

# **Geographic Information System (GIS) Septic System Inventory for Urban Counties LEPF 02-12**

## **FINAL REPORT**

In 2002 a Lake Erie Protection Fund Grant was awarded to the Toledo Metropolitan Area Council of Governments (TMACOG) to develop a Geographic Information System (GIS) for on-site sewage systems (septic systems). The following objectives were to be addressed:

- Upgrade how the Toledo-Lucas County Health Department manages septic system records by converting the records to a GIS;
- Determine the resources necessary to convert a paper system to digital;
- Determine the number and locations of parcels with no septic system records and/or no public utilities;
- Identify high priority areas for investigation or system upgrades.

TMACOG administrated the grant and provided guidance as well as project and finance management throughout the grant period.

### **Problem Statement**

*E. coli* contamination continues to be a major health hazard in the waters in Northwest Ohio. The majority of our streams are either impacted or impaired by failed septic systems (OEPA 305(b)). Notably, the beaches on Lake Erie, in particular the beach at Maumee State Park, have experienced high levels of bacterial contamination causing the park to post warnings against swimming in the water for 30 days of the bathing season in the year 2001 (ODH Bathing Beach Monitoring, 2001). Nationally in the period of 1997 through 1998 there were 32 outbreaks of infectious etiology associated with recreational water causing illness in 2,128 people (CDC, 1998). Recently, a study has shown that the ditch flowing into the marina and subsequently the beach at Maumee Bay State Park has very high *E. coli* counts presumably from septic systems upstream.

Historically, it has been very difficult to quickly assess potential sources of bacterial contamination when high levels are detected in streams. One main reason for this problem is that the septic records are not easily viewed in any comprehensive fashion.

At the Toledo-Lucas County Health Department the records of on site sewage treatment systems (septic systems) reside in individual folders in over 18 file cabinets spread out in three rooms. A sanitarian or any other party working on a case or permit must physically search the file drawers pulling each address in a given area. This system relies on the users knowledge of the area and the skills of anyone who may have refiled the folder. Within each folder there may be a septic system card if there is a record for that address. The process of researching permits is tedious and time consuming. Paper card permits do not let the user see the big picture.

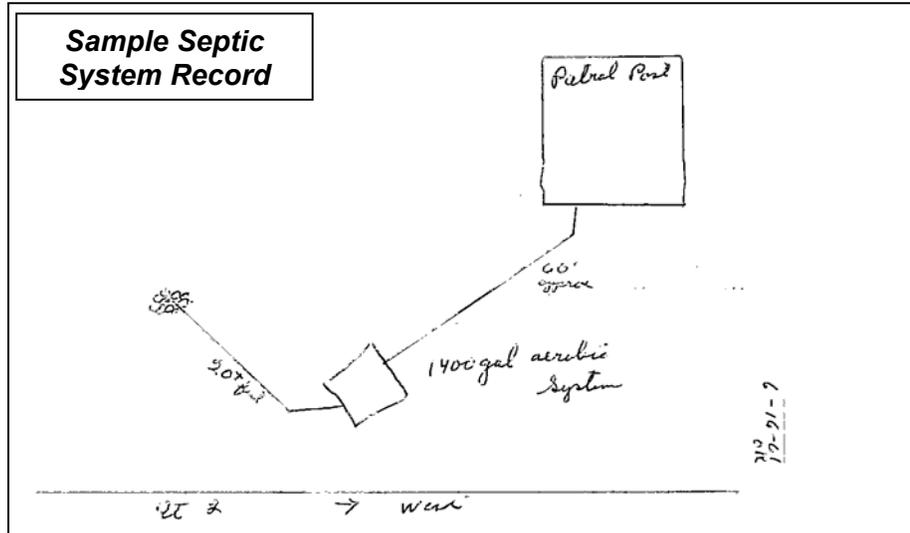
### **Objectives and Activities**

In late 2002 a project team was assembled consisting of staff from TMACOG, Lucas County Information Services (LCIS), and the Toledo-Lucas County Health Department.

The main objective was to convert the existing paper records to a digital form for inclusion into a GIS. For this task, an intern was hired to work at the Toledo-Lucas County Health Department to do document preparation and quality control. This Health Department intern reviewed a total of 12,464 records. Initial estimates projected that it would require 45 days to convert the documents to useable GIS shape files. In reality the preparation of the documents for scanning alone took one year.

In each case the address on the cards were referenced to current Lucas County Auditor's Office information. Once the address was located, the current parcel number was affixed to the bottom left corner of the card. The referenced septic system cards were then sent to a commercial scanning service. This was typically done in batches of about one file cabinet at a time. Cards were sent out for scanning and were usually returned the next day. If there were an emergency where a card needed to be referenced, the scanning service would return the card to the Health Department for use or answer questions over the phone. The scanning service was able to index the parcel number as well as the address from the cards and add it to the database file while they had the cards for scanning.

