Big Sissabagama Lake
Septic Survey: 2017

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Big Sissabagama Lake Septic Survey
On-site septic system inspection of all properties on Big Sissabagama Lake took place to ensure compliance with the Sawyer County Private Sewage System Ordinance and Wisconsin Department of Safety and Professional Services (DSPS) state codes. Domestic wastewater contains nutrients that encourage bacteria and plant growth. Nutrification can be detrimental to the overall health of the lake and surrounding ecosystems, including human health. A properly operating on-site wastewater treatment system filters out these harmful agents. All property owners should be good stewards of the land and must individually and cooperatively assure all septic systems are functioning properly and are code complying.


Sawyer County does not perform septic sewer surveys every year. Surveys require special funding to hire a summer intern to complete the survey. Additionally, lake associations need to be in favor of the survey to be conducted.

Lakeshore property owners must approve, with a majority vote, in order to initiate the lake survey to be conducted. In 2016, the Big Sissabagama Lake Association voted to proceed with the survey. The survey started in early June of 2017, and concluded August of 2017. The starting point for the survey was on the South end of Otter Lane in the Northwestern area of Big Sissabagama Lake. The field work resumed in a clockwise direction around the lake by both the County Sanitarian and the summer student intern together. After the intern was trained on how to properly perform the inspections, he continued to work by himself for the remainder of the project. The County Sanitarian also helped the intern on difficult sites where the system type was unknown and to verify failures, as the intern did not have the required State of Wisconsin credentials. The last few weeks of the survey were used to wrap up the results, to evaluate any inconclusive sites and to finalize the report.

History
Sawyer County began conducting lake septic surveys back in the 1980’s. This fostered a relationship between the county Zoning Department and the community. This provided a means to verify code compliance of septic systems of the properties around lakes in Sawyer County. These surveys also allow college students to enter a real life work environment, earn money and gain hands-on experience in their field of study. Interns chosen for septic surveys have been almost exclusively University of Wisconsin - Stevens Point students pursuing degrees in waste management and/or soils related degrees. These students are well coupled to fit job requirements for the position, providing much needed experience in a degree related field. Students earn college credit for successfully completing the summer project.

Big Sissabagama Lake was last surveyed in 1990. At the time of this survey, there were 28 violation letters sent out and a total of 113 systems were inspected around the lake.

Lake septic surveys are intended to find septic systems that are not properly treating wastewater, which ultimately will impact water quality of nearby lakes and/or cause environmental or health concerns. Historically, a 10-20% failure rate of septic systems in lake surveys is common. Because Big Sissabagama Lake was surveyed 27 years ago, many of the systems were expected to be up to code, but soil testing has changed from a percolation test to looking at soil morphology and other soil properties.

Every parcel along the lake shore would be visited to verify:

1. A septic system on the premises or if the lot is vacant
2. What type of septic system is currently in place
3. Whether or not the system complies with applicable regulations
4. Presence of other health and safety issues (graywater discharge and secure locking devices on the septic tank riser lids)

Initiation of Septic Survey
Sawyer County requires the approval of more than half (51% or more) the lakeshore property owners votes to approve the survey. The Big Sissabagama Lake Association is a very well organized association with many members around the lake. The survey passed with overwhelming favor.

Big Sissabagama Lake was somewhat smaller than most of the previously surveyed lakes. Eric Wellauer, the Sawyer County Sanitarian, was established as the contact for Sawyer County and did most of the field/on-the-job training until sufficient experience was obtained by the intern to conduct evaluations on his own. Additional assistance was also provided by the IT department at Sawyer County and by other county Zoning employees. All systems must be deemed failing by a state licensed person. The intern was able to conclude if a system passed, but was unable to fail systems. The Sawyer County Zoning and Conservation Department employees are licensed and recognized by the Department of Safety and Professional Services under WI Administrative Code to determine whether systems are code compliant.

