

7. Watershed Protection Tools



River Quote

“Water is the most critical resource issue of our lifetime and our children’s lifetime. The health of our waters is the principal measure of how we live on the land.”

- Luna Leopold

Overview

Watershed protection requires a series of tools to protect or restore aquatic resources. Many tools are available and some of these are discussed below. Different subwatersheds may require different combinations of these watershed tools.

Watershed Planning

Watershed planning is an overall tool which examines the characteristics of a watershed, including its geology, hydrology, land use, development, demographics and water quality. This data is typically broken down into smaller subwatershed units for effective and efficient planning and actions. A watershed plan may include:

- A prediction of how water resources will react to future land use changes.
- A public consensus on desired goals or uses within the watershed.
- A plan to meet the designated uses and desired goal within the watershed.
- A plan to reduce or abate current or future impervious cover.
- An action plan to select combinations of watershed protection tools for subwatersheds.
- The framework for a sustainable watershed management plan.

Land Conservation

This tool focuses on the conservation of five critical land types:

- Critical Habitats
- Aquatic Corridors
- Hydrologic Reserve Areas
- Water Hazards
- Cultural/Historical Areas

Conservation of these land types helps protect the existing water quality from degradation and encroachment onto these important critical land types. These land types may not occur in every subwatershed, but are likely to occur somewhere in the watershed or basin you are working in. There are several techniques for conducting land conservation which include: land acquisition, conservation easements, regulation of land alteration, setback of water pollution hazards, protection of green space within open space design, landowner stewardship, and public sector stewardship. Conducting land conservation efforts will require community coordination and an examination of the critical resources that are important to protect a subwatershed level.

Several programs are available locally that conduct land conservation efforts including the following:

Michigan Conservation Districts

Michigan’s Conservation Districts are “unique” local resource management agencies that coordinate and implement resource and environmental programs utilizing state, federal and private sector resources. The guiding philosophy of the Conservation Districts is that decision on conservation issues should be made at the local level, by local people and interests, with



technical assistance provided by the government. The Conservation Districts carry out many diverse programs, including programs that deal with land management, erosion control, flood prevention, water use, groundwater, farms, forestry, wildlife, water quality, recreation, and community development. Contact information for local conservation districts can be found at <http://www.macd.org/>.

Natural Resources Conservation Service

The Natural Resources Conservation Service (NRCS) works hand-in-hand with the American people to conserve natural resources on private lands. They help land-users and communities approach conservation planning and implementation with an understanding of how natural resources relate to each other and to all of us and how our activities affect these resources. The NRCS has several conservation programs, including: the Environmental Quality Incentives Program, the Wildlife Habitat Incentives Program, the Wetlands Reserve Program, the Farm and Ranch Land Protection Program, the Grassland Reserve Program, the Conservation of Private Grazing Land Program, the Conservation Security Program, the Resource Conservation and Development Program, and the Conservation Reserve Program. More information of the NRCS can be found at <http://www.nrcs.usda.gov/>.



The Nature Conservancy

The Nature Conservancy's (TNC) mission is to preserve the plants, animals and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive. TNC has developed a strategic, science-based planning process, called Conservation by Design, which helps them to identify the highest-priority places that, if conserved, promise to ensure biodiversity over the long term. In other words, Conservation by Design allows TNC to achieve meaningful, lasting conservation results. The TNC website is located at <http://nature.org/>.



Michigan Department of Agriculture's Conservation Reserve Enhancement Program

The Michigan Department of Agriculture's (MDA) Conservation Reserve Enhancement Program was created to help protect our environment and wildlife. Michigan is partnering with the federal government to implement conservation practices of great significance to the state and value to the nation in matters of soil erosion, water quality, and wildlife habitat. Information on the program can be obtained through the MDA website at <http://www.michigan.gov/mda/>.



Michigan Department of Natural Resources

The Michigan Department of Natural Resources (MDNR) is responsible for the stewardship of Michigan's natural resources and for the provision of outdoor recreational opportunities; a role it has relished since creation of the original Conservation Department in 1921. Federal funds support programs for wildlife and fisheries habitat and development, forest management, recreation and other natural resource efforts. The MDNR's website is located at <http://www.michigan.gov/dnr/>.



