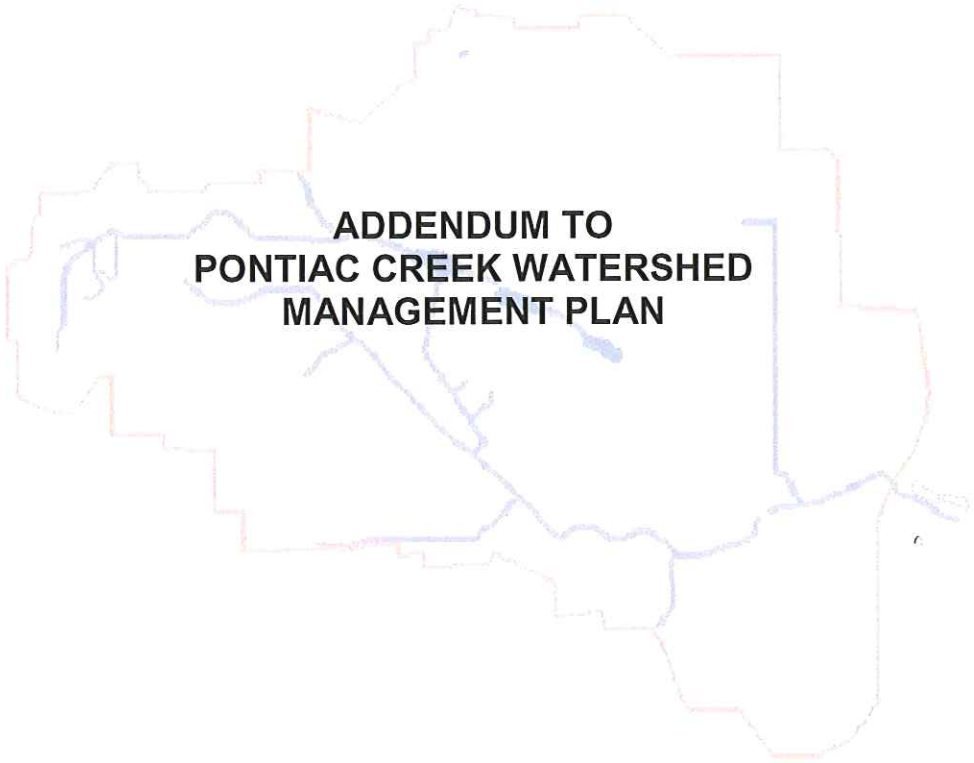
PONTIAC CREEK WATERSHED
MANAGEMENT PLAN
OAKLAND COUNTY, MICHIGAN
MDEQ TRACKING NO. 2003-0036



ADDENDUM TO PONTIAC CREEK WATERSHED MANAGEMENT PLAN

Prepared by NTH Consultants, Ltd.

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Addendum to
Pontiac Creek Watershed Management Plan

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1.0 INTRODUCTION

The *Pontiac Creek Watershed Management Plan* dated December 15, 2003, was developed for the Pontiac Creek Watershed under the Clean Michigan Initiative (CMI) Non-point Source Pollution Control Grant program and was approved by the Michigan Department of Environmental Quality (MDEQ). Due to implementation of the Federal Storm Water Phase II Final Rules in March 2003, the *Watershed Management Plan* does not completely address the United States Environmental Protection Agency (USEPA) Nine Minimum Elements of Watershed Planning. For reference, a copy of the USEPA elements is included in the Appendix.

1.1 PURPOSE

This Addendum is intended to be a supplement to the initial *Pontiac Creek Watershed Management Plan* to address the USEPA requirements. The updated *Watershed Management Plan* meeting the USEPA nine minimum elements will provide the basis for implementing short and long-term stormwater pollution prevention and reduction projects within the watershed and study area. As such, the Plan will help to sustain efforts by the City of Pontiac to improve water quality in Pontiac Creek and the Clinton River.

1.2 FUNDING

The MDEQ Water Bureau awarded funding to the City of Pontiac to upgrade the *Pontiac Creek Watershed Management Plan* in August 2004. The grant project titled "Pontiac Creek Watershed Management Plan Transition/Implementation Project," was awarded for the project period August 10, 2004, through September 30, 2005, under Grant ID Number 2003-0036.

1.3 PARTICIPANTS

The Pontiac Creek Steering and Technical Committee was formed to direct and review the upgrade of the *Watershed Management Plan*. The following organizations were represented in the Steering and Technical Committee:

City of Pontiac

- Dept. of Public Works and Services, Engineering Division
- Planning Division

Michigan Department of Environmental Quality

- Water Bureau

General Motors Corporation

- Environmental Council

Consultants

- NTH Consultants, Ltd.
- Nowak & Fraus

While Waterford Township was originally included in the *Pontiac Creek Watershed Management Plan*, stormwater pollution prevention and reduction projects outlined in this addendum are primarily the responsibility of the City of Pontiac. Waterford Township has reviewed this addendum and has added their community to specific projects, as they desired. However, Waterford Township is within the Clinton Main Subwatershed and will therefore be an active participant in the activities conducted in accordance with the Watershed Management Plan for the Clinton Main.

2.0 USEPA NINE MINIMUM ELEMENTS OF WATERSHED PLANNING

Phase I of the USEPA storm water program was promulgated in 1990 under the Clean Water Act. Phase I relies on National Pollutant Discharge Elimination System (NPDES) permit coverage to address storm water runoff from:

- "medium" and "large" municipal separate storm sewer systems (MS4s) generally serving populations of 100,000 or greater,
- construction activity disturbing 5 acres of land or greater, and
- ten categories of industrial activity.

The Storm Water Phase II program expands the Phase I program by requiring additional operators of MS4s in urbanized areas and operators of small construction sites, through the use of NPDES permits, to implement programs and practices to control polluted storm water runoff. Phase II is intended to further reduce adverse impacts to water quality and aquatic habitat by instituting the use of controls on the unregulated sources of storm water discharges that have the greatest likelihood of causing continued environmental degradation.

The Phase II program also includes provisions to facilitate and promote watershed planning and to implement the storm water program on a watershed basis. To ensure that projects make progress towards restoring waters impaired by non-point source pollution, watershed-based plans that are developed or implemented with Section 319 funds must include at least the nine elements developed by the USEPA.

2.1 DEVELOPMENT OF USEPA MINIMUM ELEMENTS

The existing *Pontiac Creek Watershed Management Plan* already contains some of the USEAP minimum elements, although they are not necessarily identified as such. The Plan identifies and prioritizes the pollutants of concern within the watershed based on the

designated and "desired uses" for the water bodies in this study area. The Plan also identifies possible sources and causes for the pollutants of concern for the Pontiac Creek watershed. This information is presented in the existing Plan on Table 6, Prioritized Pollutants, Sources, and Causes in the Pontiac Creek Watershed.

The existing *Pontiac Creek Watershed Management Plan* also presents Best Management Practices (BMPs) to achieve the desired water quality improvement goals. The BMPs were used as a guideline to develop specific action items to attain the designated uses for the watershed. For each specific task, responsibilities are assigned as well as a time frame in which to complete the task. Methods were also developed to monitor the progress toward achieving the goals identified by the Steering and Technical Committee.

This Addendum presents the USEPA elements associated with each of the four major pollutants identified on Table 6 of the existing *Pontiac Creek Watershed Management Plan*, including:

- Bacteria/BOD/COD
- Nutrients/Phosphorus/Nitrogen
- Oil & Grease
- Sediments

The information developed for each of these pollutants of concern is summarized on individual tables, designated as Table A-1 through A-4, respectively, in the Appendix. The following sections outline the rationale utilized in obtaining and developing the information required for each USEPA Element, as presented on Tables A-1 through A-4 and presented in more detail in Section 3.0.

2.1.1 Element (a): Identification & Estimate of Extent

As described by the USEPA, this element requires that the cause and source of each pollutant be identified, along with an estimate of the extent to which these causes/sources are present in

the watershed. The major pollutants of concern, along with the associated possible sources and causes, are already identified in the *Pontiac Creek Watershed Management Plan*, based on baseline analytical water quality data and stream inventory results. To determine the extent to which the pollutant sources are present in the watershed, land use data available from the Southeast Michigan Council of Governments (SEMCOG), stream inventory data, and storm water drainage maps provided by the City were utilized.

The percentages of Pontiac and Waterford within the watershed are 43.6 percent and 5.7 percent, respectively. For estimating purposes, SEMCOG data for each community were multiplied by these percentages to estimate the number of households within the watershed and the land use percentages.

2.1.2 Element (b): Load Reduction Estimates

This element requires an estimate of the load reductions that are expected to be achieved by each of the management measures identified for each pollutant of concern. The load reduction estimates for sediments and nutrients were calculated, when possible, using the "Pollutants Controlled Calculation and Documentation for Section 319 Watershed Training Manual" developed by the MDEQ (Ref. 8). Load reduction estimates were also determined using actual data provided by the City of Pontiac and the Huron River Watershed Council. Where insufficient information was available to calculate load reductions, estimates were developed using typical expected BMP removal efficiencies. BMP removal efficiencies were based on information obtained from the USEPA "BMP Menu" website (www.epa.gov/npdes/stormwater/menuofbmp).

2.1.3 Element (c): BMP Description

This element requires a description of the non-point source management measures (e.g., BMPs) that will be implemented to achieve load reductions and identification of the critical areas in which these measures will be needed. After identifying possible sources and causes, BMPs were developed for each potential pollutant cause/source. Potential BMPs were initially investigated during the development of the *Pontiac Creek Watershed Management*

Plan to determine which BMPs would aid in attaining the goals of the Pontiac Creek Watershed. These BMPs were used to develop specific action items to be taken by the City of Pontiac, Waterford Township, and other stakeholders. A summary of the BMPs evaluated and "Recommended Action Items," are included in Sections 7.0 and 8.0, respectively, of the *Pontiac Creek Watershed Management Plan.*

To further address the USEPA requirements, the BMPs and "Recommended Action Items" identified in the *Pontiac Creek Watershed Management Plan* were re-evaluated with respect to the ease of implementation and the availability of funding. Because the City of Pontiac is located within the Clinton Main Subwatershed, the document titled "Clinton Main Subwatershed Major Survey Findings," (SEMCOG 2004) was reviewed to determine if other tasks needed to be considered based on the survey results. A copy of the referenced document is included in the Appendix.

2.1.4 Element (d): Cost Estimates & Technical/Financial Assistance

This element requires an estimate of the technical and financial assistance needed and the associated costs to implement the elements of the Plan. Cost estimates were developed using a variety of resources including the MDEQ and USEPA websites. Other resources, such as "www.bmpdatabase.org" and data from the Rouge River Watershed, Huron River Watershed, and Mill Creek Sub-Watershed were used to develop representative cost estimates. Where no cost data were available, professional judgment was used to develop the estimate. References for specific information sources are included in Section 5.0.

It is also anticipated that for the tasks that utilize public outreach programs, the Clinton River Watershed Council (CRWC) will provide the funding for materials and manpower as outlined in the Public Education Plan (PEP). Cost estimates for the communities involved in these tasks include only the promotion materials to advertise these tasks.

2.1.5 Element (e): Public Information & Education

This element, which requires a description of the information/education component that will be used to enhance public understanding and participation in the project, is not included on Tables A-1 through A-4, but is discussed separately in Section 3.0.

2.1.6 Element (f): Schedule for Implementation

This element requires a schedule for implementing the non-point source management measures (e.g., BMPs) that will be implemented under the Plan. Implementation of the management measures identified in the Plan has been described on the basis of "short-term," "mid-term," and "long-term" implementation schedules. Short-term is defined as 1 to 3 years; mid-term is defined as 3 to 7 years; and long-term is defined as 7 to 15 years to complete implementation.

The schedule for implementation is based on the assumption that funding for the tasks identified in the Plan is available and funding will be obtained. The schedule for implementation needs to be continually reviewed and adjusted accordingly if funds from anticipated grants are not available. In addition, depending on the BMPs developed for the Clinton Main Subwatershed, schedules may be readjusted to implement the same or similar tasks concurrently.

