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Agenda

OAK CREEK WATERSHED FUTURE

- Review Chapter 5, "Watershed Goals and Management Objectives"
- Questions

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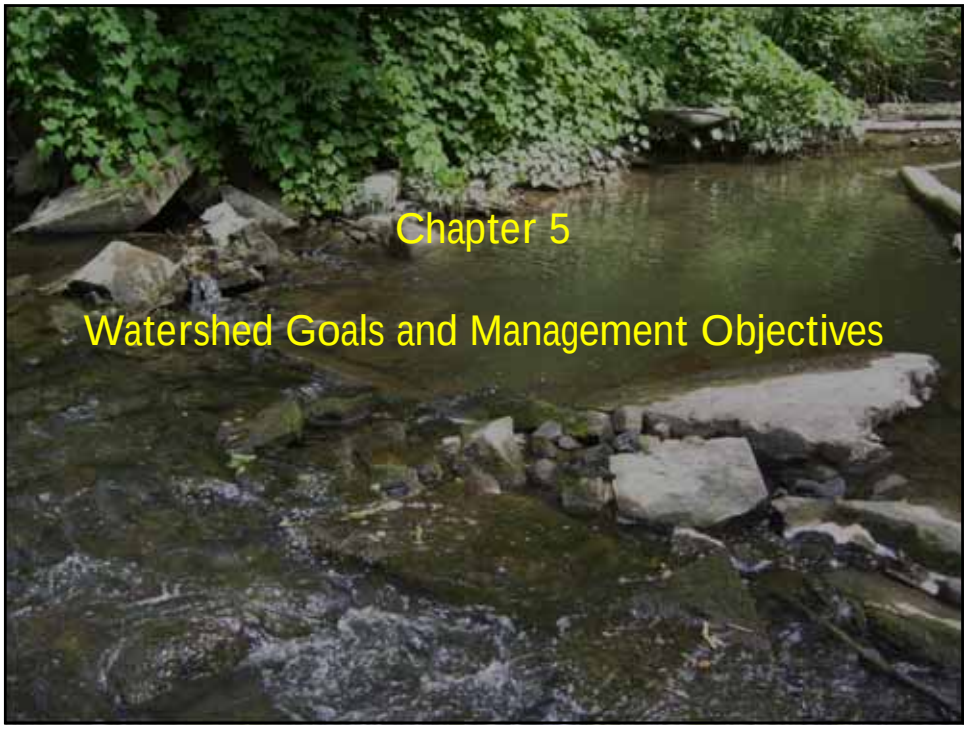

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Chapter 5

- This chapter describes:
  - The goals of the plan
  - Problem/issue statements related to each plan focus area
  - Management objectives related to each goal
    - Includes pollutant load reduction targets for four pollutants

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Goals

- Plan Goals:
  1. To improve water quality in surface waters of the watershed
  2. To improve instream, riparian, wetland, and upland habitat conditions in the watershed
  3. To reduce the impacts of flooding and stormwater runoff problems at targeted locations in the watershed
  4. To improve recreational access to and use of surface waters and riparian areas in the watershed

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Problems Related to Water Quality

- Chronically high concentrations of fecal indicator bacteria
- Chronically low concentrations of dissolved oxygen at some locations
- Chronically high concentrations of nutrients
  - Total phosphorus often exceeds standards
  - Total nitrogen usually exceeds guidelines
- High concentrations of total suspended solids
- High and increasing concentrations of chloride

Water Quality Management Objectives

1. Sources that contribute sanitary wastewater and other human wastes to surface waters should be located and eliminated
2. Anthropogenic sources that contribute fecal contamination to surface waters should be located and eliminated
3. Non-anthropogenic sources that contribute fecal contamination to surface waters should be located and eliminated
4. Contributions of total suspended solids and sediment to surface waters should be reduced

