

# Chapter 6. Waste Treatment History and Status

## Introduction and Summary

PGOLID has been vigilant in monitoring septic system records for the lakes. In 2004 as part of the original Lake Management Plan, Blue Water Science conducted an Otter Tail County Individual Waste Treatment System record survey for the PGOLID lakes. In 2006, PGOLID conducted a voluntary survey and waste treatment screening project. In addition, over the past 3 years, Otter Tail County has conducted mandatory waste treatment system inspections for systems over 20 years old.

These studies have shown that although the majority of PGOLID individual waste treatment systems are working properly, property owners are not always maintaining them correctly. After the 2006 survey, an educational campaign was launched for PGOLID property owners to try and improve their waste treatment system maintenance.

In 2012, a follow-up Otter Tail County Individual Waste Treatment System record survey was conducted and compared with the 2004 survey. The status of PGOLID waste treatment systems has improved overall since the 2003 records survey. Many of the systems from the 1970s have been updated in the last few years. In 2003, there were 209 systems in the PGOLID lakes that were installed in the 1970s. In 2012, there are 90 systems that were installed in the 1970s, and 290 systems that were installed since 2000.

## Otter Tail County Abatements, 2007-2009

In 2007-2009, Otter Tail County conducted mandatory inspections on individual waste treatment systems that were 20 years old or older. The statistics for these inspections are summarized below (Table 6.1).

Table 6.1. Abatement summary for Pelican Lake, 2007-2009.

Number	Description
23	Illegal cesspools
1	Illegal cesspool in the groundwater table
1	Illegal cesspool with an open end pipe discharging sewage to the ground surface
4	Holding tanks with broken bottoms
1	Holding tank with an apparent illegal outlet installed
1	Illegal wooden crib tank
3	Block tanks
2	Tanks too close to a well
1	Illegal steel tank with the drainfield under the driveway
7	Paved over drainfields or drainfield with no vegetative cover
10	Illegal sink drains
1	Illegal washing machine drain
3	Illegal outhouses
3	Systems not brought into compliance as required by issued site or septic permits
1	Illegal dump station in ground not connected into a septic system
1	Illegal outdoor shower
<b>Totals:</b>	
86	Abatements
329	Properties Inspected
26.1%	Of properties abated

## Waste Treatment Records Survey, 2004

In 2004, Blue Water Science conducted a soil suitability study for waste treatment systems and an Otter Tail County waste treatment system record survey.

### Soil Suitability for On-site Systems

Soil survey data on an aerial base map of the Pelican Lakes area, from Otter Tail County, was used to evaluate the suitability of soils for septic systems. The soil suitability area was evaluated from the shoreline to ¼ mile back from the shoreline. All shoreland soils for Pelican, Little Pelican, Bass, and Fish Lakes were reviewed. The shoreland area encompassed roughly 3,300 acres which represents a 1/4 mile deep band around the Pelican Lakes shoreline.

A total of 71 soil types were found in the 1/4 mile zone around the lake shorelines. Each of the 71 soils and their soil sub-types in the Pelican Lakes area were examined for slope, permeability, and depth of the water table. These factors determine septic system drainfield suitability. The five categories of septic soil limitations created by these parameters are: 1) severe soil with a poor filter, 2) severe soil because of slope or depth of groundwater, 3) moderate soil, 4) slight soil, and 5) sand or gravel pits with little to no soil present.

Moderate soils are able to properly treat septic tank effluent and have few constraints in regard to slope and percolation. Of the 71 present soils in the area, 13 soil types are considered moderate. These soils are shown in yellow areas on the soils map and represent 656 acres or 20% of the 1/4 mile zone.

Severe soils with a poor filter include those soils which are very permeable and filter water too quickly with the potential for inadequate nutrient removal. Of the 71 present soils, 23 soil types are considered severe with a poor filter. These soils are shown in orange areas on the soils map and include 812 acres or 25% of the 1/4 mile zone.

The majority of soils in the area are considered severe with the following constraints which prevent them from being suitable for septic systems: slope, wetness, slow percolation, subsiding, or ponding. Of the 71 present soils, 58 soil types are considered severe. These severe soils are shown in red areas on the soils map and include 1,786 acres or 55% of the 1/4 mile zone.

