Texas On-Site Insights
Information about On-Site Wastewater Treatment Systems in Texas
Volume 8, Number 3, August 1999

Septic Tank Effluent Pumps, Small Diameter Sewer, Will Replace Failing Septic Systems at Small Gulf Coast Community

By Ric Jensen
Editor, Texas On-Site Insights

A school district in the small Texas Gulf Coast community of High Island has teamed up with the Audubon Society as well as State and Federal agencies to replace a series of failed septic tanks. Soon, the district will have a reliable, cost-effective, constructed wetland to treat its wastewater. Because a suitable system will be in place, the district will be able to expand to meet growing numbers of students.

Allen Sims stands near this site on High Island where a constructed wetland will be built.

Background Information

High Island is a small community of 574 people located on the Texas Gulf Coast in Galveston County. This situation is unique because the wastewater system is owned and operated by the school district and each individual connected to the system. Currently, the district's wastewater system serves roughly 14 homes as well as the school. Each school-owned home utilizes a small septic tank, some of which are only 55-gallon drums. All the septic tanks owned by the school discharge into a 6"-wide ditch, which runs through the middle of the bird watching area. The system is characterized by foul odors and partially treated sewage and is a health concern and a public nuisance. It is an unauthorized sewage discharge, does not meet current Texas Natural Resource Conservation Commission (TNRCC) standards, and has violated the Texas Water Code. In 1992, the TNRCC directed the District to upgrade its system to meet State rules.

High Island is located near a major "flyway" for migratory waterfowl. Preserving the ecological integrity of the area and enhancing conditions for bird watching were objectives of the local Audubon Society. Society leaders were concerned that, when they visited the site to bird watch, they might smell or come into contact with raw or partially

treated wastewater. To assist the district, the Society donated a five-acre site where a new wetland will be built.

Obtaining Financing and Assistance

Construction costs were estimated to be $487,000. Southeast Texas Resource Conservation and Development, Inc. helped the district acquire a $300,000 Section 319 Nonpoint Source Pollution program grant from the U.S. Environmental Protection Agency (EPA) and the TNRCC. In addition, a grant and loan of roughly $200,000 was obtained through the State Revolving Fund, which is coordinated by the Texas Water Development Board (TWDB).

Because of the economic situation in the community and the county, the district was eligible for a loan and grant from the Rural Hardship Community (RHC) program. Criteria used to judge whether a community is eligible for this program include population, whether a centralized wastewater system is present, average annual per capita income, and the unemployment rate. The RHC program is administered by the TWDB and EPA. This is one of the first five cases in which the RHC program has been used in Texas, according to TWDB project engineer Carl Norris.

The Coastal Zone Management Program and the National Oceanic and Atmospheric Administration provided a grant so a walkway and a bathroom can be constructed in the center of the wetland to enhance bird watching.

The Technological Solution

To remedy these problems, the District first consulted with TWDB engineers. Jose Rodriguez coordinated the engineering review, while Chris Jurgens provided an environmental assessment. The District then worked with Allen Sims, an engineer with Carroll and Blackman, Inc. of Beaumont. Sims designed a similar system for the small town of Hull, in which grinder pumps and a surface flow wetland replaced failing conventional systems. The system designed for High Island is intended to treat flows of roughly 28,000 gallons per day, with an average biochemical oxygen demand (BOD) concentration of 300 milligrams per liter (mg/L). It is expected that this system will be required to meet the following criteria for treated effluents -- less than 20 mg/L of BOD, less than 20 mg/L of total suspended solids, less than 8 mg/L of ammonia, and more than 4 mg/L of dissolved oxygen.

Undersized septic tanks now being used will be replaced with larger two-compartment tanks that meet State rules (a two-bedroom house must have a tank that is 750 gallons or larger, while a four-bedroom home would need a 1,250-gallon unit). The first chamber of

the tanks will provide primary treatment and settling of solids and will function much the same as "trash tanks" used for aerobic systems. The second compartment will serve as a pumping chamber, which will hold effluents until they are sent to a small diameter sewer. The septic tanks will be monitored annually for performance and to check for solids buildup. The tanks may have to be pumped roughly once every three years.

A small 1-horsepower septic tank effluent pump (STEP) will be used at each home. These pumps will generate 40 pounds of pressure per square inch (psi). The STEP system will then direct effluents into a small diameter sewer (ranging from 1.5" to 3"). The sewer will be constructed using 0.25"-thick PVC pipe. A total of 2,700 linear feet of sewer line will be trenched in to a depth of 30" using a "ditch witch."