2.1.7 Element (g): Interim Measurable Milestones

This element requires a description of interim, measurable milestones for determining whether the non-point source management measures or actions are being implemented. Measurable milestones were developed to be dependant on the schedule for implementation. The milestones were defined by either completion of a task or implementation of the specific part of the task by a given time period. The milestones are to be utilized as a tool by the communities to determine the progress of the plan.

2.1.8 Element (h): Indicator Criteria

This element requires a set of criteria to determine whether loading reductions are being achieved over time and to measure progress in attaining the desired goals of the Plan. Criteria have been developed to determine if progress is being achieved to attain water quality standards. The criteria developed can also be utilized to determine if a specific task needs to be revised and/or additional tasks developed to meet the goals of the watershed.

2.1.9 Element (i): Monitoring Component

This element requires a description of the monitoring activities that will be used to evaluate the effectiveness of the implementation efforts, measured against the criteria established under Element (h). The monitoring component for this Plan includes the elements developed in Section 9.0 of the *Pontiac Creek Watershed Management Plan*. While it is anticipated that analytical water quality data will be needed to compare to the baseline water quality data collected in the initial stages of developing the Plan, other water quality based data are anticipated to be utilized for the watershed. Water quality based data anticipated to be used includes: road stream crossing surveys, erosion pin surveys, and macroinvertebrate surveys. These surveys are anticipated to be also utilized by the Clinton Main Subwatershed. Sample forms for these surveys are included in the Appendix.

It is anticipated that the CRWC will provide volunteers for some data collection for these surveys in the Pontiac Creek watershed as well as part of the effort for the Clinton Main Subwatershed. Initial water quality-based data was collected by the Clinton Main Subwatershed in two areas of the Pontiac Creek Watershed. This data is included in the Appendix.

3.0 RECOMMENDED BMPs & TASKS

For each BMP identified in Tables A-1 through A-4, specific objectives or tasks have been developed, which are to be implemented to aid in attaining the goals of the watershed. These tasks are identified on the following pages as Tasks 1 through 17. Note that Tables A-1 through A-4 provide a summary of EPA elements associated with each BMP; Tasks 1 through 17 provide detailed descriptions for each EPA element. These tasks are not listed in order of priority, but rather in order of pollutants, as identified on Tables A-1 through A-4.

It is anticipated that any of the tasks identified in Tasks 1 through 17 that are currently funded under the Clean Michigan Initiative (CMI) Non-point Source Pollution Control Grant will be continued and completed only if additional funding is granted under the MDEQ Section 319 Non-point Source Implementation Grant Program (319-IP) or other foundation grants. Other tasks are anticipated to be completed by the community's operating funds.

Task 1	Coordinate with Parks Department to eliminate/reduce wildlife (goose) waste runoff using comprehensive management techniques.
Objective	Reduce /prevent nutrients from parks and lake areas from entering surface water
Pollutant(s)	Nutrients, E.Coli
Source/Cause Estimate of Extent Component (a)	There are 7 parks and 3 lakes totaling approximately 460 acres within the watershed. The City of Pontiac estimates that the parks have a goose population of 50-100 per day. This equates to a phosphorous load of 60-120 pounds/year (Ref. 16). Goose excrement can contain e.coli/bacteria which can become a health risk if sufficient amounts reach surface water.
BMPs Component (c)	Alternative riparian vegetation (buffers). Taller vegetation can be established in the riparian corridors around lakes, wetland areas, and rivers. Hazing, egg addling, and physical barriers are also other alternatives.
Schedule/ Milestones Components (f), (g)	Year 1 - Evaluate current management practices to determine which BMPs are effective at discouraging geese populations. Year 2–5 Evaluate which alternative(s) best suits the needs of the parks and implement the practice, if necessary.
Estimated Load Reductions Component (b)	Geese reduction will depend on the practice being implemented, but on average, phosphorous loading will be reduced by 1.2 lbs/year for each goose displaced (Ref. 16). It is expected that changing management practices will reduce the amount of e.coli entering the system.
Responsible Parties	Parks and Recreation Department, Clinton River Watershed Council, Oakland County
Overall Task Duration and Priority	2-5 years
Potential Improvement Locations Component (c)	Public lakes and parks within the watershed.
Estimated Cost Component (d)	$14, 000 for vegetative filter strip for 6.5 miles of 50 foot buffer (45 acres total) (Ref.4)
Evaluation Component (h)	Estimate number of geese before and after implementing BMPs.
Monitoring Component (i)	Monitor water quality trends. The USEPA recommends that total phosphorous levels remain below 100 ug/l. Evaluation of this threshold should include annual observations of the stream for excessive aquatic plant and algae growth indicators during road stream crossing surveys and macroinvertebrate surveys. Monitoring to correspond with the five year MDEQ monitoring schedule. For e.coli, waters of the state protected for total body contact must meet limits of 130 e.coli per 100 ml as a 30-day average and 300 e.coli per 100 ml of water at any time. Monitor geese population trends.
Timeline for Evaluation	1-5 years

Task 2	Educate private landowners on the use of fertilizers, including low phosphorus fertilizers. Educate private landowners on how buffers can eliminate/reduce fertilizer from entering surface water
Objective	Reduce/eliminate nutrient inputs from residential yards from entering Pontiac Creek
Pollutant(s)	Nutrients
Source/Cause Estimate of Extent Component (a)	There are approximately 10,000 residential yards within the watershed that have the potential to overuse and/or misuse lawn fertilizers.
BMPs Component (c)	Conduct a workshop and/or provide information on preventing nutrient runoff and promoting use of low phosphorus. Message – Proper use of fertilizers and use of buffers can prevent nutrients from reaching our lakes and streams.
Schedule/ Milestones Components (f), (g)	Year 1 – Conduct a workshop covering this topic.
Estimated Load Reductions Component (b)	Attendees of the workshop can be expected to have a better understanding of their role in protecting water quality. It is expected that some of the attendees will change their management practices. This is expected to improve water quality.
Responsible Parties	City of Pontiac, Clinton River Watershed Council
Overall Task Duration and Priority	1 year – Moderate Priority
Potential Improvement Locations Component (c)	Outfall locations from residential areas
Estimated Cost Component (d)	$500/workshop
Evaluation Component (h)	Conduct a survey before and after the workshop. Conduct follow-up surveys to the public to determine if the public has made changes in practice and/or if additional workshops are necessary.
Monitoring Component (i)	Monitor water quality trends. The USEPA recommends that total phosphorous levels remain below 100 ug/l. Evaluation of this should include annual observations of the stream for excessive aquatic plant and algae growth indicators during road stream crossing surveys and macroinvertebrate surveys. Monitoring to correspond with the five year MDEQ monitoring schedule. Monitor geese population trends. Social survey trends.
Timeline for Evaluation	1-5 years

Task 3	Implement Illicit Discharge Elimination Program (IDEP)
Objective	Prevent e.coli from improper disconnects and illicit connections from entering surface water.
Pollutant(s)	E.Coli, Nutrients, BOD/COD
Source/Cause Estimate of Extent Component (a)	There are approximately 6700 acres of area within the watershed that initially were a Combined Sewer Overflow System (CSO). The CSO system was separated in the 1970s. Improper disconnects and illicit connections have the potential to discharge e-coli/nutrients to the watershed.
BMPs Component (c)	IDEP
Schedule/ Milestones Components (f), (g)	Year 1 – Identify area to study and begin identifying any residences or businesses with illicit connections. Year 2-3 – Complete IDEP in study area and identify further study areas, if necessary.
Estimated Load Reductions Component (b)	Reductions in e-coli could be reduced 50-75% after completion of the IDEP, based on data from the Huron River Watershed (Ref. 22). Approximately a 15% reduction in nitrogen and phosphorus is expected (Ref. 22).
Responsible Parties	City of Pontiac, Oakland County, Consultants
Overall Task Duration and Priority	2 years – High Priority for completion of the IDEP grant project
Potential Improvement Locations Component (c)	Storm sewer outfalls from the former CSO area.
Estimated Cost Component (d)	$ 200,000 to work with consultants to complete initial phase of the IDEP grant project (Ref. 6). Future IDEP implementation is anticipated to be completed with additional grant funding. Scope of work and costs to be determined after initial phase.
Evaluation Component (h)	Document number of residences and businesses in the study area surveyed and number of illicit connections detected and corrected.
Monitoring Component (i)	Water quality trends for e-coli. For e.coli, waters of the state protected for total body contact must meet limits of 130 e.coli per 100 ml as a 30-day average and 300 e.coli per 100 ml of water at any time. Number of disconnects completed and number of grants received.
Timeline for Evaluation	3 years

Task 4	Publicize and continue holding an annual Hazardous Waste drop off day in the watershed.
Objective	Reduce/eliminate hazardous waste used in residential applications from reaching the Pontiac Creek.
Pollutant(s)	Hazardous Waste/Pesticides/Herbicides/Fertilizers
Source/Cause Estimate of Extent Component (a)	There are approximately 12,500 households in the watershed that have the potential to improperly handle/dispose of hazardous waste.
BMPs Component (c)	Conduct Hazardous Waste drop off day. Message – it is illegal to dispose of hazardous materials in landfills and improper disposal can degrade water quality. The Hazardous Waste drop off day takes your hazardous waste and disposes of it properly.
Schedule/ Milestones Components (f), (g)	Year 1 - Publicize and hold Hazardous Waste drop off day.
Estimated Load Reductions Component (b)	It is expected that anyone that participates in the drop off day is disposing of their hazardous waste properly. It is also expected that continuing this event will increase the number of households participating in this event (Ref. 2). This is expected to maintain and/or improve water quality.
Responsible Parties	City of Pontiac, Oakland County, Clinton River Watershed Council
Overall Task Duration and Priority	1 to 10 years – High Priority
Potential Improvement Locations Component (c)	Residential areas
Estimated Cost Component (d)	$100,000 for disposal (Ref. 28)
Evaluation Component (h)	Increased number of participants each year. Increase in the amounts and types of hazardous waste collected.
Monitoring Component (i)	Participant and volumes of waste trends for Hazardous Waste days. Social survey trends.
Timeline for Evaluation	1 – 5 years

Task 5	Educate private landowners and/or provide information on Integrated Pest Management (IPM) and the safe use and disposal of pesticides. Also include information on the Household Hazardous Waste drop off day.
Objective	Reduce/eliminate pesticides used in residential applications from reaching surface water.
Pollutant(s)	Pesticides
Source/Cause Estimate of Extent Component (a)	There are approximately 12,500 households in the watershed that have the potential to improperly handle pesticides.
BMPs Component (c)	Conduct a workshop and/or provide information on the safe use and disposal of pesticides. Message – Proper handling, storage, use, and disposal protects the watershed.
Schedule/ Milestones Components (f), (g)	Year 1 – Conduct a workshop in IPM and safe use and disposal of pesticides.
Estimated Load Reductions Component (b)	Attendees of the workshop can be expected to have a better understanding of their role in protecting water quality. It is expected that a portion of the attendees will use IPM and change their management practices. This is expected to improve water quality.
Responsible Parties	City of Pontiac, Clinton River Watershed Council, MSUE.
Overall Task Duration and Priority	1 year – Low priority
Potential Improvement Locations Component (c)	Residential areas
Estimated Cost Component (d)	$500/workshop
Evaluation Component (h)	Conduct survey before and after the workshop.
Monitoring Component (i)	Conduct follow-up surveys to the public to determine if the public has made changes in practice and/or if additional workshops are necessary.
Timeline for Evaluation	1 to 5 years

