

The Water Line

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Non-Point Source Pollution Part 4: Rural Sources

By Dan Obrecht



In previous articles we have defined NPS (that's non-point source pollution for those of you who missed the previous articles), talked about urban sources of NPS, and dealt with how individuals can make a difference in their own backyard. In this

installment we will head out to the country and look at rural non-point sources of pollution.

Agriculture is a big part of Missouri's economy as well as its heritage, but it is also one of the more obvious threats to water quality (agriculture is the leading source of pollution in rivers and lakes in the United States according to the EPA). Crop fields spend a good portion of the year with low or no vegetative cover. This means that the potential is there for a lot of erosion. Soil loss in Missouri has been estimated up to 10.9 tons per acre per year!!

These fields also have fertilizers and pesticides applied to them on an annual basis. In theory, the fertilizers and pesticides remain in the field where they should provide nutrients to desirable plants and control damage by insects. However, we all know that the real world doesn't always work like it should. These chemicals are often applied earlier in the year when rainstorms are frequent. A good downpour can carry a large amount of the fertilizer or pesticide off the field and into nearby streams and lakes. This is especially true if the rain occurs soon after application.

An aspect of agriculture that we sometimes don't consider is livestock. Concentrated Animal Feeding Operations (CAFO) can have a significant

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impact on nearby waters. While CAFOs are regulated, there is still great potential for impacts. In Missouri there have been instances where animal waste treatment lagoons have overflowed or pipes carrying waste have broken. Some of the operations also spread the waste onto fields as a method of treatment. If too much is applied or if a storm occurs after application there can be a lot of input into streams and nearby lakes.

While CAFOs get a lot of attention there are impacts from smaller operations. Manure from pastures can end up feeding nutrients into nearby waterways. This problem is magnified when livestock is allowed access to the stream. Direct inputs into the stream do not have the benefit of partial terrestrial treatment. Also, cows wading in and out of the stream can damage stream banks, leaving them prone to increased erosion. While agriculture is the leading non-point source pollution problem associated with rural areas there are other problems. As we mentioned in previous

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Lakes of Missouri Volunteer Program Coordinators

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articles, any time the vegetative cover is removed, the potential for erosion is greatly enhanced. This means that activities such as timber harvest have potential to become a NPS problem. Surprisingly, the majority of problems associated with timber harvest is related to road building and use according to EPA. Mining also has the potential to cause NPS impacts. Often the problems associated with mining are acidic runoff and heavy metal contamination.

These are just some of the NPS problems associated with rural settings. We are not going to

stop farming the land or harvesting trees so we must find ways to reduce the impact of these activities. In most cases, wise land-use and BMPs (Best Management Practices) can greatly reduce rural non-point threats. Agencies such as EPA, NRCS (Natural Resources Conservation Service), DNR as well as the University of Missouri Extension have numerous web sites*, booklets and pamphlets that can help landowners reduce their impacts. Remember, we all live downstream!!

* remember to check the links page at www.lmvp.org for links to websites listed in the newsletter

BRAINS ON THE BEACH

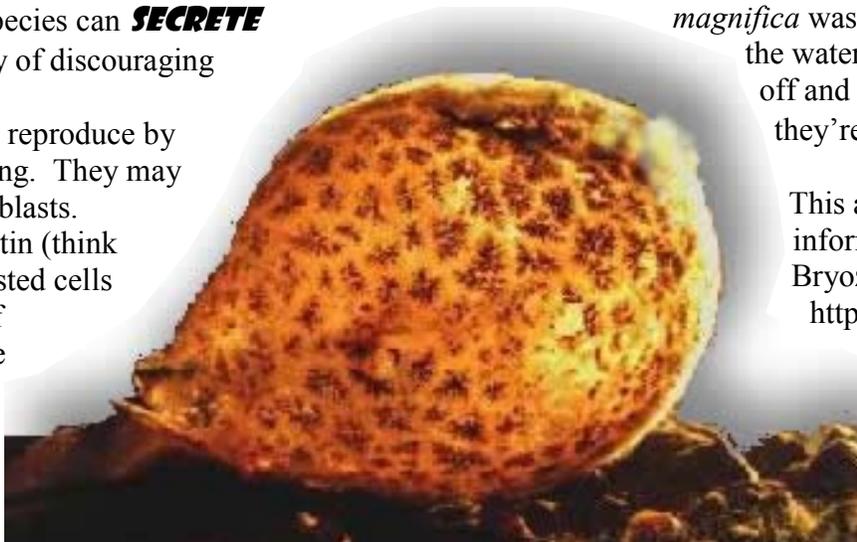
DON'T BE ALARMED if you encounter a large, gelatinous blob on the beach of your favorite lake this fall. It's probably not a brain, but a **BRYOZOAN**. Bryozoans (also called "**MOSS ANIMALS**") are colonial organisms comprised of up to many millions of individuals, each no larger than a millimeter. They feed by filtering out plankton in the water, much like a sponge or a coral. Unlike sponges and corals, however, when bryozoans die they dissolve in the water leaving practically no evidence of their having been there at all.

