



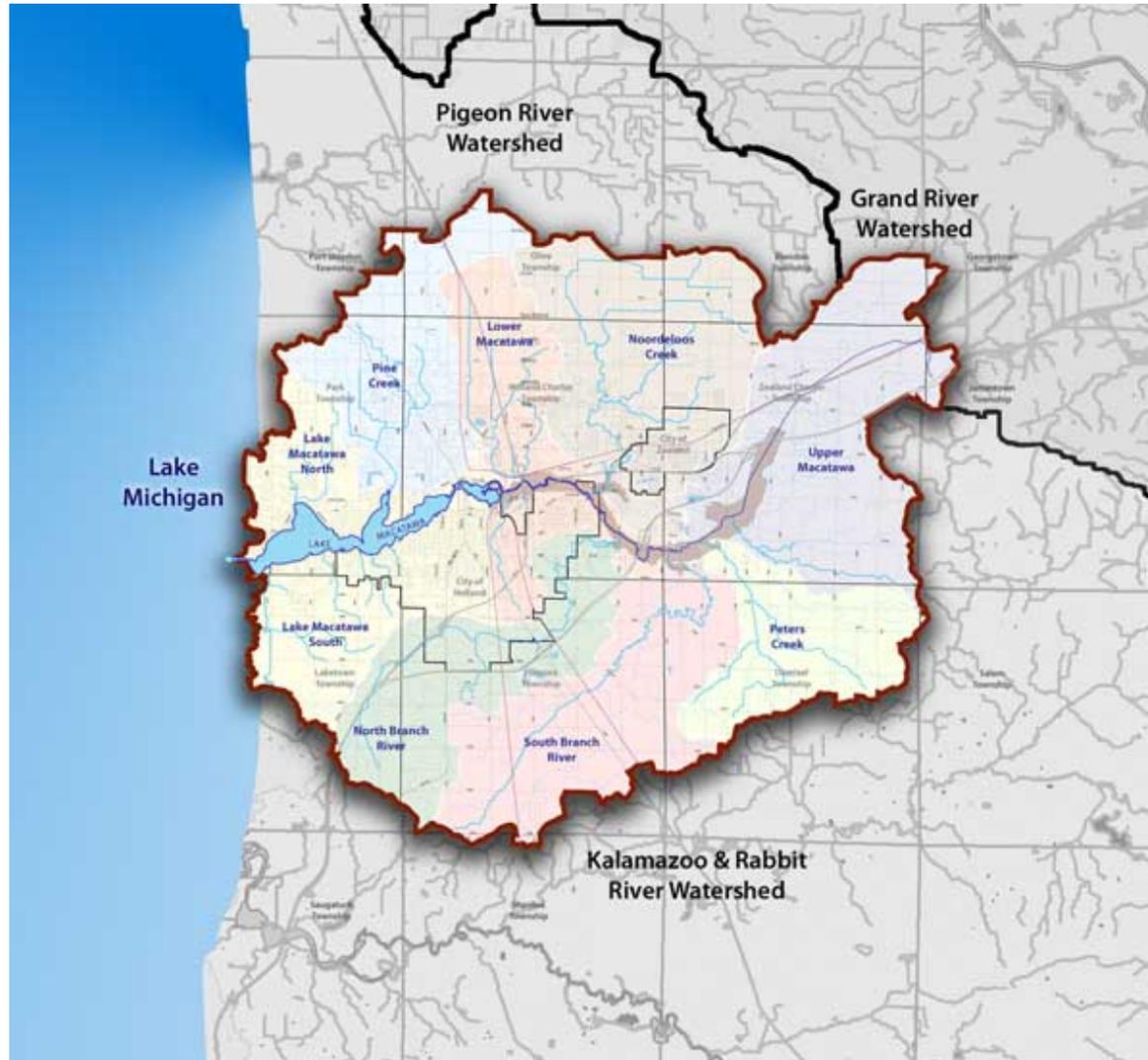
Holland
MICHIGAN

West Michigan
Green Infrastructure Conference

August 5, 2015

Presented by: Holland City Manager Ryan Cotton







Spring Lake & Holland Differences

- Soils
- Historic and Current Phosphorous Load
- Spring Lake's Lake Board & Holland's Lake Macatawa Project Clarity
- Best Management Practices:
 - Street Sweeping
 - Leaching Basins
 - “Creeks” vs. “Drains”
 - Vegetative Swales
 - Zero Run-Off vs. Retention
 - Storm Water Ordinances, Permits and Staffing
- Storm Water Utility - Neither



