Cedar Lake Watershed Management Plan Summary

The Roadmap for Watershed Protection & Improvement

A watershed management plan has been developed for the Cedar Lake Watershed by local stakeholders, riparian landowners, government officials, state agencies and environmental professionals. This plan is part of the dedicated efforts of local stakeholders and was funded in whole by Cedar Lake lakefront property owners. Moving forward, this plan will serve as a roadmap for implementing the projects and approaches that will protect and improve natural resources of the watershed.

Stakeholders

Any organization, government entity, or individual that has a stake in or may be affected by a given approach to environmental regulation, pollution prevention, or conservation measures is considered to be a stakeholder.

Lakefront property owners, or lake "riparians" are stakeholders. Tax dollars from each riparian paid for this watershed management project. Their efforts have gained the attention of state officials and demonstrate their commitment to Cedar Lake.

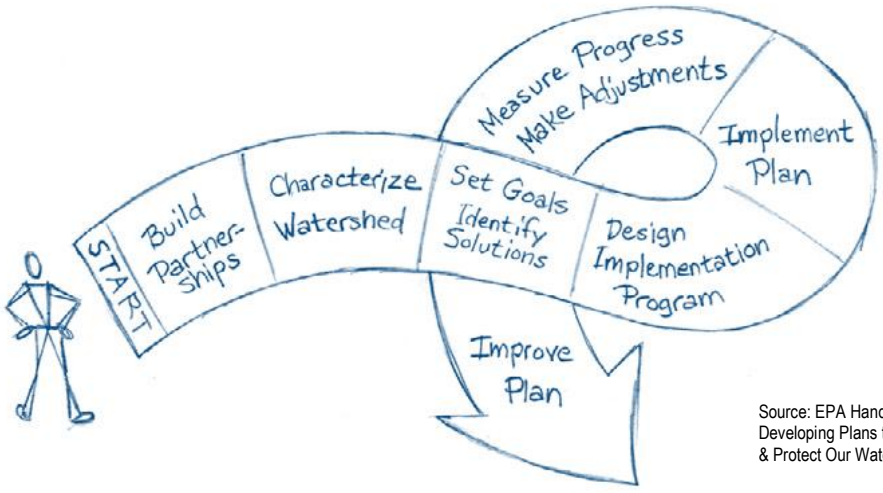
What is a Watershed?

A watershed is the area of land that drains into a particular body of water. Imagine a bathtub when the shower is turned on. All the water that falls into the bathtub runs to a single drain. While watersheds in nature can be a bit more complicated, the same principle holds. The majority of the land draining to Cedar Lake is the large cedar swamp on the northwest side of the lake and residential lots around the lakeshore.

What is Watershed Management Planning?

Watershed management involves two major steps: planning and implementation. Planning involves identifying and addressing threats and impairments to water quality and quantity. Watershed planning is not an exact science. It is an iterative process that involves evaluating the plan and making adjustments over time. This plan lays out the framework in which watershed implementation and evaluation will take place to tackle and resolve future problems and needs. The implementation phase involves executing the actual tasks laid out in the plan.

The Cedar Lake watershed management plan focuses on protecting natural resources of the watershed for lake enjoyment and recreation, aesthetic, property values, wildlife, and natural habitat. A steering committee made up of representatives from the Cedar Lake Improvement Board, Lake Association, state and local government, and lake riparians met regularly for two years to develop this plan. The state and federally approved plan will be implemented by the Cedar Lake Board and the public. This booklet summarizes the plan. A full version of the plan can be downloaded at www.cedar-lake.org.



Source: EPA Handbook for Developing Plans to Restore & Protect Our Waters (2008).

