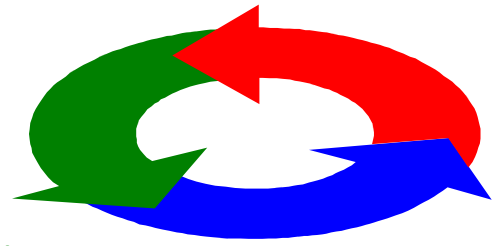


Amendments



Improving Awareness & Advocacy of the Michigan Biosolids Program

Volume 18, Second Quarter

May 2014

Biosolids Program Update

Biosolids Conference

The Michigan Biosolids Team hosted the 2014 Biosolids Conference: **"Biosolids Optimization, Focusing on the Product"** on **March 11 and 12, 2014**, at the Holiday Inn Conference Center in Big Rapids. Tours of the Nestle Ice Mountain bottling facility in Stanwood and the Fremont Community Digester in Fremont were excellent! A big plus with the tours was **good weather** for traveling. After the Evening Reception and dinner, the group enjoyed **DJ Trivia** with the winning team receiving **snickers bars**. Part of the evening's festivities was to include the crowning of the new **Baron of Biosolids**. The crowning occurred on March 12 where Mike Person crowned the new Baron, **Joe Goergen**, of Genesee County Anthony Ragnone WWTP. The presentation portion of the conference featured excellent presentations by Dr. Kang Xia, Virginia Tech, and Dr. Lakhwinder S. Hundal, CPSS, Metropolitan Water Reclamation District of Greater Chicago, to discuss PPCPs, Dr. George Bird to discuss Soil Health, Manuel Irujo, NEFCO, and Mike Gerbitz, Donohue and Associates, discussed sustainability and energy independence. Presentations by Dr. Marc Mills, Aaron Vis, Kari Stuart, Paul Gross, and Brian Hannon contributed significantly to the conference. The conference wrapped up with an inspiring talk from **Don Stypula** on the importance of collaboration to accomplish your goals.

The Biosolids Team is already beginning the planning process for 2015. Suggestions for location, venues, topics, and tours are always welcome!



BIOSOLIDS
An Effort in Fertility



MSU Agricultural Exposition

The Michigan Biosolids Team will be displaying at the 2014 MSU Ag Expo on the Michigan State University Campus. This event will once again feature a **Demonstration Plot**. With cover crops becoming more popular, winter wheat will be planted this spring to act as a cover crop. The Biosolids are provided by **NEFCO**, who has the contract with the Detroit Water and Sewer District to dry and granulate their material. The corn planted last year was mowed down, biosolids surface applied, and the cover crop will be no-till planted into the chopped cornstalks.

The Biosolids team would like to thank MSU Botany Farm Manager **Gary Zehr** for chopping the corn and planting the wheat, MSU Crop and Soils Farm Manager **Brian Graff** who provided the fertilizer and the use of their equipment, and MSU Ag Expo Coordinator **Megghan Honke** for providing the fencing around the plots and the straw for the tent. MSU is providing these services without direct cost to the Biosolids Team.

Biosolids Workshops

The Michigan Biosolids Team has commenced the development of MWEA Biosolids Training Modules that will outline sludge treatment, biosolids handling, beneficial use options such as land application, and disposal options.



Lake Superior toxic sludge cleanup options require millions

[CBC News](#) Posted: Mar 20, 2014 10:10 AM ET Last Updated: Mar 20, 2014 2:19 PM ET



It will cost between \$30-\$100 million to deal with 22 hectares of mercury-contaminated sediment in Thunder Bay's harbour. ([infosuperior.com/Google](#))

Dozens of people gathered at a public meeting Wednesday night to hear [the cleanup options](#) for a 22-hectare patch of toxic sediment in Thunder Bay's harbour.

Decades of pulp and paper mill pollution caused the mercury-contaminated mess, and it will take years — and millions of dollars — to fix it.

Current River resident Murray Milne still needs to consider all the options, but he's leaning toward total removal of the toxic sediment from the harbour.

"I would like to see it gone. That would be the only way to guarantee that it wouldn't have to be monitored or maybe further deterioration in the future."

What are the options?

Capping: Placing clean material on top of the contaminated material to contain and isolate the

contaminants. A geotextile (a strong fabric barrier) will support the cap material.

Dredging: Removing contaminated sediment underwater. This procedure needs a machine called a dredge.

