

An aerial photograph of Milwaukee, Wisconsin, showing the city skyline with several prominent skyscrapers, including the Bank of America Tower. The city is situated along the western shore of Lake Michigan. In the foreground, the Pabst Pavilion is visible, a large, modern, circular building with a glass facade, situated on a peninsula. The sky is blue with scattered white clouds, and the water is a deep blue. The overall scene is a mix of urban development and waterfront recreation.

PERFORMING A TMDL
ANALYSIS IN A WORLD
WHERE YOUR MS4 AREA
DOESN'T FIT INTO A NICE
BOX

Milwaukee County

Today's Presenters



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Jack Sudar, P.E.

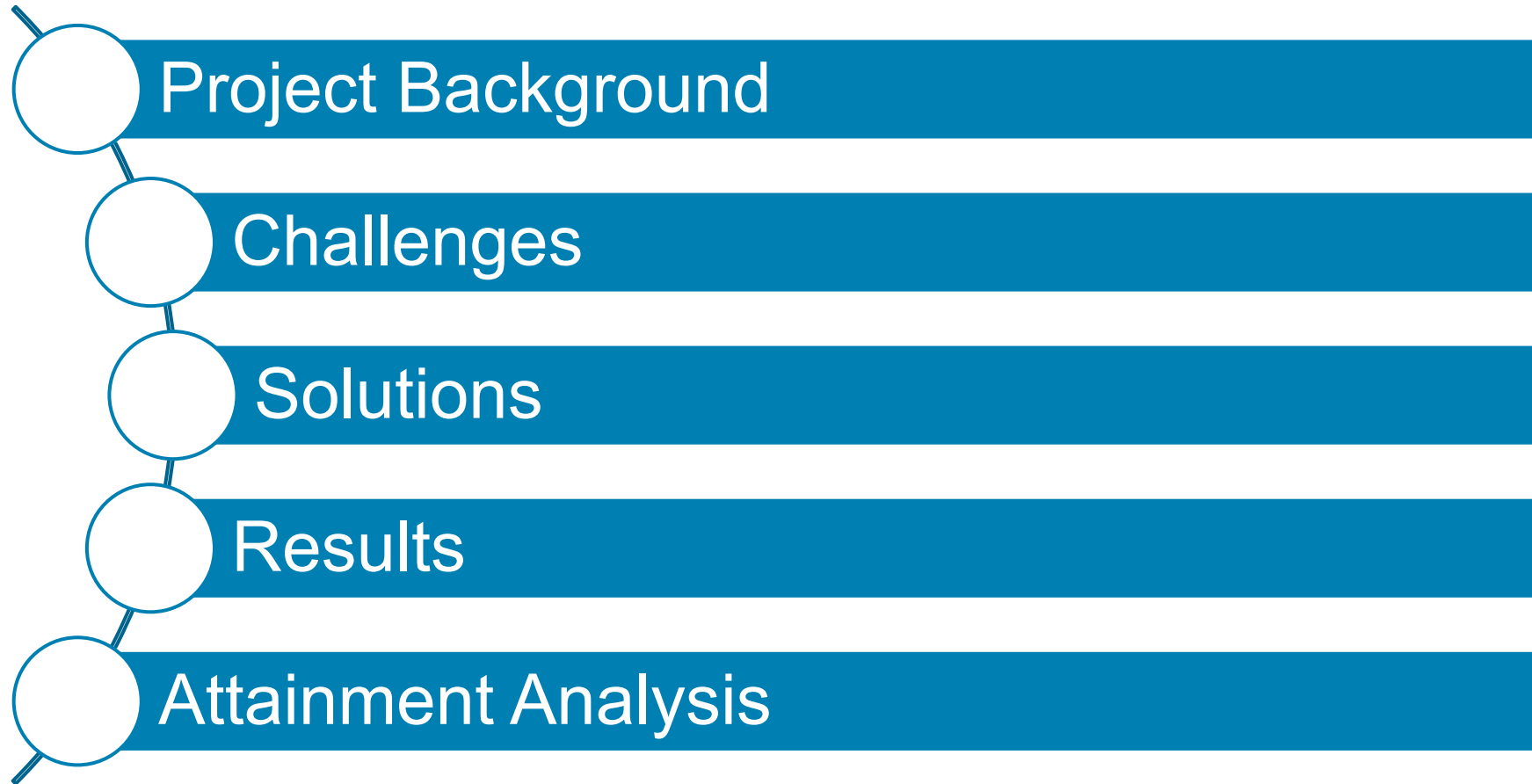
Senior Environmental Engineer
Milwaukee County



