GREATER LANSING REGIONAL COMMITTEE FOR STORM WATER MANAGEMENT

www.mywatersheds.org

2018 ANNUAL REPORT

GLRC Members

Clinton County
Delhi Charter Township
Delta Charter Township
DeWitt Charter Township
City of DeWitt
City of East Lansing
Eaton County
City of Grand Ledge
Ingham County
Lansing Charter Township
Lansing School District
City of Lansing
City of Mason
Meridian Township
Michigan State University
Waverly Community Schools

TRI-COUNTY
regional planning commission

A LETTER FROM OUR CHAIRMAN

Dear Friends,

As we enter the new year and look back at 2018, we recognize that so much has been accomplished to advance the core mission of the GLRC. Yet, we know that there is much more that needs to be achieved in the coming years, making 2018 a year of preparation for the upcoming MS4 permit cycle. The GLRC worked cooperatively to help strengthen individual programs, ready members for new permit requirements, and provide continued education to municipal staff. The following 2018 committee accomplishments highlight the success of this regional approach to water quality management and demonstrates the GLRC's impact on the watershed:

- One of the exciting new approaches to meet our Public Education Plan (PEP) goals is the expansion of the digital outreach campaign. Facebook and Instagram have allowed us to reach and educate more people than ever and gauge the effectiveness of our outreach in real time. This approach has proven to be well worth the effort and investment.

- The GLRC Regional Water Quality Survey was completed in summer of 2018. The survey was a valuable tool in identifying the knowledge gaps related to surface water issues. Consequently, the survey results were used in part to update the GLRC's shared Public Education Plan, which was completed in time to be included with the upcoming new NPDES permits to area MS4 communities.

- The GLRC sponsored its first Stormwater Seminar in June 2018. The event focused on new ways to fund and manage stormwater programs. There were also useful presentations on green infrastructure, post-construction controls, and innovative runoff treatment technologies.

- An IDEP field training event was held in July 2018 to enhance the water quality sampling and testing knowledge of GLRC members and their staff.

Finally, I would like to add that since its inception the GLRC has managed to work harmoniously with our state regulators at the MDEQ towards meeting our permits' requirements. This great relationship has continued over the past two years due in large part to the remarkable work by the GLRC coordinator, Mr. Cliff Walls. He has done an excellent job assisting members with DEQ audits and applications, and in bringing new outreach ideas such as a 2018 Dog Photo Calendar Contest that engaged more than 40,000 residents in the Greater Lansing area. With his great commitment to helping members, along with his energy and professionalism, I feel confident that our member communities will be well prepared to meet the implementation challenges headed our way when the new permits are issued, and that will be a great thing for our region's lakes, rivers, and streams.

Sincerely,

Younes Ishraidi, Meridian Township

2018 GLRC Chairman

THE BASICS

Who is the GLRC?

The Greater Lansing Regional Committee for Stormwater Management is a guiding body comprised of regulated Municipal Separate Storm Sewer System (MS4) communities within the Greater Lansing Region. The committee was established in 1999 to guide the implementation of the stormwater program for participating communities within the Red Cedar River, Grand River, and Looking Glass River watersheds. The GLRC is administered by the Tri-County Regional Planning Commission.

What is an MS4?

Municipal Separate Storm Sewers Systems (MS4s) capture runoff water in catch basins and pipes that lead directly to rivers, streams, and lakes without being processed at a treatment plant. Oil, pet waste, and other pollutants "hitch a ride" with runoff water, enter the storm system and accumulate in waterbodies. To limit pollution, the EPA's Phase II rule requires operators of MS4s in urbanized areas to implement programs and practices to control polluted stormwater runoff through the use of National Pollutant Discharge Elimination System (NPDES) permits. For permit compliance, MS4 municipalities must meet the "six minimum measures."

Minimum Control Measures

Public Participation/Involvement
Providing opportunities for citizen participation in program development and implementation, including effectively publicizing public hearings and/or encouraging citizen representatives on a stormwater management panel.

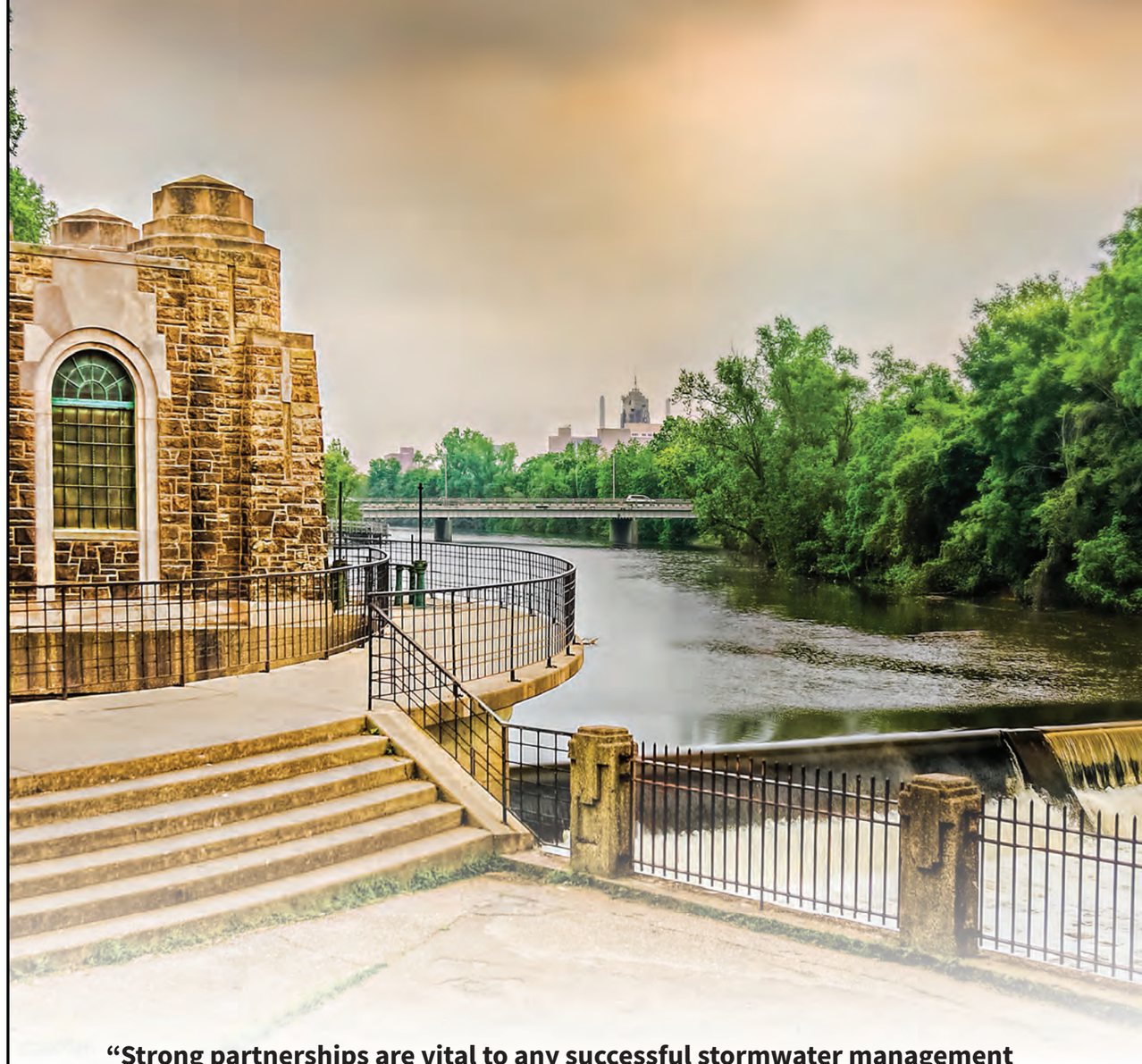
Public Education
Distributing educational materials and performing outreach to inform citizens about the impacts polluted stormwater runoff discharges can have on water quality.

Illicit Discharge Detection and Elimination
Developing and implementing a plan to detect and eliminate illicit discharges to the storm sewer system. Activities include developing a system map and informing communities about hazards associated with illegal discharges and improper disposal of waste.

Construction Site Runoff Control
Developing, implementing, and enforcing an erosion and sediment control program for construction activities that disturb one or more acres of land. Controls could include silt fences and temporary stormwater detention ponds.

Post-Construction Runoff Control
Developing, implementing, and enforcing a program to address discharges of post-construction stormwater runoff from new development and redevelopment areas. Applicable controls could include preventative actions such as protecting sensitive areas (e.g., wetlands) or the use of structural best management practices (BMPs) such as grassed swales or porous pavement.