Water Quality Management Objectives

5. Eroding stream banks along streams of the watershed should be addressed
6. Contributions of organic materials to surface waters should be reduced
7. Contributions of total phosphorus to surface waters should be reduced
8. Contributions of dissolved phosphorus to surface waters should be reduced
9. Contributions of nitrogen compounds including ammonia, nitrate, nitrite, and organic nitrogen compounds to surface waters should be reduced

Water Quality Management Objectives

10. Contributions of chlorides to surface waters and groundwater should be reduced
11. Provision of monitoring data that are adequate to evaluate the state of water quality conditions and the efficacy of management measures on a watershed scale should be continued

Pollutant Load Reduction Targets

- Derived from the modeling for the regional water quality management plan update for the greater Milwaukee watershed (RWQMPU, 2007)
  - Calibrated and validated hydrologic and water quality simulation model
  - The model is briefly described in Appendix L and more fully described in SEWRPC Planning Report No. 50
- The model estimated pollutant loads associated with existing year 2000 conditions and several alternative and planned conditions
- Pollutant loads were estimated for total phosphorus, total suspended solids, fecal coliform bacteria, and total nitrogen

Pollutant Load Reduction Targets

- The model also estimated water quality conditions under the various conditions examined
- The load estimates from the model were used to estimate
  - The load reductions needed to achieve the level of water quality improvement envisioned in the RWQMPU
  - How much of the reductions would be achieved through full implementation of the nonpoint source performance standards set forth in NR 151 of the *Wisconsin Administrative Code*

Pollutant Load Reduction Targets

- For urban areas, NR 151 required reductions in the amount of suspended solids coming off developed areas
  - Areas of existing development
    - 20 percent reduction by March 10, 2008
    - 40 percent reduction by October 1, 2013
  - Areas of new development – 80 percent reduction
  - Areas of redevelopment – 40 percent reduction
  - Areas of infill development
    - Prior to October 1, 2012 – 40 percent reduction
    - After October 1, 2012 – 80 percent reduction

Pollutant Load Reduction Targets

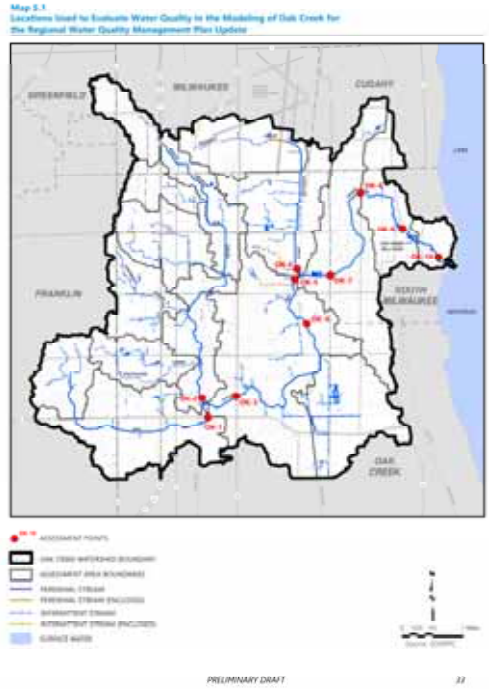
- Load reduction targets needed to be adjusted to account for the Legislature prohibiting enforcement of the 40 percent TSS reduction requirement for MS4s
  - This adjustment is explained in Appendix L
- Load reduction targets given in Tables 5.2, 5.4, 5.6, 5.9

Pollutant Load Reduction Targets

Pollutant	Urban NR 151-Related	Other Urban	Rural NR 151-Related	Other Rural	Total
Total Phosphorus (pounds)	508	1,232	50	240	2,030
Total Suspended Solids (pounds)	659,489	608,051	691,070	9,920	1,986,530
Fecal Coliform Bacteria (trillion cells)	162	1,067	0	67	1,292
Total Nitrogen (pounds)	2,247	5,583	17,180	1,100	26,110

Estimated Water Quality

- Model estimated water quality conditions that would result from achieving the load reductions called for under the RWQMPU
  - Estimated at 10 sites shown on Map 5.1
  - Many of these sites are water quality monitoring stations