Excavating: Using a type of dam, this procedure isolates the material from the water prior to removal. Then, typical earth-moving equipment like excavators, loaders and bulldozers can be used.

If material is removed, options to dispose of it include putting it in a secure landfill, creating a new on-site Confined Disposal Facility or using an existing Confined Disposal Facility at Mission Bay.

Dredging or excavating the sediment are permanent solutions. Dredging would cost \$40-\$50 million, and excavating \$80-90 million.

Another option — capping — would cost \$30-\$40 million, and involves covering the contamination with clean material and a strong fabric barrier.

Who will pay?

Whatever the decision, it's unclear who will pay the local share of the expense.

"A lot of the projects are one-third federal, one-third provincial and one-third from the industries. The problem here is those industries no longer exist," said Jean Hall-Armstrong, who co-chairs the project's public advisory committee.

Environment Canada has committed to paying the federal portion, and will help figure out who else pays once the community decides which cleanup option to take.

"Environment Canada has a mandate to deal with contaminated sediment sites in the Great Lakes,"

said Environment Canada's Roger Santiago. "And what we follow is a structure where we'll provide one-third of the funding to have these sites remediated."

He said the polluter usually pays a portion, but, in this case, the sediment accumulated over decades from a pulp and paper mill that had various owners.

About 40 people attended the public meeting at Lakehead University, including members of the general public, members of the Remedial Action Plan's Public Advisory Committee, representatives from Environment Canada, Ecosuperior, Resolute Forest Products, and Richardson Elevator, which is located across from the polluted site.

Markham-based Cole Engineering presented the options.



A thick layer of pulpy fibrous material like this sample above is suspended in the water at the Thunder Bay North Harbour site. (Jamie Saunders/EcoSuperior)

No matter what is decided upon, an estimated seven-year time line will exist around the project. Extensive public consultations need to be completed before a decision is made. After that, another two years will be required for design, six months for tender, three years for construction, and then six months will be required for verification and project close-out.

From tank to bank, processing septage to benefit Greenville

By [Curtis Wildfong](#) • Last Updated 10:15 am on Wednesday, March 05, 2014

GREENVILLE — It might be tough to believe there is a market for septic waste, but Greenville officials have approved a plan which will bring in septage from outside sources to be processed at the city's wastewater treatment plant.

The plan, which sets a fee schedule and guideline for accepting the waste, could bring in a good chunk of change. At a cost of 6.5 cents per gallon and a plant that can process up to 5,000 gallons per day, the revenue can add up.

"It will generate tens of thousands of dollars annually above what it costs to treat it," City Manager George Bosanic said. "As we all know, the sewer fund can use some revenue."

On Tuesday, the Greenville City Council adopted a letter of agreement to be signed by each hauler who contracts with the city. The agreement mostly outlines regulations, while also requiring liability insurance policies from the haulers.

"It comes at some risk that we accept an unknown source of septage that there may be something in the batch that we accept that may be harmful to our facilities," Bosanic said. "So consequently, we want to hold whoever it is who did that accountable for doing it."

The council adopted the original plan for the processing of septage, which is partially treated, concentrated sewage from septic tanks, but with the letter of agreement can move the program forward.

Shawn Wheat, superintendent of the wastewater treatment plant, said he has already had interest from several haulers, all within Montcalm County, in utilizing the city to process septage. Previously, he said, they would often have to transport it to Grand Rapids.

The ability to implement a septage program was allowed by the city's recent upgrades to the plant, Bosanic said.

"We recently expanded the wastewater treatment plant that has expanded the capacity of the plant in anticipation of new companies coming to Greenville," he said. "In the meantime, we have the opportunity to take advantage of the septage haulers who will bring septage to Greenville."

If the city does add businesses, which would produce waste, Bosanic said the city has the leeway to scale back the amount of septage taken in from haulers in order to not exceed capabilities at the plant.

There is also the potential, he said, of expanding the plant in the future in order to accept more septage, which Wheat said is definitely out there.

"There is actually more septage out there than we can treat," he said, adding he wished to be able to process up to 10,000 gallons a day, but due to Michigan Department of Environmental Quality standards, the city does not have the resources for that much.

Bosanic said we would first like to establish a successful program on a small scale, before considering any additional expansion.

"I suggest we learn to crawl before we walk," he said.

