

2018 PROJECT REPORT

# The Septic Question

## Emmet County Report



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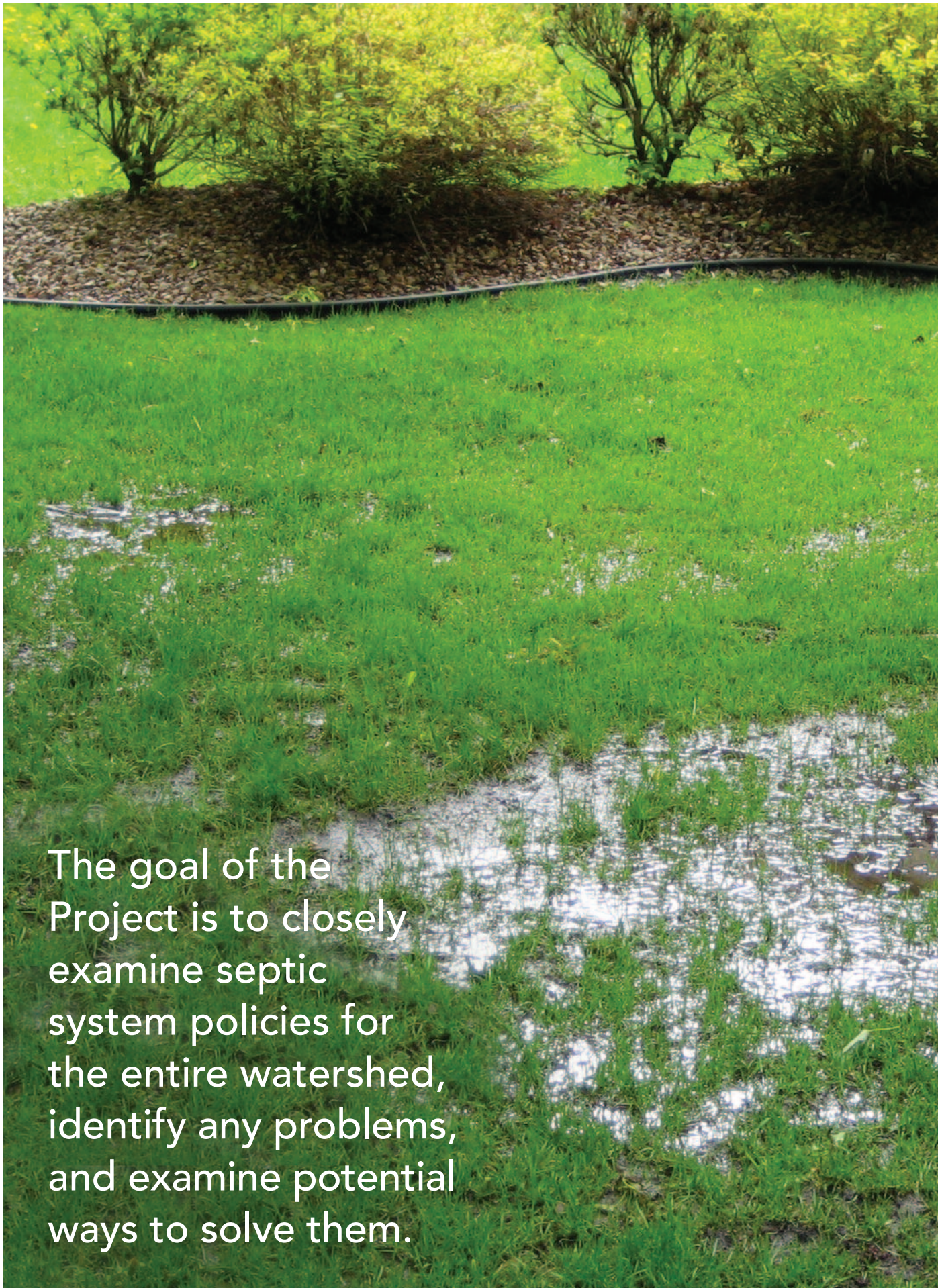
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The goal of the Project is to closely examine septic system policies for the entire watershed, identify any problems, and examine potential ways to solve them.



## THE SEPTIC QUESTION PROJECT REPORT: Executive Summary

The Septic Question Project was a grant partnership between the Health Department of Northwest Michigan and Tip of the Mitt Watershed Council, funded by the Michigan Department of Environmental Quality. The goal of the Project was to closely examine septic system policies for the entire Lake Charlevoix Watershed, identify any problems, and examine potential ways to solve them. The committee was also charged with creating a Final Report for decision makers. However, as the Project unfolded, it became obvious that this information would be useful to other watersheds. Therefore, we created additional versions. This is the 2018 Emmet County version of the Septic Question Project Final Report, which includes specific policy options for local units of government to consider in order to best protect the precious water resources of this area.

**Statement of the Problem:** *Most on-site septic systems in the state are never inspected again once installed.* Michigan is the only state in the nation without uniform standards for how on-site septic systems are designed, built, installed, and maintained. Public health officials in Michigan believe reported septic system failures represent only a fraction of the total number of failures statewide, and many go undetected or remain unreported for years. In most counties in Michigan, after a system is built the counties do not follow up to make sure those systems are functioning properly. Only 11 counties out of 83 in Michigan have a requirement for septic inspections, and those are during the transfer or sale of property. Because this important follow up is non-existent in the other 72 counties, it creates a potential threat to public health and water resources. To further support this point, as recently as June 2015, brand new research was published in the Proceedings of the National Academy of Sciences of the United States of America. The study, conducted by Michigan State University, used microbial source-tracking tools to show that pollution arising from septic system discharges is likely much more severe than previously realized. **Results suggest human fecal contamination is affecting 100% of the studied river systems in Michigan's Lower Peninsula.**

**Key Findings:** Considering that typical septic systems usually have a lifespan of 25 to 30 years, older systems still in use may have already failed, or could be on the verge of failing soon. We want to see changes that require additional oversight, to ensure failing systems are discovered before they fail completely. Research and data collection point to warning signs that we can take into account in support of making changes to oversight requirements.

Therefore, we created a **menu of Policy Options for decision makers** to consider and to help get the discussion started in the community. **Our intent is to make positive change that is not punitive or burdensome for citizens, businesses, and local governments.** We researched what is working in other areas of Michigan and the US and interviewed

individuals in charge of implementing those policies. This report summarizes each policy option, provides interview responses, and outlines the **Advantages and Disadvantages for each of the following:**

- Maintain the Status Quo
- Time of Transfer Inspection Ordinance
- Mandatory Pumping Ordinance
- Mandatory Inspection Ordinance

We also address the use of a Pilot Program, where appropriate, and Overlay Districts.



# THE SEPTIC QUESTION PROJECT REPORT

## 1. INTRODUCTION

This Project Report presents research related to the topic of on-site septic wastewater disposal and treatment systems (septic systems), with a special focus on local concerns.

Citizens and local officials in Antrim, Emmet, Charlevoix, and Cheboygan Counties are interested in this topic, and some local governments are expressing concern and asking for help. The Health Department of Northwest Michigan and Tip of the Mitt Watershed Council are involved in these discussions for Emmet, Charlevoix, and Antrim. The regional Health Department of Northwest Michigan covers Antrim, Emmet, Charlevoix, and Otsego Counties, while District Health Department #4 covers Cheboygan County. They have been very helpful to us as we created this version of the Report, which will be shared with them as well.

Originally, the Health Department of Northwest Michigan and the Watershed Council were grant partners in *The Septic Question Project* for the Lake Charlevoix Watershed, funded by the Michigan Department of Environmental Quality (MDEQ). We convened local stakeholders to form the Project Committee (participants listed in Appendix A). This Report contains the original committee findings, and adds Emmet County-specific information for this version of the Final Report. The Emmet County work is funded by the Joyce Foundation, with a grant from Emmet County to print this Final Report. We thank them for their support.

Research for this Report was conducted by the Watershed Council from summer 2015 through fall 2017, for the expressed purpose of helping local governments and other interested parties to closely examine septic systems, related to both public health and water resource protection. Later in the Report, we present a menu of policy options for consideration by local decision makers. For readers who need a **short primer on septic system mechanics, please consult Appendix B.**

Finally, we note that **there is more to the septic “system” than what the property owner manages.** Remember, the property owner system is pumped, and when the truck drives away with the contents of your septic tank, they are going somewhere. There are only two choices for where it goes in Emmet County: either land application or a wastewater treatment plant. This extremely important part of the “system” should also be considered during community conversations and debate. Both choices are backed by science, but both have their limits which must be confronted for us to continue to protect local water resources. The septic pumping business sector has many challenges moving forward, and public policy decisions about septic system oversight must take these challenges into account.

## 2. BACKGROUND

Despite being surrounded by the Great Lakes and blessed with thousands of inland lakes and streams, **Michigan is the only state in the nation without uniform standards for how on-site septic systems are designed, built, installed, and maintained.** According to the MDEQ Environmental Health Section, a state code would be a benefit, in terms of managing septic systems after they are constructed. That is because in most counties in Michigan, after



a system is built, the counties do not follow up to make sure those systems are functioning properly.<sup>1</sup> Because this important follow up is non-existent in most places, it creates a distinct threat to public health and water resources.

Importantly, as recently as June 2015, brand new research was published in the Proceedings of the National Academy of Sciences of the United States of America. The study, conducted by Michigan State University (MSU), used microbial source-tracking tools to show that pollution arising from septic system discharges is likely much more severe than previously realized. Dr. Joan Rose, one of the authors of the study, noted, *"All along, we have presumed that on-site wastewater disposal systems, such as septic tanks, were working. But in this study, sample after sample, bacterial concentrations were highest where there were higher numbers of septic systems in the watershed area."*<sup>2</sup>

*Bacteroides thetaiotaomicron (B. Theta)* is a human source-tracking marker. The MSU study covered 64 rivers that drain 84% of Michigan's Lower Peninsula. These rivers were sampled under baseflow conditions for *B. Theta*, *E. coli*, landscape characteristics, and geochemical and hydrologic variables. The study abstract noted that *"In particular, watersheds with more than 1,621 septic systems exhibited significantly higher concentrations of B. Thetaiotaomicron."* In the Results and Discussion section, the study states, *"The B. theta results suggest **human fecal contamination was affecting 100% of the studied river systems.** These results have significant implications for water and environmental quality managers."*<sup>3</sup>

Michigan-specific research such as this provides incentive for us to address septic systems with new urgency. Northern Michigan currently enjoys high quality waters, but what is the outlook if we ignore these warnings? Tip of the Mitt Watershed Council is currently involved in discussions in Lansing to urge action on a statewide code, which has been tried before. We will continue with this effort, but realistically, a statewide code could be many years in the making, if it happens at all. In the absence of a statewide code, Michigan has local Septic Codes created by local district health departments, in conjunction with county governments. As such, **local government is the best hope for taking action to address local concerns about septic system performance.** Additionally, if a successful model for local government action on septic systems is designed, it could serve as a model for consideration by statewide policy makers, who we hope will eventually address this topic. We also hope they address effective oversight for septic systems as a proactive measure, rather than 15 or 20 years from now as a reaction to fouling waters.

In the meantime, local government is charged with maintaining general health, safety, and welfare. In Northern Michigan, special emphasis is placed on healthy drinking water, plus high quality surface water and public areas devoted to recreational use. Antrim, Emmet, Charlevoix, and Cheboygan Counties all have significant areas with no public wastewater

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<sup>1</sup> Jeff Alexander, "Michigan has nation's weakest regulations on septic systems," *Bridge Magazine* (May 12, 2013; updated May 14, 2013), [http://www.mlive.com/environment/index.ssf/2013/05/michigan\\_has\\_nations\\_weakest\\_r.html](http://www.mlive.com/environment/index.ssf/2013/05/michigan_has_nations_weakest_r.html), accessed online August 2015.

<sup>2</sup> "Septic Tanks aren't keeping poo out of rivers and lakes," *Michigan State University news* (August 3, 2015), <http://msutoday.msu.edu/news/2015/septic-tanks-arent-keeping-poo-out-of-rivers-and-lakes/> accessed August 2015.

