



# The Pioneer Grant Program

The 2016 Pioneer Grant Program aims to reduce nutrient and/or sediment contaminant loads to the Maryland portion of the Chesapeake Bay and Maryland Coastal Bays from any nonpoint source: agriculture, urban or suburban stormwater, air, and septic by seeking proposals that focus on new techniques, information, or programs that increase the rate at which load reductions can occur.



## Talbot County Department of Public Works **On-Site Sewage Disposal System Management Program**

*2005-2007*

**Project Track:** New program

**Research Question:** Is it possible to reduce nitrogen loadings from on-site sewage disposal systems by 60% in the next 20 years?

**Research Results:** Based on a comprehensive review of nitrogen removal technologies, a 60% removal of nitrogen is achievable. This reduction can be accomplished through a multifaceted approach of applying nitrogen removal treatment to new and existing septic systems, limited and restricted access extensions of public sewers and the construction of clustered wastewater treatment systems which include nitrogen removal.

**Notable Information:** Additional field inspections had to be conducted on Goldsborough Creek due to a limited number of property owners agreeing to the inspections in the original project area.

PROJECT PARTNERS



**Salisbury**  
UNIVERSITY



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Talbot County Department of Public Works

### **On-Site Sewage Disposal System Management Program**

2005-2007

#### **Summary of Project**

##### *Field Protocol Development*

An extensive literature review on field inspection protocols was undertaken as an initial step in developing an appropriate approach to conduct field inspections of on-site sewage disposal systems. The objective of the field inspections was to accurately establish the as-built configuration of the system, the physical condition of the components, the maintenance status and the operational effectiveness. The field information is critical in evaluating the potential of the system to be retrofitted with denitrification treatment. After discussions of the various protocols and the specific requirements of the work effort with Talbot County Office of Environmental Health, a decision was made to contract with an experienced and reputable environmental consultant to conduct the field inspections. The field protocol is structured to be adaptable to any jurisdiction in the Chesapeake Bay Watershed. Field inspections of on-site sewage disposal systems were initiated on July 24, 2006 and continued through July 2007.

##### *Database Management System*

A comprehensive review of database management systems applicable to on-site sewage disposal systems was undertaken by the Salisbury University Eastern Shore Regional GIS Cooperative in collaboration with the Maryland Department of the Environment. AN important criterion in selecting the database management system was the ability to adapt to use with Geographical Information Systems (GIS). TWIST, The Wastewater Information System Tool, a customized Microsoft Access-based database was selected for use. The United States Environmental Protection Agency contracted with Tetra Tech, Inc. to develop an adaptable tool for tracing and managing on-site sewage disposal systems or use by local, county and state health departments. TWIST was first made available in 2006. Talbot County intends to utilize the TWIST database management for the entire county. The Maryland Department of the Environment has recently adopted TWIST for use statewide primarily as a result of their participation I this project.

#### **Project Evaluation**

##### *Project Participants*

- Estimated number of households participating in field inspections of on-site sewage disposal systems: 295
- Estimated number of households participating in field inspections of on-site sewage disposal systems: 77

##### *Project Resources*

- Total Matching Funds: \$34,788.95

##### *Restoration Outcomes*

- Educated property owners on the relationship of on-site sewage disposal systems and pollution problems of the Chesapeake Bay.
- Secured voluntary involvement of property owners in a pilot program to better manage on-site sewage disposal systems.

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- Obtained initial commitment of property owners to consider the addition of denitrification treatment systems to their on-site sewage disposal systems.
- Identified specific mechanisms to address on-site sewage disposal systems failures.

### **Transferability and Sustainability**

A major objective of the project was to implement the draft Talbot County On-site Sewage Disposal System Strategic Plan in two sub watersheds. The information developed and the experience gained will greatly assist Talbot County and other jurisdictions in implementing effective management programs county-wide. Throughout each individual work effort considerable care was taken to facilitate the use of the management element by any jurisdiction in the Chesapeake Bay Watershed. Talbot County had kept Tributary Strategy Team members from the Upper Eastern Shore Tributary Team and the Choptank Tributary Strategy Team briefed on the progress of the project. Talbot County is also committed to continue to assist other jurisdictions in implementing and advancing management of on-site sewage disposal systems.