Government of Canada invests in 31 Great Lakes clean-up projects

4/23/2014 9:16:00 AM | Canada News Wire

QUINTE WEST, ON, April 23, 2014 /CNW/ - On behalf of the Honourable Leona Aglukkaq, Minister of the Environment, Minister of the Canadian Northern Economic Development Agency and Minister for the Arctic Council, Dr. Colin Carrie was in Quinte West, Ontario, today to celebrate 31 environmental clean-up projects in the Great Lakes. The projects, valued at \$1.88 million, are funded by the Government of Canada's Great Lakes Sustainability Fund. Since 1989, the Great Lakes Sustainability Fund has supported more than 900 partnered projects to help clean up Canadian Great Lakes Areas of Concern.

This past year alone, the supported projects leveraged \$3.76 million in funding from industry, academia and other government agencies. Working together to complete these projects is an important step towards protecting this vast natural resource for generations to come.

Quick Facts

- Great Lakes Areas of Concern are areas where the environment and water quality are severely degraded. Restoring them is a priority because they impact the health of the ecosystem locally and across the basin.
- Projects supported by the Great Lakes Sustainability Fund typically focus on restoring fish and wildlife habitat and populations, cleaning up contaminated sediment, and controlling pollution from municipal wastewater, urban storm water and rural run-off.

Quotes

"Our Government is committed to delivering a clean and healthy environment for Canadians. Through the initiatives highlighted today, we are taking action to restore and protect water quality and priority ecosystems throughout the Great Lakes."

- Dr. Colin Carrie, Member of Parliament for Oshawa and Parliamentary Secretary to the Minister of the Environment

"The Great Lakes are fundamental to the well-being of millions of Canadians who live and work along their shores. Our Government is proud to invest in projects that will help to ensure the long-term health of this critical resource."

- Rick Norlock, Member of Parliament for Northumberland—Quinte West

"The funding of habitat restoration and monitoring programs by the Great Lakes Sustainability Fund will ensure that the Bay of Quinte remains a healthy and vibrant ecosystem. The Bay provides this region with numerous amenities, including everything from quality drinking water to a world class fishery. This funding will help the Bay remain a sustainable and valuable resource for future generations."

- Glenda Rodgers, Chief Administrative Officer, Lower Trent Conservation and Co-Chair of the Bay of Quinte Remedial Action Plan Restoration Council

Related Product

For more information and to view a backgrounder on this announcement, please visit the [Web site of Environment Canada](#).

Associated Link

[The Great Lakes](#) (Environment Canada)

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Office of the Minister of the Environment
819-997-1441

Great Lakes brace for more toxic algae

Climate change, agricultural runoff are factors in a resurgent plague

April 30, 2014

It's spring, and the heavy snowmelt and rain is good news for farmers and scientists who have been worried about drought the last few years. But all that water has other consequences for the Great Lakes, including runoff: rainstorms carry fertilizer from farms and lawns into streams and rivers.

Much of it eventually ends up in the lakes, and when too much accumulates it can feed huge blooms of toxic algae. The problem is especially dire in Lake Erie around Toledo, Ohio, where algal blooms in 2011 and 2013 were some of the worst on record.

"I've seen the lake go from where you weren't even supposed to go swimming in it to what it's like today, and the change has been phenomenal," says Tim Robinette, a Toledo-area resident and longtime fisherman. "There were places that used to literally dump their waste in the river, and it used to float on down the river back in the '50s and '60s. And that don't happen anymore."

Lake Erie became infamous for its contamination after the [Cuyahoga River caught on fire in 1969](#); the lake's notoriety is credited with inspiring the passage of the federal Clean Water Act as well as the creation of Earth Day. And Lake Erie's comeback has been equally legendary: point source pollution from factories and sewage systems was cleaned up to a great extent by the 1990s.

In the 2000s, though, algal blooms began to reappear in the lake, bringing with them dead zones, bad smells and water that was once again risky to consume even in small amounts. In 2011, following a spring of particularly extreme rains, the algae blooms in Lake Erie grew to more than 5,000 square kilometers—three times the previous record. That got the attention of the International Joint Commission, the U.S. and

Canadian body that has monitored the lakes for more than a century. They worked on a major report released this spring urging states and provinces to take immediate action to curb runoff.

The green goblin

“Well, it looks kind of like green goo, you know, like thick, like pea soup-type green,” says Carol Stepien, a biologist at the University of Toledo’s Lake Erie Center, which overlooks the Maumee Bay.