US Fish and Wildlife Services

The goal of the U.S. Fish and Wildlife Services is to work with the public and government agencies to conduct an environmental review for habitat protection and restoration, environmental contaminants, and federally threatened and endangered species. The agency's website is located at <http://www.fws.gov/>.





Pheasants Forever

Pheasants Forever is a non-profit conservation organization dedicated to the protection and enhancement of pheasant and other wildlife populations in North America. This mission is carried out through habitat improvement, land management, public awareness, and education. The organization's website is located at <http://www.pheasantsforever.org/>.



Ducks Unlimited

The Ducks Unlimited Great Lakes/Atlantic Regional Office, located in Ann Arbor, MI and established in 1998, provides comprehensive conservation solutions to help restore and protect diminishing wetlands in 18 states, from Wisconsin to Virginia and north to Maine. The organization's website is located at <http://www.ducks.org/>.



Trout Unlimited

Trout Unlimited's mission is to conserve, protect and restore North America's trout and salmon fisheries and their watersheds. TU accomplishes this mission on local, state, and national levels with an extensive and dedicated volunteer network. The organization's website is located at <http://www.tu.org/>.



Aquatic Buffers

The aquatic corridor, where land and water meet, needs special protection in the form of buffers. Aquatic buffers may be used along streams, rivers, lakes, ponds, and wetlands. It functions to 1) reduce the amount of pollutants entering waterbodies through filtration and uptake of pollutants and 2) protect waterbodies from encroachment. Aquatic buffers can also provide habitat corridors and protection of floodplains from impervious development.



USDA National Agroforestry Center

The USDA National Agroforestry Center conducts research on how to design and install forested buffers to protect water quality, and develops and delivers technology on a broad set of agroforestry practices to natural resource professionals who directly assist landowners and communities. The center's website is located at <http://www.unl.edu/nac/>.



Michigan State University Extension

The Michigan State University Extension focuses on bringing knowledge-based educational programs to the people of the state to improve their lives and communities. Today, county-based staff members, in concert with on-campus faculty members, serve every county with programming focused on agriculture and natural resources; children, youth and families; and community and economic development. The program's website is located at <http://www.msue.msu.edu/home/>.



Better Site Design

Better site design incorporates a number of best management practices in conjunction with sustainable development when designing a subdivision or portion of a community. This has been used in Michigan in several locations with great success. The key to this type of design is that it can reduce impervious cover by 10% to 50% (CWP, 1998). Design strategies that have a good application in watershed protection include: Open Space Residential Subdivisions, Green Parking Lots (minimized impervious

surfaces), Headwater Streets (decreased street widths with decreasing average daily trips), and Rooftop Runoff Management.

Erosion and Sediment Control

Erosion and sediment control is a critical tool that the watershed group uses to protect waters from sedimentation. The potential impacts to waterways are increased by removal of trees and topsoil, exposed soils, alteration of drainage patterns, and disturbing sensitive areas. Many Michigan communities have existing programs, but they are understaffed and under enforced. Steps such as ensuring the use of buffer strips, reducing sediment loads, and maintaining the boundary of conservation areas and buffers are important. Conducting a good erosion and sediment control program is a critical component of effective watershed protection.

Part 31 of Public Act 451 is known as Permit by Rule. Permit by Rule is administered by the Michigan Department of Environmental Quality (MDEQ) and requires any land disturbance greater than 5 acres to obtain a Notice of Coverage in addition to a soil erosion control permit from the local county enforcing agents (CEA) or municipal enforcing agents (MEA). These agencies are identified in the box on the right-hand side of the page.

Part 91 of Public Act 451 is administered by the CEAs and requires that a permit be obtained for any land disturbance greater than 1 acre.