**Pre-field (Office) Work**

Each property to be inspected had a packet created unique for that parcel, which was comprised of information to assist the inspector. Each packet consisted of multiple pages that included an inspection information sheet, a property listing page, a sanitary permit, land use permit, and/or certified soil test with a plot plan of the property, if available.

The inspection information sheet in the packet included contact information for the owner, site address, a septic related questionnaire, septic system information, and an area to mark the results and comments. The Novus sheet had tax related information that helped distinguish one property from another, including ownership information and site address. The last pages of the packet contained the Sanitary Permit or Certified Soil Test and plot plan of the parcel to be inspected. The sanitary permit is a state issued permit for the installation of a septic system which has information on the type and age of system that is present on the parcel. The back of the permit showed the plot plan which gave detailed overviews on where the components of the system are located with respect to the house, lake, roads, property lines, and/or other features in the area.

**Field Work**
The following steps were taken when inspecting a property, but not every step was taken at each site. Some of these steps were not required, if sufficient information was available within the packet.

1. Identify self as a Sawyer County Intern conducting the lake septic survey

2. Ask applicable questions to be recorded on inspection information sheet, if owner present

3. Request necessary verification of soil absorption component of septic system

4. Confirm location of said components if on permit, or if not ask owner of knowledge pertaining to location of system

5. Observe signs of failure in system (in particular soil absorption components) such as:
   - Ponding of effluent in system by removing vent/observation caps and placing measuring device down pipe
   - Discharging of effluent/sewage to ground surface
   - Verify depth to infiltrative surface in perspective to the ordinary high water mark of the lake to ensure required separation was present, using laser level or contractors level to measure elevations
   - Apply pressure to tank with a “T-Probe” to determine integrity and composition of tank (steel or concrete tanks).
   - Soils were looked at using a bucket auger at some locations to confirm adequate soil separation below system level. This was used in conjunction with soil tests previously conducted on the parcel or neighboring parcels. The NRCS Web Soil Survey was also used to gain a general knowledge of soils in the area before going to properties.

6. Walk around site/house to inspect for “graywater” discharge of domestic household waste (especially from washers and sinks), prominent in low lying areas with holding tanks.

7. Leave card to notify owner of date present on property if not home during the inspection. Additionally, leave a reminder to pump system if overdue for servicing and maintenance requirements

**Types of Private Onsite Waste Water Treatment Systems (POWTS)**
POWTS, or septic systems, have advanced greatly over the years along with treatment of domestic household waste. Some of the types of systems currently being installed under the regulations of the Department of Commerce include privies, holding tanks, conventional gravity systems, conventional lift systems, in-ground pressure distribution systems, at-grade and mounds.

There are two basic types of privies. One is an open pit privy, which is a hole dug in the ground under a privy. An open pit privy requires a soil boring to prove that soils are suitable for waste. The second type of privy is a sealed vault privy. A sealed vault privy requires a minimum storage capacity of a 200-gallon watertight container to hold all waste and must be pumped by a licensed waste hauler. Other types of privies also include portable restroom units and a variety of different composting and incinerating toilets. Privies are for minimal and occasional usage and can be installed when a dwelling does not have pressurized water or plumbing fixtures. If a dwelling has pressurized water or plumbing fixtures, a code complying POWTS system must be installed.

A holding tank is another type of system. A holding tank is a watertight container for the collection and containment of wastewater. The minimum size holding tank for up to a 3-bedroom house is 2,000-gallon tank capacity. When the tank is full, a waste hauler must be contacted to pump and dispose of the effluent either by land-spreading or at a municipal wastewater treatment plant. When soils and/or topography become limiting factors, a holding tank may be the only feasible system. Except for privies and holding tanks, all other systems include a septic tank.

A septic tank is a water treatment device defined by the Department of Commerce as a device which renders inactive or removes microbiological, particulate, inorganic or radioactive contaminates from water which passes through the device or the water supply system downstream of the device.

Downstream of the septic tank is another component of a POWTS, the Soil Absorption System (SAS) or also called a cell. Cells cannot be wider than 6 feet. Most cells are designed to be long and narrow, to utilize a larger soil area for treatment, including the native soil of the sidewalls of each cell. There are several different types of media used for SAS. Some examples are washed and screened rock, washed and screened sand, gravel-less leeching chamber units and other artificial media.

