



# Oak Creek Watershed Restoration Plan

## Plan Rollout Presentation December 8, 2021

**Speakers:**

- Laura Herrick, PE, CFM – Chief Environmental Engineer
- Joseph Boxhorn, Ph.D. – Principal Planner
- Aaron Owens – Senior Planner
- Megan Beauchaine – Planner

#259994

1

1



### Comments from Plan supporters



- Guy Smith – Milwaukee County
- Jennifer Wright – MMSD
- Kyle Vandercar – City of South Milwaukee
- Dave Giordano – Root-Pike WIN

2

2

# Strategy

Use the Watershed Plans and **Work with Landowners** to Solve Storm Water Runoff Problems

Watershed Plans

Root-Pike WIN

Landowner Wants/Needs

3

## Tactics

Use the Site-Specific Recommendations to Find Funding

**WATERSHED RESTORATION PROJECTS**

Project ID: 21

Restoration Category: Wetland Restoration

Plan: WIND POINT WRP

Priority: High: Critical Area

Project Status: In-progress - Design

Municipality: Village of Calumet

Existing Condition: 16.5 acres of drained wetlands along Tributary G Reach 3. Land is currently agricultural and slated for future residential development. Plans are in place adjacent to SEWRPC's wetland restoration project and for N of 1/2 Mile Rd. along Tributary G Reach 3 - P

Recommendation: **SITE SPECIFIC RECOMMENDATION**  
In-situ conservation of low impact residential development plans by using drained wetlands along Tributary G as wetland/biodiversity protection and/or N of 1/2 Mile Rd. along Tributary G Reach 3 - P

Location: 2132 S 1/2 MILE ROAD, RACINE, WI 53402

Owner (public or private): Private

Responsible Entity: PAUL J KRCEK

Property ID: 104042337040000

**OUTCOMES**

Return on Investment: There are two main economic outcomes that could also be achieved with the proposed restoration project - decreased flood, and erosion costs and increased property values. With more flood storage and reduced water velocities, downstream flood impacts would be reduced. The cost of damages and repairs is difficult to

Outcomes: 12/20: 50% of the design of this corridor is complete. Recently secured another 25% from WCMVP, but still need another 25%. 8/5/22 - Walked the site with Tony and AES. There are a number of opportunities here as the Village has the ROW on the park parcel and the upstream landowner has a property for restoration. There are lots of invasives and ash tree issues. 8/15/22 - Tony at VSC and has approval from the landowner to walk the site - Dave to find and interested engineering partner. 8/14/22 - Met with Tony at the Village and he proposed action on the Western half of the stream bank as its eroding badly. RPW drafted the Board resolutions. Next step is Board approval...

**POSSIBLE FUNDING SOURCES**

Program	Eligibility
5-2: Fund for Lake Michigan (FLM) - Grants Program	Public & Private
7: Great Lakes Fishery Trust (GLFT) - Habitat Pk 07 - Habitat Protection and Restoration; Tang	Public & Private
8: Great Lakes Protection Fund (GLPF) - Grants 08 - GLPF Grants Program	Public & Private
15: NFWF - Ring Back the Nations / M	Public & Private
17: NFWF - Free Star and Urban Waters F	Public & Private
18: NFWF - Sustain Our Great Lakes Grant Progr	Public & Private
33: USDA - NRCS - Environmental Quality Incent	Private
37: USDA - NRCS - Wetlands Reserve Program (WRP)	Private
49: EPA - Urban Waters Small Grants (CURRENT	Public & Private

Root-Pike WIN's Project Database

Serving the Counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha

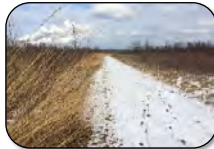
4

# Results

Major Watershed Restoration Plan Driven Projects...