Most Bryozoans are found in salt water, but some species are found in freshwater. One of the more common freshwater species is *Pectinatella magnifica*, seen in the picture. This species can get **AS LARGE AS A BASKETBALL**. Another, albeit rare, freshwater species can **SECRETE POISON** as a way of discouraging predation.

Bryozoans reproduce by budding, or dividing. They may also produce statoblasts. Statoblasts are chitin (think "bug skin") encrusted cells that are capable of withstanding more extreme conditions than

the colony can survive, like cold winter or hot summer temperatures. Statoblasts **HAVE "HOOKS"** which can hitch rides on animals and end up in other water bodies, much like a cocklebur sticks to your jeans.

So, what does this have to do with water quality, you may ask? Bryozoans feed by filtering out food from the water. This "food" is often algae, which may contribute to a shallow secchi measurement. It has been suggested that bryozoans may help to improve water clarity by filtering out algae, but I haven't seen anything authoritative on that yet. *Pectinatella magnifica* prefers warm water, and will typically die at below 20° C (68° F). So, if you see a **BIG BLOB** attached to your dock, you can probably bet that the water is warm and that there is plenty of food (algae). If you see *Pectinatella magnifica* washed up on shore, then the water has probably cooled off and it has died. And no, they're NOT **DANGEROUS**.



This article contains information gleaned from the Bryozoa Home Page:

<http://www.civgeo.rmit.edu.au/bryozoa/links.html>

By Tony Thorpe

LMVP: As we have educated people around the state about the LMVP, we have had several requests for more information on ways interested citizens can help. Is there anything these people, or our current volunteers can do to improve their lake or watershed?

Georganne: Yes, Missouri Department of Natural Resources (DNR) has established the Nonpoint Source Water Pollution Control Minigrant Program to support small projects that provide water quality protection or restoration.

LMVP: What is a Minigrant?

Georganne: It's a grant of up to \$5000 to give citizens of Missouri the opportunity to clean up their watersheds, lakes or streams. The award does require a 40% non-federal match.

LMVP: So 40% of the total project funding has to come out of the volunteers' pocket?

Georganne: No, not at all. Matching support may be in-kind, for example, volunteer's time, mileage, use of equipment. Often businesses will sponsor these projects and donate meeting rooms, supplies, or food. All of this can go toward the matching support. The total amount of nonfederal match (whether it's cash or in-kind must be at least 40% of the total project budget.

LMVP: Who can apply for a Minigrant?

Georganne: Educational institutions, 501(c)(3) non-profit organizations, and units of government can apply for NPS minigrants. These include science clubs, 4-H or scouting groups, Soil and Water Conservation Districts, watershed committees, towns, etc.

LMVP: How long do these projects last?

Georganne: The Minigrants can last up to 18 months from start to finish. These are designed to be "quick and easy." However, if more time or funding is needed, we do have other grants.

LMVP: Is there any stipulation on what the project has to do?

Georganne: These projects must address nonpoint

source water pollution issues. The projects can do this through education, information, demonstration of alternatives or innovative pollution prevention practices, or by correction of existing impacts.

LMVP: Just to get the ball rolling, what kind of lake issues could be funded through this program?

Georganne: Wow! Soapbox time. How about an educational program at Lake of the Ozarks, or Table Rock on minimizing the effects of boating uses, such as houseboat sewage discharge, or oil and gas spills. Or, use of alternative vegetation on lake shores to discourage goose population. These are just a few ideas.

LMVP: How do our volunteers apply for a Minigrant?

Georganne: To receive an application or information, they can call 1-800-361-4827 and ask for the Water Pollution Control Program, fax 573-526-5797, or write to:

The Missouri Department of Natural Resources
Attn: Water Pollution Control Program
P.O. Box 176
Jefferson City, Mo. 65102-0176

Applications are accepted anytime. The applications are then reviewed by the department after each quarter and if approved, awarded the following quarter. You need to apply at least 3 months before you want your project to begin.

