

**Mallard Point, Scott County, Kentucky**  
*of the Eagle Creek Headwaters Watershed*

**Citizen Action Plan**  
*for the*  
**Kentucky River Watershed Watch**

**December 2003**

**Introduction and Brief**

The Mallard Point lake system potentially has some serious issues that are worthy of additional water sampling and screening. Metal concentrations in Mallard Point Lake are of concern, as well as fecal coliform levels in Drake Lake and the stream used for effluent by Mallard Point Wastewater Treatment Plant. In regard to safety for recreational uses, additional research and samples need to be performed, taking into account time of day and season of the year to determine level of contaminants by both known and unknown sources.

Mallard Point is a neighborhood in rural Scott County, Kentucky. The neighborhood is built around a lake system, including 100 acre Mallard Point Lake and much smaller Drake Lake and Widgeon Lake. Many neighbors are taking a more active interest in the neighborhood and its environment, including water quality. The residential, recreational lakes are predominantly used for fishing, swimming and boating.

In August 2003, three neighbors, Wanda Faircloth, Judith Marlowe, and Traci Richter, joined and were trained by the Kentucky River Watershed Watch (KRWW), a citizens organization supported by the Kentucky Division of Water and Water Watch program, the Sierra Club, and the Kentucky Waterways Alliance. Typically, KRWW volunteers conduct a cycle of four tests statewide during the calendar year. Mallard Point volunteers conducted the last scheduled statewide sample of the year, in September, and followed up with a series of five focus samples in October to establish a baseline for the Mallard Point Lake system.

To the knowledge of KRWW volunteers, the lakes have not previously been monitored. The stream flowing from Mallard Point Lake is monitored in accordance with the EPA permit for Mallard Point Wastewater Treatment Plant, known to ratepayers as Mallard Point Disposal Systems. At the annual meeting of the Mallard Point Owners Association in October, strong discussion focused and consensus was reached on the need to monitor the water quality of the lakes.

**Test Sites**

With the advice of KRWW, the volunteers adopted three test sites:

- The center of Mallard Point Lake, accessed by boat (K313)
- Drake Lake, sampled at the shoreline (K315)
- A stream (“unknown tributary” or UT) flowing out of the dam of Mallard Point Lake, by the Mallard Point Wastewater Treatment Plant, then under a culvert beneath Wright Lane (a county road), and along the road and bottom of the hill on which sits Northern Elementary School. The treatment plant, located approximately ¼ mile upstream from the test site, uses

this stream for its effluent. Test samples were taken at the county road just upstream from the roads culvert (K314).

*How the test sites are connected.* Drake Lake flows into Mallard Point Lake. The two lakes are separated by a land bridge and culvert under Mallard Point Drive. Mallard Point Lake, created by a dam, flows into the unknown tributary and eventually into Eagle Creek. A map of the Mallard Point neighborhood and lake system is attached. The lake system and tributary are part of the Eagle Creek Headwaters Watershed.

### **October 2003 Sampling Methodology**

KRWW recommended that the Mallard Point volunteers conduct five focus samples during October of all three test sites. Tests were conducted at dawn, as recommended by KRWW to ensure the most accurate reading on dissolved oxygen levels. As during the September testing, all three volunteers worked together as a group to conduct tests and draw samples at all three test sites, except on October 23<sup>rd</sup>, when volunteer Traci Richter was not available. In addition, two other interested neighbors, Cathy White and Nancy Hounshell, accompanied the KRWW volunteers as their schedules permitted. Per KRWW instructions, samples to be tested for fecal coliform were immersed in ice water and immediately transported to Fouser Environmental Services in Versailles. KRWW paid for all lab tests.

### **Sample Data and Explanation of Water Quality Parameters**

In September, metal concentrations were tested by laboratories at the Kentucky Geological Survey Lab at the University of Kentucky. In October, Fouser Environmental Services tested for fecal coliform and fecal strep. In addition, KRWW volunteers conducted additional onsite tests included here. Water quality parameters are established by the Kentucky Division of Water, based on EPA guidelines. The following explanations are primarily excerpts from the Kentucky Water Watch technical appendix.