Document preparation took the majority of the time, as it is a very tedious task. It required a trained intern to go through every folder to determine if there was a septic system record and if so which card was the current or valid record. Many folders had duplicate cards. In instances with multiple cards, the records had to be reviewed to determine which record contained the current information. Of the 12,464 records that were scanned, 864 needed extra preparation, as they did not have complete parcel or address information that matched with current data, such as the sample card with



TOWNSHIP: Swanton LOT NO. parcel

VILLAGE: \_\_\_\_\_ SECTION: \_\_\_\_\_

SUB-DIVISION: \_\_\_\_\_

OWNER: Ohio Dept. of Highway Safety ADDRESS: 10291 Airport Hwy  
Chicago Pike

BUSINESS: Patrol Post

WATER SUPPLY: Well  City

SEWAGE DISPOSAL UNIT: Septic Tank Size: 1400 gal. aerobic system

SECONDARY TREATMENT: Tile Disposal Field: \_\_\_\_\_  
Sub-Surface Filter: \_\_\_\_\_  
Other: \_\_\_\_\_

REMARKS: C. W. Streiffert

Contractor: \_\_\_\_\_

Size of Lot: 282 x 100

Permit No.: E 134

38-46134 Date of Inspection: 6-16-61 MK DS

Chicago Pike, which is now Airport Highway.

In total, 12,464 records were scanned making a total of 24,928 scans. The original budget allowed for \$10,000 to perform the scanning service. In actuality, the final cost for scanning was \$3,845. This was a substantial savings from the anticipated cost, however additional funds were used to keep an intern on at the Health Department to continue with the document quality assurance.

Future challenges lie in scanning and indexing new systems as they are approved and installed. The LCIS and Health Department are investigating the use of *On Base* software that allows for the organization of many documents such as would be found with any type of public record.

### **Project Implementation and Continuation**

The GIS Shape file that was created from the septic system cards was matched to existing data of the Auditor's Office. Matching this information allows the septic system data to be integrated into the existing county GIS system with compatible parcel information. This results in a comprehensive view of all the parcels with septic systems related to them across the entire county with the exception of any that may exist in the City of Toledo. The full version of Arc Map allows the users to perform more complex data manipulation, however it requires a skilled, trained user.

An Arc Reader application has been developed by the LCIS for use by the Health Department. Although the Health Department does own a copy of ESRI Arc Map, the use of the simplistic Arc Reader will allow many users to fully utilize the product of this grant.

. The use of Arc Reader allows clerks and sanitarians access to the data without the need for highly specialized software training. This simple interface will allow Clerks and Sanitarians the ability to quickly locate parcels and their corresponding records when an issue comes up. The program will also allow Clerks to produce a map and print of the record when requested by a landowner or septic maintenance company. The records will be made available on the Lucas County Auditor's web site once additional data sharing software has been purchased. It is expected to be a searchable field on the Auditors Real Estate Information System (AREIS) within a year.

The Health Department is able to access and view the septic system files through the Arc Reader program. The user will be able to view and print a map such as the map shown in this report. Prints can easily be made for further field investigation as well as for sending to septic system maintenance companies or homeowners upon request. It may take an additional year before the records are viewable online through the Auditors Real Estate Information System (AREIS) <http://www.co.lucas.oh.us/AREIS/areismain.asp>.

Jerry German, Director of Real Estate for Lucas County has offered the services of his department. Appraisers will be trained to do basic ground truthing of septic system data while out in the field doing reappraisals. A Sanitarian from the Health Department will lead an In-Service for appraisers giving them information on what to look for while out in the field and providing them with an easy check list of things to look for. Any updates to the current database will be reported to the Health Department for revision and verification.

The data and images generated through this project have not been integrated into the HDIS Sewage Disposal Module from CHC Software that was developed for State of Ohio Health Departments. The HDIS system is FoxPro based and not easily integrated with other software packages. The Health Department will be utilizing Arc Reader to enable any user in the office easy access to the data and mapping utilities provided within the ESRI structure.

### **Conclusion**

The Lucas County Sanitary District is currently creating the shape files that will show the sanitary sewer lines. This process requires that they confirm and digitize the locations of all of the existing lines. This portion of the GIS is expected to be completed over the course of a few years, as it is a tedious process. At that time, both the Health Department and Sanitary engineers office will be able to analyze the areas being served by on-site systems and or sanitary sewers. The sample map shows an area where these lines have been mapped.

With the ability to view the septic system records of an entire area new questions can be asked and answered. Preliminary meetings with the Health Department have raised the issues of setting priority areas to investigate such as those with no clear record of a septic system or public sanitary services. One such area is in the Sudbury-Sherborn Street area. The sample map clearly shows several houses with neither a septic record nor sanitary services. Areas such as these will be investigated first by a Sanitarian in the field.

Other tasks evident in the map are those that show an active septic system and a sanitary sewer hook up. These parcels must be investigated and the active record removed from the database if necessary as well as making sure that the proper septic system closing procedure was performed.

Other uses evident in this sample map would be when high bacterial counts are found in a stream for example: A Sanitarian finds high bacterial counts in Wolf Creek at Airport Highway. The Sanitarian can easily refer to the GIS and see that upstream of that point are likely houses to start the investigation as there is no permit for a septic system and that area is not served by sanitary sewers. Without the use of GIS, a preliminary investigation that can now take as little as five minutes may have taken a half-day. Having an up to date, functioning GIS system can increase the effectiveness and efficiency of an already understaffed and overworked Health Department. Making a Health Department more efficient will reduce the number of failed or unpermitted septic systems in the area and reduce in-stream bacterial counts.

# Parcels with On-Site Sewage Systems - Sample Area Lucas County, Springfield Township, Ohio