Pike River: South Branch  
1.5mi Stream Corridor  
USACE Design-Build  
~\$16M



Wind Point: Cliffside Park 40ac  
Wetland Restoration  
Design-Build  
~\$140K



Pike River: UW-Parkside  
210ac Natural Area  
Implementation  
~\$300K



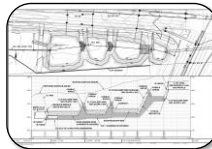
Wind Point: Turtle Creek  
Stream Corridor Restoration  
Design and Implementation  
~\$900K



Root River: Horlick Dam  
Environmental Corridor  
USACE Design-Build  
~\$5M



Pike River: Petrifying Springs  
Stream Corridor Restoration  
Design and Implementation  
~\$2M



Pike River: WisDOT CTH KR  
Regenerative Stormwater  
Conveyance (RSC) DB  
~\$250K



Root River: Wildcat Creek  
Stream Corridor Restoration  
Design and Implementation  
~\$300K

Serving the Counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha

5



## Purpose of Plan



- Targeted set of recommendations
- Build on previous work (RWQMP and update)
- 9KE plan for funding opportunities
- Four focus areas\*
  - Water Quality
  - Habitat
  - Recreation
  - Targeted Flooding

\* Areas as relate to the Mill Pond and dam

6

Serving the Counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha

6





7



## Water Quality Problems



- High concentrations of fecal indicator bacteria, phosphorus, and nitrogen compounds
- Increasing water temperatures and concentrations of chloride, chlorophyll-*a*, and dissolved phosphorus
- Low concentrations of dissolved oxygen in portions of Oak Creek and some tributaries
- Poor to fair quality aquatic communities
- Presence of exotic and invasive species
- Presence of toxic substances and emerging pollutants at some locations

8

Serving the Counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha

8



## Water Quality Problems



- Major streams of the watershed are considered impaired for not meeting water quality standards
  - Oak Creek
    - Degraded biological community due to high phosphorus levels
    - Aquatic toxicity due to high chloride levels and an unknown pollutant
  - North Branch of Oak Creek and Mitchell Field Drainage Ditch
    - Aquatic toxicity due to high chloride levels



9

Serving the Counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha

9



## Recommendations



- General recommendations
  - Most apply over the whole watershed
  - Provide guidance for the management of natural resources in the watershed
- Specific projects
  - The plan identifies and recommends over 400 specific projects
  - These partially implement the general recommendations
  - These are prioritized into high, medium, and low priority
- Example stormwater management projects

10

Serving the Counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha

10





## Water Quality Recommendations





Leaf and Yard Waste Management Programs



Improve Deicing Practices to Reduce Salt Use



Promote voluntary compliance with phosphorus fertilizer use restrictions



Regular Inspections of Stormwater Control Measures



Tracking Systems for Stormwater Control Measure and Green Infrastructure Maintenance



Trash and Litter Control Programs



Enact and Enforce Pet Litter Ordinances



Control Nuisance Waterfowl as Needed



Enact and Enforce Bans on Coal-tar Pavement Sealants

Serving the Counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha

11



## Water Quality Recommendations





Remove Ordinance and Code Barriers to Green Infrastructure Use



Install Green Infrastructure



Continue Collection Programs for Expired and Unused Medications



Water Quality Monitoring



Information and Education Programs



Install Stormwater Control Measures



Refine and Update Storm Sewer System Maps



Post Fish Consumption Advisories



Conduct Street Sweeping



Continue Household Hazardous Waste Collection Programs



Test and Apply Innovative Methods to Treat Stormwater Runoff

Serving the Counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha

12



## Recommended Projects



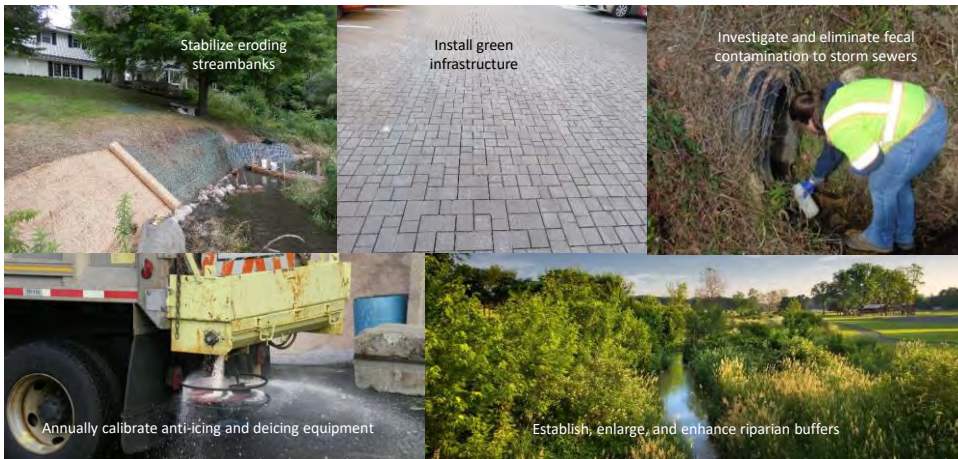
Recommended types of water quality projects include