The final type of soil with minimal presence in the Pelican Lakes area is considered slight. This type only comprises 2 of the 71 soils. (Note: for each soil series, there may be more than one soil type which accounts for the totals of each type of septic suitability to be greater than the 71 total soils).

All other areas shown on the soils map are considered sand or gravel pits and represent a small acreage. A summary of soil limitations is shown in Table 6.2 and a map of septic drainfield soil suitability is shown in Figure 6.1.

Table 6.2. Summary of the acres associated with various types of soil limitations for septic tank system drainfields (source: Otter Tail County Soil Survey)

	Red "Severe limitation" based on distance to groundwater		Orange "Severe limitation" based on being a poor filter		Yellow "Moderate limitation" few constraints		Other Sand or gravel pits		<b>Total Acres</b>
	Acres	%	Acres	%	Acres	%	Acres	%	
Pelican	1,052	52%	726	36%	248	12%	11	1%	<b>2037</b>
Little Pelican	459	74%	64	10%	95	15%	1	0%	<b>619</b>
Bass	47	40%	22	19%	48	41%	1	1%	<b>118</b>
Fish	228	51%	0	0%	265	48%	6	1%	<b>499</b>
<b>Total</b>	<b>1,786</b>	<b>55%</b>	<b>812</b>	<b>25%</b>	<b>656</b>	<b>20%</b>	<b>19</b>	<b>0.5%</b>	<b>3273</b>

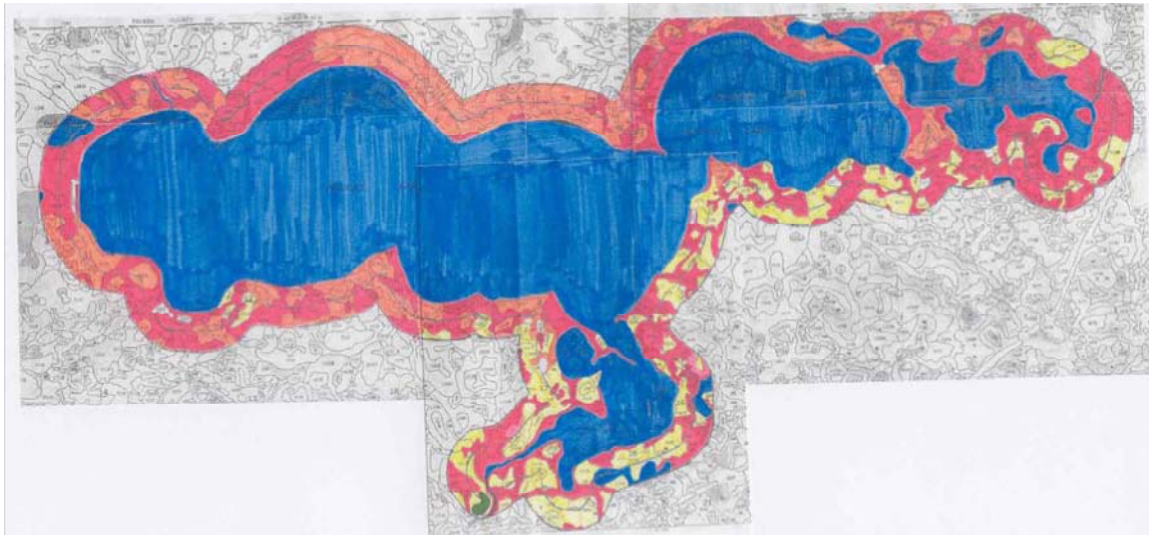


Figure 6.1 Septic tank drainfield soil suitability map for soils around the Pelican Lakes (source of soils data: Otter Tail County Soil Survey. Soil suitability map produced by Blue Water Science). Red = severe limitations; orange = severe limitations; yellow = moderate limitations. Blue represents the lake area.

