

Appendix I. Management Actions: Possibilities and Accomplishments in the Middle Huron WMP, Section 2.

The following management “alternatives” (aka options) were presented in the Middle Huron Management Plan in the first 1994 version and were included in the body of the report through the 2011 version. Including such a long list in the WMP was causing the report to lose a narrow focus on specific, measurable, and accomplishable projects.

However, the list remains in this Appendix as good reference material; furthermore, the list serves as a good structure to organize the known accomplishments the partners and stakeholders have accomplished since the WMP was written. Not every accomplishment can be properly attributed; however, this list represents a good-faith effort of HRWC to recount accomplishments as told to HRWC by the stakeholder partners, with detail if possible.

Many of the Green Infrastructure accomplishments can be seen here:

<https://gisappsecure.ewashtenaw.org/public/greeninfrastructure/>.

Acronyms:

HRWC: Huron River Watershed Council

WCWRC: Washtenaw County Water Resources Commissioner.

Managerial Actions: Ordinances and Policies

1. Adopt Ordinance and Rules for Stormwater Management

Description: Regulations that can guide land development with regard to protecting the water quality, water quantity and biological integrity of the receiving surface water are important in undeveloped and soon-to-be-developed areas. This regulation can use existing data to determine the development impact that can be tolerated by the surface waters before that system will become degraded. Future development or redevelopment can be guided to control runoff so that local streams and water resources are not negatively affected by the development to the greatest extent practicable. The ordinance can incorporate requirements for managing the quality and quantity of stormwater runoff from new development sites, including residential, commercial and institutional sites. Adopting the Rules of the County Drain Commissioner’s Office can be an element of the ordinance in order to be protective of local water resources. Modifications to existing engineering and design standards for stormwater management BMPs is a necessary element of this activity.

Accomplishments:

- 2000. WRWRC. Revised *Rules of the Washtenaw County Drain Commissioner* were published in draft in 1997 and, after extensive ongoing review, finalized in March 2000. Public participation helped guide these processes. The latest rules reflect the experience gained over five years of implementation of a major 1994 revision. The requirements for treatment of first flush, bank-full and 100-year storms remain in effect.

Revisions include increased emphasis on practical aspects of stormwater system design and maintenance, as well as criteria for ensuring proper construction and system performance. Most communities in the planning area, as well as Livingston and Wayne Counties have either adopted these rules or are using very similar standards.

- 2000. Domino Farms. Redesigned office park was used as a forerunner in the stormwater practices and it influenced standards for the county standards.
- Ongoing. City of Ann Arbor. Green Streets policy requiring green stormwater infrastructure on road projects.
- 2017. Ann Arbor Township. Stormwater ordinance adoption.
- 2016. Pittsfield Township. Coal tar/PAH resolution adoption.
- 2017. Ann Arbor Township. Coal tar/PAH ordinance adoption.
- 2017. Eastern Michigan University. Policy banning use of coal tar/high PAH pavement sealants on campus.
- 2018. University of Michigan. Policy banning use of coal tar/high PAH pavement sealants on campus.
- 2019. Pittsfield Township. Adopts road salt reduction resolution.

2. Improve Soil Erosion and Sediment Control (SESC) by adopting Erosion and Sedimentation Ordinance, Comply with Practices and Recommendations of a Soil Erosion and Soil Sedimentation Control Guide or Manual, and Improve Enforcement of SESC Policy

Regular inspection of control measures is essential to maintain the effectiveness of during-construction and post-construction stormwater best management practices. Generally, inspection and maintenance of practices can be categorized into two groups—expected routine maintenance and non-routine (repair) maintenance. Routine maintenance refers to checks performed on a regular basis to keep the practice in good working order. In addition, routine inspection and maintenance is an efficient way to prevent potential nuisance situations (odors, mosquitoes, weeds, etc.), reduce the need for repair maintenance, and reduce the chance of polluting stormwater runoff by finding and correcting problems before the next rain. In addition to maintaining the effectiveness of stormwater BMPs and reducing the incidence of pests, proper inspection and maintenance is essential to avoid the health and safety threats inherent in BMP neglect. The failure of structural storm water BMPs can lead to downstream flooding, causing property damage, injury, and even death.

Accomplishments.

- 1997; most recently updated 4/1/16. WCWRC. SESC Ordinance adopted.

3. Adopt Development Standards Zoning Ordinance for Structural and Non-Structural BMPs

Accomplishments.

- Pittsfield Township has enacted this ordinance which covers a wide-range of land use laws. Their description reads as follows: The township development standards, part of the Zoning Ordinance, include requirements for implementation of appropriate non-structural and/or structural BMPs. There is a 25 ft. buffer preservation for wetlands, 100 ft. buffer along water bodies, establishment of easements for vegetative filters and infiltration, and provision for reducing imperviousness through deferred parking requirements.

4. Adopt Illicit Discharge Ordinance and Include Enforcement Language

5. Adopt On-Site Sewage Disposal Ordinance

Septic tank and sanitary sewer maintenance measures can be used to prevent, detect and control spills, leaks, overflows and seepage from occurring in the sanitary system. Identify dry weather, illicit inflows and infiltration problems first within the sanitary system. Wet weather flows, which are more difficult to locate, can then be located using smoke testing, sewer televising and/or dye testing. On-site sewage disposal systems should be designed, sited, operated and maintained properly to prevent nutrient/pathogen loadings to surface waters and to reduce loadings to groundwater. Septic tanks should be pumped at least every three years depending on the size of the family or group using the tank. Educational materials should be distributed to new and current homeowners that maintain septic tanks so that pollution prevention is emphasized.

Accomplishments

- 1999. Washtenaw County passed an ordinance requiring septic inspection at the time of title transfer. The program is administered by the Washtenaw County Environmental Health Department.
- 2008. WCWRC. Ordinance passed.

6. Adopt Purchase of Development Rights Ordinance

The purchase of development rights, known as PDR, is an effective tool for local government or non-governmental organizations such as land conservancies or land trusts, to purchase the development rights of a property to limit development and protect natural features, open space or agricultural land in perpetuity. The ordinance is a tool for guiding growth away from sensitive resources and toward delineated development centers. A PDR ordinance identifies areas that may be protected through conservation easements or purchased for public ownership either outright or through PDR. Communities in southeast Michigan have adopted PDR ordinances and garnered the resources to purchase important parcels of land for preservation in perpetuity.

