

**Legend:**

- MAJOR WATER COURSES
- ANCHOR HARBOR WATERWAY BOUNDARY
- SUBWATERSHEDS

**Map Labels:** Anchor Harbor, Goulette Point, St. Clair River, Lake St. Clair, Lake Michigan, Lake Huron, Anchor Harbor, Goulette Point, St. Clair River, Lake St. Clair, Lake Michigan, Lake Huron.

**Map Title:** SAINT CLAIR COUNTY WATERWAY BOUNDARIES

**Map Author:** FISHACK THOMPSON, CURT & RUBER

**Map Date:** 1998

**Map Scale:** 1:25,000

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**Map Logo:** fishack

**Map Footer:** 1-2

**Written by the St. Clair County Health Department  
Approved by the Anchor Bay Watershed Advisory Group  
July 16, 2009**

## Table of Contents

<b>Executive Summary.....</b>	<b>p. 1 - 2</b>
Purpose	
Best Management Practices and Programs	
Monitoring Data	
<b>Best Management Practices and Programs .....</b>	<b>p. 3 - 7</b>
Best Management Practices Implementation	
Natural Resource Conservation Service Programs	
Soil Erosion and Sediment Control Programs	
Illicit Discharge Elimination Programs	
Waste Water Treatment and Industrial Permits	
Master Plans and Ordinances	
Pollutant Reduction Calculations	
<b>Overall Watershed Monitoring Data.....</b>	<b>p. 7 - 12</b>
Previous Studies	
Lake St. Clair Assessment Monitoring Project	
Lake St. Clair Regional Monitoring Project	
Bacteria	
St. Clair County	
Macomb County	
Nutrients, Dissolved Oxygen, pH, and Temperature	
St. Clair County	
Sediment	
St. Clair County	
Macomb County	
Habitat Monitoring	
Michigan Department of Environmental Quality	
St. Clair County	
Land Use/ Land Cover Analysis	
Michigan Department of Natural Resources	
<b>Opportunities for Input .....</b>	<b>p. 12</b>
<b>Attachments.....</b>	<b>p. 13 - 20</b>
Table 6.1 Evaluation of BMP Progress 2003 – 2008	
Table 6.2 Recommended Future Actions based on Evaluation of 2003 – 2008 BMP Activities	
Table 6.4 St. Clair County Health Department Comparison of Ecoli Monitoring Data 2001 – 2004 versus 2005 – 2008	
Figure 6.1 Macomb County Health Department, Anchor Bay Watershed Ecoli data 2003-2008	
Table 6.6 Macomb County Health Department Sediment E. Coli monitoring, 2003 - 2008	

**Anchor Bay Watershed  
Chapter 6 Methods for Measuring Progress, 2008 Update**

**EXECUTIVE SUMMARY**

Purpose

In 2007, the Anchor Bay (ABay) Watershed Advisory Group (WAG) decided to update Chapter 6, *Methods for Measuring Progress*, of the 2005 ABay Watershed Management Plan (WMP). The purpose of this effort was to meet the phase II requirement of regular revisions to the WMP. This document provides an update to recommendations of Chapter 6 and summarizes the following activities that occurred in the ABay Watershed from 2003-2008:

- Evaluation of Programs and Best Management Practices
- Overall Watershed Monitoring Data

Best Management Practices (BMPs) and Programs

BMPs to reduce bacteria and protect source water were most success across the watershed. Communities spent significant resources to maintain and improve sanitary sewer infrastructure, and both counties implemented Illicit Discharge Elimination Programs (IDEP) that resulted in an estimated reduction of over 8 million gallons of sewage per year. In addition, Macomb County (MC) and New Baltimore conducted numerous surveys and a bacterial source tracking project in an effort to locate sources of E. coli for Crapau Creek. For source water protection, Ira Township developed Michigan's first Source Water Protection Plan and water treatment plants in Algonac, Ira Township, New Baltimore and Mt. Clemens participated in the St. Clair River/ Lake. St. Clair/ Detroit River Drinking Water Protection Network.

BMPs that were implemented successfully by some, but need more consistent implementation across the watershed were:

- Implementation of Good Housekeeping and Pollution Prevention practices;
- Development of a Natural Features Inventory;
- Adoption of Low Impact Development and Water Quality Protection Ordinances;
- Construction of Infiltration Devices
- Protection of Source Water

BMPs that received the least attention across the watershed were those that:

- protect streambanks, riparian buffers and wetlands, and
- protect target peak flows and encourage Low Impact Development, and

**Anchor Bay Watershed**  
**Chapter 6 Methods for Measuring Progress, 2008 Update**

- involve the agricultural community in water quality protection, and
- inventory natural features in St. Clair County.

Considering package treatment plant concerns in the WMP, it should be noted that there were 125 violations of the Millstone Mobile Home Park's Package Treatment Plant.

Monitoring Data

Bacteria

Based on county bacteria data from 2003 to 2008, both counties did not meet the three year milestone: a 50% decrease of exceedances of total and full body contact *E. coli* critical values. Both counties did however increase the number of locations where they monitor *E. coli*.

*E. coli* levels in St. Clair County (SCC) were generally well below critical values at the majority of its 13 sampling locations. The highest violations were located at Marsac and Swartout Creeks.

For Macomb County, the worst *E. coli* levels were found in the Vanderverne Drain (46.6) and Crapau Creek at Ashley Street (46.7). They also noted that *E. coli* data collected at 8 monitoring stations indicate "occurrences of excessive *E. coli* levels are increasing instead of decreasing".

Nutrients

Extensive sampling from regional monitoring projects indicate nutrient problems in the Salt River, Beaubien Creek, and Swan Creek. Limited sampling from SCC also indicate nutrient problems in Marsac and Swartout Creeks.