Pollution Prevention/Good Housekeeping
Developing and implementing a program with the goal of preventing or reducing pollutant runoff from municipal operations. The program must include municipal staff training on pollution prevention measures and techniques, such as regular street sweeping, reduction in the use of pesticides or street salt, or frequent catch basin cleaning.



"Strong partnerships are vital to any successful stormwater management program. The working relationships that have been established through the GLRC provide a solid foundation upon which communities throughout the Greater Lansing region have built their programs."

Ruth Kline-Robach
Outreach Specialist
Michigan State University
Institute of Water Research

COMMITTEE UPDATE

Nearly two years after the application deadline, the Michigan Department of Environmental Quality (MDEQ) is poised to issue new NPDES permits to area MS4 communities this spring. GLRC members submitted applications in April of 2017, and MDEQ is in the process of reviewing stormwater management plans, offering comments and suggesting adjustments to application language. It's anticipated that permits will be issued in March or April following a public review period.

For many members, the upcoming permit cycle brings new requirements and commitments to their stormwater programs in the form of an E. coli Total Maximum Daily Load (TMDL). DEQ monitoring shows high levels of bacteria in the Grand and Red Cedar rivers, resulting in the creation of a TMDL framework to establish the allowable limit of E. coli in stormwater discharge to these impaired waterbodies. It provides a basis for determining the pollutant reductions necessary to restore and maintain water quality.

In their permit applications, many GLRC members were required to identify potential sources of E. coli to their MS4 and outline how they'll make progress towards achieving the bacteria load reduction requirement. Once permits are issued this spring, this requirement will become active and permittees will begin plan implementation.

The upcoming permit cycle also provided GLRC members an opportunity to revisit and improve their Public Education Plan (PEP). Having operated under the previous PEP since 2013, the GLRC refined their outreach goals, strategies, and commitments in 2018. The new PEP and permits will help guide the committee in its goal of improving water resources for the residents of Greater Lansing.

DIGITAL OUTREACH

Facebook and Instagram have become the GLRC's primary tools for sharing environmental information with residents. Particularly, there has been great success with utilizing paid social media advertising, helping the committee reach more people than ever before.

These "boosted" posts and advertisements allow the committee to place local environmental information on the screens of people who do not already follow the GLRC or individual members' social channels, ensuring the content is reaching residents who are less likely to be familiar with stormwater issues. Additionally, they can be targeted by geography, guaranteeing that the outreach budget is spent where it matters most to members: the Greater Lansing area.

Since adopting this approach, GLRC posts have had nearly one million unique views, earned almost 10K "likes", and increased Facebook followers by ~700%.

By reaching these new audiences, the GLRC hopes to fill knowledge gaps and create new watershed stewards!

STRUCTURE AND FINANCES

The GLRC is supported by the Tri-County Regional Planning Commission (TCRPC), which provides program staff, administrative, and fiscal support. GLRC members pay annual dues for the services provided. The following committees coordinate and complete the work necessary to maintain compliance with the permit requirements.

Illicit Discharge Elimination Program

Guides the organization and implementation of the Illicit Discharge Elimination Program (IDEP), mapping guidelines, field-sampling protocols, and how the watershed will be monitored for progress. The IDEP Committee has reviewed pet waste management, septic tank maintenance issues, IDEP ordinances, and provided staff training.

Total Maximum Daily Load Committee

Makes recommendations regarding the Grand River and Red Cedar River E. coli Total Maximum Daily Load (TMDL) requirement. The committee provides education and updates to GLRC members to assist in the development and implementation of TMDL programs.

Public Education Program Committee

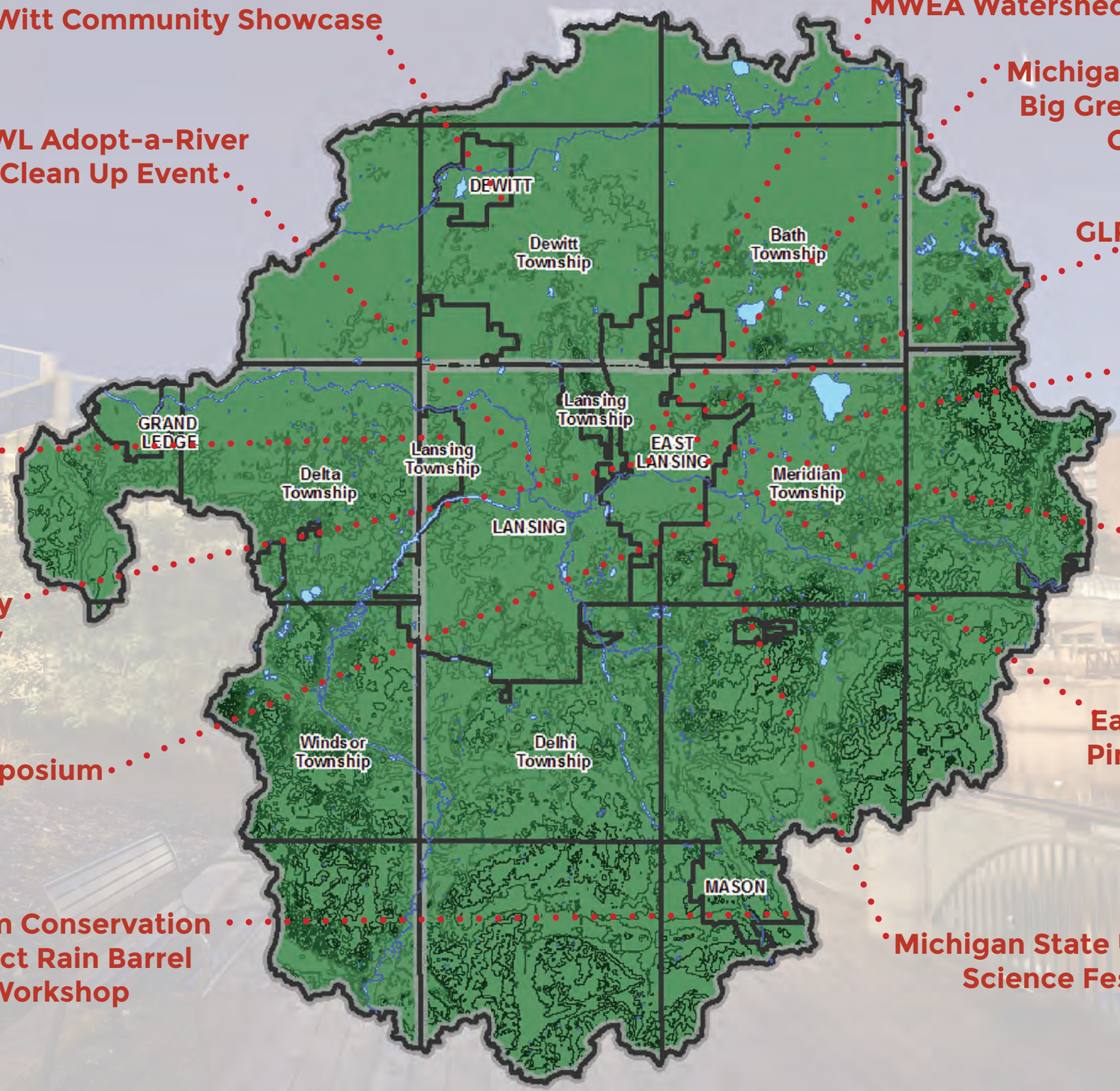
Guides the overall public education, participation, outreach and involvement process for the stormwater program. This effort includes evaluation and assessment of public knowledge and activities.

Category	2018 Budget
TCRPC Administrative Cost and Support Staff	$90,575
2018 GLRC Regional Water Quality Survey	$25,000
Illicit Discharge Elimination Plan (IDEP) Committee	$325
Public Education Plan (PEP) Committee	$5,500
Total Maximum Daily Load (TMDL) Committee	$300
Monitoring Support	$3,000
Website Hosting	$300
Annual Report Printing	$600
Total	**$125,600**

EDUCATING RESIDENTS WATERSHED WIDE

The GLRC utilizes a traveling watershed display for local workshops, conferences, and events.

When the display is not in use for an event, it circulates throughout the region to GLRC member offices. Look for it at your local city hall, public works, and various locations around the region!



