

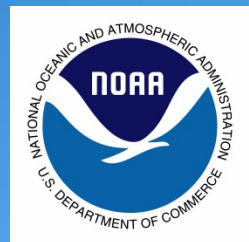
# Root River Watershed Restoration Plan

Plan Rollout Presentation  
July 31, 2014

Joseph E. Boxhorn, Ph.D., Senior Planner

Southeastern Wisconsin Regional Planning Commission

# Partners and Funding Agencies



Municipalities and Counties of the Root River Watershed



The plan is documented in:

SEWRPC Community Assistance Planning Report  
No. 316, *A Restoration Plan for the Root River  
Watershed*

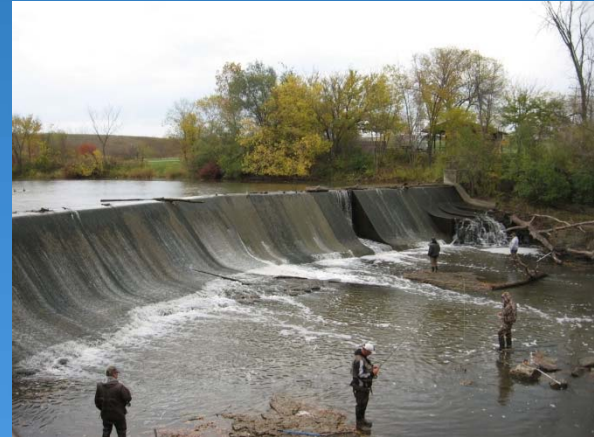
# Focus Issues

- The plan seeks to make progress relative to a set of focus issues
- Focus issues came from
  - Problems identified in the regional water quality management plan update (RWQMUP)
  - Issues identified in other, related plans
  - Two-part survey of interested parties
    - Land managers
    - Local officials
    - Residents of the watershed
    - People who work or recreate in the watershed

# Focus Issues



Water Quality



Recreational Use and Access



Habitat Conditions



Flooding (Racine County)

# Focus Issues



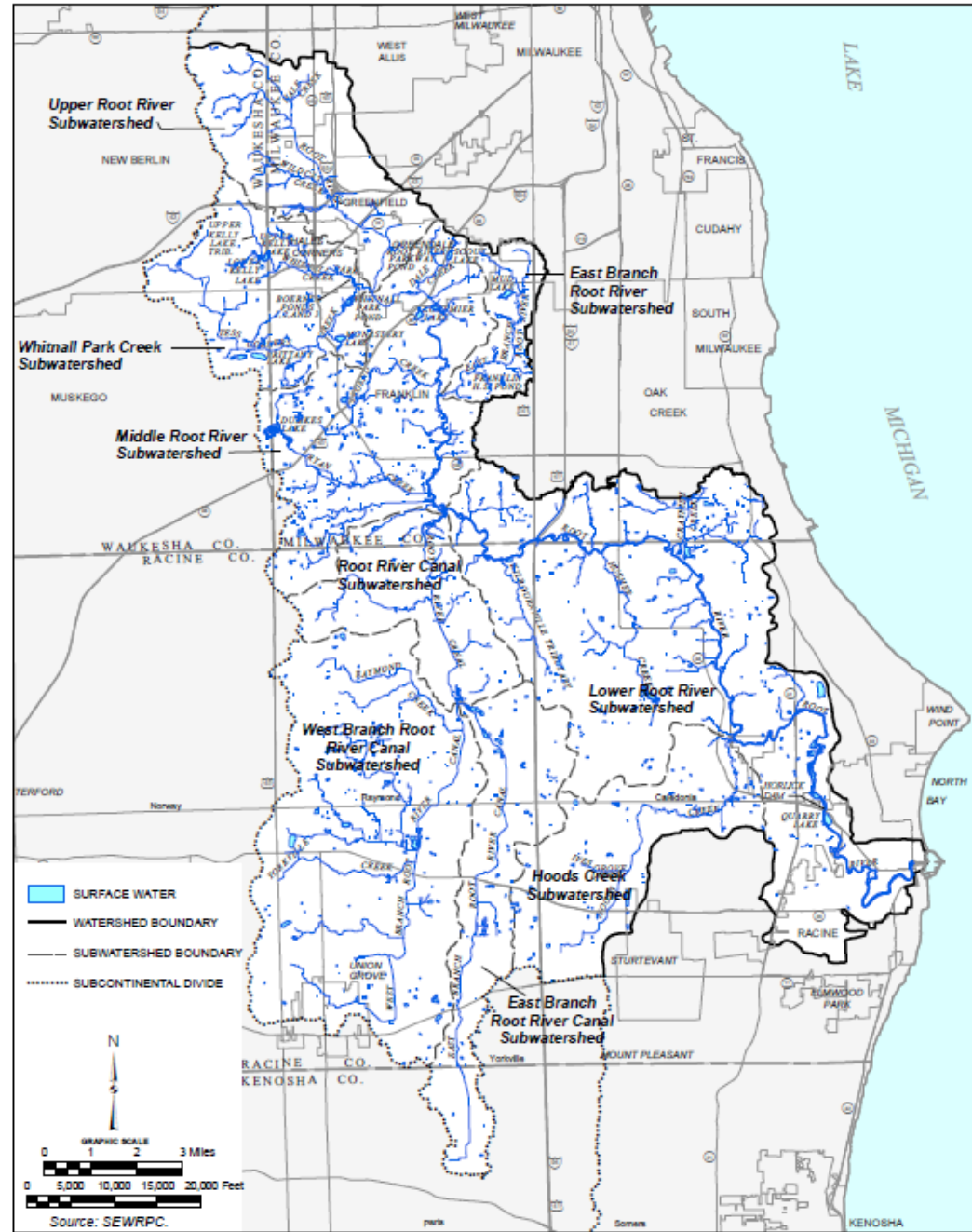
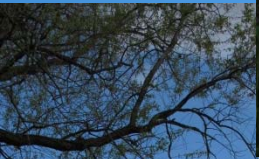
At the request of Racine County the study examined options for Horlick dam

# The Root River WRP Was Developed in the Context of the 2007 Regional Water Quality Management Plan Update (RWQMPU)

- The WRP is a second-level plan that builds upon and refines the recommendations of the RWQMPU



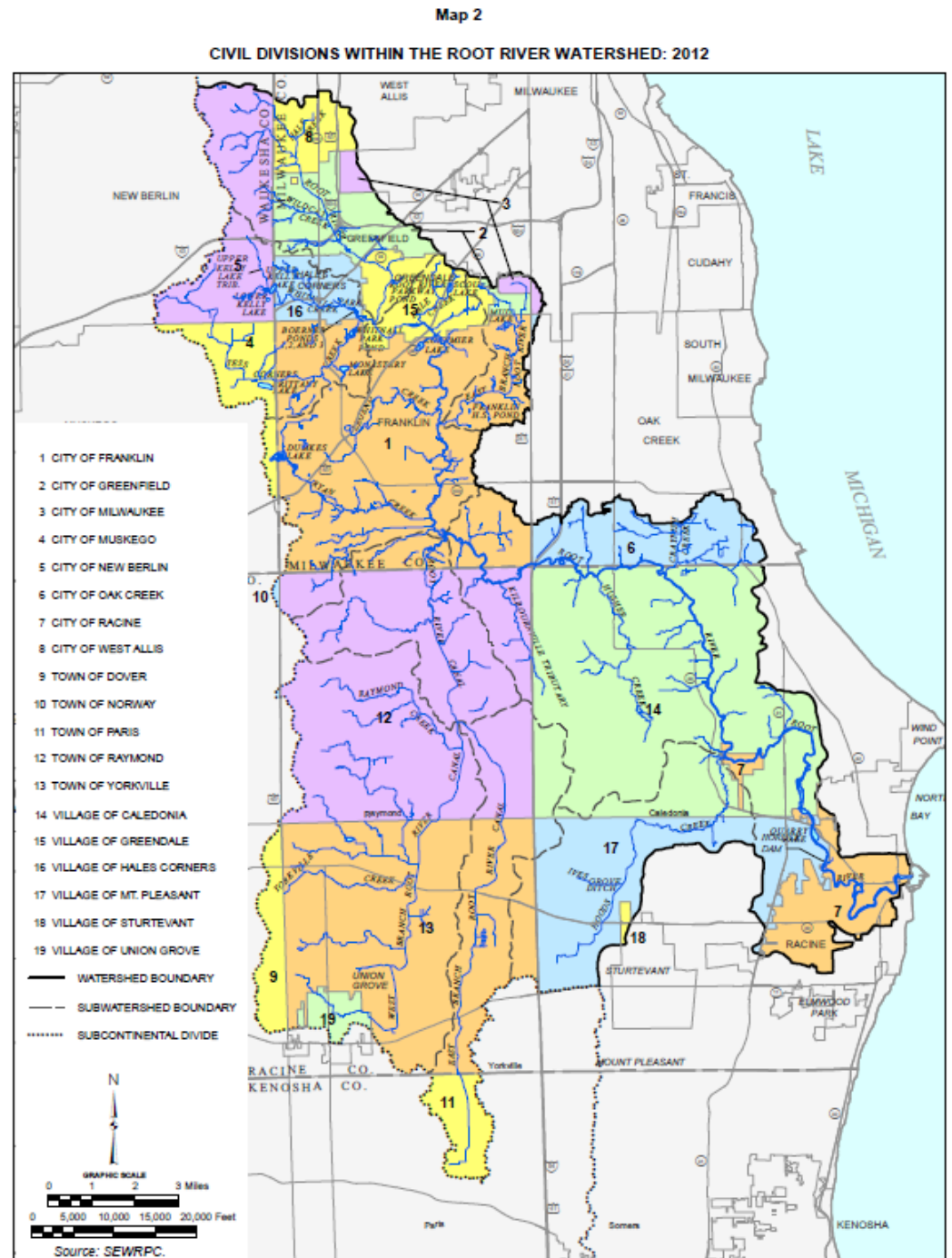
# Surface Waters of the Root River Watershed