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Estimated Water Quality

- Estimated improvements in water quality resulting from these pollutant load reductions

Pollutant (mean concentrations)	Existing	Planned
Total Phosphorus (mg/l)	0.084	0.076
Total Suspended Solids (mg/l)	16.4	10.8
Fecal Coliform Bacteria (cells per 100 ml)	7,994	4,427
Total Nitrogen (mg/l)	1.23	0.82

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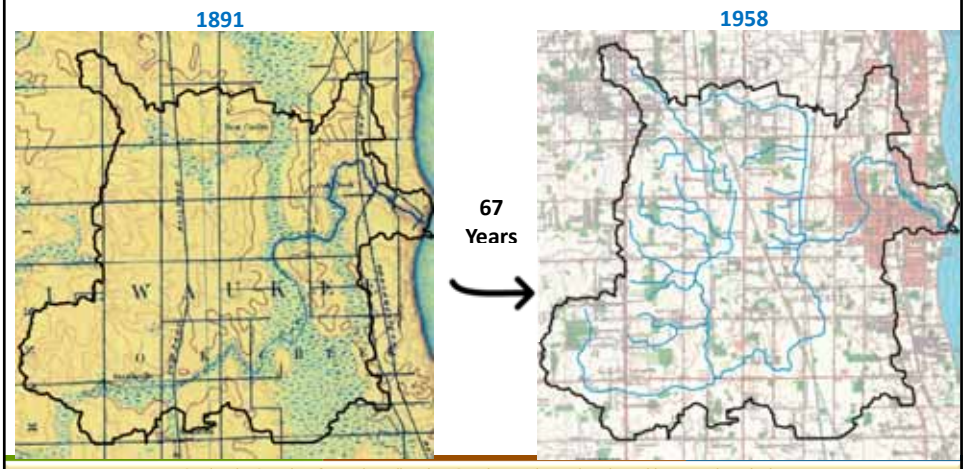
Estimated Water Quality

- The goal of the RWQMPU was to improve water quality
  - While achieving the load reductions called for by the RWQMPU would improve water quality, it probably will not be sufficient to fully achieve compliance with water quality standards
  - Monitoring of water quality, reassessment of compliance with standards, and adjustments of the plan in future editions will be necessary in order to meet water quality standards

Problems Related to Habitat

- Urbanization and prior agricultural development have significantly altered surface and groundwater hydrology contributing to many of the problems summarized below



Problems Related to Habitat

- Stream channels throughout the watershed have been highly modified contributing to many of the problems observed in the watershed

Problems Related to Habitat

- Many stream reaches in the watershed have been disconnected from their floodplains. This disconnection confines flow and increases peak flow velocities and volumes, streambank erosion, and the accumulation of sediment

Problems Related to Habitat

- The flashiness of streamflow in the watershed increases erosion of stream beds and banks and reduces the suitability of instream habitat for aquatic organisms

Problems Related to Habitat

- Excessive streambank erosion is present in some areas of the watershed.This degrades habitat for aquatic organisms and has potential to threaten vital infrastructure

Problems Related to Habitat

- Poor diversity of instream habitat in some stream reaches in the watershed limits the quality of aquatic communities

Problems Related to Habitat

- The coverage, connectivity, and widths of riparian buffers in the watershed is insufficient to provide good habitat for aquatic and terrestrial organisms and protect water quality

Problems Related to Habitat

- Invasive plant and insect species have degraded the quality of waterways, riparian areas, wetlands, and uplands in the watershed

Problems Related to Habitat

- 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

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Problems Related to Habitat

- Projections of future conditions indicate that average water temperatures in Oak Creek are likely to increase by about 2°C by the end of the 21st century due to climate change, resulting in changes to the biological communities that Oak Creek and its tributaries are able to support

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Problems Related to Habitat

- Accumulation of trash and debris has degraded the aesthetics of streams and riparian areas and can harm wildlife and aquatic organisms

Habitat Management Objectives

1. Natural surface water hydrology should be re-established and maintained to the extent practicable.
2. Connection between stream channels, floodplains, and adjacent wetland should be re-established.
3. Environmentally sensitive areas such as designated Natural Areas, wetlands, and environmental corridors should be protected and preserved.
4. Riparian buffer areas should be protected, expanded, restored, and connected to one another.