Accomplishments

- 2004. WCWRC. Ordinance passed.

7. Establish Master Plans & Ordinances that Protect Natural Features, such as Natural Rivers Ordinance, Natural Feature Protection Ordinance, Wetlands Ordinance, Tree/Woodlands Protection Ordinance, Riparian Buffer Ordinance, and Site Design Ordinance

Many of the native plants and shrub landcover of the watershed have been replaced with non-native plants and shrubs and turfgrass, both of which require intensive cultivation and application of chemicals. Native plant and shrub species are adapted to this area and require less water and less maintenance because of their deep root system and resistance to disease. Natives improve stormwater infiltration and stabilize soils by replacing turf grass or other introduced cover with native grasses, flowers, shrubs and trees. In addition, native species provide habitat and food to insects and wildlife. Native landscaping resources are available in southeast Michigan from plant growers to landscaping consultants. A native landscaping

ordinance would promote planting of native species and remove any existing obstacles to growing these plants on residential and commercial lands.

Wetlands serve as giant sponges, which soak up storm water during wet weather events allowing the water to infiltrate into the soil instead of running off directly to surface waters. As the stormwater infiltrates into the soil, pollutants are filtered out before it reaches groundwater. Wetlands serve to reduce storm water velocities, reduce peak flows and to filter out storm water pollutants, they also provide habitat for numerous wildlife species. A subset of all wetlands are regulated by state and federal authorities. These regulated wetlands are at least five acres or larger in area, within 500 feet of a water body, or located in counties where 100,000 or more people reside, A wetlands ordinance that is more protective than required by the state or federal government is necessary to protect those smaller, isolated wetlands which are still important natural resources to a community. A model wetlands ordinance is available to local communities from the Huron River Watershed Council and the Michigan Coastal Zone Program of the MDEQ.

Zoning maps may be amended to increase protection for water resources. Inclusion of natural features and open space zoning are two of the most common and useful ways. Allowing for compact development design increases the ability to preserve a significant amount of open, undeveloped land by grouping buildings and paved surfaces to provide more compact developments while maintaining open spaces.

Accomplishments

- 2000. WCWRC. Open Space Ordinance.

8. Adopt New Standards for Lawn Care, such as Native Landscaping Ordinance, Local Fertilizer Ordinance, Local Weed Ordinance, or Lawn Care Chemical Ordinances (including administration)

Often native plantings are used within stormwater conveyance swales, depressions and wet ponds. However, native landscaping as an alternative to traditional lawns is becoming more common. Native plants, especially those adapted to prairie environments, require little to no irrigation, fertilizer or pesticides and allow stormwater to percolate more efficiently down into the soil. Local weed ordinances, however, indirectly prohibit the use of native landscaping without a variance. Communities should adopt ordinances that allow and encourage native landscaping as an alternative to lawns while not negating the intent of common weed ordinances.

Nitrogen, phosphorus, potassium and other nutrients are necessary to maintain optimum growth of lawns and most gardens. While phosphorus is a naturally occurring nutrient in Michigan waters, human activities such as turfgrass fertilizing contribute excess amounts of phosphorus to lakes and rivers. Over-nutrication of freshwater systems can create nuisance algal blooms that deplete oxygen needed by aquatic organisms, which can lead to fish kills, and prevent water-based recreation. A local phosphorus fertilizer reduction ordinance can address the proper selection, use, application, storage and disposal of fertilizers, and incentives to reduce residential and commercial herbicide/fertilizer use. The ordinance should be combined with a coordinated information and education campaign to communicate the need for the ordinance. Research has shown that phosphorus is not needed as a soil additive in most areas within southeast Michigan.

Accomplishments

- 2007. City of Ann Arbor. The City implemented a ban on phosphorus fertilizer for general household use. In 2012, this became statewide law.

9. Adopt Pet Waste Ordinance

Pet waste can be washed into nearby surface waters and wetlands via direct runoff or storm water systems, thereby adding *E. coli* and nutrients to these freshwater systems. An ordinance that states proper pet waste management practices and provides for education, enforcement and necessary infrastructure (e.g., bag dispensers) can reduce the incidences of pet waste entering the watershed.

10. Develop and Adopt Floodplain Ordinance

11. Adopt Site Design & Road Standards that Reduce Impervious Surface

Utilizing a Low Impact Development (LID) Plan for new developments can reduce directly connected impervious surfaces. LID plans combine a hydrologically functional site design with pollution prevention measures to compensate for land development impacts on hydrology and water quality. The result will be a reduction in stormwater peak discharge, a reduction in runoff volume and the removal of storm water pollutants. LID principles can apply to new residential, commercial and industrial developments. Under the umbrella of LID are specific options such as reducing street widths, right of ways, minimum cul-de-sac radius, driveway widths and parking ratios, allowing for pervious materials to be used in spillover parking areas, and establishing a minimum percentage of parking lot area that is required to be landscaped (with native plants, preferably). Communities are encouraged to minimize the total impervious cover in Zoning Ordinances to protect water resources in the build-out scenario.

Alternative: Once natural resources have been protected to the greatest extent possible, impervious surfaces (roads, rooftops and parking lot dimensions) should be minimized, in order to maintain the natural balance between stormwater infiltration and runoff. Current studies suggest that when the amount of impervious area passes a threshold level of approximately 8%, downstream impacts become evident, as stream channels are destabilized and aquatic habitats are degraded. While minimizing the imperviousness may be a difficult objective, it is necessary to keep in mind that for every percent this threshold is surpassed in a given area, downstream effects are compounded significantly.

Accomplishments

- 2000. The Drain Commissioner's Office, in partnership with Ann Arbor, Scio and Superior Townships, has completed an Impervious Surface Reduction Study.
 - The project sought to reduce the build-out imperviousness of Honey and Fleming Creeksheds and to mitigate the impact of nonpoint source phosphorus using integrated stormwater BMPs. A complete imperviousness build-out of the townships was modeled on a GIS system. Alternative futures were also modeled based on impervious reductions through flexible design standards for roads, parking lots and open space developments. Literature pertaining to existing and innovative BMPs was evaluated to gauge their long-term and sustained efficacy in treating and mitigating phosphorus export.
 - Based on the findings, recommended amendments to township ordinances governing development standards were proffered. In addition, a *Stormwater Management and Treatment Ordinance* was drafted for consideration by the

townships. The stormwater ordinance establishes a performance standard requiring new development to limit phosphorus export.

