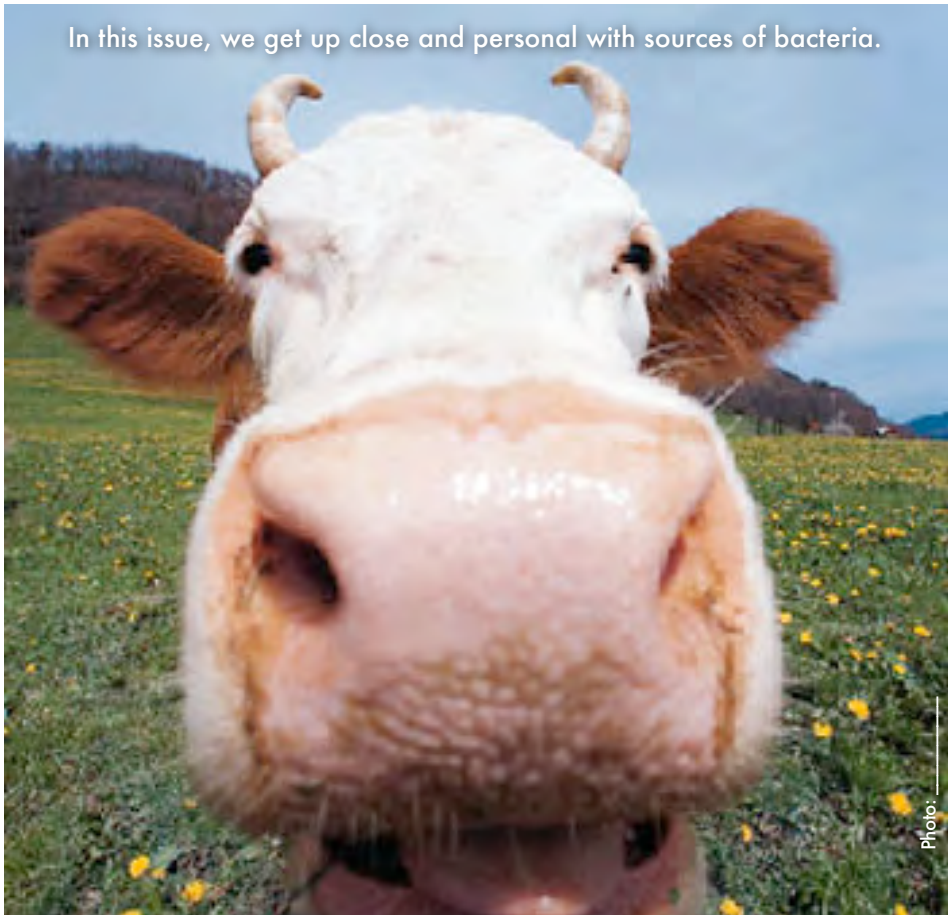


Alliance

ISSUE 2
BACTERIA



What is *E. coli* and What is it Doing in Our River?

Perhaps more commonly discussed as contaminating food, *E. coli* bacteria is in the Upper Grand River too.

The goal of the Clean Water Act is to make our rivers and lakes "fishable and swimmable." Unfortunately, portions of the Upper Grand and Portage Rivers are not swimmable because bacteria concentrations are too high. They fail to meet state water quality standards for "total body contact."

What is *E. coli*?

E. coli is short for *Escherichia coli*, the scientific name for a particular species of bacteria. Bacteria are single-celled organisms found throughout the world; in soil, water, and inside of us. *E. coli* are



to Issue #2 of the Watershed Alliance Newsletter

In this issue we continue our series on the Upper Grand River TMDLs (peek inside to learn what a TMDL is). Although not usually the subject of polite conversation, we take a look at sources of bacteria, the *E.coli* TMDL, and what we can do.

some of the most common bacteria living in the intestinal tract of humans and other warm-blooded animals. Most strains of this bacterium are harmless - even helpful - as they aid in breaking down and digesting food. Some strains however can be harmful and cause a variety of intestinal illnesses.