Habitat Management Objectives

5. Areas with high groundwater recharge potential should be protected and groundwater contamination should be prevented.
6. Instream passage impediments that restrict access of aquatic organisms to a variety of habitats throughout the stream system should be removed or modified to allow passage.
7. The diversity and quality of instream habitat should be protected and restored.
8. Terrestrial wildlife habitat should be protected, restored, and expanded. Connections among various habitats should be increased.

Habitat Management Objectives

9. Non-native and invasive species in waterbodies, riparian areas, wetlands, and uplands should be controlled, managed, and/or removed.
10. The negative physical, chemical, and biological impacts on aquatic and terrestrial ecosystems that are associated with climate change should be reduced or mitigated.
11. Excessively eroding streambanks along streams of the watershed should be addressed.
12. Trash and debris within stream channels and riparian areas should be removed.

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Problems Related to Flooding

- There are several remaining insurable structures impacted by the regulatory FEMA flood elevations, and they are scattered through out the Oak Creek watershed.
- Additional stream flooding locations were provided by stakeholders, and these predominantly occur in the lower portions of the Oak Creek mainstem. Impacts included public and private property flooding, flooding at the South Milwaukee High School grounds, and potential impacts to sanitary sewer lift stations in South Milwaukee.

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Problems Related to Flooding

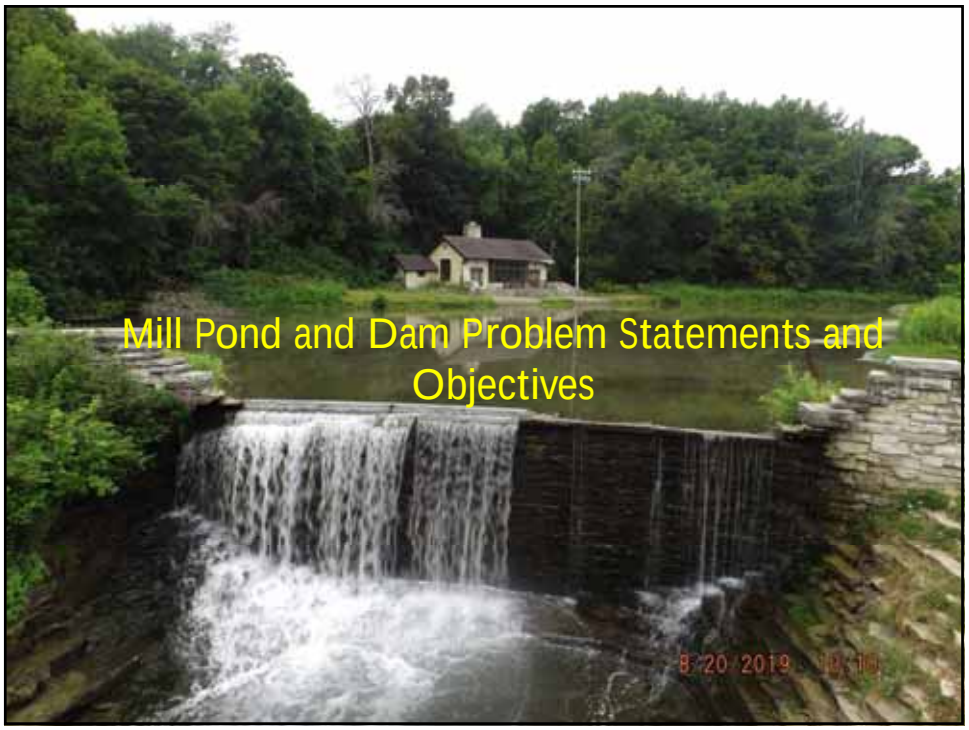
- There are numerous road crossings impacted by the regulatory FEMA flood elevations for Oak Creek, located predominantly on the mainstem of Oak Creek. Some of these road crossings are overtopped for events as small as the 10-percent-annual-probability (10-year recurrence interval) event.
- Stormwater flooding areas were also provided by stakeholders. These areas were spread throughout the watershed and include streets, public property, and private property.
- Storm event flows of the Oak Creek watershed are flashy due to large amounts of impervious surfaces and the dominance of direct connections from the local storm sewer systems.