Casey McQuin

Environmental Engineer
Milwaukee County

Presentation Agenda



Project Background

- Milwaukee County was awarded a WDNR Urban Nonpoint Source & Storm Water Management Planning Grant for the following tasks:
 - Storm Water Outfall Basin Delineation
 - Classify approximately 1,400 outfalls
 - TMDL Wasteload Allocation Compliance & Attainment Analysis
 - Summary Report of TMDL Analysis Results
- This presentation will focus on the TMDL Wasteload Allocation Compliance & Attainment Analysis



Project Background

- TMDL Wasteload Allocation Compliance Analysis
 - Utilize WinSLAMM to calculate pollutant loading generated by County-owned lands & roadways
 - Utilize WinSLAMM and available data to determine pollutant reduction efficiency of existing storm water facilities
 - Evaluate current reductions against TMDL wasteload allocations (WLA)
 - Evaluate path toward compliance for reachsheds in exceedance of WLA

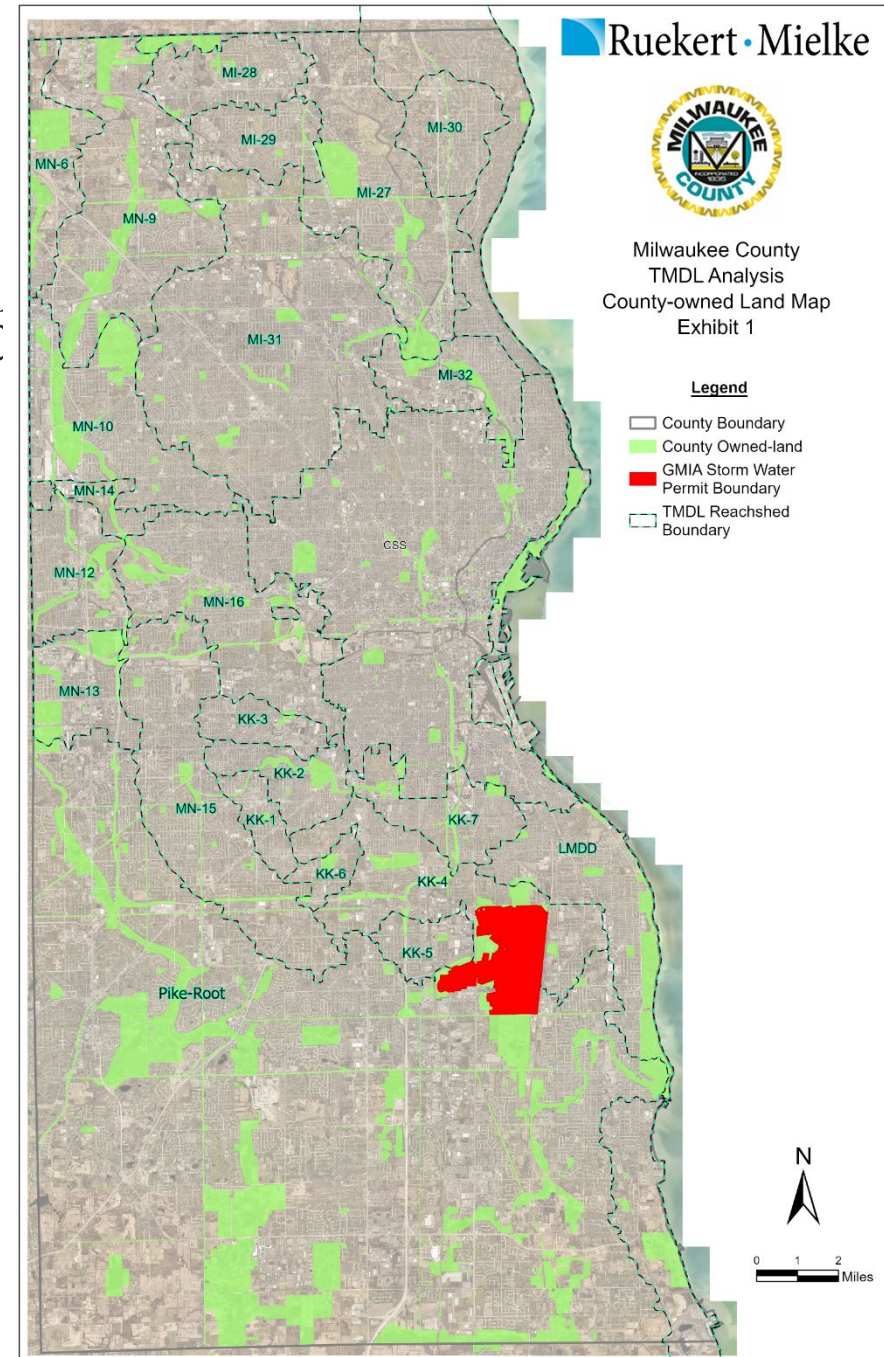
Project Planning Area

- County-owned land within the corporate limits of Milwaukee County
 - County Parks
 - County-owned Sites
 - Highways owned/maintained by the County
- Excludes General Mitchell International Airport
 - Covered under individual WPDES Permit



Project Planning Area

- Green shading: County-owned Land
- Dashed lines: TMDL Reachshed Boundaries
- Red shaded area: General Mitchell Airport



Challenges

Data Management

Land Use

Jurisdiction

Data Management

- LOTS of data!
- Multiple County departments that manage data
- Multiple datasets with similar/overlapping data
- Datasets that need additional analyses performed
- Software limitations for GIS data manipulation

Data Management

- Work with the County to ensure needs are being met
- Internal collaborations to create solutions
 - What data do we have?
 - What data do we need?
 - What do our results need to look like?
- Teamwork makes the dreamwork!



Data Management

- Organization is key!
 - Keep track of how you manipulate data
 - Utilize metadata and attributes
- Map editing for multiple users
 - Online data and version of basemap
 - ArcPro project split by regions
 - Helped with QA/QC