You've probably heard news stories of *E. coli* bacteria in spinach, peanuts, apple

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UPCOMING EVENTS



2009

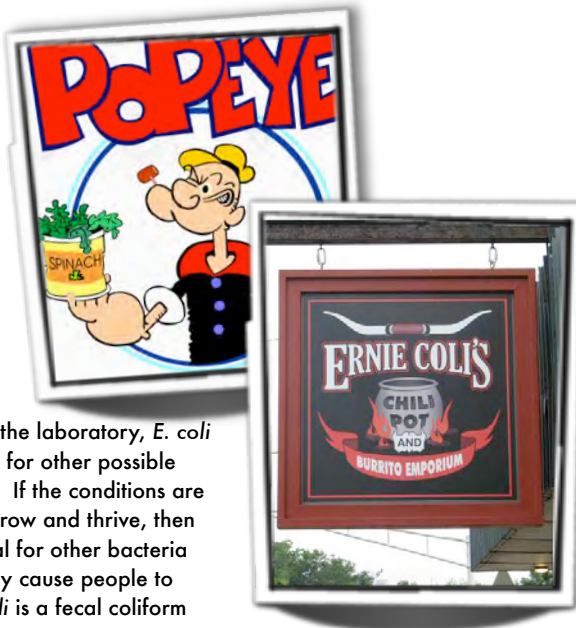
- Grand River 2010 Planning..... **June 15, Impression 5 Science Museum**
 - Adopt-A-Stream Fall Collection..... **October 3, Dahlem Center**
 - Adopt-A-Stream Bug ID..... **October 7, Rm 135 McDivitt Hall, JCC**
- Check out uppergrandriver.org for more events and information

What is E. coli and What is it Doing in Our River? (cont'd)

What is E. coli? (cont'd)

juice, meat, etc. In most cases, the source of contamination in these foodstuffs is manure, scat, droppings, feces...from wild pigs, from mice and rats in processing plants, etc. The same is true for the river. It's believed that most of the bacteria in the Upper Grand is from some source of animal waste.

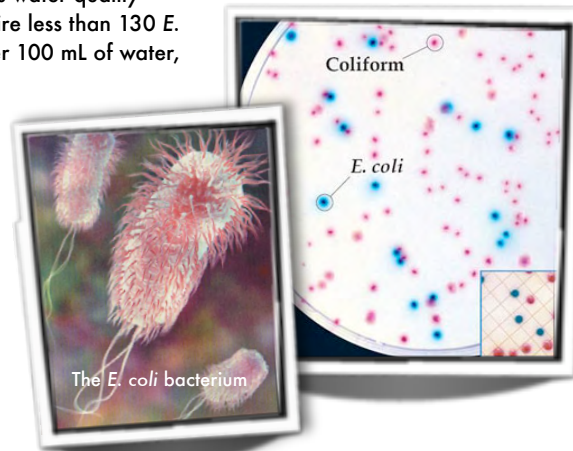
Most forms of *E. coli* are not dangerous. But, because it can be readily detected in the laboratory, *E. coli* is used as a marker for other possible harmful pathogens. If the conditions are right for *E. coli* to grow and thrive, then there is the potential for other bacteria and viruses that may cause people to become ill. *E. coli* is a fecal coliform



bacteria, which means it lives in the intestinal tract of humans and other animals. So, its presence in lakes and streams indicates contamination from feces.

Michigan's water quality standards require less than 130 *E. coli* colonies per 100 mL of water, as an average, or less than 300 *E. coli*/100 mL in any one sample.

Concentrations in the Grand River typically exceed these values. Single day geometric average values in the Upper Grand River have been recorded as high as 19,000 *E. coli*/100 mL.



Where Does the Bacteria Come From?

Okay, we can use whatever term we choose, but basically the bacteria comes from "poop." So pictured here are the faces and sources of bacteria...**dogs, cats, livestock, waterfowl, wildlife,...and people.**

How Does it Get in the River?