Cedar Lake Watershed (red outline)

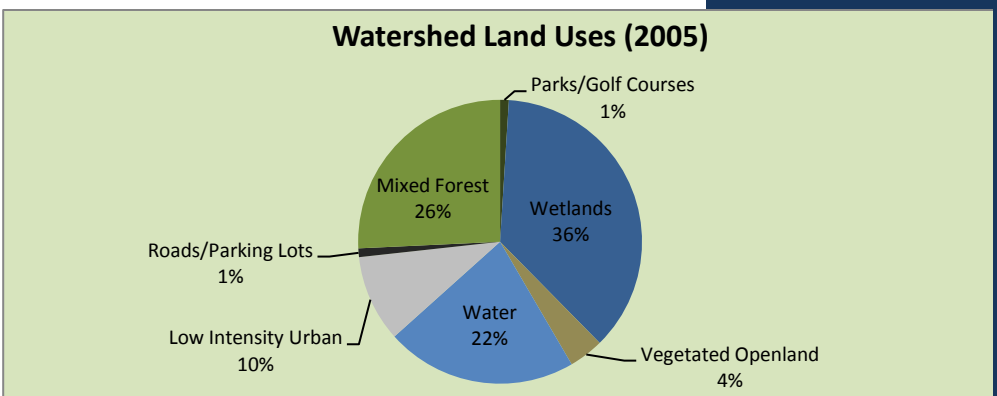
About the Watershed

The watershed is about 3,600 acres in size. The cedar swamp in the northwest collects water in the spring and drains to Cedar Lake through two small creeks, Jones and Sherman Creeks. This swamp is the main water supply to the lake, and without it the lake levels would drop substantially.

Water quality in this fairly shallow lake is quite good. Past sampling shows that nutrients, like phosphorus, are within the safe range for a lake. Good water quality makes the lake ideal for fishing, swimming, and other recreation.

Land Use in the Watershed

The conditions in a lake are impacted by the incoming water. In the Cedar Lake Watershed, water drains into the lake from rain flowing over the land and groundwater. Groundwater is filtered by the soils, but surface water picks up any pollutants it contacts and delivers them directly to the lake, untreated. This is why knowing the land use in a watershed is essential for planning.



Designated Uses

Designated uses are specific ways in which people and wildlife use lakes and rivers. In Michigan, all surface waters of the State are designated for and shall be protected for:

- Agriculture
- Industrial Water Supply
- Public Water Supply
- Navigation
- Warmwater or Coldwater Fishery
- Indigenous Aquatic Life and Wildlife
- Partial Body Contact Recreation
- Total Body Contact Recreation (May 1-Oct 31)

Desired Uses

A desired use is simply how stakeholders want to use the watershed or would like it to look (for example, building a wetland viewing area).

What's an Impaired Waterbody?

The State of Michigan is working to assess each waterbody to confirm all designed uses are being met. When a lake or river is not meeting all designated uses, it is "impaired".

An example is when a lake has an outbreak of blue-green algae that prohibits lake users from swimming in the lake. At that point the lake is considered "impaired" for total body contact recreation.

Key Watershed Concerns & Issues

The steering committee gained input from stakeholders about major watershed concerns through a survey done by the Alcona-Iosco Cedar Lake Association. The committee developed a list of the watershed concerns and gave them a priority ranking (high, medium, or low). It is important to identify the suspected and known sources and causes of these pollutants or problems in the watershed. Once these pollutants or problems are identified, they can be used to develop a more detailed plan of how to address the key concerns.

CEDAR LAKE CONCERNS	PRIORITY	SUSPECTED SOURCES/ CAUSES
Sediments	HIGH	Historical organic material
Habitat Loss	HIGH	Development, filling wetlands, low lake levels
Biota - Fish & Other Wildlife	HIGH	Non-native invasives, nuisance aquatic plants in excess
Hydrologic Modification	HIGH	Drainage/filling of wetlands, stormwater drains, pumping from lake
Recreation	HIGH	Low water level, nuisance aquatic plants in excess
Wetland Loss	HIGH	Development, filling wetlands (especially for smaller parcels)
Urbanization/ Development	HIGH	Filling wetlands, improper building/driveways, excessive removal of natural vegetation
Nutrients	MEDIUM	Lawn fertilizers, leaking septic systems, stormwater, leaves
Litter/Yards	MEDIUM	Dumping leaves/litter into lake
Pathogens/Parasites	LOW	Leaking septic systems, pet/ wildlife feces

Goals & Objectives

The goals set in the watershed management plan are focused on restoring and protecting the designated and desired uses for the watershed. Watershed concerns, pollutants and other issues were taken into consideration when developing these broad goals.

