

**Portage and Arcadia Creeks Watershed Transition/Implementation**  
**Project Tracking Code: 2003-0028**

**Options for Developing Milestones and Tracking Progress**

**Table 8-1. Milestones for Assessing Progress** (*Work Plan Task 2.2*)

The Watershed Management Plan defines specific BMPs for all stream stretches to protect or improve water quality. Watershed-wide objectives in the list below were presented to the Steering Committee. Priority milestones were selected with accompanying values and timelines. The prioritized milestones are listed in the Watershed Management Plan update text. Example milestones considered by the Steering Committee are listed below. These were separated into distinct categories. Kieser & Associates assessed the quantitative aspects of prioritized milestones in relation to existing or assumed levels necessary to achieve improvements where possible. Bold items were prioritized.

<b>Milestone</b>	<b>Quantity</b>	<b>How is it Measured?</b>	<b>Who Can Measure It?</b>
<b>Structural/Vegetative BMPs/Source Reduction</b>			
<b>Phosphorus reduction</b>	Pounds as related to TMDL (43% reduction of 2002 baseline load)	Grab samples upstream and downstream of BMP, mouth of creeks with Auto-sampler	Entity with ISCO and/or flow meter
		Estimations based on BMP efficiency, Modeling, published BMP efficiencies, lateral recession rate (streambanks)	Entity with GIS capabilities or training of lateral recession rate
<b>Sediment reduction</b>	Tons, sediment reduction which comes from BMPs targeting 43% TP reduction	Same as above	Same as above
Improvement of other in-stream parameters (flashiness, temperature)	Reduce average temperature by 2 degrees C in certain reaches, reduce temperature spikes by 10%, reduce peak flow spikes by 10%	Gauging Station, monitoring equipment, would require pre-implementation temperature monitoring, can use existing ISCO data for pre-implementation flow monitoring	Entity with ISCO and/or flow meter
In-stream goals using the Index of Biological Indicators	Increase in IBI score	Rapid Bioassessment Protocol, Macroinvertebrate collection with kick nets or rock baskets	Volunteers, MI Dept. of Environmental Quality

Floodplain (new available flood storage, upland infiltration)	Acre-feet of runoff intercepted, acres of new wetlands, number of rain barrels	Participation in neighborhood rain barrel program, modeling of rain garden capture, city tracking via website of restoration projects	Municipalities, neighborhoods, storm sewer drainage unit groups
Number of BMPs completed	Acres of infiltration, number of projects, acre-feet of runoff captured	Online tracking integrated into city websites	Steering Committee, Municipalities
<b>Number of catch basin and inline treatment systems</b>	Acres of runoff captured, number of units, mass of sediment removed from units	Site plan review, required reporting by property owners	Municipalities
<b>Reduction of effective imperviousness/runoff volumes in storm sewered areas</b>	Same as above for floodplain metric	Modeling, GIS Mapping	WMP Tracking System
<b>Number of rain barrels/rain gardens installed</b>	Same as above for floodplain and BMP metrics	Track enrollment in rain garden/barrel program	Residents, neighborhood associations, Nature Center
<b>Decrease in waterfowl populations</b>	Number of birds	Waterfowl counts at specific stations	Volunteers
<b>Habitat/Preservation</b>			
Preservation of open space	Acres of preserved land		Kalamazoo Conservation District, municipalities
Habitat improvement	Length of buffers restored, area of wetlands restored, number of volunteer-hours spent planting native vegetation	Online tracking integrated into city websites, Natural features inventory updated, tracking by group leading efforts	Subwatershed committees, WildOnes, volunteer groups, Nature Center
Elimination of exotic species	Acres restored, number of volunteer-hours spent removing exotics	Same as above for habitat improvement	Subwatershed committees, WildOnes, volunteer groups, Nature Center
<b>Education/Policy</b>			
<b>Newsletter articles, press releases, public service announcements</b>	Number of articles, number of media outlets broadcasting messages	Sustained and consistent publications, track requests for logo/information/slogans	MS4s, neighborhood associations
<b>Workshops</b>	Number of events, number of participants	Sustained program theme, track requests for program slides/logo/slogans	Kalamazoo Nature Center, Steering Committee