### On-site Waste Treatment System Record Review

In July of 2003, a group of interns from Blue Water Science and one intern from the Pelican River Watershed District went to the Otter Tail County Courthouse in Fergus Falls, MN to locate and examine all property files for property owners on Pelican Lake, Little Pelican Lake, Fish Lake, and Bass Lake. Approximately 1,000 files were reviewed for the following parameters:

- property identification number
- name of property owner/s
- legal description including section number, township name and number, and range
- year of installation of onsite wastewater treatment system
- property parcel number
- lake address or addition of the property
- lot size in square feet
- impervious surface size in square feet
- lake frontage in feet
- system type

- tank size
- drainfield size
- tank and drainfield setback from the lake front
- tank and drainfield depth to groundwater
- percolation test
- tank and drainfield distance from a well on the property

These data were then transferred into spreadsheet format where they were evaluated, and averaged for several of the parameters. These results give some insight about the state of the Pelican Lakes area with regards to its current onsite wastewater treatment conditions (Figure 6.2).

Table 6.3. Summary of septic tank and holding tanks recorded for the Pelican Lakes, based on Otter Tail County records in 2003.

	Septic Tanks		Holding Tanks		Other		Total
	number	percent	number	percent	number	percent	
Pelican	598	72%	236	28%	0	0%	<b>834</b>
Little Pelican	26	66%	12	31%	1	3%	<b>39</b>
Bass	10	100%	0	0%	0	0%	<b>10</b>
Fish	27	39%	41	59%	1	2%	<b>69</b>
<b>Total</b>	<b>661</b>	<b>69%</b>	<b>289</b>	<b>30%</b>	<b>2</b>	<b>--</b>	<b>952</b>

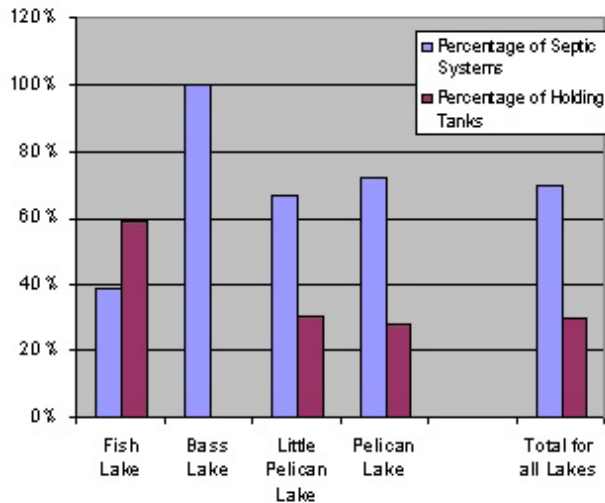


Figure 6.2 Percentage of septic tanks and holding tanks for each lake.

To see individual statistics, please refer to the 2004 PGOLID Lake Management Plan. The 2004 results are summarized below.

**Year of septic system installation.**

- Nearly all of the on-site wastewater treatment systems around the Pelican Lakes are 35 years old or newer.
- The majority of the systems are from 1981 or more recent.
- A well maintained on-site wastewater treatment system has a life expectancy of 30 to 50 years.

**Drainfield setbacks from the lake**

- The minimum set back of a septic tank drainfield is 50 feet from the lake.
- Records show that 99% of the drainfields are at least 50 feet from the lake.

### **Distance of Drainfield to groundwater table**

- The minimum separation of the bottom of the septic tank drainfield from the groundwater table is 3 feet.
- County records indicate that all existing drainfields have at least a 3-foot separation.

### **Conclusions**

- County records indicate that the septic tank/drainfield systems are in good shape and should function properly if maintained.
- The existing onsite wastewater treatment systems do not appear to be adversely impacting the water quality of the Pelican Lakes.
- However, there are a high number of holding tanks (30% of the onsite systems) in the shoreland area. In the future offsite treatment employing cluster systems or centralized sewers could be considered.

## **Waste Treatment Screening Special Project, 2006**

The current status of the septic systems on the Pelican Group of Lakes is unknown. In order to acquire a better understanding of the status of septic systems within the improvement district, PGOLID approved funding of a special project in 2006. Funding was approved for the screening of 150 properties. Jordan Ornquist, PGOLID Lake Resource Coordinator at that time, designed, implemented and managed the project.