The gooey muck she’s talking about is blue-green algae or cyanobacteria, which, when it’s overfed by fertilizers in the water, can grow into blooms that are dangerous to drink or even touch. In recent years cyanobacteria has poisoned multiple pets who drank from the lake, and last summer it shut down a water treatment system in a township near Toledo.

When the algae decomposes there’s another problem: it eats up oxygen, and that creates dead zones in the lake where no fish or plants can live, an effect called hypoxia.

Stepien explains that the Maumee River, a large river that runs through the middle of Toledo and into the bay, carries fertilizer runoff from up to 150 miles away. The Maumee Bay is a particularly warm, shallow part of the lake, and as runoff gathers, the algae becomes a well-fed monster.

But this isn’t some mysterious green goblin. Stepien says the problem can be traced primarily to phosphorus, an ingredient in commercial fertilizers that’s also found in manure, and sewer overflows from municipal water systems. The trouble is identifying and stemming the sources of the phosphorus.

“This is water that’s coming in from many many places, it can’t be pinpointed to a single pipe or certain pipes,” she says.

Golf greens can’t be brown

Sources can’t be pinpointed individually, but the potential sources are widely known. Among them

are lawns and golf courses that use commercial fertilizers. Just a couple miles away from the lake, there’s a golf course right along the river.

“Golf courses get a bad rap for the leaching issue,” says Tim Glorioso, the golf course manager at the Toledo Country Club. He admits people who come here don’t want their greens to be brown, and a 2009 survey of golf course managers found the average golf course puts down 65 pounds of phosphorus per acre each year, and even more pounds of nitrogen.

Glorioso, though, says he uses a lot less.

“With the way budgets are right now, why would you go out and put more phosphorus down and more nitrogen than you need to? It doesn’t make sense, economically,” he says.

Glorioso monitors the phosphorus in the soil constantly, and says he only puts on the amount the grass can absorb. Timing matters too — simple stuff like not putting down nutrients on frozen ground, or right before a storm. He attends continuing education classes during the winter months and thinks responsible management practices can lessen golf courses’ contribution to the algae problem. But he admits that not everyone is quite so diligent.

“We have some people that probably don’t do what they’re supposed to do,” he says.

Some farmers resist regulation

Most of the area that drains into the Maumee River isn’t golf courses or suburban lawns: it’s farms. There are miles and miles of them — mainly corn, wheat and soybeans — from Toledo all the way up the Maumee River and its tributaries, which extend into Indiana and Michigan.

“We could argue back and forth about is it urban, is it yards, is it agriculture, is it municipal water systems,” says Tadd Nicholson with the Ohio Corn and Wheat Growers Association. “I prefer to say it’s all of those things.”

Corn has been booming recently due to ethanol production, so farmers are planting to the very edges of fields, and at least some of them are laying the fertilizer down thick. But Nicholson says the corn industry is producing more corn per acre while also using less fertilizer than it did a few decades ago. In other words, corn can't be solely to blame for the resurgence of algal blooms. And, like Glorioso, he says education and voluntary programs to reduce runoff are as beneficial for the industry as they are for the lake.

"If we can show farmers how to minimize phosphorus runoff, it's not a hard sell, it's something that we are very motivated to do," he says.

It's worth noting that over-applying fertilizer isn't against any laws in Ohio, and agriculture in particular has long been exempted from aspects of the Clean Water Act; the industry has also pushed back against water quality regulations for runoff. There's a bill pending in the Ohio legislature that would require agricultural users of fertilizer to apply for a permit. It has the support of the Ohio Farm Bureau, but not the Ohio Corn and Wheat Growers Association. And even that law is not really a set of rules but a required educational program. In Illinois, a 2010 law restricting the use of phosphorus in fertilizer exempts farms and golf courses.

'When you look at Lake Erie, it breaks your heart'

Cities like Chicago and Toledo are under federal order to reduce sewer runoff through extensive infrastructure upgrades, and manure runoff, which is also a contributor, is more tightly regulated than farms. The IJC report finds the need for more research and monitoring to establish clear best practices for reducing runoff from all sources, and the agriculture industry in particular has posited the need for more research as a reason to hold off stringent regulation.

"We would never allow a dump truck full of manure to back up and dump into the lakes," says Lana Pollack, the U.S. chair for the IJC. She refutes the idea that there's not enough research to take action on the issue. "The science is there, we understand the cause, we understand the

effect, and we understand that no one should have a choice whether or not to harm Lake Erie or any of the other lakes."