LMVP: Can they call you?

Georganne: Yes. As the Clean Lakes Coordinator, my job is to get as many lake projects going as possible. Therefore, I will do my best to answer any technical questions about NPS issues (or find an expert that can). My number is 573-526-1157, or they can call the Water Pollution Control Program at 1-800-361-4827, and ask for me, and of course there is always email, my address is nrbowmg@dnr.state.mo.us

Minigrant Information
Georganne Bowman
Water Pollution Control Program
1-800-361-4827
nrbowmg@dnr.state.mo.us

Minigrants—How to Fund Your Clean-Up Project. An Interview with DNR's Georganne Bowman

Party Cove Predator Stymies Sampling Efforts by Tony Thorpe

A recent discovery at the Lake of the Ozark's "Party Cove" has hampered monitoring efforts. A giant daphnia, or "water flea" has been attacking Secchi discs. This giant crustacean, nicknamed "Daffy," often chews through the ropes that hold the Secchi discs and swallows them. "It's getting really expensive" says Dan Obrecht of the Lakes of Missouri Volunteer Program.

"I have to order more Secchis and they aren't cheap! I'm also becoming concerned about my safety," warns Obrecht. "That beast darn near took my hand off as I was filling a sample bottle." It is believed that the daphnia grew to such a giant size by consuming canned beverages fed to it by the revelers of Party Cove.

Witnesses observed this creature trying to climb aboard a flotilla of pontoon boats this summer. Fortunately for the partiers, the oversized arthropod was no threat. "That thing is huge, and it's mostly water," said Fran Pope, also of the LMVP. "It just doesn't have the strength to

move around out of the water. But I sure as sugar wouldn't want to tangle with it in the lake."

Daphnia feed by filtering particles out of the water. Typically these particles are algae and bacteria. "I think this guy's eating my Secchi discs because he's hungry. He's too big to eat bacteria and algae anymore, and fish probably move too fast for him to catch," suggests Obrecht.



Obrecht battles a giant Daphnia at Lake of the Ozarks



Happy Halloween!

For **accurate** information about Daphnia, check out the following websites:

<http://www.cladocera.uoguelph.ca/default.htm>

<http://www.microscopy-uk.org.uk/mag/artjun99/wflea.html>

Or check the links page at www.lmvp.org

The LMVP Has a New Website!

The Lakes of Missouri Volunteer website is online at www.lmvp.org. At the site you can read back issues of the newsletters, check out the data from the latest data report (older data will be added soon), and get current information from us. If you have friends interested in becoming volunteers, then this is a perfect way to get them acquainted with the program. If they like what they see, they can get all of our contact information from the website. There is a great links section, with links to other websites

related to water quality monitoring. I'll also be posting links to websites mentioned in the newsletters.

If you come across any websites of interest let me know (contact information is on the front page of the newsletter) and I'll check them out.

You may also notice that the email addresses for Fran and Dan have changed. The new email addresses are easier to remember, but the old addresses will still work. Check the front of this newsletter for all of our contact information.

Tony Thorpe

On average a person uses 50 gallons of water each day. This includes 2 gallons for brushing teeth, 2-7 gallons to flush a toilet, 25-50 gallons for a shower. This costs an average of 25 cents per day per person. In addition to the water used by each person every day is the water used in the processing and production of consumable goods.

Water Trivia Facts
Compiled from EPA 810-F-95-01

steel. 24 gallons of water are used to produce a pound of plastic. To prepare a pound of cotton or wool requires 101 gallons of water.

To make a single board foot of wood requires 5.4 gallons of water. However, a birch tree transpires about 70 gallons of water each day through its leaves. A single acre of corn will transpire 4,000 gallons of water each day.

It takes approximately one gallon of water to process a pound of hamburger. To make a barrel of beer, you'll need about 1,500 gallons of water. A ton of beet sugar requires 33,100 gallons of water to be processed. A single chicken needs about 11.6 gallons of water for processing, which is more than a can of fruit or vegetables, which requires 9.3 gallons.

39,090 gallons are typically required to manufacture a new car. 1,851 gallons of water are needed to refine a single barrel of crude oil, and 62,600 gallons of water to produce a single ton of

Although 80 percent of the Earth's surface is covered with water, 97 percent of that is salt water. This means that only 3 percent of all of the water on the planet is freshwater. Of that 3 percent, two-thirds is frozen. Therefore, only 1 percent of all the water on Earth is available for human use. There are a million miles of pipes and aqueducts in the United States and Canada to move around our portion of that 1 percent of the planet's water. That's long enough to circle the world 40 times!