13



## Recommended Projects



Some water quality projects also address habitat, flooding, or recreation

14

*Serving the Counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha*

14



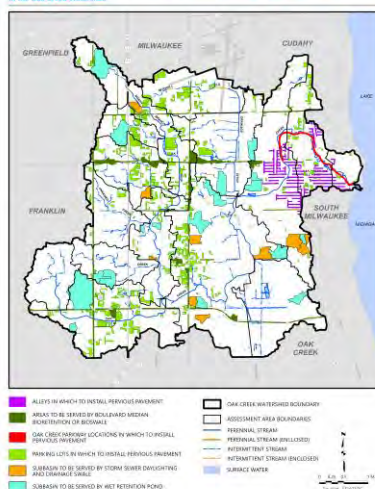


## Example Stormwater Projects



- Conducted a preliminary screening to identify areas where several stormwater management practices could be installed
- Developed preliminary designs for several types of practices
  - Wet retention ponds
  - Removing storm sewers and installing swales
  - Bioswales in boulevard medians
  - Bioretention in boulevard medians
  - Pervious pavement in parking lots, alleys, and parking lanes of parkway

Map 6.14  
Preliminary Candidate Locations for Installation of Selected Stormwater Management Practices in the Oak Creek Watershed



15

Serving the Counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha

15

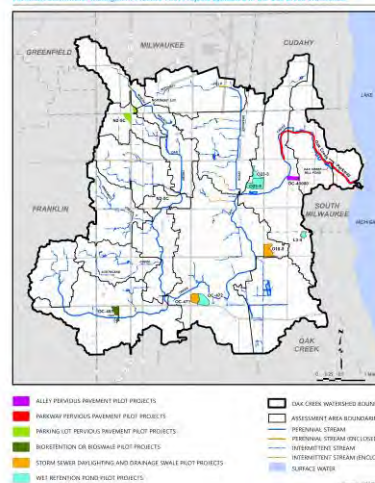


## Example Stormwater Projects



- Estimated costs and pollutant load reductions
- The goal was to demonstrate the feasibility, potential, and benefits of these types of projects and to encourage communities to develop similar projects throughout the watershed
- Some are included as recommended projects

Map 6.15  
Localized Stormwater Management Practice Pilot Projects Evaluated in the Oak Creek Watershed



16

Serving the Counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha

16

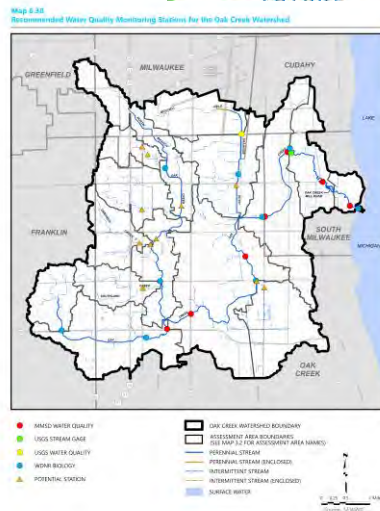




## Measuring Plan Progress



- Continue and expand water quality, habitat, and biological monitoring
  - MMSD, USGS, WDNR, and Milwaukee County Parks continue current efforts
  - Add eight water quality sampling stations
  - Evaluate Mill Pond sediment for contaminants
- Collate, analyze, and interpret monitoring data every 10 years
- Track and evaluate implementation of plan recommendations
  - Milwaukee County Environmental Services to track
  - Advisory Group to evaluate