Lake Erie is far from the only body of water that's been affected: smaller lakes throughout the region have seen algae blooms in recent years. Last year, the bay of Green Bay Wisconsin was literally green. And there may not be an algae bloom off Chicago's Navy Pier yet, but that's because most of Illinois' runoff drains to the Gulf of Mexico. In the past, that's helped create a dead zone there larger than the state of New Jersey. Smaller lakes and ponds throughout the midwest are susceptible to algal blooms during the summer months.

Climate change is also intensifying the algal blooms. Algae prefer warmer temperatures, and more intense rainstorms mean more intense runoff.

The IJC report recommends that Ontario, Canada and the states in the Lake Erie basin set new targets for reducing phosphorus runoff in Lake Erie. That could lead to more regulation on farms as well as septic system owners and urban water treatment systems.

"One community shouldn't be able to decimate the resources that are so important to everyone," Pollack says. "If you look at Lake Erie, it breaks your heart."

She also says there's no silver bullet, no single solution or single cause. There was a record amount of snow and ice this year around Toledo, and it's all been melting, running off and bringing phosphorus with it.

Back down on the Maumee river bank, cold, clear water rushes out of a broken drainage pipe and into the river. In a couple hours, it'll be in Lake Erie.

Lewis Wallace is a reporter for WYSO, the public radio station for Dayton, Springfield and Yellow Springs, Ohio.

Ohio

Akron hoping green approach can save money on its sewer cleanup plan



Akron is considering green infrastructure -- an example of which is seen here -- as a possibly cheaper way to address its sewage overflow problem. (Courtesy of Northeast Ohio Sewer District) (Courtesy of Northeast Ohio Sewer District)

By [Andrew J. Tobias, Northeast Ohio Media Group](#)

March 27, 2014 at 10:18 PM, updated March 28, 2014 at 9:34 AM

FAIRLAWN, Ohio – Akron is hoping a greener approach to its sewer overflow problem will lessen the cost of a looming \$1.4 billion, federally mandated sewage cleanup project, a city official said at a panel discussion Thursday night.

“That \$1.4 billion [price tag] gives us all a lot of heartburn,” said James Hewitt, manager of Akron’s engineering bureau. “Not just the residents, but the mayor and [city] council. So, the mayor decided ...we want to look at green components to try to save some green.”

Hewitt was among the experts that spoke to residents about green infrastructure, the name for surface features that use grass, plants and soil to help absorb rainwater and keep it from overwhelming underground sewer systems. About 50 people, including members of Summit County Council and Akron City Council, attended the event, which was organized by the Akron chapter of the League of Women Voters and held at the Unitarian Universalist Church in Fairlawn.

Many audience questions on Thursday pertained to last month’s vote from Akron’s council to [approve a two-year, 69 percent sewer rate hike](#).

The hike will pay for previous sewer system improvements and for potential fines the city may face for not moving ahead with additional upgrades. It also allows Akron Mayor Don Plusquelic to proceed with discussions to change an existing cleanup plan that was negotiated with state and federal regulators and consider a greener alternative instead.

Hewitt walked residents through the city’s decade of negotiations with the United States Environmental Protection Agency. The federal government in 2009 sued Akron, [forcing the city to address the noxious sewage overflows](#) that pollute the Cuyahoga River (which, incidentally, flows into Lake Erie) during heavy storms.

“In my mind, we have been more than forthright with the agency, more than generous with the [federal] government, and we’ve been environmental stewards to try to make our community better,” he said. “I think at the end of the day we’re all in this together and we’re just trying to make this affordable for the citizens of Akron.”

A Northeast Ohio Media Group [series](#) last month highlighted and explored ‘green infrastructure’ as a [potentially cheaper alternative](#) to the tunnels cities traditionally have built to hold the sewage during storms until it can be pumped into treatment plants.

Increasingly, cities like Akron, grappling with expensive, federally imposed sewage cleanup projects, are looking to green infrastructure.

The series found that the Northeast Ohio Regional Sewer District, which provides sewer service to much of Greater Cleveland, developed [its \\$3 billion tunneling plan](#), while giving only limited consideration to green. Sewer district officials have incorporated some green projects into their plan -- about \$80 million worth -- and say they are pursuing more as opportunities present themselves.

After lobbying from cities and local governments, the U.S. Environmental Protection Agency recently opened the door for what’s called integrated planning, which allows cities more flexibility in dealing with water control issues. Shannon Conway, an engineer with

MWH Global who's helping Akron develop their plan, said Thursday the change allows for more innovative approaches that can include green infrastructure.

