

6.0 EDUCATION AND OUTREACH

Education and Outreach activities supporting the Lake Granbury Watershed Protection Plan have been a collaborative effort between the Brazos River Authority (BRA), and Texas AgriLife Research and Extension (AgriLife).

6.1 ON-GOING OUTREACH AND EDUCATION EFFORTS

The Education and Outreach work group was charged with the task of defining methods to 1) increase public awareness about water quality issues and planning and implementation efforts in the watershed, and 2) motivate individual actions to improve water quality in the Lake Granbury. The Lake Granbury Watershed Protection Plan, Education and Outreach Plan is attached in Appendix H.

To engage stakeholders and to support development of the watershed protection plan, a suite of outreach strategies have been used to inform the local community about water quality issues and the Lake Granbury Watershed Protection Plan development. Ongoing outreach and education efforts have maintained public involvement in the process and continue to increase awareness of the program and its goals throughout the watershed. Resources and activities that have been utilized in this effort include the following:

6.1.1 Project Websites



Two, linked project websites were created to provide easy access to project related information. The Lake Granbury Watershed Protection Plan website (<http://www.brazos.org/gbWPP.asp>) is maintained by the BRA and includes information on the technical aspects of the project including: a general problem description, the project work plan, stakeholder meeting agendas, stakeholder meeting minutes, presentations to the stakeholders group, a calendar of stakeholder events, and status reports. A Lake Granbury Water Quality website (<http://twri.tamu.edu/programs/lake-granbury-water-quality>) is also maintained by TWRI. The site includes information on water quality education, fact sheets on numerous water quality issues impacting bacteria levels on Lake Granbury, and information on golden algae research on Lake Granbury.

6.1.2 Fact Sheet

The Lake Granbury Water Quality Fact Sheet was developed as a 2-page information marketing tool to support and facilitate participation in the planning process (Figure 47). It has been distributed in the watershed via electronic mail, at stakeholder meetings and at community events. The fact sheet is also available at the Hood County Extension Office and on the Lake Granbury Water Quality website. Update versions will continue to be created as needed to provide new information about programs and accomplishments resulting from project implementation.

6.1.3 News Releases

Both the BRA and AgriLife have created and submitted news releases to numerous local media outlets, including the local newspapers and television stations. Submission of information articles to local news media regarding the Lake Granbury WPP, Lake Granbury water quality, and other environmental issues impacting the lake is on-going. Additional public information articles will be developed and submitted to key outlets to announce the completion of the watershed plan and to encourage stakeholder involvement in the implementation process. Table 30 summarizes the list of related news releases.

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lakegranbury.tamu.edu

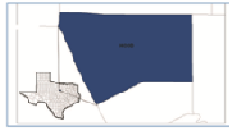
Lake Granbury is a popular tourist attraction and critical water supply for North Texas. In recent years, toxic blooms of golden algae have caused fish kills, and Escherichia coli bacteria have invaded some of the lake's coves, threatening the lake's water quality.

Lake Granbury provides water for more than 250,000 people in more than 15 cities. It is also the source of cooling water for a natural gas-fired steam electric power plant and the Comanche Peak nuclear power plant. In addition to municipal and industrial uses, the lake is a recreation haven for local water enthusiasts.

In recent years, golden algae and fecal coliform bacteria have threatened the lake's water quality. Golden algae blooms have caused a number of fish kills in Lake Granbury, resulting in substantial economic and biological losses. In addition, recent studies by the Brazos River Authority (BRA) have detected contamination of fecal coliform bacteria in several areas of the lake, primarily in coves with poor water circulation.

The Texas Water Resources Institute currently administers two projects that aim to improve the water quality of Lake Granbury. Through the *Improve Water Quality in Hood County* project, funded by the U.S. Department of Agriculture's Natural Resources Conservation Service, Texas AgriLife Extension Service staff members have developed education programs to help landowners, homeowners, businesses and the city of Granbury reduce nonpoint source pollution. In the *Testing Approaches to Golden Algae Control*, funded by the U.S. Army Corps of Engineers and in previous projects funded by the U.S. Department of Energy and Texas Parks and Wildlife Department (TPWD), scientists from three universities are investigating golden algae (*P. parvum*), its explosive growth and its deadly toxins. In a third project, BRA is working with the Texas Commission on Environmental Quality (TCEQ) and a consortium of local, state and federal and state agencies to develop and implement an integrated watershed protection plan designed to reduce bacterial contamination.