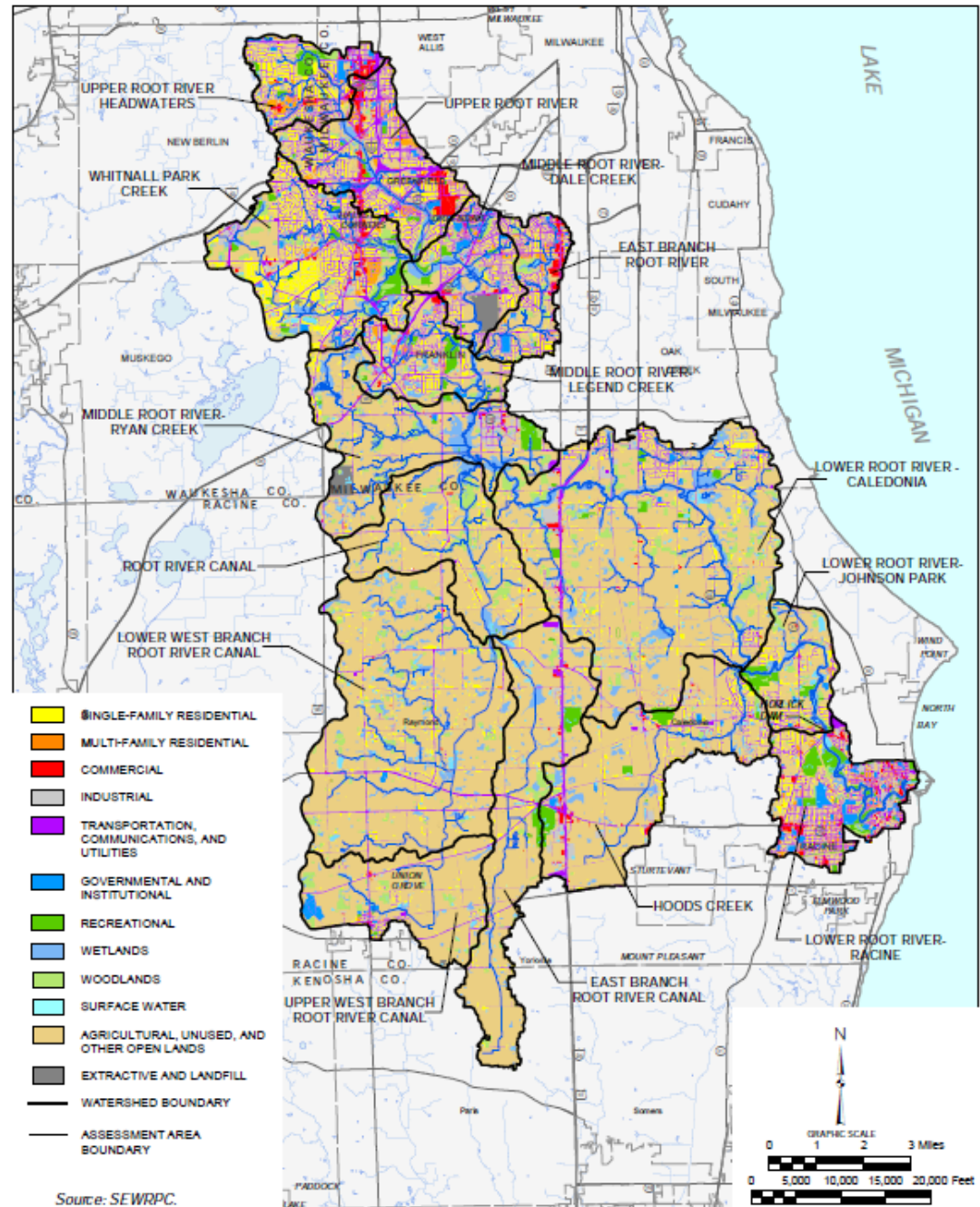
# Root River Watershed Includes Portions of

- Four counties
- 19 municipalities
- Several special purpose units of government



## 2010 Land Use

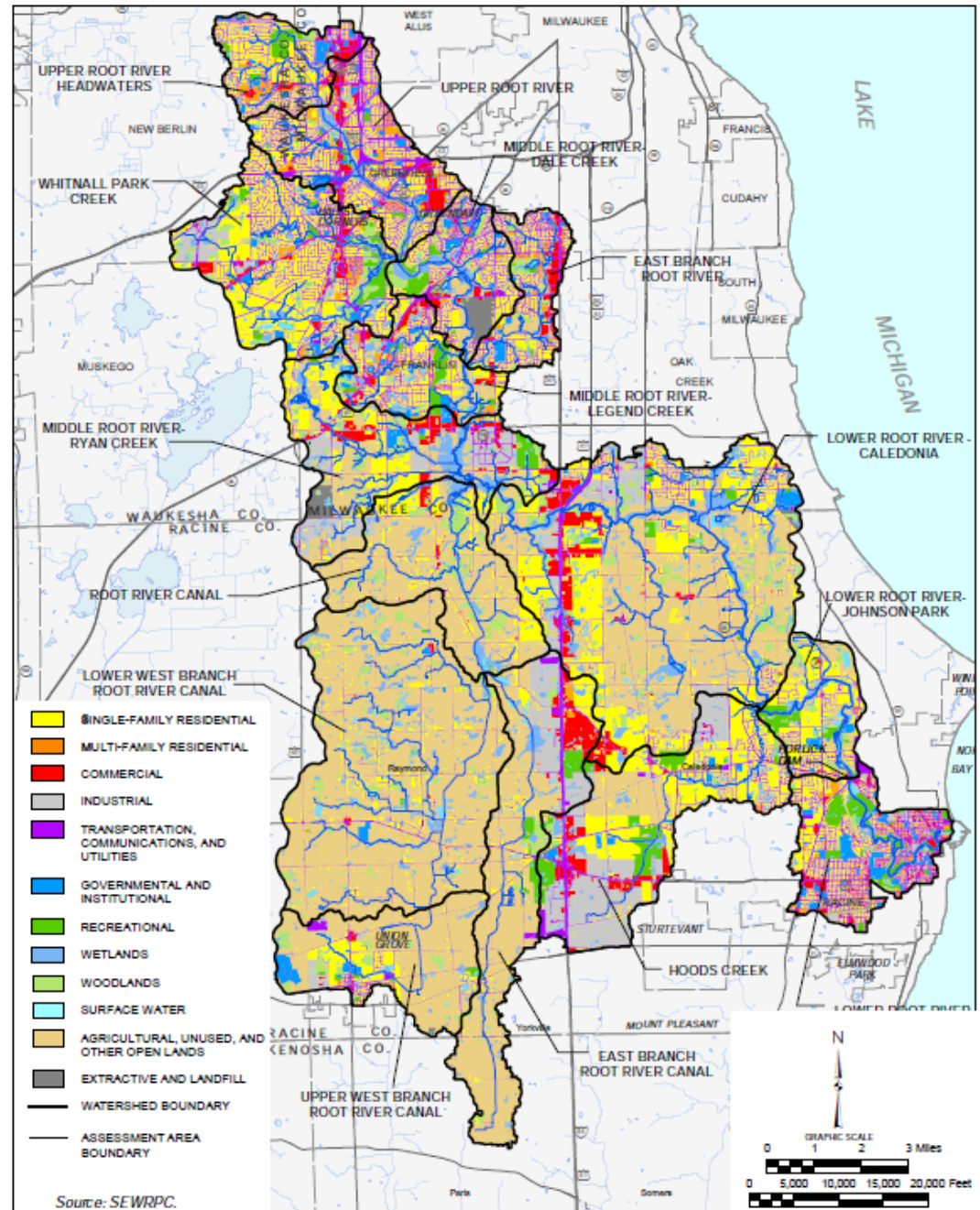
- Urban land uses cover 35 percent of watershed
  - Northern and southeastern portions
- Agriculture and other open lands cover 65 percent of watershed
  - Racine County and Franklin