Habitat

Fishery surveys conducted by the Department of Natural Resources found a variety and large number of yearling fish of both game and forage species in the following streams: St. Clair Flats, Marsac Creek, Swan Creek, Crapau Creek, and Auvase Creek. These surveys indicate the importance of ABay's tributaries as important seasonal spawning grounds and nursery habitat for a number of fish.

**Anchor Bay Watershed**  
**Chapter 6 Methods for Measuring Progress, 2008 Update**

## **BEST MANAGEMENT PRACTICES AND PROGRAMS**

### **BEST MANAGEMENT PRACTICE IMPLEMENTATION**

As recommended in Chapter 6, annual reports were gathered to evaluate implementation of recommended Best Management Practices (BMPs). Because five years of annual reports contained a substantial amount of inconsistent information, the subcommittee gauged implementation by listing and rating the BMPs that they and the WAG were aware of. The subcommittee limited this list of BMPs to those that were located within the watershed, or would directly affect tributaries within the watershed. The subcommittee and WAG used a subjective scoring system to evaluate progress on this list of BMPs which is documented in Table 6.1 (Attachment A). The subcommittee then developed a list of recommendations for future actions based on this evaluation which are documented in Table 6.2 (Attachment B). The information, scores, and recommendations were presented for input and consensus approval at two WAG meetings in 2008. Table 6.3 below lists the recommended BMP in order of the score that was given, from BMPs that were most successfully implemented to BMPs that were least successfully implemented. The scores for each BMP should not be interpreted to reflect the progress of any one particular community or agency; it only reflects a general assessment of BMPs by WAG representatives that were most active in the Evaluation and Steering Committees in 2007 and 2008.

<b>TABLE 6.3    ABay BMP Evaluation of 2003 – 2008 Activities</b>		
<b>BMP #</b>	<b>BMP</b>	<b>SCORE</b>
2	Sanitary Sewer Overflows	<b>4</b>
3	Failing Septic Systems	<b>4</b>
20	Hazardous Waster Recycling	<b>4</b>
22	Illicit Discharge Elimination Programs	<b>4</b>
21	Source Water Protection	<b>4</b>
5	Pet/ Wildlife	<b>3</b>
6	Lawn/ Garden	<b>3</b>
7	Riparian Recreation Areas	<b>3</b>
9	Drain Markers/ Watershed Signs	<b>3</b>
11	Oil/ Grease Trap Maintenance	<b>3</b>
12	Salt/ Deicing Practices	<b>3</b>
13	Soil Erosion and Sedimentation Control Programs	SCC- <b>3</b>
		MC - <b>pending</b>
15	Street Sweeping	<b>3</b>

## Anchor Bay Watershed

### Chapter 6 Methods for Measuring Progress, 2008 Update

16	Natural Feature Inventory	MC – 3
19	Litter Clean Up	3
24	Low Impact Development Ordinances	MC - 3
26	Infiltration Devices	3
17	Wetland Conservation	2
18	Natural Feature and Floodplain Ordinances	2
27	Storm Water Treatment	2
1	Generally Accepted Agricultural Management Practices	1
4	Lagoons	1
8	Buffers	1
10	Riparian Habitat	1
14	Bank Stabilization	1
16	Natural Feature Inventory	SCC – 1
24	Low Impact Development Ordinances	SCC - 1
23	Hydrology Analysis	1
25	Storm Water Storage Facilities	1
28	Wood Debris Management	1
<b>ACRONYMS</b> SCC: St. Clair County                      MC: Macomb County		
<b>SCORING</b> <ol style="list-style-type: none"> <li>1. Needs improvement</li> <li>2. Little progress</li> <li>3. Good progress by few, but more consistent participation across the watershed still needed</li> <li>4. Excellent; successful implementation has occurred across the watershed.</li> </ol>		

#### **NATURAL RESOURCE CONSERVATION SERVICE PROGRAMS**

Chapter 6 recommends that Annual Reports of Farm Bill activities be collected from the Natural Resource Conservation Service (NRCS) as a means of evaluating Generally Accepted Agricultural Management Practices (GAAMP) activities in the watershed. These annual reports were not gathered from the Natural Resource Conservation Service (NRCS) agent and the NRCS agent has not participated in ABay WAG activities from 2003 - 2008. It is recommended that as a first step to improving agricultural practices, the WAG specifically identify where agricultural practices need improvement.

#### **SOIL EROSION AND SEDIMENT CONTROL (SESC) PROGRAMS**

Chapter 6 recommends “a follow-up with counties and communities” as a means of evaluating the effectiveness of each county’s SESC ordinance. The Evaluation subcommittee attempted this task but came to the conclusion that MDEQ audits of SESC programs are less subjective way of measuring these programs.

**Anchor Bay Watershed  
Chapter 6 Methods for Measuring Progress, 2008 Update**

St. Clair County

The County Enforcing Agency for SESC was transferred from the SCC Road Commission (RC) to the SCCHD in 2007. According to the SCCHD, the number of inspectors available for ABay has increased from two inspectors in 2006 to six inspectors (sanitarians) in 2008. The SCCHD SESC program passed an MDEQ audit in 2008.

Macomb County

The Macomb County Public Works Office (MCPWO) passed a SESC ordinance in 2007 and at the time of this report an MDEQ audit of its SESC program was pending.

**ILLECT DISCHARGE ELIMINATION PROGRAMS (IDEP)**

St. Clair County

The SCCHD and SCC Drain Commission (SCCDC) worked together to identify and correct 110 illicit discharges (failing septic systems) in ABay since 2002. These corrections are estimated to be an equivalent reduction of more than 5 million gallons of sewage discharge per year to ABay tributaries based on an estimate of 131 gallons per day per household, with 50 gallons of sewage per person, and 2.62 persons per household (2000 Census Data).