*Fecal Coliform Bacteria.* Malfunctioning sewer or septic systems can release pathogens into rivers and streams. Indicator organisms such as fecal coliform bacteria usually do not themselves cause disease, but they are used to detect the possibility of pathogens in the water. The existence of a leaking or overflowing sanitary system can be signaled by the presence in the water of these indicator organisms. Potential health risk exists for individuals exposed to this water. The criterion for swimming is fewer than 200 colonies per hundred ml. of sample; for fishing and boating, fewer than 1000 col./100 ml.

*Dissolved Oxygen* is one of the most important parameters in aquatic systems. Criteria for aquatic life require that the average dissolved oxygen remain above 5.0 mg./l. and the instantaneous minimum not fall below 4.0 mg./l. In the state of Kentucky, the average value is 9.1 mg./l. (per the Division of Water Ambient Monitoring Base).

*pH* represents the acidity or basic nature of a solution. For aquatic life, the pH should be between 6.0 and 9.0. A pH of 7.0 is neutral. The more acidic the solution, the lower the pH. In Kentucky, the average is 7.4 (per the Division of Water Ambient Monitoring Base).

*Temperature* affects the toxicity of many other parameters. An important physical relationship exists between the amount of dissolved oxygen in a body of water and its temperature. The warmer the water, the less dissolved oxygen, and vice versa. High temperatures reduce the availability of oxygen in water. Water quality standards for temperature are based on the time

of the year. During the latter half of October, for aquatic life, the temperature should not exceed 25 C. and the average temperature should be no higher than 22.2 C.

*Conductivity* is a measurement of the ability of an aqueous solution to carry an electrical current. Criteria limit is 800  $\mu$ mbos/cm. In Kentucky, the average value is 335  $\mu$ mbos/cm. (Division of Water Ambient Monitoring Base). Conductivity is a measure of dissolved ions in a solution, for example mineral salts, cleaning chemicals, or detergents (surfactants).

*Metal Sampling.* The toxicity of metals is dependent on their solubility and on pH. The higher the concentration of metals, the harder the water. Not all metals are toxic and some are more readily absorbed by living organisms. Activities, such as mining that disturbs soil or rock, can lead to entry of metals into groundwater or surface water. Metals can also enter with discharges from sewage treatment plants, industrial plants, and other sources. Concentrations of metals may become toxic to aquatic life.

### **Sample Results**

The sample results are compiled in the attached two tables.

### **Assessment**

The Mallard Point lake system potentially has some serious issues that are worthy of additional water sampling and screening. Metal concentrations in Mallard Point Lake are of concern, as well as fecal coliform levels in Drake Lake and the stream used for effluent by Mallard Point Wastewater Treatment Plant. In regard to safety for recreational uses, additional research and samples need to be performed, taking into account time of day and season of the year to determine level of contaminants by both known and unknown sources.

*K313 Mallard Point Lake.* While the monthly average fecal coliform is only slightly above that recommended, additional samples should be conducted. For the five samples taken during the baseline period in October, boating and fishing would be acceptable uses on all days, according to the fecal coliform levels. However, full body contact (swimming) would not be recommended on one of the five sample days due a spike in fecal coliform levels. High concentrations of metals are potentially toxic to aquatic life, the source unknown, and should be investigated, along with the spike in fecal coliform.

*K314 Unknown Tributary.* At an October monthly average of 13,810 col./100 ml. , levels of fecal coliform bacteria exceed the 2003 EPA permit requirement of 200 col./100 ml. In addition, dissolved oxygen levels were consistently below the permitted 7.0 mg./l. threshold. Visible discharge and sheen on the tributary may also be in violation of the EPA permit for Mallard Point Wastewater Treatment Plant.