Task 6	Coordinate with schools and parks to obtain pesticide application certification and certification in chemical use reduction and safety certification program.
Objective	Reduce/eliminate pesticides and nutrient use in school applications that enter surface water.
Pollutant	Pesticides, Nutrients
Source/Cause Estimate of Extent Component (a)	There are 13 schools and 7 parks totaling approximately 600 acres within the watershed.
BMPs Component (c)	Integrated Pest Management Plan, no spray zones, buffers, and vegetative filter strips.
Schedule/ Milestones Components (f), (g)	Year 1 - Enrollment of applicable personnel into certification program. Year 2 - Obtain certifications Year 3-7 Implement BMPs if necessary.
Estimated Load Reductions Component (b)	It is expected that obtaining certification in a pollution prevention program will require changes in practices and implementation of BMPs that control nutrient runoff. This will improve water quality. Implementation of vegetative filter strips/buffers can be expected to remove up to 85% TSS and 20% Nitrogen (Ref. 25).
Responsible Parties	Parks and Recreation, Schools, Oakland County, MDEQ
Overall Task Duration and Priority	2 year – High Priority
Potential Improvement Locations Component (c)	Outfall locations at parks and schools, non-point source runoff throughout the entire watershed.
Estimated Cost Component (d)	$14,000 cost of implementing BMPs on 45 acres. (Ref. 4)
Evaluation Component (h)	Successful completion of water quality certification.
Monitoring Component (i)	Monitor water quality trends. The USEPA recommends that total phosphorous levels remain below 100 ug/l. Evaluation of this threshold should include annual observations of the stream for excessive aquatic plant and algae growth indicators through road stream crossing and macroinvertebrate surveys. Monitoring to correspond with the five year MDEQ monitoring schedule. Number of people in certification program.
Timeline for Evaluation	1 to 3 years

Task 7	Develop and implement stormwater education programs.
Objective	Prevent pollutants of concern from urban areas from reaching surface water.
Pollutant(s)	All
Source/Cause Estimate of Extent Component (a)	There are approximately 100 storm drain outfalls that potentially carry pollutants into Pontiac Creek. The entire watershed area of approximately 10.6 square miles is primarily in an urban land use within the watershed.
BMPs Component (c)	Provide information to landowners through newspaper articles, newsletter, and public service announcements. Message – Storm drains discharge directly to water bodies.
Schedules/ Milestones Component (f), (g)	Year 1 - Obtain public service announcement campaigns and add local contact information. Year 1-5 Publish one newspaper article per quarter in the local newspapers regarding stormwater issues. Publish a bi-annual newsletter for residents.
Estimated Load Reductions Component (b)	It is expected that some landowners exposed to information and education campaigns will change their practices based on a greater awareness of water quality issues. This is expected to improve and/or maintain water quality.
Responsible Parties	City of Pontiac, Road Commission of Oakland County, Clinton River Watershed Council, MSUE
Overall Task Duration and Priority	1 to 5 years to complete – Moderate priority
Potential Improvement Locations Component (c)	Storm drain outfall locations.
Estimated Cost Component (d)	$1,500/newsletter (Ref. 5)
Evaluation Component (h)	Survey landowners before and after about their management techniques to determine if a change in practices had been made, or if more education efforts are needed.
Monitoring Component (i)	Social surveys. Road stream crossing and macroinvertebrate survey trends.
Timeline for Evaluation	1 to 5 years

Task 8	Develop and implement community-wide storm drain stenciling program
Objective	Prevent pollutants of concern from urban areas from reaching surface water.
Pollutant(s)	All
Source/Cause Estimate of Extent Component (a)	There are approximately 4500 storm drain inlets throughout the Pontiac Creek Watershed.
BMPs Component (c)	Conduct community-wide storm drain stenciling program. Message – Storm drains discharge directly to water bodies and impacts the watershed.
Schedule/Milestones Components (f), (g)	Year 1 - Develop drain stencil Years 1-5 - Stencil stormwater intakes in the watershed. Develop lesson plan and materials for stormwater education for students.
Estimated Load Reductions Component (b)	Stenciling the drains can be expected to result in increased awareness of landowner impacts to surface water. This should result in a change in practices that will improve and maintain water quality.
Responsible Parties	City of Pontiac, Clinton River Watershed Council
Overall Task Duration and Priority	1 to 5 years – Moderate priority
Potential Improvement Locations Component (c)	Storm drain outfall locations.
Estimated Cost Component (d)	$45,000 (Ref. 14, 27)
Evaluation Component (h)	Before and after photographs, document the number of sites stenciled, before and after surveys of drain stencil program.
Monitoring Component (i)	Post surveys to participants to determine knowledge gained.
Timeline for Evaluation	5 to 7 years

Task 9	Reduce and delay runoff from parking lots and residential/commercial developments through incentive programs that promote installation of BMPs in urban areas
Objective	Prevent oils, grease, and sediments from urban areas from reaching surface water.
Pollutant(s)	Oils&Grease (O&G) / Sediments
Source/Cause Estimate of Extent Component (a)	There are approximately 100 storm drain outfalls that potentially carry O&G and sediments into Pontiac Creek Watershed. The entire watershed area of approximately 10.6 square miles is primarily an urban land use within the watershed.
BMPs Component (c)	Porous pavement, vegetative ponding areas around parking lots, grassy islands in parking lots, grassed waterways draining parking lots, gravel driveways, contoured landscaping, vegetative depressions, detention basins, and green roofs, street narrowing, traffic calming, rain gardens.
Schedule/ Milestones Components (f), (g)	Years 1-2 Obtain "buy in" from building officials and other permitting agencies. Year 1-3 Coordinate with responsible parties to establish incentives to install BMPs. Years 3-10. Have at least 10% of new construction and or redevelopments utilizing the incentive program each year.
Estimated Load Reductions Component (b)	Each BMP implemented can be expected to reduce or prevent runoff from the site. This will result in improved water quality. Depending on BMP proposed, up to 50 % O&G and 50-90% reduction in TSS can be expected (Ref. 4). For porous pavement up to 90% reduction in TSS (Ref. 26).
Responsible Parties	City of Pontiac, Building Officials, Permitting Officials.
Overall Task Duration and Priority	1 to 10 years – Moderate priority
Potential Improvement Locations Component (c)	Outfall locations
Estimated Cost Component (d)	Dependant on proposed incentive. Porous pavement $45,000-$100K/acre, vegetative swales $17,000/acre. (Ref: 4,14,25,26)
Evaluation Component (h)	Increased number of entities participating, increased of BMPs installed. Meeting goal of 10-25% participation in 10 years.
Monitoring Component (i)	Trends in number of entities participating in incentive program. Monitor water quality trends through road stream crossing and macroinvertebrate surveys.
Timeline for Evaluation	1 to 15 years

Task 10	Investigate and prioritize implementation of structural BMPs on high priority streambanks to reduce the amount of sediment entering the river.
Objective	Prioritize streambank stabilization sites based on data collected by the Clinton River Subwatershed and/or independent hydrology study, and determine stabilization techniques for sites determined to need installation of corrective measures.
Pollutant	Sediment
Source/Cause Estimate of Extent Component (a)	Stream bank erosion – 2 sites totaling 4000 feet in length. Approximately 6.5 miles of stream bank are in the watershed that needs protection in order to keep in their current natural state.
BMPs Component (c)	Slope/shoreline stabilization, streambank stabilization, critical care stabilization, bioengineering, re-vegetation, stairways, rock riprap.
Schedule/ Milestones Component (f), (g)	Year 1-5 – Review data collected by Clinton River Subwatershed to determine and prioritize linear feet of streambank targeted for corrective measures and/or determine if data is adequate. Year 5-7 – Determine corrective measure and costs associated with implementing corrective measures. Year 7-10 - Secure funding for sites determined to need corrective measures.
Estimated Load Reductions Component (b)	For each site currently experiencing erosion, the BMPs will control erosion. This would be a reduction of up to 79 tons/yr of sediment for 2000 feet of streambank stabilization (Ref. 3,7,8, 20).
Responsible Parties	City of Pontiac, Oakland County, Clinton River Watershed Council, Clinton River Subwatershed
Overall Task Duration and Priority	7-10 years to complete – Moderate priority
Potential Improvement Locations Component (c)	Streambank locations
Estimated Cost Component (d)	$40,000 to implement 2000 feet of streambank stabilization.
Evaluation Component (h)	Take before and after photographs and document number of sites completed. Conduct erosion pin calculations, road crossing surveys, and macroinvertebrate surveys at locations for initial stream inventory.
Monitoring Component (i)	TSS levels for the watershed should remain at or below 20 mg/L in order to maintain "clear" water. This should be evaluated visually on a routine basis each year along with monitoring every five years to coincide with MDEQ biosurvey schedule.
Timeline for Evaluation	1 to 10 years

Task 11	Target riparian landowners with information regarding maintenance of shoreline protection measures including: streambank stabilization, critical area treatment, conservation easements, wetlands, wildlife habitat, etc.
Objective	Encourage riparian owners to maintain and/or repair streambank sites.
Pollutant	Sediment
Source/Cause Estimate of Extent Component (a)	Approximately 6.5 miles of streambank in the watershed need protection in order to remain in their current stable state.
BMPs Component (c)	Publish and mail newsletters/fliers highlighting incentive programs
Schedule/ Milestones Component (f), (g)	Year 1 - Establish a mailing list targeting riparian landowners in the watershed. Year 1-5 - Produce and mail one flyer/newsletter per quarter and conduct workshops for riparian landowners on landscaping for water quality.
Estimated Load Reductions Component (b)	It is expected that exposure through the newsletter/flyer information will change some landowner's practices and encourage participation in programs that protect water quality. This is expected to improve and maintain current water quality. Landowners who attend workshops may change their current shoreline management practices. This is expected to improve and maintain current water quality.
Responsible Parties	City of Pontiac, Oakland County, MSUE, Clinton River Watershed Council
Overall Task Duration and Priority	5 years to complete – High priority
Potential Improvement Locations Component (c)	Riparian shorelines
Estimated Cost Component (d)	$500/workshop, $1500/newsletter
Evaluation Component (h)	Record contacts generated by mailings. Conduct before and after surveys in conjunction with workshops. Record number of completed conservation easements.
Monitoring Component (i)	Monitor water quality trends. TSS levels for the watershed should remain at or below 20 mg/L in order to maintain "clear" water. This should be evaluated visually on a routine basis each year through road stream crossing and macroinvertebrate surveys. Monitoring every five years to coincide with MDEQ monitoring schedule.
Timeline for Evaluation	1 to 15 years

Task 12	Utilize baseline road crossing survey results and baseline data collected by the Clinton Main Subwatershed to establish a water quality monitoring program
Objective	Establish a stream inventory program to monitor and identify problems within the watershed. Train personnel on the stream inventory program to identify problems at areas surveyed.
Pollutant	Sediment
Source/Cause Estimate of Extent Component (a)	20 total road/stream crossings requiring continued maintenance in order to maintain riparian area around them current state.
BMPs Component (c)	Stream Inventory Program
Schedules/ Milestones Components (f), (g)	Year 1-3 – Gather and train volunteers. Year 1-5 Develop database and evaluation methods and a method to incorporate results into decision making processes Year 5-7 Begin implementing program and evaluation process to evaluate and prioritize projects.
Estimated Load Reductions Component (b)	Integrating the road-stream crossing form into current inventory documents/procedures can be expected to result in earlier identification of eroding areas and more information about the impacts of these areas so that the City can prioritize their maintenance and repair efforts. This can be expected to improve and/or maintain water quality.
Responsible Parties	City of Pontiac, Oakland County, Clinton River Watershed Council
Overall Task Duration and Priority	5 to 7 years – High priority
Potential Improvement Locations Component (c)	Road stream crossings, entire watershed
Estimated Cost Component (d)	$10,000/year. Utilize Clinton River Watershed Council to provide training/volunteers for some of the sites.
Evaluation Component (h)	Monitoring results to determine effectiveness and value of survey forms.
Monitoring Component (i)	Monitor water quality trends. TSS levels for the watershed should remain at or below 20 mg/L in order to maintain "clear" water. This should be evaluated visually on a routine basis each year through road stream crossing and macroinvertebrate surveys. Monitoring every five years to coincide with MDEQ monitoring schedule.
Timeline for Evaluation	2 to 10 years.