Watershed objectives were set to outline in more detail how the watershed goals will be met:

Objective I: **Protect critical wetlands identified along the northwest side of Cedar Lake from drainage or diversion (and loss of wetland function).**

Objective II: **Prevent additional groundwater loss from the lake on the southeast side due to storm sewer infrastructure.**

Objective III: **Pursue augmentation feasibility study to choose (suite of) lake level management options for implementation.**

Objective IV: **Improve sport fishery in Cedar Lake through enhanced lake levels, creek levels, habitat, and wetland protection.**

Objective V: **Work to stop the spread of invasive, non-native species to the Cedar Lake Watershed and control existing nuisance species.**

Objective VI: **Seek ways to improve composition of lake bottom sediments (determine feasibility of muck reduction).**

Objective VII: **Continue water quality monitoring of pathogens and nutrients to protect good water quality and recreational value of Cedar Lake.**

Objective VIII: **Educate lake riparians about natural lakescaping, green buffers, and other Best Management Practices (BMPs) that benefit the lake.**

Objective IX: **Utilize conservation options with local land conservancy for habitat protection.**

Watershed Goals

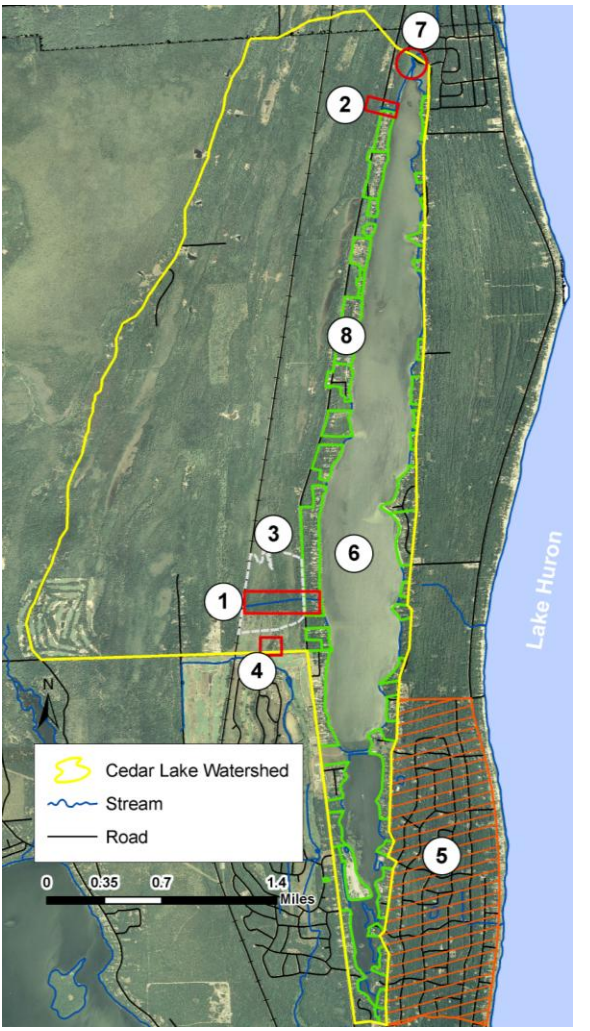
1. Restore and protect warmwater fishery for native fish
2. Maintain balanced and healthy aquatic plants and wildlife
3. Maintain open and clear waterways for recreation
4. Preserve good water quality and minimize muck for recreation
5. Protect groundwater for lake recharge to achieve balanced lake levels
6. Maintain legal lake level by protecting wetland and creek surface inputs
7. Conserve and restore wetland and aquatic habitat

Critical Areas

A critical area is a geographic location in the watershed that is contributing a majority of pollutants or has a major impact on water quality or quantity.

For watershed management planning, critical areas help reduce the geographic scope of your watershed projects and focus your attention on the most important parts of the watershed that need restoration or protection.

Critical areas can range from a severely eroding stream bank that needs to be repaired to a prairie habitat used by an endangered species that needs to be protected.