## PLANNED LAND USE WITHIN THE ROOT RIVER WATERSHED: 2035

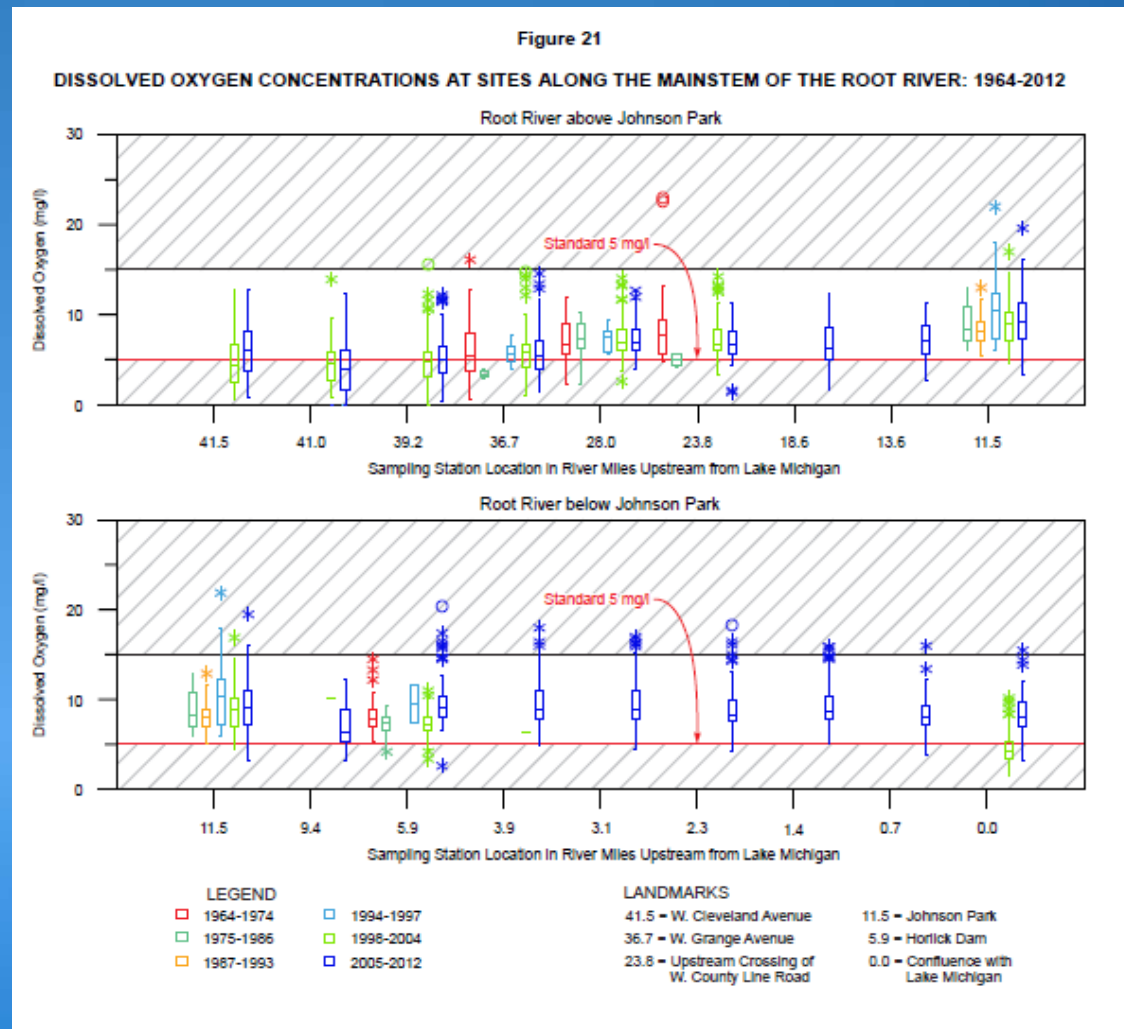
## 2035 Planned Land Use

- Urban land uses are anticipated to cover 52 percent of watershed
- Agriculture and other open lands are anticipated to cover 48 percent of watershed



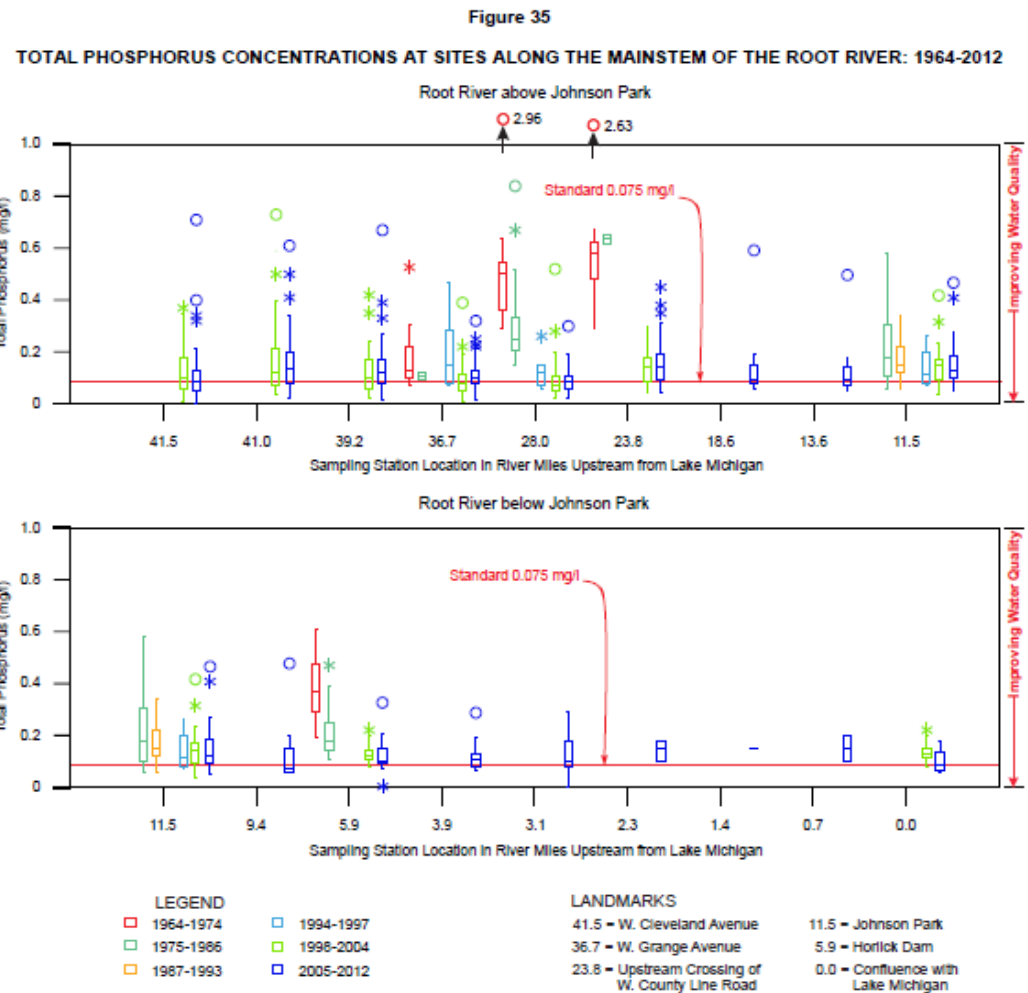
# Water Quality Problems in the Watershed

- Low concentrations of dissolved oxygen
  - Upper reaches of the mainstem
  - Some tributaries
- Large daily fluctuations in dissolved oxygen concentration
  - At some sites



# Water Quality Problems in the Watershed

- High concentrations of total phosphorus
  - Everywhere in the watershed that has been sampled
  - Water quality criteria usually exceeded

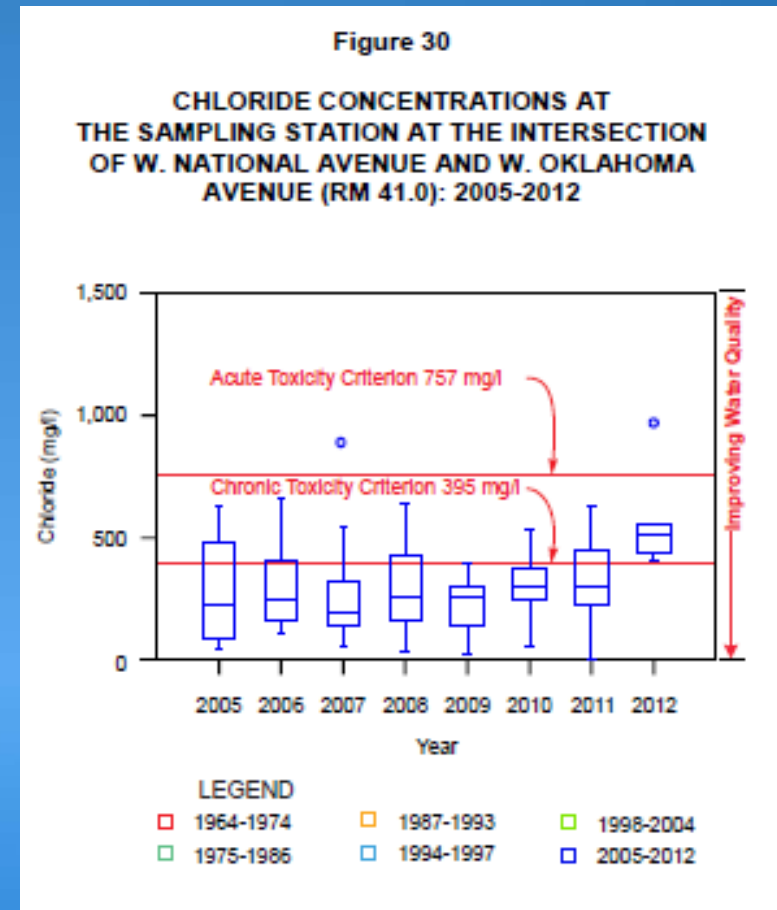


# Water Quality Problems in the Watershed

- Factors contributing to dissolved oxygen problems
  - Nutrient enrichment → Phosphorus
  - Inputs of organic material → Sanitary wastewater
- Strategies to address dissolved oxygen problems
  - Reduce inputs of total phosphorus and total suspended solids
  - Locate and remediate sources of sanitary wastewater