*K315 Drake Lake.* Levels of fecal coliform, at a monthly average of 884 col./100 ml., exceed the 200 col./100 ml. level for safe swimming, but are below the 1000 col./100 ml. for safe boating and fishing. Oxygen levels also appear somewhat depleted below the recommended level. While water fowl may partially explain the high fecal coliform level, all recreational users of the lake should exercise caution given unexplained spikes in the fecal content on two of the five test days.

### **Action Items**

Based on the fecal sampling data, we suggest the following action items.

1. Request the Department of Water and the Attorney General review and potentially investigate the 2003 KRWW data for Mallard Point.
  
2. Present findings to the following groups; educate and ask to assist in addressing this report.
  - Mallard Point Wastewater Treatment Plant
  - Mallard Point Owners Association
  - Mallard Point LLC, which owns Mallard Point Lake
  - Northern Elementary School (Does the school use this stream for any purposes, commercial or involving stream/water contact with students?)
  - Local officials, including the county judge executive and the health department
  - State regulatory agencies, including Fish and Wildlife as well as the Cabinet of Health and Family Services
  - The US Environmental Protection Agency
  
3. Follow-up sampling to produce more data, including:
  - Participating in the scheduled statewide samples in 2004
  - Investigating sources of fecal coliform spikes and metal concentrations
    - Additional water sampling, including more series of focus sampling in 2004
    - Soil sampling for metal concentrations
    - Septic system dye tests and other dye tracing studies
  
4. Research causes for environmental considerations described in the assessment
  - Previous and current land uses and history of the area
  - Potential means of geographic and man-made discharge into the lake system
  - Interview neighbors regarding their knowledge of environmental hazards/discharge
  - Develop a comprehensive understanding of the local sanitary sewer systems
  
5. Secure existing, relevant documentation
  - Open records requests from the Kentucky Division of Water
  - Operational records from the local and state health department
  
6. Recruit new volunteers for KRWW training to conduct tests in 2004 and follow up on this action plan, which will also increase neighborhood activism and understanding of environmental issues. Additional testing will occur with Mallard Point and at key sites in other parts of the watershed.
  
7. Recruit volunteers to present findings, conduct qualitative research, and advocate for action.

### **Details of the Citizen Action Plan**

Additional detail and documentation are attached in the following reports:

#### *Part One: Watershed Environmental and Cultural History*

- Kentucky River Basin Assessment Report

#### *Part Two: Citizen Scientific Examination*

- Summary tables of sampling data
- Map of Mallard Point neighborhood and lake system

- 2003 EPA permit for Mallard Point Wastewater Treatment Plant
- Habitat assessments and photographs
- Certificates of Analysis from Fouser Environmental Services
- Chain of Custody records and photographs
- Research on aeromonas hydrophila
- Data from other sampling sites in the Eagle Creek Headwaters Watershed

*Part Three: Assessment*

- Individual site assessments and a collective assessment for Mallard Point
- Explanation of water quality parameters

*Part Four: Action Items*

*Part Five: Summary and Approval of KRWW*

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## Part Three: Assessment

### How the Test Sites Are Connected

A map of the Mallard Point neighborhood and lake system is attached. Drake Lake flows into Mallard Point Lake. These two lakes are separated by a land bridge and culvert under Mallard Point Drive. Mallard Point Lake, created by a dam, flows into the unknown tributary and eventually into Eagle Creek. The lake system and tributary are part of the Eagle Creek Headwaters Watershed.

### K313 The Center of Mallard Point Lake, Accessed by Boat

While the monthly average fecal coliform is only slightly above that recommended, additional samples should be conducted. For the five samples taken during the baseline period in October, boating and fishing would be acceptable uses on all days, according to the fecal coliform levels. However, full body contact (swimming) would not be recommended on one of the five sample days due a spike in fecal coliform levels. High concentrations of metals are potentially toxic to aquatic life, the source unknown, and should be investigated, along with the spike in fecal coliform.