Task 13	Continue street sweeping operations
Objective	To reduce the amount of sediments entering surface water.
Pollutant	Sediment
Source/Cause Estimate of Extent Component (a)	There are approximately 5,000 storm drain catch basins within the watershed that potentially carries sediments to the watershed.
BMPs Component (c)	Street sweeping
Schedule/ Milestones Components (f), (g)	Year 1 – Continue street sweeping operations on monthly basis. Year 2-5 – Evaluate effectiveness of street sweeping operations and equipment. Determine if resources/need to increase frequencies, upgrade equipment, etc.
Estimated Load Reductions Component (b)	A reduction of approximately 1300 tons/year of sediment, debris, and leaves is expected. (Ref. 13)
Responsible Parties	City of Pontiac, Oakland County
Overall Task Duration and Priority	5 years – High priority
Potential Improvement Locations Component (c)	Storm drain catch basins
Estimated Cost Component (d)	$25,000/year for labor (Ref. 23), $30,000/ year for disposal (Ref. 13)
Evaluation Component (h)	Record amount of debris and sweeping frequencies. Water quality surveys.
Monitoring Component (i)	Monitor water quality trends. TSS levels for the watershed should remain at or below 20 mg/L in order to maintain "clear" water. This should be evaluated visually on a routine basis each year through road stream crossing and macroinvertebrate surveys. Monitoring every five years to coincide with MDEQ monitoring schedule. Trends in amount of debris collected/disposed.
Timeline for Evaluation	3-5 years

Task 14	Conduct training to contractors and inspectors in Best Management Practices for soil erosion control. Implement inspection program.
Objective	Reduce/eliminate construction site erosion
Pollutant	Sediment
Source/Cause Estimate of Extent Component (a)	There are approximately 100 construction sites per year within 500 feet of surface water or larger than 1 acre in size requiring contractor training and permitting.
BMPs Component (c)	Conduct workshop highlighting how to comply with Part 91 soil erosion requirements and BMPs.
Schedule/ Milestones Component (f), (g)	Year 1 - Obtain a list of area contractors and inspectors. Year 1-2 Develop training materials and presentation Year 2-5 Conduct training and inspections.
Estimated Load Reductions Component (b)	It can be expected that workshop attendees will have an increased knowledge of soil erosion BMPs and the steps involved in the Part 91 permitting process. This should result in a change or practices that can be expected to improve and/or maintain water quality.
Responsible Parties	City of Pontiac
Overall Task Duration and Priority	5 years – Moderate priority
Potential Improvement Locations Component (c)	Construction sites
Estimated Cost Component (d)	$25,000/year
Evaluation Component (d)	Reduced numbers of permit violations, before and after acknowledge gained survey. Increased number of inspections.
Monitoring Component (i)	Follow up with contractors following the workshop to determine if practices have changed or if more workshops are needed. Permit violation trends. Inspection trends.
Timeline for Evaluation	1 to 5 years

Task 15	Conduct catch basin inspection/cleaning program
Objective	Prevent/reduce sediment entering storm drains.
Pollutant	Sediment
Source/Cause Estimate of Extent Component (a)	There are approximately 5,000 storm drain catch basins within the watershed that potentially carry sediments to the watershed.
BMPs Component (c)	Annual inspection/cleaning program
Schedules/ Milestones Components (f), (g)	Years 1 – Organize work crew and implement BMPs at select sites. Years 2-10 – Continue maintenance program that is conducted on a yearly basis.
Estimated Load Reductions Component (b)	It is expected that a routine maintenance program will reduce the amount of sediments entering the river, resulting in a 30-90% reduction of TSS (Ref. 23).
Responsible Parties	City of Pontiac
Overall Task Duration and Priority	3 to 10 years – High priority
Potential Improvement Locations Component (c)	Lakes, Clinton River and tributaries
Estimated Cost Component (d)	$22,000/year (Ref. 14,17), assume 5-year cycle
Evaluation Component (h)	Document the number and location of storm drains inspected each year as well as those that needed cleaning/repairs. Document amount of debris collected. Monitoring results.
Monitoring Component (i)	Monitor survey trends for TSS. TSS levels for the watershed should remain at or below 20 mg/L in order to maintain its current status as "clear" water. This threshold should be evaluated visually on a routine basis each year through road stream crossing, erosion pin, and macroinvertebrate surveys along with monitoring ever five years to coincide with MDEQ sampling schedule.
Timeline for Evaluation	3 to 10 years

Task 16	Repair storm drain catch basin structures.
Objective	Prevent/reduce sediment entering river from storm drains
Pollutant	Sediment
Source/Cause Estimate of Extent Component (a)	There are approximately 5000 storm drain catch basin structures in the Pontiac Creek Watershed that are in need of repair and potentially carry sediment into the watershed. An initial 165 catch basin structures were identified as needing repair. Repair is scheduled to be completed in mid-2005.
BMPs Component (c)	Catch basin repair
Milestones/ Schedule Components (f), (g)	Year 1 – Complete catch basin repair program. Year 2 – 5 – Repair catch basins structure in need of repair on an annual basis.
Estimated Load Reductions Component (b)	It is expected that implementation of a repair program will reduce the amount of sediments entering the river, resulting in a 30-90% reduction of TSS (Ref. 23).
Responsible Parties	City of Pontiac
Overall Task Duration and Priority	1 to 5 years to complete – High priority
Potential Improvement Locations Component (c)	Lakes, Clinton River and tributaries
Estimated Cost Component (d)	$25,000/year (Ref. 14, 17), assume 10/year need repair
Evaluation Component (h)	Document the number and location of storm drains repaired. Monitoring results.
Monitoring Component (i)	Monitor survey trends for TSS. TSS levels for the watershed should remain at or below 20 mg/L in order to maintain its current status as "clear" water. This threshold should be evaluated visually on a routine basis each year through road stream crossing, erosion pin, and macroinvertebrate surveys along with monitoring ever five years to coincide with MDEQ sampling schedule.
Timeline for Evaluation	1 to 6 years

Task 17	Review relevant ordinances and evaluate current land uses.
Objective	Preserve open space. Protect identified sensitive areas and decrease impervious surfaces in order to limit runoff and land cover changes associated with increased development.
Pollutant(s)	Sediments, Excessive flow
Source/Cause Estimate of Extent Component (a)	There are approximately 10.6 square miles of primarily urban area within the watershed.
BMPs Component (c)	Land use evaluation, conservation by design, low impact development, impervious surface reduction/minimization, storm water management, floodplain protection, wetland protection, conservation easements/preserves.
Schedule/ Milestones Component (f), (g)	Years 1-5 – Utilize information gathered by the Clinton River Subwatershed to determine options for better protection of natural resources. Identify current ordinances that need to be changed and/or identify additional ordinances that can be adopted by the City. Year 5-10 – Adopt 25% of the ordinances identified in the evaluation. Year 10-15 – Complete adoption of ordinances identified in the evaluation.
Estimated Load Reductions Component (b)	After completing the evaluation, it is expected that the City of Pontiac will better understand their natural resources and how to protect them. This will result in improved or maintained water quality.
Responsible Parties	City of Pontiac, Clinton River Subwatershed
Overall Task Duration and Priority	5 to 15 years – Moderate priority
Potential Improvement Locations Component (c)	Outfall locations
Estimated Cost Component (d)	$25,000 (Ref.14), assume conducted by City of Pontiac personnel
Evaluation Component (h)	Increased number of ordinances revised or adopted relating to reducing flow/sediment. Focus group sessions to evaluate the effectiveness of ordinances.
Monitoring Component (i)	Monitor survey trends for TSS. TSS levels for the watershed should remain at or below 20 mg/L in order to maintain its current status as "clear" water. This threshold should be evaluated visually on a routine basis each year through road stream crossing, erosion pin, and macroinvertebrate surveys along with monitoring ever five years to coincide with MDEQ sampling schedule.
Timeline for Evaluation	2 – 15 years (results may be long term)

4.0 PUBLIC INFORMATION & EDUCATION ACTIVITIES

The CRWC has developed a Public Education Plan (PEP) for the Upper Clinton, Clinton Main, and Rouge 1-2 Watersheds in an effort to address the Phase II Stormwater permit requirements. This PEP has been reviewed by the MDEQ, and comments and deficiencies have been addressed. The revised PEP was approved on September 26, 2005.

The CRWC has agreed to provide the programs outlined in their PEP to any community within the aforementioned watersheds. Since the City of Pontiac is a community within the Clinton Main and Rouge 1-2, they have subscribed to the services offered by CRWC and have signed a four-year contract with the watershed council.

The goal of the PEP is to promote and publicize watershed awareness and encourage the public to reduce the discharge of pollutants to the watershed. The objectives and activities outlined in the PEP address the information/education component (EPA element (e)) for each of the tasks outlined in Section 3.0 of this Addendum and include:

- Educating the public regarding their responsibility and stewardship in their watershed.

- Educating the public on the separate stormwater system, where the stormwater system discharges, and the potential impacts of pollutants on the watershed from the separate stormwater system.

- Encouraging the public to report the presence of illicit discharges or improper disposal of materials to the separate stormwater system.

- Educating and encouraging the public to minimize the amount of residential waste washed into stormwater catch basin. This includes education information on the preferred cleaning methods for washing cars and pavement, or power washing; acceptable methods for application and disposal of pesticides and fertilizers; and the acceptable methods for disposal of grass clipping, leaf litter, and pet waste.

- Educating the public on the locations for acceptance of household hazardous wastes, travel trailer sanitary wastes, chemicals, yard wastes, and motor vehicle fluids.

- Educating the public concerning the importance and maintenance of riparian lands to protect water quality.

5.0 ACTION PLAN FOR THE PONTIAC CREEK WATERSHED

The 18 tasks presented in Section 3.0 provide the City of Pontiac a variety of BMPs that can be implemented in the Pontiac Creek Watershed. A number of the recommended BMPs have already been implemented within the watershed, and current plans include continuing these BMPs. These activities include: street sweeping, catch basin inspection and cleaning/repair program, an IDEP, and some of the public outreach programs. The remainder of the public outreach programs are intended to be implemented within the first 5 years of implementing the Plan with assistance from the Clinton River Watershed Council. The remainder of the BMPs are intended to be implemented within a 5 to 7-year timeframe. Implementation schedules may change depending on available resources and staff.

In order to evaluate the effectiveness of the watershed management plan, the evaluation and monitoring methods outlined for each BMP will need to be implemented. The CRWC will provide certain methods, such as surveys performed during the public outreach programs. Some of the water quality monitoring is also intended to be provided by the CRWC through the use of volunteers. However, the City of Pontiac will need to provide additional resources to implement the evaluation and monitoring methods not provided by the CRWC. Because the City of Pontiac is also part of the Clinton Main Subwatershed and Rouge River Watershed, evaluation and monitoring programs already in place or intended to be implemented for those watersheds that are similar to those needed for this Plan may be used to minimize duplication efforts.