A letter requesting voluntary participation was sent to all lakeshore property owners within the improvement district in June of 2006. Nearly 300 property owners responded, requesting that they be considered for the special project. 152 sites were chosen, based upon the project's goals and available funding, and property owners were notified in July. Twenty-five percent of the volunteered sites were chosen from the oldest holding tanks, 50% were chosen from the oldest septic tanks with drain fields, and 25% were chosen by a random selection of newer (10 years or less) septic tanks with drain fields.

As stated within the design of the program, each participant was given a unique ID number in order to keep personal identities and property information strictly confidential. Access to such information was limited to RMB Environmental Laboratories, Jordan Ornquist and A1 Septic. PGOLID Board members were excluded from access to the confidential property information. As initially designed, PGOLID was to receive the facts and findings of the project.

A1 Septic, a Minnesota state-certified and licensed septic inspection company, was awarded the service contract to complete the septic compliance screening. On-site screening began in August and was completed on November 28<sup>th</sup>. Results were tallied and statistical analysis was completed to identify the current status of the district's septic systems that were surveyed and their effects on Pelican, Little Pelican, Fish, and Bass lakes.

It must be stated that the inspections completed by A1 Septic were for screening purposes alone, and must not be construed as being a complete certified inspection. The septic system screenings included, but were not limited to: tank inspection and probing, soil boring (when applicable), drainfield inspection (yard seepage and drainfield ponding), proper sizing, and potential impact to the water table. General information surveys were submitted by the participants and were used to identify usage and maintenance practices.

Thorough and accurately balanced studies such as this one will begin to assist PGOLID in understanding the potential impact on the Improvement District's water resources and assist the district in making better decisions to preserve the quality of its lakes and rivers.

**Summary**

In this study, 137 holding tanks and septic systems were inspected out of approximately 1,000 waste treatment systems in the Pelican Group of Lakes Improvement District. These inspections were voluntary and were for screening purposes alone, and must not be interpreted as being a complete certified inspection. Thirty-one (23%) holding tanks and septic systems were found to be Potentially Incompliant and 21 (15%) were potentially impacting the Pelican Group of Lakes water quality. While most of the systems were not potentially impacting water quality, over half were improperly maintained. When your septic system is properly designed, installed, operated and maintained it will provide economical and effective sewage treatment. If you properly treat sewage today, future generations will not incur the costs of cleaning up the health or environmental problems that may have otherwise been created. Please see the PGOLID website ([www.pgolid.org](http://www.pgolid.org)) for worksheets for properly maintaining your septic system or holding tank.

The overall Facts and Findings of the study are summarized in the following tables.

<b>Number of systems chosen for this study</b>	<b>152</b>
<b>Number of systems inspected</b>	<b>137</b>
<b>Number of systems not found</b>	<b>15</b>
<b>Number of systems replaced since last county inspection</b>	<b>6</b>
<b>Number of systems never pumped/cleaned</b>	<b>5</b>

**Survey Participants**

<b>Resident Status</b>	
11%	Year-round
59%	Seasonal
30%	Weekend

<b>System Types</b>			
<b>Qty</b>	<b>% of Total</b>		
40	29	%	Holding Tanks from 1972-1997
65	48	%	Septic Systems from 1971-1986
32	23	%	Septic Systems from 1992-2006

<b>Estimated Total Systems</b>			
	<b>Qty</b>	<b>% of Total</b>	
Potentially Incompliant	31	23	%
Potentially Impacting Pelican Waters	21	15	%

Insufficient Maintenance	100	73	%
Good Condition	38	26	%

Some systems had more than one reason for noncompliance and/or insufficient maintenance and are listed separately under these statistics, which is why they do not add up to 100%.