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Improve Water Quality in Hood County
Objectives

- Work with BRA, TCEQ and local stakeholders as they develop a watershed protection plan for Lake Granbury.
- Hold public meetings to educate stakeholders and clients within the watershed about water quality and its protection.
- Provide public educational programs to help achieve improved water quality.
- Conduct training events on proper operation and maintenance of on-site wastewater treatment systems (septic systems) and collection facilities.

Testing Approaches to Golden Algae Control
Objectives

- Work with TPWD, Baylor University and the University of Texas at Arlington to investigate linkages between water conditions, nutrients, pH and ammonia levels, cyanobacteria and golden algae blooms.
- Continue model development that will produce a spatially explicit, time-dependent numerical model focused on *P. parvum* demographics in Texas reservoirs.
- Test effectiveness of various approaches to control toxic *P. parvum* algal blooms.
- Provide an understanding of how *P. parvum* populations respond to direct intervention.

Accomplishments



- Cooperated with BRA and TCEQ in developing a watershed protection plan for the Lake Granbury Watershed.
- Produced a series of water quality fact sheets about specific water quality issues in the region, namely, nutrient and sediment loadings, bacteria, urban and agricultural nonpoint sources and landscape chemicals.

Collaborators


- Texas Water Resources Institute
- Texas AgriLife Research
- Texas AgriLife Extension Service
- Texas Commission on Environmental Quality
- Brazos River Authority
- Texas Parks and Wildlife Department
- Baylor University
- University of Texas at Arlington
- Hood County, Texas




Funding Agencies

- U.S. Army Corps of Engineers
- USDA Natural Resources Conservation Service

Texas Water Resources Institute
1904 Research Parkway, Suite A240
1318 TAMU
College Station, TX 77743-2118
179.845.1851 (T)
tami@twri.tamu.edu

 **make every drop count** twri.tamu.edu

texas water resources institute twri.tamu.edu

Figure 47. Lake Granbury Water Quality Fact Sheet

Table 30. News Releases Related to Lake Granbury Water Quality

Year	Organization	Title
2010	BRA	Texas Lake and River Swimmers Reminded of Potential Health Risks
2009	AgriLife	On-site Wastewater System Management
2009	AgriLife	Pet Waste Management
2009	AgriLife	Management of Wildlife on Your Property
2009	AgriLife	Proper Lawn Maintenance
2009	BRA	Beware of Hazards Due to Low Lake Levels
2008	BRA	Lake and River Swimmers Should be Aware of Potential Health Risks
2008	BRA	Proper Disposal Can Keep Your Money from Going Down the Drain
2008	BRA	BRA to Conduct Dye-Based Flow Studies
2008	BRA	Brazos River Authority to Hold Lake Granbury Open House
2008	BRA	Dye-based Water Flow Study will Begin at Lake Granbury
2007	BRA	Brazos River Authority to Begin Lake Granbury Cleanup
2007	BRA	Lake Granbury Dye Testing
2007	BRA	The Brazos River Authority Advises Lake and River Swimmers of a Potential Health Risk
2007	BRA	Bacteria Levels Return to Normal in Most Parts of the Basin
2007	BRA	Clear Skies Don't Guarantee Risk Free Recreation
2007	BRA	Lake Granbury Public Boat Ramps Reopen to the Public
2007	BRA	Texas Parks and Wildlife Closes Access to Lake Granbury
2007	BRA	What Should I Know After a Flood
2006	BRA	Brazos River Authority and TCEQ Fly the Rivers

6.1.4 Newsletter Articles

Lake Granbury Watershed Protection Plan articles, as well as, informational articles regarding general water quality and environmental issues have been written for the “The Brazos Basin” newsletter which is prepared and disseminated by the BRA. The newsletter is distributed quarterly via email to all Authority customers and lakeside residents and is available on the BRA website.