High metal concentrations include boron, iron, manganese and phosphorous. Such levels are typically found in water in areas of mining or agricultural use. The metal concentration data is based on a one-time snapshot, or synoptic sampling, in September. Follow-up sampling is needed to verify these readings. With Mallard Point Lake vicinity being partially forested, pesticide use restricted, the sewage system closed, and no known mining activity in the area, the following high metal concentrations are at this point unexplained. The following explanations are primarily excerpts from the Kentucky Water Watch technical appendix.

*Boron.* This metal is an essential element for the growth of plants, but is toxic to a number of sensitive plants at high concentrations.

*Iron.* While iron is vital to plants and animals, high levels can originate from groundwater or mines. With little effect on aquatic life, concentrations are more of a nuisance than a hazard.

*Manganese.* The primary uses of manganese are in metal alloys, dry cell batteries, and fertilizer additives. Also a vital nutrient for plants and animals, concentrations of this metal pose no apparent hazard to recreational uses of the water source.

*Phosphorous.* While organic phosphates are important in nature, very high levels can be toxic to people and animals. Some forms are produced by natural processes and others are found in sewage or pesticides which contain phosphate.

In addition, residents have been concerned about a medical incident in Mallard Point Lake. A child contracted the bacteria *aeromonas hydrophilia* apparently in the lake through a cut on her foot, resulting in a severe infection, a week-long hospital stay, and treatment with multiple antibiotics. Internet research documented in Part Two of this report, along with informal testimony from medical specialists, confirms that this bacteria is present in all freshwater

environments. Some strains are capable of causing illness in humans who may acquire infection through open wounds.

### **K314 Unknown Tributary below Mallard Point Wastewater Treatment Plant**

This site represents the stream (“unknown tributary” or UT) flowing out of the dam of Mallard Point Lake, by the Mallard Point Wastewater Treatment Plant, then under a culvert beneath Wright Lane (a county road), and along the road and bottom of the hill on which sits Northern Elementary School. The treatment plant, located approximately ¼ mile upstream from the test site, uses this stream for its effluent. Test samples were taken at the county road just upstream from the roads culvert (K315).

At an October monthly average of 13,810 col./100 ml., levels of fecal coliform bacteria exceed the 2003 EPA permit requirement of 200 col./100 ml. and general water quality parameter of 1000 col./100 ml. for type of use. Fecal coliform levels varied significantly through October, from a low of 160 col./100 ml. to a high of 31,850 col./100 ml. In addition, dissolved oxygen levels were consistently below the permitted 7.0 mg./l. threshold. Visible discharge and sheen on the tributary may also be in violation of the EPA permit for Mallard Point Wastewater Treatment Plant.

Without the EPA permit requirements, measured levels of fecal coliform would still prohibit all recreational uses of this stream.

### **K315 Drake Lake at the Shoreline**

Levels of fecal coliform, at a monthly average of 884 col./100 ml., exceed the 200 col./100 ml. level for safe swimming, but are below the 1000 col./100 ml. for safe boating and fishing. Oxygen levels also appear somewhat depleted below the recommended level. While water fowl may partially explain the high fecal coliform level, all recreational users of the lake should exercise caution given unexplained spikes in the fecal content on two of the five test days. Fecal coliform tests varied from a low of 30 col./100 ml. to a high of 3,420 col./100 ml.

### **Collective Assessment**

The Mallard Point lake system potentially has some serious issues that are worthy of additional water sampling and screening. Metal concentrations in Mallard Point Lake are of concern, as well as fecal coliform levels in Drake Lake and the stream used for effluent by Mallard Point Wastewater Treatment Plant. In regard to safety for recreational uses, additional research and samples need to be performed, taking into account time of day and season of the year to determine level of contaminants by both known and unknown sources.

On the first test date in October, both Mallard Point Lake and Drake Lake experienced a spike in the fecal coliform level. This spike could possibly be attributed to “lake turnover,” a natural event which can produce such a spike as well as an oily sheen this time of the year. Lake turnover has to do with the temperature of a lake changing, especially deep lakes. Regardless, whatever was occurring was doing so in both bodies of water at the same time and requires follow-up sampling.