# Water Quality Problems in the Watershed

- Impacts from chlorides
  - Few winter samples are available for chloride or specific conductance
  - Trends toward increasing concentration in surface waters
  - Evidence of accumulation in groundwater



# Water Quality Problems in the Watershed

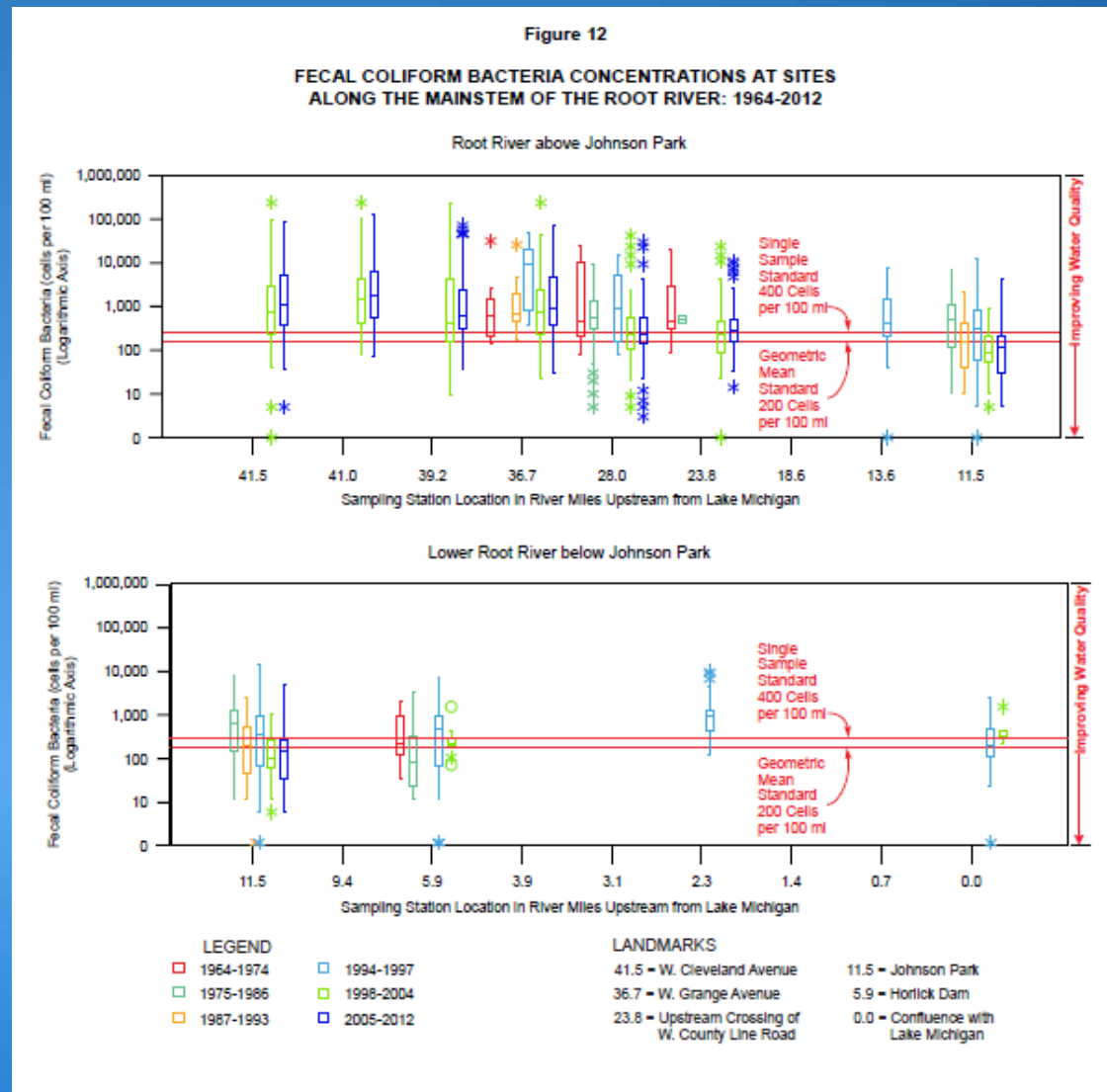
- Factors contributing to chloride problems
  - Winter snow and ice control → Road salt
- Strategies to address chloride problems
  - Reduce road salt applications while preserving public safety
  - Fill data gaps regarding chlorides





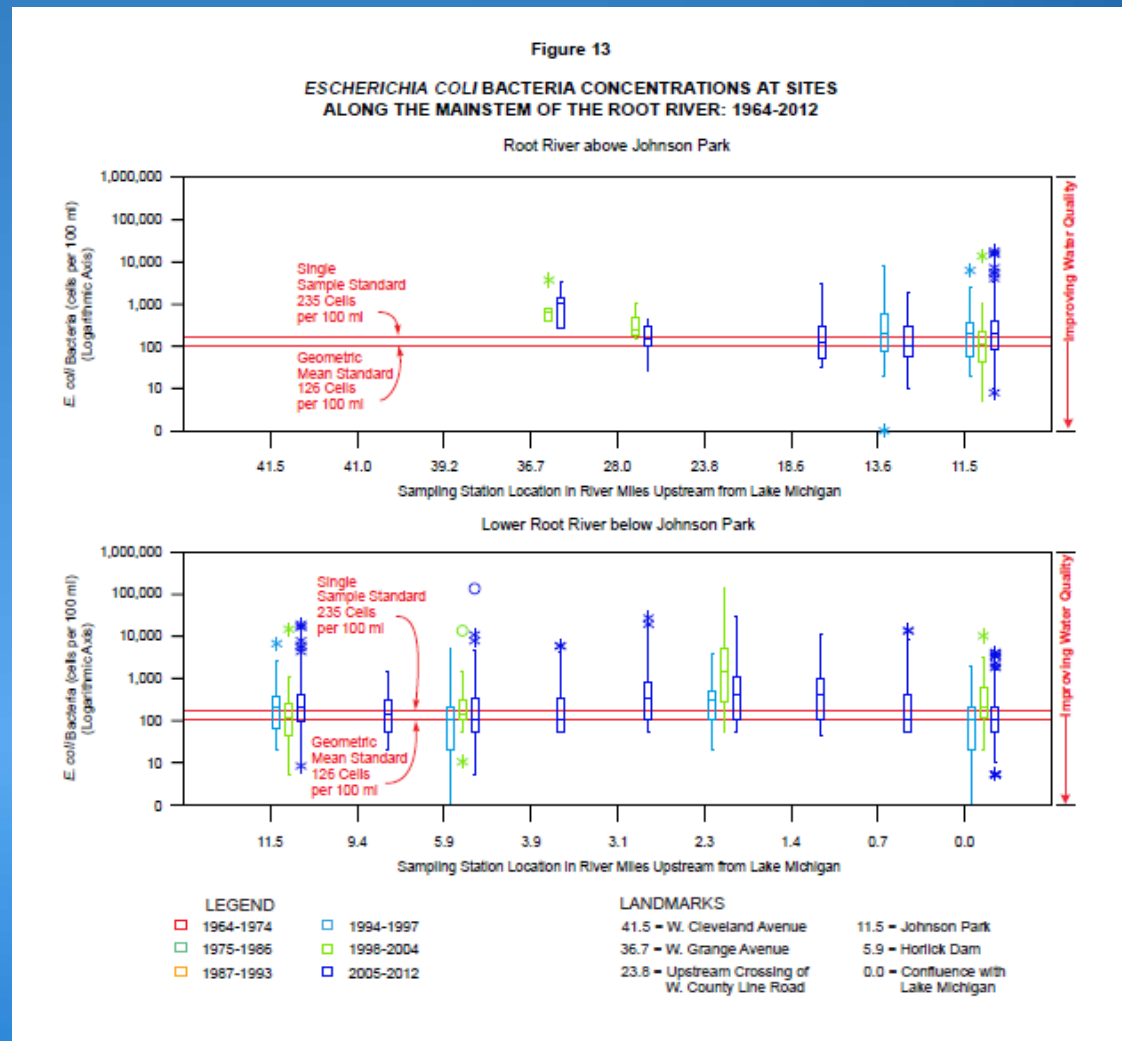
# Water Quality Problems in the Watershed

- High concentrations of fecal indicator bacteria
- Indicate fecal contamination
- Indicate possible presence of disease agents
- Water quality criteria often exceeded



# Water Quality Problems in the Watershed

- High concentrations of fecal indicator bacteria
- High everywhere that has been sampled except for the beach at Quarry Lake



# Water Quality Problems in the Watershed

- Factors contributing to fecal indicator bacteria problems
  - Illicit discharges, sewer cross-connections
  - Runoff containing manure
- Strategies to address fecal indicator bacteria problems
  - Locate and remedy sources of sanitary wastewater
  - Locate and remediate nonhuman sources