Flooding Management Objectives

1. As opportunities arise, the remaining insurable structures in the regulatory Oak Creek floodplain should be voluntarily acquired and removed
2. Public infrastructure and private property should be protected from stream and stormwater flooding
3. Road crossings impacted by the regulatory floodplains should be elevated or modified
4. Streams in the Oak Creek watershed should be reconnected to their floodplains

Flooding Management Objectives

5. Riparian buffers should be protected and expanded to allow stream floodwaters to spread out and slow down
6. Rainfall runoff should be retained onsite to mitigate stream and stormwater flooding
7. Sufficient undeveloped land should be maintained in the watershed for infiltration and flood storage



Problems Related to Pond and Dam

- The sluice gate that is required to dewater the pond for dam maintenance is inoperable due to sediment accumulation and lack of regular operation of the gate.
- The Mill Pond was not designed to provide flood storage but for recreational and aesthetic purposes. Under the current configuration of the dam, the regulatory FEMA floodplain indicates that the adjacent Oak Creek Parkway would be flooded during the one-percent-annual-probability event.
- 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.

Problems Related to Pond and Dam

- The dam is a full barrier to fish and aquatic organism passage between Lake Michigan and the upstream Oak Creek watershed.
- The Mill Pond warming house has not been utilized to its full potential due to diminished recreational opportunities at the pond.

Dam and Pond Management Objectives

1. If the dam is not removed, provision should be made for dewatering the pond for dam maintenance
2. If the dam is not removed, an emergency spillway design should be evaluated to improve safety at and downstream of the dam structure and lower flood elevations in the pond area
3. Sediment should be managed more effectively in the Mill Pond area
4. Enhanced recreational opportunities should be provided and maintained in the Mill Pond area

Dam and Pond Management Objectives

5. Habitat quality for aquatic and terrestrial wildlife should be improved in the Mill Pond area
6. Aquatic organism passage through the Mill Pond and dam area should be evaluated as a part of potential improvement

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Recreational Access and Use Findings

1. Major recreational uses of the watershed include walking, hiking, biking, and fishing
2. The public has expressed a desire for improved quality and increased extent of trails within the watershed
3. The Milwaukee County Parks has proposed adding about six miles of trails to the Oak Leaf Trail system within the watershed
4. The public has expressed a desire for educational signage
5. The presence of a poor-quality fishery upstream from the Mill Pond dam

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Recreational Use Management Objectives

1. Continued development of trails and recreational corridors within the Oak Creek watershed to provide an interconnected trail system that provides access to the streams of the watershed and to local, County, and regional trail systems within adjacent watersheds
2. Improve fishing access along the mainstem of Oak Creek
3. Provision of educational signage along trails within the watershed

Potential Projects

Potential Project Types

- Stormwater ponds
- Floodplain reconnection
- Streambank stabilization
- Remove or modify debris jams
- Remove or modify fish passage impediments
- Targeted illicit discharge detection and elimination
- Stormwater outfall retrofits
- Historical stream channel re-alignments
- Green infrastructure installation, including
  - Permeable pavement (parking lots and alleys)
  - Bioswales
  - Rain gardens
  - Rain barrels
  - Stormwater trees
- Invasive species management
- Establishment, restoration, and connection of riparian buffer areas
- Mill Pond and dam alternatives

Questions

- Questions

Website and Contact Information

- Communication
  - SEWRPC website for Draft documents, meeting materials, and comments

www.sewrpc.org/OakCreekWRP

- Contact
  - Laura Herrick – Chief Environmental Engineer
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