<sup>3</sup> Marc P. Verhougstraete, Sherry L. Martin, Anthony D. Kendall, David W. Hyndman, and Joan B. Rose, "Linking fecal bacteria in rivers to landscape, geochemical, and hydrologic factors and sources at the basin scale," *Proceedings of the National Academy of Sciences of the United States of America*, (June 29, 2015, pages 1-2). Obtained using PNAS website: <http://www.pnas.org/content/112/33/10419.abstract?sid=df386024-ecd7-4f06-a0b4-e55720db3950> accessed September 2015.



collection and treatment systems. In some locations, this means there is a potential for water supplies to be threatened by failing septic systems. Statewide examples of this exist. According to a Marquette County permitting database, between 2009 and 2012, almost 40 percent of septic systems being replaced were actively failing to the ground surface. These failed systems were only discovered because property owners were willing to voluntarily contact the health department.<sup>4</sup>

Additionally, a study was conducted by Washtenaw County after passing a county ordinance in the year 2000, requiring inspection of wells and septic systems at the time of the sale of a property. For inspections conducted over the first 18 months, the study showed:

- 18% of the septic systems inspected were failing or inadequate
- One out of every 18 septic systems (5.5%) had an illicit discharge<sup>5</sup>

The term "failure" (as it pertains to septic systems and wells) in Washtenaw County is defined as follows: 1) *the backup of sewage into a structure*; 2) *discharge of effluent onto the ground surface*; 3) *the connection of an Onsite Sewage Disposal System to a storm drain*; 4) *liquid level in the septic tank above the outlet invert*; 5) *structural failure of a septic tank*; 6) *discharge of sewage into any stream or other body of water*; 7) *the liquid level in a disposal field above the outlet holes in the pipe of such field*; 8) *unsafe water sample*; 9) *substantial nonconformance with water well construction requirements*; 10) *substantial nonconformance with water well isolation from contamination source requirements*.<sup>6</sup>

Section 12752 of the Michigan Public Health Code, Act 368 of 1978, was written to establish the need for public sewer systems. It is included here because it highlights some of the problems with septic systems. This section of the health code states:

"...Septic tank disposal systems are subject to failure due to soil conditions or other reasons. Failure or potential failure of septic tank disposal systems poses a threat to the public health, safety, and welfare; presents a potential for ill health, transmission or disease, mortality, and economic blight; and constitutes a threat to the quality of surface and subsurface waters of this state..."<sup>7</sup>

We are duty-bound to address this issue in Michigan.

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<sup>4</sup> Brad Neumann, "Got Water? Time of sale septic inspections can protect water quality: Part 1," Michigan State University Extension website posted October 6, 2015, [http://msue.anr.msu.edu/news/got\\_water\\_time\\_of\\_sale\\_septic\\_inspections\\_can\\_protect\\_water\\_quality\\_part\\_1](http://msue.anr.msu.edu/news/got_water_time_of_sale_septic_inspections_can_protect_water_quality_part_1), accessed November 2015.

<sup>5</sup> Washtenaw County website, eWashtenaw, Time Of Sale (TOS) Program, [http://www.ewashtenaw.org/government/departments/environmental\\_health/wells\\_septic/eh\\_owds/home.html](http://www.ewashtenaw.org/government/departments/environmental_health/wells_septic/eh_owds/home.html); accessed November 2015.

<sup>6</sup> Washtenaw County website, eWashtenaw, TOS Regulation, definitions, [http://www.ewashtenaw.org/government/departments/environmental\\_health/wells\\_septic/eh\\_owds/reg.html](http://www.ewashtenaw.org/government/departments/environmental_health/wells_septic/eh_owds/reg.html); accessed December 2015.

<sup>7</sup> Michigan Legislature website, Public Health Code (Excerpt) Act 368 of 1978, 333.12752; <http://www.legislature.mi.gov/gov%28S%28e5osikul5tn4pv33eqm51xnu%29%29/mileg.aspx?page=getobject&objectname=mcl-333-12752&query=on&highlight=12752> accessed December 17, 2015.

### 3. THE SANITARY CODE

Emmet, Antrim, Charlevoix, and Otsego counties are covered by the same local code. That original Sanitary Code was passed in 1966, and it has been amended several times since then, with the most recent update in 2017. The Health Department of Northwest Michigan is responsible for implementing the Sanitary Code. As noted earlier, District Health Department #4 covers Cheboygan County, and a version this Report will be shared with them.

By law, the Health Department of Northwest Michigan is REQUIRED to inspect septic systems in Emmet County in ALL of the following circumstances:

- 1 – according to the Sanitary Code
- 2 – if a citizen complains
- 3 – if another government agency makes a referral
- 4 – if related to the beach program

If the Health Department discovers that any of the prohibited acts from the Sanitary Code are occurring, they inspect the system and take actions to correct the violation. As noted above, the Health Department also inspects when they receive complaints. Those can come from citizens or from other agencies, who also may be requesting technical assistance for various reasons. During the summer beach monitoring programs, septic inspections could also be required if it looks like a system is contributing to public beach contamination problems.<sup>8</sup>

Importantly, if a building permit has only minor changes, then an inspection is not required. Many times a bank will require an inspection at the time of transfer or sale of a property before approving a loan. In those cases, the bank will contract with the Health Department to do the inspection, but these are all private decisions and no ordinances require property transfer inspections in this county.

**There are no requirements for regular inspections of existing septic systems, beyond what has been described.** This means that, as in most Michigan counties, most systems are never inspected again once installed. If homeowners are not educated about their septic system, it is possible that they will not have it maintained properly, resulting in problems for waterways and sometimes for neighbors. Also, because there is no requirement for additional inspections, some **aging systems have not been replaced, are probably uninspected and unmaintained, and thus are in danger of failing.** However, even newer systems that are uninspected can need repairs, and that could mean the difference between an affordable fix and polluting Mullett Lake, for example.

Finally, before any changes are made, two other things should also be considered. First, **periodic reviews of the Board of Appeals process** should be done to ensure appointees are well-trained and making decisions based on a clear standard of review. We recommend this based on our experience in other counties, where we heard complaints that a lack of training sometimes resulted in political decisions being made, rather than decisions based on public or environmental health impacts.

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<sup>8</sup> District Health Department #4, Mike Kavanaugh, phone interview, February 7, 2017.



Second, serious consideration should be given to address the **capacity for change in Emmet County, when it comes to septic haulers**. If we begin a robust pumping effort, for example, we want to ensure they can handle not only the actual work of pumping, but also the disposal of the additional waste we will produce with any new change in policy. Our preliminary research indicates that the existing haulers would welcome the new business, but they should be included in this conversation because their insights will be important to any policy decisions.

Despite these challenges, it is imperative that we require additional oversight to ensure failing systems are discovered before they fail completely. Failing systems on lake shorelines are likely leaching into the water for a long time before sewage is visible on the ground. Research and data collection point to warning signs that we can take into account, in support of making changes to oversight requirements. **Our goal, however, is to make change that is positive, not punitive or burdensome for citizens, businesses, and local governments.** Nevertheless, changes in this regard are likely to be difficult for some property owners who are unaware that their system is in trouble because of lack of maintenance or aging. Repairs or replacements can be costly. We urge the community to include funding solutions in these discussions, as there are some ways to provide assistance to homeowners in need.

#### 4. PICKEREL LAKE AND CROOKED LAKE

A large portion of Emmet County is located in the Cheboygan River Watershed, with sections in the southwest located in the Little Traverse Bay Watershed, sections in the northeast located in the Carp River Watershed, and sections in the northwest located in various minor watersheds. The County features numerous inland lakes and streams that are headwaters of the popular Inland Waterway, which is nearly 40 miles long. In this section, we will focus on two important water bodies in southeast Emmet County, Pickerel Lake and Crooked Lake, to highlight water quality that is indicative of the country overall.

Pickerel Lake has a surface area of 1082 acres and 7.1 miles of shoreline. The Lake contains extensive shallow areas but has two deep pockets of around 70 feet in the northwest. Cedar Creek feeds the Lake on its east side and Mud Creek feeds from the west side. Pickerel's outlet is the Black Hole channel that feeds Crooked Lake. In 2015, no areas of Pickerel contained "what is generally considered to be nuisance plant growth."<sup>9</sup>

Crooked Lake has a surface area of 2351 acres and 16.3 miles of shoreline. The Lake is also mostly made up of shallow areas but has a roughly 50 foot deep pocket in its west side basin. The Black Hole channel feeds the Lake and it flows outward northeast via the Crooked River. Only a few areas of Crooked Lake in 2015 contained nuisance heavy plant growth, which included small pockets in the southwest and a couple along the Lake's north shore.<sup>10</sup>

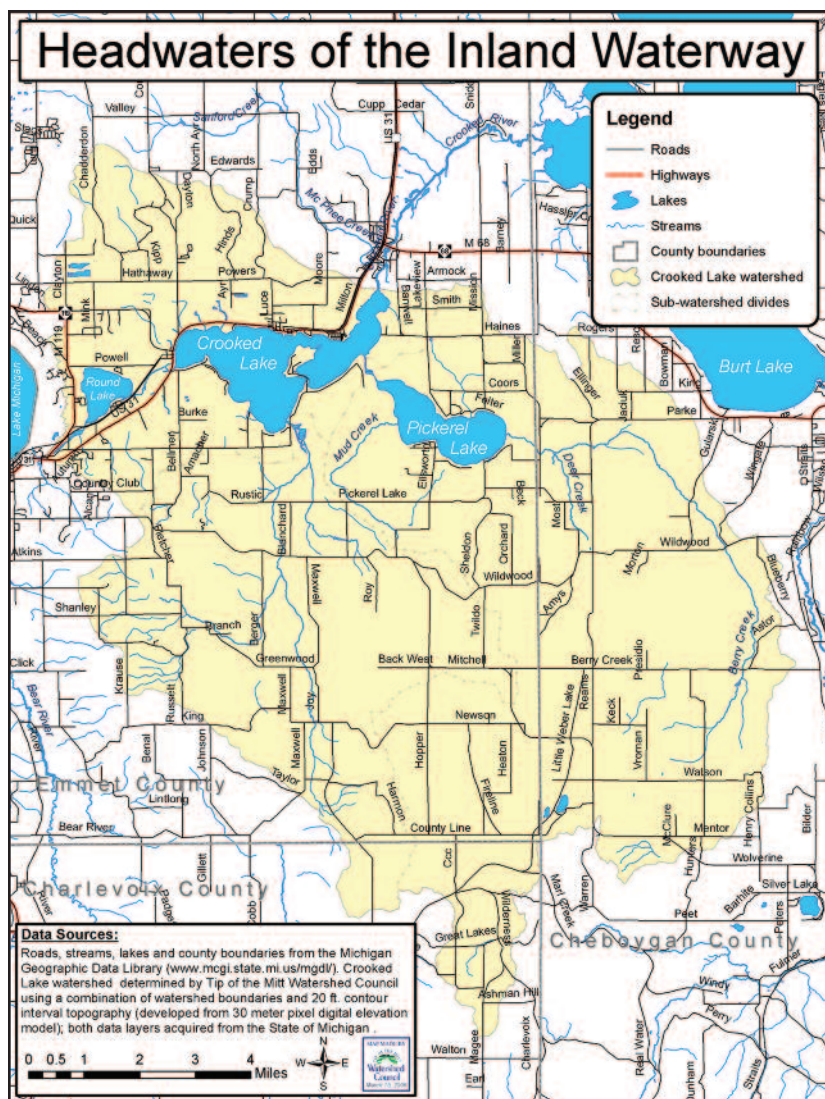
Pickerel and Crooked Lakes are connected via the Black Hole channel and contribute to the Pickerel-Crooked Lake Watershed, which covers 63,000 acres and exists completely within the

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<sup>9</sup> Tip of the Mitt Watershed Council, Pickerel and Crooked Lakes Aquatic Plant Surveys 2015, page 8.