Over the land or through a pipe: over land - animal waste and other materials high in bacteria are washed off of sidewalks, lawns, farm fields, and other surfaces when it rains. The runoff flows into the catch basins along the curb or into ditches and streams and is ultimately carried to the river. Through a pipe - houses and businesses may also be built with their sewer pipes incorrectly connected, so that sanitary sewer waste is sent to the storm drain and then to the river.

When we walk our dogs and don't pick up behind them, their waste washes into the streams during rains. Raccoons living in the storm drains or ducks and geese on lakes and ponds contribute fecal matter and bacteria (unless they wear diapers like the duckling pictured here).

If septic tanks fail or the drain fields are insufficiently sized or built too close to the water's edge, bacteria can wash into local lakes and streams. Combined sewer systems and illicit cross-connections between separate storm and sanitary sewers send carry untreated sewage to rivers and streams. Likewise, sanitary waste from campers and trailers should not be dumped on the ground or into storm sewers. Livestock manure that is not contained or liquid manure used as fertilizer may also lead to contamination. Uncovered garbage or dumpsters may also be sources if allowed to runoff into ditches and catch basins.



Don't Neglect Your Septic System

Nearly one quarter of the households in the U.S. rely on septic tanks to treat and dispose of their household wastewater. With septic tank outflows containing 10,000 to 10,000,000 colonies of fecal coliform bacteria per 100 mL, as well as nitrogen, phosphorus, and other pollutants, it is vital that the soils in the septic drainage field adequately capture and absorb contaminants in the effluent.

Unfortunately, it is estimated that 5-40% of septic systems are failing at any one time (failure estimates vary regionally but average approximately 10%). The most common causes of failure are poor installation, hydraulic overloading, and a lack of maintenance. Homeowners, health department officials, community planners, and elected officials can all influence and prevent some of these causes.

Many septic failures stem from improper placement and installation: locating systems where there is an insufficient separation distance above the water table, insufficient separation from lakes or streams, insufficient absorption area, poor soils, or the compaction of soils during construction.

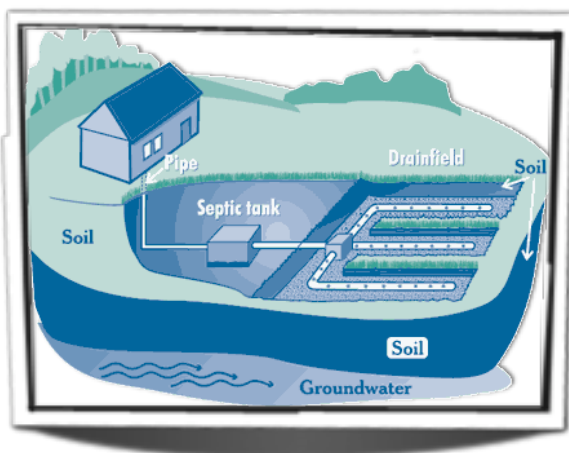
Hydraulic overloading may, again, be due to poorly drained or wet soils or contact with the water table, or too much water being put into the system.

This may happen when older small cottages are turned into year-round homes, or when storm water also discharges to the drainage field.

As long as the soils in the drain field are not saturated, bacteria and viruses are generally absorbed and rendered inactive within a few feet of soil. Saturated soils, however, may allow

pollutants to travel much greater distances. Redirecting runoff from roofs and other impervious surfaces away from the drain field, can help reduce soil saturation.

As a homeowner, the best way to ensure that your septic system is operating efficiently, and not polluting groundwater or nearby surface waters, is to have the system pumped or cleaned out regularly. For most systems, pumping out the vault every 3 to 5 years is recommended. The design life of a septic system is generally 12 to 20 years. However, more than half of the septic systems in the U.S. are over 30 years of age. Proper maintenance is the key to expanding the life of your septic tank.



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What's a TMDL?