PROJECT CLARITY PROTECTED PROPERTIES



Remediation Plan

- Identify key areas for land acquisition and restoration
- Prioritize restoration/remediation options to maximize benefit
- Identify BMPs - both urban and agricultural
- Create Information/Education program
- Provide for long-term management/maintenance plan

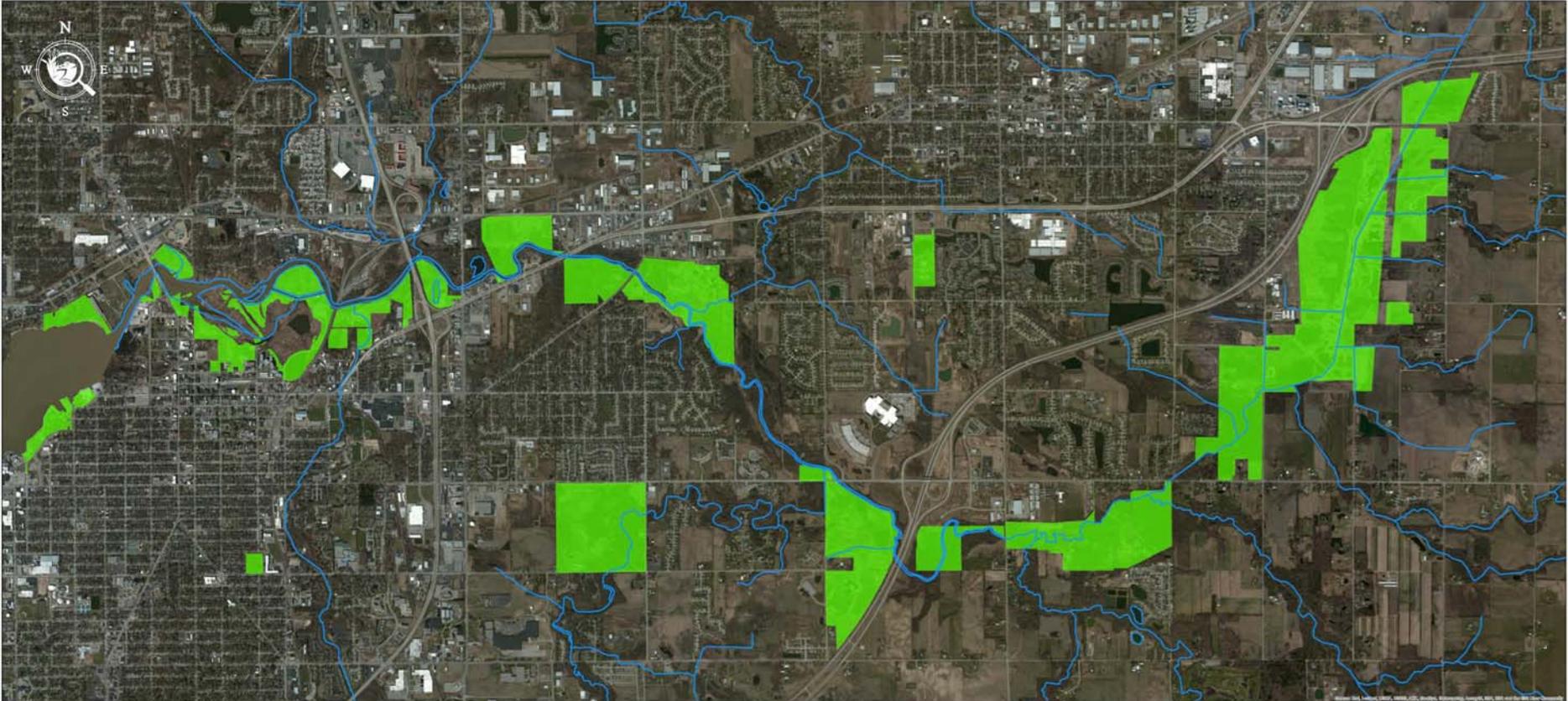


Best Management Practices (BMPs)