The most common POWTS is a conventional gravity flow system. This system includes a septic tank and a SAS. The SAS is located at a lower elevation than the outlet of the septic tank and the effluent flows via gravity to the cell(s).
A conventional lift system is similar to that of the gravity flow system, but the cells are located at an elevation above the outlet of the septic tank. A separate chamber is required to house a pump to dose the effluent to a high point and then the effluent flows to the cell(s) via gravity. This chamber can be in combination with the septic tank or a separate pump tank.

An “At-grade” pressure distribution system is also a lift system that utilizes the shallowest natural soil possible, which is 36 inches. It includes a septic tank, a pump chamber or pump tank, and a pressurized dosed cell.

If 36 inches of natural suitable soil are not available, washed and screened sand is needed to construct a mound. Mounds require a large area. A mound system also includes a septic tank, pump chamber or pump tank, and a pressurized dosed cell.

Some types of SAS, still present and in use today, once considered acceptable, but are no longer being installed due to state code changes include: drywells, cesspools and conventional septic beds.

Drywells, also called seepage pits, were once commonly installed as a way of treating effluent leaving the septic tank. Drywells were constructed out of concrete blocks, bricks, fieldstones, or rocks and composed in a 4 to 6-foot diameter cylindrical shape and up to 10 feet in height. Most were installed 5 to 15 feet in the ground. Because of this deep construction technique, not only was it dangerous to install drywells, but many were installed in or slightly above ground water resulting in untreated effluent entering the ground water. If a drywell was installed in groundwater, the system would very seldom fail or back up into a house, because the groundwater would flush the system as the water level fluctuates up and down. The untreated effluent would then travel through the ground water to wells and/or to surface waters of lakes, rivers and streams. Present code requires a minimum separation distance of 36” between the bottom of the infiltrative surface of a system and a limiting factor such as groundwater.

Cesspools are defined by Department of Safety and Professional Services -Chapter 381 as an excavation which receives domestic wastewater by means of a drain system without pretreatment of the wastewater and retains the organic matter and solids permitting the liquids to seep from the excavation. Some cesspools were constructed in such a manner that they did not have a cover and were exposed to the ground surface. This type of system does not utilize a septic tank and poses serious health risks. The use of a cesspool as a POWTS is prohibited, including any cesspool existing prior to July 1, 2000.

The life span of a particular POWTS depends on water usage, household habits and other criteria. One way to improve effluent quality is to install an Aerobic Treatment Unit (ATU). An ATU introduces oxygen into the treatment tank to improve effluent quality before
entering the SAS. An ATU can be installed to rejuvenate a failing SAS, and can also allow for downsizing of the installation of a new SAS, if area or soils are a limiting factor. An ATU is also required to be installed in dining establishments and other commercial businesses which have high strength waste. As technology continues to improve, new types of private onsite wastewater treatment components and systems will better protect public health and the waters of the state.

Most conventional (or gravity fed) septic systems can be envisioned as “designed to fail” in a systematic fashion. Bacteria that treat effluent underground, where soil and wastewater meet, form a bio-mat or clogging “slime”. As wastewater is added to the soil with a “slime” layer covering it, the soil interface fails to accept wastewater because there is too much resistance for wastewater to percolate down into the soil profile, causing effluent to flow further downstream in the cell before it can be incorporated into the soil. When soil surrounding the cell is incapable of allowing effluent to pass into the soil, the septic begins to flood and backs up onto the ground or into the septic tank (possibly even into dwelling).

### Failure of Septic Systems

The failure of septic systems is defined and categorized by Chapter 145.245 of Wisconsin Administrative Code. According to this statute:

A “failing private sewage system” means a private sewage system which causes or results in any of the following conditions:

- The discharge of sewage into surface water or groundwater.
- The introduction of sewage into zones of saturation which adversely affects the operation of a private sewage system.
- The discharge of sewage to a drain tile or into zones of bedrock.
- The discharge of sewage to the surface of the ground.
- The failure to accept sewage discharges and backup of sewage into the structure served by the private sewage system.