*E. coli* bacteria



# Targets: Load Reductions—Total Phosphorus and Total Suspended Solids

Source	Total Phosphorus (pounds)	TSS (pounds)
Urban		
NR 151-related	2,268	1,388,338
Other measures	2,932	869,032
Subtotal	5,200	2,257,370
Rural		
NR 151-related	8,440	18,961,880
Other measures	8,180	13,691,100
Subtotal	16,620	32,652,890
<b>Total</b>	<b>21,820</b>	<b>34,910,260</b>

# Targets: Load Reductions—Fecal Coliform Bacteria

Source	Fecal coliform bacteria (trillion cells)
Urban	
NR 151-related	963.29
Other measures	3,019.28
Subtotal	3,982.57
Rural	
NR 151-related	204.67
Other measures	624.31
Subtotal	828.98
<b>Total</b>	<b>4,725.42</b>

# Plan Elements

- General Recommendations
  - Generally applicable over the entire watershed
  - Guidance for management of water resources relative to the focus issues
  - Some come from the RWQMPU or are refinements of RWQMPU recommendations
- Specific Projects
  - Projects implement general recommendations
  - Chosen to make progress toward achieving targets
  - Assembled from several sources
  - Locations are mapped

# Water Quality Plan Elements

- Urban Nonpoint Source Pollution
  - Urban NPS controls consistent with standards in NR 151
    - Runoff infiltration, stormwater treatment, and maintenance practices
  - Modification of MS4 illicit discharge detection and elimination programs
    - Transfer IDDE effort from major outfalls where no problems have been detected to other, previously screened outfalls
  - Municipalities and counties continue to evaluate deicing practices to obtain application rates that ensure public safety without applying more chlorides than needed
    - Also education programs regarding chloride application and alternatives

# Water Quality Plan Elements

- Urban Nonpoint Source Pollution
  - Information and education programs about fertilizer use
  - Pet litter control ordinances
  - Continue and expand litter and debris control programs
  - **Green infrastructure**



# Examples of Green Infrastructure



Bioretention



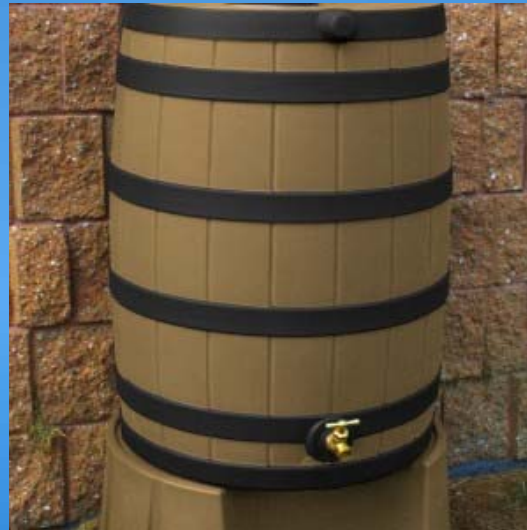
Rain Gardens



Green Roofs



Stormwater Trees



Rain Barrels



Porous Pavement

# Water Quality Plan Elements

- Urban Nonpoint Source Pollution
  - Information and education programs about fertilizer use
  - Pet litter control ordinances
  - Continue and expand litter and debris control programs
  - **Green infrastructure**
    - Audit of municipal codes and ordinances to identify barriers to the implementation of green infrastructure practices
    - Installation in the MMSD planning area as per the MMSD green infrastructure plan
    - Pursue installation of green infrastructure in urban areas outside of MMSD planning area

# Water Quality Plan Elements

- Urban Nonpoint Source Pollution
  - Green infrastructure – Implementation by 2019

Table 83

**GREEN INFRASTRUCTURE STRATEGIES RECOMMENDED FOR IMPLEMENTATION BY 2019  
IN THE PORTION OF THE ROOT RIVER WATERSHED LOCATED IN THE MMSD PLANNING AREA**

Green Infrastructure Strategy	Units	Number of Units	Average Annual Stormwater Volume Captured (million gallons)	Cost (dollars)
Porous Pavement .....	Average city blocks <sup>a</sup>	88	1,245.8	\$ 3,080,000
Bioretention/ Rain Gardens .....	150-square-foot rain gardens	1,750	42.0	3,430,000
Stormwater Trees .....	Trees <sup>b</sup>	5,790	8.1	840,000
Green Roofs .....	Buildings with 5,000-square-foot green roofs	70	1.2	1,750,000
Cisterns .....	Large buildings with 1,000-gallon cisterns <sup>c</sup>	20	1.1	70,000
Native Landscaping .....	Average city blocks <sup>a</sup>	14	39.6	210,000
Rain Barrels .....	Number	1,570	4.8	210,000
Soil Amendments .....	Average city blocks <sup>a</sup>	35	83.9	560,000
<b>Total</b>	--	--	1,426.5	\$10,150,000

<sup>a</sup>The area of an average city block is estimated as being five acres.

<sup>b</sup>The MMSD Green Infrastructure Plan recommends the planting of nine new trees per average city block. The area of the portion of the Root River watershed that is located within the MMSD planning area is about 9,190 average city blocks.

<sup>c</sup>The plan defines large buildings as those with roof areas greater than 6,500 square feet.

Source: Milwaukee Metropolitan Sewerage District.

# Water Quality Plan Elements

- Urban Nonpoint Source Pollution
  - Green infrastructure – Implementation by 2035

**Table 81**

**GREEN INFRASTRUCTURE STRATEGIES RECOMMENDED FOR IMPLEMENTATION BY 2035  
IN THE PORTION OF THE ROOT RIVER WATERSHED LOCATED IN THE MMSD PLANNING AREA**

Green Infrastructure Strategy	Units	Number of Units	Average Annual Stormwater Volume Captured (million gallons)	Cost (dollars)
Porous Pavement.....	Average city blocks <sup>a</sup>	1,260	17,837.8	\$ 44,000,000
Bioretention/ Rain Gardens .....	150-square-foot rain gardens	25,000	600.0	49,000,000
Stormwater Trees	Trees <sup>b</sup>	82,710	116.2	12,000,000
Green Roofs .....	Buildings with 5,000-square-foot green roofs	1,000	85.0	25,000,000
Cisterns .....	Large buildings with 1,000-gallon cisterns <sup>c</sup>	280	15.9	1,000,000
Native Landscaping.....	Average city blocks <sup>a</sup>	200	566.3	3,000,000
Rain Barrels.....	Number	22,400	68.6	3,000,000
Soil Amendments .....	Average city blocks <sup>a</sup>	500	1,197.9	8,000,000
<b>Total</b>	--	--	<b>20,487.7</b>	<b>\$145,000,000</b>

<sup>a</sup>The area of an average city block is estimated as being five acres.

<sup>b</sup>The MMSD Green Infrastructure Plan recommends the planting of nine new trees per average city block. The area of the portion of the Root River watershed that is located within the MMSD planning area is about 9,190 average city blocks.

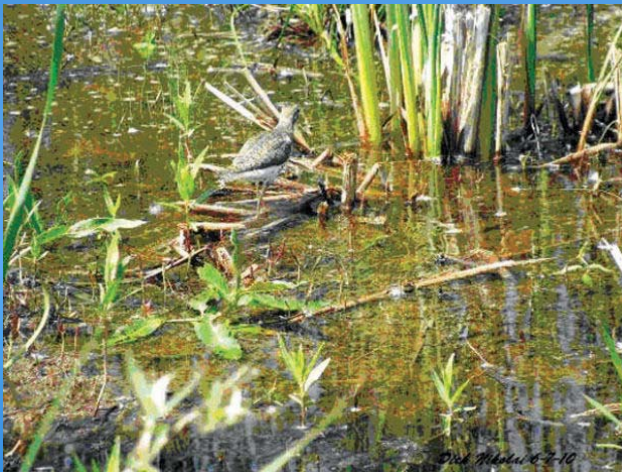
<sup>c</sup>The plan defines large buildings as those with roof areas greater than 6,500 square feet.