"By keeping the septic tanks in place, you still get primary treatment and solids reductions, and because a small pump is used, you can be flexible in the design," Sims says. "Use of the STEP system eliminates the need for large lift stations."

Effluents will flow into four, half-acre wetlands cells. Because suitable soils were found at the site, it was not necessary to haul extra clay materials or to purchase a synthetic material to line the wetland cells. The middle third of the wetland will have a depth of 2.5' to 3'. However, the two wetlands cells which are before and after it will range from 4" to 8" deep. Shallow areas will be planted with bulrush and cattails, which will be gathered from natural wetlands in the region. This new system will have to be managed by an individual with a TNRCC Class D wastewater operator license.

"We designed this system with zones of different depths to provide areas for aerobic and anaerobic wastewater treatment," Sims says. "This design enhances the treatment process, while providing 21 days of detention time. It eliminates the need for chlorine disinfection."

NOTE: For more details about this system, contact Sims at (409) 833-0118 or adspe@aol.com. You can contact Norris at (512) 475-3051 or cnorris@twdb.state.tx.us.

TAMU Explores How Long-Term Disposal of Effluents Through Drip Irrigation May Affect Soil Clogging

A research project now underway at Texas A&M University (TAMU) is taking some of the first steps to determine how drip irrigation, when used as part of an on-site wastewater treatment and distribution system, may affect soil hydraulic properties. The project leaders, graduate student Ihab Jnad and Bruce Lesikar of the TAMU Agricultural

Ihab Jnad demonstrates this research system, which measures how drip irrigation affects soil hydraulics.

Engineering Department, hope this study may be useful in developing effluent application rates for drip irrigation systems.

"Texas now uses the same application rates for on-site wastewater disposal areas, whether a conventional drainfield or drip irrigation is being utilized, because there is not a lot of research-based information on how drip application affects soils," Lesikar explains. "If we can improve the understanding of how drip irrigation influences soil clogging, improved design criteria could be developed which take full advantage of the benefits of drip."

The goal of this study, Jnad explains, is to develop a better understanding of how long-term application of effluents affects soil hydraulic properties. Jnad has developed a laboratory experiment in which a steel box measuring 31" x 31" x 42" has been filled with medium texture Class II soil. Septic tank effluent flows into the box through a drip emitter. The flow rate for the emitters is 0.6 gallons per hour, with a hydraulic loading rate of 2.4 gallons per day. Time domain reflectometry (TDR) is being used to measure soil moisture content. A tensiometer is being used to measure soil moisture tension. Preliminary work has been undertaken to develop a three-dimensional model to simulate how drip irrigation may affect soils. Monitoring began in April.

"This is one of the first times that this type of research has been carried out anywhere," Jnad says. "We feel that we are laying the groundwork that will help precisely measure how disposal of effluents through drip irrigation systems over time affects the basic soil structure." Lesikar hopes follow-up laboratory experiments and field studies can be conducted to study this issue using many soil types and loading rates.

NOTE: Lesikar can be contacted at b-lesikar@tamu.edu or (409) 845-7453. A related paper, "Characterizing Soil Hydraulic Properties in a Subsurface Drip Drain Field," was presented by Jnad, Lesikar, and colleagues at the 1999 annual meeting of ASAE. Contact TWRI at (409) 845-1851 or twri@tamu.edu to get a copy.

A&M-Corpus Christi Scientists Use DNA Tools to Determine if On-Site Systems Degrade Coastal Waters

A&M-Corpus Christi students (shown here) will develop DNA fingerprints of fecal bacteria through laboratory tests.

When the U.S. Federal Bureau of Investigation or a local police department hunts for a criminal, one of the first things they do is seek a fingerprint that can identify the culprit. In much the same way, a research project now underway at Texas A&M University-Corpus Christi is investigating whether the use of DNA fingerprints can pinpoint if fecal bacteria found along the Gulf Coast originates from human or animal sources.

The research is led by Joanna Mott and Roy Lehman of the A&M-Corpus Christi Physical and Life Sciences Department. The project is funded by the Coastal Coordination Council through the Coastal Zone Management Act. It is supervised by staff members of the Texas General Land Office (GLO).

The overall goal of the study is to develop testing protocol which may improve and enhance Texas' coastal management programs and control non-point source pollutants.