BMP1: Drainage Improvements: Sediment traps, 2-stage ditches, & flood plain restoration throughout critical areas in the watershed

BMP2: Provide Data & Software for Advanced Conservation Planning and earthworks projects

BMP3: Urban Stream Erosion and Runoff Retention: Implementation of shoreline restoration programs, stream bank restoration, and rain garden/bio-retention programs

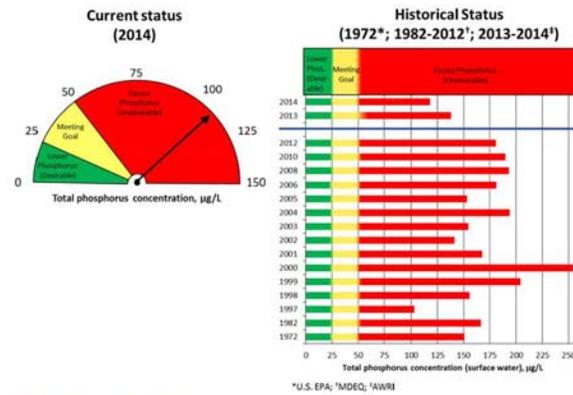


Macatawa River Greenway

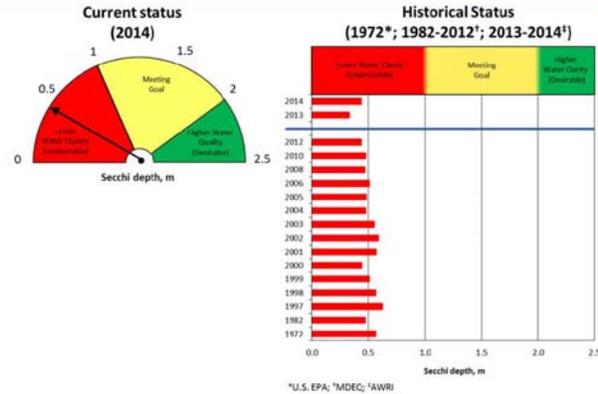




Total Phosphorus



Secchi Disk Depth (Water Clarity)



The following graphs are from Grand Valley State University Robert B. Annis Water Research Institute's Project Clarity Water Quality Dashboard Report. The full monitoring report can be downloaded from MacatawaClarity.org.



Project Dashboard February 2015

Project Name	Location	Project Description	Resulting Benefits	Status
Paw Paw Bridge Park	Zeeland	250 foot streambank restoration	Erosion control, habitat improvement, aesthetics	Completed 
Brouwer Farm	Zeeland Township	Gully repair, buffer strip implementation	Sediment reduction, habitat improvement, erosion control	Completed 
Middle Mac North	Zeeland Township	1.6 acre wetland restoration, gully repair	Erosion control, habitat improvement	Completed 
Kleinheksel Drain Two-Stage Ditch	Fillmore Township	1,250 feet of two-stage ditch	Erosion control, flood storage	Under Construction 
Haworth	Holland	42 acre wetland restoration; 70 acres of BMPs	Sediment reduction, habitat improvement, flood storage, aesthetics	Permitted 
Middle Mac South	Zeeland Township	45 acre wetland restoration	Sediment reduction, habitat improvement, flood storage	Permitted 
Jan Belt Two-stage ditch	Fillmore Township	2,600 feet of two-stage ditch	Erosion control, flood storage	In Design 
DenHerder Site	Holland Township	Streambank and channel restoration	Erosion control, habitat improvement	In Design 
Lumir	Laketown Township	16 acre wetland and streambank restoration	Erosion control, sediment reduction, habitat improvement	In Design 
Peters Creek Restoration	Zeeland Township	Approximately 1,000 feet of streambank and channel restoration	Erosion control, sediment reduction, habitat improvement	Needs Funding 