# Water Quality Plan Elements

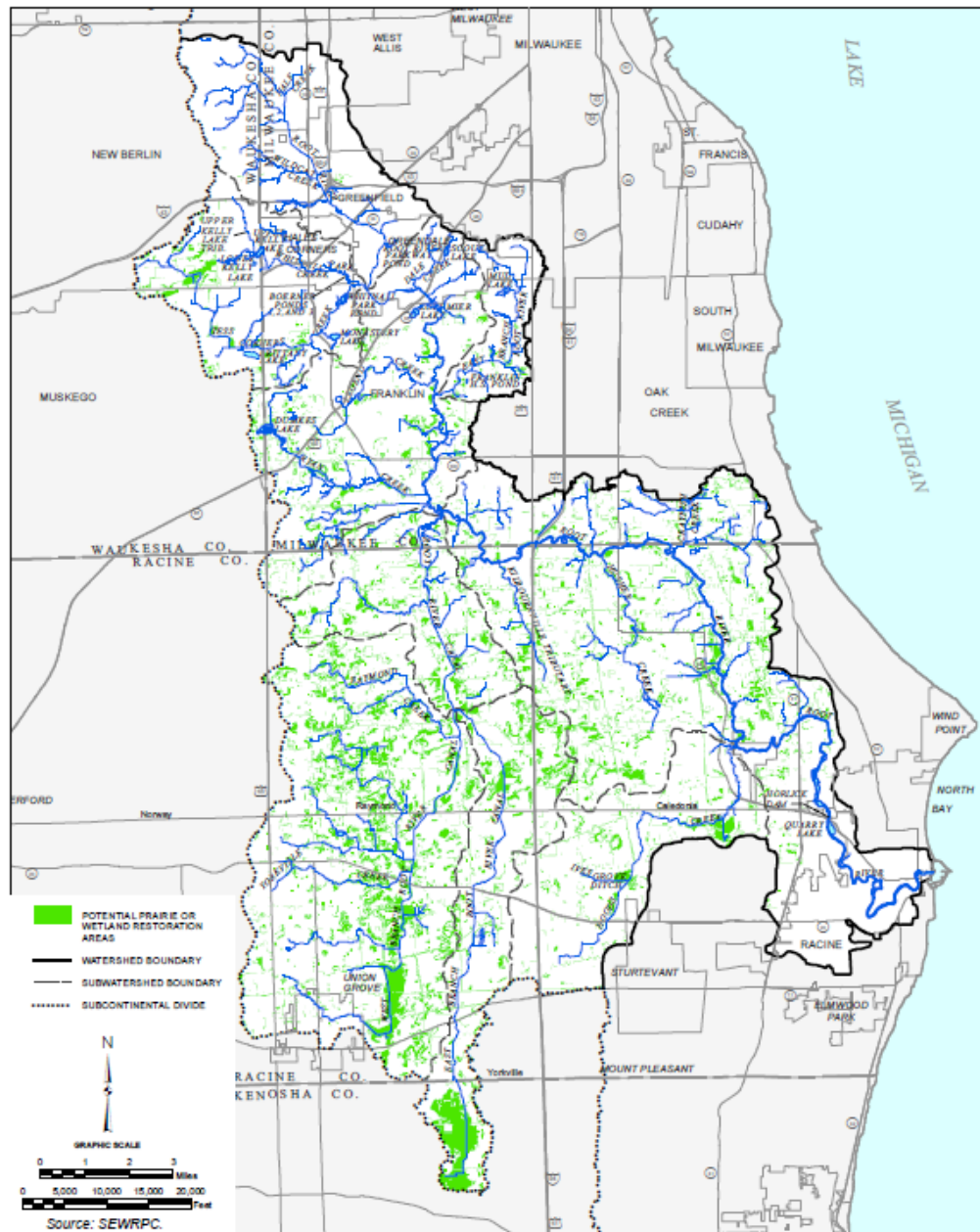
- Rural Nonpoint Source Pollution
  - Expand applications of practices to reduce soil loss from cropland below the allowable rate of soil erosion (“T”)
  - Provision of six months manure storage for all livestock operations with 35 or more combined animal units
  - Nutrient management plans
    - Apply manure and fertilizer in accordance with these
  - Barnyard runoff control systems for all livestock operations
  - Practices to exclude livestock from waterbodies and riparian areas

# Water Quality Plan Elements

- Rural Nonpoint Source Pollution
  - Convert marginal cropland and pastureland to wetlands or prairie
    - Lands that are not classified as having prime agricultural soils by NRCS
    - 8,685 candidate acres in the watershed



POTENTIAL PRAIRIE OR WETLAND RESTORATION AREAS IDENTIFIED  
IN THE REGIONAL WATER QUALITY MANAGEMENT PLAN UPDATE



# Water Quality Plan Elements

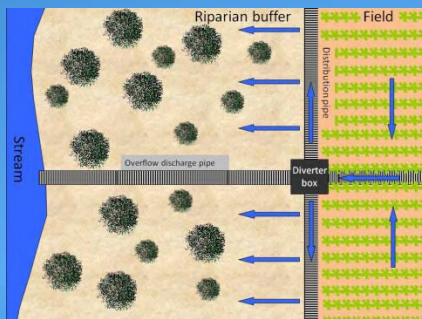
- Rural Nonpoint Source Pollution
  - Riparian buffers
    - Protect and expand buffers to the greatest extent possible with a minimum 75-foot width and an optimum 1,000-foot width goal
    - Protect and increase the continuity and connectivity of buffers
    - More on buffers under habitat



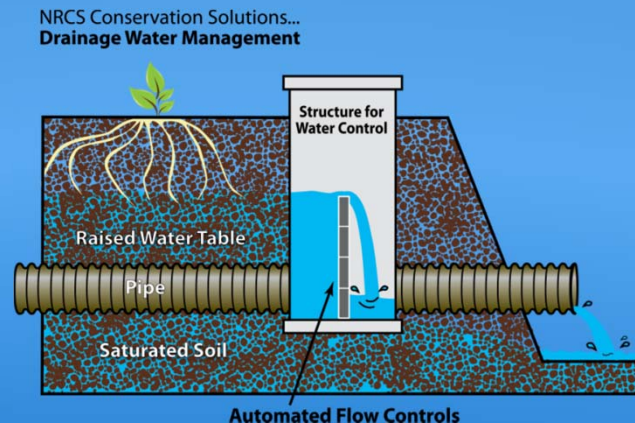


# Water Quality Plan Elements

- Rural Nonpoint Source Pollution
  - Conduct pilot projects to evaluate the performance of several agricultural BMPs to determine their usefulness in reducing nutrient contributions from fields
    - Drainage water management
    - Saturated buffers
    - Wood chip bioreactors



Saturated buffer



Drainage water management



Wood chip bioreactor

# Water Quality Plan Elements

- Point Source Pollution
  - Refine unrefined sewer service areas
  - City of Racine and Village of Union Grove continue to maintain and operate wastewater treatment plants
  - Abandon Yorkville wastewater treatment plant when it reaches the end of its useful life
    - Connect its service area to the Racine system
  - Municipalities construct and maintain local sewer systems
  - Eliminate discharges from sewer flow relief points in sewerage systems

# Water Quality Plan Elements

- Point Source Pollution
  - Facilities planning to establish what new conveyance, pumping, and storage facilities are needed to provide service to areas in Caledonia and Mt. Pleasant that were added to the Racine and Environs sewer service area in 2007
  - Municipalities implement capacity, management, operations, and maintenance (CMOM) programs for sewerage systems and evaluate the need to reduce clearwater inflow and infiltration into sewers

# Water Quality Plan Elements

- Point Source Pollution
  - Continue operation of the private wastewater treatment plant serving Fonk's Mobile Home Park
    - Upgrade as necessary
    - Formulate level of treatment through WPDES permitting process
  - Continue to regulate wastewater treatment plant and industrial discharges through WPDES program

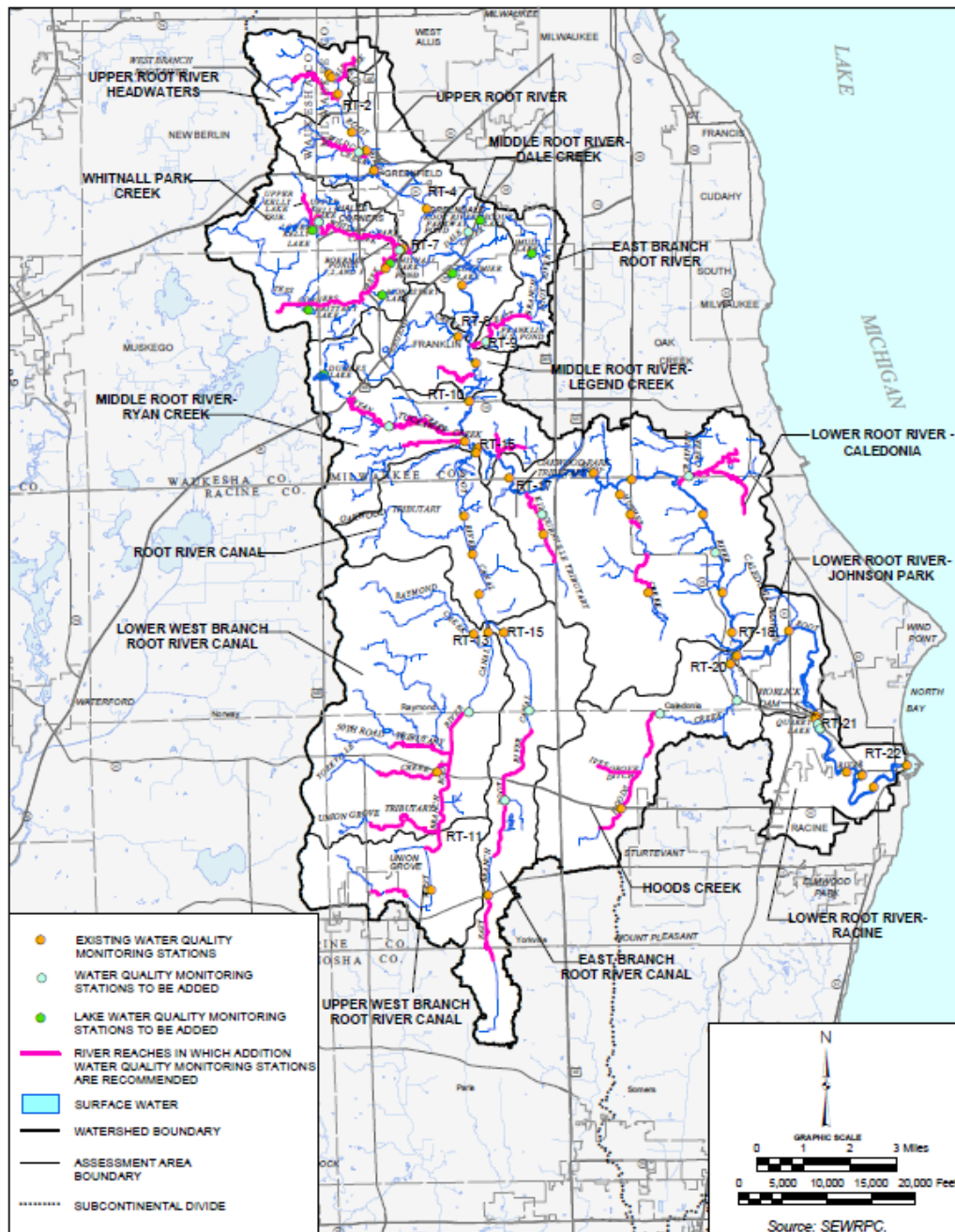
# Water Quality Plan Elements

- Recommendations for fecal indicator bacteria and pathogens (in recreational use and access section)
  - Several recommendations echo water quality recommendations
  - **Modification of MS4 illicit discharge detection and elimination programs**
    - **Transfer IDDE effort from major outfalls where no problems have been detected to other, previously screened outfalls**
  - Control pet waste and waste from nuisance animals on as needed based on demonstrated water quality problems

