

DECENTRALIZED WASTEWATER TREATMENT – PLANNING, ALTERNATIVES, MANAGEMENT

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Abstract. Decentralized on-site wastewater treatment technologies are widely used throughout Georgia today. Whether or not they are part of tomorrow's solution is widely debated. This paper presents the existing situation and options and tools for the future.

Saying "all" or "none" and "good" or "bad" do not address the complexities facing a range of communities in Georgia today. Some are highly developed, some rapidly developing, some on the verge of development, some rural and slowly growing. All have at least some on-site wastewater treatment. Some on-site systems have worked well for decades; some are failing causing difficulties and expenses for individuals and communities. Policy, planning, and technical tools available will be discussed.

The relationship between population density and septic system use was evaluated as part of the Metropolitan North Georgia Water Planning District Long-Term Wastewater Management Plan. This paper presents this relationship and specific examples of how communities are transitioning. In addition, installation, maintenance, and management recommendations will be reviewed.

Many communities face development opportunities prior to wastewater infrastructure being in place. Management options for these communities are discussed and real-world scenarios are presented. Policies such as restricted development, dry sewers, private systems, and community systems are evaluated.

INTRODUCTION

Septic systems serve nearly 40% of households in the state of Georgia; however, in many urban areas, where wastewater collection and treatment facilities are well established, septic systems are used by less than 20% of households. In less developed areas

without extensive wastewater collection and treatment systems, many or most households have privately owned on-site septic systems. Some highly developed areas have significant numbers of septic systems, and some communities have made policy decisions to limit the sewered area, despite growth. In other communities, the growth rate has simply exceeded the ability to design and construct wastewater infrastructure. The biggest problem is what to do when septic systems fail and how to pay for major transitions from septic systems to public sewer.

Septic systems impact streams, wastewater treatment plants and consumptive use. Many streams and lakes throughout the state do not fully support their designated use, and non-point source pollution is identified as a major cause of water quality impairment. Contamination by fecal coliform bacteria is a principal cause of failure to support designated uses. Failing septic systems have been identified as one possible source of fecal coliform contamination.

The use or non-use of septic tanks can impact wastewater treatment plants by changing the capacity needs, by placing additional waste loads due to septage pumping, and by increasing conveyance



Photo1. Septage handler discharges at WWTP.

systems. These impacts include both capital and operating costs. Septic systems are also a consumptive use of water according to the tri-state water compact negotiations.

The EPA published draft Guidelines for Management of Onsite/Decentralized Wastewater Systems in September 2000. That document presents five model programs to manage septic systems. The models offer varying degrees of private-public ownership, and increased levels of inspection/maintenance and record keeping requirements. Each of these models solves some problems, but additional issues such as understanding, access, and cost must still be addressed. As development becomes more dense and sewer systems grow to areas previously developed at lower density; continued use of septic tanks will pose increasing challenges for emerging communities.

IMPACT OF SEWER POLICY DECISIONS ON TRANSITION ISSUES

In densely developed areas that are almost completely served by wastewater collection and treatment facilities, use of septic tanks will continue to decrease. New development and redevelopment will be connected to the wastewater system without new policies or encouragement. Isolated existing areas of septic tank usage will either remain with little negative impact or connect to a nearby sewer if failing septic systems and/or water quality problems should arise. In less developed areas with less extensive wastewater collection and treatment systems, there are more transition issues. Below are some policy considerations which can seriously impact the make-up of our communities:

- **Maintaining the Status Quo Use of Septic Tanks.** In the near term, wastewater collection and treatment facilities may not be available in areas where development is occurring or might occur. The status quo for these areas is to be developed with septic tanks. If it becomes necessary to connect these areas to sewers in the future, disruption and added costs (\$5,000 to \$25,000 per house) will be encountered.

- **Restricting Development to Sewered Areas Only.** One possibility is to restrict new development to areas where sewers are available. This option is likely to experience great resistance and possible legal battles regarding the right to use one's land to the highest and best use. However, it is important to

acknowledge that permitting development in a non-sewered area is a wastewater management division.

- **Identifying New Funding Sources to Expedite Sewer Construction.** State grants and low cost loans, formation of Community Improvement Districts, use of impact fees to shift the costs to the future ultimate user and/or use of SPLOST funds are among the possibilities to be considered. If a suitable funding mechanism(s) can be identified that will provide collection and treatment facilities quickly, the greater longer term cost of retrofitting can be avoided.

- **Developing Policies for Dry Sewers.** Policies could be developed to encourage/require developers to install dry sewers for new development where sewer is not currently available, but is expected to be available in the near future. Septic tanks would be located for easy future connection to the sewer with minimal disruption to the property, landscaping and community. The local wastewater utility would need to have a master plan for future sewer locations and specific requirements for areas subject to the dry sewer requirement.