<sup>10</sup> Ibid.

<sup>11</sup> Tip of the Mitt Watershed Council, Mullett Creek Watershed Management Plan, page 1 (August 2011, revised July 2012).



boundaries of Emmet County. Via the Crooked River, the Watershed's output ends up in Burt Lake, which then flows into Lake Huron via the Cheboygan River.<sup>11</sup> Considering that the Watershed covers about 63,000 acres total, it is fairly small when compared to the other watersheds within the larger Cheboygan River Watershed.

Although relatively small in total area, Pickerel and Crooked Lakes are vitally important to both Emmet County's environment and economy. The small vacation towns of Conway and Oden are located on Crooked Lake's west shores and bring an influx of people to the area in both the summer months and winter. Popular activities include boating, swimming, paddling, and fishing, both regular and ice in the winter. Northern pike, walleye, and perch are the common sport fish found in Pickerel and Crooked Lakes.

## Conductivity and Chloride

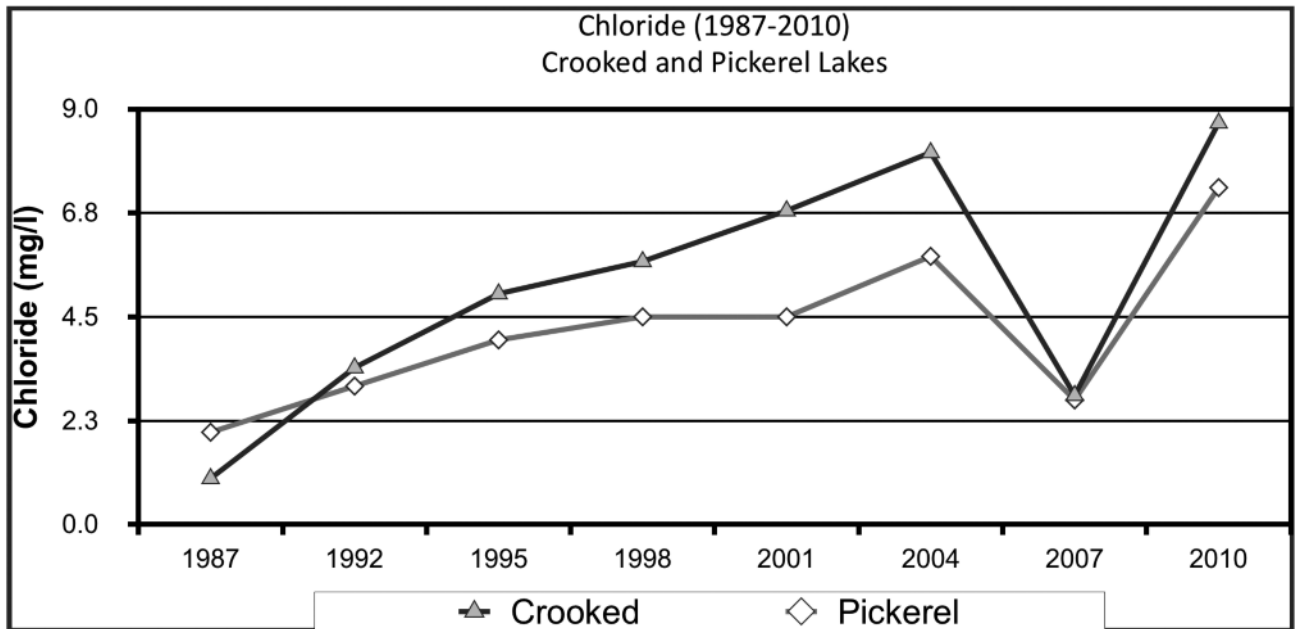
The Watershed Council monitors water quality for both Pickerel and Crooked Lakes, and has done so for decades. Trends in water quality monitoring data can be used as indicators for their current conditions. **Because their health depends upon land use practices surrounding them, it is important to understand that the water runoff from thousands of acres ends up in these Lakes, carrying pollutants.** This includes pollutants stemming from human activity, which can be controlled. Recreation, urbanization of rural areas, dams, agriculture, and faulty septic systems all contribute to pollution, which can be measured over time.

Conductivity is a measure of the ability of water to conduct an electric current, which is dependent upon the concentration of charge particles (ions) dissolved in water. Chloride is a component of salt that is found in many products associated with human activities, such as de-icers, water softeners, fertilizers, and bleach. It is a negatively charged particle that contributes to the conductivity of water. Conductivity and chloride levels in lakes and streams tend to increase as population and human activity in a watershed increase. Research shows

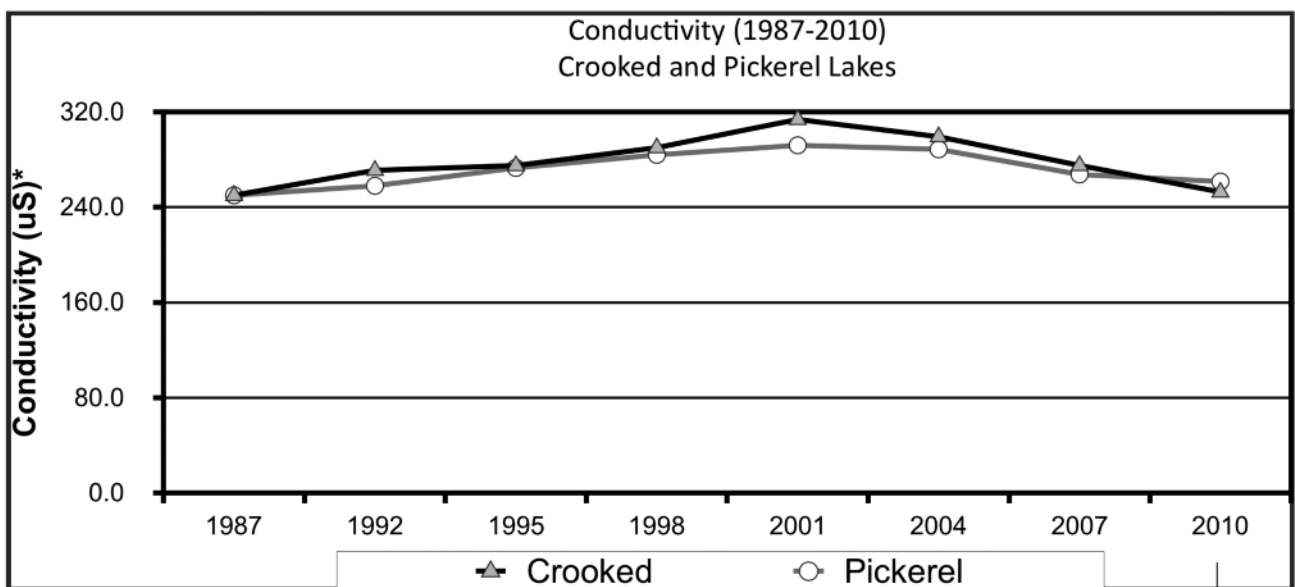
<sup>11</sup>Tip of the Mitt Watershed Council, Pickerel-Crooked Lakes Webpage. <https://www.watershedcouncil.org/pickerel-crooked-lakes.html>.



that both conductivity and chloride levels in surface waters are good indicators of human disturbance in a watershed, particularly from urban land use.<sup>12</sup> Overall trends in Pickerel Lake mirror those of Crooked Lake, its hydrologically connected neighbor, indicating that nonpoint source pollution from agricultural and urban areas are some of the main culprits related to documented general increases in chloride levels and the relatively high measure of conductivity. This signals the need for pro-active measures to protect the water quality of both lakes.



**Figure 2. Chloride Levels (1987-2010) Crooked and Pickerel Lakes**



**Figure 3. Conductivity (1987-2010) Crooked and Pickerel Lakes**

<sup>12</sup> Tip of the Mitt Watershed Council, *Lake Charlevoix Watershed Management Plan: Protecting Water Quality for Today and Tomorrow*, July 2012, page 5.

## Nutrients and Algae Growth

Nutrients are chemicals needed by organisms to live, grow, and reproduce. Nutrients occur naturally and can be found in soils, water, air, plants, and animals. Phosphorus and nitrogen are essential nutrients for plant growth and important for maintaining healthy, vibrant aquatic ecosystems. However, excess nutrients from sources such as fertilizers, stormwater runoff, and faulty septic systems lead to nutrient pollution, which can have negative impacts on surface waters. This has been evident in recent years, with the presence of *Cladophora* appearing on various sections of the Pickerel and Crooked Lake shorelines.

*Cladophora* is a branched, filamentous, green algae that occurs naturally in small amounts in Northern Michigan lakes, mostly on rocky shorelines. Importantly, nutrient requirements for *Cladophora* to achieve large, dense growths are greater than the nutrient availability in lakes with high water quality, such as Pickerel and Crooked Lakes. Therefore, the presence of dense *Cladophora* can indicate locations where relatively high concentrations of nutrients, particularly phosphorus, are entering a lake.<sup>13</sup>

Sources of these nutrients can be due to natural conditions. However, **the majority of *Cladophora* growths can be traced to cultural sources, such as malfunctioning septic systems, lawn fertilization, soil erosion, poor agricultural practices, or shoreline and wetland destruction.** These nutrients can contribute to an overall decline in lake water quality.

During the late spring of 2012, the Watershed Council, funded by the Petoskey-Harbor Springs Area Community Foundation, did a comprehensive shoreline study of both Pickerel and Crooked Lakes, which included documentation of *Cladophora* growth. Relative to shore surveys of other lakes in the region, Crooked and Pickerel Lakes were near the average in terms of the percentage of properties with *Cladophora* growth, but above the average with respect to heavy *Cladophora* growth. The shoreline areas that showed evidence of nutrient pollution can be associated with both natural factors and man-made factors. Pickerel and Crooked Lakes have multiple streams, springs, and seeps that feed the Watershed that may be delivering nutrients that naturally increase algal growth. On the other hand, human factors are undoubtedly associated with areas of increased nutrient pollution on the shorelines.

Based on these shoreline survey results, there was an increase in the percentage of habitable parcels that possessed noticeable growths of *Cladophora* on Pickerel and Crooked Lakes from 31% in 1988 to 39% in 2012. These are indications that nutrient pollution around the Lakes is increasing and in need of attention. **It is not a guarantee that septic systems are the cause, or the only cause, but septic systems can easily be checked, and this warrants attention from the community.** Property owners should be especially interested, as property values depend upon the health of Pickerel and Crooked Lakes.

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<sup>13</sup> Tip of the Mitt Watershed Council, Crooked-Pickerel Lakes Shoreline Survey 2012, page 4.