17

Serving the Counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha

17



Habitat Quality

18

18



## Habitat Problems



- Urbanization and agricultural development have significantly altered surface and groundwater hydrology
- Stream channels have been highly modified
- Many stream reaches have been disconnected from their floodplains leading to streambank and bed erosion and accumulation of sediment
- Poor diversity of instream habitat in some stream reaches limits the quality of aquatic communities
- Coverage, connectivity, and widths of riparian buffers is insufficient in some areas

19

*Serving the Counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha*

19



## Habitat Problems



- Invasive plant and insect species have degraded the quality of waterways, riparian areas, wetlands, and uplands
- Passage impediments such as road crossings, drop structures, large debris jams, and the Mill Pond dam restrict migration of fish and other aquatic organisms throughout the watershed, limiting their access to refuge areas, feeding, and/or breeding habitat, contributing to poor abundance and diversity
- Projections of future climate conditions indicate a 2°C increase in water temperatures in Oak Creek by end of 21<sup>st</sup> century, resulting in changes to the biological communities the streams are able to support
- Accumulation of trash and debris has degraded the aesthetics of streams and riparian areas and can harm wildlife and aquatic organisms

20

*Serving the Counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha*

20

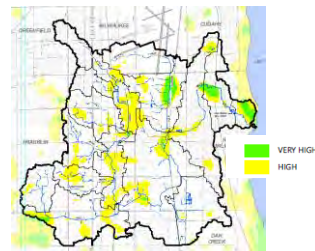


## Re-establish and Maintain Natural Surface Water Hydrology



Protect and Enhance Natural Landscape  
Elements to "Slow Water Down"

Protect Areas of High Groundwater Recharge  
Potential and Prevent Groundwater Contamination



Promote Stormwater Reuse,  
Storage, and Infiltration



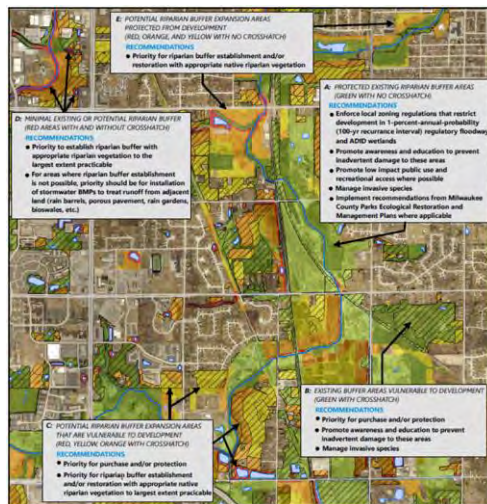
21

Serving the Counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha

21



## Protect, Restore, Expand, and Connect Riparian Buffers



**LANDS UNDER SOME FORM OF PROTECTION (NOT CROSS HATCHED)**

- EXISTING RIPARIAN BUFFERS (DELINEATED BY SEWRPC STAFF USING 2015 DIGITAL ORTHOPHOTOGRAPHY)
- 75-FOOT MINIMUM RECOMMENDED BUFFER WIDTH
- 400-FOOT MINIMUM CORE HABITAT WIDTH FOR WILDLIFE PROTECTION
- 1,000-FOOT OPTIMAL CORE HABITAT WIDTH FOR WILDLIFE PROTECTION

**VULNERABLE LANDS (CROSS HATCHED)**

- EXISTING OR POTENTIAL RIPARIAN BUFFER LANDS WITH NO FORM OF PUBLIC INTEREST OWNERSHIP

1. Manage and Restore Existing Riparian Buffers
2. Protect What Currently Exists (Vulnerable Existing Buffers Have Highest Priority)
3. Establish New Riparian Buffers to Greatest Extent Possible with Minimum Target of 75-foot Width From Water's Edge and Optimal Goal of a 1,000-foot width (or greater)
4. Establish Connections/Corridors Between Buffer Areas