"I do believe this for them really is a shift... This is the first time I've seen a hand reached across the aisle, legitimately to give the City of Akron and [the federal government] a deal we can all live with," Conway said.

Samuel Salsbury, a principal with design-landscaping firm Salsbury-Schweyer Inc., who has consulted with Akron on its green infrastructure plan, said he sees potential in Akron's approach.

"This is a huge learning experience for everyone. But we're all in this together, and I think we're going to see Akron transformed," he said.

This story was corrected on March 28 to reflect that the U.S. EPA sued Akron in 2009. It previously incorrectly reported the federal government was threatening a lawsuit.

Wisconsin

Phosphorus Legislation Passes Both Wisconsin Houses

Article By: Angela A. James
Michael Best & Friedrich LLP
posted on: Tuesday, February 25, 2014

Last week, the **Clean Waters, Healthy Economy Act (Act)** was passed by both houses of the Wisconsin legislature. This legislation discussed briefly in an earlier [client alert](#), establishes the basis for creating a multi-discharger variance for point sources struggling to meet Wisconsin's stringent numeric phosphorus water quality criteria. Assuming this legislation is signed by Governor Scott Walker and enacted into law, several other conditions must be met before it is available to permit holders. This client alert provides a brief preliminary overview of this legislation and what would need to happen before it could become available to permittees.

What does the Act do?

Very simply, the Act sets in motion the development of economic information to justify a multi-discharger variance based on adverse widespread social and economic impact. The Act requires the Department of Administration (DOA) to look at costs of compliance for categories of point source dischargers statewide. If the DOA finds that the "cost of compliance with water quality based effluent limitations for phosphorus by point sources that cannot achieve compliance without major facility upgrades would cause substantial adverse social and economic impacts on a statewide basis, then the **Department of Natural Resources (DNR)** will seek approval from the **Environmental Protection Agency (EPA)** for a variance under 40 CFR Part 131. The Act also defines the criteria for qualifying for the variance and what a point source must do if it opts into the variance.

How would this multi-discharger variance work?

To qualify for the variance, a point source will need to:

- (1) Demonstrate the economic determination made by the DOA applies to the source;
- (2) Certify the permittee cannot achieve compliance without a major facility upgrade (defined to mean the addition of both new treatment equipment and a new treatment process); and
- (3) Agree to comply with the requirements of the variance.

Once DNR has confirmed these requirements have been met, the permittee may participate in the variance for up to four permit cycles as long as it meets the discharge limits established by the multi-permit variance and takes steps to reduce phosphorus contributions from other sources.

First, the permit must comply with decreasing phosphorus discharges. These concentrations begin at 0.8 mg/L in the first permit term and then drop to 0.6

mg/L and 0.5 mg/L in the third and fourth permit term, respectively. In the fourth permit for which the variance is available, the DNR will require the permittee to achieve – by the end of the term of that permit – the water quality based effluent limit for phosphorus that would apply without the variance.

Second, while complying with these reduced discharge limits, the permittee must also undertake some activity to reduce phosphorus contributions from other sources in its watershed. This concept borrows from Wisconsin's EPA-approved adaptive management program, and requires the permittee to:

(1) Enter into a binding, written agreement with the DNR under which it implements a project or plan designed to reduce phosphorus contributions from other sources; or

(2) Enter into a binding, written agreement that is approved by DNR with another person under which the other person implements a project or plan designed to reduce phosphorus contributions from other sources; or

(3) Make a payment to the counties of the watershed in which the permittee is located. These payments are calculated by multiplying \$50/lb times the difference between what the permittee is currently discharging, and what the permittee would discharge if its effluent met a target limit. The target limit is either the limit set by a TMDL (total maximum daily load), if applicable, or 0.2mg/L if no TMDL is approved.

Counties that receive money through this program must use at least 65% of the amounts received to fund cost-sharing for projects governed by 281.16(3)(e) or (4) (the state's nonpoint source program). These must be applied to projects that have been prioritized by their potential to "reduce the amount of phosphorus per acre entering the waters of the state, based on an assessment of land and land use practices in the county." Up to 35% can be used for staffing, or toward modeling or monitoring to evaluate the amount of phosphorus in waters for planning purposes.

What's Next for the Act?