- **Developing Policies for Community Wastewater Systems.** In this scenario, policies would be developed to encourage/require developers to install sewers for new development connected to a community-based (decentralized) wastewater treatment system. In this way, individual septic systems are never installed and individual homes never experience a transition between septic systems and wastewater collection systems. Standards for level of treatment, type of equipment, etc. would need to be developed for these community-based decentralized systems. Issues of ownership, operations and maintenance would also need to be established. The treatment system could be a land application system or could provide opportunities for urban (non-potable) reuse. The treatment system might discharge to a local stream or river, requiring a surface water discharge permit. This may require a change in permitting philosophy at EPD and with stakeholders. In the future, when larger wastewater collection and treatment facilities are available, the community-based systems can connect without disruption and costs to individual homeowners.

What all of these considerations have in common is that in order to function satisfactorily, they require vision and a long term commitment. Allowing development in unsewered areas IS a wastewater management decision. Both septic systems and public sewer systems (wastewater treatment plants) represent responsible ways of dealing with our waste

waters and protecting the environment, given appropriate circumstances. Basically, the decision must be based not only on a combination of soil types, topography and ultimate population density, but also on a future vision of our communities. No

other single policy decision so drastically affects the overall nature of our development patterns, controls the look of our countryside, or influences the ultimate cost of our infrastructure.

EXAMPLES OF TRANSITIONS

Based on available data in the 16-county metropolitan Atlanta area, the relationship between population density and percent of septic tank usage was plotted and a best-fit curve determined. Figure 1 illustrates the strong correlation between density and septic tank usage. Highly developed areas, such as DeKalb County and the central portion of Fulton County have a high density and low septic use. On the other hand, Paulding County and Forsyth County have low density and the highest percentage of septic use. Portions of Gwinnett County, which are becoming more densely developed, have a higher percentage of septic system use than would be expected due to the use of septic systems in the 1980's growth period in advance of adequate wastewater infrastructure.

Gwinnett County is an example of a community in major transition from septic system use to public sewers, as shown in Figure 2. This transition involves constructing sewers in developed areas and disconnecting houses from the septic system and connecting them to public sewers. This process is both costly and disruptive. It involves actions by the public utility (constructing the public sewers) and the homeowner (re-plumbing from septic to sewer on private property). Gwinnett County has enacted a Sewer Petition Policy to guide this transition. This policy describes the criteria, procedures, participation and cost sharing for transitioning from septic systems to public sewer.

In less dense, but growing areas, communities have the opportunity to be proactive in developing a local wastewater management plan and avoiding some of the cost and disruption of transition issues. The "no action" status quo option is shown by the dashed line in Figure 3. In this scenario, growth occurs faster than public sewer is available. A more proactive approach is shown as the solid line in Figure 3.

The policy decisions discussed above (which either favor or disfavor new septic tanks over wastewater treatment plants) will determine how each community transverses this chart, and at what cost to be incurred by what party now and later.

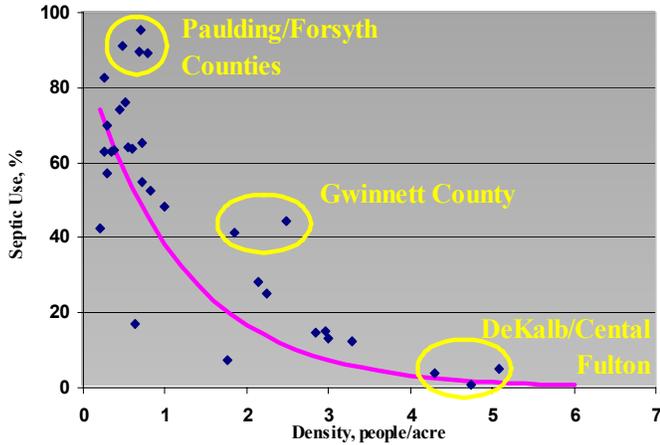


Figure 1. Correlation between density and septic use.

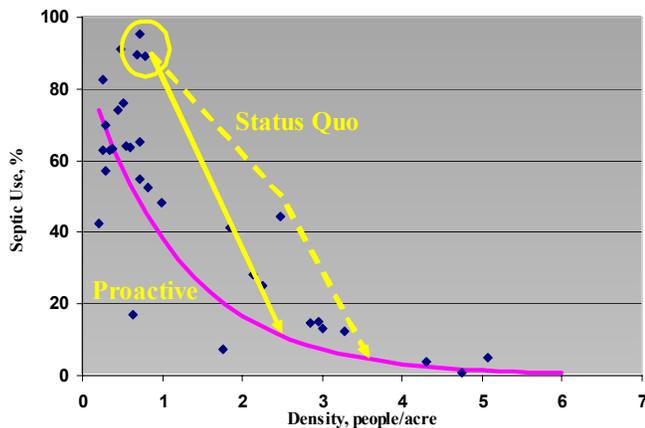


Figure 3. Options for growing communities.