22

Serving the Counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha

22

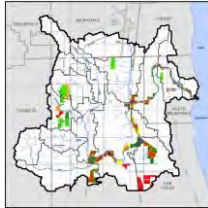




## Preserve, Restore, Expand, and Connect Wildlife Habitat

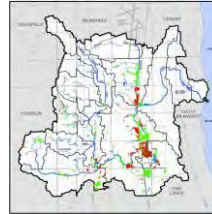


Projects from MCP's Ecological Restoration and Management Plans



- RAPID RESPONSE INVASIVE REMOVAL
- RAPID RESPONSE INVASIVE REMOVAL AND FOREST STAND IMPROVEMENT
- REFORESTATION
- FOREST STAND IMPROVEMENT
- GRASSLAND MANAGEMENT
- GRASSLAND RESTORATION
- SHRUB MANAGEMENT
- SHALLOW-WATER WILDLIFE AREA

Areas to be Considered for Wetland Restoration



- AREAS CONSIDERED BY WDNR TO BE POTENTIALLY RESTORABLE WETLANDS
- AREAS CONSIDERED BY WDNR TO BE POTENTIALLY RESTORABLE WETLANDS THAT ARE CURRENTLY BEING CULTIVATED
- FARMED WETLANDS

Control, Manage, and/or Remove Invasive Species in Waterbodies, Riparian Areas, Wetlands, and Uplands



23

Serving the Counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha

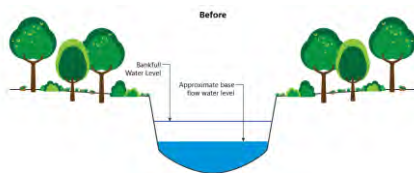
23



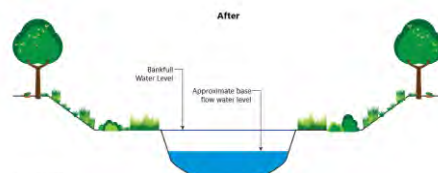
## Protect and Restore the Diversity and Quality of Instream Habitat



Re-Establish Connections Between Streams, Floodplains, and Adjacent Wetlands



Disconnected from Floodplain



Source: IDEM/RC

Connected Floodplain



Oak Creek



Underwood Creek - Wauwatosa

24

Serving the Counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha

24



## Protect and Restore the Diversity and Quality of Instream Habitat

Remove Impediments to Aquatic Organism Passage



Rock Ramp Retrofit



Retrofit Low-Flow Channel



Install Strategically Placed Boulder Resting Spots



Selectively Remove Parts of Woody Debris to Open Passage Lanes



25

Serving the Counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha

25



## Protect and Restore the Diversity and Quality of Instream Habitat



Address Excessive Streambank and Streambed Erosion



Repair, Replace, or Retrofit Failing Stormwater Outfalls



26

Serving the Counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha

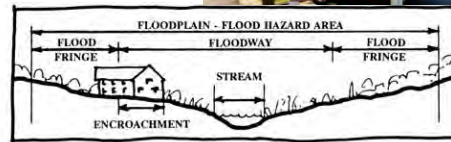
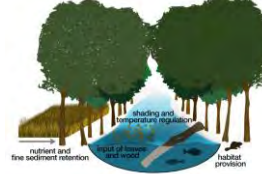
26



## Reduce Negative Impacts of Climate Change



- Slow Down, Detain, and Treat Runoff
- Reduce Peak Stream Flows
- Maintain Shallow Groundwater Levels
- Promote Actions to Reduce Warming of Aquatic Habitats
- Consider Strengthening Floodplain Ordinances



27

Serving the Counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha

27



## Reduce Trash and Debris Within Stream Channels and Riparian Areas



- Community-Oriented Cleanup Days
- Place and Maintain Additional Trash Receptacles Along Trails, Parkways, and Parks
- Continue and Expand Large Trash Pick-Up Days
- Continue Household Hazardous Waste Collections Electronic Recycling Options



Serving the Counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha

28





29



## Flooding Recommendations



- As opportunities arise, the remaining insurable structures in the regulatory Oak Creek floodplain should be voluntarily acquired/removed or floodproofed
- Road crossings impacted by the regulatory floodplains should be elevated or modified as part of improvement projects
- Flooding solutions should be evaluated on a case-by-case basis
- Rainfall runoff should be retained onsite to mitigate stream and stormwater flooding
- Sufficient undeveloped land should be maintained in the watershed for infiltration and flood storage