PROJECT clarity Campaign Update February 2015

Donor Divisions	Pledges Outstanding	Cash/In-Kind Received	Total Gifts	Goals	% of Goal	# of Gifts
INDIVIDUALS						
Leadership	\$2,951,750.00	\$2,722,803.55	\$5,674,553.55			13
Lake Neighbors	\$213,939.51	\$433,033.49	\$646,973.00			77
Community	\$2,800.00	\$44,537.24	\$47,337.24			27
Youth	\$0.00	\$2,168.60	\$2,168.60			1
TOTAL INDIVIDUAL	\$3,168,489.51	\$3,202,542.88	\$6,371,032.39	\$7,970,000.00	79.9%	118
Agricultural	\$0.00	\$0.00	\$0.00			0
Business	\$618,000.00	\$213,600.00	\$831,600.00			19
Business & Agriculture	\$618,000.00	\$213,600.00	\$831,600.00	\$790,000.00	105.3%	19
PUBLIC FUNDS						
Local Municipalities	\$0.00	\$13,000.00	\$13,000.00			2
State & Fed Grants	\$0.00	\$241,822.00	\$241,822.00			1
TOTAL PUBLIC	\$0.00	\$254,822.00	\$254,822.00	\$3,000,000.00	8.5%	3
FOUNDATIONS						
Individual	\$89,500.00	\$632,000.00	\$721,500.00			3
Corporate	\$0.00	\$0.00	\$0.00			0
TOTAL FOUNDATIONS	\$89,500.00	\$632,000.00	\$721,500.00	\$240,000.00	300.6%	3
IN-KIND GIFTS						
Services	\$6,110.86	\$177,898.31	\$184,009.17			11
Land Donations	\$602,000.00	\$0.00	\$602,000.00			2
TOTAL IN-KIND	\$608,110.86	\$177,898.31	\$786,009.17			13
TOTALS	\$4,484,100.37	\$4,480,863.19	\$8,964,963.56	\$12,000,000.00	74.7%	156

Fundraising Update

- Fundraising efforts for 2015 will continue to focus on remaining Lake Macatawa residents and business who have yet to consider an investment of time or money to the Project Clarity effort.
- A fundraising auction event will take place on Monday, July 13 at the Macatawa Bay Yacht Club. We will create sponsorship opportunities for both the July 13 event and July 25th Water Festival. Our fundraising efforts will support the Community Campaign goal.
- Land acquisitions efforts are ongoing and several of the properties we've secured have been donated and or acquired for much less than originally budgeted. In two acquisition cases we've been able to parcel off land that could not be used for restoration and resell, investing funds back to Project Clarity.
- Several public and private grant applications, totaling over \$500,000, have been submitted. Decisions should be forthcoming in the 2nd quarter of 2015.

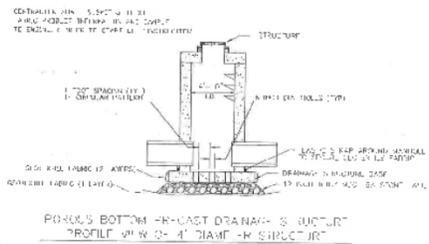
CITY OF HOLLAND, MICHIGAN

**STORMWATER
STANDARDS**



City of Holland

**CITY OF HOLLAND
SPECIAL PROVISION
FOR
DRAINAGE STRUCTURE, POROUS BASE
3 OF 3**



**POROUS BOTTOM PRE-CAST DRAINAGE STRUCTURE
PLAN VIEW OF 4" DIAMETER DRAINAGE STRUCTURE BASE**



Downstream Defender®

Advanced vortex separation maximizes sediment removal while controlling costs.

Product Profile

The Downstream Defender® is an advanced vortex separator used to treat stormwater runoff in residential or storm-flow applications. Its unique flow-modifying internal components distinguish the Downstream Defender® from conventional and simple swirl separators that typically bypass untreated peak flows to prevent removal of captured pollutants. Its side-treatment flow range, low headloss, small footprint and over-profile make it a compact and economical solution for capturing nonpoint source pollution.