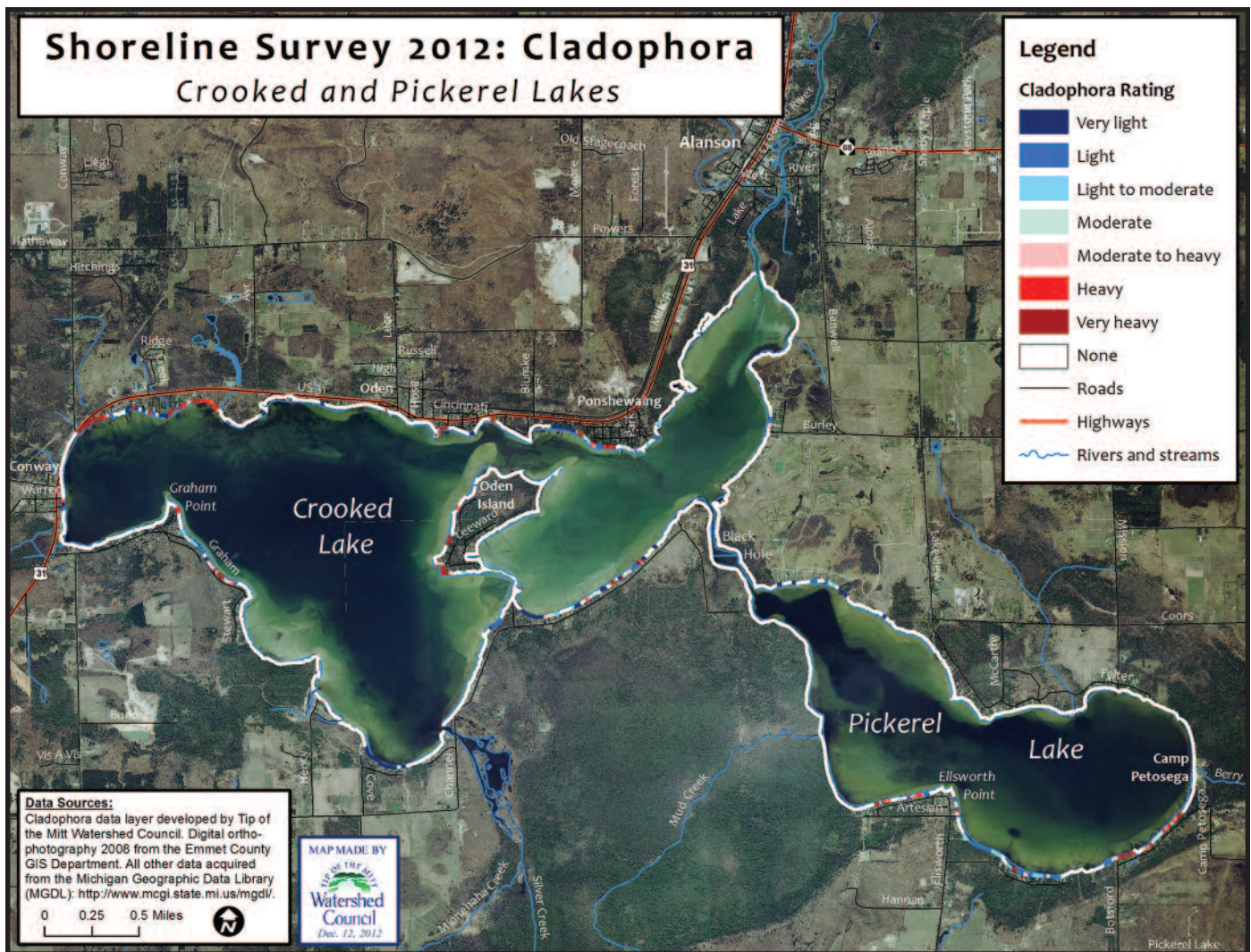


Figure 4. Shoreline Survey 2012: Cladophora, Crooked and Pickerel Lakes

## 5. STATEMENT OF THE PROBLEM

According to the MDEQ, approximately 30% of homes and businesses in Michigan are served by 1.4 million onsite wastewater systems.<sup>14</sup> *“Unless properly maintained, septic tanks may fail and leak sewage into nearby waterways and groundwater. In the most extreme cases, raw sewage may appear on the land surface close to the septic tank. The failure rate for these systems in any given year is 5-10%, based on information from local county health departments submitted to the MDEQ.”*<sup>15</sup>

The MDEQ Michigan 2013 Statewide Failed Sewage System Evaluation Summary Report notes *“Statewide, the top four probable causes of system failures were soil clogging (19 %), root intrusion (13 %), hydraulic overload (11 %), and undersized system (10 %). However, public health officials believe reported septic system failures represent only a fraction of the total number of failures statewide and many go undetected or remain unreported for years.”*<sup>16</sup>

<sup>14</sup> Michigan State University Center for Water Sciences, Pathogen Workshop Series Fact Sheet #2, “Sources of Waterborne Pathogens in Michigan,” <http://www.cws.msu.edu/documents/FactSheet2finalrevised.pdf>, accessed July 2015.

<sup>15</sup> Ibid.

<sup>16</sup> Neuman, “Got water? Time of sale septic inspections can protect water quality: Part 1,” Accessed October 2015.

The fact that 20-35% of septic failures are of an unknown age means we have uncertainty about what to expect from these systems in terms of performance. This also means there is a good chance that many older systems are not receiving important maintenance steps to keep them performing well and protecting lakes and streams, as they are intended to do. It is clear that we need more information about individual septic systems at the state level to ensure they are not polluting water resources, which drive our statewide economy.

The true extent of septic system failure and replacement has not been quantified by the state, the County, or the Health Department, including the types of failed systems, their spatial distribution, and reasons for failure. On the topic of aging septic systems, Emmet County is in a similar position to other neighboring counties. County staff were extremely helpful, but they could not tell us exactly how many homes were built for historic time periods. The County does have the information on file, but it is not digital or searchable. We found the same thing in Charlevoix and Antrim Counties; the hard copy data exists, but not in an electronically accessible form. The Health Department also has hard copy system replacement records going back several decades, but those records do not exist in a digital, searchable format prior to the late 1990s. We visited the Health Department to look at hard copy records in the fall of 2016. This was very helpful for us to conduct a simple local analysis of existing systems.

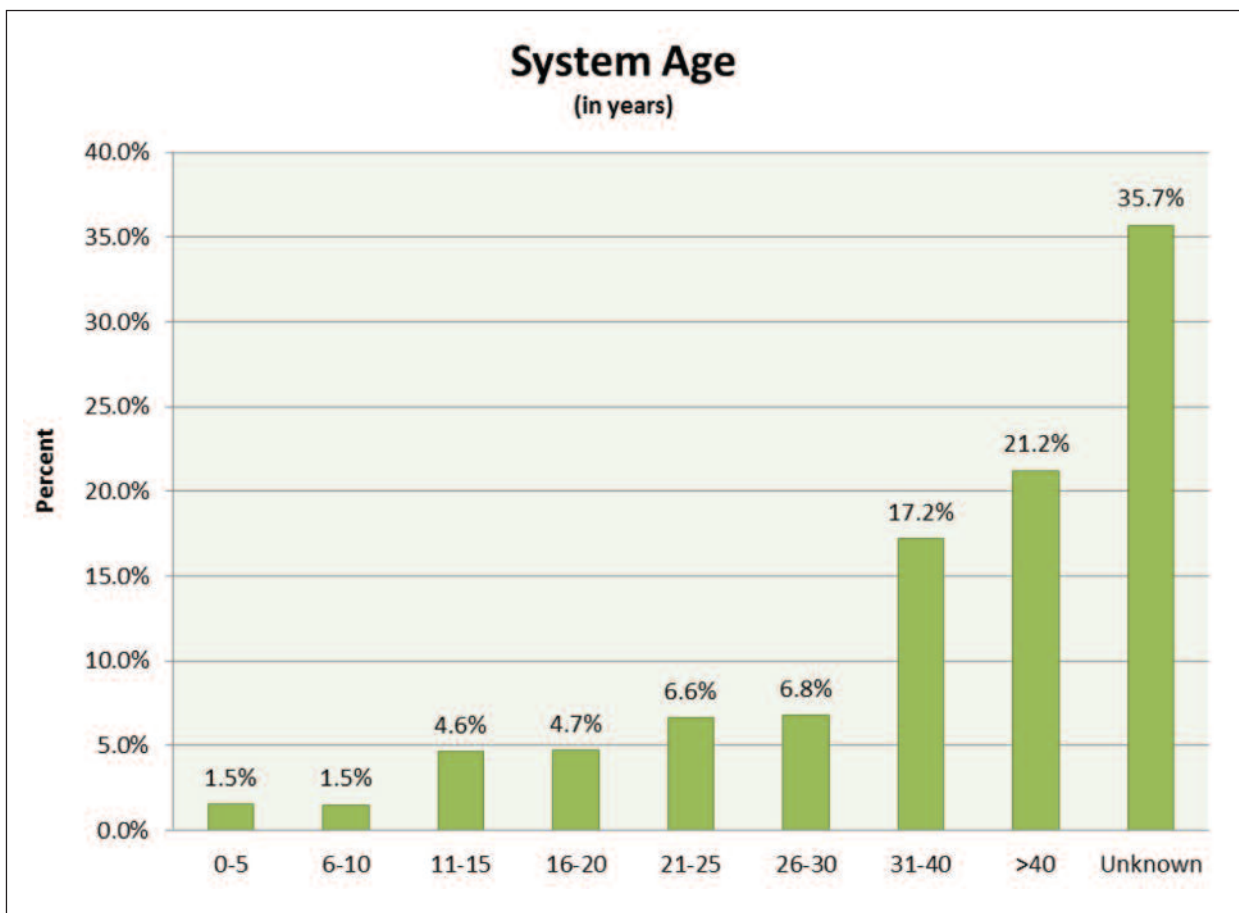


Figure 5. System Age of Residential System Failures – 2013



For both the County and the Health Department, it is clear that we need better access to information about individual septic systems. On this point alone, the Septic Question Project Committee recommended that partnerships be explored to write grants and get some help to modernize and update County records. Decision makers need access to accurate data in order to study local statistics and pinpoint areas that should be addressed on many topics.

Under these circumstances, we looked for ways to help us better understand the local picture. Given that septic systems have an expected lifespan of 25-30 years, our objective was to figure out how many homes in the County still have septic systems that are 25 years old or more. We suspect they exist, because there is no required oversight for them once they are installed.

State County/County Equivalent	Population					Housing units				
	2010	2000	1990	1980	1970	2010	2000	1990	1980	1970
Emmet County.....	32,694	31,437	25,040	22,992	18,331	21,304	18,554	14,731	12,506	8,904

According to census data from 1990 to 2010, we have a 20-year span that shows a housing unit growth of 6573 housing units. With statistics provided from the Health Department, we show that from 1992 to 2010 there were installations of 5224 septic systems and replacements of 1337 septic systems. With this data we can assume that from 1990-2010, 6561 housing units were built with new or improved septic systems, and the rest were connected to sewers. However, what is lacking is the information for septic systems built before 1992. There is simply no way for anyone to quantify with confidence the number of systems that are older than 30 years, and whether or not they are in good shape.

We ask, **could this also mean that expected lifespans are actually longer than 25-30 years if systems are well-maintained, or used sparingly, the way they can be in our local resort areas?** Knowing that would be extremely helpful to homeowners and manufacturers. Unfortunately, we don't have the data available to figure that out either, because once these systems are installed, there is no required oversight or maintenance.

Importantly, this short analysis only included septic systems that were part of residential housing units. It does not take into account septic systems on commercial or agricultural property, or statistics regarding things like remodeling or rebuilding. Those systems are also potentially vulnerable, but we think the risk posed by the simple analysis of residential housing units is enough to warrant a County-wide inspection effort at the least. This would be an opportunity to also upgrade local information on the topic.

Given this specific local information, coupled with the MSU study linking fecal bacteria in rivers to possible septic system contamination, we urge our local officials to encourage a serious community discussion to help determine how to better understand the actual health of these systems and their impacts upon the watersheds in Emmet County.





## 6. POLICY OPTIONS TO CONSIDER

We can summarize the septic system problem with two key points:

- **Public health and environmental impacts.**

*We have existing older systems that are likely failing or about to fail, which could impact the water resources of the Emmet County if left unchecked. If failing septic systems result in the appearance of effluent at the surface, or entering drinking water supplies, there is potential danger to public health.*

- **No oversight after installation.**

*Septic systems are expected to have a 25-30 year lifespan, but the state of Michigan and most of its local jurisdictions have no regulation to ensure that they are maintained after installation, or replaced before failure is obvious. At that point, it is possibly too late to prevent serious environmental or public health problems.*

To address these issues, a pro-active approach should focus on preventing contamination of surface water, groundwater, and private water wells. Private wells do not have the support structure of municipal systems, so problems from nearby septic systems can sometimes go undetected. But, there are numerous steps a local government can take to protect private property owners and prevent pollution of local water supplies.