30

Serving the Counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha

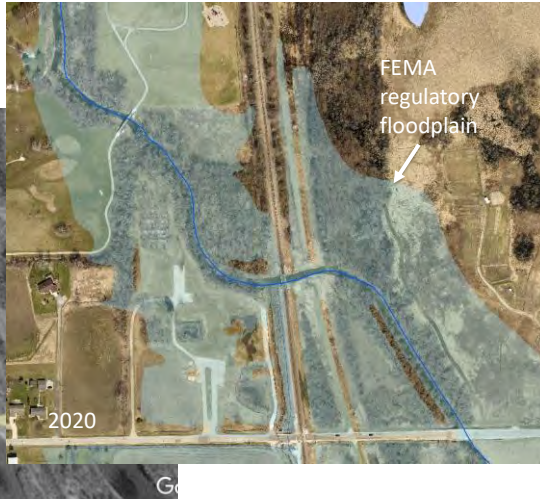
30



## Flooding Recommendations



Flooded Structure Removal – Greenhouses at Forest Hill Ave. and Oak Creek mainstem



31

Serving the Counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha

31



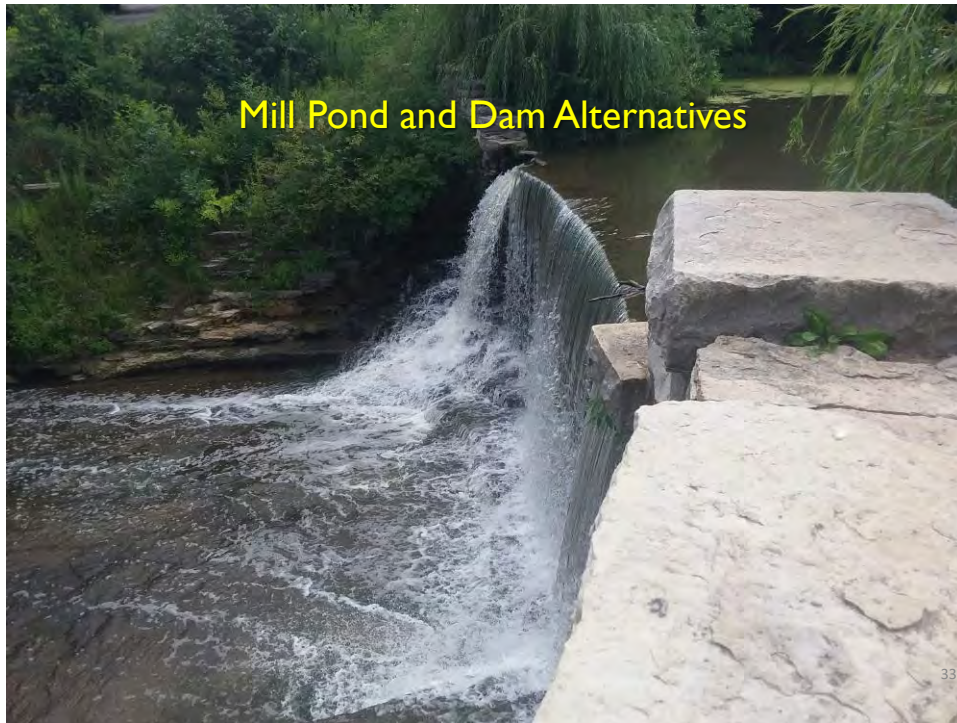
## Flooding Recommendations



32

Serving the Counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha

32



33



### Issues at Mill Pond and dam



- The sluice gate for dam maintenance is inoperable.
- Sediment accumulation in the Mill Pond has become excessive, creating islands in the pond and very shallow water depths that have adversely impacted water quality, habitat, aquatic species, and recreation.
- The dam is a full barrier to fish and native aquatic organism passage between Lake Michigan and the upstream Oak Creek watershed.

34

Serving the Counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha

34





## Issues at Mill Pond and dam



- The Mill Pond was not designed to provide flood storage but rather for recreational and aesthetic benefits. Under the current configuration of the dam, the adjacent Oak Creek Parkway floods during the 1-percent-annual-probability (100-year storm) event.