Components

- | | |
|------------------------------------|--------------------------|
| 1. Inlet to Precast Vortex Chamber | 4. Outlet Pipe |
| 2. Cylindrical Baffle | 5. Sediment Storage Sump |
| 3. Center Shaft | 6. Access Lid |



Fig. 1 The Downstream Defender® has internal components designed to maximize pollutant capture and minimize pollutant removal.

Applications

- Removal of total suspended solids (TSS), floatable trash and petroleum products from stormwater runoff
- New construction or redevelopment of commercial and residential sites
- Pollutant hotspots such as maintenance yards, parking lots, gas stations, streets, highways, airports and transportation hubs
- Site construction and green infrastructure based developments
- LEED® development projects

Advantages

- Special internal components maximize pollutant capture and minimize footprint, headloss and wearout
- Capable and reliable in a wide range of TSS particles
- High peak treatment flow rates
- Treats the entire storm with no washout or untreated bypass flows
- Low maintenance requirements – no dredging required and no screens or media to block
- Variable inlet/outlet angles for ease of site layout

How it Works

Advanced hydrodynamic vortex separation is a complex hydraulic process that augments gravity separation with buoyancy-solubility forces. The flow-modifying internal components used in the Downstream Defender® harness the energy from vortex flow and maximize the time for separation to occur while deflecting high-solids vortices (Fig. 1).

Polluted stormwater is introduced tangentially into the side of the precast vortex chamber to establish rotational flow. A cylindrical baffle with an inner center shaft creates an outer (negative) vortex and an inner (positive) spiraling column of flow and ensures maximum residence time for pollutant travel between the inlet and outlet.

Oil, trash and other floating pollutants are captured and stored on the surface of the outer spiraling column. Low-energy vortex motion deposits sediment into the protected sump region. Only after following a long three-dimensional flow path is the treated stormwater discharged from the outlet pipe. Maintenance ports at ground level provide access for easy inspection and clean-out.



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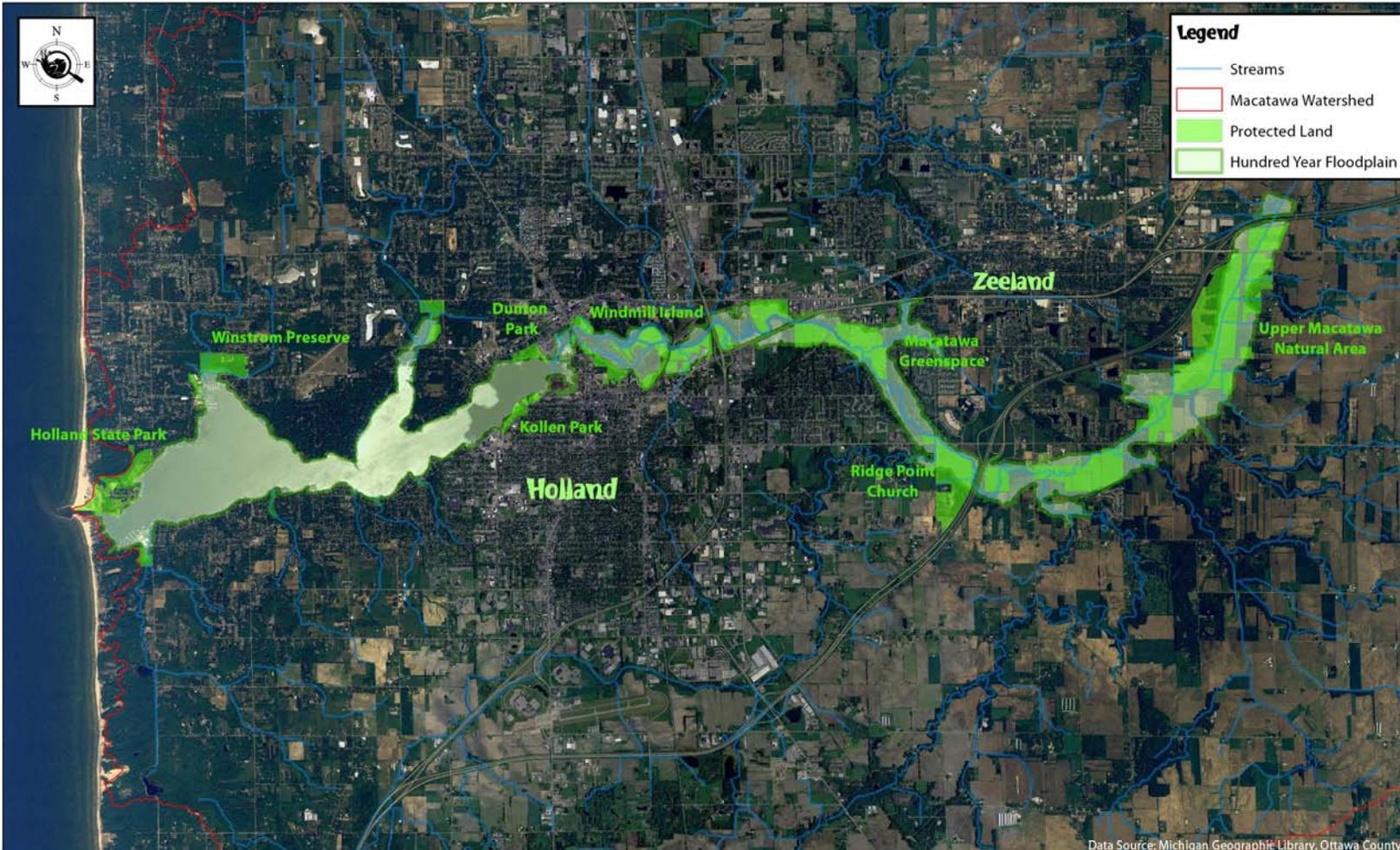
Education and Information Update