- Representatives of local governments participated in every phase of ordinance development. Informational presentations were made to planning commissions and boards of three communities considering adoption of study recommendations. A summary document detailing the components, processes and results of the Impervious Surface Reduction Study has been published and disseminated to local communities.

12. Adopt a Policy Requiring Any Development which is Financed or Subsidized by Local Government, or Receives a Tax Abatement, to Meet or Exceed LEED Standards Pertinent to Storm Water Management where Authority to Regulate is Present

13. Create Jurisdictional Authority Under Drain Code for Protection and Restoration

14. Establish an Environmental Protection Overlay Zoning District

Zoning maps may be amended to increase protection for water resources. Inclusion of natural features and open space zoning are two of the most common and useful ways. Allowing for compact development design in an area zoned for lower density development increases the ability to preserve a significant amount of open, undeveloped land. By clustering buildings and paved surfaces around natural areas and open spaces, a development can encompass the same amount of total area while avoiding the destruction of these resources. While individual lots can lose area in this type of zoning district, residents or tenants of the entire subdivision benefit from increased access to natural and open spaces.

15. Enact Ordinance Revisions to Reduce Runoff From Single and Two-Family Residences

16. Incorporate Methods for Capturing and Treating Storm Water Runoff within Road Construction and Improvement Projects

Accomplishments.

- 2016-Ongoing. City of Ann Arbor. Green streets policy.

17. Regulate Maintenance of Stormwater Control Facilities by Requiring Permits for Their Use and Anniversary Dates for Inspections, Maintenance, and Permit Renewals Contingent on Functional Integrity of Structures

18. Establish Dog Parks with Appropriate BMPs

Accomplishments.

- Ongoing. City of Ann Arbor.

Managerial Actions: Practices

19. Create and Maintain Street Cleaning and Roadside Cleaning Programs (including Adopt-a-Road)

High-powered street sweeping is a management measure that involves pavement cleaning practices on a regular basis to minimize pollutant export to receiving waters. These cleaning practices are designed to remove sediment debris and other pollutants from road and parking lot surfaces that are a potential source of pollution impacting urban streams. Recent improvements in street sweeper technology (e.g., regenerative air or vacuum assisted systems) have enhanced the ability of the current generation of street sweeper machines to pick up the fine grained sediment particles that carry a substantial portion of the stormwater pollutant load. Many of today's sweepers can now dramatically reduce the amount of street dirt entering streams and rivers. Street sweeping is recommended as a pollution prevention measure in cold climate areas during or prior to spring snowmelt.

Accomplishments.

- Ongoing. City of Ann Arbor, University of Michigan, Washtenaw County Road Commissioner.

20. Create and Maintain Yard Waste/Compost Pick-Up Programs

Accomplishments.

- Ongoing. City of Ann Arbor.

21. Identify and Label Catch Basins/Storm Drains

The purpose of catch basin and storm water drain marking is to eliminate waste entering the Huron River through storm drains by creating public awareness of the danger of dumping into these drains. This process works by marking storm drains with a warning stating that any waste entering the drain goes straight to the Huron River. Along with the marking, the project places educational fliers on the doors of residences in the vicinity of newly marked drains. Markers are continuously placed on drains and replaced every few years when old markers begin to fade or fall off.

Accomplishments.

- 2015-Ongoing. HRWC with financial assistance from WCWRC has replaced thousands of storm drain labels through the Adopt-a-Storm-Drain program.
- 2019. Ann Arbor Public Schools. Storm drain labeling.
- 2016. University of Michigan. Storm drain labeling.

22. Comply with BMPs for Fleet Maintenance

Accomplishments.

- Ongoing. WCWRC.

23. Inspect Sanitary Sewer and Septic Systems for Elimination/Minimize Infiltration

Accomplishments.

- Ongoing. WCWRC.

24. Regularly Inspect and Maintain Storm Water System

Accomplishments.

- Ongoing. WCWRC.
- 2018-2019. City of Ann Arbor. Public and private detention basin inventory.
- 2017. City of Dexter. Storm and sewer asset management project.

25. Create Catch Basin Inspection/Maintenance Programs

Accomplishments.

- Ongoing. WCWRC.

26. Comply with BMPs for Municipal Landscaping Practices (i.e. Integrated Pest Management, Soil Testing, and Native Plantings)

Accomplishments.

- Ongoing. WCWRC. Conducted at some County properties.

27. Organize, Implement and Expand County Clean-up Programs

Accomplishments.

- Ongoing. WCWRC.

28. Inspect Facilities for Pollution Prevention

Accomplishments.

- Ongoing. WCWRC.

29. Implement the Pump Station Contingency Plan for Pump Station Flooding

30. Clean-Up Accident Spills and Establish Communications to Coordinate Efforts

Accomplishments.

- Ongoing. WCWRC.
- 2018-2019. City of Ann Arbor. Spill response team and fire department developed mobile trailer to better respond to spills.

31. Spay and Neuter Cats and Dogs to Reduce Feral Population and Decrease Habitat for the Local Canada Goose Population

32. Place Dog Bags in Local Parks

This program provides bags for pet waste clean-up in order to reduce pet waste in parks, subsequently reducing the amount of *E. coli* entering surface waters from pet waste.

Accomplishments

- Ongoing. This practice is now wide spread in City, Township, and County parks.

Managerial Actions: Studies and Inventories

33. Conduct Natural Features Inventories

The composition and condition of natural features throughout most of the watershed is virtually unknown. Conducting natural features inventories is the typical approach to gathering natural features information. Several dozen state-listed and federally-listed plant and animal species have been sighted in the watershed. The distribution and status of those species should be surveyed and management plans for their survival and sustainability developed. These species and the habitats that they need for survival can serve as bellwethers for how management of the Middle Huron Watershed is proceeding.

Accomplishments

- Ongoing. HRWC (Adopt-a-Stream, BioReserve Project., City of Ann Arbor (Natural Areas Programs))

34. Create a Geographic Information System (GIS) of Municipal Separate Storm Sewer Systems (MS4s)

GIS offers a universal tool for inventorying and manipulating data, producing accurate maps and associated databases, and provide a basis on which to develop comprehensive land use plans. As GIS data becomes more readily available to land use decision makers, incorporating information about critical natural resources, hydrology, and stormwater systems can more readily be incorporated into master plans and individual site plan reviews. GIS information can be incorporated into flow and water quality modeling and provide a framework for watershed-scale stormwater management. Lastly, GIS technology facilitates the transfer of information between agencies, governments and the public.