Macomb County

The Macomb County Health Department (MCHD) IDEP program conducted 406 investigations within the ABay watershed since 2002. These investigations led to the identification of 70 illicit discharges of which 63 were corrected by January 2009. These corrections eliminated an estimated 3 million gallons of sewage per year from the ABay watershed based on an estimate of 131 gallons per day per household, with 50 gallons of sewage per person, and 2.62 persons per household (2000 Census Data).

On behalf of the Crapau Creek Inter-county Drain Board, the MCPWO partnered with the City of New Baltimore to conduct a bacterial source tracking analysis on Crapau Creek and at the New Baltimore Park Beach in 2006 to determine the source of the elevated *E. coli* concentrations. During the study, *E. coli* concentrations were quantified at several

## **Anchor Bay Watershed Chapter 6 Methods for Measuring Progress, 2008 Update**

locations along the Creek and the Beach during dry and wet weather conditions. A subset of these samples were analyzed for the human and bird gene biomarker using polymerase chain reaction (PCR) DNA analytical technology. The results of the study were as follows:

1. *E. coli* contamination from a human source(s) is impacting the Creek downstream of 25 Mile/Arnold Road during dry weather conditions;
2. Human sources are contributing to the elevated *E. coli* counts along the entire Creek during wet weather conditions;
3. Crapau Creek is unlikely to be impacting New Baltimore Park Beach, as there is no correlation between the *E. coli* counts found at the Creek outlet and at the Beach;
4. *E. coli* contamination from human and avian sources was found at both Beach locations regardless of the weather conditions;
5. *E. coli* from avian sources appears to be more prevalent in the Creek and at the Beach, than *E. coli* from human sources;
6. Human contamination was present in only 35% of the samples that had *E. coli* concentrations between 300 and 10,000 cfu/100mL, while bird contamination was found in 75% of these samples;
7. Human and bird contamination were found in virtually all samples with *E. coli* concentrations above 10,000 cfu/100mL; and
8. The beach sand is not the source of *E. coli* found in the aqueous beach samples.

### **WASTEWATER TREATMENT AND INDUSTRIAL PERMIT COMPLIANCE**

Compliance records from wastewater treatment and industrial facilities were collected by Ira Township staff and no violations were noted.

### **MASTER PLANS AND ORDINANCES**

Ira Township added ABay goals into its Master Plan and added water quantity protection requirements to its development ordinance, based on the ABay 2005 hydrology project. The SCC Metropolitan Planning Commission added ABay goals to the SCC's Master Plan in 2008. The MC Public Works Office updated its drain standards in 2008 to include post construction storm water and water quality standards, and incentives for the implementation of water quality and quantity BMPs on new construction. The SCC Road



**Anchor Bay Watershed**  
**Chapter 6 Methods for Measuring Progress, 2008 Update**

Commission developed its first written procedures for post construction requirements in 2008. All Phase II entities were required to submit post construction standards and/or procedures to the Michigan Department of Environmental Quality in August 2008.

**POLLUTANT REDUCTION CALCULATIONS**

The three (3) year milestone of identifying sites for pollutant reduction calculations has not been met.

**OVERALL WATERSHED MONITORING EFFORTS**

**PREVIOUS STUDIES**

Lake St. Clair Assessment Monitoring Project (LSCA)

The LSCA performed continuous sampling in Swan and Beaubien Creeks during the summers of 2004 and 2005. The following text from the LSCA Summary provides direction for future sampling in Swan and Beaubien Creeks.

“Ecoli levels in Swan and Beaubien Creeks met full-body contact almost all of the time”. Total Phosphorous criteria was violated in 60% of samples from Swan Creek and in 100% of the samples from Beaubien Creek.

Lake St. Clair Regional Monitoring Project (LSCRMP)

The LSCRMP provided the following information about the Salt River sampling site:

- *E. coli* levels generally exceeded critical values, although it was able to meet the Partial Body Contact critical value during dry conditions.
- Total Phosphorus and Nitrate-N levels exceed the critical values in 13 of 15 samples.
- TSS levels exceeded the Project median value in 14 of 15 samples.
- Fifteen sample results for chloride all exceeded the critical value of 125 mg/L.
- The Salt River should be targeted for further sampling and in-depth study.

**BACTERIA MONITORING**

The three year milestone for *E. coli* monitoring that was identified in Chapter 6 was a 50% decrease in violations of the partial body contact standard (1000 *E. coli*/ 100 ml.) and the total body contact standard (300 *E. coli*/ 100 ml.).

## **Anchor Bay Watershed**

### **Chapter 6 Methods for Measuring Progress, 2008 Update**

#### St. Clair County

The number of sites being monitored for *E. coli* increased from nine (9) in 2005 to thirteen (13) in 2007. The four sites added were Swan, Marsac, Beaubien and Swartout Creeks. The percentage of total body and partial body contact violations between 2001 – 2004 with those from 2005 – 2008 is included in Table 6.3 (Attachment C). This comparison and an examination of individual *E. coli* data reveals the following conclusions:

- *E. coli* levels at the majority of sites in the SCC portion of Anchor Bay are well below total and partial body contact standards, with the majority of samples measuring below 100 *E. coli*/ 100 ml.
- The milestone was not met in SCC but this milestone may be inappropriate as some locations didn't have violations in either time period, and sampling at some locations just began in the 2005 – 2008 time period.
- Violations of total body contact standards in Marsac and Swartout Creeks indicate these creeks as the highest priority for IDEP surveys in SCC.

#### Macomb County

As of 2008, the MCHD conducts sampling at 10 tributary sites within the ABay watershed. Figure 6.1 (Attachment D) shows *E. coli* levels at each sampling site from 2003-2008. Sampling data for the Anchor Bay tributaries dating back to 2001 indicates that the sampling sites at the Vanderverne Drain (46.6) and Crapau Creek at Ashley Street (46.7) have the worst *E. coli* levels. Extensive investigations and illicit discharge surveys have been conducted in New Baltimore, Crapau Creek, and the Vanderverne Drain. Since 2001, this area has been subject to significant development and *E. coli* levels have continued to increase as development increases.