DeWitt Community Showcase

MWEA Watershed Summit

Michigan State University Big Green Gig Earth Day Celebration

BWL Adopt-a-River Clean Up Event

GLRC Stormwater Seminar

Lake Lansing Property Owners Association Annual Meeting

Delta Township Trick or Treat Trail

East Lansing Schools Pinecrest Science Fair

Michigan State University Grandparents University

East Lansing Schools Pinecrest Elementary STEAM Night

Quiet Water Symposium

Ingham Conservation District Rain Barrel Workshop

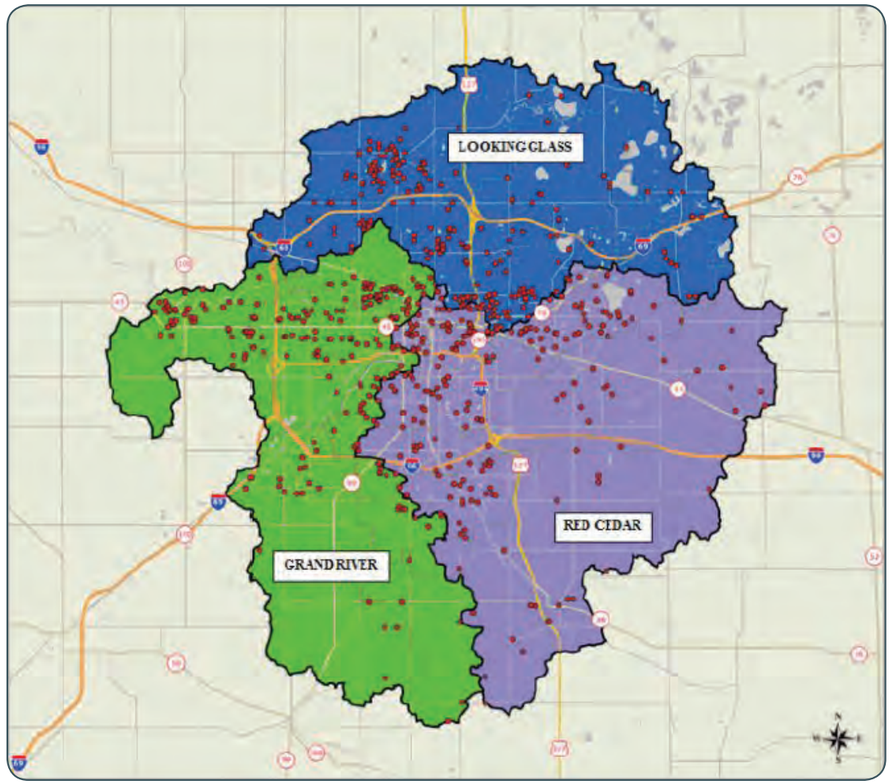
Michigan State University Science Festival

REGIONAL WATER QUALITY SURVEY

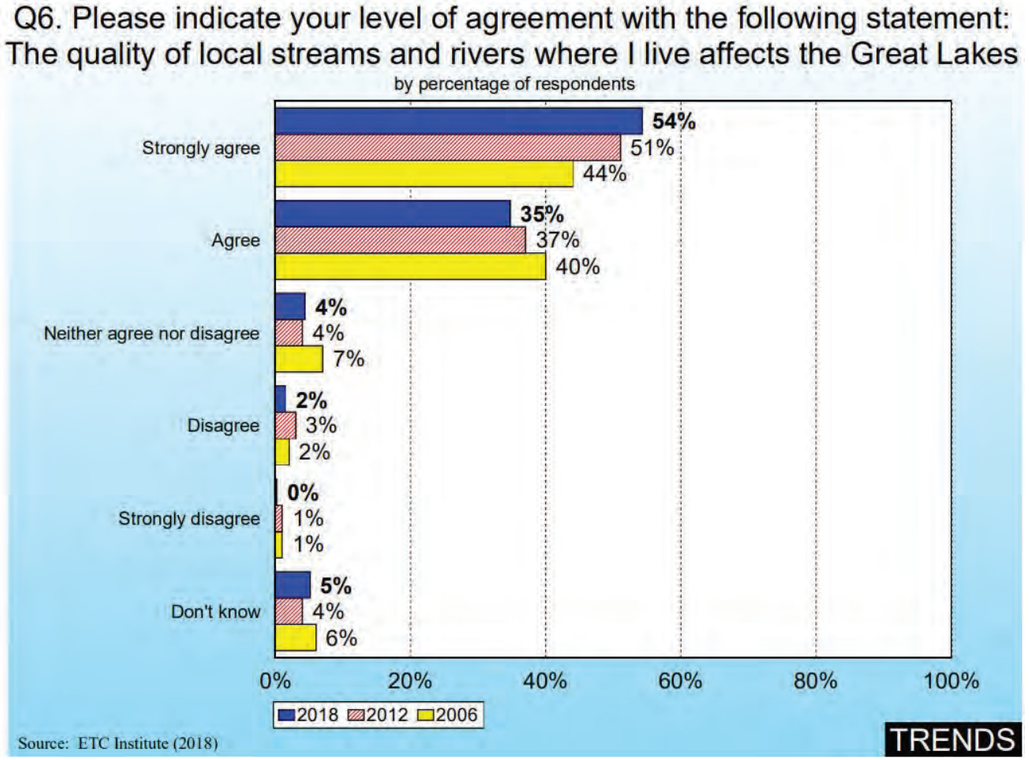
To maintain MS4 permit compliance, communities must evaluate their Public Education Plans (PEP) and measure the effectiveness of their outreach efforts. The GLRC has satisfied this requirement by utilizing professionally administered surveys that gauge public awareness of local water quality issues and determine if the PEP has improved residents' knowledge during the permit cycle. The third and most recent GLRC Regional Water Quality Survey was completed in summer of 2018, and its data highlights where outreach has been successful and which topics or concepts need added attention to improve public understanding.

The survey was administered through phone, mail, and digital questionnaires and completed by over 600 randomly selected residents throughout the Grand River, Red Cedar, and Looking Glass River urbanized watersheds. The Public Education subcommittee compared 2018 results to the GLRC's 2006 and 2012 surveys to determine if outreach campaigns have been effective in improving public knowledge or if new approaches should be adopted in the upcoming permit cycle.

The 2018, 2012, and 2006 survey final reports are available at www.mywatersheds.org/for-municipalities-1. The public and partners are encouraged to use and share these reports freely. Contact GLRC Coordinator Cliff Walls at CWalls@mitcrpc.org with any questions.



Each red dot represents a survey response. 666 responses were collected from throughout the Grand, Red Cedar, and Looking Glass River watersheds.



(Above) Sample question from the 2018 Regional Water Quality Survey. Questions covered resident's knowledge, current behaviors, and their willingness to take environmentally friendly actions in the future.

Key Survey Findings

- More people realize that their actions at home impact water quality in their community. Only 24% of respondents said their actions have "little effect" or "no effect", compared to 36% in 2006.
- 89% of respondents understand that local water quality affects the Great Lakes.
- Over time, more respondents have correctly indicated that "stormwater runoff" contributes most to water pollution.
- Most people understand where storm drains discharge.
- 14% of respondents were familiar with the GLRC and its outreach efforts.
- Respondents prefer to learn about environmental issues and initiatives through social media.
- The majority of respondents are willing to pay more in taxes, utilities, and housing to improve water quality in their community.

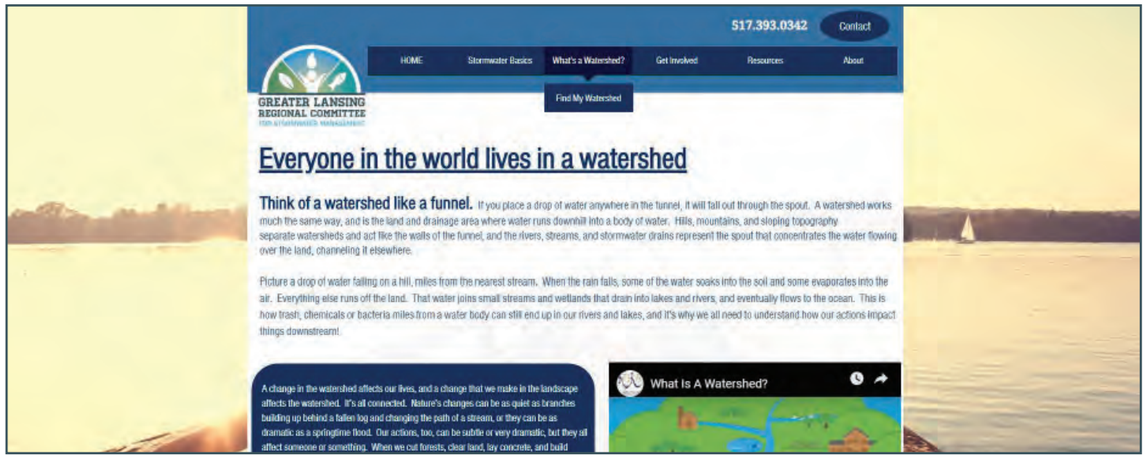
REVAMPED PUBLIC EDUCATION PLAN

With a new stormwater permit cycle about to begin, the GLRC's PEP subcommittee recently revisited the group's shared Public Education Plan (PEP) and recommended updates to the GLRC's outreach activities. The PEP document guides the GLRC's public outreach efforts and details specifically how members and staff will work to educate residents on stormwater issues and water quality concerns. The general public's actions can greatly impact both the quality and quantity of urban stormwater, making public education a key component of MS4 permit compliance.