6.0 REFERENCES

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TABLE A-1
SUMMARY OF EPA ELEMENTS PRIORITIZED POLLUTANTS, SOURCES, AND CAUSES
IN THE PONTIAC CREEK WATERSHED – BACTERIA BOD/COD
(REFERENCE TABLE 6 FROM THE PONTIAC CREEK WATERSHED MANAGEMENT PLAN DATED DECEMBER, 2003)

	SUMMARY OF EPA ELEMENT COMPONENTS									
Pollutants of Concern	**(a) Possible Sources**	**(a) Possible Causes**	**(a) Estimate of Extent**	**(b) Load Reduction Estimate**	**(c) BMP Description** (Associated Tasks listed in parenthesis) (Refer to Section 3.0 for Details)	**(d) Cost Estimate**	**(f) Schedule for Implementation**	**(g) Interim Measurable Milestones**	**(h) Set of Criteria**	**(i) Monitoring Component**
Bacteria BOD/COD	Animal Waste	Goose Population Animal Waste Runoff	Approximately 460 acres in the watershed are parks and lake areas.	Phosphorus loading reduced by 1.2 lb/yr for each goose displaced. (Ref. 16)	Goose Population Management (1,7) Vegetative Buffers (1) Public Outreach Programs (7)	$14,000	Mid-term	Determine which BMP is effective by Year 5	Reduction in number of geese after implementing BMPs	Goose population trends Water quality trends for e-coli
		Improper Disposal of Pet Waste	Approximately 460 acres in the watershed are parks and lake areas.	Expect some of the attendees to change management practices. This is expected to improve water quality.	Public Outreach Programs (7)	$500/workshop	Mid-term	Complete and implement programs by Year 5	Survey results of landowners before and after about management techniques	Social surveys Water quality trends for e-coli
	Sewage	Sanitary Sewer Overflow/Failure	Approximately 6700 acres within the watershed was initially CSO System that was separated in the 1970s	E-coli loadings reduced 50-75 % after IDEP completed (Ref. 22)	Illicit Discharge Elimination Program (3) Public Outreach Programs (7)	$500/workshop plus $50,000 for ordinance review	Short-term	Complete initial educational materials by Year 2	Survey results of landowners and businesses before and after about management techniques	Water quality trends for e-coli
		Illicit Discharges Improper Disconnect	Approximately 6700 acres within the watershed was initially CSO System that was separated in the 1970s	E-coli loadings reduced 50-75 % after IDEP completed (Ref 22)	Illicit Discharge Elimination Program (3)	$200,000 for implementation of the initial project	Short-term for completion of grant	Complete IDEP study by Year 3 Complete disconnects by year 7	Document number of residences and businesses in study Reduction in the number of illicit connections	Water quality trends for e-coli Number of disconnects completed Number of grants received
	Grass Clippings, Leaf Litter, and Trash	Improper Disposal	There are approximately 12,500 households within the watershed	Expect some of the attendees to change management practices this is expected to improve water quality.	Public Outreach Programs (7)	$500/workshop	Mid-term	Complete and implement programs by Year 5	Survey results of landowners and businesses before and after about management techniques	Social surveys Macroinvertebrate trends Road stream crossing surveys

Note: Element (e) not included on this table. Refer to Section 4.0 of the Addendum for a description of the Education/Public Information component of the Plan

Note: Short term = 1 – 3 years
Mid-term = 3 – 7 years
Long-term = 7 – 15 years

TABLE A-2
SUMMARY OF EPA ELEMENTS PRIORITIZED POLLUTANTS, SOURCES, AND CAUSES
IN THE PONTIAC CREEK WATERSHED – NUTRIENT PHOSPHORUS / NITROGEN
(REFERENCE TABLE 6 FROM THE PONTIAC CREEK WATERSHED MANAGEMENT PLAN DATED DECEMBER, 2003)

Pollutants of Concern	SUMMARY OF EPA ELEMENT COMPONENTS									
	(a) Possible Sources	(a) Possible Causes	(a) Estimate of Extent	(b) Load Reduction Estimate	(c) BMPs (Associated Tasks listed in parenthesis) (Refer to Section 3.0 for Details)	(d) Cost Estimate	(f) Schedule for Implementation	(g) Interim Measurable Milestones	(h) Set of Criteria	(i) Monitoring Component
Nutrient Phosphorus / Nitrogen	Animal Waste	Goose Population Animal Waste Runoff	Approximately 460 acres in the watershed are parks and lake areas.	Phosphorus loading reduced by 1.2lb/yr for each goose displaced. (Ref. 16)	Goose Population Management (1,7) Vegetative Buffers (1) Public Outreach Programs (7)	$14,000	Short -term	Determine which BMP is effective by Year 3	Reduction in number of geese after implementing BMPs Survey results	Goose population trends Water quality trends for e-coli
		Improper Disposal of Pet Waste	Approximately 460 acres in the watershed are parks and lake areas.	Expect some of the attendees to change management practices. This is expected to improve water quality.	Public Outreach Programs (7)	$500/workshop	Mid-term	Complete and implement programs by Year 5	Survey results of landowners before and after about management techniques	Social surveys Water quality trends for e-coli
	Sewage	Septic Failure	Less than 50 of the households have septic systems	Total phosphorus loadings reduced by approx. 15% after IDEP completed Total Nitrogen loadings reduced by approx. 18% (Ref. 22)	Illicit Discharge Elimination Program (3) Public Outreach Programs (4,7)	$500/workshop	Mid-term	Complete initial educational materials by Year 2	Increased usage of coupons	Water quality trends for e-coli
		Illicit Discharges Improper Disconnect	Approximately 6700 acres within the watershed was initially CSO System that was separated in the 1970s	Total phosphorus loadings reduced by approx. 15% after IDEP completed Total Nitrogen loadings reduced by approx. 18% (Ref. 22)	Illicit Discharge Elimination Program (3)	$200,000 for implementation of the initial project	Short-term for completion of grant	Complete IDEP study by Year 3	Document number of residences and businesses in study Reduction in the number of illicit connections	Water quality trends for e-coli Number of disconnects completed
	Residential/ Commercial Runoff	Overuse/Misuse of Lawn Fertilizers	There are over 10,000 residential yards and over 600 acres of schools and parks within the watershed	For 150 feet of filter strip/buffer removal of up to: 20% removal N 40% removal P 84% removal TSS (Ref. 25)	Integrated Pest Management (6) Vegetative Filter Strips/Buffers (6) Public Outreach Programs (2,4,5)	$500/workshop plus $14,000 for vegetative filter strip	Mid-term	Complete BMPs by Year 7 Obtain certifications by Year 2	Conduct follow-up surveys Increase in number of people completing pesticide certification program. Reduction in pesticide usage before and after certification	Social surveys Pesticide usage trends Number of people in certification program Macroinvertebrate trends Road stream crossing surveys
	Grass Clippings, Leaf Litter, and Trash	Improper Disposal	There are approximately 12,500 households within the watershed	Expect some of the attendees to change management practices. This is expected to improve water quality.	Public Outreach Programs (7)	$500/workshop	Mid-term	Complete and implement programs by Year 5	Survey results of landowners and businesses before and after about management techniques	Social surveys Macroinvertebrate trends Road stream crossing surveys

Note: Element (e) not included on this table. Refer to Section 4.0 of the Addendum for a description of the Education/Public Information component of the Plan

Note: Short term = 1 – 3 years
Mid-term = 3 – 7 years
Long-term = 7 – 15 years

TABLE A-3
SUMMARY OF EPA ELEMENTS TABLE FOR PRIORITIZED POLLUTANTS, SOURCES, AND CAUSES IN THE PONTIAC CREEK WATERSHED – OIL AND GREASE
(REFERENCE TABLE 6 FROM THE PONTIAC CREEK WATERSHED MANAGEMENT PLAN DATED DECEMBER, 2003)

Pollutants of Concern	SUMMARY OF EPA ELEMENT COMPONENTS									
	(a) Possible Sources	(a) Possible Causes	(a) Estimate of Extent	(b) Load Reduction Estimate	(c) BMPs (Associated Tasks listed in parenthesis) (Refer to Section 3.0 for Details)	(d) Estimates Cost	(f) Schedule for Implementation	(g) Interim Measurable Milestones	(h) Set of Criteria	(i) Monitoring Component
Oil & Grease	Above-Ground Fuel Storage	Improper Storage Procedures/Containment	Approximately 1000 acres of industrial land use within the watershed	Dependent on proposed incentive up to 50% reduction in O&G (Ref. 4)	Public Outreach Programs (7) Stormwater Management (9)	Dependent on incentive proposed $1500/newsletter $500/workshop	Long-term	Complete public outreach program by Year 7	Increased number of BMPs implemented Survey results	Social Survey Macroinvertebrate trends Road stream crossing survey trends
	Accidental Spills	Improper Storage/Handling Procedures	Approximately 1000 acres are industrial within the watershed	Dependent on incentive proposed up to 50% reduction in O&G (Ref. 4)	Public Outreach Programs (7) Stormwater Management (9)	Dependent on incentive proposed $1500/newsletter $500/workshop	Long-term	Complete public outreach program by Year 7	Increased number of BMPs implemented Survey results	Social Survey Macroinvertebrate trends Road stream crossing survey trends
	Household Waste	Improper Disposal of Household Waste	There are approximately 12,500 households within the watershed and approximately 100 storm drain outfalls that have the potential to carry pollutants to the watershed.	Expect some of the attendees to change management practices. This is expected to improve water quality.	Public Outreach Programs (4,5)	$1500/newsletter $500/workshop	Short-term	Completion of workshops by Year 2	Increased number of participants in Hazardous Waste Days. Increase volumes of waste collected Survey results	Participant and volumes of waste for Hazardous Waste Day trends Social surveys
	Industrial Runoff	Impervious Surfaces Insufficient Stormwater Management Practices	Approximately 1000 acres are industrial within the watershed	Dependent on incentive proposed up to 50% reduction in O&G (Ref. 4)	Stormwater Management (9) Public Outreach Programs (7) Ordinance Review (17)	Dependent on incentive proposed $1500/newsletter $500/workshop $50,000 for Ordinance Review	Long-term	Road stream crossings surveys Erosion pin survey Macroinvertabrate survey	Monitoring results	Macroinvertebrate trends Road stream crossing survey trends Erosion pin survey trends
	Parking Lot Runoff	Impervious Surfaces Insufficient Stormwater Management Practices	Approximately 1500 acres are industrial or commercial within the watershed.	Dependent on incentive proposed up to 50% reduction in O&G (Ref. 4)	Stormwater Management (9) Public Outreach Programs (7) Ordinance Review (17) Street Sweeping (13)	Dependent on incentive proposed $1500/newsletter $500/workshop $50,000 for Ordinance Review	Long-term	Road stream crossings surveys Erosion pin survey Macroinvertabrate survey	Monitoring results Survey results Increased/revised number of ordinances to reduce runoff/sediments	Macroinvertebrate trends Road stream crossing survey trends Erosion pin survey trends Number of Ordinances adopted or revised
	Roadside Runoff	Sediment/Erosion Insufficient Stormwater Management Practices	Approximately 100 outfalls in the watershed that have the potential to carry sediments to Pontiac Creek	Dependent on incentive proposed up to 50% reduction in O&G (Ref. 4)	Stormwater Management (9) Public Outreach Programs (7) Ordinance Review (17)	Dependent on incentive proposed $1500/newsletter $500/workshop $50,000 for Ordinance Review	Long-term	Road stream crossings surveys Erosion pin survey Macroinvertabrate survey	Monitoring results Survey results Increased/revised number of ordinances to reduce runoff/sediments	Macroinvertebrate trends Road stream crossing survey trends Erosion pin survey trends Number of Ordinances adopted or revised

Note: Element (e) not included on this table. Refer to Section 4.0 of the Addendum for a description of the Education/Public Information component of the Plan

Note: Short term = 1 – 3 years
Mid-term = 3 – 7 years
Long-term = 7 – 15 years

TABLE A-4
SUMMARY OF EPA ELEMENTS TABLE FOR PRIORITIZED POLLUTANTS, SOURCES, AND CAUSES IN THE PONTIAC CREEK WATERSHED – SEDIMENTS
(REFERENCE TABLE 6 FROM THE PONTIAC CREEK WATERSHED MANAGEMENT PLAN DATED DECEMBER, 2003)