Accomplishments

- Ongoing. See #50.

35. Develop GIS for Road Drainage Facilities

Accomplishments.

- Ongoing. Washtenaw County Road Commissioner.

36. Construct and Monitor Strategic, Innovative BMPS, including permeable pavements and Vegetated Roofs, and Develop and Refine Standards Accordingly

Porous pavement can be made of concrete, stone or plastic and promote the absorption of rain and snowmelt. The most common type of porous pavement is paving blocks and grids which are modular systems that contain openings filled with sand and/or soil. Some pavers can support grass or other suitable vegetation providing a green appearance. Porous pavement can be effective in reducing the quantity of surface runoff for small to moderate-sized storms, and may also reduce the amount of pollutants associated with these events. Typically, these systems will work better when overlaid on sandy, permeable soils (as opposed to less permeable clay soils). Effectiveness of these pavements can be improved by maximizing the opening in the paving material and providing a sub-layer of at least 12 inches. This type of

pavement is particularly applicable for overflow and special event parking, driveways, utility and access roads, emergency access lanes, fire lanes and alleys.

Accomplishments

- Through approximately 2012. City of Ann Arbor has installed several areas with pervious pavement; Burns Park neighborhood, Sylvan Avenue between White and Packard Streets; parking lot by 5th and William; Willard Street. Sand (from snow and ice control) clogs the pavement however, and the City has moved away from this type of technology.
- 2018. HRWC's Swift Run project installed permeable pavements around raingardens.
- Early 2000s. City of Ann Arbor. A green roof was installed on Malletts Creek Branch Library and landscape was redone to reduce stormwater run-off.
- Ongoing. WCWRC.

37. Conduct Frog and Toad Survey

Accomplishments.

- Ongoing. City of Ann Arbor.

38. Continue water quality sampling and bio-monitoring, Expand to Monitor Strategic Points Along the Waterways, and Issue Annual Reports to the Public

A consistent dataset of water quality parameters, biotic indicators and stream flow is needed for a better understanding of conditions in the middle Huron River Watershed and to use as baseline when measuring conditions following implementation of recommended management alternatives. Further, pollutant removal efficiencies should be measured as part of any implementation project since the literature remains incomplete. Monitoring should include dry and wet weather events and seasonal variation over multiple years.

Accomplishments.

- Ongoing. HRWC. HRWC continues with water quality, biotic, and stream flow monitoring and continually expands sampling points and parameters as funding permits.

39. Continue Ford Lake Water Quality Monitoring

40. Investigate Whether There is Adequate Means for Fish to Pass through the Middle Huron River Tributaries and Dams

41. Study Locations to Identify Public Properties to Serve as Overflow and Diversion Points During High Water Periods

Managerial Actions: Public Information and Education

42. Create and Maintain a Public Education Campaign for Soil Erosion, OSDS, Illicit Discharge and Improper Disposal of Hazardous Wastes

An estimated 75% of the nonpoint source pollutants in the Huron River Watershed are the result of individual practices. Audiences need to include homeowners, local governments, riparian landowners, lake and home associations, commercial lawn care businesses, general businesses and services, and institutions. It is critical that these target audiences understand and respond to their impacts on the river system. Preventing pollutants from reaching the river is far more cost effective than waiting until restoration is required.

This project should target nonpoint source pollution prevention through traditional marketing outlets including print advertising, direct mail and retail promotions. Behaviors addressed by the campaign should include: proper lawn care practices; home toxics disposal; septic system maintenance; water conservation; storm drain awareness; land use; and pet waste. Market research would be used to determine core behavioral motivations and how to use these motivations to inspire behavior change. Messages would focus on items of interest to the homeowner, such as savings in time and money, with water quality protection positioned as an “added benefit.” Individual impacts should be stressed to empower homeowners with the message that “their actions do make a difference.” Consistency of messages across the watershed and repetition will be crucial to success of the campaign.

Accomplishments

- Ongoing. WCWRC.
- Ongoing. HRWC.
 - During the 1994 Watershed Plan Development Process, public education materials were developed and disseminated to promote involvement and support for river protection. These included a display used at public gatherings to engage the public one-on-one, and a citizens’ guide to nonpoint source pollution. The citizen’s guide provided pollution prevention and source control information. A series of presentations were made to local community boards and planning commissions in the Fall of 1994 to inform communities about the Ann Arbor-Ypsilanti Watershed Plan and gain support for implementation of its recommendations. All communities in the planning area passed resolutions supporting the plan, and committed to its implementation.
 - The Huron River Watershed Council’s Information and Education campaign has brought the message of water resource stewardship to individual households. Informational tip cards have been mailed to residents within Salem Township, the City of Ann Arbor and the City of Ypsilanti. The tip cards provide residents with the proper knowledge base to incorporate creek protection into everyday activities. Tip card topics include lawn fertilization, water conservation, septic system maintenance, hazardous material disposal and storm water runoff. Media outlets such as the Ann Arbor News and local radio have been used to convey and reemphasize these same messages.
 - Calendars produced every other year including water conservation, stormwater management, and energy saving tips.
 - Further action is explained in L, the Public Education Plan (PEP).
- 2007-2010. HRWC. Millers Creek Film Festival. Public invited to produce short films that highlight water quality issues in the Huron River, specifically phosphorus problems and discharge of hazardous waste; films are screened at the Michigan Theater; awards are given to the winners. Winning videos are here:
<https://www.youtube.com/playlist?list=PLFCFywdeWzv159qIYaS9LjQ8lY5Cq0vnT>
- Ongoing. University of Michigan. Storm drain public education and awareness campaign.

- 2015-Ongoing. Pittsfield Township. Septic system maintenance outreach and education.
- 2018-Ongoing. City of Ann Arbor stormwater infrastructure education and outreach campaign.
- 2019-Ongoing. SEMCOG One Water education campaign on stormwater, wastewater, and drinking water.
- 2012-Ongoing. Pittsfield Township. Fats, oils, and greases education and outreach campaign.
- 2019. Barton Hills Village. Water efficiency and usage education and outreach campaign.