To contact the MDEQ about the Permit by Rule program, use the following contact information:

Michigan Department of Environmental Quality
Water Bureau, Storm Water Administration
PO Box 30657
525 West Allegan, 2nd Floor
Lansing, MI 48909-8157

Storm Water Best Management Practices

As described by the US Environmental Protection Agency (EPA), storm water nonpoint source pollution has a significant impact on water quality in the United States. To reduce this impact, it is important that watershed protection measures include examining best management practices (BMPs) used to reduce the amount of pollution that is entering receiving water bodies. Since development causes hydrological changes in the watershed, BMPs must also be chosen to mitigate this effect. A number of BMP types are presented below:

- Erosion and Sediment Control systems - These include silt fences, catch basin inserts, and many other systems/actions that reduce erosion at the source and/or trap traveling sediments.
- Infiltration systems - These include basins and swales that are designed to allow storm water runoff to slowly percolate into the soil. The primary benefits of these systems are runoff volume reduction and pollutant removal, specifically total suspended solids (TSS), phosphorus (P), nitrogen (N), and metals.
- Filtration systems - These include bioretention, sand filters, and filter strips. The primary benefit of these systems is pollutant removal, specifically TSS, P, N, and metals.



MEAs

City of East Lansing
2000 Meritt Road
East Lansing, MI 48912
517-337-9459

City of Lansing
Public Service Department
7th Floor City Hall
124 W. Michigan Ave.
Lansing, MI 48893
517-483-4455

CEAs

Clinton County Drain Commissioner
Clinton County Courthouse
100 East State Street, Suite 2300
St. John's, MI 48879
989-224-5160

Eaton County Drain Commissioner
1045 Independence Blvd
Charlotte, MI 48813
517-543-7500

Ingham County Drain
Commissioner
707 Buhl Drive
Mason, MI 48854
517-676-8395



MSU Green Roof



Street Sweeping



- Vegetated Swales / Wetlands – These systems are designed to attenuate and reduce runoff in addition to removing pollutants such as TSS, P, N, and metals.
- Retention systems – These systems include specialized ponds and function in a similar fashion to infiltration systems in that the total volume of storm water runoff is reduced. These systems typically provide some benefits for pollutant removal, principally TSS.
- Detention systems – These systems include basins and vaults that are typically dry and are designed primarily to attenuate runoff discharge but may provide some pollutant removal benefits, specifically TSS.

The BMP types discussed above are classified as either vegetative or structural. Vegetative BMPs are those that use vegetation to slow runoff, infiltrate stormwater, and/or filter pollutants. Structural BMPs include those that are hard-engineered (meaning they are typically constructed of concrete or steel). Other BMPs typically fall under the ‘managerial’ category. These BMPs typically aim to reduce pollution by standardizing environmentally responsible activities and educating people about environmental issues and proper actions. These BMPs include such things as ordinances, household hazardous waste programs, and street sweeping.

Non-Storm Water Discharges

Non-storm water discharges include discharges from septic systems, sanitary sewers, and others such as industrial NPDES discharges, and manure runoff to name a few. This tool is used to evaluate the need for septic system inspections, failing septic system repairs, ordinance changes, spill prevention, and identifying and removing illicit connections.

Watershed management planning being conducted through the Michigan watershed permit program are already developing and implementing an illicit discharge elimination plan, or IDEP, which is examining the storm sewer systems and other waterways for illicit discharges and connections.

This watershed management plan is also examining current septic system issues and will make recommendations for future improvement in local planning, installation and maintenance operations. This is discussed earlier in Section 3.

Watershed Stewardship Programs

Watershed stewardship is the community investment of time and resources to promote public understanding and awareness of watershed issues. A number of programs are available to consider when selecting a method to promote watershed stewardship including:

- Watershed Advocacy
- Watershed Education
- Pollution Prevention
- Watershed Maintenance
- Indicator Monitoring
- Restoration

These programs provide different ways to promote watershed stewardship, depending on the number, education level, and watershed education level of the community members. One or more of these programs may be used as tools in implementing a watershed management plan.

There are many programs that promote watershed, including the following.