The PEP update process was guided by the GLRC's 2018 Regional Public Survey findings, which allowed the committee to craft an outreach strategy that addresses knowledge gaps identified in the results and determine if previous and current educational campaigns have been effective in changing resident's behavior. For example, the Michigan Department of Environmental Quality (MDEQ) requires that MS4 permittees educate their residents on watershed stewardship, yet survey results show that nearly 70% of people do not understand the term "watershed" and many do not know if they live in one. In response, the GLRC committed to aggressively address this knowledge gap, as understanding what watersheds are and what they do is central to playing a role in their protection. The GLRC committed to creating new brochures, displays, and web-content highlighting watershed information in hopes of flipping those survey results during the upcoming permit cycle. The survey results help the GLRC and its members to justify their outreach decisions and ensure that resources are being spent efficiently by targeting topics and behaviors that will have a lasting impact.

The PEP committee also used survey results to determine how to best reach and engage with residents. Not surprisingly, the majority of respondents indicated that they prefer to learn about local environmental issues via social media; Facebook and Instagram in particular. Knowing this, the GLRC altered the PEP to prioritize their social media presence and committed to posting particular topics online at defined frequencies. As these responses change over time, the GLRC adapts, altering their outreach strategy to align with resident's preferences.

This collaborative approach to public education is one of the key successes of the GLRC as an organization. Not only does a shared effort lower outreach costs for members, performing PEP obligations as a region creates better results by delivering consistent messaging throughout the watershed.



GLRC STORMWATER SEMINAR

The GLRC regularly provides training opportunities for municipal field staff, but this year, members requested an additional event focused on continued education for their engineers, public service directors and elected officials. The GLRC listened and hosted their first Stormwater Seminar in June 2018. The event provided municipal decision makers an opportunity to hear experts present on new ways to fund, manage, and improve their stormwater programs.

With stormwater utility bills under consideration in the Michigan legislature, the seminar focused heavily on preparing officials in the Greater Lansing area for potential changes in stormwater funding options. Consultants and municipal leaders from outside the region and state spoke on their experience in creating and implementing stormwater utilities, highlighting their lessons learned and the resulting benefits of this funding approach. Attendees also heard from experts on green infrastructure and post-construction controls, and learned about new treatment technologies for projects with space constraints.

The event proved to be a great way to equip local leaders with the tools and knowledge to adapt to changes in the technological and regulatory landscape, and demonstrates the strength of the GLRC's cooperative approach to regional issues. Due to the success of the event, the committee plans to hold more seminars throughout the upcoming permit cycle.

PET OWNER OUTREACH

When left on the ground, pet waste (and the bacteria it carries) can wash into storm drains and discharge into our shared surface waters, making it a top water quality concern for MS4 communities. It's why many communities institute pet waste "pick up" ordinances and commit to educating their residents on proper pet waste disposal. As a group, the GLRC has dedicated much of its public education efforts towards encouraging dog owners to pick up after their pets, and individual communities have identified pet owner outreach as an important tool to address new E. coli Total Maximum Daily Load (TMDL) requirements.

In an effort to reach and educate more residents on the relationship between their pets and stormwater pollution, the GLRC held a Dog Photo Calendar contest. The GLRC purchased advertising space on Facebook and asked residents to submit pictures of their furry friends for a chance to have their photo included in the GLRC's 2019 calendar. Twelve winning photos were chosen as a month's featured image, and winners were sent a $20 gift certificate to a pet supply store.

In order to be eligible to submit a photo, residents were required to read about dog waste impacts on stormwater and proper disposal techniques, then pledge to "scoop" in the future. They were also given the opportunity to subscribe to the GLRC's newsletter publications to stay in the loop on other local stormwater issues.

The campaign was a great success, reaching over 40k people on Facebook, drawing over 1,600 visits to the GLRC's website, and resulting in over 300 photo submissions and pledges. Residents love sharing photos of their pets, and the contest allowed the GLRC to engage them, educate them, and get them involved in the effort to protect the Grand River watershed!

In addition to dog photos, the calendar features important pet waste/stormwater facts and information on local dog-friendly parks. A digital version is available for download at MyWatersheds.org. Due to the success of the campaign, the GLRC plans to hold another contest for 2020. Stay tuned!

DOG PHOTO CALENDAR CONTEST

GLRC PLANS FOR 2019

- Receive NPDES permits
- Begin E. coli Total Maximum Daily Load (TMDL) plan implementation
- Execute activities identified in the new Public Education Plan
- Exhibit at the Quiet Water Symposium, Adopt-a River, MWEA Watershed Summit, etc
- Help develop and organize the first Crandell Lake Water Festival
- Utilize traveling educational display at every member community
- Hold staff training and continued education events for members

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@LenonJames: Cover photo, Pages, 2, 4, 5, 9 & 10, 18

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REGIONAL COMMITTEE
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"At the request of the DEQ, the GLRC successfully piloted a new MS4 permitting approach. The GLRC framework of engaged membership focused on regional collaboration was used by the DEQ to guide development of the new MS4 permitting approach. The GLRC continues to be an example of a successful model for collaborative stormwater management by maximizing financial resources, delivering consistent messaging across the watershed, and developing regional stormwater control standards."

Christe Alwin
Statewide MS4 Program Coordinator
Michigan Department of Environmental Quality

Produced by the Tri-County Regional Planning Commission

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Follow the GLRC and TCRPC online for updates on regional planning and stormwater management!

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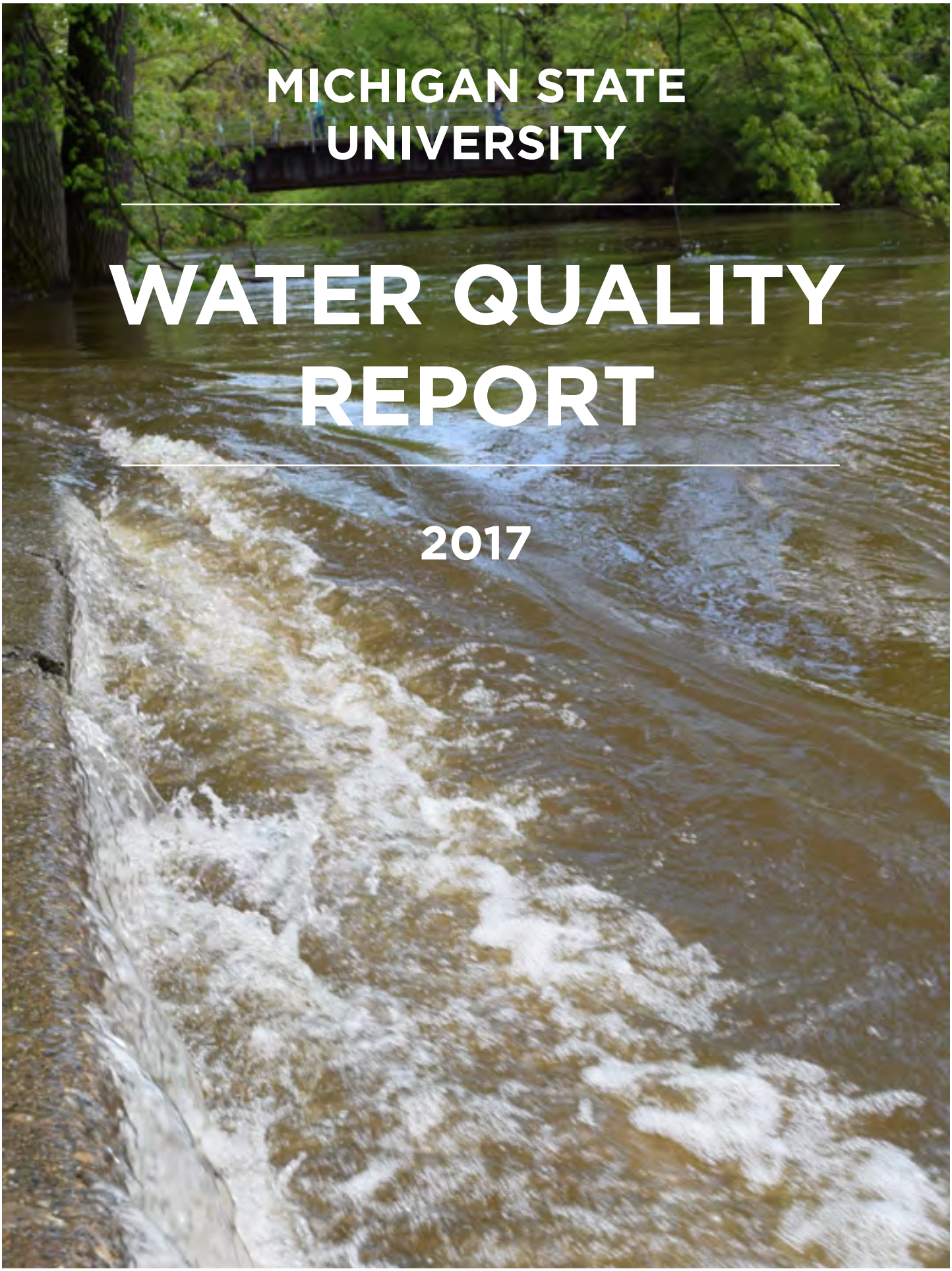