"The project is significant scientifically because it is the first time these methods have been used along the Texas coast," Mott says. "If successful, this method may show great promise at helping us better understand sources of coastal water pollution."

" It would be a great help if we could separate man-made sources of bacteria from those generated by animals," says Sally Davenport of the GLO. "These bacteria, including those from on-site wastewater systems, may be impairing coastal waters. Determining their origins could help us correct the problems and improve water quality."

Basics About the Research

The objectives of this project are to collect samples of bacteria that may indicate threats to human health. Phase I of the project is a literature search and testing of evaluation techniques. It should be completed by early 2000. Phase II will consist of Restriction Fragment Length (RFL) sampling and testing and should take about 10 months. Phase III will be a pilot-scale field project in which this method is utilized in selected Texas estuaries.

In this project, Mott and Lehman hope to develop a method which uses RFLs

of DNA segments to identify specific sources of *E. coli.* First, a water sample is collected and *E. coli* is isolated through filtration and growth on a differential media. DNA is separated and extracted and a "fingerprint" is taken which will identify *E. coli.* Positive results are identified when the DNA gels and fluoresces, based on separation patterns.

Afterwards, the A&M-Corpus Christi scientists intend to develop a library of DNA RFLs from *E. coli* which are specific to various warm-blooded animals found in tributaries of South Texas coastal rivers as well as bays and estuaries. This information can be used to determine such sources of pollution as on-site wastewater systems, as well as urban and agricultural runoff.

"Ultimately," Mott says, "we hope we can compare DNA fingerprints found in South Texas coastal waters to fingerprints in our library which can be linked to specific pollution sources." The researchers will identify specific strains of *E. coli* bacteria which are found along the Texas coast that may be harmful to humans. There are thousands of strains of *E. coli*, each of which causes human health threats. Some cause diarrhea, while others can be fatal.

How the Research is Progressing

Over the past few years, A&M-Corpus Christi researchers have conducted a series of studies to utilize microbiological tools to assess coastal water quality. Last year, Mott teamed up with GLO to monitor samples for fecal coliform and enterococci bacteria from coastal waters in the "Beachwatch" program. The intent of this project was to develop baseline data about the extent to which coastal waters may be contaminated by fecal bacteria. Results of Beachwatch are displayed on the GLO World Wide Web. Results document that, in a few instances, some Texas coastal waters violated State regulatory standards.

So far, Mott and Lehman are developing quality assurance and quality control (QA/ QC) procedures that will be used when samples are collected the field. QA/ QC protocols are needed to make sure that data which are gathered are scientifically valid. Mott and Lehman are also instrumenting a laboratory which will be used to conduct the DNA work. In the near future, the researchers hope to collect water quality samples from throughout the Coastal Bend and South Texas to determine pollutant sources.

NOTE -- For details, contact Davenport at (512) 463-5059 or sally.davenport@glo.state.tx.us, Mott at (361) 825-6024 or jmott@falcon.tamucc.edu, or Lehman at (361) 825-5819 or rlehman@falcon.tamucc.edu.

UTPA Efforts Identify Colonia Wastewater, Water Needs, Help Families Obtain Aid to Connect to Central Systems

UTPA is taking the lead in efforts to work with colonia residents and determine their wastewater and water treatment needs.

The University of Texas -- Pan American (UTPA) is located in the Lower Rio Grande Valley and, thus, right in the heart of the largest concentration of communities without adequate water and wastewater treatment in the United States. As a result, it seems only fitting that UTPA is leading two significant efforts to learn more about these subdivisions, called "colonias," and to help area residents obtain service by centralized wastewater systems.

The projects are led by Rossana Ramirez Robertson of the UTPA Community Outreach Partnership Center and the Office of Center Operations and Community Services. Cooperating agencies include the Texas Water Development Board (TWDB), the U.S. Department of Agriculture Rural Development Agency (RDA), the City of Edinburg, and the City of Mission.

The UTPA effort has two main thrusts -- to gather needed information about the numbers of persons residing in colonias, and to assist families in converting their on-site systems to centralized sewers, which may provide better treatment.

Background Information

Amazingly, nearly all (98%) of the colonias in the United States are in Texas, where they total 1,495 subdivisions. The TWDB estimates that roughly 392,188 people resided in counties without adequate water and wastewater systems which are eligible for assistance from the Board's Economically Distressed Areas Program (EDAP) in 1996.