Of the 10 sample sites in MC's portion of ABay, 8 have been sampled since 2001. The majority of the occurrences exceeding partial body contact standards have occurred at all 8 sites from 2005 to 2008. The majority of the occurrences exceeding full body contact standards occurred at 6 of the 8 sites from 2005 to 2008. Sampling data indicates that occurrences of excessive *E. coli* levels are increasing instead of decreasing.

**Anchor Bay Watershed  
Chapter 6 Methods for Measuring Progress, 2008 Update**

Employing the Mann Whitney-U test, there is statistically a significant increase in full body contact *E. coli* levels between the years 2001-2004 and 2005-2008 for 4 of the sample sites. These sites are the Salt River at 29 Mile (37), Crapau Creek at Main St (46), Crapau Creek at County Line Road (46.3) and Vanderbenne Drain at Fox Pointe Rd.(46.6). For partial body contact *E. coli* levels between the years 2001-2004 and 2005-2008, there is statistically a significant increase at 3 of the samples sites. These sample sites are Crapau Creek at County Line Rd. (46.3), Vanderbenne Drain at Fox Pointe Rd. (46.6) and Crapau Creek at Ashley Street (46.7). Attention has been given to these sample sites and they continue to be explored for further IDEP activity.

**NUTIRENTS, DISSOLVED OXYGEN, pH, and TEMPERATURE**

The Evaluation subcommittee recommends the following changes in this section of Chapter 6:

- The Dissolve Oxygen (DO) criteria of 5mg/l should be added.
- A Total Phosphorous (TP) criteria should be added.
- A temperature criteria of 28-29 °C should be added.
- Priority metals should be determined before metal monitoring is recommended
- The parameters and a purpose for monitoring Waste Water Treatment Plant (WWTP) intakes should be identified before this large amount of data is collected for monitoring purposes.

St. Clair County

At the time of this report, SCC is unaware of a TP criteria for Michigan streams such as those sampled in ABay. The TP criteria of 0.05 mg/l was used in Table 6.5 (recommendation of Joe Rathbun, MDEQ) but conclusions based on this criteria should be qualified as preliminary until a criteria is determined. The SCCHD collected one sample for TP, DO, temperature and pH per month over a three months time period at Marsac and Swan Creeks during the summer of 2008. These sites were chosen based upon sampling and unqualified analysis conducted by the SCCHD and Ira Township staff in the summer of 2007. Table 6.5 lists the average results of the 2008 sampling effort. Analysis was performed by a certified lab.

**Anchor Bay Watershed**  
**Chapter 6 Methods for Measuring Progress, 2008 Update**

<b>Table 6. 5</b>	<b>2008 Average DO, Temp, pH and TP data</b>			
<b>Parameter</b>	<b>DO</b>	<b>Temp</b>	<b>pH</b>	<b>TP</b>
<i>Criteria Used</i>	<b>5 mg/l</b>	<b>28-29 °C</b>	<b>6.5-9</b>	<b>0.05 mg/l</b>
<b>Marsac Creek</b>	4.0	22.2	6.81	0.37
<b>Swan Creek</b>	6.3	24.9	6.82	0.15

## **SEDIMENT MONITORING**

Chapter 6 recommends the collection of Total Suspended Solids (TSS) and Total Dissolved Solids (TDS) data from WWTP samples. This was not done as the data is extensive and chapter 6 does not make the purpose of this task clear.

### St. Clair County

The SCCHD recommends revising the recommended monitoring plan for sedimentation. Currently the plan recommends using volunteers to conduct pebble counts at fourteen (14) locations. Cross section and longitudinal surveys should be conducted with pebble counts, as was done in 2005, to make the data a more meaningful measure of sedimentation. When the SCCHD and WAG volunteers performed pebble counts, and cross section and longitudinal surveys at six (6) of the fourteen (14) sites, the SCCHD concluded that this monitoring recommendation was too labor and resource intensive to be sustainable.

### Macomb County

The MCHD collects and analyzes sediment samples for *E. coli* levels in two tributary sites in the ABay watershed. The 2003 – 2008 results of this effort are provided in Attachment E. It is not accurate, however, to relate these results with water samples due to the overwhelming abundance of outside influences.

## **HABITAT MONITORING**

### Michigan Department of Environmental Quality (MDEQ)

## **Anchor Bay Watershed**

### **Chapter 6 Methods for Measuring Progress, 2008 Update**

The MDEQ plans to conduct macroinvertebrate monitoring and Road Stream Crossing Surveys in the summer of 2010. Recommendations for monitoring locations should be provided to the MDEQ in the fall of 2009.

#### St. Clair County

In 2008, SCC's Stream Leaders program conducted its first macroinvertebrate monitoring event on Meldrum Drain (Short Cut Road, Ira Twp.) and Beaubien Creek (Starville Rd., Cottreville Twp.) Both the drain and creek rated as "good". This data is considered preliminary until three seasons (both spring and fall) of monitoring data has been collected.

In the past, the SCC MSU Extension Adopt-A-Stream program has conducted macroinvertebrate monitoring at Swan Creek (between Marine City Hwy. and Springborn Rd.) and the rating was "poor". While this data is not quality assured, results should be tracked, and used as screening tools for further investigations.

The SCCDC did not develop a written overall assessment of ABay drains like it did for the development of the ABay WMP in 2004, but verbal communications with SCCDC staff indicates that the poor conditions of drains in ABay have not changed and education is still needed to improve the public's stewardship.