A New Face at the LMVP

By now, nearly all of you have either talked with me or corresponded with me in some way as we have been doing sample pick-ups. I am Tony Thorpe, and I'm the new recruit here at the LMVP. Fran Pope is following her muse and moving on. I have been conducting the sample pick-ups with her for the last month or so and have had the pleasure of meeting many of you. I am in awe. Not only am I amazed at what you volunteers do each summer, but I'm amazed by your enthusiasm. I hope I can keep up with all of you.

In 1992, its first year, the LMVP recruited volunteers to sample 4 Kansas City lakes. At the end of 2000 we had at least 80 volunteers sampling over 50 sites on 20 different lakes. Since I started at the Limnology lab 1995 I have had the opportunity to watch from the outside as the program evolved from a file drawer and a pile of papers on a table in a single room, to several file drawers and several piles on several tables in several rooms.

Under the direction of Fran Pope in the last few years, this program has really grown in size. However, even as the program has expanded, she still has managed to maintain a friendly and personal working relationship with each of you. I will try to continue that tradition.

If you have any questions or comments for me, do not hesitate to call, email, or write me. All of my contact information is on the front page of the newsletter, and at the new website, www.lmvp.org.



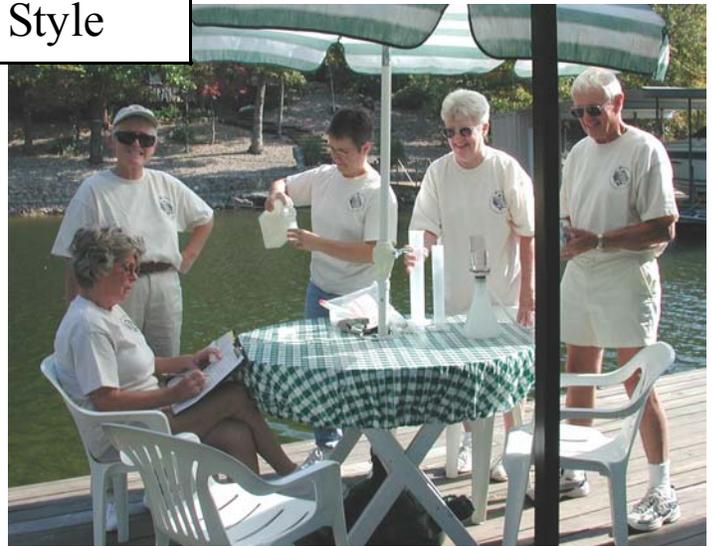
Tony Thorpe ♦♦♦

Region VII, US Environmental Protection Agency, through the Missouri Department of Natural Resources, has provided partial funding for this project under Section 319 of the Clean Water Act.
The Lakes of Missouri Volunteer Program is also supported by the University of Missouri.

Water Sampling - Lake of the Ozarks Style

When the team sampling Lake of the Ozarks mile marker 13 emailed us and invited us to sample with them, how could we refuse? When we rolled in at 1:00, we were greeted by five cheerful faces and a smorgasbord of food and beverages! Apparently, whenever these folks sample they make a party of it.

The sampling session went well, the only glitch being that we had to stop off at Kittie's dock for additional beverages. Such is life, and we must learn to cope with adversity. With additional beverages on deck, we returned to our duties and collected the remaining samples.



Above: The 13 Mile Marker Crew processes the water samples at Doug's dock. Left to right: Peggy (seated), Jan, Karen, Kittie, and Doug

Left: Kittie wields a red flag as a warning to other boaters that we're here for business and won't take any gruff.

Below: One shouldn't sample on an empty stomach. Just make sure you don't get salmon in the sample bottles!



The Water Cycle

by Dan Obrecht

A raindrop falls from a dark storm sky.
Plummets to earth, having fallen from high.

It joins others in a surface flow.
Meanders downhill. It cuts the earth as it goes.

Into a puddle the drop's flow does stray.
Soaks into soil, held in place by clay.

Absorbed by roots, it moves to a leaf.
Out as vapor. Its stay all too brief.

Moisture in air, the drop skyward goes.
It falls as flake in a December snow.

It turns into ice, after a sunny day.
Melts back to water when the warmth finally stays.

Down a storm drain, funneled out of sight.
Part of a river, the drop flows with much might.

Into the ocean, part of the sea.
To travel the world the water drop is free.

On a warm day, the drop rejoins the air.
With brethren drops, cloud space it does share.

A raindrop falls from a dark storm sky....