Estimated Holding Tanks			
	Qty	% of Total	
Potentially Incompliant	7	18	%
Potentially Impacting Pelican Waters	3	8	%
Insufficient Maintenance	28	70	%
Good Condition	13	33	%

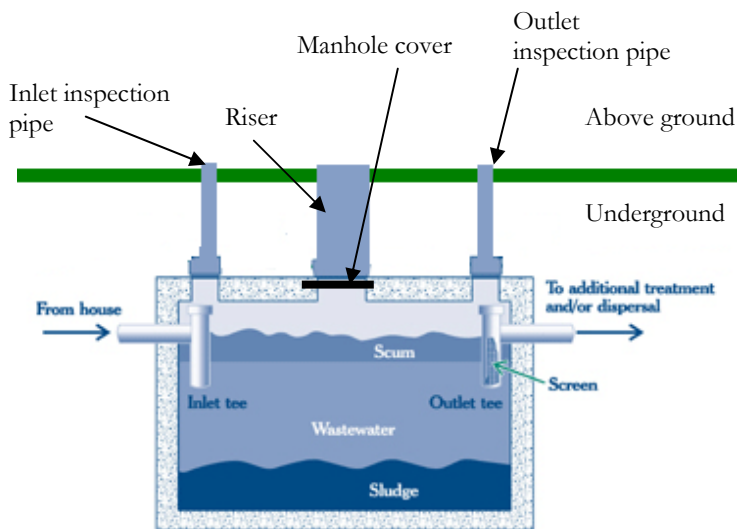
Some tanks had more than one reason for noncompliance and/or insufficient maintenance and are listed separately under these statistics, which is why they do not add up to 100%.

Estimated Septic Systems <1986			
	Qty	% of Total	
Potentially Incompliant	19	29	%
Potentially Impacting Pelican Waters	14	22	%
Insufficient Maintenance	55	85	%
Good Condition	10	15	%

Some systems had more than one reason for noncompliance and/or insufficient maintenance and are listed separately under these statistics, which is why they do not add up to 100%.

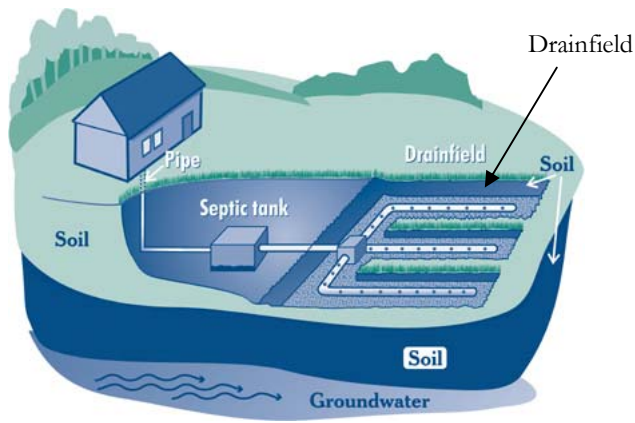
Estimated Septic Systems >1992			
	Qty	% of Total	
Potentially Incompliant	5	16	%
Potentially Impacting Pelican Waters	4	13	%
Insufficient Maintenance	17	53	%
Good Condition	15	41	%

Some systems had more than one reason for noncompliance and/or insufficient maintenance and are listed separately under these statistics, which is why they do not add up to 100%.



### Septic and Holding Tank Best Management Practices

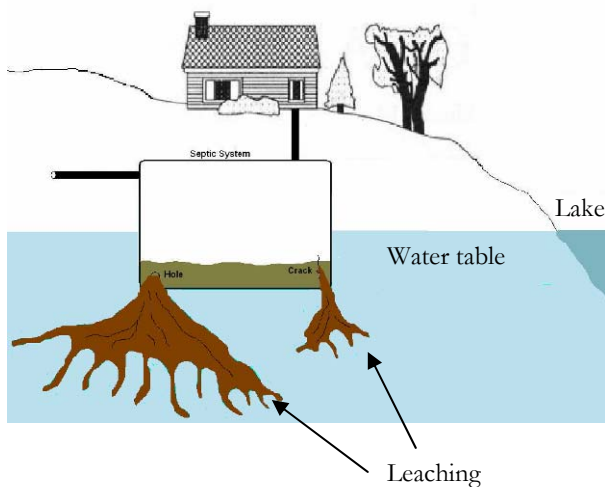
- Make sure the riser is exposed so the tank can be inspected and pumped properly through the manhole
- Make sure your tank has an alarm to warn you when it is so full that it could cause backup
- Pump your holding tank every few weeks and your septic tank every few years
- Be conservative with your water usage