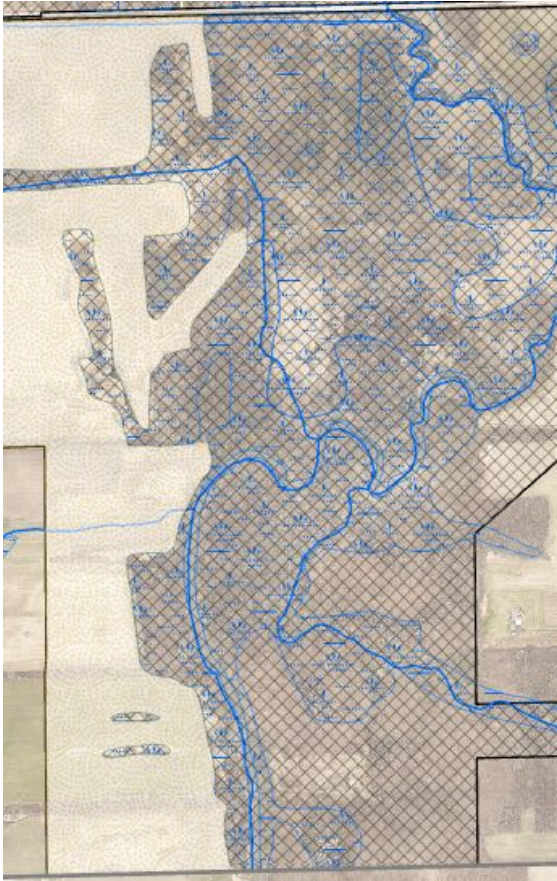
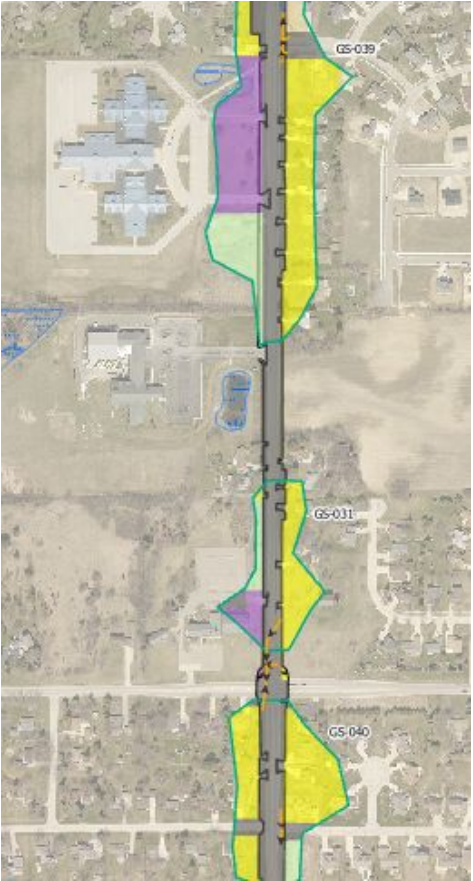
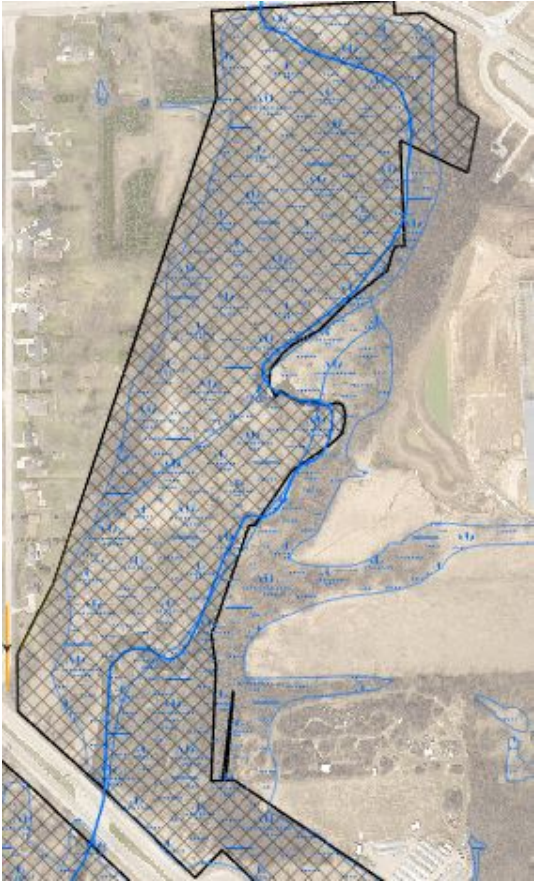
Land Use

- Lack of interconnectivity of County-owned land
- SEWRPC Land Use covers the entire County
- Significant amount of transportation land use without adjacent land ownership (County highways)
 - WinSLAMM Transportation Standard Land Use does not accept street sweeping as a control device

Land Use

- Join SEWRPC Land Use to applicable layers (County-owned land, drainage basins, etc.)
 - Queries to sort through data
- Classify according to current use, may be different from the 2015 designation
- Carve land use acreage that is not required by DNR to model
 - Land that drains directly to WOTUS
 - Land zones for agricultural use

Land Use



Jurisdiction

- Milwaukee County is fully incorporated by smaller municipalities
- No jurisdictions within the County over which they have direct storm water management control
- The County controls storm water management for County-owned properties only
- Any County BMP that served itself and another Municipality, the practice must be modeled as receiving loads from both areas, independent of who carries responsibility for the area



Jurisdiction

- During BMP modeling, land ownership was tracked to calculate acres of runoff from County-owned land versus land draining to a County BMP from another jurisdiction
 - Loading was not separated in results
- Modeling of land without controls was only completed for acreage owned by the County
- Delineated storm sewer based on the point of County ownership, did not include upstream interconnected storm sewer from other jurisdictions