A considerable effort was made as part of the project to identify and evaluate denitrification systems for on-site sewage disposal systems. A major element of the On-site Sewage Disposal System Management Strategy was to establish a viable approach to achieving nitrogen reduction from existing and future systems. This effort resulted in unexpected benefits as the Maryland Department of the Environment announced the availability of grant funds for installation of denitrification systems as part of the Chesapeake Bay Restoration Funds in March 2006. In large part due to the work completed as part of the Pioneer Grant, Talbot County received \$1.1 million dollars to install denitrification systems. This effort is currently underway and is scheduled for completion within two years.

An important element of this project was to further evaluate and develop effective management strategies for addressing problems which were identified as a result of the field inspections of on-site sewage disposal systems in the project area. The field inspections indicated many of the older systems were in need of repair or replacement. The Chesapeake Bay Restoration Funds cannot be used to address existing problems of on-site sewage disposal systems. After a thorough analysis of viable options, recommendations were developed to enhance the Chesapeake Bay Restoration Fund Program by modifying the legislation to allow for extension of sewers to these problem areas using restricted and denied access sewers. The proposed enhancement to the Chesapeake Bay Restoration Fund was discussed with the Choptank Tributary Strategy Team and the Upper Eastern Shore Tributary Strategy Team. Letters of support for the legislation were submitted by both Teams. The legislation did not pass however the Eastern Shore delegation indicated their commitment to address issues which had been raised to pursue passage in the next legislative session.

Talbot County has effectively used this project to further the implementation of the On-site Sewage Disposal System Management Strategy on a county-wide basis. During the past three months the Talbot County Council has been briefed on the project results and has provided support for implementation of a comprehensive program to address on-site sewage disposal systems in systematic and cost-effective multi-pronged approach. There is a strong commitment to support and sustain this effort.

The Maryland Department of the Environment recently engaged local governments in developing a strategy to implement Total Maximum Daily Load (TMDL). The need for an effective management program for on-site sewage disposal systems is further reinforced by the requirements for load

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reductions for waters of the State impacted by bacteria, nutrients and other oxygen demanding pollutants. Talbot County is currently collaborating with the Maryland Department of the Environment with implementation of a TMDL for fecal coliform for the Upper Miles River Watershed and the Leeds Creek Watershed. The work performed as part of the Pioneer Grant Project will be of great value in furthering development of load reduction of fecal coliform.

### **Monitoring and Maintenance**

#### *Operational Status of Field Inspected On-site Sewage Disposal Systems*

The field inspection protocol was used to conduct field inspections of on-site sewage disposal systems throughout the Leeds Creek and Glebe Creek watersheds. Additional inspections were carried out in the Goldsborough Creek watershed as a result of the limited number of property owners agreeing to the inspections in the project area. Goldsborough Creek along with Leeds Creek and Glebe Creek are currently listed as impaired for fecal coliform on the State 303(d) list and are included in the Total Maximum Daily Load for the Miles River. The inspections were performed by Accurate Environmental Consultants, LLC with assistance from Talbot County Department of Public Works and Salisbury University students. Approximately 225 parcels have on-site sewage disposal systems in the Leeds Creek and Glebe Creek watersheds. All the property owners were notified about the project by letter which included an educational flyer discussing pollution from septic systems and the Chesapeake Bay. Individual reports were prepared for each property and copies were given to the property owners.