TMDL is short for Total Maximum Daily Load. A TMDL is a pollution reduction target, calculated and required by the state of Michigan. There are 3 TMDLS on the Upper Grand River; for bacteria, dissolved oxygen, and biota (aquatic life).

E.coli bacteria concentrations in the river are too high, exceeding water quality standards, while dissolved oxygen (DO) concentrations are too low. Fish and invertebrate populations are also poorer than they should be so a biota TMDL is in place for part of the Upper Grand mainstem and parts of the Portage River.

For More Information About Septic Systems, Please Contact Your County Health Department:

Calhoun County
www.calhouncountymi.gov/Departments/HealthDept/EH/OverviewEH.htm

Eaton County
www.barryeatonhealth.org/neweh-home.htm

Hillsdale County
www.bhsj.org/eh/environment.htm

Ingham County
hd.ingham.org/environmental-health.aspx

Jackson County
www.co.jackson.mi.us/ED/ehsForms.htm

Washtenaw County
www.ewashtenaw.org/government/departments/environmental_health/

Do's and Don'ts:

- When installing a septic system, do make sure that your site's soils are suitable for septic systems
- Do maximize the distance between your septic field and nearby wells or surface water
- Don't allow excess storm water from roof tops or other impervious surfaces to saturate the drain field
- Do have your septic system inspected and pumped out every 3-5 years

For More Information, Contact Your County Health Department, or

Check out the Watershed Alliance's Website: www.uppergrandriver.org



Picking up After Your Pet Really Does Make a Difference

Studies show that pet waste accounts for over 20% of the contamination in our lakes and

Okay, it's not pleasant, but picking up after your dog can make a big difference in the watershed. The Upper Grand River Watershed is home to an estimated 36,000 dogs and the waste they generate is a bigger water quality problem than you may think.

In studies conducted in the Pacific Northwest, and the Chesapeake Bay area, researchers "fingerprinting" the DNA of *E. coli* in surface waters found that approximately 20% of the bacterial contamination was from dogs.

The 36,000 dogs in the Upper Grand River Watershed are estimated to contribute 15,000 pounds of solid waste every day and a single gram of dog poop can contain 23 million fecal coliform bacteria (there are 453.6 grams in a pound...we'll leave to it our readers to do the math).

Let's look at it another way: studies estimate that 100 dogs in a 20 square mile watershed would contribute enough poop and bacteria in 2 to 3 days to close swimming beaches and contaminate shellfish. The Upper Grand River Watershed has an estimated "dog density" of over 1,000 dogs per 20 square miles - it's no wonder that bacteria concentrations in the river are too high.

So Why Don't We Pick Up?

Surveys indicate that about 1/2 of dog owners walk their dogs (the other presumably letting their dogs go in the yard). Of those that do walk their dogs, only about 60% of us pick up after our pets. Why is that?

People have a lot of reasons:

- "There aren't any garbage cans."
- "I don't have a plastic bag."
- "My dog goes off the trail, no one will notice."
- "It eventually goes away."

Well, it does eventually go away - it gets washed into streams and the river during the next rain, even when the nearest lake or stream seems to be a long way away. If you're in the city, remember that the storm drain is a direct conduit to the river.

Though we have a number of reasons for not picking up after our pets, surveys conducted in Maryland and Washington DC, indicate that we generally think it is the right thing to do. 86% of the people surveyed disapproved of people that don't pick up after their pets; characterizing "them" as inconsiderate and irresponsible... If only 30-60% of us pick up after our dogs, how come so many of us think it's wrong not to? It appears



that there is a disconnect between what we think should be done and what we actually do.

Sure, it can be a bit embarrassing putting a plastic bag over your hand and bending to pick up after our pets...but isn't it more embarrassing to stand there while your dog goes to the bathroom and then walk away, acting as if it never happened? What better use for that plastic tube the newspaper comes in, the bag from a loaf of bread, or the plastic bags we get from the grocery?

Do you pick up after your pet? If you don't now, please consider making it a new habit. Help keep our beaches and the river clean enough for swimming and paddling. Think of what a difference we could make if we all decided to do our part.