The Michigan Department of Agriculture

Information on the following programs can be obtained through the MDA's website at <http://www.michigan.gov/mda/>.

The Michigan Groundwater Stewardship Program

The goal of the Michigan Groundwater Stewardship Program (MGSP) is to provide information and assessment tools for pesticide and nitrogen fertilizer users which help them identify risks to groundwater associated with their pesticide and nitrogen fertilizer use practices and to coordinate local, state, and federal resources to help individuals reduce those risks. The MGSP is designed to be voluntary, to be locally driven, to address the concerns of individuals, and to maintain a focus on the financial and technical constraints which drive real-world decisions.



Farm*A*Syst

Farm*A*Syst identifies potential risks posed by farmstead operations. Technical assistance with completing Farm*A*Syst evaluations is available free of charge from the Michigan Groundwater Stewardship Program.

Home*A*Syst

Home*A*Syst is a household assessment tool that can be used to help identify risks and provide information on how to lower your risks to groundwater contamination around the home. Home*A*Syst helps protect your drinking water, the environment, your health, and the health of your family.



Field*A*Syst

Field*A*Syst is a series of worksheets and fact sheets that help identify and offer ways to reduce the risk of groundwater contamination associated with pesticide and nitrogen fertilizer use. Just like Farm*A*Syst, the Field*A*Syst program is voluntary and confidential.

Abandoned Well Closures

The objective of abandoned well closure is to reduce the risk of contaminants moving down an abandoned well and contaminating groundwater supplies. Farmers may qualify for technical assistance and cost-share through the Michigan Groundwater Stewardship Program. Stewardship Teams determine local cost-shares, which are often as high as 75 to 90 percent of the total cost.

Groundwater Stewardship Practices

There are many practices that can be implemented on the farm that can reduce the risk of groundwater contamination. Types of practices that may be available include: abandoned well closures, nitrate testing, sprayer tips, rotational grazing, backflow devices, manure testing, and spill kits.

Right to Farm Act

The Michigan Right to Farm Act, P.A. 93, was enacted in 1981 to provide farmers with protection from nuisance lawsuits. This state statute authorizes the Michigan Commission of Agriculture to develop and adopt

Silviculture is the science, art and practice of caring for forests with respect to human objectives.



Generally Accepted Agricultural and Management Practices for farms and farm operations in Michigan. These voluntary practices are based on available technology and scientific research to promote sound environmental stewardship and help maintain a farmer's right to farm.

The Farmland and Open Space Preservation Program

The Farmland and Open Space Preservation Program consists of methods for preserving farmland and open space.

Michigan's Biosolids Program

When treated and processed, sewage sludge becomes biosolids which can be safely recycled and applied as fertilizer to sustain, improve, and maintain productive soils and stimulate plant growth. Michigan's Biosolids Program encourages the use of Biosolids to enhance agricultural and silvicultural production in Michigan. Biosolids are also used to provide nutrients and soil conditioning in mine reclamation projects, tree farms, and forest lands.

Michigan Agriculture Environmental Assurance Program

Michigan's Agriculture Environmental Assurance Program teaches effective land stewardship practices that comply with state and federal regulations and shows producers how to find and prevent agricultural pollution risks on their farms. The program is designed as a multi-year program allowing producers to meet personal objectives, while best managing both time and resources.

Organic Farming

Organic farming is widely recognized as an alternative to conventional or chemical farming. In September, 1998, the MDA Director created the Michigan Organic Advisory Committee. This Committee was charged with developing a strategic plan: serving as a framework for advancing a system of production, processing and marketing products of organic agriculture in Michigan.

The Michigan Department of Environmental Quality

Information on the following programs can be obtained through the MDEQ's website at <http://www.michigan.gov/deq/>.

Groundwater: Drinking Water

The MDEQ has primary enforcement authority in Michigan for the Federal Safe Drinking Water Act under the legislative authority of the Michigan Safe Drinking Water Act. The MDEQ also investigates drinking water well contamination, and oversees remedial activities at sites of groundwater contamination affecting drinking water wells.