Before this program is available to permittees, a number of things must happen. First, Governor Walker must sign the Act into law. Second, the DOA must complete an economic study that demonstrates compliance with the phosphorus standard will have adverse and widespread social and economic impact. This study must also identify the categories of dischargers that will be eligible for the multi-discharger variance. Finally, EPA must approve the variance before it may be implemented in Wisconsin.

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National

Concrete-Dissolving Bacteria Are Destroying Our Nation's Sewers

Sarah Zhang, Gawker Media Mar 28, 2014, 10.30 PM IST



AP Photo/Mary Altaffer

Underground in places nobody likes to look, bacteria are doing terrible things to our sewage pipes. The concrete pipes that carry our waste are literally dissolving away, forcing engineers into a messy, expensive battle against tiny microbes.

"The veins of our cities are in serious trouble, and they're in serious trouble because of corrosion, and this corrosion has been unanticipated and it's accelerating," said Mark Hernandez at a [symposium on the microbiology of the built environment](#) in Washington DC yesterday. Hernandez is a civil engineer, but he's meeting with microbiologists because this problem is bacterial. Essentially, it's an infection of the nation's sewage system.

The sewer as a microbial ecosystem

Here's what's going on. One set of microbes emits hydrogen sulfide, the gas that is also responsible for raw sewage's unpleasant smell. This gas fills the empty space between the top of the pipe and the water flow. Another set of microbes living in this headspace turns hydrogen sulfide to sulfuric acid, which eats away at concrete, leaving behind gypsum, the powdery stuff you find in drywall.

"Essentially what we're ending up with is wet drywall," said Hernandez. This is one reason the American Society of Civil Engineers has [gave our wastewater infrastructure](#) a D grade.

The current solution is to put plastic liners into the concrete pipes, a process that is almost as expensive as digging them up entirely. But if the problem is microbial, perhaps the solution is, too?



Photo of concrete cubes placed in sewage pipes via Mark Hernandez

When Hernandez and his team sequenced bacteria living in the headspace of different pipes, they found only three or four species-an extremely remarkable lack of diversity. With so few actual problematic microbes, there could be a way just to target them specifically with some type of antibiotic or even [bacteria-infecting viruses](#).

The solution they settled on was shotcrete-a type of concrete that can be sprayed onto the inside of pipes-embedded with small amounts of charcoal and bacteria-killing metals like chrome. As the acid ate through this concrete, metal would be released. Based on Hernandez's tests, this concrete did hold up better against sewage microbes-suggesting a promising solution to corrosion.

Designing water pipes for-rather than against-bacteria

But gatherings of microbiologists can be funny things these days. With the technological ability to sequence bacterial samples from every table top, belly button, and shoe, we've come to understand that *everything* is covered in millions of bacteria-mostly unknown, mostly benign, some even beneficial. Instead of just trying to kill the few harmful ones, perhaps we can build environments that encourage the growth of others, which then keep out the bad ones-an ecological and architecture version of [prebiotics](#).

That was the premise of a talk at the same symposium by Amy Pruden, a professor of civil engineering at Virginia Tech. If sewers are the veins of our cities, than drinking water pipes are the arteries. Pruden talked about how the very design of our drinking water system could be prebiotic to encourage the growth of good microbes and discourage the ones that cause disease. There are, after all, an estimated 10 to 100 million free-floating organisms in every quart of drinking water. "We can't continue to fool ourselves that drinking water is sterile," she said.

Like all research into how prebiotics, especially in a context outside of the human gut, it's still very conceptual. But there are so many factors that can be designed or engineered to manage the microbiome of the water system: chlorine or chloramine as disinfectant, plumbing configuration, pipe material, temperature of the water heater, and on and on.

It helps to think of the whole water system-from drinking water to waste water-as one interconnected microbial ecosystem. The chemicals that we add in every stage affect the ecosystem, whether it's the chlorine to disinfect drinking water, the antibiotics flushed down the toilet, or the metals that might protect our concrete pipes. And it's important because we then rely on those microbes to treat out sewage . Sewage treatment plants? They're basically a series of tanks that let bacteria do the work of breaking down our waste. In laying down miles of water pipes, we've created an entire microbial ecosystem under our feet.

1.6 million Americans don't have indoor plumbing. Here's where they live

By Christopher Ingraham

April 23 at 12:58 pm



An outhouse near McCall, Idaho. Photo by Flickr user [Charles Knowles](#), used under a [Creative Commons License](#).