### Septic System Drainfield Best Management Practices

(not applicable to holding tank)

- Make sure you have a drainfield that is not clogged and filtering correctly
- Do not irrigate your drainfield
- Do not drive on your drainfield or compact the soil, decreasing its filtering ability
- Make sure your drainfield is set back from the lake at least 50 feet
- Make sure no chemicals are killing the bacteria that recycle your waste in the drainfield (pesticides, bleaches, ammonias, paint, fuels and herbicides)



### Lake Proximity Best Management Practices

- Make sure your septic or holding tank is set back at least 50 feet from the lake
- Regularly have your tank inspected for cracks or leaks that could be leaching sewage into the lake
- Make sure your tank is properly sized for your house



# PGOLID On-site Waste Treatment System Status 2012

## Introduction and History

The Pelican Group of Lakes Improvement District (PGOLID) has been vigilant in monitoring septic system records for the lakes. In 2003, as part of the original Lake Management Plan, Blue Water Science conducted an Otter Tail County Individual Waste Treatment System record survey for the PGOLID lakes. In 2006, PGOLID conducted a voluntary survey and waste treatment screening project. In addition, in 2007-2009, Otter Tail County conducted mandatory waste treatment system inspections for systems over 20 years old.

These studies showed that although the majority of PGOLID individual waste treatment systems are working properly, property owners are not always maintaining them correctly. After the 2006 survey, an educational campaign was launched for PGOLID property owners to try and improve their waste treatment system maintenance.

In the summer of 2012, the PGOLID Water Resource Coordinator went to the Otter Tail County Land and Resource Department in Fergus Falls, MN to re-examine the property files for PGOLID residents. These files were reviewed for the following parameters:

- Property identification number
- Name of property owner(s)
- Address of property
- System type (septic system or holding tank)
- Year of last inspection

The 2012 data was then compared to the 2003 data to see if there have been improvements in the overall status of the septic systems in PGOLID in the past 10 years.

## Summary

### System Type

A septic system treats waste in a drainfield, while a holding tank just holds the waste until it is pumped out. Septic systems are a very good way to treat waste when properly maintained. Holding tanks are common in areas where there is not sufficient surface area or distance from the water table to install a drainfield.

In 2012, 68% of PGOLID waste treatment systems were septic systems, while 31% were holding tanks (Figure 6.3, Table 6.4). In 2003, 69% of waste treatment systems were septic systems and 30% were holding tanks (Table 6.4). Therefore, the type of systems in PGOLID have not changed much over the last 10 years. This can be expected since the areas that have holding tanks will never be suitable for a septic system and drainfield.

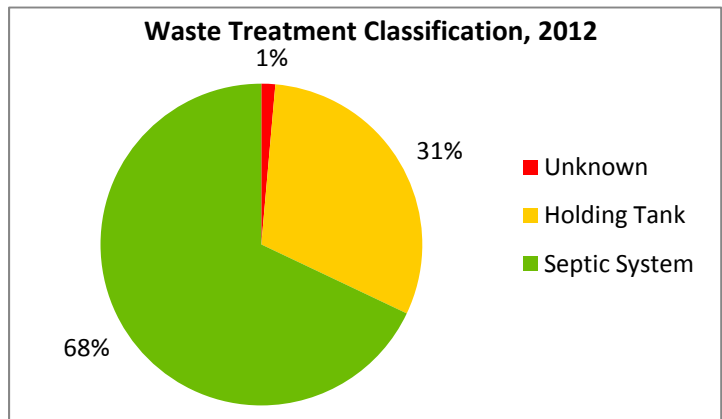


Figure 6.3. Waste treatment systems in PGOLID, 2012.

Table 6.4. Comparison of system types between 2003 and 2012 surveys.

	<b>2003 Count</b>	<b>2003 Percent</b>	<b>2012 Count</b>	<b>2012 Percent</b>
Septic Systems	661	69%	738	68%
Holding Tanks	289	30%	333	31%
Other	2	1%	15	1%

Each lake varies in the number of septic systems versus holding tanks (Figure 6.4). Bass Lake has only septic systems. Fish Lake has the highest percentage of holding tanks, while Pelican Lake has the highest number of holding tanks.