- 2015 Water Festival is planned for Saturday July 25, 2015 on Windmill Island. This year Project Clarity will offer an interactive educational experience promoting sustainable water practices in our watershed. Activities such as fishing, kayaking, paddle boarding and biking will be available for festival guests. Free access to the island will be made available for everyone on festival day.
- Project Clarity educational fundraising presentations at homes and condos along the lake will begin in late spring. Two are currently scheduled and many more are in the process of being scheduled. The goal is to reach 100% of Lake Macatawa residents by year end.
- A community-wide sign plan is underway. Landmark, wayfinding and interpretive signs will be placed throughout the community in high visibility parks and open spaces where people can see and learn about Project Clarity, the Macatawa Greenway and the Macatawa Watershed.
- The Project Clarity Website update went live in February. Check it out www.macatawaclarity.org
- Project Clarity's Agricultural Committee hosted a lunch for farmers on March 10th to learn more about private funding available to assist with agricultural water quality techniques. Sponsors of the event are Huntington Banks, CHS, GreenValley Agricultural, Greenmark Equipment and Zeeland Farm Services.
- Project Clarity leaders met with GreenValley and CHS agronomists to present Project Clarity and review the funding application process for agricultural best management practices.
- Project Clarity presentations are scheduled at the Macatawa Bay Yacht Club for members the second Thursdays each month April through June of 2015.

Monitoring Efforts

As part of Project Clarity, Grand Valley State University's Annis Water Resources Institute (AWRI) established a monitoring program on Lake Macatawa in 2013. The goal of the monitoring program is to evaluate and document the progress toward achieving Project Clarity's goal of improved water quality in Lake Macatawa. The monitoring program involves sampling the lake 3 times per year for a suite of biological, physical, and chemical parameters; these data are then averaged to give a visual representation of the lakewide conditions over the entire year.

Key water quality indicators were selected from the many parameters that are monitored to create a water quality dashboard for Lake Macatawa. The goal of the dashboard is to provide a visual representation of the current status and historical trends in Lake Macatawa water quality, by rating each indicator along a scale from desirable (green) to undesirable (red) conditions. Each scale also includes a category that indicates the water quality goal for the lake is being met (yellow). The indicators that were chosen are commonly used to assess lake trophic status: total phosphorus, chlorophyll a , and Secchi disk depth. Each indicator is described in more detail in a full report that can be downloaded from our website www.MacatawaClarity.org.



Macatawa River Greenway





**MACATAWA WATERSHED
SURROUNDED BY OUR
NEIGHBORHOOD WATERSHEDS**