To date, 92 Onsite sewage Disposal Systems have been inspected on 77 properties. Of these systems, 44 were found to be functioning properly. Of the malfunctioning systems, 11 showed evidence of surface seepage. 37 tanks showed staining above the outlet invert, signifying possible groundwater intrusion or back-ups. Of the total systems inspected, 16 tanks were noted to be missing at least one baffle. At the time of inspection, 8 systems contained solids levels greater than half of the compartment volume.

#### *Nitrogen Removal Systems for On-site Sewage Disposal Systems*

A major element of the Talbot County On-Site Sewage Disposal Management Program is a goal of 60% reduction in nitrogen loadings from on-site sewage disposal systems in the next twenty years. A comprehensive review of nitrogen removal technologies indicated that 60% removal of nitrogen from septic systems was achievable. The goal would be attainable through a multifaceted approach of applying nitrogen removal treatment to new and existing septic systems, limited and restricted access extension of public sewer and the construction of clustered wastewater treatment systems which includes nitrogen removal. This approach is needed as there will be areas where retrofits of existing septic systems with nitrogen removal treatment will not be cost-effective. In situations where property owners with on-site sewage disposal systems are connected to wastewater systems with Enhanced Nutrient Removal treatment (3.0 mg/1 Total Nitrogen, 0.3/1 Total Phosphorus), a reduction of 95% of total nitrogen loadings associated with these septic systems could be achieved.

A systematic process was followed to select nitrogen removal treatment technologies for use in Talbot County. A comprehensive review of the literature was completed as an initial step. The effort included solicitation of letters of interest and supporting materials from firms representing the various nitrogen removal technologies for on-site sewage disposal systems.

The information was reviewed by representatives of the participating agencies including the Maryland Department of the Environment. The review group selected six technologies for further analysis. Individual presentations were made along with extensive discussions with the review

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panel. The review panel selected the following nitrogen removal systems for use in the first phase of implementation in Talbot County:

- Bioclere
- Septitech
- Retrofast

A promising technology which has not been approved by the Maryland Department of the Environment is the Soil-Air System. The system involves injecting air into the tile field. The introduction of air can restore tile fields which have been clogged with organic deposits. Also the system has the potential for facilitating nitrification and denitrification. The system can be readily installed in existing on-site systems without extensive construction of tanks. The relatively low costs also make this technology very attractive. Talbot County intends on installing this system in collaboration with the Maryland Department of the Environment.

The information obtained during the field inspections and personal contact with the property owners will greatly enhance Talbot County's ability to secure participation in the nitrogen removal treatment program.

### **Community Involvement and Outreach Activities**

A critical element of the On-site Sewage Disposal management Program is educating and enlisting the public in improving the management of their septic systems. A flyer was mailed out to all the property owners in the Glebe Creek and Leeds Creek Watersheds. An additional informational letter was sent out along with another copy of the flyer in advance of scheduling field inspections of on-site sewage disposal systems.

Presentations on the Onn-site Sewage Disposal management and the Chesapeake Bay Trust Pioneer Grant funded project were made to the following groups: Upper Eastern Shore Tributary Strategy Team, Choptank River Tributary Strategy Team, Miles River Watershed Restoration Action Strategy Working Group, Chesapeake Bay Foundation, Isaac Walton League, and Talbot County Council (televised).

Individual meetings detailing carious aspects of the project were held with representatives of the following counties: Queen Anne's County, Caroline County and Cecil County. These meetings were extremely helpful to the Counties in advancing their on-site sewage disposal system management programs. A web page for the on-site sewage disposal system management program was developed as part of the project. This site will be extremely valuable tool to educate the public and to communicate activities and progress in implementing the On-site Sewage Disposal Program countywide.

### **Partnerships**

Talbot County Public Works Advisory Committee, Talbot County Office of Environmental Health, Talbot County Office of Planning and Zoning, Salisbury University and Maryland Department of the Environment.

### **Accounting of Expenditures**

CBT Funds: \$93,000

Accurate Environmental Consultants, LLC: \$8,075

Talbot County Department of Public Works: \$26,713.95

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**Total Funds: \$127,788.95**