Our research included an examination of what is working in other parts of the US. We not only looked at ordinance examples, we also made calls to interview the people in charge of implementing those ordinances. A list of the people we contacted for these interviews is included in Appendix C. **We asked everyone the same six questions:**

1. **Generally, how is the ordinance working, as you see it?**
2. **How do you educate homeowners and encourage participation?**
3. **How do you enforce requirements, and what happens if a homeowner does not comply?**
4. **What are the major drawbacks of the system, as you see it, now that you've worked with it a few years?**
5. **What are the best parts of the ordinance?**
6. **Have the objectives in the ordinance been achieved?**

What we learned during our investigations helped to inform the information included in the Policy Options section below. Here you will find summaries of ordinances from the following states: Michigan, Virginia, Pennsylvania, Connecticut, Oregon, and Rhode Island. Each example outlines how the ordinance generally works. Then we provide three examples of specific ordinances, including the answers to the interview questions from each location. We end each section with a summary of Advantages and Disadvantages to the approach.

Other than Michigan, the states in this study all provide a statewide code that authorizes local action and provides guidance to local jurisdictions. For example, the Rhode Island Septic System Maintenance Act of 1987 authorizes the passage of official town representatives and licensed septage transporters onto private property for periodic inspection, pumping, maintenance, and repair of individual septic systems. Connecticut began requiring mandatory pump-outs and inspections at least every 5 years in 2010. Connecticut and Virginia require local municipalities and specific commissions to independently draft rules and regulations for septic system oversight. By comparison, as we emphasized earlier, Michigan has no uniform, statewide Septic Code. The Watershed Council hopes to prompt a statewide discussion of this topic in addition to our local conversations.

The following section presents a menu of policy approaches for local decision makers to consider. You will see that the majority of these examples illustrate policy choices that have been in place for a number of years with proven track records.

## **POLICY OPTIONS**

### **A. Maintain the Status Quo**

This is, of course, the easiest option in that no changes in current oversight or policy process would be required. However, potentially failing septic systems in the county are a cause for increased concerns regarding health and environmental impacts. In this scenario, education and outreach to local citizens about proper septic system care and maintenance could be done for very little cost. Also under this scenario, some improvement may occur after system failures are brought to the attention of the Health Department and are replaced, or as older homes and cottages are razed and replaced with year-round homes. But the pace could potentially be unacceptable, as older systems go uninspected and unmaintained, and ultimately fail, resulting in public health and environmental problems.

#### **Advantages of Maintaining the Status Quo**

- ✓ No immediate cost to the county or townships; no additional staff tasks, paperwork, or fees to manage
- ✓ Ordinance would not be required
- ✓ Educational campaigns to county citizens can be conducted for little cost

#### **Disadvantages of Maintaining the Status Quo**

- ✓ Does not proactively address nutrient levels and pollution in local water resources
- ✓ Potential for public health impacts
- ✓ Continued lack of data; we only know about failed systems voluntarily reported to the Health Department
- ✓ Does not address concerns of citizens and lake associations
- ✓ Potential to negatively impact property values

## B. County or Township Time of Transfer Inspection Ordinance

In Northern Michigan, we have several local examples from which to learn about this next option: a Time of Transfer (TOT) or Point of Sale (POS) inspection program. In our region, Benzie County, Long Lake Township in Grand Traverse County, and Milton Township in Antrim County are three examples of TOT ordinances that are working well, as evidenced by annual reports and corresponding metrics.

A county or township TOT inspection requirement is established by ordinance. Inspections are usually conducted by the Health Department at the time of sale or transfer of a property, but contractors can also be designated to do inspections. This type of program ensures that septic systems are inspected at the time an improved lot is sold. If the system is found to be failing, or near the end of its effective life, a plan for remediation is normally required and a follow-up inspection is done to ensure compliance. The cost of the program for the local government can be at least partially offset by fees, and a recording fee can also be established to help with administrative costs.

Some of these types of programs use outside contractors to minimize requirements for additional staff or funding. In such cases, the local Health Department conducts a training program for private inspectors, and issues and renews credentials. If locations have had problems in the past, inspectors report directly to those local governments or Health Departments to protect citizens from fraud or bad practices. In those cases, citizens pay fees to the county or township to cover costs of the program.





**Benzie County** in northwest Lower Michigan adopted a POS ordinance in 1990 over concerns that failing systems were degrading the water quality in Crystal Lake. In 2014, Glen Arbor Township in neighboring Leelanau County also passed a POS ordinance and the Benzie-Leelanau District Health Department performs inspections for both of these ordinances. According to the County Director of Environmental Health, when the program started, about 15% of the systems had to be replaced or upgraded. By 2008, almost 6,000 inspections later, fewer than 8% required upgrades.<sup>17</sup>



This program does two things: it informs and educates the purchaser of what they will have upon completion of the sale, and it requires upgrading of failing systems to protect water supplies and public health. All code violations are required to be fixed within 150 days after the date of sale.

Finally, according to the Health Department, fees are based on whether the system has been installed or evaluated since 1990 or not. If an installation or evaluation has been done since then, the price to the homeowner is about \$270. If it was not installed or evaluated since then, the price to the homeowner is around \$500.

Here is the **Benzie-Leelanau District Health Department interview**:

1. Success story – a lot of improperly working systems have been updated. Because of this ordinance, most people make sure to get an inspection before they upgrade their homes with extra bedrooms or other additions.
2. We deal with homeowners who are selling and buying, and also with realtors, so we educate by working with the Board of Realtors. Benzie County website has some info and it is improving and will eventually include more information there.
3. We utilize our Sanitary Code as enforcement. As often happens with homes built before 1965, violations regarding isolation distance trigger the upgrade requirement. Corrections have to be done within 150 days after time of sale, and if not, a civil infraction process is begun.
4. Hard time keeping up with the workload, at times. We also have to track down people selling without an inspection being done. However, as time goes on, more people are onboard. **Family transfers are not exempt** – key “problem properties” tend to be passed down through the family – so these are not exempt in ordinance. Ordinance took 3 times to pass, so it was a difficult process. The number one opposing factor that was cited by homeowners was “property rights” and politics is another issue, with some folks just being anti-government.
5. Just found a well-cap damaged and the water was full of insects, so this can now be corrected. That is just one example of a recent inspection – in about 50% of the inspections, minor problems are identified and corrected, which prevents further damage.
6. Yes, it is working.

<sup>17</sup> Brian McGillivray, “Law requires septic inspection before sale,” *Traverse City Record Eagle*, [http://www.record-eagle.com/news/local\\_news/law-requires-septic-inspection-before-sale/article\\_493f08b0-5b57-5612-bfa2-a8d173db0061.html](http://www.record-eagle.com/news/local_news/law-requires-septic-inspection-before-sale/article_493f08b0-5b57-5612-bfa2-a8d173db0061.html) December 10, 2008. Accessed October 2015.

For **Long Lake Township in Grand Traverse County, Township** Ordinance No. 23 is the POS program that took effect in 2008. An inspection report is required to be filed with the Township and a written report is provided to the transferee as part of the sale of the premises.<sup>18</sup> Inspections are done by private entities that are required to be certified and registered with the Township. Other than complete failures, which must be corrected by law because they pose immediate danger to the public, the Township does not require other violations to be corrected. Out-of-date systems that violate current codes, but are “grandfathered in” and still working are not required to be corrected. However, it is their experience that these minor violations do tend to be fixed at the point of sale because the buyer is typically interested in having an up-to-code system upon purchase.

In terms of fees, Gourdie-Fraser, Inc. was contacted for information. They are one of the contractors included on a list of registered inspectors approved by the Township to conduct the evaluation. They charge by the hour, not to exceed \$350 total. The time they spend depends upon the documents available to them about the property. The Township provides them with a form they are required to fill out, and Gourdie-Fraser uses that to do an interview with the home owner by phone first. The site visit includes an inspection of the tank and drainfield. They do a visual inspection of scum/sludge; inspect the drainfield corners to ensure there are no isolation issues; dig into the drainfield stone to ensure no ponding; and they look for tree roots or other potential intrusions. They do a sketch of the system and submit that with the form to the Township, the Health Department, and the property owner.

Here is the **Grand Traverse County Health Department interview:**

1. Working fine – Long Lake Township wanted to do an ordinance and we at the Grand Traverse County Health Department supported them – no complaints.
2. The Health Department does not participate in education of homeowners at this time. That is up to Long Lake Township.
3. Certified inspectors do evaluations. If a failure is identified, the Township contacts the Health Department. We have authority, under the Sanitary Code, to enforce the code by forwarding failure violations to the County Prosecutor’s Office as a misdemeanor offense. However, this has not been done because, so far, the failures have all been properly addressed. Failures are also fixed because the Health Department can declare the premises unfit for habitation.
4. No drawbacks.
5. Homes are being sold with full disclosure about the state of the septic system. This educates the public as to what a septic system is, and how it operates. Also, the inspection reports can be used to ensure that future additions to the house will be up-to-code, so the buyer already knows what to expect with future additions to the home. The Long Lake community is a resort town with a beautiful lake that is enjoyed by many. It has a lot of support to maintain water quality in that lake. So, the public in Long Lake has been largely in favor of the ordinance.
6. Yes, it is working.



Long Lake  
Photo Courtesy of Long Lake Association

<sup>18</sup> Long Lake Township, Traverse City MI website, Supplemental Residential Seller Disclosure Statement, <http://www.longlaketownship.com/Portals/1040/zoning%20ordinances/sellers-disclosure-statement-2013.pdf> Accessed April 6, 2016.

**Milton Township** in Antrim County adopted the Septic Inspection and Property Transfer Ordinance in 2012 to *“protect public health and to prevent or minimize the degradation of groundwater and surface water quality by malfunctioning sewage treatment and disposal systems (STDS) and to assure safe water supplies...”* It acts as a mechanism to provide information to buyers and sellers of real estate regarding the operational status of existing water and wastewater systems serving private residences and commercial facilities.<sup>19</sup>



The ordinance requires the Health Department to test well water and to inspect on-site sewage systems at the property seller's expense. The fee to inspect existing systems for Real Estate transactions is \$285. Systems that were newly installed within the past 10 years, or that were inspected within the past five years, are exempt. Septic tanks must be pumped before a property changes hands unless the seller can produce records showing that the tank has been pumped by a licensed contractor within the past five years. Health Department inspections also determine whether further development of the property, or additions to the home, will be possible for the buyer.

The ordinance also provides the Health Department with new, valuable information about existing systems in the Township. The Lake Charlevoix Watershed Septic Question Project Committee invited the Milton Township Zoning Administrator, a Milton Township Planning Commissioner, and a Milton Township area Real Estate Agent to attend one of our meetings in 2015. According to their presentation and question & answer period, the ordinance is working well, but they continue to make adjustments as they implement it and see opportunities for improvement in efficiency and water protection. The Real Estate market has not been disrupted.

Here is the **Milton Township interview**:

1. Went into effect about October 16, 2012 – ordinance is working well.
2. The township held many public hearings, and also went to real estate companies. Local brokers were very helpful; we met with the local realtors' organization to openly discuss the ordinance, before it was enacted. This got the Real Estate agencies on board. The health department is in the process of creating pamphlets and information packets for residents.
3. A \$500 civil fine can be assessed in civil court for each day of violation; however, so far, there has been no need to enforce. Realtors make homeowners very aware of ordinance, from the start. The whole intent is to have them inspected, not to enforce fines. The ordinance states that the seller must do the inspection – but in actual practice, it's OK if either the buyer or seller has inspection done. In winter, the realtors, the buyer, and the seller sign off on a letter to the township saying that when the time is appropriate, an inspection will be done (i.e. when frost melts). The Health Department makes recommendations, if needed, in a report, or notes the corrections that have to be made. Out of about 300 inspections, only 2 were actually considered to be failed. About 2 out of 5 were found to have improvement recommendations assigned by the Health Department. The most common recommendation has to do with additions and modifications to a home – if additions or modifications are made, then those must meet the Septic Code of 2007, even if the entire system is much older. This typically results in the Health Department making a recommendation to enlarge the size of the drainfield.

<sup>19</sup> Milton Township Septic Inspection and Property Transfer Ordinance – Annual Report Dec 2013 Through Dec 2014; <http://www.3lakes.net/wp-content/uploads/2009/05/Milton-Township-Ordinance-Annual-Report.pdf> Accessed November 2, 2015.