Pollutants of Concern	SUMMARY OF EPA ELEMENT COMPONENTS									
	(a) Possible Sources	(a) Possible Causes	(a) Estimate of Extent	(b) Load Reduction Estimate	(c) BMPs (Associated Tasks listed in parenthesis) (Refer to Section 3.0 for Details)	(d) Cost Estimate Cost	(f) Schedule for Implementation	(g) Interim Measurable Milestones	(h) Set of Criteria	(i) Monitoring Component
Sediments	Construction Site Runoff	Improper Sediment/Erosion Control	There are approximately 100 construction sites per year requiring training and permitting.	Expect some of the attendees to change management practices. This is expected to improve water quality.	Public Outreach Programs (14) Ordinance Review (17)	$25,000/year for train/inspections Ordinance Review - $50,000	Short-term/ Long-term	Record of Inspections	Reduced number of permit violations Increased/revised number of ordinances to reduce runoff/sediments	Permit violation trends Macroinvertebrate trends Road stream crossing survey trends Erosion pin survey trends Number of Ordinances adopted or revised
	Parking Lot Runoff	Impervious Surfaces Insufficient Stormwater Management Practices	Approximately 1500 acres are industrial or commercial within the watershed.	50-90% reduction in TSS dependant on incentive proposed Porous pavement 80-90% reduction (Ref. 4, 26)	Stormwater Management (9) Public Outreach Programs (11,14) Ordinance Review (17)	Dependent on incentive proposed $1500/newsletter $500/workshop $50,000 for Ordinance Review	Long-term	Road stream crossings surveys Erosion pin survey Macroinvertabrate survey	Monitoring results Survey results Increased/revised number of ordinances to reduce runoff/sediments	Macroinvertebrate trends Road stream crossing survey trends Erosion pin survey trends Number of Ordinances adopted or revised
	Roadside Runoff	Sediment/Erosion Insufficient Stormwater Management Practices	Approximately 100 outfalls in the watershed that have the potential to carry sediments to Pontiac Creek	45-90% TSS 30-90% Phosphorus (Ref. 4)	Stormwater Management (9) Public Outreach Programs (11,14) Ordinance Review (17) Street Sweeping (13)	Dependent on incentive proposed $1500/newsletter $500/workshop $50,000 for Ordinance Review $25,000/year for street sweeping	Long-term	Road stream crossings surveys Erosion pin survey Macroinvertabrate survey	Monitoring results Survey results Increased/revised number of ordinances to reduce runoff/sediments	Macroinvertebrate trends Road stream crossing surveys trends Erosion pin survey trends Number of Ordinances adopted or revised
	Storm Drains	Insufficient Storm Sewer Maintenance	There are approximately 4,500 storm drain catch basins within the watershed	30-90% removal of TSS (Ref. 4)	Stormwater Control Devices (16) Maintenance Program (15) Public Outreach Programs (11,14) Storm Sewer Stenciling (8)	$22,000/year for inspections $25,000/year for catch basin repairs. $45,000 for storm sewer stenciling program.	Short-term/ Mid-term	Record of completion of repairs Record of inspections	Monitoring results Reduced number of repairs	Macroinvertebrate trends Road stream crossing surveys trends Erosion pin survey trends
	Stream Bank or Channel Erosion	Excessive Flow Fluctuations Insufficient Stormwater Management Practices	There are approximately 2 sites totaling 4000 feet in length. Approximately, 6.5 miles of stream bank are in the watershed that need protection.	For 2000 feet of stream bank stabilization: 79 Tons/year sediment removed 85 lbs/yr reduction in phosphorus 3 lbs/year reduction in nitrogen	Stream bank Stabilization (10,11,) Public Outreach Programs (11,14) Stream Inventory Program (12) Ordinance Review (17)	$40,000 for 2000 feet of streambank stabilization $10,000/year for stream inventory program.	Long-term	Complete BMP for stabilization at high priority sites by Year 7 2000 ft by Year 6 2000 ft by Year 10	Monitoring results Survey results Increased/revised number of ordinances to reduce runoff/sediments	Macroinvertebrate trends Road stream crossing surveys trends Erosion pin surveys trends Number of Ordinances adopted or revised

Note: Element (e) not included on this table. Refer to Section 4.0 of the Addendum for a description of the Education/Public Information component of the Plan

Note: Short term = 1 – 3 years
Mid-term = 3 – 7 years
Long-term = 7 – 15 years

APPENDIX

EPA Minimum Elements	Clarification	Examples
a. An identification of the causes and sources or groups of similar sources that will need to be controlled to achieve the load reductions estimated in this watershed-based plan(and to achieve any other watershed goals identified in the watershed-based plan).	Sources that need to be controlled should be identified at the significant subcategory level with estimates of the extent to which they are present in the watershed. Information can be based on a watershed inventory, extrapolated from a sub watershed inventory, aerial photos, GIS data, and other sources.	X numbers of dairy cattle feedlots needing upgrading, including a rough estimate of the number of cattle per facility. Y acres of parking lots needing improved run off management. Z linear miles of eroded streambank needing remediation.
b. An estimate of the load reductions expected for the management measures described in element (c) below.	This can be done using the "Pollutants Controlled Manual" and technical resources on the web such as: http://www.bmpdatabase.org/ Percent reductions can be used only in conjunction with a current or known load.	PDR on X acres would prevent Y additional in put during development and y input annually. Y miles of grassed swales would reduce sediments to Z% of the 2002 loadings from the subwatershed.
c. A description of the NPS management measures that will need to be implemented to achieve the load reductions estimated in element (b) above, and an identification (using a map or a description) of the critical areas in which those measures will be needed to implement this plan.	EPA defines management measures as including BMPs and measure needed to institutionalize changes (i.e. I&E tasks, land use tasks) A critical area should be determined for each combination of source and BMP. Designating the entire watershed for all BMPs is not acceptable.	X acres of wetlands will be restored (or protected) below the 585 foot topological contour. A downspout disconnection program will be implemented in all neighborhoods built prior to 1960. Management support targeting producers adopting nutrient management.
d. An estimate of the amounts of technical and financial assistance needed, associated costs, and/or the sources and authorities that will be relied upon, to implement this plan.	"Authorities" are the specific state or local legislation which allows, prohibits, or requires an activity. BMP costs are available on-line.	Michigan Wetland Protection Act for protecting wetlands > 5 acres. Local Wetland Protection Ordinance for wetlands 1 to 5 acres. Need technical assistance to delineate wetlands and $250,000 CMI funds for an easement program. 1/X FTE technical assistance for crop residue management for each Y acres or Z producers.

e. An information/education component that will be used to enhance public understanding of the project and encourage their early and continued participation in selecting, designing, and implementing the NPS management measures that will be implemented.	Blue book guidance is acceptable.	
f. A schedule for implementing the NPS management measures identified in this plan that is reasonably expeditious.	Blue book guidance is generally acceptable. Specific dates are not required. However if terms such as "short-term" are used they must be defined.	short-term = 1 to 3 years Mid-term = 3 to 7 years Long-term = 7 to 15 years
g. A description of interim, measurable milestones for determining whether NPS management measures or other control actions are being implemented.	Milestones should be tied to the progress of the plan to determine if it is moving in the right direction.	Reduce soil erosion by X tons per year by 2008 Reduce peak flows by Y% by 2010. Complete I&E efforts by year 6
h. A set of criteria that can be used to determine whether loading reductions are being achieved over time and substantial progress is being made towards attaining water quality standards and, if not, the criteria for determining whether this watershed-based plan needs to be revised.	The criteria for loading reductions do not have to be based on analytical water quality monitoring results. Rather, indicators of overall water quality from other programs can be used. The criteria for the plan needing revision should be based on the milestones (g. above) and water quality changes.	Increased time between dredging a river mouth as an indication of reduced sediment rates. Fewer beach closings as an indication of reduced *e. coli* levels. Student monitoring results Improved fishery as demonstrated by creel survey
i. A monitoring component to evaluate the effectiveness of the implementation efforts over time, measured against the criteria established under item (h) immediately above.	The monitoring component should include required project specific needs, the criteria in h. above, local monitoring efforts and it should also be tied to the State water quality monitoring efforts (i.e. environmental, social, administrative, and water quality elements).	Social surveys (and follow up) for homeowners, officials, students, and farmers. # of grants received, $ committed. Water quality and ecological trend results (both ambient monitoring and indicators).

Clinton Main Subwatershed Major Survey Findings

The Regional Public Education survey was undertaken the summer of 2004. Following are results specific to the Clinton Main Subwatershed.

Perceptions and Value of Water Resources

Residents were asked to rate the quality of water in lakes, rivers, and streams in the community where they live. Seventeen percent (17%) of those surveyed thought water quality was improving ("somewhat better" or "much better"). Thirty-seven percent (37%) reported that they thought water quality was getting worse ("somewhat worse" or "much worse").

The activities that households were most likely to have done in or near lakes and streams in the region during the past year were: hiking/walking (45%), swimming (39%), boating (34%), and picnicking (32%) and. Almost one-fourth (24%) of those surveyed indicated that they did not participate in activities in or near lakes and streams in the region during the past year.

67% of those surveyed thought the way they cared for their lawn and home affects the quality of water in lakes and streams in the community where they live; 21% did not, and 12% indicated that they "didn't know."

26% of those surveyed indicated that their household had taken some type of action to protect water resources in the past two years; 60% had not, and 14% indicated that they "didn't know" if they had done anything that would have helped protect water resources.

Connection of Stormwater Runoff and Water Resources

33% of those surveyed thought stormwater runoff was the greatest contributor of pollution to lakes, rivers and streams. Sewage overflows were second (31%). Industrial discharges (26%) were next, followed by wastewater treatment plant discharges (10%).

Twenty-eight percent thought stormwater goes directly to lakes/streams without treatment; Forty-eight percent of those surveyed indicated that they "didn't know" where stormwater goes after it enters a storm drain or roadside ditch. 16% thought it goes to a treatment plant, and 7% thought it goes to lakes/streams with treatment.

Seventeen (17%) of those surveyed knew that they lived in a watershed.

Almost three-fourths (71%) of those surveyed agreed with the statement that the quality of local streams where they live affects the Great Lakes and Lake St. Clair.

Sixty percent of the respondents indicted that they had not seen road signs identifying rivers or watersheds in their community. Forty-one percent had seen signs identifying rivers.

Current Activities

Twenty percent (20%) of those surveyed indicated that they typically wash their vehicles at home in the driveway. Most (78%) of those surveyed indicated that they use a car wash.

Eleven percent (11%) of those surveyed indicated that members of their household usually change motor oil, transmission fluid or radiator fluid for a vehicle at their home.

Fifty-six percent (56%) of those surveyed indicated that their household uses a community collection site to dispose of household hazardous waste, such as old oil, fluids from vehicles, batteries, and pesticides; 17% of those surveyed indicated that their household typically disposes of household hazardous wastes with their regular trash.

Over half (52%) of those surveyed who were not using a community collection site for household hazardous waste indicated that the reason they did not use a community collection site was because they did not know where one was located.

Thirty-three percent (33%) indicated they use fertilizer on their lawn at least once a year. Twenty-nine percent (29%) of those surveyed indicated that their household uses fertilizers on their lawn seldom or never.

The types of fertilizer that households were most likely to use on their lawn were: weed and feed (33%), seasonal varieties (19%), slow release nitrogen (13%), and low phosphorous (9%).

The most common reason residents gave for selecting the type of fertilizer or pesticide they use was previous experience with a product (31%).

Twenty-nine percent of those surveyed indicated that their household uses a lawn service for fertilizer and/or pesticide applications.

Willingness to Take Action to Help Reduce Pollution of Streams and Lakes.

Residents were asked how willing they would be to perform various actions to help reduce pollution in lakes and streams. Residents were most willing to (1) dispose of hazardous waste at a community collection day (83%), (2) sweep excess fertilizer/grass clippings into their lawn (80%), and (3) change car washing practices (75%). Residents were somewhat less willing to change lawn watering practices (63%).

Best Ways to Inform Residents About Ways to Protect Lakes and Streams.

The top four ways residents preferred to receive information about what they can do to protect lakes and streams were from their community newspaper (47%), major newspapers (44%), television news (44%), and municipal newsletter (26%).