43. Distribute Educational Handbooks on Municipal Ordinances and Citizen Stewardship for Local Government and Citizen Groups

44. Maintain Website for Watershed Education and Information

Accomplishments

- Ongoing. HRWC, City of Ann Arbor, WCWRC

45. Increase mass media (i.e. Radio, Television) and social networking efforts.

Accomplishments

- Ongoing. HRWC, City of Ann Arbor, WCWRC

46. Increase the Number of Environmental Articles in Local Media Sources

Accomplishments

- Ongoing. HRWC regularly works with MLive and NPR (both Michigan Radio and WEMU) to reach the public on a wide variety of monitoring, stormwater management, and water quality stories.
- Ongoing. WCWRC

47. Continue the Drain Commissioner's Field Inspection Division Apprenticeship Program

Accomplishments

- Ongoing. WCWRC

48. Continue to Offer Public Presentations and Workshops, such as WCDC's Land Use Presentations Series and Water Resource Workshops

Accomplishments

- Ongoing. WCWRC

49. Develop School Curriculum for Storm Water

Accomplishments

- Ongoing. WCWRC. Rain Garden lessons developed by WCWRC and in use by request.

50. Establish and Maintain GIS Database to Assist Hydraulic, Hydrologic, and Water Quality Modeling

A comprehensive study of the hydrology of the river system would provide an understanding of the interaction of precipitation, infiltration, surface runoff, stream flow rates, water storage, and water use and diversions. A hydraulics study would yield information about the river's velocity, flow depth, flood elevations, channel erosion, storm drains, culverts, bridges and dams. Information resulting from these studies would provide greater detail on the sources and causes of problems related to hydrology-induced erosion and flooding. The studies are prerequisite to identify the most appropriate management alternatives and best locations for practices that can restore the hydrology of the river and its tributaries.

Accomplishments

- Ongoing. Washtenaw County developed multiple GIS layers that are useful in local government agency and citizen watershed management practices.
- Ongoing. The City of Ann Arbor has establishing a comprehensive GIS and hydrologic model of the system within the city's jurisdiction.

51. Use Stormwater in Public Art Works such as Fountains, Sculptures, and Landscaping Water Features

Accomplishments

- 2011. City of Ann Arbor. Public art produced for the redesign of City Hall, bronze sculpture with blue glass pearls that light up in computerized variations as stormwater circulates over the sculpture's surface. Built in conjunction with a rain garden.

52. Initiate and Develop a Waterway Stewardship Program for Citizen Participation

Accomplishments

- Ongoing. HRWC.
 - The Adopt-a-Stream Program and the Water Quality/Flow program at HRWC have proved to be a powerful tool in raising public awareness and appreciation of local water resources in the project area. Through experience gained while sampling for life within the creeks, mapping waterways and surveying habitat, residents have become aware of the threats and impairments to water resources. In many cases, participants have become further involved in stewardship activities: founding creek groups, submitting input to local planning decisions, running for public office and participating in creek cleanups. Input from creek groups has been particularly instrumental in the development of this Watershed Plan. The water quality, habitat and bio-monitoring data collected by adopters has been analyzed and published. These reports have been disseminated to the public and to local decision makers to increase awareness of water quality threats and to enlist support for creekshed protection.
- Ongoing, WCWRC. Referring people to Shoreland Stewards and/or Waterfront Wisdom/H2O Hero as well as RiverSafe Home.

53. Use Opportunities Provided by Public Projects (i.e. Street/Sidewalk, Sewer and/or Culver Repair) to Provide Public Education and Enjoyment (i.e. Small Sitting Areas, Vestpocket Parks, and Signage Regarding BMPs)

Increased watershed education and watershed ethic among residents is needed along with a coordinated information and education campaign. Public participation and involvement programs are meant to be activities where people learn about the watershed and how to work together to control stormwater pollution.

Accomplishments

- 2014. City of Ann Arbor. Construction of “Canoe art” throughout City parks bordering on the Huron River.
- Ongoing. WCWRC. Rain Garden signage.

54. Train Staff to Implement and Enforce Soil Erosion/Sedimentation and IDEP Policies and Procedures

Accomplishments

- Ongoing. WCWRC. Staff trained as needed.
- Ongoing. Pittsfield Township. Staff trained as needed.
- Ongoing. Washtenaw County Road Commission. Staff trained as needed.

55. Educate Local Government Staff to Receive Pesticide Certification

Accomplishments

- Ongoing. WCWRC. Staff trained as needed. WCWRC is a certified pest applicator with the State.

4.2.5. Managerial Actions: Illicit Discharge Elimination

Illicit discharge detection and elimination requires: 1) the prevention, detection and removal of all physical connections to the storm water drainage system that conveys any material other than storm water; 2) the implementation of measures to detect, correct and enforce against illegal dumping of materials into to streets, storm drains and streams; and 3) implementation of spill prevention, containment, cleanup and disposal techniques of spilled materials to prevent or reduce the discharge of pollutants into storm water. Crews must be trained on how to identify illicit discharges and locate illicit connections. Although this effort can be labor intensive, the pay off is a reduction in the amount sanitary sewage and chemicals that enters surface waters.

Specific activities within an Illicit Discharge Identification and Elimination program include:

56. Identify and Eliminate Illicit Discharges and Connections

Accomplishments

- Ongoing. WCWRC.
- Ongoing. Pittsfield Township

57. Conduct dye testing for illicit connections for all new construction, whenever property changes ownership, or when water quality sampling or inspection programs show evidence of illicit connections or illegal discharges

Illicit discharge identification and elimination activities implemented by the communities in the Middle Huron River Watershed will dovetail with each community's MDEQ-approved Illicit Discharge Elimination Plan.

Managerial Actions: Coordination and Funding

58. Designate an Entity to Produce and Coordinate Technical Watershed-Wide Information

Accomplishments

- Ongoing. HRWC fulfills this role watershed wide per its mission.

59. Establish a Storm Water Advisory Committee and Public Involvement Programs for Creekshed Communities

Increased watershed education and watershed ethic among watershed residents is needed along with a coordinated information and education campaign. Public participation and involvement programs are meant to be activities where people learn about the watershed and/or work together to control stormwater pollution. These programs would be based on the following four objectives: 1) promote a clear identification and understanding of the problem and solutions; 2) identify responsible parties/target audiences; 3) promote community ownership of the problems and solutions; and 4) integrate public feedback into program implementation. To achieve these objectives the audience needs to be identified, the program carefully designed and the program effectiveness periodically reviewed.