Critical Areas in the Cedar Lake Watershed

Critical Areas for Protection & Restoration

The steering committee identified specific locations in the watershed that are high priority for protection. The eight critical areas listed below were identified and are shown on the map above.

1) Sherman Creek and its corridor
2) Jones Creek and its corridor
3) Sherman Creek drainage area
4) Kings Corner Culvert - water diversion
5) Lakewood Shores drainage district
6) In-lake habitat
7) Cedar Lake outlet
8) Developed areas along the lakeshore

Photo Credit: Allegan County Conservation District

Implementing Priority Projects & Action Items

After assessing the watershed as a whole and identifying specific critical areas, a strategy on how to meet each of the watershed objectives was developed. The watershed management plan has a complete table with each project and action item, a priority ranking (1-3), key steps to complete, outcomes, organizations that will be involved, watershed benefits, technical assistance needed, costs, and potential funding sources.

A very brief summary of each of the recommended projects and actions is included here. For more details, see the full watershed management plan, Attachment D.

Protecting Wetlands

1) Support and implement a wetlands protection ordinance to protect critical wetlands and their function. *(Model language for an ordinance is included in the plan.)*

2) Restore hydrology in NW wetlands (select option from augmentation pilot recommendations).

3) Acquire property in the NW wetlands (priority is Sherman Creek drainage area) to protect and restore hydrology and habitat and create public wetland viewing area/preserve.

Spillway Recommendation

The Steering Committee recognized the aging of the concrete spillway structures on the north end of the lake. The committee determined that future replacement of the structure should be engineered in a way that lake level can be controlled. Being able to fluctuate the lake level will help control flooding and assist in the aquatic plant management program.

Watershed Tip:

What goes on the lawn goes into the lake! Rain and lawn irrigation will wash fertilizers and pesticides into the lake and can encourage rapid growth of aquatic plants and algae. Do not apply these chemicals within 30 feet of the lake.

Fishery Recommendations

- Conduct fish population study
- Perform fish habitat surveys
- Enhance habitat enhancement (walleye and catfish)
- Maintain/increase size and number of adult bass
- Re-assess stocking of Redear sunfish for bluegill habitat
- Continue walleye stocking
- Monitor benefits of spawning benches (and install more if successful)

Prevent Additional Water Loss to Subsurface Drainage on SE Side of Cedar Lake

1) Hold meetings with county building inspector(s) and other regulators to ensure residential building codes are enforced and buildings are constructed in areas above high groundwater mark.

2) Modify Lakewood Shores Property Owners' Association Architectural Standards to ensure homes are built above high groundwater mark (to avoid flooding issues that will require an increase in subsurface drainage by Drain Commissioner).

3) Hold workshops to educate homeowners and potential builders on practices, measures, and techniques that will reduce the risk of flooding in new and existing homes.

Choose and Implement Lake Level Management Options

A final report on the augmentation pilot project with recommendations for lake level management strategies will be complete in 2011. As part of the pilot project, a large augmentation well was installed and tested to determine whether groundwater can be pumped and used during dry years to lessen significant drops in lake level. One implementation project involves reviewing the report recommendations and selecting the preferred strategy for restoring hydrology in the watershed and lessening significant drops in lake level in the future.

Protect and Improve the Cedar Lake Fishery

1) Protect, restore, and/or enhance hydrology of NW wetlands for fish spawning.

2) Protect wetlands through policy or ordinances and conservation easements.

3) Pursue and fund recommendations of the fishery management studies and reports through Lake Board contracts.

4) Continue aquatic plant management and control nuisance species.

5) Continue relationship with Michigan DNR so walleye stocking continues on an "as needed" basis.

Control Existing Invasive and Excessive Aquatic Plants and Prevent New Invasions

1) Use the prescriptive and selective plant management agents and strategies from current Cedar Lake Management Program to mitigate against cultural and natural disturbances.

2) Improve opportunities for recreation, increase aesthetic values, and provide improvements in the structure of flora for critical fish habitat.

3) Target problematic aquatic plants, such as Eurasian water milfoil, and other nuisance species that that have appeared more recently.

4) Use aquatic plant and algae surveys as an indicator of general water quality and the effect on the lake's fishery.