#### Land Use/ Land Cover Analysis

The WMP recommends that each county planning department develop a base line land use-land cover analysis in 2010 so that changes in impervious surface percentages and/or habitat changes can be measured.

#### Michigan Department of Natural Resource (MDNR)

The MDNR conducted fishery surveys in 2006 and 2007. The following summaries and quotes regarding the results of these surveys were provided by MDNR staff.

- Marsac Creek: "Small streams like Marsac Creek are important tributaries to Lake St. Clair. They provide spawning and nursery habitat for a number of game and forage species and provide unique habitat for species like banded kilifish which live in shoal and estuary waters of large lakes." (DNR)
- Swan Creek Two sites, Arnold Rd Bridge and Palms to Springborn, were sampled in SCC. Three adult northern pike were found and indicate that these sites are "important seasonal spawning habitat for pike."(DNR)

**Anchor Bay Watershed**  
**Chapter 6 Methods for Measuring Progress, 2008 Update**

- St. Clair Flats: 15,494 fish and 55 species were caught. “The high species diversity and number of fish found during sampling indicates the importance of shallow near shore waters as nurseries of game fish and as a major producer of forage species.” (DNR)
- Crapau Creek: 557 fish and 14 species were caught. Most fish caught were yearling fish indicating the importance of the stream in supporting juvenile fish. Total catch and spp. richness were intermediate compared to Marsac and Auvase Creeks. 90% of the fish were tolerant species.
- Auvase Creek: 419 fish and 18 species were caught. There was a “very high species diversity”(DNR) considering the size of the stream. The total catch was less than Marsac but the composition similar. Most of the catch was dominated by yearling fish, indicating the importance of this stream for juvenile fish habitat.

**OPPORTUNITIES FOR INPUT**

In 2007, the WAG formed the Evaluation Subcommittee (subcommittee) to work on the Chapter 6 update. The subcommittee’s efforts were led by the St. Clair County Health Department (SCCHD) and included representatives from the Village of New Haven, Ira and Chesterfield Townships, and the Cities of Richmond and Algonac. The subcommittee met three times in 2007 and once in 2008. Working documents were presented for input at five WAG meetings in 2008, and information was obtained through individual email communications. A final draft of this document was provided to the WAG for comments at the February 2009 WAG meeting and the document was approved by the ABay WAG as an addendum to the 2005 ABay WMP on July 16, 2009.

**Table 6.1 Evaluation of BMP Progress 2003 – 2008**

<b>BMP</b>		<b>Summary of 2003-2008 Actions</b>	<b>Rating</b>
1	<b>GAAMPS</b>	No agricultural surveys accomplished to pinpoint problem areas. No participation of NRCS in ABay WAG and no NRCS annual reports were gathered by the WAG. SCC performed Total Phosphorous (TP) monitoring to pinpoint potential ag sources in 08. High levels found in Marsac and Swan. TP sources undetermined.	1
2	<b>SSO</b>	No SSOs to report. All sewered communities: Implementation of I& I efforts. N. Baltimore: millions invested in new treatment plant	4
3	<b>FAILING OSDS</b>	<u>SCC + MC: programs</u> = Reduction of a total of 64 million gallon of sewage discharged/year. (Reported at LSC conference 2008)	4
4	<b>LAGOONS</b>	Review of Lagoon permit violations, 6.20.03 – 5.29.08 1. Millstone MHP: Pack TP, discharge to Crapeau trib, 125 viol. 2. MDOT EB/NB Rest Area: 2 viol. 3. MDOT WB/SC Rest Area: 2 viol. 4. Anchor Bay Schools: No viol. 5. Americana Est: Marsac, No viol. 6. Old Club WWTP: 15 viol. 7. Northhampton Comm. MHP: Pack TP, No viol.	1
5	<b>PET/ WILDLIFE</b>	<u>Algonac</u> : 5 dispensers <u>Chesterfield</u> : No pets allowed <u>Clay</u> : purchased 4.39 acres of property next to twp hall in 2007. Planning a park setting. No actions related to pet/wildlife BMP yet. <u>Ira</u> : 2 dispensers at Meldrum park. <u>N. Baltimore</u> : 1 dispenser in park where dogs allowed; waterfront park no dogs. Several goose round ups and repellant used with no success. Definite problem at waterfront parks.	3
6	<b>LAWN/ GARDEN</b>	<b>Employee training</b> <u>Chesterfield</u> : Landscape- 1 employee <u>Clay</u> - Landscape - 4 employees. <u>Ira</u> : - Landscape - 2 employees <u>N. Baltimore</u> – newsletters and cable <u>SCC</u> : Landscape–2 HD and 1 PARC, Goose – 1 HD and 1 PARC, Provided 2 lawn workshops	3