Groundwater: Michigan Groundwater Discharge Program

The Groundwater Program regulates discharge to groundwater under Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451 and Part 22 Rules.

Groundwater: The Michigan Wellhead Protection Program

This program assists local communities utilizing groundwater for their municipal drinking water supply systems in protecting their water source.

Groundwater: Groundwater Modeling Program

The Groundwater Modeling Program has provided groundwater modeling support on a department-wide basis since 1980 when an EPA grant was used to fund the use of groundwater models for site remediation.

Surface Water: Inland Lakes and Streams

The State's water resources are monitored by the Department of Environmental Quality and partnering organizations to determine water quality, the quantity and quality of aquatic habitat, and the health of aquatic communities, and compliance with state laws.

Surface Water: The Surface Water Enforcement Unit

The Surface Water Enforcement Unit is responsible for conducting all escalated enforcement actions taken by the division. These actions are conducted in response to violations of state water pollution control statutes and rules, violations of surface water discharge permits, and any violations of administrative or judicial orders.

Surface Water: Nonpoint Source Program

The Nonpoint Source Program offers grants and technical assistance and develops information and educational materials to help protect and improve Michigan's lakes and streams.

Surface Water: Water Quality Trading Program

The State of Michigan is developing a statewide water quality trading program. Water quality trading will allow facilities facing high pollution control costs to meet their regulatory obligations by purchasing environmentally equivalent pollution reductions from another source at lower cost, thus achieving the same water quality improvement at lower overall cost.

Surface Water: Michigan Biosolids & Industrial Pretreatment Program

To further preserve and protect Michigan's water resources, the Michigan Department of Environmental Quality encourages and enforces the use of wastewater treatment systems through the use of Biosolids and the Industrial Pretreatment Program.

Surface Water: Water Management

The MDEQ regulates activities that may have potential impacts to the public trust, riparian rights, or may impair or destroy the waters or other natural resources of the state, including inland lakes and streams, the Great Lakes, wetlands, and groundwater.

Surface Water: Michigan Water Quality Monitoring

The MDEQ has several water quality monitoring programs that assist in keeping all of Michigan's waters clean. These programs include Beach Water Monitoring, Assessment of Michigan Waters, Inland Lakes Monitoring, and Public Swimming Pool Monitoring.

Surface Water: Emergency Response

The MDEQ is responsible for implementing the Part 5 Rules - Spillage of Oil and Polluting Materials. The Part 5 Rules deal with the storage and release of oil, salt, and polluting materials.

Surface Water: The MDEQ/USACE "Joint Permit Application"

There is a package that covers permit requirements pursuant to state and federal rules and regulations for construction activities where the land meets the water and including wetlands, often referred to as the land/water interface.

Michigan Environmental Council

The Michigan Environmental Council (MEC) provides a collective voice for the environment at the local, state and federal levels. Working with





MSU WATER



Local Nature Centers

Audubon Society of Michigan
6011 W. St. Joseph Hwy.
Lansing, MI 48917
<http://www.michiganaudubon.org/>

Fenner Nature Center
2020 Mount Hope Rd.
Lansing, MI 48917
<http://parks.cityoflansingmi.com/fenner/fnc.html>

Harris Nature Center
3998 Van Atta Rd.
Okemos, MI 48864

Rails to Trails Conservancy
319 W. Homes Rd., Suite 145
Lansing, MI 48910
<http://www.railtrails.org/default.asp>

Woldumar Nature Center
5739 Old Lansing Rd.
Lansing, MI 48910
<http://www.woldumar.org/>

member groups and their collective membership of nearly 200,000 residents, MEC is addressing the primary assaults on Michigan's environment; promoting alternatives to urban blight and suburban sprawl; advocating for a sustainable environment and economy; protecting Michigan's water legacy; promoting cleaner energy; and working to diminish environmental impacts on children's health. The MEC website is located at <http://www.mecprotects.org/>.