## Part Four: Action Items

Based on the fecal sampling data, we suggest the following action items. Details will be developed by current and additional KRWW volunteers to be recruited under this plan.

1. Request the Department of Water and the Attorney General review and potentially investigate the 2003 KRWW data for Mallard Point.
2. Present findings to the following groups; educate and ask to assist in addressing this report.
  - Mallard Point Wastewater Treatment Plant
  - Mallard Point Owners Association
  - Mallard Point LLC, which owns Mallard Point Lake
  - Northern Elementary School (Does the school use this stream for any purposes, commercially or involving stream/water contact with students?)
  - Local officials, including the county judge executive and the health department
  - State regulatory agencies, including Fish and Wildlife as well as the Cabinet of Health and Family Services
  - The US Environmental Protection Agency
3. Follow-up sampling to produce more data, including:
  - Participating in the scheduled statewide samples in 2004
  - Investigating sources of fecal coliform spikes and metal concentrations in the lakes
    - Additional water sampling, including more series of focus sampling in 2004
    - Soil sampling for metal concentrations
    - Septic system dye tests and other dye tracing studies
4. Research causes for environmental considerations described in the assessment
  - Previous and current land uses and history of the area
  - Potential means of geographic and man-made discharge into the lake system
  - Interview neighbors regarding their knowledge of environmental hazards/discharge
  - Develop a comprehensive understanding of the local sanitary sewer and storm water management systems
5. Secure existing, relevant documentation
  - Open records requests from the Kentucky Division of Water
  - Operational records from the local and state health department
6. Recruit new volunteers for KRWW training to conduct tests in 2004 and follow up on this action plan, which will also increase neighborhood activism and understanding of environmental issues. Additional testing will occur with Mallard Point and at key sites in other parts of the watershed.
7. Recruit volunteers to present findings, conduct qualitative research, and advocate for action.

## Part Five: Summary

This study is simply a starting point for understanding and protecting the lake environment and water quality of Mallard Point. In addition to conducting baseline testing and analysis, the Mallard Point citizen group of volunteers has also developed an initial proposal to improve the health of the Mallard Point lake system and in effect the Eagle Creek Headwaters Watershed. The proposal includes additional monitoring, a movement of increased education and community activism, involvement of state and local officials, and research and analysis on preventing environmental degradation of the lake system.

The Mallard Point citizens wish to thank and acknowledge the Kentucky River Watershed Watch and its affiliates for supporting these and other important grassroots efforts. Without KRWW, the Mallard Point community would not have a mechanism to monitor, analyze and look after the environment in which we live and for which we are ultimately responsible.

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Traci Richter	Date	

**Approved by the Kentucky River Watershed Watch (KRWW) Steering Committee:**

_____	_____	P.O. Box 4307 Midway, KY 4305 (859) 846-4905 info@krww.org
NAME???	Date	

## **Part One**

# **Watershed Environmental and Cultural History**

***Kentucky River Basin  
Assessment Report  
of the  
Lytle Fork and Eagle Creek  
Headwaters Watershed***

## Part Two

# Citizen Scientific Examination

- *Summary tables of Mallard Point sampling data*
- *Map of Mallard Point Neighborhood and lake system*
- *2003 EPA permit for Wastewater Treatment Plant*
- *Habitat assessments and photographs*
- *Certificates of Analysis,  
Fouser Environmental Services*
- *Chain of Custody records and photographs*
- *Internet research on aeromonas hydrophila*
- *Data from two other sampling sites in the watershed*

*While included here, at this time, we do not see any immediate correlation between these sites and the Mallard Point sites, since Mallard Point is at the top of the watershed.*

## **Part Three**

# **Assessment**

- ***Individual site assessments***
- ***Collective assessment***
- ***Explanation of water quality parameters***

*These relevant pages are excerpted from the:*

*Kentucky Water Watch*

*Technical Appendix*

*Explanation of Water Quality Parameters*

## **Part Four**

# **Action Items**

**Part Five**

**Summary**

**Approval**  
*of the*  
**Kentucky River**  
**Watershed Watch**