Muck Removal and Prevention

1) Conduct sediment thickness study and bathymetric mapping of the lake.

2) Use study results to determine if dredging will be a cost-effective muck removal option.

3) Work to prevent riparians and others from dumping leaves and lawn material into lake.

4) Create an incentive program for riparians to adopt good stewardship practices (e.g., buffer along lakeshore).

Water Quality Monitoring

Collecting water samples and taking lake measurements is an important part of keeping a lake healthy. Like going to the doctor for a checkup or taking your car in for regular maintenance, water quality monitoring can catch early signs that problems are brewing. Action items for this objective include:

1) Continue participation and involvement with Michigan's Cooperative Lakes Monitoring Program.

2) Further develop Lake Association's *E. coli* monitoring program.

3) Continue providing feedback to stakeholders and tailor education plan to pertinent topics.

More on Muck

Dr. Douglas Pullman served on the Steering Committee and provided information on lake bottom muck. The creation and build up of muck is a complex process. Organic material that falls into or grows in a lake is broken down by micro-organisms. Almost 2/3 of the organic material from trees and plants is broken down in less than a few days.

Sometimes the breakdown of this material is slowed and muck starts to accumulate slowly. Studies show that aeration can do little to "jump start" this break down process. In the end, the only way to get rid of muck is to remove or displace it. So keeping leaves and soil from entering the lake is all part of good lake stewardship.

Watershed Tip:

Don't feed waterfowl. Nuisance geese and ducks add excess nutrients to the lake and can play a role in swimmer's itch. Keep tall grass and plants along the shoreline as a buffer to deter waterfowl like geese.

Healthy Lakes

- Natural shorelines with buffers to filter pollutants
- Well vegetated to provide shade
- Good water quality with low levels of pollutants or excess nutrients
- Water clarity remains constant or normal
- Relatively low invasive species
- Abundant and healthy fish and wildlife
- Lake conditions change gradually or naturally over time

Source: Lakeland Alliance, Ontario CAN

Education on Stewardship and BMPs

The development of a Lake Stewards Program that will guide, educate, and recognize residents for use of BMPs for their lakefront properties. The program will focus on encouraging the use of shoreline buffers of native plants, no-mow practices, avoidance of harmful chemicals, and erosion control methods.

A second action item is completing a native buffer demonstration project in a visible area around the lake. This project will give riparians and lake users a better idea of what an attractive buffer can look like along with its many benefits.

Land Conservation for Habitat Protection

1) Work with land protection organization or land conservancy to get voluntary conservation easements on privately owned parcels in the northwest wetland

2) Explore options to purchase critical areas around Sherman Creek to permanently protect and manage for fish and wildlife habitat and hydrology

Watershed Tip:

Get your septic system pumped regularly. Besides avoiding expensive septic backups, regular cleanouts can extend the life of your septic and stop excess nutrients from leaking into the lake through groundwater. It's recommended that you get it pumped out every 3-5 years.

Watershed Costs

Estimating the cost of watershed implementation can be challenging. To get a plan approved at the state and federal level requires providing the costs of projects and action items. In the Cedar Lake Watershed these costs will be shared by a number of stakeholders, including local governments, lake improvement board, lake association, and riparians that voluntarily change practices (e.g., townships will spend time and money to get wetland ordinance passed). Stakeholders will have to work within existing budgets, but the approved watershed management plan will make some of the projects eligible for grant funding.

The following is a summary of cost for implementing the Watershed Management Plan over time. More detailed cost information is available in the full plan, Attachment D.

Get Involved!