<b>New signage and storm drain stenciling</b>	Number of signs	Group account with signage company for all watershed signs, established layout and bulk discount	Steering Committee
<b>New ordinance adoption</b>	Number of ordinances, number of ordinance enforcement actions, number of illicit connections removed (due to IDEP ordinance)	Online ordinance information	MS4s, MI Township Association, MI Municipal League
<b>Establishment of municipal budget items for implementation efforts</b>	Dollars committed		MS4s
<b>School curriculum</b>	Number of schools, number of students		Education Subcommittee, MS4s
<b>Student involvement in watershed work</b>	Number of students, number of student leaders trained		WMU, Education Subcommittee
<b>Monitoring/Public Participation</b>			
<b>New volunteers</b>	Number trained, number of volunteer hours logged	Enrollment in MSU-E program, work of Clean Water Corps, Americorps Program	Volunteer monitoring program
Adoption of creeks	Number of schools, stream miles adopted	Identify adopted streams with signage, like highways	Education subcommittee, public school systems
Use of “You Make the Difference” logo on other organizations’ materials	Number of requests for logo	Request links to publications using logo, requirement to report usage when requested	Education subcommittee, City of Battle Creek
New organizations joining efforts	Number of groups	Track meeting attendance, request for watershed information	Steering Committee
Project website usage	Number of visits	Track monthly web statistics	Webmaster

**Table 8-2. New Metrics to Monitor Change (Task 2.3)**

BMPs and education programs are expected to result in improvements in surface water quality. Metrics to determine whether improvements are realized are needed to assess progress toward goals. The following list identifies potential in-stream metrics. These were considered in terms of whether a volunteer monitoring effort could be implemented and sustained. Items in bold were prioritized. They will be refined as the Volunteer Monitoring Program is developed (Task 4.2).

<b>Metric</b>	<b>How is it Measured?</b>	<b>Can Volunteers Measure it?</b>
<b>Stream macroinvertebrate community composition</b>	Kick Netting, Rock Baskets	Yes
Periphyton community composition	Rapid Bioassessment Protocol	Can collect samples, need to send to lab for analysis
Fish community composition	Electroshocking, Gill Netting	No, likely MI Dept. of Natural Resources Fisheries Division
<b>Sediment accumulation</b>	Visual observation at fixed station, quantity of sediment dredged from impoundments	Yes for visual observation, no for dredging
<b>Pool/riffle habitat</b>	Physical Characterization Data Sheet, Rapid Bioassessment Protocols	Yes
<b>Riparian habitat/buffers</b>	Rapid Bioassessment Protocol	Yes
Baseflow stream temperatures	Data Loggers	No
Baseflows/rainfall	Gauging Station, ISCO Auto Sampler	Maybe
<b>Litter accumulation</b>	Periodic counts at fixed station, annual Clean Sweep measurements	Yes
<b>Turbidity</b>	Turbidity tube, horizontal measurements	Yes
Wet weather peak flows	Gauging station, ISCO Auto Sampler	No

**Table 8-3. Methods for Tracking Progress** (Task 2.4)

Implementation projects must be communicated to the public in order to build momentum for further watershed improvements. The following list suggests avenues for sharing data and watershed success stories, and possibly, for quantifying progress toward goals. These items are being considered by the Steering Committee.

<b>Method/Tool</b>	<b>What's Tracked</b>	<b>Example</b>
City of Kalamazoo storm water catch basin treatment system tracking	Number of stormwater treatment systems installed as required by site plan review at redevelopment sites. Can pollutant reduction quantification be added based on design of equipment by manufacturer?	
City of Kalamazoo and City of Portage online mapping programs	Parcel information, floodplains, aerial photographs, storm sewer assets. Can new BMPs be added as map layer?	<a href="http://www.ci.kalamazoo.mi.us/onlinegis/Viewer.htm">http://www.ci.kalamazoo.mi.us/onlinegis/Viewer.htm</a> <a href="http://www.portagemi.com/living/gis_mapping.asp?bhcp=1">http://www.portagemi.com/living/gis_mapping.asp?bhcp=1</a>
Project website	Community groups submit project and group information	<a href="http://www.kalamazooriver.net/pa319new/groups.htm">http://www.kalamazooriver.net/pa319new/groups.htm</a>
Voluntary monitoring water quality data entry	Water quality, macroinvertebrate, habitat scores	<a href="http://www.fotsjr.org/wqm/wqm.htm">http://www.fotsjr.org/wqm/wqm.htm</a>
Road-stream crossing and streambank erosion quantification tool	Erosion from streambanks, sediment loading is quantified	<a href="http://www.kalamazooriver.net/tmdl/nps_opps/rsc.htm">http://www.kalamazooriver.net/tmdl/nps_opps/rsc.htm</a>
Rain barrel program, Neighborhood tracking	Number of homes in program, area of roof disconnection	
USEPA National Directory of Volunteer Monitoring Programs	Volunteer monitoring group information, contacts	<a href="http://yosemite.epa.gov/water/volmon.nsf/Home?readform">http://yosemite.epa.gov/water/volmon.nsf/Home?readform</a>
BMP Pollutant Reduction Calculator	Pollutant load reductions from various BMPs	<a href="http://www.in.gov/idem/water/planbr/wsm/loadreduction.html">http://www.in.gov/idem/water/planbr/wsm/loadreduction.html</a>