Results

Milwaukee County									
Table 5.1 Comparative Analysis of TMDL Target Reduction From No Controls (Percent)									
TMDL Reachshed	Area (acres)	Total Suspended Solids (TSS)			TMDL Requirement	Total Phosphorus (TP)			TMDL Requirement
		Discharge No Controls (pounds)	Discharge With Controls (pounds)	Achieved TSS Reduction (%)	TSS Reduction (%)	Discharge No Controls (pounds)	Discharge With Controls (pounds)	Achieved TP Reduction (%)	TP Reduction (%)
KK-1	14	1,773.13	1,690.94	4.64%	78.40%	8.72	8.53	2.14%	68.10%
KK-2	105	10,825.18	10,114.02	6.57%	77.60%	56.33	54.71	2.88%	68.10%
KK-3	20	1,970.69	1,789.54	9.19%	76.80%	10.26	9.86	3.87%	78.70%
KK-4	515	66282.46	64471.96	2.73%	84.00%	329.50	325.07	1.34%	89.40%
KK-5	63	8,388.51	7,934.41	5.41%	80.00%	41.67	40.39	3.08%	78.70%
KK-6	55	8,274.30	7,973.14	3.64%	77.60%	37.52	36.83	1.82%	69.00%
KK-7	169	26,663.28	25,789.15	3.28%	75.20%	116.95	114.78	1.86%	45.00%
KK Overall	942	124,178	119,893	3.45%	81.00%	601	590	1.74%	77.00%
MN-6	42	5,139.33	4,820.18	6.21%	73.60%	24.85	24.13	2.90%	69.00%
MN-9	377	51,584.74	39,586.09	23.26%	70.40%	227.17	199.46	12.20%	64.50%
MN-10	658	81,107.96	65,465.92	19.29%	67.20%	430.62	335.76	22.03%	31.70%
MN-12	356	53,228.79	36,940.83	30.60%	80.00%	213.13	175.19	17.80%	76.10%
MN-13	492	59,314.98	52,574.81	11.36%	76.80%	278.05	259.26	6.76%	69.80%
MN-14	18	2,226.22	2,108.87	5.27%	64.80%	11.43	10.94	4.31%	49.40%
MN-15	302	49,303.48	48,196.50	2.25%	73.60%	222.10	219.01	1.39%	67.20%
MN-16	309	104,325.27	54,187.35	48.06%	72.00%	369.57	284.60	22.99%	49.40%
MN Overall	2,555	406,231	303,881	25.20%	73.00%	1,777	1,508	15.11%	57.00%
MI-27	325	37,741.33	30,121.42	20.19%	72.80%	196.81	173.39	11.90%	53.90%
MI-28	21	1,136.32	930.157553	18.14%	72.80%	7.26	6.77	6.70%	88.50%
MI-29	38	4,037.75	3,917.82	2.97%	71.20%	23.06	22.74	1.40%	87.60%
MI-30	66	11,148.92	9,222.09	17.28%	65.60%	48.47	42.77	11.76%	76.10%
MI-31	333	40,664.57	32,102.10	21.01%	71.20%	203.67	176.50	13.34%	85.80%
MI-32	64.63	7,833.19	6,568.80	16.14%	58.40%	39.14	34.47	11.93%	23.70%
MI Overall	849	102,562	82,862	19.21%	70.00%	518	457	11.91%	68.00%
Overall	4,345	632,970	506,558	20%	74.00%	2,896	2,554	12%	63.00%



Results

- KK Reached Overall
 - 95,749 lbs of TSS and 447.49 lbs of TP remaining
- MN Reached Overall
 - 193,233.62 lbs of TSS and 725.34 lbs of TP remaining
- MI Reached Overall
 - 52,319.55 lbs of TSS and 291.86 lbs of TP remaining

Results

- The existing storm water controls are not sufficient to meet water quality targets defined in the TMDL report
- To achieve full TMDL compliance, the County must reduce the annual discharge of TSS by 341,302.46 pounds and reduce TP by 1,464.69 pounds