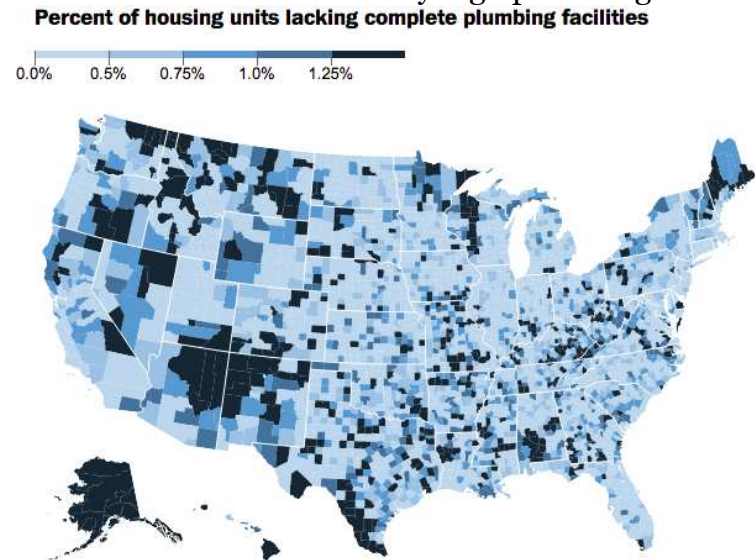
The Pew Research Center's excellent FactTank blog [reported Tuesday](#) that the Census Bureau is considering dropping a number of questions from its [American Community Survey](#). The ACS has been a perennial target of [Republican lawmakers](#), who say that its questions on everything from household income to commute times constitute an invasion of privacy.

Perhaps hoping to stave off some of these concerns, the bureau is reviewing a number of questions, including the one that has been subject to the most ridicule from the right: [Housing questions 8a-8c](#), which cover the plumbing facilities in a household, including the presence (or lack thereof) of a "flush toilet." Setting aside privacy issues for the moment, can such a question possibly have relevancy in the year 2014? Or to put it more bluntly: Who doesn't have a flushing toilet?

As it turns out, a lot of people. According to the latest American Community Survey, nearly

630,000 occupied households lack complete plumbing facilities, which means that they are without one or more of the following: a toilet, a tub or shower, or running water. The Census Bureau says that the average household contains 2.6 individuals, which means that today, in 2014, in the wealthiest nation on Earth, upwards of 1.6 million people are living without full indoor plumbing.

As the map below shows, there is considerable geographic variation. Counties containing Indian reservations have astonishingly high percentages of households without plumbing -- 14 percent of households in Shannon County, S.D., don't have full plumbing. In Apache County, Ariz., the rate is more than 17 percent. Sparsely-populated census areas in Alaska also have very high percentages.



Counties along the Rio Grande in Texas have high rates of unplumbed households, as do a smattering of counties in Appalachia, particularly in eastern Kentucky and western Virginia. The southwestern portion of Alabama is another hot spot.

Looking beyond the present day, it's worth remembering that indoor plumbing is a fairly new development for many communities. In 1950 **fully one quarter** of U.S. households did not have a flush toilet -- this means that the era of outhouses is well within living memory for many Americans. The town I live in, Oella, Md., was reliant on outhouses **until 1984**. And it's smack in the middle of the Acela corridor, between Baltimore and Washington.

So the American Community Survey's questions on the issue aren't simply a laughing matter or an abstract exercise in privacy invasion -- it's about a real problem that still affects millions of people. Among other things, **the government uses this data** to allocate Section 8 and other federal housing subsidies; to assess the quality of housing stock in a given area; to determine the number of older Americans living in sub-standard housing who may be eligible for assistance; and to identify the Indian reservations that need the most housing assistance.

All told, a Brookings Institution **study estimated** that American Community Survey data is used to guide over \$416 billion in annual federal spending. Without that data, the government would be forced to spend that money blindly.

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Calendar of Events

MBT Meetings

June 19, 2014, 10:00 a.m.
Manistee WWTP, Manistee, MI

July 24, 2014, 10:00 a.m.
Biosolids Tent @ MSU Agricultural Expo
E. Lansing, Mi

September 18, 2014, 10:00 a.m.
Carl Johnson Wildlife Center, Cadillac, MI

December 11, 2014, 10:00 a.m.
Frankenmuth, MI (Holiday Party)

MBT Display Events

MSU Agricultural Exposition
July 22-24, 2014
Michigan State University, E. Lansing, MI