Mid-Michigan Environmental Action Council

MID-MEAC is a non-profit environmental organization dedicated to improving the environment and quality of life by raising environmental consciousness and activism. MID-MEAC conducts storm drain labeling, water quality monitoring, tree plantings, youth programs, and trail and greenway planning. The MID-MEAC website is located at <http://www.midmeac.org/>.

Michigan State University Watershed Action through Education and Research

The Michigan State University Watershed Action through Education and Research group provides watershed education, outreach and research. This includes local school mentoring program, seminars, research, and data. The group's website is located at <http://www.msu-water.msu.edu/>.

Michigan Turfgrass Environmental Stewardship Program

The mission of the Michigan Turfgrass Environmental Stewardship Program is to advance the environmental stewardship of Michigan's golf industry by increasing the awareness and understanding of environmental issues, ensure regulatory compliance, and recognize stewardship achievements. The program's website is located at <http://www.mtesp.org/>.

Michigan Nature Centers

Nature Centers are either privately or locally funded entities that focus on research, recreation, and, education. The State of Michigan has approximately 72 nature centers. The MDEQ lists the nature centers in the State of Michigan, which can be found at [http://www.michigan.gov/deq/under "Key Topics" → "Environmental Education"](http://www.michigan.gov/deq/under/Key+Topics/Environmental+Education).

The Groundwater Foundation

The Groundwater Foundation focuses on educating people and communities about the importance of groundwater and how to protect it. The foundation's Groundwater Guardian program assists communities in organizing a team and developing result oriented activities that focus on education, pollution prevention, public policy, conservation, and best management practices. More information about the Groundwater Foundation can be found at <http://www.groundwater.org/>.



Tri-County Regional Planning Commission

The Tri-County Regional Planning Commission has published "Regional Choices for Our Future" which outlines goals and visions for an improved quality of life and economic competitiveness. This publication includes the roles of government, citizens, and stakeholders in maintaining a healthy economy and



healthy environment, growth and redevelopment of the community, and open space and resource protection.

School Curriculum

Watershed protection will be most effective when the public understands the environmental challenges and is invested in rectifying them. This understanding and investment ultimately comes through education and this education should start when people are young. The education of young people on these issues will pave the way for watershed protection becoming a societal value.

Michigan Department of Environmental Quality

The Department of Environmental Quality (DEQ) is using \$1 million of the Clean Michigan Initiative funds and working with the Department of Education to develop and disseminate sound science-based supplementary environmental curriculum materials for use by Michigan educators. The five unit topics under development include: Air Quality, Ecosystems, Energy and Resources, Individuals' Impact on the Land, and Water Quality.

Additional information including classroom resources, grant opportunities, speaker request forms and a list of local nature centers can be found at <http://www.michigan.gov/deq/> under "Key Topics" → "Environmental Education".

Global Rivers Environmental Education Network

GREEN is a national network of schools and communities working together to meet critical water resource challenges through a combination of environmental education and civic action. GREEN builds on national academic standards and teaches elementary, middle and high school-aged youth essential skills including critical thinking, teamwork, problem solving and the application of science to real world problems. Additional information can be found at the following website:

<http://www.earthforce.org/section/programs/green/>.

Additional Resources

In addition to the programs listed in the previous sections, there are numerous documents by various organizations that describe tools to use for watershed protection. A complete listing of these documents is not possible, but a number of the more popular ones are listed:

- Stormwater Management Guidebook produced by the Land and Water Management Division of the MDNR
- Guidebook of Best Management Practices for Michigan Watershed produced by the Surface Water Quality Division of the MDEQ
- The Michigan Department of Transportation's Drainage Manual

References

Center for Watershed Planning. Rapid Watershed Planning Handbook. 1998.

Project Green—Lansing, MI

Lansing's Project GREEN began in 1992 with a grant from the General Motors Corporation (GM). Woldumar Nature Center became the area Coordinator in 1995 and carries out the Project today with continued support from GM. GREEN satisfies multiple benchmark requirements for teachers in Chemistry, Biology, Environmental Studies, Social Studies, and Math, enhancing curriculums in these areas. Refer to <http://www.woldumar.org/programs/green.html> for additional information.