Single Site Watershed Survey Data Sheet

Date: Time:
Waterbody Name: County: Station #:
Location: Township: Sec T R ¼ ¼
Investigator: Lat: Long:
Coordinate Determination Method (check the one that applies):
___ GPS ___ GPS w/ DBR ___ Digital mapping software ___ Topographic map ___ Other (describe _____)
Map Scale (if known _____)

Upstream Side/Downstream Side

PHYSICAL HABITAT

BACKGROUND INFORMATION - pg. 18

Event Conditions noted at site	None	Light	Moderate	Heavy
Days since Rain	= 1	2	3	Unknown
Water Temp./D.O./pH *				
Water Color	Clear	Gray	Brown	Black / Green
Waterbody Type -u/s	Stream	Lake	Impound	Wetland
Waterbody Type -d/s	Stream	Lake	Impound	Wetland
Stream Width (ft.)	<10	10-25	25-50	>50
Avg. Stream Depth (ft.)	<1	1-3	>3	Unknown
Water Velocity (ft./sec) *				
Stream Flow Type	Dry	Stagnant	L	M / H

PHYSICAL APPEARANCE - pg. 20
(Check all that apply)

Aquatic Plants	Present	Abundant
Floating Algae	Present	Abundant
Filamentous Algae	Present	Abundant
Bacterial Sheen/Slimes	Present	Abundant
Turbidity	Present	Abundant
Oil Sheen	Present	Abundant
Foam	Present	Abundant
Trash	Present	Abundant

SUBSTRATE (%) – pg. 22
(add to 100%)

Boulder – 10 in. diam.	
Cobble/Gravel –10 to .08 in. diam.	
Sand – coarse grain	
Silt/Detritus/Muck - fine grain/organic matter	
Hardpan/Bedrock – solid clay/rock surface	
Artificial – manmade	
Unknown	

INSTREAM COVER – pg. 23
(check all that apply)

Undercut Banks	
Overhanging Vegetation	
Deep Pools	
Boulders	
Aquatic Plants	
Logs or Woody Debris	

RIVER MORPHOLOGY – pg. 23

Riffle	Present	Abundant	
Pool	Present	Abundant	
Channel	Natural	Recovering	Maintained
Designated Drain	?	Y	N

Highest Water Mark (ft.)	?	<1	1-3	3-5	5-10	>10

STREAM CORRIDOR – pg. 26

Riparian Veg. Width ft.(L)	<10	10-30	30-100	>100
Riparian Veg. Width ft.(R)	<10	10-30	30-100	>100
Bank Erosion	0	L	M	H
Streamside Land Cover	Bare	Grass	Shr	Trees
Stream Canopy %	<25	25-50		>50

Stream Cross Section

Adjacent Land Uses

Wetlands	L	R
Shrub or Old Field	L	R
Forest	L	R
Pasture	L	R
Crop Residue	L	R
Rowcrop	L	R
Residential Lawns, Parks	L	R
Impervious Surfaces	L	R
Disturbed Ground	L	R
No Vegetation	L	R

* Optional Data Item

Data Sheet Version 4/27/00

Instream Survey Data Sheet

Average Water Depth (ft.):
Is the substrate covered with excessive silt? ( ) Yes ( ) No
Substrate Embeddedness: ( ) 0-25% ( ) 25-50% ( ) > 50%

Benthic Macroinvertebrates

Describe the types of habitats and substrates from which invertebrates were collected:

Use letter codes (R = 1-10, C = 11 or more) to record the approximate numbers of organisms in each taxa found in the stream reach.

Group 1 Sensitive	Group 2 Somewhat-Sensitive	Group 3 Tolerant
_____Beetle adults (Coleoptera)	_____Beetle larvae (Coleoptera)	_____Aquatic worms (Oligochaeta)
_____Caddisfly larvae (Trichoptera)	_____Clams (Pelecypoda)	_____Leeches (Hirudina)
_____Hellgrammites (Megaloptera)	_____Cranefly larvae (Diptera)	_____Midge larvae (Diptera)
_____Mayfly nymphs (Ephemeroptera)	_____Crayfish(Decapoda)	_____ Pouch snails (Gastropoda)
_____Gilled Snails (Gastropoda)	_____Damselfly nymphs (Odonata)	_____Sowbugs (Isopoda)
_____Stonefly nymphs (Plecoptera)	_____Dragonfly nymphs (Odonata)	_____True Bugs (Hemiptera)
_____Water penny (Coleoptera)	_____Scuds (Amphipoda)	_____Other Diptera
_____Blackfly larvae (Diptera)	_____Alderfly larvae (Megaloptera)	

Group 1	Group 2	Group 3
____# of R's * 5.0 =____	____# of R's * 3.0 =____	____# of R's * 1.1 = ____
____# of C's * 5.3 =____	____# of C's * 3.2 =____	____# of C's * 1.0 = ____
Group 1 Total =____	Group 2 Total =____	Group 3 Total = ____

Total Stream Quality Score (sum of totals for Groups 1-3) = _____

____Excellent (>48) ____Good (34-48) ____Fair (19-33) ____Poor (<19)

During the sampling and evaluation, did you observe any fish or wildlife? ( ) Yes ( ) No

If yes, please describe (if possible):

(Data Sheet Version 4/27/00)

Modified Bank Erosion Hazard Index (BEHI) Field Form

Date:_____ **Personnel:**_____

Location:_____

(Circle one in each column)

Root Depth (% of BH)	Root Density (%)	Bank Angle (degrees)	Surface Protection (Avg. %)
1.0-0.9	100-80	0-20	80-100
0.89-0.5	79-55	21-60	55-79
0.49-0.3	54-30	61-80	30-54
0.29-0.15	29-15	81-90	15-29
0.14-0.05	14-5	91-119	10-14
< 0.05	< 5	> 119	< 10

Date:_____ **Personnel:**_____

Location:_____

(Circle one in each column)

Root Depth (% of BH)	Root Density (%)	Bank Angle (degrees)	Surface Protection (Avg. %)
1.0-0.9	100-80	0-20	80-100
0.89-0.5	79-55	21-60	55-79
0.49-0.3	54-30	61-80	30-54
0.29-0.15	29-15	81-90	15-29
0.14-0.05	14-5	91-119	10-14
< 0.05	< 5	> 119	< 10

Date:_____ **Personnel:**_____

Location:_____

(Circle one in each column)

Root Depth (% of BH)	Root Density (%)	Bank Angle (degrees)	Surface Protection (Avg. %)
1.0-0.9	100-80	0-20	80-100
0.89-0.5	79-55	21-60	55-79
0.49-0.3	54-30	61-80	30-54
0.29-0.15	29-15	81-90	15-29
0.14-0.05	14-5	91-119	10-14
< 0.05	< 5	> 119	< 10

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
SOUTHEAST MICHIGAN DISTRICT OFFICE

JENNIFER M. GRANHOLM
GOVERNOR

STEVEN E. CHESTER
DIRECTOR

September 26, 2005

Mr Arthur Mitchell
Deputy City Engineer
City of Pontiac
55 Wessen Street
Pontiac, Michigan 48341-2266

Dear Mr. Mitchell:

SUBJECT: Revised MS4 General Watershed Permit IDEP and PEP Review
National Pollutant Discharge Elimination System (NPDES)
Certificate of Coverage (COC) MIG610023

On June 7 and June 29, 2005, the Department of Environmental Quality (DEQ), Water Bureau (WB), Southeast Michigan District Office, received the City of Pontiac's revised Illicit Discharge Elimination Plan (IDEP) and revised Public Education Plan (PEP). Pontiac submitted these documents in response to DEQ's review letter sent February 7, 2005 requesting changes to the initial IDEP and PEP submittals These plans were also sent to satisfy the IDEP and PEP submittal requirements outlined in the city's Certificate of Coverage (COC) No. MIG610023 and Part I.A.3 of the Municipal Separate Storm Sewer System (MS4) Watershed General Permit No. MIG619000

Based on our review, the revised IDEP and PEP submittals are approved and meet the requirements under the MS4 permit.

Thank you for your response. If you have any further questions, please contact Martin Hendges at (586) 753-3769 or via e-mail at hendgesm@michigan.gov.

Sincerely,

Hae-Jin Yoon
District Supervisor
Southeast Michigan District Office
Water Bureau

cc: Martin Hendges, WB
File

CLINTON MAIN FIELD SURVEYS
BANK EROSION HAZARD INDEX

Survey Type

MDEQ Standard Operating Procedure for Assessing Bank Erosion Potential using Rosgen's Bank Erosion Hazard Index (BEHI).

Dates of Survey

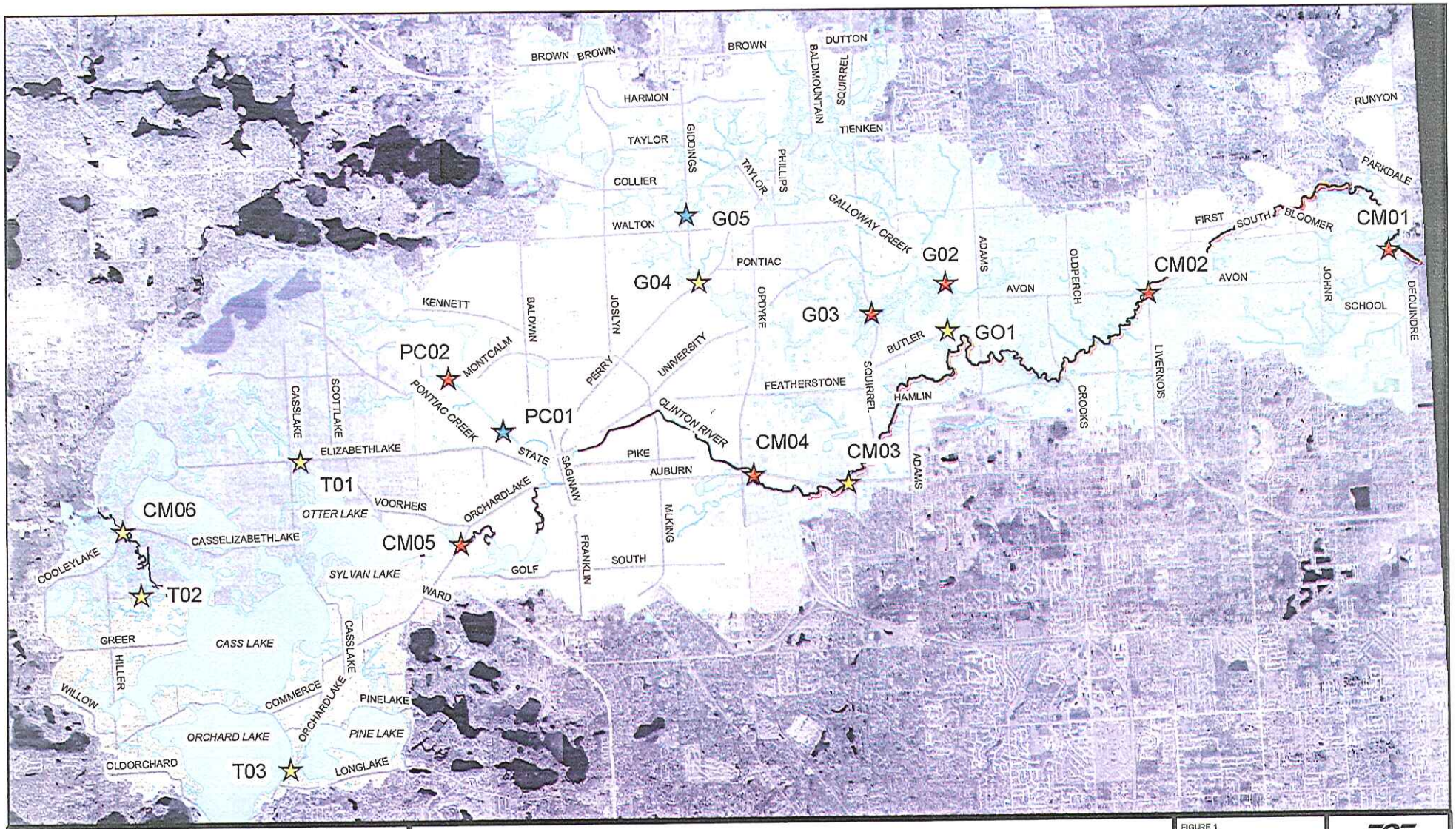
The BEHI was conducted by ECT staff on November 10th, 12th & 16th, 2004. Sixteen (16) sites within the Clinton Main Subwatershed were surveyed. The results showed 2 sites ranked "Poor", 7 sites ranked "Fair" and 7 sites ranked "Good"

Procedure

The Modified Bank Erosion Hazard Index (BEHI) is a subjective survey of existing stream bank conditions. It is used to determine the probable likelihood of stream bank erosion. Both banks of the watercourse are subject to the survey. In both the upstream and downstream directions there are 4 observational categories that are evaluated during this survey that include the following:

- Root depth to bank height
  - Good Ranking – Plant root depth approximately equivalent to bank height
  - Fair Ranking – Plant root depth approximately half of bank height
  - Poor – Plant root very short in relation to bank height
- Root density – Portion of streambank covered
  - Good Ranking – Very dense roots of all sizes present
  - Fair Ranking – Moderate amount of roots present on bank
  - Poor – Very little mass of roots present
- Bank angle – Angle of bank from waterline to top of bank
  - Good Ranking – Very low bank angle present
  - Fair Ranking – Some cutting present but slope still present to water
  - Poor Ranking – Steep slope or undercutting present
- Surface protection – Similar to root density, but higher ranking if stone is present
  - Good Ranking – Dense roots and/or rock present
  - Fair Ranking – Roots present and/or some rock
  - Poor Ranking – Minimal roots and/or rock present

"Poor" sites show signs of extensive erosion conditions. A "Fair" site displays some erosion but has a good foundation that will limit future erosion. This foundation may consist of vegetation growth on the banks or slight slope angles on the bank. Finally, a "Good" site will have minimal erosion. These sites have a good vegetation buffer and root cover.