		<b>Landscaping/ Garden projects in A Bay</b> <u>Ira</u> : Construct. of green roof & rain gardens, <u>Clay</u> : Native shrubs and landscape at Twp Hall. Unmarked. No contract language yet. <u>N. Baltimore</u> .: Staff perform all landscaping.	
7	<b>RIPARIAN REC. AREAS</b>	New Baltimore added land to their waterfront beach. Welcome kit in Clay includes encouragement to conserve natural areas.	3
8	<b>BUFFERS</b>	No Actions	1
9	<b>DRAIN MARKERS</b>	<b>Catch basin marking</b> <u>Chesterfield</u> used but ~30% fell off <u>N. Baltimore</u> ~ 100 cbs stenciled/ yr. <u>N Haven</u> : Yes <u>MC</u> : No <u>SCC</u> : Goodells and F. Gratiot Cnty park.	3
		<b>Watershed Signs</b> : 13 locations total <u>Ira</u> : Swan, St. Mary's, Meldrum, Marsac, Crapeau <u>Cottrevelle</u> : Robins Creek, Broadbrdge rd. <u>Clay</u> : Swartout Drain, Cartwright Drain, Dana Drain, Beaverdam Drain <u>MC</u> : 2 locations: Salt River/ 26 Mile, Fish Creek/ 23 Mile.	3
10	<b>RIPARIAN HABITAT</b>	No action	1
11	<b>OIL/ GREASE TRAPS</b>	<u>Oil/ SCCDC</u> : 2004 standards require oil/water separator for basin outlets. <u>N. Baltimore</u> : 1 condo site near lake was required to install SW pretreatment Storm Ceptor. <u>Clay</u> : Grease trap req. enforced by Bldg inspector. Clay Township Engineering Design Standards, December 14, 2007 requires exterior grease/oil interceptors for all restaurants, food service establishments, gas stations, auto service areas or repair facilities and as determined by the building department or the Township Engineer.	3
		Maint. floor drain has oil/water sep. <u>Ira</u> : Fire station, Yes <u>N. Baltimore</u> : Yes <u>Clay</u> : Yes	
12	<b>SALT/ DEICING</b>	<u>Algonac</u> salt storage covered; intermittent education	3



		<u>N. Baltimore</u> : Currently building new salt storage barn. <u>N. Haven</u> : Sweep as needed; no schedule <u>SCCRC</u> : education every yr.	
13	<b>SESC</b>	<u>SCC</u> <ul style="list-style-type: none"> <li>• Program transfer to HD; increased # of inspectors - 1 in 2002 to 6 in 2008.</li> <li>• 500 ft from county drains and natural water only.</li> <li>• SCC passed 2008 SESC audit</li> </ul>	3
		<u>MC</u> <ul style="list-style-type: none"> <li>• 500 ft from catch basins, drains, natural water. road ditches</li> <li>• Adoption of SESC ordinance 2007</li> <li>• 2006 audit results pending</li> </ul>	pending
14	<b>BANK STABILIZATION</b>	No actions	1
15	<b>STREET SWEEPING</b>	<u>SCCRC</u> : MDOT_ – 4x's/yr. Prim rds – 3x/yr, Local rds – 2xs/yr. <u>Algonac</u> : ~4x's /yr. <u>N. Baltimore</u> : 4x's/ yr. (contracted)	3
16	<b>NAT. FEAT. INVENTORY</b>	<u>MCPED</u> : inventory <u>SCC</u> : Map features by 2008	3
17	<b>WETLAND CONSERVATION</b>	<u>DNR</u> : Grant acquired by DNR for Phragmites control demonstration project in St. John's Marsh. <u>SCCPARC</u> : donated \$5K for match. <u>Clay Twp</u> : St. John's Marsh clean up annually	2
18	<b>NAT FEAT &amp; FLDPLN ORDINANCES</b>	<u>MCPED</u> : model ordinances, 2007 <u>Watershed</u> : A Bay model SW ordinance, 2005. Ira adopted portions of ABay SW ordinance model No other A Bay communities have adopted natural feature or floodplain ordinances	2
19	<b>LITTER CLEAN UP</b>	<u>SCCHD</u> : MC Dredge Cut 3 events <u>Clay Twp</u> : St. Johns Marsh SCC Adopt a Stream and Adopt A Road sites	3
20	<b>HAZ WASTE RECYCLE</b>	SCCES - Spring collection, Clay Twp. MCHD – regular collection in Mt. Clemens	4
21	<b>SOURCE WATER</b>	<u>Ira Source Water Protection Plan</u> <u>Ira, Clay, N. Baltimore, N Haven</u>	4

		SCR drinking water monitoring system <u>Richmond</u> : Well head protection	
22	<b>IDEP</b>	<u>Algonac</u> TV'd. No cross connects. <u>N. Baltimore</u> ~ 3 homes cross connected were corrected = 143,000 gal/yr. reduction <u>Clay Twp</u> : no cross connections found. <u>N. Haven</u> : cross connect were corrected See MC and SC stats under OSDS.	4
23	<b>HYDRO ANLAYSIS</b>	No actions WMP Eval. Goal: Determine controls needed to protect target peak flows by 2009.	1
24	<b>LID IN ORDINANCES</b>	MCPED template ordinances encourage LID. MCPWO drain standards provides incentives for LID BMPs	MC - 3
		SCC: no actions	SCC - 1
25	<b>SW STORAGE FAC.</b>	Ira Twp Green Roof and Rain Gardens	1
26	<b>INFILTRATION DEVICES</b>	Ira Twp Green Roof and Rain Gardens Lenox Twp hall has zero storm water discharge.	3
27	<b>SW TREATMENT</b>		
28	<b>WOODY DEBRIS</b>	No actions	1
<b>* SEWAGE REDUCTION CALCULATIONS</b>		131 gpd/ household. Estimate of 50 gal/person, and 2.62 persons/ household per 2000 Census Data.	
<b>SCORING</b>		1. Needs improvement 2. Little progress 3. Good progress by few, but more consistent participation across the watershed still needed 4. Excellent; successful implementation has occurred across the watershed.	
<b>ACRONYMS</b>			