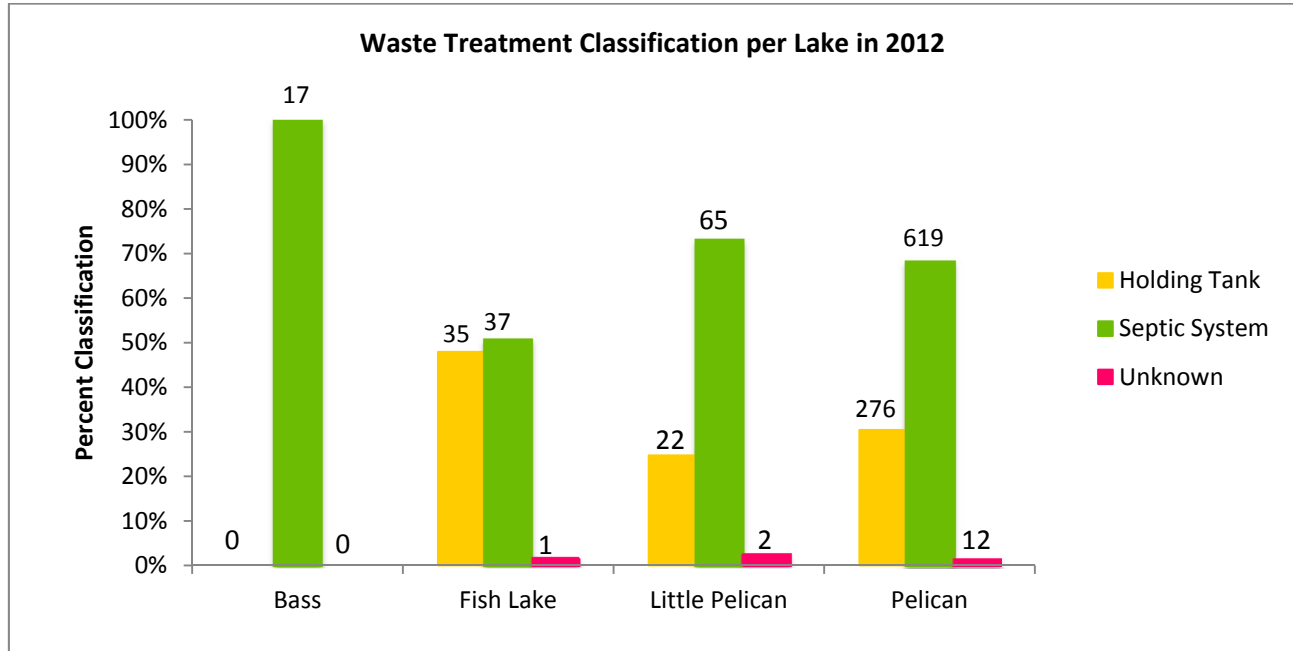


Figure 6.4. Waste treatment classification per lake in 2012.

### System Age

Septic systems can last 30 years or more when properly maintained. For all the lakes, the majority of the systems are newer than 30 years old (Table 6.5, Figure 5). All of Bass Lake's systems are newer than 1991, which is most likely because development on Bass Lake has occurred since then (Figure 6.5).

Most of the systems in Pelican Lake are older than 20 years (62%) (Table 6.6). This is most likely because the development on Pelican Lake occurred more than 20 years ago, and many properties have stayed within families and not been sold.

Table 6.5. Waste treatment systems in PGOLID lakes that are over 30 years old.

<b>Lake</b>	<b>% systems less than 30 yrs old</b>	<b>% systems over 30 yrs old</b>
Pelican	92%	8%
Little Pelican	91%	9%
Bass	100%	0%
Fish	93%	7%

Table 6.6. Waste treatment systems in PGOLID lakes that are over 20 years old.