Table 31. Newsletter Articles

Year	Title
2010	Easing the Brazos' Salt Water Woes
2010	Taming a River: Calming the Flood Prone Brazos River
2010	Water School: School is in Session
2010	How do you Dispose of Hazardous Waste?
2010	Invasion of the Mollusks
2010	Monitoring the Brazos
2010	Staying Informed on the River
2010	The Backbone of our Water Supply
2010	Water: Not Just for Drinking
2010	Planning for Water in Texas
2010	Community Works to Remove Lake Pollutant
2010	Brazos River Authority to Begin Lake Granbury Cleanup
2009	What Happens After you Flush?
2009	Flood Control vs. Water Supply vs. Recreation
2009	Keeping the Brazos Clean
2009	Conservation Important for Fall Gardening
2009	Will we have Enough Water?
2009	Nuisance Water Plants

2009	Recreation on the Brazos River
2009	Teaching Kids About Water
2009	Texas: The State of Flowing Water
2009	Preparing for a Potentially Extended Drought
2008	Don't Let your Trash Go Down the Drain
2008	Drought Easing in the Basin
2008	Make your Fall Garden Flourish
2008	Controlling Nuisance Wildlife
2008	Texas Aquatic Plants can be a Beautiful Nuisance
2008	Texas Tough Landscapes through Xeriscaping
2008	Keeping Your Lakes Clean
2008	Time to Take Care of our Lakes and Rivers
2007	Protecting Water for our Future
2007	Yuck! Why does the Water Taste Funny?

6.1.5 Watershed Tour

A watershed tour was organized upon request of the Lake Granbury Watershed Protection Plan Stakeholders Group to provide an overview of the current characteristics and conditions across the watershed. The tour was conducted on June 23, 2009. Information was provided on urban, agricultural and industrial activities and issues and water quality monitoring efforts in the watershed.

6.1.6 Outreach at Local Events

Local public events such as the Rotary Club meetings, Chamber of Commerce meetings, homeowner's association meetings, were used as venues for presentations and/or distribution of education and information resources. Depending on the event maps, displays, fact sheets and handouts addressing the plan and water quality issues were disseminated and will continue to be disseminated. Events attended are listed in Table 32.

6.1.7 Texas Watershed Stewards

Texas Watershed Stewards is a science-based watershed education program designed to help citizens identify and take action to address local water quality impairments. A Texas Watershed Stewards workshop was held in Hood County on June 30, 2009

6.1.8 Targeted Outreach Efforts

AgriLife staff organized a series of events targeted at specific groups or addressing specific water quality topics related to Lake Granbury. A summary of Targeted Outreach Efforts is presented in Table 32. Topics presented include:

Table 32. Outreach at Local Events

Year	Organization	Event/Group Meeting
2010	BRA	Pecan Plantation Men's Breakfast Club
2009	BRA	Hood County Law Enforcement Environmental School
2009	BRA	Lake Granbury Waterfront Owner's Association
2009	AgriLife	Hood County Fair
2009	AgriLife	Granbury Birthday Bash
2009	AgriLife	Local Television Station - discuss watershed management, bacterial sources, and BMPs
2009	AgriLife	Pecan Plantation Men's Breakfast Club
2008	BRA	Lake Granbury Open House
2008	BRA	2 nd Grade Class at Acton Elementary School
2008	BRA	5 th Grade Class at Oakwood Intermediate School
2008	BRA	Granbury Rotary Club
2008	BRA	3 rd Grade Class at Acton Elementary School
2008	BRA	5 th Grade Class at Oakwood Intermediate School
2007	AgriLife	Oak Trail Shores Homeowner's Association
2007	BRA	AquaSmart at all Granbury ISD Elementary, Intermediate and Middle Schools
2007	BRA	Hood County Chapter of Master Gardeners
2007	BRA	Hood/Somervell County Chapter of Master Naturalists

Advanced On-site Wastewater Treatment Systems for Practitioners

Hood County wastewater practitioners participated in a training program describing the use of advanced treatment units to remove contaminants of concern from the wastewater.

Septic System Maintenance for Homeowners

Four workshops have been conducted for homeowners. These trainings targeted concern areas identified in WPP. The program focused on key aspects of operation, maintenance and repair that are important for homeowners.

These trainings have been extremely successful in motivating homeowner's to perform maintenance on their systems. After a training targeted at the communities on the northwest shore of the lake, one community had a homeowner's, who lived on the worst canal in the development perform maintenance on their system. Since that time bacteria concentrations in the canal have been dramatically reduced.

Future training events will be conducted in other priority areas as needed and where additional funding is available.

Pet Waste Management

AgriLife staff worked with the North Central Texas Council of Governments to create a Public Service Announcement on Pet Waste Management, a source of bacterial contamination especially for areas adjacent to the lake. The PSA was run on local television and radio stations.