### 2017 Big Sissabagama Lake Septic Survey Results
In 2017, a total of 209 parcels were visited, with 168 septic systems inspected. Initially, 15 systems failed during the first round of inspections, with some of the inconclusive properties expected to be reconsidered as failures upon the further research and inspection. Many of the inconclusive systems found, will remain as inconclusive, due to insufficient information about system component location and/or lack of soils information. Properties with a failure result were given an order for correction letter and are expected to be compliant within 12 months from the date on the letter. Passing systems were inspected and determined to be code complying and functioning properly. Vacant parcels were initially noted based on tax information, then confirmed onsite.

Steel septic tanks found around the lake were unable to be failed based solely on the fact that they were steel. The Lake Shoreowners Association was adamant about finding and replacing all steel septic tanks. A pamphlet providing information about steel tanks was left with the owner or at the door of the dwelling, encouraging the replacement before a health and/or safety hazard occurs.

The results were determined based on the number of septic systems, rather than the number of parcels. This was due to the fact that some parcels have more than one system, while other parcels had multiple dwellings connecting to one system.

Letters were sent to all owners of septic systems where there was a result of: Inconclusive, Fail, Presence of a steel tank, and/or an Order for Correction.
The numbers in the graph shown below represent observations after the initial inspection of all parcels around the lake.

- **vac** = vacant, no structure on property
- **ofc** = order for Correction- Small problem on site that can be taken care of without replacing system
- **inc** = inconclusive- Was not able to pass or fail system based on findings
- **pass** = system functioning to code
- **fail** = system needs to be brought to code

**Wisconsin Fund**
The Wisconsin Fund Grant Program, established in 1978, is a program that provides financial assistance to property owners with a failing septic system to help protect the public health, safety, and the waters of the state. Most counties in Wisconsin, including Sawyer County, participate in this program. Not every property owner in the county is eligible to receive the grant and filling out the application does not guarantee the homeowner will receive assistance. There are a number of requirements that must be met.

1) Your permanent residence must be in Wisconsin and also in a county participating in the program. The owner(s) must occupy the residence at least 51% of the year.

2) Your system must be considered failing by code.

3) The private sewage system serving your principal residence or small commercial establishment was constructed prior to July 1, 1978.

4) Family income of all owners of the primary residence is less than $45,000 or the gross revenue of the small commercial establishment is less than $362,500.

Failing septic systems are divided into three categories:

**Category 1** failures are those that fail by discharging sewage to the surface water, groundwater, bedrock, or into zones of seasonally saturated soils. These are considered the highest priority.

**Category 2** systems are those that fail by discharging sewage to the surface of the ground.

**Category 3** failures are those that fail by causing the backup of sewage into the residency or business served.

The State of Wisconsin has budgeted approximately $1.5 million dollars annually for the grant program. The homeowners grant is approximately 35% of the system cost, and not to exceed 60% of the total system cost. The maximum grant for a small commercial business is $7,000. Funding received through the Wisconsin Fund Grant are a reimbursement to the homeowner. If eligible and approved, it can take over a year to receive a reimbursement check.

**About the Intern**
Kris Pasewald is heading into his senior year at UW-Stevens Point, where he is majoring in Soil and Land Management. After graduation, he is planning on working with agriculture in southeastern Wisconsin. He spent his summer living at the house of the retired county sanitarian. Kris spent his free time fishing, shooting his bow and spending time with family at their cabin in Ojibwa, WI.

Acknowledgements

Thank you to the Big Sissabagama Lake Shoreland Owners Association for allowing me to survey Big Sissabagama Lake and for funding my summer salary while working for Sawyer County. Finally, thank you to all the members of Sawyer County Zoning and Conservation, IT department and Land Records for helping me get settled into the job, helping me with daily duties and for creating a very comfortable work environment.