# Water Quality Plan Elements

- Monitoring – Watershed Conditions
  - Maintain and continue current monitoring efforts
    - MMSD, WDNR, USGS, WAV, and CLMN at current levels
    - Racine Health Department adjust frequency of sampling
  - Expand monitoring network to fill data gaps
    - Additional stations on 24 streams and 9 ponds
    - Automated, continuous monitoring at 2-4 “real-time” stations
    - Mussel surveys every 10 years
  - Periodically collate and analyze data and report results
    - At least once every 10 years

RECOMMENDED WATER QUALITY MONITORING STATIONS FOR THE ROOT RIVER WATERSHED



# Water Quality Plan Elements

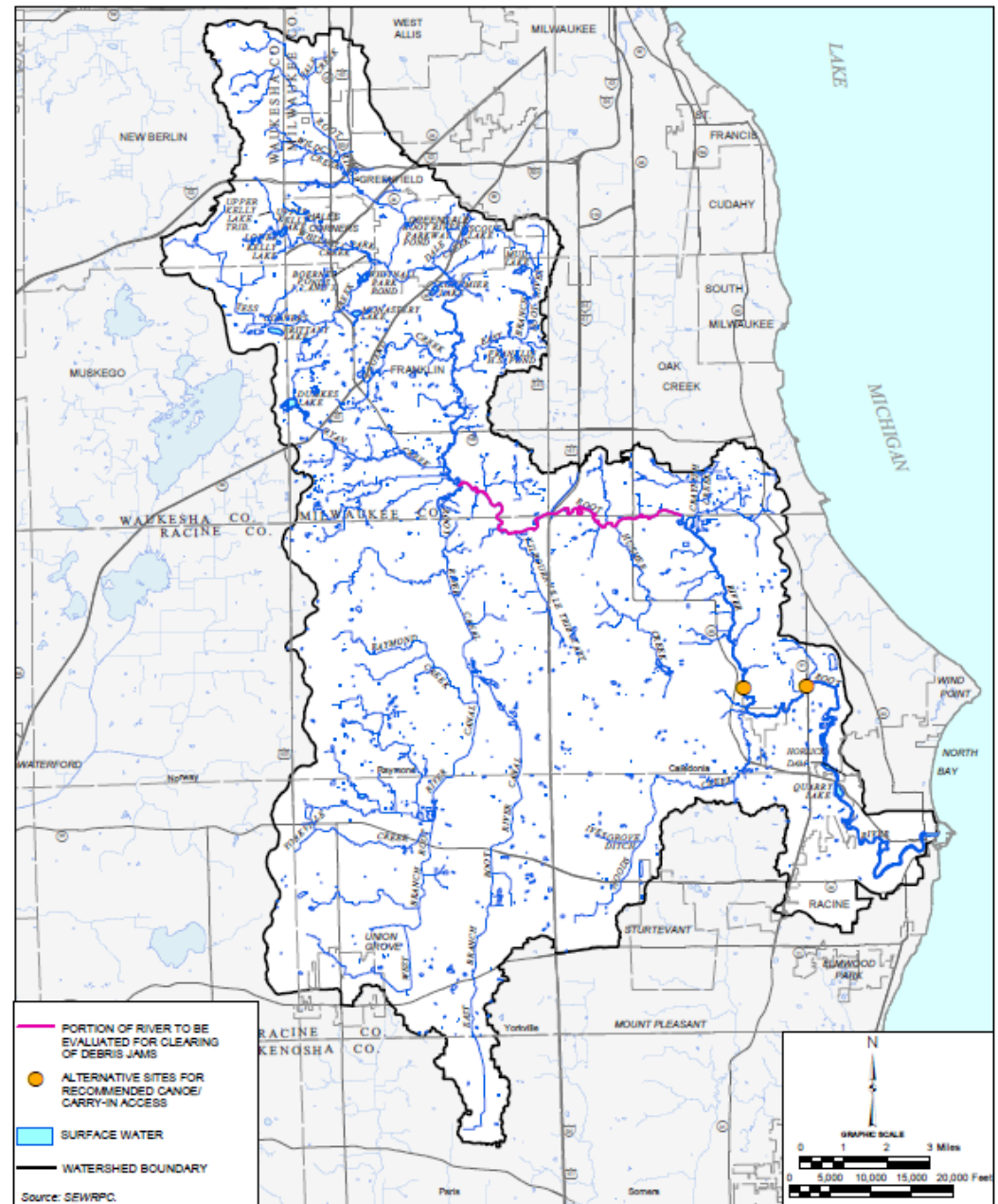
- Monitoring – Plan Implementation
  - Monitoring of implementation to be overseen by:
    - Sweet Water in the MMSD service area
    - Root-Pike WIN outside of the MMSD service area
  - Recommend that organizations implementing projects report initiation and completion to the appropriate overseer
  - Root River Plan Advisory Group to continue and meet annually to evaluate status of implementation
  - Established schedule and milestones for evaluating implementation



# Recreational Access

- Additional carry-in landing
  - Two alternative sites
- Evaluate feasibility of creating and maintaining a channel through debris jams
  - If implemented add a canoe landing in parkway

SURFACE WATER ACCESS RECOMMENDATIONS WITHIN THE ROOT RIVER WATERSHED



# Specific Projects

- The plan recommends over 240 specific projects
- These partly implement the general recommendations
- Sources
  - Public input at December 4, 2013 public meeting
  - Plans and engineering surveys and reports reviewed
  - Suggestions from State, county, MMSD, and municipal staff
  - Suggestions from nongovernmental organizations
  - Stream surveys by SEWRPC staff

# Specific Projects

- Urban stormwater management
- Riparian buffer installation
- Agricultural nonpoint source pollution control
- Land acquisition for natural areas
- Instream habitat enhancements
- Streambank stabilization and protection
- Invasive species removal and management
- Repair of degraded outfalls
- Recreational access
- Specific monitoring projects