For more on what you can do and how to get involved, check out:

Cedar Lake Association
www.cedar-lake.org

MSU Extension
www.msue.msu.edu

Michigan DNR
www.michigan.gov/dnr

Objective I:	**Wetland Ordinance**	**$5,000-20,000**
	Restore Wetland Hydrology	**$100K-500K**
	Protect Sherman Creek Critical Areas	**$150K-500K**
Objective II:	**Building Meetings & Architectural Standards**	**$3,000-10,000**
	Conservation Easements	**$1K-2,500/acre**
Objective III:	**Lake Level Management Project(s) (*some costs may overlap with Objective I*)**	**$150K-500K**
Objective IV:	**Fisheries Management Tasks (*over 5+ years*)**	**$26,000**
Objective V:	**Public Education**	**$7,000-12,000**
	Lake Manager	**$50K-100K/yr**
	Aquatic Plant Management Program	**$50,000/yr**
Objective VI:	**Sediment Study**	**$10-30K**
	Dredging Project	**$500K-1M**
	Public Education & Lake Stewards Program	**$6,500**
Objective VII:	**Public Education**	**$1,000-3,000**
	Annual Stewardship Activities	**$300-500/yr**
	Native Buffer Demonstration Project	**$5,000-10,000**
Objective VIII:	**Public Education & Membership Costs**	**$1,500-3,500**
	Water Quality Monitoring Program	**$1K-5K/yr**
Objective IX:	**Conservation Easements**	**$1K-2,500/ac**
	Purchase Property for Permanent Protection (*overlap Objective I*)	

[$1K = $1,000, $1M = $1,000,000]

What's Next?

The Cedar Lake Improvement Board will take the lead on implementing the Cedar Lake Watershed Management Plan. But to fully implement the plan and achieve the goals and objectives, the public will need to get involved. Your involvement in supporting projects and taking actions on your property will be vital in improving and protecting the watershed and Cedar Lake.

The Lake Board will work with other local stakeholder groups, such as the Lake Association and local governments to tackle the projects and action items in the watershed management plan. Starting in the summer of 2011, the Lake Board will start assigning specific tasks in order to start implementing projects. A complete schedule for implementation is included in Chapter 7 of the plan. Some of the first priority tasks will be to select lake level management options from the augmentation pilot study and start on-the-ground projects.

A watershed management plan is often referred to as a "living" document. It will be periodically evaluated and updated throughout the implementation phase. The main purpose of the plan is to serve as a roadmap to reach the watershed goals. As some projects are check of the list, others will be added to address current issues that will ensure the watershed and Cedar Lake are permanently protected for future generations to enjoy.

More Resources

The following resources are cited in this brochure:

Michigan DEQ, Developing a Watershed Management Plan for Water Quality: An Introductory Guide (February 2000)

EPA Handbook for Developing Watershed Plans to Restore & Protect Our Waters (March 2008)

Lakeland Alliance, A Shoreline Owner's Guide to Lakeland Living

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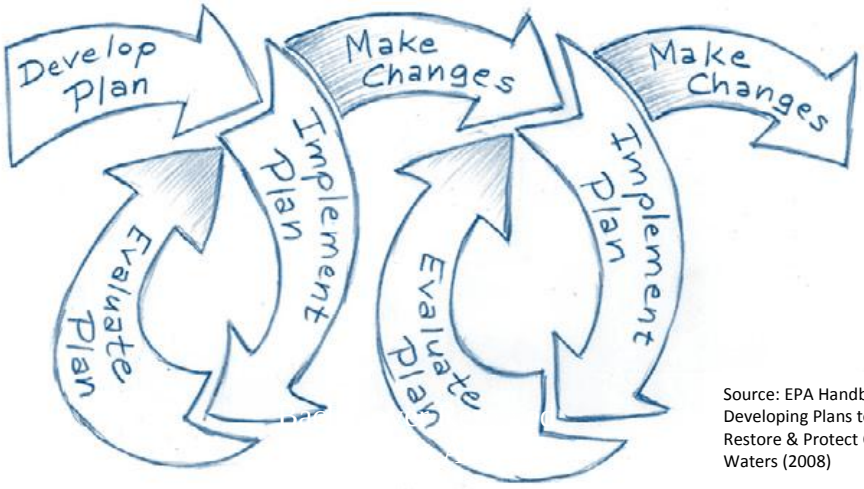
This booklet was developed by Kieser & Associates, LLC with financial support from the Community Foundation of Northeast Michigan, the Cedar Lake Improvement Board, and the Alcona-Iosco Cedar Lake Association.



Source: EPA Handbook for Developing Plans to Restore & Protect Our Waters (2008)