Of this number, the majority (53%) are sited in the four counties of the Lower Rio Grande Valley. Hidalgo County, where UTPA is sited, is the home to 34% of Texas' colonias -- the highest number of any county in the State.

To respond to the needs of colonia residents, the Texas Legislature created the EDAP in 1989. As of July 1999, $250 million in voter-authorized state general obligation bonds and $29 million of state funds from EDAP are being combined with $300 million from the Federal Colonia Wastewater Treatment Assistance Program (CWTAP). These funds can be used to finance eligible water and wastewater construction projects in economically distressed areas. CWTAP resources may be used to provide services

to 14 Texas counties located within 64 miles of the United States - Mexico border.

From the $579 million in available funds, 54 projects have received construction commitments totaling roughly $330 million, and another 36 projects are in the EDAP facility planning phase , which will cost an estimated $256 million, if constructed. The Board forecasts that 42 projects serving a total of 117,500 residents will be completed by the end of the year 2000. Roughly 283,000 residents (70% of the people living in economically distressed areas) have ultimately been targeted for service by these 90 EDAP projects.

EDAP statutes prohibit State funds from being used to pay for improvements on private property to connect colonia residents to public water or wastewater mains. In 1999, the TWDB successfully negotiated with the U.S. Environmental Protection Agency (EPA) to use $33 million from a CWTAP grant to fund residential service connections and water projects. Using CWTAP grants, as well as funds from the Texas Department of Housing and Community Affairs, the RDA, and the North American Development Bank, colonia residents can be connected to water and wastewater systems.

Surveying the Demographics of Colonia Residents

The goal of the survey was two-fold -- to identify whether residents may be willing to pay to be connected to centralized wastewater systems, and to assess the extent to which colonia residents were utilizing TWDB financial assistance aids.

In this effort, UTPA surveyed 314 residents of seven colonias in Hidalgo, Cameron, and Willacy counties. A questionnaire was developed in English and Spanish. Information was collected by 10 interviewers who visited colonia residents during April and May of 1997. UTPA professionals gathered data on such factors as the average number of people living in each household (4.3), average household income (64% earned less than $10,000), the number of residents who own their homes (88%), and the length of time households lived in a colonia (14 years).

Significantly, the survey also collected a wide range of information about water and wastewater issues. For example, nearly all (96%) residents obtain water from a public water system and most (57%) of the households with public water services have been connected for five years or less. Interestingly, 62% of residents buy bottled water for drinking, instead of relying on tap water.

Survey results also yield clues about the use of on-site wastewater systems. For example, the survey suggests that as many as 30% of households rely on septic tanks as well as cesspools and even outhouses (please note that cesspools and outhouses are not legal

systems). Roughly half (46%) of colonia residents who utilize centralized wastewater systems have been connected for less than year. More than a quarter of those surveyed who were not currently connected to centralized systems indicated they hoped to get hooked up in the near future. In addition, many (69%) residents who wanted to be connected to a centralized system said they were interested in obtaining a loan to offset these costs. Roughly half of the households pay $30 to $70 per month for wastewater, water, and trash services.

Helping Guide Colonia Residents to Obtain Aid

In 1995, UTPA cooperated with Hoover Camden of the Prairie View A&M University Cooperative Extension Program to study barriers which may hinder colonia residents from taking full advantage of USDA/ RDA programs. As a result of this project, UTPA created Project ACCESS, which helps colonia residents obtain financing through loans and grants offered by USDA/ RDA and other sources.

Activities of Project ACCESS include conducting hands-on outreach in colonias, where UTPA staff help process and track applications for USDA/ RDA funding and provide bilingual assistance.

In the initial phase of Project ACCESS in 1996, UTPA staff worked to contact and assist residents of 10 colonias by providing technical assistance in English and Spanish. Through this program, roughly 400 families were contacted, 240 of which were eligible for $320,000 of aid. These funds helped families receive adequate water and wastewater treatment by hooking them up to central systems.

Recently, TWDB awarded the City of Mission a grant to work with 100 households who are not currently connected to central water and wastewater systems in the Madero and Granjeno colonias. UTPA is acting as the authorized representative of the City of Mission, and program efforts will be funded by the TWDB Colonia Assistance and Management Support Program. UTPA staff will contact individual families, inform them of funding opportunities, and determine if they are eligible to receive assistance. UTPA anticipates that as many as half the households in these colonias may qualify for aid. The goal is to help 85% of the families process their applications to the point where they can be considered for funding.