35

*Serving the Counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha*

35



## Summary of Mill Pond and Dam Alternatives



- Alternative 1 – Sluice Gate Repair
- Optional – Emergency Spillway and Abutment Extension
- Alternative 2 – Partial Pond Restoration (2)
- Alternative 3 – Full Pond Restoration
- Alternative 4 – Bypass Channel, Dam Lowering, and Pond Restoration
- Alternative 5 – Dam Removal and Channel Restoration (3)

36

*Serving the Counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha*

36





## Mill Pond Alternative Evaluation



- Total present worth costs (2019)
- Construction and maintenance for 50 years
  - Sluice gate repair only \$542,000
  - Dam remains and pond restored (Alts 1-4)
    - \$4.3M - \$12.4M
  - Dam removed and stream restored (Alt 5)
    - \$4.8M - \$11.9M
- Alternatives also evaluated for flooding, environmental, and recreational impacts

39

Serving the Counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha

39



## Recommendations for Mill Pond and Dam

- Recommended action:
  - Sediment core sampling to assess level of contamination (est. \$49,000)
- Potential additional actions:
  - Sediment transport analysis to better estimate sediment deposition rates in the pond (est. \$10,000-\$70,000)
  - Sluice gate repair if it is determined that dam removal will not be pursued (\$542,000)



40

Serving the Counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha

40





41



## Major Recreational Findings



- Recreational Opportunities: Oak Creek Parkway, Parks, Oak Leaf Trail (OLT), and Access to Stream for Fishing
  - County has Proposed Adding About 6 miles to the OLT System
- Main Recreational Uses of the Watershed Include Walking, Hiking, Biking, and Fishing
- Desire for Increased Educational Signage, Improved Quality and Quantity of Recreational Trails, and Resolving Mill Pond to Allow for Improved Recreational Uses

42

Serving the Counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha

42



## Major Recreational Recommendations



- Pursue Land Acquisition for Increased Recreational Opportunities
- Expand Trail System and improve its connections to Trails within and Adjacent to the Watershed
- Provide Educational Signage Along Trails and within Parks and Parkway
- Improve Fishing Access Along the Mainstem of Oak Creek
- Re-examine Mill Pond as an “Urban Fishing Water” designation
- Examine Additional Uses for the Mill Pond Warming House
- Improve accessibility of Recreational Facilities to persons with disabilities

43

*Serving the Counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha*

43



44



## Plan Implementation



- Recommend that local units of government adopt the plan
- Identify organizations that may have a role in implementation
  - Local governments
  - Federal, State, regional, and local agencies
  - Nongovernmental
- Discuss maintaining and revising the plan
  - Nine key element plans have expiration dates
  - The plan will need to be updated and reapproved in the future
- Schedule – full implementation over 30 or more years

45

*Serving the Counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha*

45



## Plan Implementation (Cont.)



- Information and Education Plan Element:
  - Targets various groups
  - Inform about the plan
  - Inform about natural resource management
- Implementation Tracking:
  - Milwaukee County Environmental Service Unit
  - Advisory Group (AG) Meet Periodically
- Milestones:
  - Helps AG Evaluate Progress

46

*Serving the Counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha*

46





## Plan Implementation (Cont.)



- Plan Costs:
  - 290 of 405 Projects Costed Out
  - Overall, \$204-216 Million
- Potential Funding Programs:
  - Extensive List and Descriptions of Programs
  - Helps with Project Costs
  - Funding Programs Screened for Recommended Projects

47

Serving the Counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha

47



## Thank You

### Funding Partners



48

Serving the Counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha

48



## Website and Contact Information



### ■ Communication

- SEWRPC website for final Plan documents

[www.sewrpc.org/OakCreekWRP](http://www.sewrpc.org/OakCreekWRP)

### ■ Contact

- Laura Herrick – Chief Environmental Engineer  
262-953-3224 or [lherrick@sewrpc.org](mailto:lherrick@sewrpc.org)

49

*Serving the Counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha*

49



## Questions



### ■ Questions

50

*Serving the Counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha*

50