**TABLE 6.2 Recommended Future Actions based on  
Evaluation of 2003 – 2008 BMP Activities**

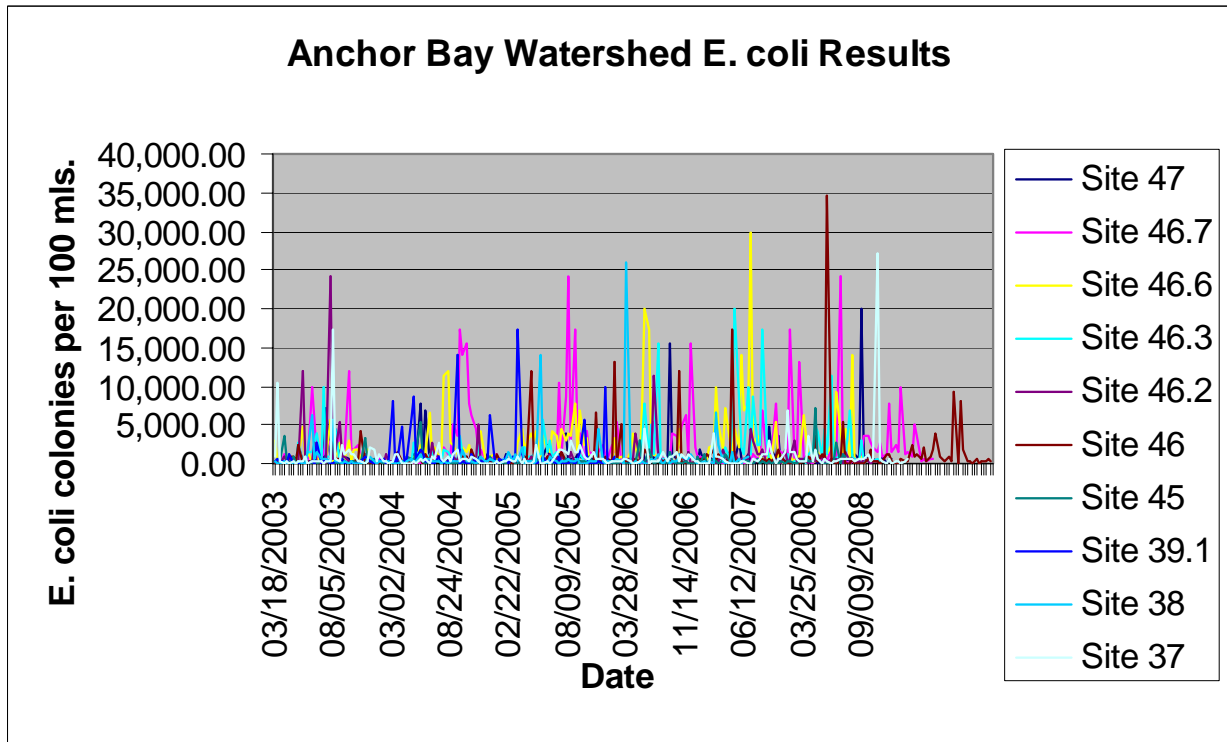
BMP #	BMP	FUTURE ACTIONS
1	GAMMPS	<ol style="list-style-type: none"> <li>1. Identify priority agricultural problem areas</li> <li>2. Refer these to NRCS and track progress</li> <li>3. Develop priority agricultural projects for grants.</li> </ol>
2	SSO	<ol style="list-style-type: none"> <li>1. Continue I&amp;I efforts</li> </ol>
3	FAILING OSDSs	<ol style="list-style-type: none"> <li>1. Continue OSDS id and corrections</li> </ol>
4	LAGOONS	<ol style="list-style-type: none"> <li>1. Improve permit violation at Millstone MHP package treatment plant.</li> </ol>
5	PET/ WILDLIFE	<ol style="list-style-type: none"> <li>1. ID priority parks for BMPS.</li> </ol>
6	LAWN/ GARDEN	<ol style="list-style-type: none"> <li>1. Create a standardized schedule and education materials for environmentally friendly landscape training for employees that take care of municipal landscaping.</li> <li>2. Encourage beautification committees to implement one native plant/ landscape demo project in one park per municipality.</li> <li>3. Include landscape contract specifications that require no or limited phosphorous fertilizers unless soil test shows need on municipal properties.</li> </ol>
7	RIPARIAN REC. AREAS	<ol style="list-style-type: none"> <li>1. Id areas for potential public access acquisition in SCC to improve public access.</li> <li>2. Use aerials to prioritize 3 riparian recreation areas for enhancements by 2010.</li> <li>3. Implement enhancements and grant applications for acquisition by 2013</li> </ol>
8	BUFFERS	<ol style="list-style-type: none"> <li>1. Map priority areas for buffers; Establish baseline.</li> <li>2. Increase buffers 25% by 2013</li> </ol>
9	DRAIN MARKERS	<ol style="list-style-type: none"> <li>1. Install watershed signs along the Marine City Dredge Cut, Beaubien Creek, and Auvase Creek.</li> </ol>
10	RIPARIAN HABITAT	Same as BMP 7.
11	OIL/ GREASE TRAPS	<ol style="list-style-type: none"> <li>1. Ensure that each municipal maintenance facility has an oil/water separator in their floor drain(s).</li> <li>2. Id where oil wastes are taken for free and advertise to the public.</li> </ol>
12	SALT/ DEICING	<ol style="list-style-type: none"> <li>1. Implement a consistent schedule for educating maintenance and DPW staff about proper salting techniques.</li> </ol>
13	SESC	<ol style="list-style-type: none"> <li>1. Pass DEQ SESC audits every 5 years.</li> </ol>
14	BANK STABILIZATION	Same as BMP 8
15	STREET SWEEPING	<ol style="list-style-type: none"> <li>1. Obtain MCRC sweeping schedule</li> <li>2. Maintain current SCCRC sweeping schedules.</li> <li>3. Increase use of sweepers in municipal parking lots</li> </ol>