Through 1998, the project had helped colonia residents receive more than $300,000 in federal funds so they could be connected to centralized water and wastewater systems. It has been praised by many water leaders, including Noe Fernandez, the Vice Chairman of

TWDB. "This is an excellent example of how an institution of higher learning, as well as local, state, and federal governments, are working together to address a public need."

NOTE: For more information about UTPA's activities, contact Robertson at (956) 385-3808 or copc@panam.edu. More about the TWDB EDAP program can be obtained through the World Wide Web at http://www.twdb.state.tx.us/colonias/index.htm.

Meetings & Conferences

The Texas Engineering Extension Service (TEEX) is offering the following classes at the dates and locations shown below. The Installer I course will be taught September 7-8 in Mesquite. The Installer II class is being offered September 28-30 in San Antonio. The Site Evaluator class will meet September 7-9 in Houston. The Designated Representative course is being taught September 14-17 in Mesquite. The OSSF Operation and Maintenance of Surface Irrigation Systems with Aerobic Treatment class will be taught September 9 in Mesquite. For more information or to register, contact TEEX at (800) 252-2420 or (409) 845-6246. You can also e-mail Gregory Lewis of TEEX at psglewis@teexnet.tamu.edu for registration information.

The Texas On-Site Wastewater Treatment Research Council recently announced the dates and site of the 2000 Annual Conference. The Conference will be in Waco and will meet February 28- March 1. Few details are available so far, but Council Executive Secretary Warren Samuelson says that continuing education credits will once again be offered for those who attend. More details about the Conference will be announced in this newsletter as soon as they become available.

A section of the Texas Natural Resource Conservation Commission (TNRCC) World Wide Web (WWW) site provides a listing of continuing education (CE) opportunities and offerings in Texas. The WWW site address is http://www.tnrcc.state.tx.us/enforcement/csd/ics/ossf_ceu.html.

UGRA Monitors Streams to Detect How On-Site Systems May Affect Water Quality in Springs, Seeps, Streams

By Ric Jensen, Editor, Texas On-Site Insights

Scott Loveland of UGRA stands outside his home in the Hill Country in Kerr County. Loveland utilizes a low-pressure dosing field as part of his on-site wastewater treatment system.

In scenic Kerr County, the staff of the Upper Guadalupe River Authority (UGRA) is sampling surface and ground waters to identify sites where on-site wastewater systems may be degrading water quality.

In the near future, UGRA hopes these efforts can help identify "hot spots" where the use of on-site systems may be causing spikes in the levels of nutrients, total dissolved solids, and bacteria in waters throughout the region. Ultimately, the goal of the Authority is to

develop definitive, science-based information which could be used to guide whether on-site systems should be taken out of service and replaced with centralized systems.

Background Information

According to Scott Loveland, who coordinates this program for UGRA, water quality is a prime concern in this scenic Hill Country county. This area is renowned for opportunities for excellent river recreation, including canoeing, jet skiing, and swimming and is the home for many youth camps.

"We need to carry out a sampling program so we protect water quality throughout the region," Loveland says. "We hope that examining what is happening at upstream sites can help us better protect the Guadalupe River as well as shallow groundwater supplies."

UGRA manages the on-site wastewater program for Kerr County. Its staff provides a variety of services to support on-site wastewater systems, including soil testing, on-site inspections, and a laboratory which performs water quality testing. The Authority also maintains a database with detailed data about the design and performance of many systems.

Throughout the county, Loveland says there are a number of potential problems associated with the use of on-site systems. For example, many of the soils are classified as shrink-swell clays (Class 4), according to rules adopted by the Texas Natural Resource Conservation Commission (TNRCC). Class 4 soils cannot be used for conventional septic tanks and drainfields. Other locations consist of caliche rock covered by shallow soils. In some parts of the county, houses and mobile homes have been installed on small quarter-acre lots which are too small to provide adequate treatment. In addition, shallow groundwater systems and the location of nearby streams also limit the number of sites in the County which can be used for conventional systems.

"The best sites for conventional on-site systems have already been developed here," Loveland says. "For many of the remaining undeveloped sites, people will largely have to turn to alternative systems which may cost substantially more to install and maintain."

UGRA's Monitoring Program

UGRA's current monitoring efforts are part of an ongoing program to examine how on-site wastewater systems may be influencing water quality in the region.