MICHIGAN STATE UNIVERSITY

WATER QUALITY REPORT

2017

Infrastructure Planning and Facilities
MICHIGAN STATE UNIVERSITY

ISSUED JUNE 2018

2017 WATER QUALITY REPORT EXECUTIVE SUMMARY

In 2017, Michigan State University initiated efforts to improve campus water quality aesthetically and to ensure its public health excellence. The initiative included a study to determine a water treatment process to address the aesthetic challenges typically observed, as well as a sanitary review with the Michigan Department of Environmental Quality (MDEQ) to ensure continued and improved public health.

The study recommended construction of an iron removal filter plant and an elevated water storage facility to improve aesthetics and system reliability. It also recommended reconfiguring how MSU's water supply system is tested and monitored. In the spring of 2017, MDEQ and MSU split the water distribution system into two separate systems. The North Campus system serves the majority of MSU. The Farms Distribution system serves the southern agricultural area (see map on page 3).

The separation is a management tool, not a physical separation. Both systems serve customers as they did before the change. The Farms Distribution system will have enhanced monitoring. Vigorous monitoring of the North Campus system will remain unchanged.

Enhanced Farms Distribution system monitoring includes a significant increase in testing types and number. New testing protocols were developed for each well serving the Farms system. New sampling was added for bacteria, lead/copper, volatile organic compounds, synthetic organic compounds, metals and radionuclides.

When two wells had radionuclides above the maximum contaminant level and were immediately taken out of use. These wells will not be used for drinking water and will be abandoned and replaced. Prior to removal from service, the water from these wells was blended with other well water, resulting in an aggregated sample below the maximum contaminant level. Required sampling of the Farm system will continue indefinitely, as is done for all public water supply systems.

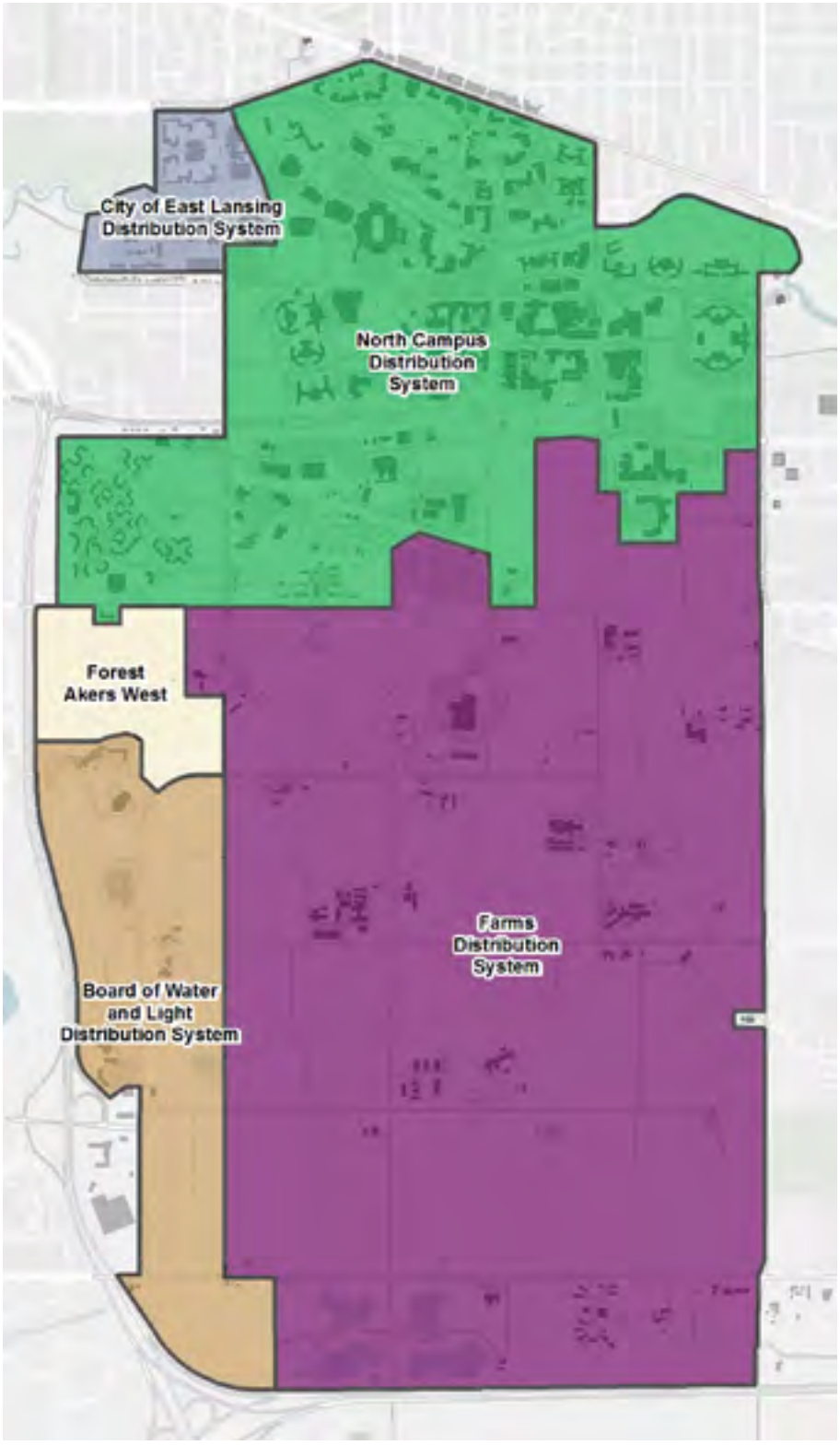
Additional sampling was performed in March 2017 on all production wells individually, even though the well water is blended with other wells. This sampling included testing for radionuclides, which MDEQ did not require for each well prior to 2017.

Testing consists of taking four samples quarterly for each well and averaging the results to determine the Running Annual Average (RAA). The RAA determines radionuclide concentrations. The March tests showed three of 17 wells were above the 5.0 pCi/L MCL. They were immediately taken offline. Subsequent quarterly samples showed two of the three wells remained above the 5.0 pCi/L; they were permanently removed from use. The remaining wells all tested below the 5.0 pCi/L.

Michigan State University's current and future efforts strive to improve campus water aesthetics and ensure its safety for the MSU community.

Questions regarding this report or MSU's water supply can be directed to 517-355-3314 or water@ipf.msu.edu.

DISTRIBUTION SYSTEM MAP



Michigan State University's 2017 water quality report includes details about where our water comes from, what MSU is doing to ensure that it remains safe to drink, what's in it and how it compares to federal Environmental Protection Agency (EPA) and state Michigan Department of Environmental Quality (MDEQ) standards and regulations. MSU facilities operate 24 hours a day, seven days a week and are monitored continuously by qualified, trained and licensed personnel. MSU is pleased to report our drinking water meets or surpasses all federal and state regulatory requirements.

MSU'S COMMITMENT TO SAFE WATER

MSU is committed to providing our campus community with safe, reliable and healthy water. In order to ensure that tap water is safe to drink, EPA regulations limit the amount of certain contaminants in water provided by public water systems. The Food and Drug Administration (FDA) establishes limits for contaminants in bottled water, which provide the same protection for public health.

The state and EPA require MSU to test our water on a regular basis to ensure its safety. MSU meets all monitoring and reporting requirements for both state and federal regulations.

In the wake of the water crisis experienced in Flint, it is understandable that the MSU community is concerned about its water quality. Infrastructure Planning and Facilities (IPF) Power and Water has a highly qualified staff of water utility professionals who understand the importance of the water supply quality for our community. We are dedicated to providing the highest quality drinking water, and continue to meet or exceed all state and federal regulatory requirements.