CLINTON MAIN SUBWATERSHED PLANNING
BEHI SAMPLE LOCATION RANKING MAP
12-07-2004

0 4,500 9,000 18,000
1" = 9000'

FINAL BEHI SURVEY RESULTS

GOOD FAIR POOR

WATER COURSE

STUDY AREA

FIGURE 1

AERIAL PHOTOGRAPHY PROVIDED BY:
OAKLAND COUNTY 2002

_CLINTON MAIN SUBWATERSHED\DGN\MAPS\
CLINTON MAIN OVERALL 11X17.101120104.MXD

ECT
Environmental Consulting & Technology, Inc.
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ANN ARBOR, MI 48108
TEL: (734) 769-3004
FAX: (734) 769-3164
www.ectinc.com

CLINTON MAIN FIELD SURVEYS
MACROINVERTEBRATE SURVEYS

Survey Type

Collection: GLEAS Procedure 51
~30 minutes of sampling time
D-frame kick-net
Representative habitat sampling
Whole-sample analysis (no sub-sampling)

Scoring: MDEQ Volunteer Monitoring Stream Road Crossing Survey, Instream Survey Data Sheet

Dates of Survey

The macroinvertebrate surveys were conducted by ECT staff on November 8th, 10th & 12th, 2004.

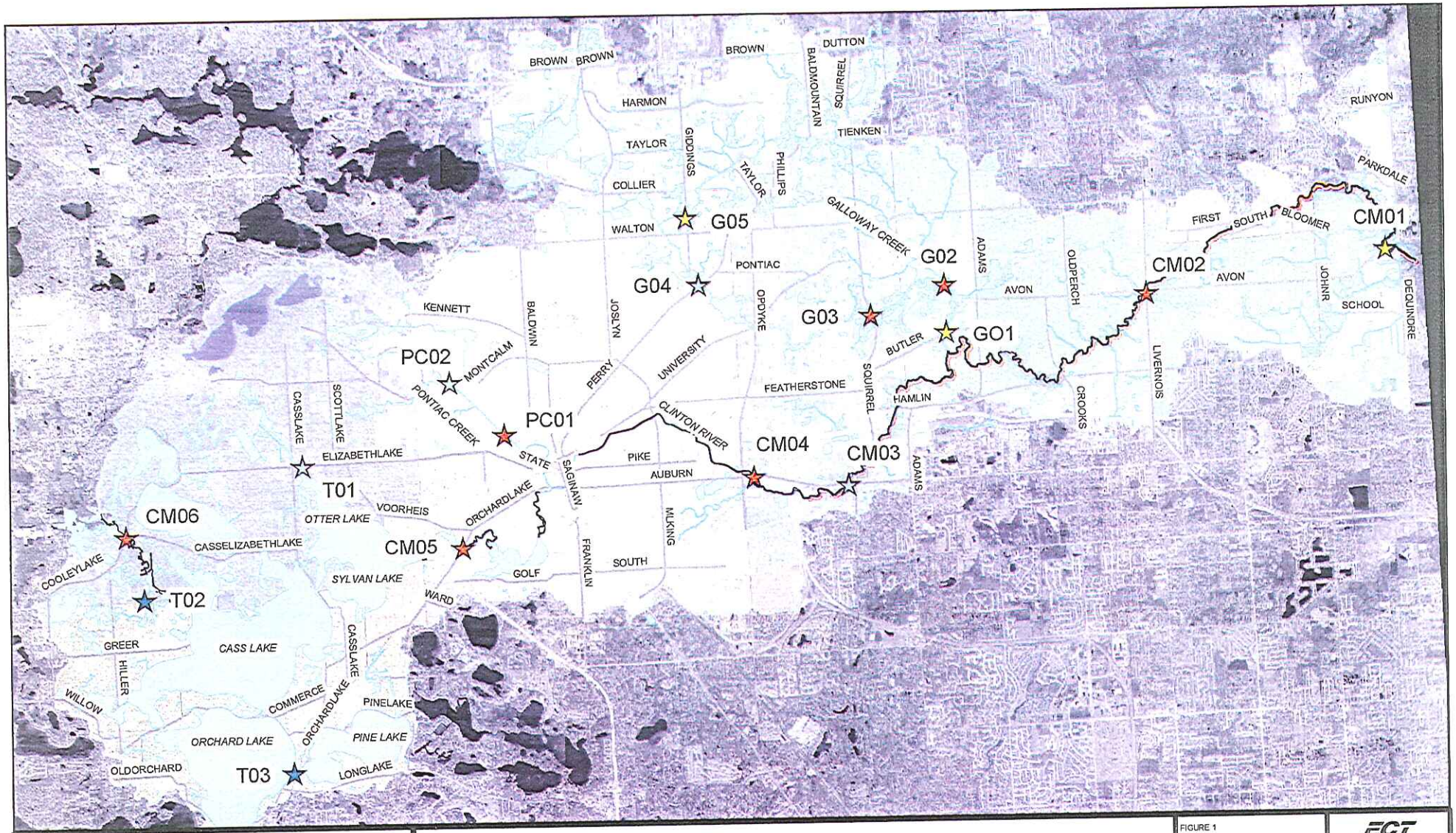
Summary

In general, macroinvertebrate surveys suggest that the macroinvertebrate communities of the Clinton River and its tributaries within the Clinton Main subwatershed are moderately (Good) to severely impaired (Poor). Although three sites ranked as Good, the scores for those sites (36, 37, 38.8) only slightly exceeded the lowest possible score for the Good ranking of 34, range 34 to 48. The highest scoring site was 38.8 out of a possible 60 points. Generally, as diversity of macroinvertebrates decreases, the overall ranking decreases.

The primary difference between Good sites and Fair or Poor sites was the number of sensitive taxa. The sensitive taxa group accounted for fifty-three percent (53%) of the mean score for the Good sites, but only accounted for thirty-percent (30%) of the mean score for Fair and Poor sites. Furthermore, the mean tolerant taxa group score of Fair and Poor sites was double that of Good sites (24% versus 12%). In addition, the sensitive taxa group was dominant at Good sites, while the moderately sensitive taxa group was dominant at Fair and Poor sites. The main difference between Fair and Poor sites was the total number of taxa rather than the community composition.

Typical macroinvertebrates present at the sites included the following:

- **Good:** Beetle adults, Caddisfly larvae, Mayfly, Stonefly
- **Fair:** Clams, Cranefly, Damselfly, Scuds
- **Poor:** Aquatic worms, Midge larvae, Sowbugs, Water snipe flies, Pouch snails



CLINTON MAIN SUBWATERSHED PLANNING
MACROINVERTEBRATE COMMUNITY RANKING MAP
12-07-2004

0 4,500 9,000 18,000
1" = 9000'

FINAL MACROINVERTEBRATES COMMUNITY SURVEY RESULTS

GOOD FAIR POOR N/A

WATER COURSE
STUDY AREA

FIGURE 1

AERIAL PHOTOGRAPHY PROVIDED BY:
OAKLAND COUNTY 2002

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CLINTON MAIN SUBWATERSHED FIELD SURVEY
SUMMARY OF RESULTS

Road Stream Crossing
Bank Erosion Hazard Index
Macroinvertebrate

← Road Stream Crossing

Site ID	Stream Depth (ft)	Highest H_20 Mark (ft)	Substrate	Morphology	Embed. (%)	Macro. Survey	Stream Canopy (%)	Riparian Buffer (ft)	Physical Appearance	Main Nonpoint Sources	BEHI
CM01	1-3	1-3	Fair	Pools/Riffles	25-50	Good	<25%	<10 30-100	Aquatic plants Filamentous algae Foam Turbidity	Residential/Parks	Fair
CM02	1-3	1-3	Fair	Pools/Riffles	>50	Fair	25-50%	<10 10-30	Aquatic plants Filamentous algae Foam Turbidity	Residential	Fair
CM03	1-3	1-3	Good	Pools/Riffles	>50	Poor	>50%	<10 10-30	Filamentous algae Turbidity Foam	Commercial Industrial	Good
CM04	1-3	5-10	Good	Pools/Riffles	25-50	Fair	25-50%	<10 30-100	Filamentous algae Turbidity Trash	Commercial Industrial	Fair
CM05	1-3	1-3	Fair	Pools/Riffles	25-50	Fair	25-50%	<10 10-30	Aquatic plants Filamentous algae Trash	Residential Commercial	Fair
CM06	1-3	<1	Good	Pools/Riffles	25-50	Fair	<25%	10-30 >100	Aquatic plants Filamentous algae Trash	Residential Commercial	Good
T01	<1	1-3	Poor	None observed	>50	Poor	<25%	<10	Aquatic plants Oil Sheen Trash	Commercial	Good

Silt and muck

Site ID	Stream Depth (ft)	Highest H_20 Mark (ft)	Substrate	Morphology	Embed. (%)	Macro. Survey	Stream Canopy (%)	Riparian Buffer (ft)	Physical Appearance	Main Nonpoint Sources	BEHI
T02	<1	<1	Fair	None observed	N/A	N/A	25-50%	<10 30-100		Residential	Good
T03	1-3	<1	Poor	None observed	N/A	N/A	<25%	>100	Aquatic plants Filamentous algae Bacterial Sheen	Residential	Good
G01	1-3	1-3	Good	Pools/Riffles	>50	Good	25-50%	30-100 >100	Filamentous algae Turbidity	University/ ~~Golf Course~~ Residential	Good
G02	<1	1-3	Good	Pools/Riffles	>50	Fair	25-50%	30-100 >100	Filamentous algae Turbidity	University/ ~~Golf Course~~ Residential	Fair
G03	<1	1-3	Good	Pools/Riffles	>50	Fair	25-50%	10-30 >100	Aquatic plants Filamentous algae Turbidity	Commercial Industrial	Fair
G04	<1	<1	Fair	Riffles	N/A	Poor	25-50%	10-30 >100	Filamentous algae Turbidity	Commercial	Good
G05	<1	<1	Good	None Observed	>50	Good	>50%	<10 30-100	Filamentous algae Foam Turbidity	Residential	Poor
PC01	<1	<1	Poor	None Observed	N/A	Poor	25-50%	<10	Aquatic plants Turbidity	Residential Commercial	Fair (channelized)
PC02	<1	<1	Poor	None Observed	N/A	Poor	<25%	<10 10-30	Aquatic plants Oil Sheen Filamentous Algae	Commercial	Fair

Wetland County