Do's and Don'ts:

- Don't leave pet waste on the ground or sidewalk and don't wash it into storm drains and catch basins
- Instead, do please pick up after your pet.
- Bagged pet waste may be disposed of in trash cans (This is a good way to reuse plastic grocery and newspaper bags).
- Un-bagged pet waste can be flushed down the toilet.

For More Information, Check out the Watershed Alliance's Website: www.uppergrandriver.org

Attention Agricultural Producers

The Natural Resource Conservation Service (NRCS) and your local County Conservation Districts offer programs to help reduce manure runoff and water pollution. NRCS staff can assist you in developing a Comprehensive Nutrient Management Plan (CNMP) including soil and/or plant analysis, buffer strips, equipment calibration, the timing of fertilizer applications, fencing cattle out of streams, and/or other practices to protect water quality.



The Environmental Quality Incentives Program (EQUIP) cost share programs are available for traditional and organic agricultural producers with approved management plans.

For more information please contact:

Andrew Gust
District Conservationist
Jackson Service Center
211 W. Ganson Street,
Jackson, MI
(517) 789-7716 x 3



Photo: Center for Watershed Protection

Bacteria Busting Success Stories

Between 2004 and 2007, community officials and their contractors investigated 171 suspected storm water outfalls to the Upper Grand River and its tributaries. They found seven (7) illicit discharges in the process including 13 residential households, a 36-unit apartment complex, and a restaurant.

Cities and Townships in the Jackson area have taken on the challenge of reducing bacteria in the Upper Grand River by identifying and eliminating improper connections between the sanitary and the storm sewers. Partner agencies in the project included the following:

- Jackson County Drain Commissioner's Office
- Jackson County Road Commission
- Jackson County Health Department
- City of Jackson
- Blackman Charter Township
- Leoni Township
- Napoleon Township
- Rives Township
- Spring Arbor Township
- Summit Township, and
- Tetra Tech, their engineering consultant

Just this month (June 2009), Blackman Township officials discovered two more residential discharges with septic systems tied into field tiles and carrying sewage to nearby surface waters. The Township is now working with the County Health Department to have these sources tied into the sanitary sewer system.

Eliminating these discharges eliminates a number of pollutants that had otherwise been going into the river. To date, this project has kept nearly 55 tons (109,734 pounds) of suspended solids (sediment); 6,096 pounds of nitrogen; 1,219 pounds of phosphorus; and 15,241 pounds of oil and grease from reaching the river. Bacteria reductions are a bit harder to present in meaningful terms, but each passing day represents 13,240 gallons of wastewater diverted from the river. With each gallon of wastewater containing nearly 38 billion bacteria colony forming units, we are thankful for the efforts of these communities.



Get Ready To Paddle!

Want to spend 13 days on the river - from headwaters to Lake Michigan? Maybe only one or a few days will fit your schedule. You can take your pick:

Grand River Expedition 2010 is planned for July 14-26, 2010.

It will start with ceremonies in Liberty Township in Jackson County and travel downriver to the big lake, stopping for events in cities and towns along the way. There will be music, festivals, and opportunities to learn about the river along the way.

Planning for the event is underway. You can learn more or find out how to join in the planning by visiting:

michigan.sierraclub.org/issues/greatlakes/articles/GRE2010.html

A regional meeting to begin focused planning for the events in the Upper Grand River is planned for mid to late July. Please check the Upper Grand River Watershed Alliance website for the date and place as plans for that meeting are solidified.

We hope to see you on the river!

Upper Grand River Watershed Alliance
c/o Jackson County Drain Commissioner's Office
120 W. Michigan Avenue
Jackson, MI 49201

The Upper Grand River

The Upper Grand River Watershed Alliance is a coalition of municipalities, businesses, agencies, and individuals in the headwaters region of the Grand River, Michigan's longest river, working to protect and restore the river, its lakes, streams, and wetlands. www.uppergrandriver.org