Accomplishments

- 1994 and Ongoing. In 1994 the MDEQ established a Total Maximum Daily Load (TMDL) for phosphorus entering Ford Lake. The Huron River Watershed Council, working with State technical experts and local municipalities, developed the *Middle Huron Initiative Phosphorus Reduction Strategy for the Middle Huron River Watershed*. The initiative provides recommendations for best management practices along with cost estimates for implementation of the TMDL over a 5-year period. The initiative focuses on point and nonpoint source phosphorus initially, then takes a broader, phased approach for addressing other watershed concerns. The program includes monthly monitoring and annual reporting. All communities within the area served by this Watershed Plan have signed a Cooperative Partnership Agreement for phosphorus reduction. This agreement continues today through the (renamed) Middle Huron Partnership.

60. Continue Community Partners for Clean Streams (CPCS) and Promote Riversafe Homes

Accomplishments

- Ongoing. WCWRC.

- The CPCS program was developed and adopted in 1996 with funding under Section 319 of the Federal Clean Water Act, and is currently supported by the general fund of Washtenaw County as well as grant funds. Implementation of the program is ongoing and increasing. The RiverSafe Homes program is administered by WRWRC and encourages local residents to practice environmentally-friendly behavior that protects the Huron River Watershed. For participation, the program requires residents to follow practices that related to Home Toxics Disposal, Yard Care and Outdoor Housekeeping, Car and Vehicle Care, and Pet and Urban Wildlife Waste.

61. Coordinate OSDS inspection program with other communities and agencies

62. Encourage dam removal where opportunities exist

63. Collaborate with and Provide Technical Assistance to Sub-Watershed Groups

- Ongoing. Volunteers and other concerned citizens have established creek groups in Fleming, Malletts, Millers, Allens, Ford Lake and Traver Creeks. These five organizations developed by citizens and facilitated by the Huron River Watershed Council and the Washtenaw County Drain Commissioner's office, are active on the local level to promote stewardship of area creeks and Ford Lake. They have become regular participants in townships and city planning activities affecting water resources including:
 - Involvement in local decisions making: master planning, park planning, individual site plan review,
 - Drafting sub-watershed management plans that serve as a foundation for this update
 - Staffing informational tables at public events,
 - Submitting issues for print in local media
 - Developing and distributing public educational materials.
 - Note: Fleming and Malletts groups are still active as of 2019. The others have been on longer hiatuses but could be restarted as the need arose.

64. Establish a Single Unit in Local Government to Oversee Stormwater Management

Accomplishments.

- Ongoing. See #59 and the Middle Huron Partnership.

65. Review Construction Site Plans for Storm Water Enforcement and BMP

Recommendations

Community site plan review standards can be revised to include, if applicable, the 100-year floodplain, location of waterbodies and their associated watersheds, location of slopes over 12 percent, site soil types, location of landmark trees, groundwater recharge areas, vegetation types within 25 feet of waterbodies, woodlands and other vegetation on site, and site topography.

Accomplishments

- Ongoing. WCWRC internal rules.
- Ongoing. Pittsfield Township. Consistently reviewing and improving the soil erosion programs and storm water program.

66. Develop and Implement Creekshed and Watershed Management Plans

Accomplishments

- Ongoing. HRWC and project partners. Watershed Management Plans have been written for the creekshed level of Millers, Malletts, and Allens Creek. Broader Middle Huron Watershed Management Plans updated approximately every 10 years.

Managerial Actions: Vegetative

67. Protect and Restore Wetlands/Natural Areas

A restored wetland is the rehabilitation of a drained or degraded wetland where the soils, hydrology, vegetative community, and biological habitat are returned to the natural conditions to the greatest extent possible. A constructed wetland is a man-made wetland with more than 50% of its surface area covered by wetland vegetation. It is ideal for large, regional tributary areas (10 to 300 acres) where there is a need to achieve high levels of particulate and nutrient removal. Wetland size and configuration, hydrologic sources, and vegetation selection must be considered during the design phase. Constructed wetlands provide a suspended solid removal of approximately 70%, while nutrient removal capabilities vary widely (between 40% and 80%) because no standard design criteria exists. These wetlands also benefit the area by providing fish and wildlife habitat and aesthetic benefits.

Accomplishments

- 2009-2015. Domino Farms, Washtenaw County Parks partnered together on five different properties that translated to preservation of 160 acres of property.
 - Four of the five properties were in proximity to Marshall Park in Ann Arbor and University of Michigan's woods. This ultimately created the Friedman Preservation. This allowed the linkage between natural assets from all properties into one. At the completion of the project, there will be over four miles of continuous pathways. The final property is an 83 acre preserve off Dixboro and Warren. It is adjacent to a creekbed with a 100-foot conservation easement on the north and west banks.
- Ongoing. City of Ann Arbor Green Belt Program.
- 2010-Ongoing. Salem Township. Salem Township reports that they are actively pursuing properties to conserve and protect. Just recently they worked with the Washtenaw County Parks and Rec as well as the Green Belt to preserve 25 acres on Curtis and Brookfield Road. The township also owns 235 acres of property that is an active farm. There are many preserved farms in the township that are active farms, often preserved through the Green Belt Program.

68. Plant and Promote Rain Gardens

The term "rain garden" refers to a constructed depressed area of land that is used as a landscape tool to improve water quality. Rain gardens should be placed strategically to intercept water runoff, and typically are placed beside impervious surfaces such as driveways, sidewalks, or below downspouts. Rain gardens are designed to allow for ponding of the first flush and

increased infiltration. Nutrient removal occurs as the water comes into contact with the soil and the roots of the trees, shrubs or other vegetation, as such plant choices should center on native wildflowers and grasses that are adapted to local conditions. A rain garden can be as simple to establish and maintain as a traditional garden.

