionate Share for the benefit received	Interclass (between property classes) Equity
	Intraclass (within property class) Equity
	Intergenerational (existing vs. new properties) Equity
Property Impact	Affordability
	Assessment Bill Stability
	Development Effects
Administration	Administrative Burden
	Conservancy Court Impacts
Public Acceptance/Perception	Representative survey to be performed

Schedule

Task	Start Date	End Date
Task 1 - Evaluate Current Benefit Methodology	7/17/24	11/11/24
Task 2 – Evaluate Benefits to the Broader Community	8/15/24	11/21/24
Task 3 – Benchmarking Analysis	8/15/24	11/01/24
Task 4 – Evaluation of Alternate Methodology & Funding Strategies	10/1/24	12/20/24

Next Steps

Estimate direct and indirect benefits

Evaluate alternative methodologies – narrow down to four

Progress meeting with BOA in December 2nd/11th

Communications/public outreach coordination

Phase 1 completion by end of 2024