Previously, UGRA tested the use of a red dye (rhodamine) which fluoresces when placed under ultraviolet light to identify which contaminants were flowing from on-site systems used in homes and campgrounds into area streams. The Authority also sponsored studies to assess which method should be used to infer whether on-site systems are contaminating area waters.

UGRA began its program to monitor springs, creeks and seeps in 1994. In this effort, water quality samples are being collected from springs, seeps (sites where the groundwater rises to the surface and forms pools), and streams. Generally, sampling sites are downstream of areas where large numbers of conventional on-site systems (septic tanks and drainfields) are currently utilized.

A focus of this effort is to detect contamination of shallow groundwaters and smaller creeks from on-site systems and other nonpoint pollution sources. The hope was that this

could serve as an "early warning" system which could protect water quality in the Guadalupe River. "If seeps or smaller streams are showing water quality problems, it could eventually impact the river," Loveland says.

In this program, the most recent samples were collected in December 1998. Data was gathered at 76 sites. Laboratory analyses have been conducted for conductivity, chloride, sulfate, nitrate, and phosphorus, as well as fecal and *E. coli* bacteria, but these results have not yet been published.

A report prepared by UGRA in 1997 provides insights about how the use of on-site systems may affect water quality in the region. According to the report, the use of on-site systems was thought be degrading water quality in four areas (U.S. Highway 173 South, along Interstate Highway 10 and U.S. Highway 16 north, Ingram/ Greenwood Forest, and Kerrville South). At two other sites -- one near the River Inn Resort on the South Fork of the Guadalupe River near Hunt and another below the City of Kerrville Wastewater Plant -- where water quality was a concern. It should be noted that River Inn previously used an on-site system which UGRA thought may be failing, but it has been replaced with a new subsurface disposal system and the problem seems to be remedied, Loveland says.

The 1997 report showed that conductivity ranged from 431 to 1440 parts per million (ppm), concentrations of chloride varied from 8 to 261 ppm, and sulfates were less than 10 ppm at some locations and as high as 261 ppm elsewhere. Levels of fecal bacteria were as great as 10,000 colony forming units (cfu) per 100 milliliters (ml) at one location, while concentrations of *E. coli* were as high as 910 cfu per 100 ml elsewhere.

"Although we're still in the beginning of this project and much more testing needs to be done," Loveland says, "the preliminary findings of this monitoring program are telling us a lot about how on-site systems may be affecting quality. At some sites, we are finding hot spots with high levels of total dissolved solids, salts, and nutrients downslope from on-site systems. In general, the monitoring is helping us identify areas where it appears that on-site systems may be degrading the quality of streams as well as shallow groundwater systems."

It is important to note that none of the sampling in this program is being done on any stream segments for which the TNRCC has designated water quality criteria. However, UGRA also is carrying out separate studies (as part of the Clean Rivers Program) to monitor water quality on four stream segments in Kerr County for 14 water quality parameters as well as populations of aquatic invertebrates.

How the Monitoring May Affect Future UGRA Programs

According to Loveland and UGRA Manager Jim Brown, the Authority hopes to use results of the monitoring program, along with other efforts, to identify neighborhoods where it may make the most sense to take on-site wastewater systems out of service and replace them with some type of centralized system.

Although the plans are still sketchy -- no engineering work has yet been done -- Brown hopes to initiate the process of converting some homes from on-site systems within next two years. The hope is that as many as 500 homes using on-site systems in as many as four neighborhoods could be converted to centralized sewers. Another hurdle to be overcome is that UGRA does not now have the authority to force people to switch from on-site systems to conventional sewers. However, UGRA has requested a ruling from the

Texas Attorney General's Office to clarify its regulatory authority in this regard.
"We are now working with all parties involved -- homeowners, community advisory groups, neighborhood associations, and the City of Kerrville -- to identify if there is a desire and a need to replace on-site systems with centralized sewers in specific areas," Brown says. "We are also studying the responsibilities of all parties which would be involved in making this transition work."
Brown says that a number of benefits could result from taking people off on-site systems, especially in areas where it is suspected that septic tanks and drainfields could be malfunctioning. First, removing failing systems could improve water quality. Second, installing centralized systems could develop new areas for homes and businesses. Third, the use of centralized systems could provide a "new" source of water, creating opportunities for widespread collection and reuse of treated wastewater.

NOTE: For details, contact Loveland at (830) 896-5445 or ugrasal@ugra.org.