16	NAT. FEAT. INVENTORY	<ol style="list-style-type: none"> <li>1. <i>Implement a Natural features inventory for SCC</i></li> <li>2. <i>Implement natural feature protection ordinances across the watershed</i></li> </ol>
17	WETLAND CONSERVATION	<ol style="list-style-type: none"> <li>1. <i>Educate municipal field staff about the importance of wetland protection and reporting problems to DEQ for enforcement.</i></li> <li>2. <i>Increase the use of wetland maps and buffer protection during the plan review process</i></li> <li>3. <i>Increase/support Phragmites control practices</i></li> <li>4. <i>Educate Steering Committee about wetland banking/conservation programs.</i></li> </ol>
18	NAT FEAT & FLDPLN ORDINANCES	<ol style="list-style-type: none"> <li>1. <i>Adopt storm water ordinances that provide incentives for natural feature preservation</i></li> <li>2. <i>Natural features inventory for SCC.</i></li> </ol>
19	LITTER CLEAN UP	<ol style="list-style-type: none"> <li>1. <i>ID clean up areas the A-A-Road and A-A-Stream programs perform clean ups.</i></li> <li>2. <i>Continue SCC clean up events</i></li> <li>3. <i>Clean up sites needed in MC portion of A Bay.</i></li> </ol>
20	HAZ WASTE RECYCLE	<ol style="list-style-type: none"> <li>1. <i>Maintain HHW drop off availability</i></li> <li>2. <i>Increased publicity for HHW drop off.</i></li> </ol>
21	SOURCE WATER	<ol style="list-style-type: none"> <li>1. <i>Continue SCR drinking water monitoring project</i></li> </ol>
22	IDEP	<ol style="list-style-type: none"> <li>1. <i>Maintain County IDEP programs</i></li> </ol>
23	HYDRO ANALYSIS	<ol style="list-style-type: none"> <li>1. <i>Enhance Steering Comm. Understanding of 2005 hydrologic project and its implications.</i></li> <li>2. <i>Wait until ordinances are implemented to reassess with another hydrologic model.</i></li> </ol>
24	LID IN ORDINANCES	<ol style="list-style-type: none"> <li>1. <i>Adopt SW Ordinances with LID incentives</i></li> </ol>
25	SW STORAGE FAC.	<ol style="list-style-type: none"> <li>1. <i>Survey condition of detention basins in the watershed</i></li> <li>2. <i>Adopt SW Ordinances with post construction standards and LID incentives</i></li> </ol>
26	INFILTRATION DEVICES	<ol style="list-style-type: none"> <li>1. <i>Adopt SW Ordinances with post construction standards and LID incentives</i></li> </ol>
27	SW TREATMENT	
28	WOODY DEBRIS	<ol style="list-style-type: none"> <li>1. <i>Determine priority tributaries where woody debris build up is a drainage problem.</i></li> </ol>

## Attachment C

Table 6.4 St. Clair County Health Department Comparison of Ecoli Monitoring Data 2001 – 2004 versus 2005 - 2008				
Monitoring Location	Ecoli standard	2001 – 2004	2005 – 2008	
		% of samples taken that were in violation		
Algonac State Park 8730 River Rd. Algonac	partial body contact	0	0	
	total body contact			
Marine City Dredge Cut Broadbridge Rd., Cottreville	partial body contact	0	0	
	total body contact	13	13	
Algonac Board Walk 805 St. Clair River Dr. Algonac	partial body contact	0	0	
	total body contact			
Brown’s Landing 6630 Middle Channel, Clay	partial body contact	0	0	
	total body contact			
Frank’s Dock 3240 S. Channel, Clay	partial body contact	0	0	
	total body contact			
J. Legs Pier 9724 Pearl Beach Blvd., Ira	partial body contact	0	1.8	
	total body contact	0	3.6	
DNR Boat Launch M29 at W. Palms Rd. Ira	partial body contact	0	1.8	
	total body contact	0	3.6	
Tin Fish 10069 Dixie Hwy, Ira	partial body contact	0	1.8	
	total body contact	1.8	7.1	
S. Channel Drive Harsens Island. Clay	partial body contact	0	0	
	total body contact			
Beaubien Creek Starville Rd., Cottreville	partial body contact	Not sampled	1.8	
	total body contact		12.5	
Swan Creek Shortcut Rd., Ira	partial body contact		1.8	
	total body contact		19.6	
Marsac Creek Arnold Rd., Ira	partial body contact		*17.9	
	total body contact		*39.3	
Swartout Creek Holland Rd., Clay	partial body contact		*3.6	
	total body contact		*28.6	
*2007 & 2008 data only; % taken with 1/2 the total # of samples as other numbers in chart				

**Figure 6.1 Macomb County Health Department, Anchor Bay Watershed  
Ecoli data 2003-2008**



Site #	Location	Site #	Location
47	Salt River at Washington	46	Crapau Creek at Main St.
46.7	Crapau Creek at Ashley St.	45	Salt River at Jefferson
46.6	Vanderbenne Drain at Fox Pointe Rd.	39.1	Marsac Drain at M29 bridge
46.3	Crapau Creek at County Line Rd.	38	River Voss at Jefferson
46.2	Drain age Ditch w. of County Line Rd.	37	Salt River at 29 Mile

## Attachment E

<b>Table 6. 6 Macomb County Health Department Sediment E. Coli monitoring, 2003 - 2008</b>		
<b>Date</b>	<b>Sediment E. coli MPN/g</b>	
	<b>w37 Salt River at 29 Mile Rd.</b>	<b>w46 Crapeau Creek at Main St. Bridge (N. Baltimore)</b>
5/27/2003	0.0	1.0
7/15/2003	4.0	4.0
9/16/2003	37.0	20.0
5/27/2004	80.0	1.4
7/15/2004	22.0	0.0
9/16/2004	1.3	0.7
6/21/2005	1500	31
8/2/2005	350	1400
9/20/2005	120	150
5/23/2006	25.0	193.5
7/25/2006	328.2	920.8
9/19/2006	1413.6	38.4
5/8/2007	107.1	38.4
7/24/2007	1936.3	387.3
9/10/2007	365.4	365.4
5/6/2008	3.1	20.1
7/8/2008	43.2	686.7
9/30/2008	160.7	167.4