4. One problem is that the ordinance requires that if there is a private well onsite for drinking water, then that water must be tested for bacteria, nitrates, and other contaminants. However, in the ordinance there are certain exemptions allowed, and if there are exemptions allowed then the well does not have to be tested. So, one improvement would be that if system is exempt, then the well must STILL be inspected. A handful of reports had no recommendations regarding the well, due to a septic system being exempt, but it would be better if the well could still be tested and not be included in septic system exemption.
5. **People buy homes and don't even know they have a septic system as opposed to a municipal system.** So, this makes people aware that they are buying something different. It is beneficial for the buyer to know about modifications or add-on code restrictions, so they can appropriately plan. This informs people as to what to expect in the future. We caught several issues that weren't failures, but still needed many improvements, which were then recommended by the health department.
6. Overall – yes – the ordinance is working to help make people aware of how to properly care for septic systems. Two failures were identified, and many recommendations were made that likely prolonged the life of existing systems, and contributed to the effort of protecting public health.

#### **Advantages of the Time of Transfer Inspection Ordinance**

- ✓ Specific to the local county or township
- ✓ Protects public health
- ✓ Problems discovered are corrected, adding to the longevity of the system
- ✓ Protects ground and surface water quality by addressing nutrient levels and pollution
- ✓ Improved system data collection for the Health Department and local government, and thus for citizens to best manage water quality
- ✓ Addresses concerns of local citizens and lake associations
- ✓ Helps protect local property values

#### **Disadvantages of the Time of Transfer Inspection Ordinance**

- ✓ Increased cost of property transfers
- ✓ Does not capture all of the older systems that need the most attention
- ✓ Requires passing an ordinance
- ✓ Requires setting up a process to implement ordinance, including new staff tasks, paperwork, and management of fees

### **C. Mandatory Pumping Ordinance**

The next option we examined was the Mandatory Pumping Ordinance. The point of Mandatory Pumping ordinances is to prevent septic system failures by making sure everyone pumps them out within a specific time frame and shows proof of doing so. A County or Township Mandatory Pumping requirement is established by ordinance. Some of these require an inspection in addition to pumping, others simply require proof of pumping within specified times. Reliable software programs exist to help a jurisdiction organize and keep track of the process.

However, it is important to keep some basic guidelines in mind when designing these ordinances. We point out two sources for such guidelines: US Environmental Protection Agency (EPA) and Michigan State University Extension (MSUE).

The US EPA notes that four major factors influence how frequently a system should be pumped:

1. The number of people in your household
2. The amount of wastewater generated (based upon # people and amount of water used)
3. The volume of solids in the wastewater (using a garbage disposal increases solids)
4. Septic tank size<sup>20</sup>

**TABLE 1. Years between Pumping**

Estimated Number of Years Between Septic Tank Pumping						
	Number of People in your household					
Tank size (gallons)	1	2	3	4	5	6
500	5.5	2.5	1.5	1	.5	.5
1000	12	5.5	3.5	2.5	2	1.5
1500	18.5	9	5.5	4	3	2.5
2000	25	12	8	5.5	4.5	3.5

**MSUE recommends pumping every 3-5 years and they present the following table as a guideline for when to pump.**<sup>21</sup>

Find a tank size, noted in gallons along the left side of Table 1, on the left. Move across the row to the column for the number of people in a home. Where the row and column intersect, this is the estimated number of years between pumping a septic tank. This is based on average use and no garbage disposal. For example: if there are two people in your household and you have a 1,000-gallon tank, you would need to pump approximately every 5.5 years.

**Fairfax County, VA** is a suburb of Washington, DC. The Potomac River, which is a major tributary of Chesapeake Bay, runs along its eastern border. Its southern border is formed by the Occoquan River. The Individual Sewage Disposal Facilities Code of Fairfax County, VA includes Chapter 68.1, which became effective on August 1, 2003. All individual sewage treatment and disposal systems not requiring a Virginia Pollutant Discharge Elimination System (VPDES) permit are required to have a pump-out of the septic tank a minimum of once every five years. This code is administered by the State Board of Health, the State Health Commissioner, and the State Department of Health. The district or local health departments are responsible for implementing and enforcing the operational activities as required by the code. The County charges \$200 for a Written Evaluation of Existing Individual Sewage Disposal System, according to Chapter 68, section 1-9-1 of the ordinance.

Here is the **Fairfax County** interview:

1. Chapter 68 of the ordinance clarifies the Chesapeake Bay Preservation Act (CBPA). Chapter 68 mandates pumping every 5 years, across the board. The CBPA is not as definitive.
2. We hold seminars with real estate agencies and related companies to educate them, and we also do homeowner association presentations. And we send out reminder notices.
3. We have never taken anybody to court, but we could. The first step is a reminder notice, then a second notice goes out, and by that point, compliance usually happens. We've never had to go further because we have a very high compliance rate. They are debating adding civil penalties to reach 100% compliance, but there is currently a very high compliance rate without civil penalties.

<sup>20</sup> US EPA brochure "A Homeowner's Guide to Septic Systems" EPA-832-B-02-005 revised March 2005, page 6.

<sup>21</sup> Managing Shoreline Property to Protect Water Quality; Michigan State University Extension Home \*A\* Syst Program, 2008 <http://migarden.msu.edu/uploads/files/WQ52.pdf>

4. One drawback I see is that the code doesn't include requiring a licensed inspector for alternative systems – alternative systems don't fit the five-year mandatory pump-out rate. **Alternative systems are becoming more common – 90% of all new systems are alternative** – 900 total alternative systems in Fairfax County. This needs addressed.
5. It gives us the opportunity to get a system repaired before a malfunction occurs. Problems can be assessed and corrected before they become malfunctions. Total malfunctions are frequently prevented when minor problems are identified and fixed during pump-out.
6. Yes – small problems are being fixed before they become big problems.

Named after Benjamin Franklin, **Franklin Township, Adams County, PA** is located about 10 miles east of the Gettysburg Civil War battlefield. This is a rural area of rolling hills and numerous lakes, springs, and streams. Ordinance No. 2006-01 was passed by Franklin Township in 2006. The Township Board assigns an official to review permit applications, issue permits, and conduct investigations and inspections that are necessary to implement the act. The township was divided into three districts, and over the course of three years, each district was assigned a year to have an initial inspection in 2006, 2007, and 2008, respectively.

After the end of 2008, every septic system in each district must have their septic tanks pumped at least once every three years. Receipts from the pumper/hauler must be submitted to the Township within the prescribed three year pumping period. **Removal of septage or other solids from treatment tanks must be performed once every three years, or whenever an inspection program reveals that the septic tank is filled with solids or scum in excess of 1/3 of the liquid depth of the tank.** Fees charged range from \$175-\$250, according to the Township clerk, plus the Township charges a \$5 administration fee.

Here is the **Franklin Township interview:**

1. Working well.
2. No education programs – the Township sends out postcards each year to whichever of the three districts is up for pumping.
3. Postcards sent out each year and the homeowners have until October 31st to pump tanks, as pumping in winter is not recommended. All homeowners have complied although a few have been late. The Township sends out reminder letters if no pumping has occurred by October 31st. Then the Solicitor sends out a letter warning of \$1000.00 fine.
4. No drawbacks.
5. The systems get pumped and problems with systems get fixed.
6. Yes the objectives in the ordinance have been achieved.

**Loudoun County** forms the western border of Fairfax County in Virginia. It is also a suburb of Washington, DC. and home to George Mason University. The Potomac River flows along its northern border and the Shenandoah River flows parallel outside of its western border. In Loudoun County, Ordinance 1066 to regulate septic systems was originally passed in 1994 and focused on construction, permits, and other general characteristics. In 2011, an amendment was made that requires pump-out for maintenance every 5 years. **The pump-out requirement was amended in September of 2015 to allow a sludge and scum accumulation depth measurement, in lieu of pumping, that must be submitted at least every 2 years.**





The reason the County passed these requirements is summed up this way: *“Routine tank pump outs are a critical step in helping to prevent premature failure of a system with resultant repair or replacement costs. Septic tanks are designed to trap solids and scum before they enter the rest of the treatment system where they can cause damage. If the tank is not pumped regularly it could lead to poor system performance, backups, reduced system life, well contamination and premature failure.”*<sup>22</sup>

Great Falls Septic Service is a contractor on the county list of Licensed Pump & Haul Contractors. They also service nearby Fairfax County, noted above. A company representative explained that it is more expensive to dump in Loudoun County, so the fees here range from \$300-\$350.

Here is the **Loudoun County interview**:

1. Generally working well, as it is encouraging people to learn about septic systems and identifies problems in tanks that were otherwise unknown.
2. Mailings – postcards – interviews in local papers.
3. There are criminal sanctions, although nobody has been charged with an offense yet. So far, the vast majority of homeowners have complied.
4. There is a drawback because assigning criminal charges for violators is not realistic or appropriate. The county is working towards creating civil fines for violators instead of criminal sanctions.
5. The required pumping has identified several tanks that needed repairs, and many of these malfunctions have been repaired.
6. Yes. Pump out reports growing rapidly. **A lot of tanks had never been pumped until the pumping amendment went into effect in 2011.**

### **Advantages of the Mandatory Pumping Ordinance**

- ✓ Specific to the local county or township
- ✓ Protects public health
- ✓ Captures older systems that are most critical and maintains newer system
- ✓ Protects ground and surface water quality by addressing nutrient levels and pollution
- ✓ Consistent with Antrim County Master Plan
- ✓ Addresses concerns of local citizens and lake associations
- ✓ Helps protect local property value
- ✓ Reliable software programs exist to organize and keep track of the process

### **Disadvantages of the Mandatory Pumping Ordinance**

- ✓ Increased cost to property owners if they haven't maintained their systems
- ✓ Potential to be arbitrary if not scheduled correctly according to actual use of the property
- ✓ Potential for pumping too often for the best operation of the system
- ✓ Requires passing an ordinance
- ✓ Requires setting up a process to implement ordinance, including new staff tasks, paperwork, and management of fees

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<sup>22</sup> “Frequently Asked Questions,” Loudoun County, VA, <https://www.loudoun.gov/DocumentCenter/Home/View/32277>. Accessed November 30, 2015.

## D. Mandatory Inspection Ordinance

The final policy option is a County or Township Mandatory Inspection requirement, which is established by ordinance. Inspections are regularly conducted or overseen by the Health Department within a specified time period. The homeowner is only required to do whatever is appropriate for their specific system, including pumping recommendations. Repairs are normally required within 60 days, but additional time can be extended with an agreed upon plan to help the homeowner solve the problem. The cost of the program is offset by fees, and reliable software programs exist to help a jurisdiction organize and keep track of the process.



The **Town of Clinton** is situated along the waters of Long Island Sound on the coast of Connecticut. Known as the bluefish capital of the world, its marina and beaches provide a tourism destination. The purpose of the 2010 Onsite Sewage Disposal Maintenance Ordinance is to protect ground and surface water; establish mandatory cleaning and inspection of septic tanks; compile statistical data concerning frequency of pump outs and condition of sewage receiving structures; establish and maintain lists of properly licensed and registered Septic Tank Cleaners and Installers; protect public health; and to educate property owners and septic system users on the purpose, use, and care of septic systems.<sup>23</sup>

Every Septic System must be cleaned and inspected every five years. Cleaning and inspection is done by a licensed Septic Cleaner/Installer, although the Director of Health has the authority to observe the Cleaning and Inspection and to impose more frequent cleaning and inspection if needed. A local contractor, Lussier and Sons, quoted fees of up to \$255 for a 1,000 gallon tank.

Here is the **Town of Clinton interview**:

1. Success. Effective. Carmody software tracking system used. Send out a lot of fines and notices.
2. Homeowner education is not an aspect of the program at this time, but we would like to do that.
3. Requirements are enforced with fines, notices, and court actions.
4. Major drawbacks are that sending out all the notices and fines is very labor-intensive – a lot of notices in mail – people with fines can hold-out. **Also, seasonal folks think they should have longer terms but the terms are the same for all types of homes.**
5. The best part of the ordinance is that new structures are being built with proper permits and procedures.
6. Difficult to track if the program is a success, but we know new structures are compliant, whereas older structures were not.