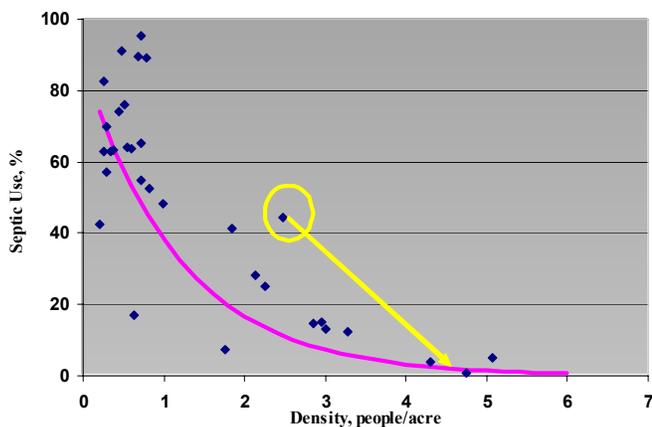


Figure 2. Gwinnett County transition from septic to sewer.



Photo1. Septage handler discharges at WWTP.

MNGWPD RECOMMENDATIONS

The Metropolitan North Georgia Water Planning District (MNGWPD) prepared a Long-term Wastewater Management Plan (WW Plan) in 2003. The WW Plan included the following recommendations associated with septic and decentralized systems within the District:

1. Improve siting, design and construction. Local governments or the County Boards of Health within the District need to establish additional septic system design requirements to improve the design, siting, permitting and construction of new septic systems, offer a proactive way to avoid future problems, and ease transitions where necessary. Key recommendations include:

- Establishing minimum lot sizes of not less than ½ acre.
- Sizing residential septic tanks as if the home included a garbage disposal (i.e. 50% increase in capacity).
- Providing stricter reviews of septic systems designs and siting.
 - Increasing inspection during construction.

2. Improve maintenance requirements. Currently, the septic system owner is responsible for proper operation and maintenance. Most owners are not aware of the limited guidance from DHR and do not even think about their septic system unless, or until, a major failure has occurred. The District recommends that the County Boards of Health establish a requirement for system owners to pump out septic tanks every five years. In addition, it is recommended that septage haulers submit copies of their hauling manifests to the County Boards of

Health for tracking of pumping compliance and proper septage disposal.

3. Manage septic systems. Currently, there is no formal management program in place within the District for septic systems after initial installation. The purpose of establishing a management program for septic systems is to prescribe a proactive management program that will raise the level of performance and reduce risk to public health and environmental harm caused by failing or failed systems. Key recommendations include:

- Create a septic system database. Establish computerized databases of septic system locations, repairs, and required maintenance actions.
- Continue septic system management under DHR with EPD support. Management should continue to be performed by the DHR, but EPD should become more involved in providing technical assistance since EPD is the agency with responsibility for water quality.
- Include septic system area planning in local wastewater management plans. Local governments, with the involvement of DHR staff, should develop wastewater management plans to identify areas for long-term septic system use, as well as those areas where public sewer service will eventually be available.

4. Manage decentralized wastewater treatment systems. In lieu of septic systems, decentralized wastewater treatment systems may be used. Some jurisdictions already prohibit private wastewater systems; some allow them in limited situations, while still others view private systems as building blocks that can be installed without public financing. Local policy should address how to deal with existing and future decentralized systems and how they will be integrated into the long-term plan.

5. Establish policies concerning connection to public sewers. Establish local policy on connections to public sewer that follows the local wastewater management plan. In areas designated by the plan for sewer service, it may be necessary for the jurisdiction to extend sewer service to new developments, or to install both septic systems and dry sewers for future connection.

CONCLUSION

The question is where do you want your community to be on this graph...and at what time? How do you want your community to look now, and at 5, 10, 20 and 30 years in the future? More

importantly, what policies should be implemented today in order to ease that transition at the most efficient cost and least disruption, while providing the highest degree of protection to our health and environment?

So, “to be or not to be... sewerred?” is a question for each community to answer through deliberate planning and policies. These plans and policies should consider the communities vision for a 20+ year horizon. Both short-term and long-term costs and impacts should be evaluated.