# Specific Projects

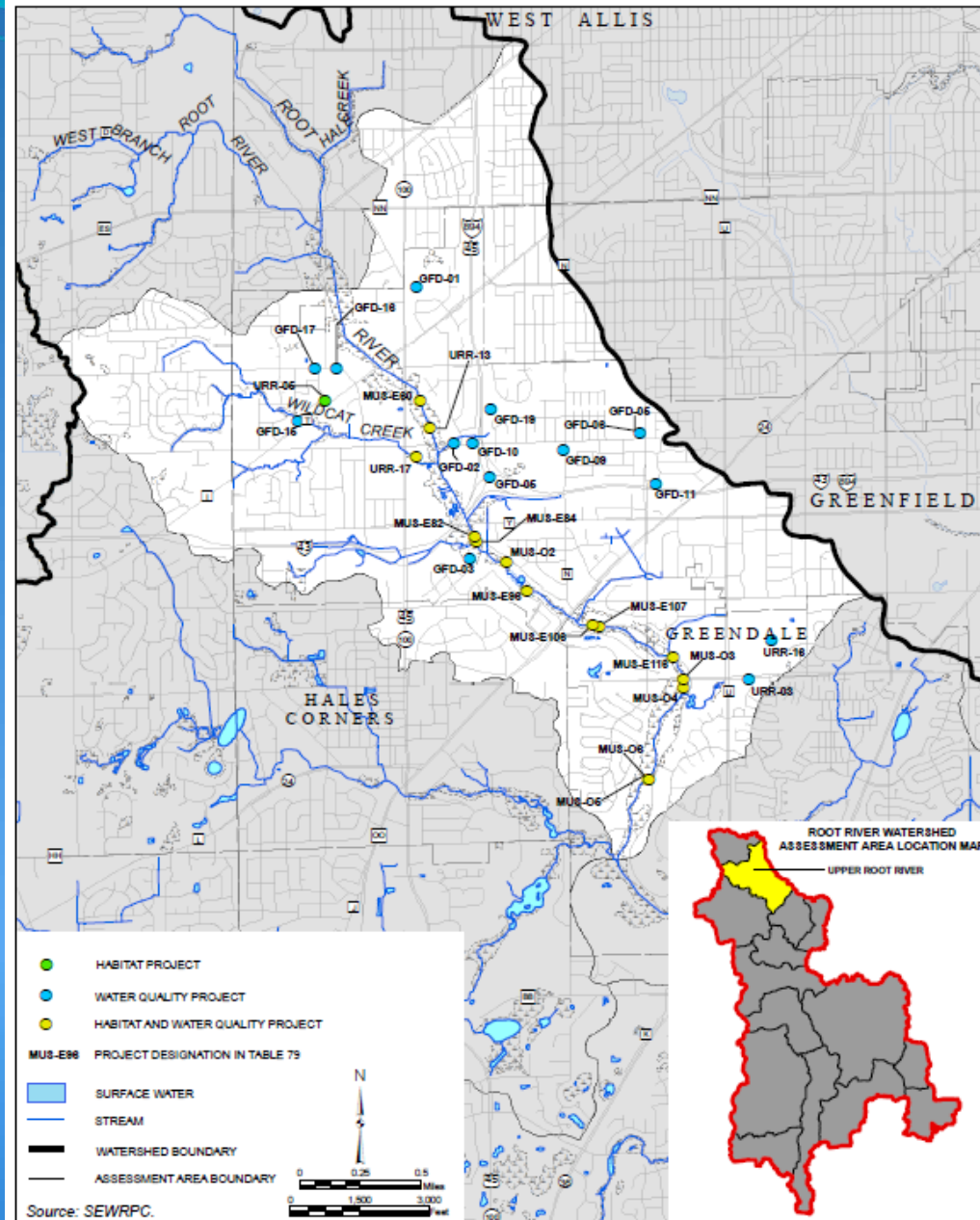
Table 78

SITE-SPECIFIC MANAGEMENT MEASURES FOR THE ROOT RIVER WATERSHED

ID Number (see Maps 74 through 88) <sup>a</sup>	Focus Areas Addressed	Site Information			Management Action	Annual Pollutant Reductions			Responsible Party	Costs (dollars) <sup>b</sup>		Potential Funding Sources <sup>c</sup>	Potential Technical Assistance	Priority <sup>d</sup>
		Location	Municipality	Owner		TSS (pounds)	Total Phosphorus (pounds)	Fecal Coliform Bacteria (trillion cells)		Capital	Annual O&M			
GFD-01	Water Quality	Northeast of W. Morgan Avenue and S. 106th Street	City of Greenfield	Milwaukee County	Installation of stormwater pond with 0.5 acre permanent pool to treat runoff from a contributing area of 30 acres	8,000	15 <sup>e</sup>	3.96 <sup>f</sup>	City of Greenfield	\$267,000	\$4,950 <sup>g</sup>	55, 64, 67	WDNR	Medium
GFD-02	Water Quality	Northwest of W. Coldspring Road and S. 104th Street along Root River	City of Greenfield	Milwaukee County	Installation of stormwater pond with 0.3 acre permanent pool to treat runoff from a contributing area of 41 acres	4,200	7 <sup>e</sup>	5.41 <sup>f</sup>	City of Greenfield	185,000	3,790 <sup>g</sup>	55, 64, 67	WDNR	Medium
GFD-03	Water Quality	East of I-49/US-45 intersection near north end of W. Spring Green	City of Greenfield	Milwaukee County	Installation of stormwater pond with 0.3 acre permanent pool to treat runoff from a contributing area of 31 acres	3,800	6 <sup>e</sup>	4.00 <sup>f</sup>	City of Greenfield	169,000	3,790 <sup>g</sup>	55, 64, 67	WDNR	Medium
GFD-05	Water Quality	Intersection of I-49 and US-45	City of Greenfield	State of Wisconsin	Installation of stormwater pond with 0.3 acre permanent pool to treat runoff from a contributing area of 30 acres	4,400	8 <sup>e</sup>	1.58 <sup>f</sup>	City of Greenfield	177,000	3,790 <sup>g</sup>	55, 64, 67	WDNR	Medium
GFD-06	Water Quality	Northwest of W. Coldspring Road and S. 84th Street at St. John School	City of Greenfield	St. John School	Installation of stormwater pond with 0.8 acre permanent pool to treat runoff from a contributing area of 72 acres	14,000	27 <sup>e</sup>	9.50 <sup>f</sup>	City of Greenfield	658,000	6,600 <sup>g</sup>	55, 64, 67	WDNR	Medium
GFD-09	Water Quality	Southwest of W. Coldspring Road and S. 92nd Street, Wisconsin Electric Power	City of Greenfield	We Energies	Installation of stormwater pond with 0.2 acre permanent pool to treat runoff from a contributing area of 25 acres	4,400	8 <sup>e</sup>	3.30 <sup>f</sup>	City of Greenfield	234,000	3,380 <sup>g</sup>	55, 64, 67	WDNR	Medium
GFD-10	Water Quality	Northwest of W. Coldspring Road and S. 100th Street on drainage right-of-way	City of Greenfield	City of Greenfield	Installation of stormwater pond with 0.4 acre permanent pool to treat runoff from a contributing area of 49 acres	6,800	12 <sup>e</sup>	6.47 <sup>f</sup>	City of Greenfield	153,000	4,260 <sup>g</sup>	55, 64, 67	WDNR	High
GFD-11	Water Quality	East of S. 84th Street and north of I-43	City of Greenfield	Milwaukee County	Installation of stormwater pond with 0.4 acre permanent pool to treat runoff from a contributing area of 47 acres	7,800	14 <sup>e</sup>	6.20 <sup>f</sup>	City of Greenfield	225,000	4,260 <sup>g</sup>	55, 64, 67	WDNR	High
GFD-15	Water Quality	Northwest of W. Howard Avenue and S. 116th Street along Root River	City of Greenfield	City of Greenfield	Installation of stormwater pond with 0.3 acre permanent pool to treat runoff from a contributing area of 30 acres	4,200	7 <sup>e</sup>	3.96 <sup>f</sup>	City of Greenfield	120,000	3,790 <sup>g</sup>	55, 64, 67	WDNR	Medium
GFD-16	Water Quality	North of W. Beloit Road along Wildcat Creek near S. 119th Street	City of Greenfield	City of Greenfield	Installation of stormwater pond with 1.0 acre permanent pool to treat runoff from a contributing area of 121 acres	16,200	31 <sup>e</sup>	16.00 <sup>f</sup>	City of Greenfield	358,000	7,280 <sup>g</sup>	55, 64, 67	WDNR	High
GFD-17	Water Quality	Northeast of W. Howard Avenue and S. 116th Street along the Root River	City of Greenfield	City of Greenfield	Installation of stormwater pond with 0.2 acre permanent pool to treat runoff from a contributing area of 23 acres	3,400	6 <sup>e</sup>	3.04 <sup>f</sup>	City of Greenfield	129,000	3,380 <sup>g</sup>	55, 64, 67	WDNR	Medium
GFD-19	Water Quality	East of I-894 north of W. Coldspring Road in Wisconsin Electric Power Company right-of-way	City of Greenfield	We Energies	Installation of stormwater pond with 1.9 acre permanent pool to treat runoff from a contributing area of 213 acres	37,000	73 <sup>e</sup>	28.10 <sup>f</sup>	City of Greenfield	1,527,000	11,760 <sup>g</sup>	55, 64, 67	WDNR	High
LRC-03	Habitat	Nicholson Wildlife Refuge	Village of Caledonia	Village of Caledonia	Remove invasive plant species, restore site	--	--	--	Village of Caledonia	-- <sup>h</sup>	-- <sup>h</sup>	1, 3, 5, 9, 16, 17, 20, 21, 39, 45, 48, 51	SEWISC, Racine Weed Out!	High
LRC-04	Water Quality	Husher Creek south of 5 Mile Road	Village of Caledonia	--	Add water quality monitoring station	--	--	--	City of Racine Health Department or WAV Program	-- <sup>h</sup>	-- <sup>h</sup>	5, 17, 20, 39, 40, 50, 51	--	Medium
LRC-07	Habitat, Water Quality, Recreational Use and Access	Husher Creek south of 7 Mile Road	Village of Caledonia	Private landowner, Racine County WDOT	Stream rehabilitation, naturalization, or bank stabilization project to address eroding streambanks. Remaindering of channelized reaches including addition of buffer and canopy cover	-- <sup>j</sup>	-- <sup>j</sup>	--	Private landowner, Racine County	-- <sup>h</sup>	-- <sup>h</sup>	5, 9, 15, 18, 20, 24, 39, 44, 45, 51, 64, 67	City of Racine Health Department	Low

# Specific Projects

- Estimates of pollutant load reductions
  - TSS, total phosphorus and fecal coliform bacteria
- Costs
- Identification of potential funding sources
- Prioritization of projects
  - Identification of high-priority projects



# Implementation

- Recommend that units of government located in the watershed adopt the plan by resolution
  - Includes a model resolution
- The plan includes an information and education element
  - Designed to provide information to elected officials, county and municipal staffs, businesses, residents, news media, and general public
- Extensive section on sources of financial and technical assistance
  - Descriptions and contact information for over 70 programs

# Project Web Site

- <http://www.sewrpc.org/SEWRPC/Environment/Root-River-Watershed-Restoration-Plan.htm>

- Plan report
- Summary notes from Advisory Group meetings
- Presentations from RRRPG meetings