There is no detectable lead in MSU drinking water when it enters the distribution system. Water supplied to MSU comes from a consistent source of groundwater, drawn from wells located deep within the Saginaw sandstone aquifer. Because water is naturally corrosive, if small amounts of lead are present in existing plumbing materials, lead could enter into drinking water if allowed to sit for several hours. To prevent this, MSU employs a comprehensive corrosion protection regimen, consisting of the use of phosphate additives. MSU has been testing for lead and other contaminants since 1992, and the water results consistently have been in full compliance, with lead levels below the action level of 15 parts per billion (ppb).

SOURCES OF DRINKING WATER

The water source for MSU is groundwater drawn from the Saginaw aquifers. These underground water-bearing formations are continually replenished with water through the normal hydrologic cycle. In Michigan and the Great Lakes Basin, we are fortunate to have an abundant supply of fresh water as compared with other areas of the world. The Great Lakes Basin contains 20 percent of the world's fresh water. MSU's water system uses 15 groundwater wells, each with pumping capacities ranging from 400 to 850 gallons per minute. MSU closely monitors the source water and the treated drinking water to ensure a high level of quality and safety is maintained. Once treated, the water is pumped to campus through a network of water mains, consisting of approximately 67 miles of pipes that range six to 16 inches in diameter.

1855 Place, Jack Breslin Student Events Center, Brody Neighborhood, University Village and the Kellogg Hotel & Conference Center are supplied by the East Lansing Meridian Water and Sewer Authority. For more information, refer to the City of East Lansing Water Quality Report here:

https://www.cityofeastlansing.com/ArchiveCenter/ViewFile/Item/437

Facilities along the southwest boarder of campus at Forest and Collins roads, including the Henry Center for Executive Development, are supplied by Lansing Board of Water and Light. For more information, refer to the Lansing Board of Water and Light Quality report here:

https://www.lbwl.com/WaterQualityReport/

STEPS MSU TAKES TO ENSURE WATER SAFETY AND QUALITY

MSU's water treatment process consists of the addition of small quantities of chlorine, fluoride, phosphate and sodium hydroxide. Water is naturally corrosive; water corrosion is controlled by adding phosphate. These treatment techniques are used to promote public health and to improve aesthetic quality of the water in the distribution system and buildings.

Chlorination is a chemical process used to control disease-causing microorganisms by killing or inactivating them, and is the most important step in drinking water treatment. Chlorination is the most common method of disinfection in North America. Significant strides in public health are directly linked to the adoption of drinking water chlorination. Before U.S. communities routinely began treating drinking water with chlorine, thousands of residents died annually from cholera, typhoid fever, dysentery and hepatitis A. Drinking water chlorination and filtration have helped eliminate these diseases in the United States. The filtration of drinking water plus the use of chlorine is likely the most significant public health advancement in human history.

Fluoride is one of the most plentiful elements on Earth, occurring naturally in both ground water and surface waters in Michigan. All ground water sources contain some fluoride. Community water fluoridation is the process of adjusting the amount of fluoride found in water to achieve optimal prevention of tooth decay. When optimal levels of fluoride are present in drinking water, it has been shown to promote oral health by preventing tooth decay. Water systems are considered naturally fluoridated when the natural level of fluoride is greater than 0.7 milligrams per liter (mg/L). Fluoride in MSU's groundwater is .3-.4 mg/L prior to fluoride addition. Fluoride is added to achieve the optimal range recommended by EPA and MDEQ.

CONTINUED...

Phosphate and sodium hydroxide are additives used to promote protection of the infrastructure and building plumbing under current treatment techniques. They are added in relatively small amounts to provide a protective layer on pipe interiors, reducing corrosion. This prolongs the life of the pipes and reduces the amount of mineral and iron deposits in the water.

These additives are monitored and approved by the EPA. MSU performs multiple water quality tests throughout the year to ensure water quality. These are all promulgated and required by EPA and MDEQ. Additional testing is also performed to further ensure health and safety.

In addition to the water treatment and testing listed above, MSU flushes the distribution systems every year. This helps remove naturally occurring iron sediment that is associated with the ground water that settles in the main lines, lessening the duration and impact associated with the occasional appearance of "red water" on campus.

Conditions that cause red water include increased water flow through mains or changes in water flow direction, resulting in stirred up sediment in the water distribution system. Although the red water is safe and does not pose a health risk, it can stain laundry or impact research activities. The flushing process minimizes red water occurrences to the community as much as possible.

SOURCE WATER ASSESSMENT

The 1996 amendments to the federal Safe Drinking Water Act required states to assess the susceptibility of all public water supplies to potential sources of contamination. The susceptibility rating is determined using a scale ranging from "very low" to "very high" based primarily on geologic sensitivity, water chemistry and locations of contaminant sources. MSU's Source Water Assessment was completed in 2003. The susceptibility of the campus water supply was deemed to be "moderately high."

Potential sources of contamination include: above-ground storage tanks, liquid manure spreading, chemical and waste storage areas, biowaste holding tanks, wet labs, equipment storage areas, farming operations, chemical storage, pesticide storage; equipment washing pads, paint storage, mixing and cleaning operations, a biotechnology facility and a number of sites that generate, use and dispose of hazardous waste and other chemicals.

To protect our groundwater from these potential sources of contamination, MSU developed a Wellhead Protection Program (WHPP) in 2000. The program is updated regularly, with the latest revision approved by MDEQ in 2014. The goal of MSU's WHPP is to manage the land area that surrounds our water supply wells in order to minimize the potential for contamination. In 2015, MSU's WHPP received the Exemplary Wellhead Protection Program award for a medium-sized system by the Michigan section of the American Water Works Association.

Information about the campus WHPP can be accessed here:

https://www.michigan.gov/deq/0,4561,7-135-3313_3675_3695---,00.html

TYPES OF CONTAMINANTS IN GROUND WATER SUPPLY MAY INCLUDE:

- **Microbial contaminants,** such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife.

- **Inorganic contaminants,** such as salts and metals, which can be naturally occurring or result from urban storm water runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming.

- **Pesticides and herbicides,** which may come from a variety of sources such as agriculture and residential uses.

- **Radioactive contaminants,** which are naturally occurring.

- **Organic chemical contaminants,** including synthetic and volatile organic chemicals, which are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff and septic systems.

To reduce the potential of these contaminants reaching the MSU water supply, a source water assessment was conducted and the Wellhead Protection Program was implemented. These are in the source water assessment section of this report.

SUBSTANCES FOUND IN MSU'S WATER

The tables show test results for substances found in MSU's drinking water. Results are not shown for substances that were tested for but not detected at or above the Maximum Contaminant Level (MCL). Unless otherwise noted, the data presented from testing that occurred Jan. 1 to Dec. 31, 2017. Note, as explained in the executive summary, the Farms Distribution system didn't begin until March 2017.

MCL (Maximum Contaminant Level) — The highest level of a contaminant that is allowed in drinking water. MLCs are set as close to the MCLGs as feasible using the best available technology.

MCLG (Maximum Contaminant Level Goal) — The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

AL (Action Level) — The concentration of a contaminant which, if exceeded, requires a water system to initiate treatment process or other action.

ALG (Action Level Goal) — The level of a contaminant in drinking water below which there is no known or expected risk to health. ALGs allow for a margin of safety.

TT (Treatment Technique) — A required process intended to reduce the level contaminants in drinking water.

MRDL (Maximum Residual Disinfectant Level) — The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

MRDLG (Maximum Residual Disinfectant Level Goal) — The level of drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

SDWA (Safe Drinking Water Act) — A set of federally mandated regulations that ensures the quality and safety of water provided by public water systems.

ND (None Detected) — Below analytical method detection limit.

NTU (Nephelometric Turbidity Units) — Unit of measurement for water clarity.

RAA (Running Annual Average) — A continuous averaging of four quarters of sampling.

AVG (Average) — Regulatory compliance with some MCLs are based on running annual average of monthly samples.

ppm (parts per million) or milligrams per liter (mg/L) — or one ounce in 7,350 gallons of water.

ppb (parts per billion) or micrograms per liter (mcg/L) — or one ounce in 7,350,000 gallons of water.

ppt (parts per trillion) or nanograms per liter (ng/L) — or one ounce in 7,350,000,000 gallons of water.

pCi/L (picocuries per liter) or nanograms per liter (ng/L) — a measure of radioactivity.

> — An abbreviation meaning "more than."
< — An abbreviation meaning "less than."

North Campus Distribution System

Jan. 1 to Dec. 31, 2017

This table shows test results for substances that were found in MSU's drinking water. Results are not shown for substances that were tested for but not detected at or above the Maximum Contaminant Level (MCL).