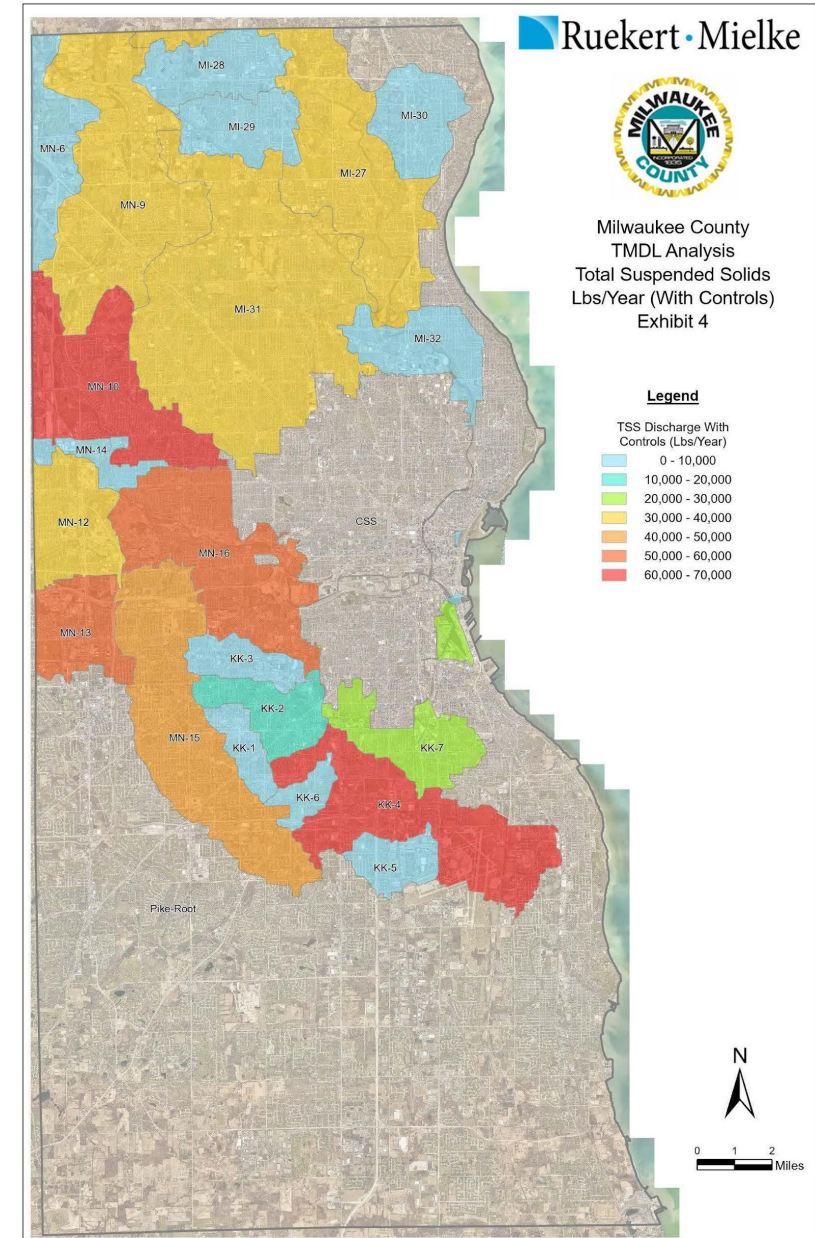
TMDL Attainment Analysis

- Roadmap to TMDL compliance
 - Site-specific alternatives
 - BMP implementation costs for full compliance
 - Grant funding opportunities
 - Water quality recommendations