Accomplishments

- Ongoing. HRWC, WCWRC, City of Ann Arbor, Salem Township all have built and maintain rain gardens around the Watershed region. As we are able, they are listed here:
 - Ongoing. WCWRC's resident rain garden program (>700 homeowners)
 - Ongoing. WCWRC
 - Miller Avenue
 - Swift Run Streetside Rain Gardens
 - Ongoing. WCWRC School Raingardens
 - ACCE in Ypsilanti
 - Ann Arbor STEAM at Northside
 - Bach Elementary in Ann Arbor
 - Bates Elementary in Dexter
 - Clague Middle School in Ann Arbor
 - Eberwhite Elementary in Ann Arbor
 - Estabrook Elementary in Ypsilanti
 - Holmes Elementary in Ypsilanti
 - Huron High School in Ann Arbor
 - King Elementary in Ann Arbor
 - Lawton Elementary in Ann Arbor
 - Pattengill Elementary in Ann Arbor
 - Summers Knoll in Ann Arbor
 - Ypsilanti Community High School
 - Ongoing. U-Michigan.
 - City of Ann Arbor Municipal Center
 - Stone School roadside rain gardens
 - Great Lakes Garden at Matthei Botanical Gardens
 - University of Michigan Kellogg Eye Center Courtyard.
 - 2010. HRWC.
 - Prairie and Plymouth.
 - Thurston Elementary School.
 - Mitchell Elementary school
 - Forestbrooke Swim Club
 - Swift Run Streetside
 - 2019. Salem. Salem Township office.

69. Protect, restore, and maintain grassed swales

Grassed swales are open channel management practices designed to treat and attenuate stormwater runoff. As stormwater runoff flows through these channels, it is filtered first by the vegetation in the channel, then through a subsoil matrix, and finally infiltrates into the underlying soils. Grassed swales are improvements on the traditional drainage ditch and are well suited for treating highway or residential road runoff. Grassed channels are the most similar to a conventional drainage ditch, with the major differences being flatter side and longitudinal slopes and a slower design velocity for water quality treatment of small storm events. The type and coverage of vegetation grown in the swales will influence pollutant treatment. Pollutant reduction values in this analysis assume the use of well-established turf grasses consistent with

traditional residential settings. Other plantings may provide greater pollutant reduction, but may also alter conveyance hydraulics.

Accomplishments

- 2009. City of Ann Arbor. West Park renovations; bioswales built to catch stormwater (Allens Creek)

70. Protect and Manage Roadside Vegetation

- Ongoing. Washtenaw County Road Commission.

71. Plant buffers along sensitive areas

72. Ensure minimum disturbance of soils and vegetation

Accomplishments

- Ongoing. WCWRC.

73. Reduce Turf by Planting Shrubs and Trees

Unlike conventional turfgrass, native trees, shrubs and grasses have extensive, deep root systems that can improve stormwater infiltration. Research of stormwater runoff from various land surfaces indicates that runoff coefficients from turfgrass can more closely resemble runoff coefficients for paved areas due to the shallow root structure of turfgrass and more compacted soils on which it grows. A popular technique for reducing turf is to use native landscaping for attractive borders. Because native plants have adapted to local soils and pests, they require less watering and need no chemicals or fertilizers to protect them. So less turfgrass can mean cost savings.



*Replacing turfgrass with native plants increases infiltration
Photo: Center for Watershed Protection*

Accomplishments

- Ongoing. WCWRC, City of Ann Arbor. Tree planting projects. Native plant promotion.
- 2017-Ongoing. Pittsfield Township. Residential tree planting program.
- 2019. Ann Arbor Public Schools. Tree planting grant project.

74. Stabilize priority streambeds

Habitat restoration techniques include in-stream structures that may be used to correct and/or improve fish and wildlife habitat deficiencies over a broad range of conditions. Examples of these techniques include: channel blocks, boulder clusters, covered logs, tree cover, bank cribs, log and bank shelters, channel constrictors, cross logs and revetment and wedge and “K” dams.

The majority of these structures require trained installation with hand labor and tools. After construction, a maintenance program must be implemented to ensure long-term success of the habitat structures. In areas that experience high stormwater peak flows, in-stream habitat restoration should be installed after desired flow target is reached, to ensure the success of the habitat improvement project.

Accomplishments:

- 2010. City of Ann Arbor. Extensive stabilization of Millers Creek along Huron Parkway from Hubbard Road to Glazier Way.
- 2014. City of Ann Arbor. Extensive stabilization of Millers Creek downstream of Huron High School.
- 2020-2021. City of Ann Arbor/WCWRC. Stabilization of Millers Creek in some of the very steep, upstream tributary areas.(Pepper Pike project)
- 2014. WCWRC, City of Ann Arbor. Extensive stabilization of Malletts Creek near Chalmers Road.
- 2012. WCWRC. Leslie Park Golf Course restoration project.
- 2019-Ongoing. WCWRC, City of Ann Arbor. Huron Hills Golf Course stream bank stabilization project.
- 2019-Ongoing. University of Michigan, City of Ann Arbor, HRWC. School Girls Glen restoration and stabilization project.
- 2015-2017. Ann Arbor Township. Stream restoration project near Dominos Farms.
- 2013-2014. Ypsilanti Township. Willow Run Plant restoration project.

75. Protect, stabilize and restore stream banks and channels through engineering/ bio-engineering

Soil erosion control is the process of stabilizing soils and slopes in an effort to prevent or reduce erosion due to storm water runoff. Source areas are construction sites where soil has been disturbed and exposed, streambanks that are eroding due to lack of vegetation and an excess of peak flows during storm events, and road crossing over streams where the integrity of the structure is compromised or where the road itself contributes gravel or dirt. Soils can be stabilized by various physical or vegetative methods, while slopes are stabilized by reshaping the ground to grades. Both techniques will improve surface drainage and reduce the amount of soil eroding from a site. In areas where development activity is underway, it is important to emphasize the Soil Erosion and Sediment Control ordinance inspection and enforcement, which often entails hiring an adequate number of field staff.

Managerial Actions: Structural

76. Install inlet filters

77. Construct New Storm Water Facilities and Retrofit Existing Storm Water Facilities to Detain First Flush and Bank Full Storms and Remove Sediment.

Stormwater infiltration basins are any stormwater device or system, which causes the majority of runoff from small storms to infiltrate into the ground rather than be discharged to a stream. Most infiltration devices also remove waterborne pollutants by filtering water through the soil. Stormwater infiltration can provide a means of maintaining the hydrologic balance by reducing

the impacts of impervious areas. Infiltration devices can include any of the following: basins, trenches, permeable pavement, modular pavement or other systems that collect runoff and discharge it into the ground. Infiltration devices should only be used on locations with gentle slopes, permeable soils and relatively deep water tables and bedrock levels. In new developments, permeable soil areas should be preserved and utilized as stormwater infiltration areas.