Michigan State University Water - Table of Detects					
Constituent/units of measurements	MCL	MCLG	Amount in MSU Water	Year[1]	Likely Sources
Biological Constituents					
Total Coliform (% Positive Samples)	N/A	N/A	Number Detected: 1 Violation: None	2017	Naturally present in the environment.
Inorganic					
Copper (ppb)[3]	AL = 1300	1300	500 No samples exceeded the Action Level[4]	2017	Corrosion of household plumbing systems; Erosion of natural deposits.
Lead (ppb)[3]	AL = 15	0	9.0 Two samples exceeded the Action Level[4,5]	2017	Corrosion of household plumbing systems; Erosion of natural deposits.
Fluoride (Tap) (ppm)	4	4	0.62	2017	Naturally occurring and hydrofluorosilicic acid. Numbers shown averaged over 2017; Current level at 0.7 per EPA and MDEQ recommended dosage goal.
Barium (ppm)	2	2	0.14	2015	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits.
Disinfectants					
Chlorine (ppm)[6]	4	4	Highest RAA: 0.42 Range: 0.1 - 0.8	2017	Water additive used to control microbes.
Disinfectants By-Products					
Stage 2 Total Trihalomethanes (THMs)(ppb)	80	N/A	LRAA: 12.5 Range: 0.9 - 21.7	2017	By-product of disinfection.
Stage 2 Total Haloacetic Acid (HAA5)(ppb)	60	N/A	LRAA: 5.5 Range: 1.0 - 9.0	2017	By-product of disinfection.
Radionuclides					
Gross alpha (pCi/L)	15	0	14.2	2016	Erosion of natural deposits.
Radium (pCi/L)	5	0	3.7	2016	Erosion of natural deposits.
Unregulated Substance[2]					
Sodium (ppm)	N/A	N/A	15	2017	Erosion of natural deposits and runoff.

[1] Water quality regulations allow us to monitor some substances less often than once a year because their concentrations are not expected to vary significantly from year to year.
[2] Unregulated substances are those for which the EPA has not established drinking water standards. The purpose of monitoring these substances is to assist the EPA in determining the occurrence of unregulated substances in drinking water and whether future regulation is warranted.
[3] MSU is currently on a three-year cycle for lead and copper testing. These results are from 2017.
[4] 90 percent of samples were at or below this level.
[5] Sample Fixtures were isolated and changed after receipt of sample results above action level.
[6] Chlorine does not have an associated MCL or MCLG. It is limited by a MRLG which is defined on the previous page. The levels shown are the MRLG limit.

More Water Quality Parameters of Interest: North Campus

Additional water parameters for researchers, faculty, staff and students

Parameter	Units	Your Water Results	
		Average Level Detected	Range
Alkalinity as calcium carbonate	ppm	363	330-400
Aluminum	ppm	0.012	.001-.028
Arsenic	ppm	ND	ND
Cadmium	ppm	ND	ND
Chloride	ppm	25	24-25
Chromium	ppm	ND	ND
Conductivity	S/cm	829	655-1026
Hardness (calcium carbonate)	ppm	438	288-592
Iron	ppm	0.8	0.3-1.4
Lead	ppm	ND	ND
Magnesium	ppm	35	26-45
Mercury	ppm	ND	ND
Nickel	ppm	ND	ND
Nitrate as N	ppm	ND	ND
Nitrite as N	ppm	ND	ND
Sodium	ppm	13	6-34
Sulfate	ppm	88	16-180
Temperature[1]	°F	55	53-57
Total Organic Carbon	ppm	1.9	0.5-4.5
pH	S.U.	7.6	7.4-7.7
Zinc	ppm	0.068	.03-.10

[1] May differ at tap due to building residence time

Unregulated Contaminant Monitoring Rule 3 (UCMR3)[2]

	Average	Range
Molybdenum (ppb)	1.4	1.3-1.5
Strontium (ppb)	270	220-320

Farms Campus Distribution System

Jan. 1 to Dec. 31, 2017

This table shows test results for substances that were found in MSU's drinking water. Results are not shown for substances that were tested for but not detected at or above the Maximum Contaminant Level (MCL).

Michigan State University Water - Table of Detects					
Constituent/units of measurements	MCL	MCLG	Amount in MSU Water	Year[1]	Likely Sources
Biological Constituents					
Total Coliform (% Positive Samples)	N/A	N/A	Number Detected: 0 Violation: None	2017	
Inorganic					
Copper (ppb)[3]	AL = 1300	1300	200 No samples exceeding the Action Level[4]	2017	Corrosion of household plumbing systems; Erosion of natural deposits.
Lead (ppb)[3]	AL = 15	0	0 No samples exceeding the Action Level[4]	2017	Corrosion of household plumbing systems; Erosion of natural deposits.
Fluoride (Natural) (ppm)	4	4	0.44 Range: 0.13 - 0.44	2017	Erosion of natural deposits; water additive which promotes strong teeth; discharge from fertilizer and aluminum factories.
Nickel (ppm)	0.1	0.1	0.01 Range: 0 - 0.01	2017	Erosion of natural deposits.
Barium (ppm)	2	2	0.19 Range: 0.09 - 0.19	2017	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits.
Arsenic (ppb)	10	10	6 Range: 2.0 - 6.0	2017	Erosion of natural deposits; discharge from wood treatment; discharge from glass production.[5]
Total Xylenes (ppm)	10	10	0.0008 Range: 0 - 0.0008	2017	Runoff from petroleum products, paint, and rust preventatives.
Radionuclides					
Radium (pCi/L)	5	0	6.4 Range: 0 - 6.4	2017	Erosion of natural deposits.[6]
Gross Alpha (pCi/L)	15	0	19.4 Range: 1.4 - 19.4	2017	Erosion of natural deposits.[7]

[1] Water quality regulations allow us to monitor some substances less often than once a year because their concentrations are not expected to vary significantly from year to year.
[2] Unregulated substances are those for which the EPA has not established drinking water standards. The purpose of monitoring these substances is to assist the EPA in determining the occurrence of unregulated substances in drinking water and whether future regulation is warranted.
[3] MSU is currently on a three-year cycle for lead and copper testing. These results are from 2017.
[4] 90 percent of samples were at or below this level.
[5] While your drinking water meets EPA's standard for arsenic, it does contain low levels of arsenic. EPA's standard balances the current understanding of arsenic's possible health effects against the costs of removing arsenic from drinking water. EPA continues to research the health effects of low levels of arsenic, which is a mineral known to cause cancer in humans at high concentrations and is linked to other health effects such as skin damage and circulatory problems.
[6] Some people who drink water containing radium 226 or 228 in excess of the MCL over many years may have an increased risk of getting cancer.
[7] Certain minerals are radioactive and may emit a form of radiation known as alpha radiation. Some people who drink water containing alpha emitters in excess of the MCL over many years may have an increased risk of getting cancer.

HEALTH AND SAFETY INFORMATION

Pure water is often called a universal solvent because it will dissolve almost anything. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material. It can also pick up substances resulting from the presence of animals or from human activity. Some of these substances have been deemed by the EPA to be contaminants that must be monitored and strictly controlled. Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. Maximum Contaminant Levels (MCLs) and Maximum Contaminant Level Goals (MCLGs) are standards and criteria established using science and evidence-based approaches to keep the concentrations low at established safety levels based on toxicology studies, laboratory and engineering studies and monitoring. More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline at 1-800-426-4791.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, the elderly and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. The EPA and the Centers for Disease Control and Prevention guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline. More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline at 1-800-426-4791.

The MSU campus drinking water is safe and meets all federal and state safety standards. However, the water may have a different taste and feel compared to the water you are used to if you come from a location with a different water supply. For example, you may experience dry skin, or notice that the water feels "hard," which is due to naturally occurring minerals in the water. Individuals usually acclimate to changes in a water supply fairly quick; however, if you have concerns, you should contact your health care provider for further guidance.

PROTECTING YOURSELF FROM LEAD IN DRINKING WATER

Considering that many of our customers travel to other locations in the world, below are general safety recommendations provided by the EPA and MDEQ that can be implemented to reduce the risk of contracting lead through any water system.

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and building plumbing. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to two minutes before using water for drinking or cooking.

Infants and children who drink water containing lead in excess of the action level could experience delays in their physical or mental development. Children could show slight deficits in attention span and learning abilities. Adults who drink this water over many years could develop kidney problems or high blood pressure. Information on lead in drinking water, testing methods and steps you can take to minimize exposure is available from the EPA Safe Drinking Water Hotline at 1-800-426-4791 or online here.

HELPFUL HINTS TO CONSERVE WATER

Water conservation helps improve the environment and safeguard water resources for the community. MSU is working to ensure a balanced and sustainable approach to water consumption. Some examples of MSU's on-campus water conservation measures include installing drip irrigation systems to target plant root systems so less water is wasted, and replacing high-water-use fixtures with fixtures that use less.

The suggestions below are some of the many ways you can conserve water at home.