Non-Point Sources of Pollution

AgriLife personnel prepared radio news pieces on non-point sources of pollution, which was run on local radio stations.

Bacterial Impairment of the Lake

AgriLife personnel prepared radio news pieces on bacterial impairment of the lake, which was run on local radio stations/

Septic System Health

AgriLife personnel prepared radio news pieces on septic system health, which was run on local radio stations.

Rainwater Harvesting Education

The topic of rainwater harvesting was used to convey messages about water and stormwater management, pollution control and the importance of educating others. The course as comprised of both classroom instruction and field demonstrations. During the course, participants were able to help in the installation of rainwater harvesting systems that became part of a demonstration site located near the Extension office. These systems are a stormwater management BMP that teaches basic hydrology and water management. Many participants increased their water literacy through implementing a rainwater harvesting project. They learned about the quantity of water running off a surface and the contaminants that can be absorbed by the water as it runs across a surface. They learned how the volume of water generated during a rainfall event is quantified. In addition, the amount available for capture from a specific size surface was calculated. Ultimately, the participants learned valuable information that will assist them in making informed decisions regarding management and protection of critical water resources

Table 33. Targeted Outreach Efforts

Year	Topic
2010	2 - Basic Septic System Maintenance Programs
2009	Rainwaterharvesting
2009	2- Basic Septic System Maintenance Programs
2009	Advanced On-Site Wastewater Treatment Systems – for Practitioners
2009	Stormwater Management in the Home Landscape
2009	Health and Maintenance of your Aerobic Treatment System
2009	Wastewater Practitioners Training
2008	Pet Waste Management
2008	Small Acreage Land Management
2007	2- Basic Septic System Maintenance Programs
2007	Priority Groundwater Management Areas
2007	Septic System Installer Training

6.1.9 Printed and Distributed Fact Sheets

In order to facilitate dissemination of information and educational materials Texas AgriLife Extension personnel developed multiple fact sheets that were printed and distributed to homeowners, at local events and during targeted training sessions.

1. Fecal Coliform Contamination and Sources,
2. Collective Wastewater Treatment Systems,
3. Pet Waste Management,
4. Graywater Use and Water Quality
5. Nutrient and Sediment loading,
6. Landscape Chemicals, and Management Practices to Minimize Loadings
7. What is the Fate of Your Rainfall;
 - a. What is the Fate of Your Rainfall: Leader Guide;

- b. What is the Fate of Your Rainfall: Flip Chart; Lawn Fertilization and Environmental Impacts;
- 8. Living on the Water's Edge.
- 9. Agricultural BMPs
- 10. Bacteria and Nutrients
- 11. Golden Algae
- 12. In Home Water Conservation
- 13. Pollution
- 14. Rainwater Harvesting
- 15. Urban BMPs
- 16. Water Conscious Landscapes
- 17. Water Testing
- 18. Watersheds,
- 19. On-Site Wastewater Treatment – Selecting and Permitting,
- 20. On-Site Wastewater Treatment – Alternative Collection Systems,
- 21. On-Site Wastewater Treatment – Homeowner's Guide to Evaluating Service Contracts,
- 22. On-Site Wastewater Treatment – Soil Particle Analysis Procedure,
- 23. On-Site Wastewater Treatment – Graywater,
- 24. On-Site Wastewater Treatment – Septic Tank/Soil Absorption Fields,
- 25. On-Site Wastewater Treatment – Evapotranspiration Beds,
- 26. On-Site Wastewater Treatment – Low-Pressure Dosing,
- 27. On-Site Wastewater Treatment - Subsurface Drip Distribution,
- 28. On-Site Wastewater Treatment – Aerobic Treatment Units,
- 29. On-Site Wastewater Treatment – Spray Distribution Systems,
- 30. On-Site Wastewater Treatment – Table Chlorination,
- 31. On-Site Wastewater Treatment - Operation and Maintenance,
- 32. On-Site Wastewater Treatment – Mound Systems, and
- 33. On-Site Wastewater Treatment – Liquid Chlorination.

The education programs provided through this project will and have lead to changes in behavior and have created a sense of ownership of Lake Granbury. This sense of ownership will lead to improved water quality. BRA and AgriLife will continue to work together to develop and present information on how to protect and improve water quality.