Extended wet detention ponds, or wet ponds, are constructed basins designed to contain a permanent pool of water in order to detain and settle stormwater runoff. The primary pollutant removal mechanism is settling as stormwater resides in the pool and pollutant uptake occurs through biological activity in the pond. Wet ponds are among the most cost-effective and widely used stormwater practices. A sediment forebay should be incorporated into the pond design, which promotes increased settling of sediments and helps prevent outlet clogging. Landscaping design requirements should include a natural vegetated buffer around the pond to increase aesthetics, reduce pollutants entering the area, and discourage goose habitation. Studies indicate that wet ponds may outperform dry detention basins for nutrient and sediment removal, and dry detention basins do not treat first flush stormwater.

Accomplishments

- 2011-2013. WCWRC. Extensive stormwater work conducted in Malletts Creek watershed at Mary Beth Doyle Park and County Farm Park; increasing stormwater capture, infiltration, vegetated buffers.
- 2011. WCWRC. Pioneer High School underground detention basin.
- 2011. University of Michigan. Palmer Drive Cistern. 1 million gallon cistern built beneath the Life Science Institute managing runoff from 60 acres of central campus.
- 2013. City of Ann Arbor. Fourth Street infiltration trench.
- 2018. University of Michigan. Underground detention put beneath the “Diag” portion of campus.
- 2018. City of Ann Arbor. Capital project to rebuild ten storm water detention ponds.
- 2016. University of Michigan. Ross School of Business infiltration system project.
- 2017-2019. University of Michigan. State Street/Central Campus infiltration basin project.
- 2017-2019. University of Michigan. Ingalls Mall infiltration system project.
- 2017-2019. University of Michigan. Monroe Mall infiltration system project.
- 2017-2018. Michigan Department of Transportation, Ann Arbor Township. Highway detention pond project.

78. Install/Retrofit Water Quality Sumps into Catch Basins, including Regular Maintenance and Cleanout

A catch-basin is an inlet to the storm drain system that typically includes a grate or curb inlet and a sump to capture sediment, debris, and associated pollutants. A number of proprietary technologies are now available to augment the pollutant capture of these systems. These technologies generally employ additional sump chambers to enhance the capture of solids, and many employ filtering media to capture additional pollutants or fractions of the pollutant inflows. The generic term “catch-basin inserts” is used here to describe a variety of in-sump or in-line designs.

Accomplishments

- Ongoing. City of Ann Arbor.

79. Complete Ford Lake Nuisance Algae Pilot Project, Engineering Implementation Project and Oxygen Injection Equipment

Accomplishments

- 2007. Ypsilanti Township, HRWC, University of Michigan. This study was conducted in under the direction of Dr. John Lehman. Oxygen injection was successful in reducing nuisance algae production; however, cost of spreading this throughout the lake has prevented wide-spread adoption in the time since. Instead, Ford Lake dam operators pulls bottom water from the lake if flow permits, allowing for a constant mixing that does suppress algae production in Ford Lake.

80. Prioritize and Execute Infrastructure Repairs to Drains and Tributaries and Expand Removal of Sediment Islands to County Drains

Accomplishments

- Ongoing. WCWRC.

81. Stabilize Roads and Bridges

The gravel and sand/gravel composite used for road surface can be the source of sediment pollution to surface waters when precipitation washes it into the stream or when road grading builds piles of the surface along the sides of the road. Stabilization of the eroding road and bridge surfaces at the sites identified in the field inventory may involve structural techniques such as retrofitting the bridge to prevent runoff from entering the stream or managerial techniques such as altering grading practices and selecting a different road and bridge surface. Local units of government, specifically the townships, will need to work through the county governments to implement this practice.

Accomplishments

- Ongoing. Washtenaw County Road Commission.

82. Construct appropriate recreational access points to reduce erosion and protect banks and shorelines. Engage livery and marina operations to establish no wake zones and similar managerial BMPs to properly control erosion associated with recreational uses

In order to encourage public awareness and concern for rivers, streams and wetlands, it is important to increase opportunities for people to access these water resources. If provided with aesthetic and accessible, well-advertised recreational areas - be it a canoe livery, a fishing pier, or a trail system - the public will be able to experience the human benefits that the water offers and in turn, may want to work to protect the resource. First, the designated and desired uses must be restored so that it is safe for the public to use the resource in the manner it is intended; i.e., reduce sediment in order to construct a canoe livery. Then, the recreational amenity can be planned, built and promoted.

Accomplishments

- Ongoing. HRWC. Through HRWC's River Up project, HRWC improves recreational access points to make them safer and reduce erosion.

- 2015. Washtenaw County Road Commission, University of Michigan. Fleming Creek trail improvement project.

83. Daylight Streams, where Technically Feasible and Cost-Effective

84. Modify Roof Drain of Directly Connected Impervious Areas

Accomplishments

- Ongoing. WCWRC's Rain Garden program.

85. Inventory Opportunities and Promote LID (i.e. Rain Gardens, Rain Barrels, Green Roofs, Porous Pavement)

Land use planning and management involves a comprehensive planning process to promote Low Impact Development (LID) and control or prevent runoff from developed land uses. LID is a low cost alternative to traditional structural stormwater BMPs. It combines resource conservation and a hydrologically functional site design with pollution prevention measures to reduce development impacts to better replicate natural watershed hydrology and water quality. Through a variety of small-scale site design techniques, LID reduces the creation of runoff, volume, and frequency. Essentially, LID strives to mimic pre-development runoff conditions. This micro-management source control concept is quite different from conventional end-of-pipe treatment or conservation techniques. The LID planning process involves the following steps: 1) determine water quality and quantity goals with respect of human health, aquatic life and recreation; 2) identify planning area and gather pertinent hydrological, chemical and biological data; 3) determine and prioritize the water quality needs as they relate to land use and the proposed development; 4) develop recommendations for low impact development to address the problems and needs that have been previously determined; 5) present recommendations to a political body for acceptance and 6) implement adopted recommendations.

Accomplishments

- 2009 and 2010. HRWC. HRWC facilitated a public sale of Rain Barrels for two years.
- Ongoing. WCWRC, City of Ann Arbor. Rain Garden program.

86. Construct BMP demonstration sites on both private and public lands

- Ongoing. WCWRC, City of Ann Arbor. Rain Garden program.
- Ongoing. HRWC's rain garden projects (#68) are always demonstration sites and include signage.