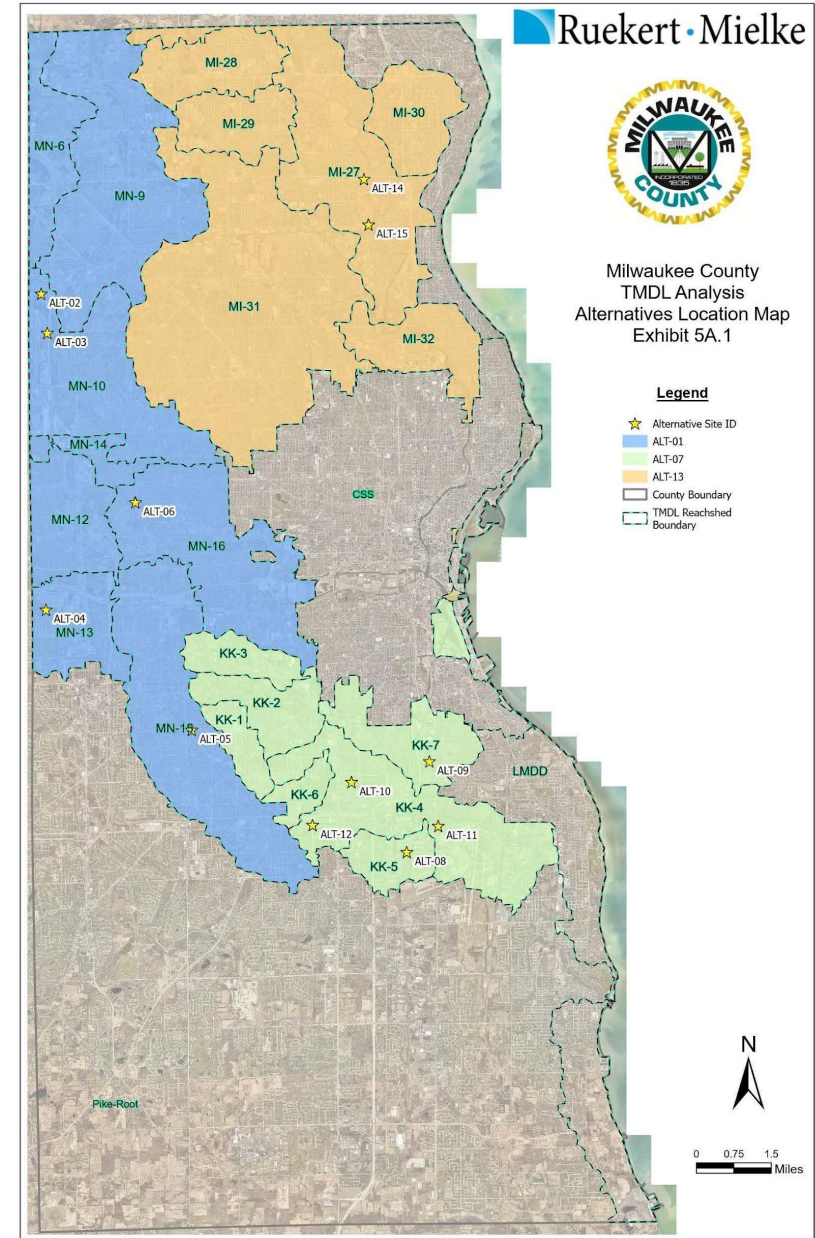
TMDL Attainment Analysis

- TSS & TP Hot/Cold Map
 - Cold (blue) is closest to compliance
 - Hot (red) is furthest from compliance
- Resource for prioritization of future BMP development and implementation



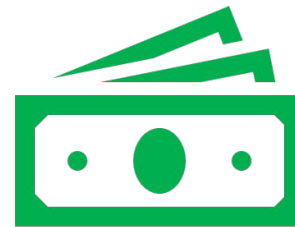
Site-specific alternatives

- 15 proposed alternatives analyzed
 - TSS & TP pollutant reduction estimates
 - Cost estimates
 - Environmental impediments
 - Potential contamination concerns
- Kickstart progress towards compliance



BMP Implementation Costs

- Anticipated capital costs for full TMDL compliance is a minimum of \$13 million
- Anticipated capital costs for full TMDL compliance considering additional factors is a minimum of \$18 million
 - Land acquisition
 - Unexpected construction costs
 - Distance to existing infrastructure



BMP Implementation Costs

- Assumes a distribution of a minimum of 150 new devices
 - Biofiltration Devices
 - Rain Gardens
 - Permeable Pavers
 - Proprietary Devices
- Anticipated annual operating costs to maintain new BMPs is at a minimum of \$450,000 annually

Grant Funding Opportunities

- WDNR
 - UNPS Planning and Construction Grants
 - Surface Water Restoration Grants
 - TRM Grants
- Midwest Glacial Lakes Partnership: Lake Conservation Grant
- National Fish & Wildlife Foundation: Sustain our Great Lakes Grant
- Fund for Lake Michigan Grants



Water Quality Recommendations

- The overall goal of the TMDL is to remove or “de-list” waters from the State’s Impaired Waters List
- Lower cost recommendations to improve biological, physical, and chemical aspects of waterways
 - Evaluate streambanks within the County
 - Survey County bridges, culverts, stream crossings
 - Review salt application rates and techniques
 - Install pet waste stations in County parks



Next Steps

- County is working with administrators to figure out the best path towards financing full TMDL compliance
- Start identifying which grants to target for potential funding



Questions?

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Thank you for listening!