Lake	% systems less than 20 yrs old	% systems over 20 yrs old
Pelican	38%	62%
Little Pelican	72%	28%
Bass	100%	0%
Fish	51%	49%

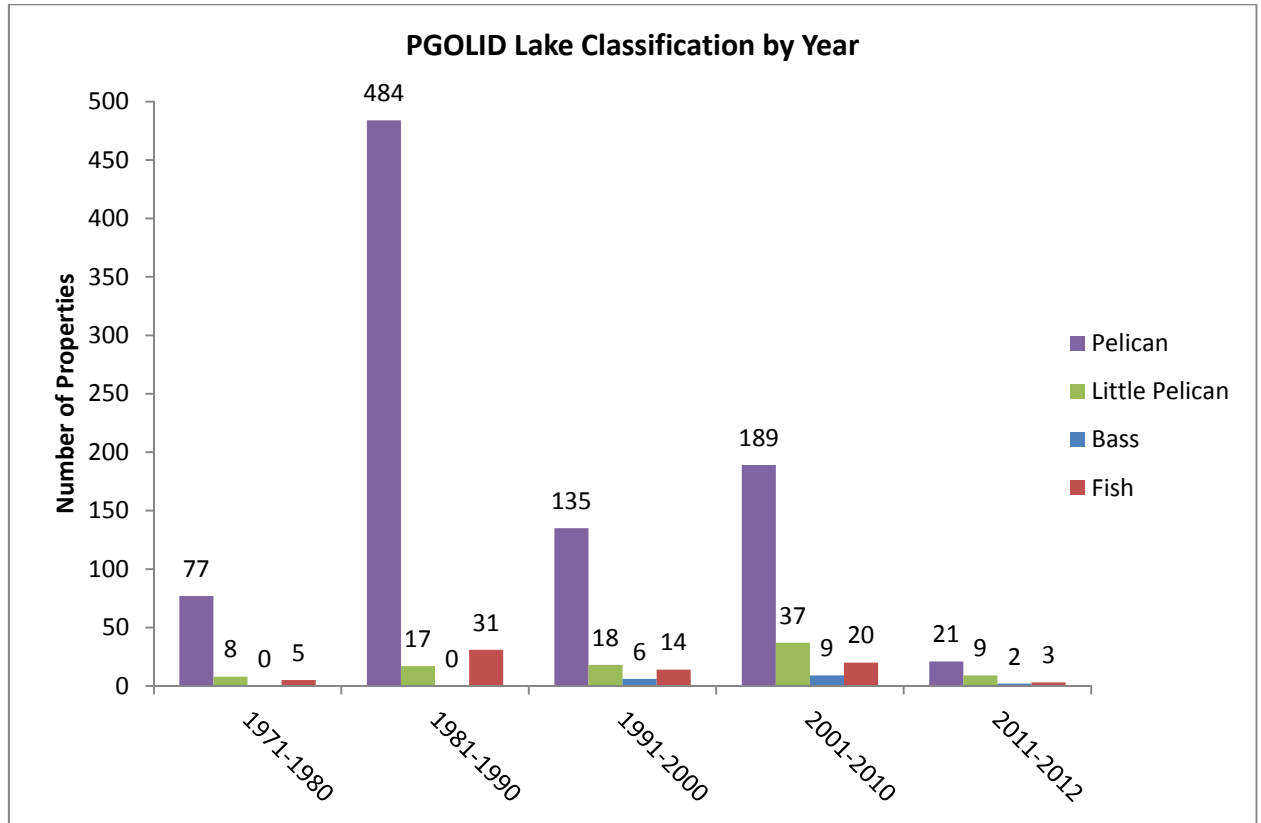


Figure 6.5. PGOLID waste treatment system ages.

### Next Steps

Even though a septic system can last 30 years, most people do not properly maintain them, which decreases the life expectancy of the system. A properly maintained septic system should be pumped at least every three years, and a holding tank should be pumped whenever it is full (numerous times per year). If property owners are not pumping their systems, then the waste could be leaching into the ground. In addition, septic system drainfields need to be kept clear and porous to be able to treat the waste. When drainfields are driven over and built upon, they cannot work properly anymore.

PGOLID next sent a letter to everyone with systems older than 20 years (622 property owners) informing them of their system’s age, and recommending they conduct an inspection.