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<sup>23</sup> # Town of Clinton, CT website, Chapter 438: Sewage Disposal Systems, <http://ecode360.com/12948735>, Accessed February 12, 2016.



The **Dunes City, OR** website greets visitors with this slogan: *Welcome to Dunes City, Where the Dunes Meet Woahink & Siltcoos Lakes*. It is not on the Pacific Coast, but it is very close and serves as a gateway city to the nearby Oregon Dunes National Recreation Area. Dunes City also borders Siltcoos Lake, the largest inland lake on the Oregon coast.

The 2010 Dunes City Ordinance 203 requires inspection every five years. The Initial Inspection includes pumping of the tank, unless it was pumped in the last five years; and mapping of the system including cleanout port, access port, distribution box, and the drainfield. Within five years, a Periodic Inspection is required. This examines the thickness of the scum layer and percent of solids in the tank, the water, pumps, filters, and other important features of the system. If a periodic inspection indicates a fully functioning system, then pumping is not required. Failed systems or systems in violation of code must be repaired or decommissioned after obtaining all permits within 90 days of failure notice. Fees charged by local contractors are normally \$250, and \$50 of that goes to the city to cover administrative costs.

Here is the **Dunes City interview**:

1. For individuals who understand the need for septic regulation, it's working great – they are cooperating and doing what needs to be done. For those individuals who are not interested and who don't see the need, it's an uphill battle. There is an improvement in water quality that has occurred since 2006, but it's not attributed solely to the ordinance – started testing in 1970's – and a dramatic, visible improvement in water quality was noticed in 2006. The first septic ordinance (Ordinance 173) was enacted in 2006, but also a phosphate ban in detergents started in 2006, so it is unclear to what degree the significant improvement is related to this ordinance.
2. Quarterly newsletter is mailed/emailed to all property owners and they always include something on septic education. Also education is part of our Festival of the Lakes and the Emergency Preparedness Expo.
3. The city has authority, under the code, to abate but we've never exercised it. In order to get the order, city officials must travel to Eugene. This is cumbersome, so currently the city is barraging non-compliant property owners with letters. Prior to 2008, letters were very threatening and created a division in community. A change in the makeup of the city council produced letters that were more helpful, not threatening. We suggest approaching this with an attitude of helping homeowners to understand benefits, such as increased property values. For people who couldn't afford to participate, there are USDA rural development funds available for failure not maintenance. So the city went to the state legislature to introduce



funding for maintenance in addition to failures. They created a bill to allow USDA funds to be used for maintenance in addition to failures. The bill is installed right now – but is being considered.

4. The current ordinance (#203) does not take into consideration the different circumstances of each home. For example vacation homes, where homeowners might only visit on holidays are locked into 5-year mandatory frequencies. However, if the inspector says he has to pump, regardless, every 5 years, it might actually be bad for the system to pump too frequently. And it is seen as a waste of money by homeowners. Also, in Oregon, the Department of Environmental Quality (DEQ) is responsible for all septic systems – and DEQ assigned responsibility to the county. So folks in the city say that “it’s not our responsibility” but it is, because all of our drinking water comes from two lakes that are surrounded by homes that have septic systems.
5. The best results are that Dunes City has managed to eliminate 90-100% of cesspool systems – these systems were brought up to modern standards.
6. Yes, for the most part – out of 763 total properties, only 83 are out of compliance, at this time. The city is requiring mapping of all systems and older systems are not mapped. It is very expensive to dig up land, randomly, to try to find where older systems are. They are currently researching historical maps to help homeowners know where their systems are located. Some of the 83 properties are dilapidated and not being used. But progress on finding old maps of the existing outdated systems is helping to find the older systems, which brings the objectives of the ordinance closer to accomplishment.

**New Shoreham, RI** is located on Block Island off the coast of Rhode Island. Block Island is in the Block Island Sound, which lies between Long Island Sound and Rhode Island Sound in the Atlantic Ocean. In 2012, New Shoreham passed a Wastewater Management Ordinance for Onsite Wastewater Treatment Systems. Its purpose is: *“To maintain proper operation, inspection, and routine maintenance to prevent malfunctioning systems. This program provides a framework for efficient inspection, repair and maintenance of septic systems in the town to ensure that homeowners maintain properly functioning systems.”*

New Shoreham is a very popular tourist/resort destination, and this ordinance was the response to them experiencing measurable water quality problems. In turn, the ordinance has had measurable improvement on water quality already, according to staff. At a minimum, inspections occur once every three years, or more frequently as determined by the wastewater management office. Homeowners are notified of due inspections in writing and have 30 days to schedule an inspection. This ordinance also requires a robust public education program, overseen by the Conservation Commission, which includes: proper operation and maintenance; water conservation; operation and management framework; and use of environmentally sensitive cleaning products.

In Rhode Island, cities and towns have authority under state law to establish local management programs to encourage or require septic system maintenance. Most of these programs are created with the assistance of State Bond funds or Federal Nonpoint Source funds distributed through Department of Environmental Management (DEM) grants. The exception is New Shoreham, where a US EPA grant was used. Towns use these funds to develop an onsite wastewater management plan designed to meet local needs. Once approved by DEM, this

plan makes a town eligible to apply to the Community Septic System Loan Program. Money is used by participating towns to provide low-interest loans to homeowners, to cover the costs associated with septic system repairs and upgrades. An inspection every three years usually costs the homeowner \$125, according to the Wastewater Inspector.

Here is the **New Shoreham interview**:

1. Good, very good.
2. University of Rhode Island produces pamphlets which are available in the office. Real Estate brokers also help.
3. If homeowner does not comply, the town has the authority to pump tank. The town pays and the homeowner repays the town. A notice of violation gives up to 30 days, after which a second notice and court action can commence.
4. No drawbacks.
5. Carmody computer software system keeps all maintenance records.
6. Definitely decreasing Nitrogen levels in the pond.

#### **Advantages of the Mandatory Inspection Ordinance**

- ✓ Specific to the local county or township
- ✓ Protects public health
- ✓ Captures older systems that are most critical and maintains newer systems for longevity
- ✓ Protects ground and surface water quality by addressing nutrient levels and pollution
- ✓ Protects the system health and avoids arbitrary pumping schedules
- ✓ Addresses concerns of local citizens and lake associations
- ✓ Helps protect local property values
- ✓ Reliable software programs exist to organize and keep track of the process

#### **Disadvantages of the Mandatory Inspection Ordinance**

- ✓ Increased cost to property owners, if they haven't maintained their systems
- ✓ Requires passing an ordinance
- ✓ Requires setting up a process to implement ordinance, including new staff tasks, paperwork, and management of fees

### **E. Pilot Program, Overlay District, and Septic Maintenance District**

Allow us add a few important points about ways to implement these possible policy options, or some hybrid of the options presented above. First, the committee urges our local government officials to consider the use of a Pilot Program, if appropriate. This allows the community to test an ordinance during a pilot period of time, and then re-evaluate at the end of that time period. It affords an opportunity to implement what looks like an attractive option for a jurisdiction, but allows them an easy way to discontinue it, if it does not prove to be a positive experience. In certain circumstances, this can be quite informative and help a community to settle on a long-term approach.

Next, there are also advantages to considering an incremental approach to septic system oversight. Rather than asking the entire county or township to make changes, decision makers could target the most urgent areas for protection when considering mandatory pumping or

inspection ordinances. For example, using an Overlay District could target properties with septic systems within 1000 feet of an inland lake, stream, or Great Lake. This has the advantage of taking action in specific locations that are most at risk of polluting public waters. It is our hope that everyone with a septic system, who learns about what this report covers, will take action to properly care for the systems on their property. However, an Overlay District targets prevention efforts toward properties that can potentially impact water resources. If future monitoring shows that impacts can also be created from outlying areas, the jurisdiction could consider that evidence and take additional appropriate action.

During the course of this research, the Watershed Council attempted to understand what Michigan state law allows, in terms of creating Septic Maintenance Districts. The Watershed Council authored a report about this in 1990, citing a law that has since been repealed. For this report, we researched a number of laws and interviewed attorneys and scholars at Michigan universities, state agencies, nonprofits, and private firms. We cannot find a current law that authorizes the use of such districts today, but we will continue to research this and all potential policy approaches to address aging septic systems that have potential to pollute wells and water resources.

Finally, there are numerous ways to fund such programs, including grant and low-interest loans available to both municipalities and individuals. We continue to collect information about these options and will create a Fact Sheet later this year to provide information.

## 7. CONCLUSION

Thank you for taking time to review this Report. We hope you found it helpful. If you have any questions or would like to submit comments about this report, please feel free to contact me.

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Tip of the Mitt Watershed Council  
231.347.1181 ext. 118  
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## APPENDIX A

Participants on the Lake Charlevoix Watershed Septic Question Project Committee:

Scott Kendzierski, Co-chair  
**Health Department of Northwest Michigan**

Marlene Golovich  
**Clerk, Hayes Township**

Grenetta Thomassey, PhD, Co-chair  
**Tip of the Mitt Watershed Council**

John W. Campbell  
**Site Plan Development, Inc.**

Joel Evans  
**Charlevoix County Board of Commissioners**

Tom Zipp  
**Northern Michigan Engineering, Inc.**

Marc Seelye  
**Charlevoix County Soil & Erosion**

Tom Darnton  
**Caldwell/Banker/Schmidt Realty**

John Vron dran  
**Supervisor, Eveline Township**

Dan Mishler, Joe Kimmell,  
and Larry Levensgood  
**Lake Charlevoix Association**

Eric Beishlag  
**Planning Commissioner, Eveline Township**

Bill Henne  
**W.A.T.C.H.**

## APPENDIX B

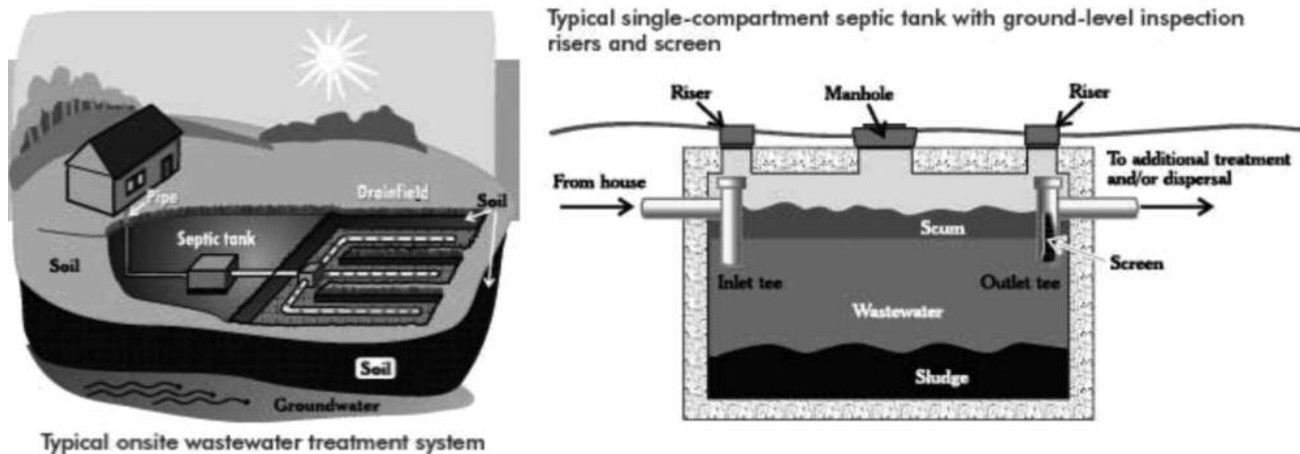
### Septic System Mechanics

As pointed out in US Environmental Protection Agency (EPA) brochures on this topic, most residential septic systems consist of four key parts: a pipe from the home, a septic tank, a drainfield, and the soil. All wastewater from your home exits through a pipe to the septic tank. The tank is usually constructed of concrete or polyethylene.