Bathroom

- Check the toilet for leaks. Place 12 drops of food coloring into the tank. Within 30 minutes, if the food coloring appears in the bowl without flushing, there is a leak that needs repair.
- Don't use the toilet as a wastebasket. Using a wastebasket instead of the toilet for tissues and other bits of trash will save water.
- Turn off the water to brush teeth, shave and soap up in the shower.
- Shorten your showers by one or two minutes.
- Save the running water that is wasted while waiting for hot water. Collect it in a container and use it for watering indoor plants.

Laundry

- Wash full loads of laundry or adjust the water level to the amount of clothes.
- Select the proper water level for laundry since many clothes washers allow control over the amount of water used.
- Use the correct amount of detergent to eliminate second rinses.

Kitchen

- When hand-washing dishes, use one sink to wash and fill the other sink with rinse water. For a single sink or basin, wash and stack dishes in a drainer, then rinse them all together with a sprayer.
- When washing dishes by hand, use a spray device or short blasts from the faucet instead of letting water run for rinsing.
- When cooking, peel and clean vegetables in a large bowl of water instead of under running water. Use a bowl or pan filled with water to wash and rinse fruits and vegetables.
- Keep a bottle of drinking water in the refrigerator instead of running the tap for cold water.
- Only use the garbage disposal when necessary. Disposals require a lot of water to run properly.
- Only run the dishwasher when it's full.
- Use just enough dish detergent to get dishes clean, preventing unnecessary rinsing.

THE FUTURE OF MSU WATER

In 2016 and 2017, MSU initiated a study to determine the feasibility of treating our drinking water supply to improve aesthetics and overall condition. The process started with preliminary planning and goal setting followed by a pilot study in early 2017 to determine the best treatment technology for our specific water. The information gleaned from the pilot study was used to develop an engineering study that provided different treatment and design scenarios to determine the best approach for MSU as it relates to quality, reliability and fiscal responsibility. The end result was a recommendation to construct an Iron Filter Plant to treat the water pumped from the well field and store it for use in a two million gallon elevated storage tank (water tower). This approach provides for optimal water quality, reliability and fiscal benefit to the university and its community of students, staff, researchers and faculty.

The concept was taken from an idea to design in 2017 and into early 2018 and culminated into a 6 million gallon per day water filter plant with a 2 million gallon elevated storage tank. Bids for the construction came in within the planned budget. The proposed water treatment plant will be located just east of the T.B. Simon Power Plant using land intended for university service activities. The project is planned to commence in July 2018 pending final Board of Trustee approval. Substantial completion of the water treatment plant is slated for December 2019 with minor off site work to follow with final completion by July 2020.

Artistic Rendering
Fishbeck Thompson, Carr & Huber

PROTECTING OUR SHARED WATER RESOURCES

While groundwater is the sole source of drinking water in the Mid-Michigan area, it is important to realize that it is connected to our surface water supplies as well.

MSU is fortunate to have the Red Cedar River run through campus. Our wastewater travels through sanitary pipes to the East Lansing Water Resources Recovery Facility, where the water is treated and ultimately discharged to the Red Cedar River. Our storm water (the water from rain or snow melt) is not treated; rather, it travels to the river via an intricate network of catch basins and storm drains. As an MSU student, faculty or staff member, or a visitor to campus, you can play an essential role in protecting our shared water resources.

Wastewater treatment facilities have to deal with an increasing amount of prescription drugs in the water supply. Unfortunately, facilities aren't equipped to "filter out" these chemicals and therefore, they make it into our water ways and eventually back into our water supplies.

Do not flush unused medications. Instead, take them to participating pharmacies and law enforcement offices in the area. To find a prescription disposal location near you, visit www.takebackmeds.org.

Please use caution with what you flush down the toilet. You can help protect the sanitary sewer system and ease the burden of wastewater treatment by disposing of the following items in the trash:

- **"Flushable wipes"** – Marketed as flushable, however these don't break down like toilet paper.
- **Condoms** – These do not break down and can balloon, creating clogs.
- **Fats, oils and grease** – Don't put grease down garbage disposals. Pour into a container such as an empty jar or coffee can. Once cooled and solidified, secure the lid and place it in the trash.
- **Diapers and feminine supplies** – Padding and adsorbent nature makes these too thick for plumbing.
- **Cotton swabs** – Cardboard cotton swabs can be composted, and plastic swabs go into the trash.
- **Dental floss** – Not biodegradable, can create clogs.
- **Cigarette butts** – Contain chemicals that can contaminate water.
- **Hair** – Put hair in a compost bin or in the trash.

TAP WATER VERSUS BOTTLED WATER

At MSU, plastic water bottles account for a large percentage of campus waste. It is estimated that only 25 percent of the nearly three million water bottles on campus make their way to MSU's Recycling Center each year. The waste from plastic water bottles increases the university's landfill costs and contributes to our environmental footprint. For this reason, MSU encourages campus to hydrate sustainably with a reusable water bottle at one of the university's many water refill stations. Additionally, MSU installed drinking water and water bottle refill stations that include additional filters across campus as a sustainable, aesthetic response to the campus community's issue with MSU's drinking water (i.e. the appearance of "red water".) These stations offer access to high quality drinking water that is both economically and environmentally responsible.

For more information about your water, the contents of this report, or the 2003 source water assessment, contact the MSU water operations manager at **517-355-3314** or e-mail **water@ipf.msu.edu**.

MICHIGAN STATE UNIVERSITY

MSU Water

PROTECTING WATER RESOURCES ON CAMPUS

MENU

YOU CAN PLAY A ROLE IN PROTECTING CAMPUS WATER RESOURCES!

As an MSU student, faculty or staff member, or a visitor to campus, you are an essential part of the Red Cedar River Watershed, and your actions can help to protect our shared water resources.

You may have noticed labels attached to the storm drains and catch basins around campus. Storm drains, or catch basins are designed to carry rainwater away from developed areas to prevent flooding. The storm water conveyance system is not connected to the sanitary sewer system, and the storm water is never conveyed to the wastewater treatment plant. The storm water flows through a network of drainage pipes until it reaches the Red Cedar River.

As storm water flows, it picks up pollutants from parking lots, roadways, sidewalks and lawn areas before it reaches the river. This type of pollution is known as nonpoint source pollution, which is our nation's largest remaining water quality problem. If more people become informed about the link between storm drains and our surface waters, we can all help to protect and restore the quality of our waters.

For more information about Red Cedar River educational activities, please contact Ruth Kline-Robach at the Institute of Water Research at kliner@msu.edu.

Thank you for playing a role in protecting the water in the Red Cedar River!

VOLUNTEER FOR STORM WATER MANAGEMENT ACTIVITIES

ON-CAMPUS & OFF-CAMPUS RESIDENTS, STAFF MEMBERS AND VISITORS

- **Report spills!** If you notice any unusual discharge(s) into the Red Cedar River, please call MSU Environmental Health and Safety at **517.355.0153**.
- **Don't litter** (even cigarette butts)! Take advantage of the trash and recycling bins found in each building on campus. If trash and recyclables are properly disposed of, it will prevent litter from finding its way into the Red Cedar River.
- **Don't overflow trash receptacles**, especially ones that are located outside. If the receptacles are full, contact your building coordinator or the Residential and Hospitality Services Office at **517.355.7457**.
- **Never dump anything down a storm drain**, and report it to the Environmental Health and Safety Office if you see someone else doing so.
- **Check your car frequently for leaks and spills.** By properly maintaining your car, and making repairs of leaks immediately, you can prevent oil, antifreeze, and other toxic substances from entering the storm drains.
- **Refrain from feeding the ducks** and other waterfowl that inhabit the Red Cedar River. Feeding them results in unnatural concentrations of waterfowl in one area which can result in high concentrations of bacteria.

- **Participate in on-campus activities that promote the protection of the Red Cedar River and our watershed**, such as river clean-ups, storm drain labeling and water quality monitoring activities.
- **Spread the word** about protecting our waterways from polluted runoff.
- **Clean up waste from pets.** This is one way to reduce fecal pollution. Learn how else you can reduce E. coli by downloading this homeowners guide.
- **Properly store, use and dispose of household hazardous waste**, and recycle used motor oil.
- **Keep yard waste, trash, and dirt off the street** and out of the gutters.
- **Apply pesticides and fertilizers sparingly**, and follow the manufacturer's instructions for application.
- **Wash your car at a car wash facility** instead of in the driveway.
- If your property borders a stream or lake, **consider installing a riparian buffer.** This will help protect the water's edge. Learn more by downloading this brochure.
- **Volunteer** for local river clean-ups, storm drain labeling or other activities that promote the protection of our water resources.
- **Learn more** about water resources groups in the Mid-Michigan area. A good starting point is www.pollutionisntpretty.org.

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