In the septic tank, the septic discharge settles into three components:

- Sludge, which is solid material that sinks to the bottom of the tank
- A variable middle layer of liquid material, commonly referred to as the effluent
- The upper floating level, comprised mostly of oils and greases, known as the scum layer (See Figure 1)

FIGURE 1 (from US EPA brochure “A Homeowner’s Guide to Septic Systems”)



Usually, compartments and a T-shaped pipe outlet prevent sludge and scum from moving into the drainfield. Screens are recommended to prevent the solids from entering the drainfield as well.<sup>24</sup>

The rest of the system includes the drainfield and soils. Wastewater leaves the septic tank and is discharged into the drainfield soils for additional treatment. Every time new wastewater enters the tank, partially treated wastewater is pushed along into the drainfield for additional treatment. This is where it percolates into the soil, and correct soil is the key to success. Suitable soil is necessary for successful wastewater treatment at this point, which includes removing harmful bacteria, viruses, and nutrients.<sup>25</sup>

When things go wrong in this system, local water resources can suffer. If the drainfield is overloaded with liquid, it will flood. This can cause sewage to flow up to the ground surface, and it can also migrate into surface waters.<sup>26</sup> For lakefront property, this potential migration is not a far trip. Such failures can also create backups in plumbing fixtures in the home. Septic

<sup>24</sup> US EPA brochure “A Homeowner’s Guide to Septic Systems” EPA-832-B-02-005 revised March 2005, page 2.

<sup>25</sup> Ibid., 3.

<sup>26</sup> Ibid.

systems located in areas with poor drainage will not be able to operate as well as systems installed in more appropriate conditions. Improper siting can also affect longevity.

Typical pollutants in household wastewater are nitrogen, phosphorus, and disease-causing bacteria and viruses. If a septic system is working properly, it will effectively remove most of these pollutants.<sup>27</sup> Conversely, when it is not working properly, it will send the wastewater where it does not belong, with the very real potential to contaminate nearby sources of ground or surface water.

Septic systems in houses along the waterfront are often placed in sandy soils with high water tables. With bad placement or faulty construction, this can mean less filtration and, unfortunately, a direct pathway to the lake. When the system leaks, nutrient levels can result in algae blooms, which can be very unpleasant and odorous. Additionally, impacts caused by failing septic systems contribute to the eutrophication of a lake.<sup>28</sup>

### **Shallow Wells and Groundwater**

Michigan has nearly 1.12 million households served by private wells for drinking water, with approximately 15,000 domestic wells drilled each year.<sup>29</sup> On-site septic systems are one potential cause of well and surface water contamination around Lake Charlevoix. According to our local Health Department of Northwest Michigan, in Antrim and Charlevoix Counties the most probable causes of well contamination could include improper well construction (shallow well depth, improper grouting, no confining material, etc.); damage to the well; nearby land uses; industrial contaminants; and failing septic systems.<sup>30</sup>

In most cases in the watershed, the distance between the well and the drainfield exceeds a minimum of 50 feet, which is required by the state of Michigan. And although well depths less than fifty feet can increase the chance of contamination, relatively shallow wells are not necessarily an indicator of risks to drinking water. But depth to groundwater and soils able to protect the water supply have to be considered in the siting process. Old systems in these conditions can be a serious concern.<sup>31</sup>

The EPA notes on its Private Drinking Water Wells website, *"EPA regulates public water systems; it does not have the authority to regulate private drinking water wells. Approximately 15 % of Americans rely on their own private drinking water supplies, and these supplies are not subject to EPA standards, although some state and local governments do set rules to protect users of these wells. Unlike public drinking water systems serving many people, they do not have experts regularly checking the water's source and its quality before it is sent to the tap. These households must take special precautions to ensure the protection and maintenance of their drinking water supplies."*<sup>32</sup>

Michigan has no state law that requires routine inspection, maintenance, or quality monitoring of on-site water wells. Testing is only required when evidence of contamination has been reported. In addition to monitoring drinking water quality, well water testing could be another early indicator of potential septic system problems.

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<sup>27</sup> Ibid., 4-5.

<sup>28</sup> "Eutrophication" means excessive richness of nutrients in a lake, frequently due to runoff from the land, which causes a dense growth of plant life and death of animal life from lack of oxygen. (Oxford dictionary)

<sup>29</sup> Michigan Department of Environmental Quality website, "Drinking Water," [http://www.michigan.gov/MDEQ/0,4561,7-135-3313\\_3675---,00.html](http://www.michigan.gov/MDEQ/0,4561,7-135-3313_3675---,00.html), accessed July 2015.

<sup>30</sup> Health Department of Northwest Michigan, Director Scott Kendzierski, email/phone interview, September 16, 2015

<sup>31</sup> A 2004 USGS study found septic tank leakage contaminated drinking water supplies. Fact sheet 072-03: <http://pubs.usgs.gov/fs/fs07203/>

<sup>32</sup> US EPA website, Private Drinking Water Wells, <http://water.epa.gov/drink/info/well/index.cfm>, accessed July 23, 2015.



## APPENDIX C

### Interview Contact Information

The contact information below identifies the individuals we interviewed for the purposes of this research. They are listed in the order they appear in the report.

#### **Benzie County, Michigan:**

Tom Fountain, R.S.  
Director of Environmental Health  
Benzie-Leelanau District Health Dept.  
Benzie Office: (231) 882-2103

#### **Grand Traverse County for Long Lake Township, Michigan:**

Daniel R. Thorell, M.S., R.S.  
Environmental Sanitarian,  
Environmental Division  
Grand Traverse County Health Depart  
(231) 995-6051

#### **Milton Township, Michigan:**

Chris Weinzapfel  
Zoning Administrator  
Milton Township  
(231) 264-6697

#### **Fairfax County, Virginia:**

Marty Thompson  
Environmental Health Supervisor, Division  
of Environmental Health  
Fairfax County Health Department  
(703) 246-2444

#### **Franklin Township, Adams County, Pennsylvania:**

Susan Plank  
Secretary/Treasurer  
Franklin Township Board of Supervisors  
(717) 334-4901

#### **Loudoun County, Virginia:**

Jerry Franklin  
Environmental Health Services Office  
Loudoun County Health Department  
(571) 258-8229

#### **Clinton, Connecticut:**

Shirley Mickens  
Water Pollution Control Clerk  
The Town of Clinton  
(860) 669-9349

#### **Dunes City, Oregon:**

Jamie Mills  
Acting City Administrator, Councilwoman  
Dunes City  
(541) 997-3338

#### **New Shoreham, Rhode Island**

Don Thimble  
Wastewater Inspector  
Town of New Shoreham  
(401) 466-7737

### Additional information:

Norton Bretz, Dean Branson, Tim Hannert, and Paul Roush, "Characterization of Groundwater Phosphorus in Torch Lake," Rev. 1.0, Three Lakes Association, PO Box 689, Bellaire, MI 49615 and Doug Endicott, Great Lakes Environmental Center, 739 Hastings St., Traverse City, MI 49686 (Jan. 2006).

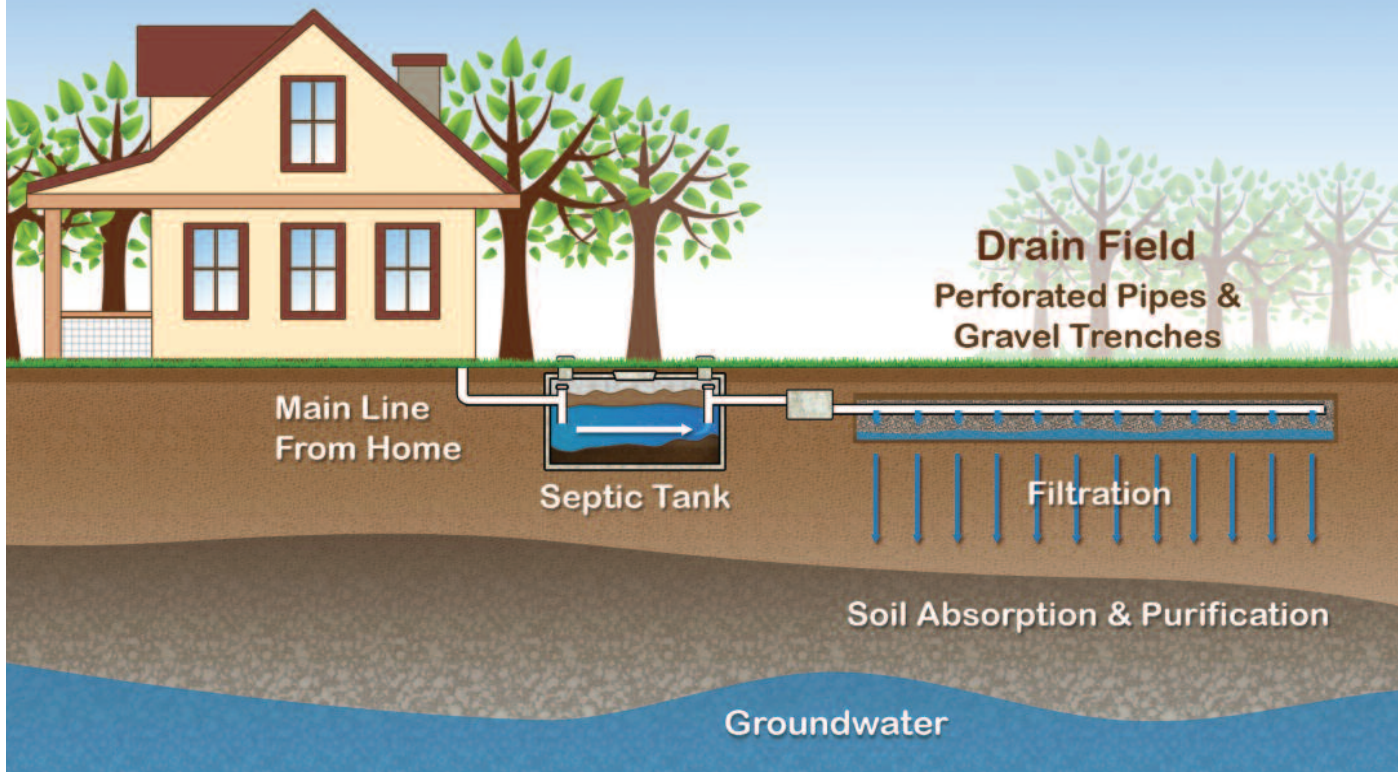
Sarah Conkle, Brianne Lunn, Jocelyn Menestrina, Norton Bretz, and Tim Hannert, "A Shoreline Algal Survey of Torch Lake, Clam Lake and Lake Bellaire," Three Lakes Association, 106 Depot St., P.O. Box 689, Bellaire, MI, 49615 (August 2004).

Elizabeth Homa and Steve Chapra, "Modeling the impact of calcite precipitation on the epilimnion of an ultraoligotrophic, hard-water lake" (Torch Lake), *Ecological Modeling*, Volume 222, Issue 1 (10 January 2011) 76-90.

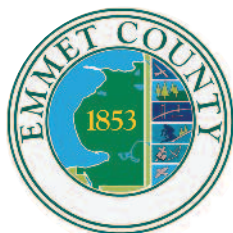
Mary Lusk, Gurpal S. Toor, and Tom Obrez, "Onsite Sewage Treatment and Disposal Systems: Phosphorus," University of Florida IFAS Extension. This document is SL349, one of a series of the Soil and Water Science Department, UF/IFAS Extension. Original publication date July 2011. Reviewed October 2014. <http://edis.ifas.ufl.edu/ss551> .

Marc P. Verhougstraete, Sherry L. Martin, Anthony D. Kendall, David W. Hyndman, and Joan B. Rose, "Linking fecal bacteria in rivers to landscape, geochemical, and hydrologic factors and sources at the basin scale," *Proceedings of the National Academy of Sciences of the United States of America* (June 29, 2015).

# Conventional Septic System



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