

**Water Quality Monitoring in the Geronimo Creek Watershed and Facilitation of the  
Geronimo and Alligator Creeks Watershed Partnership**

Guadalupe-Blanco River Authority  
FY2011 CWA Section 319(h)  
Project No. 11-06

**Quarterly Report Number 3**

Covering work accomplished April through June, 2012

July 9, 2012

**I. Abstract**

Two public meetings were held to receive comments on the draft watershed protection plan (WPP). Two stakeholders sent in written comments. One stakeholder came to the public meeting in New Braunfels, none to Seguin. A tour of the watershed was given to EPA. After the tour, a lengthy discussion was held on the draft WPP. The draft plan was reviewed by Texas AgriLife staff, TSSWCB and GBRA. A meeting was held to discuss comments received from all reviewers. Edits were made to the draft WPP based on stakeholder, EPA and TSSWCB comments.

**II. Overall Progress and Results by Task**

**TASK 1: Project Administration**

**Subtask 1.1:** GBRA will prepare electronic quarterly progress reports (QPRs) for submission to the TSSWCB. QPRs shall document all activities performed within a quarter and shall be submitted by the 15<sup>th</sup> of January, April, July and October. QPRs shall be distributed to all project partners and posted to the project website.

- GBRA prepared the progress report for January through March 2012 and submitted the report on April 11, 2012.

15% complete – On-going

**Subtask 1.2:** GBRA will perform accounting functions for project funds and will submit appropriate Reimbursement Forms to TSSWCB at least quarterly.

- GBRA will submit the invoice for May through June 2012 by July 31, 2012.

15% complete – On-going

**Subtask 1.3:** GBRA will host coordination meetings or conference calls, at least quarterly, with Project Partners to discuss project activities, project schedule, communication needs, deliverables, and other requirements. GBRA will develop lists of action items needed following each project coordination meeting and distribute to project personnel.

- May 18, 2012 - GBRA, Texas AgriLife and TSSWCB met to discuss the comments

on the draft WPP (Project no. 08-06) received from stakeholders, EPA and TSSWCB. A table of comments and corresponding responses was prepared by AgriLife and reviewed by GBRA and TSSWCB. Table is attached.

20% complete – On-going

**Subtask 1.4:** GBRA will continue to host and maintain a website (<http://geronimocreek.org/>) to serve as a public clearinghouse for all project- and watershed-related information. All presentations, documents and results will be posted to this website. The website will serve as a means to disseminate information to stakeholders and the general public. Extension shall contribute content matter for the website as appropriate.

- June 25, 2012 - AgriLife posted the draft WPP to the Geronimo Creek website.

12% complete – On-going

## **TASK 2. Quality Assurance**

**Subtask 2.1:** GBRA will develop a QAPP for activities in Task 4 consistent with the most recent versions of EPA Requirements for Quality Assurance Project Plans (QA/R-5) and the TSSWCB Environmental Data Quality Management Plan.

Consistent with Title 30, Chapter 25 of the Texas Administrative Code, Environmental Testing Laboratory Accreditation and Certification, which describes Texas' approach to implementing the National Environmental Laboratory Accreditation Conference (NELAC) Standards, shall be required.

All monitoring procedures and methods prescribed in the QAPP shall be consistent with the guidelines detailed in the TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods for Water, Sediment, and Tissue (RG-415) and Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data (RG-416).

- GBRA drafted a quality assurance project plan and submitted it to TSSWCB for review. GBRA received comments on the QAPP on June 18, 2012. After responding to comments, the final QAPP was sent to San Antonio River Authority for signatures. The signed document was then sent to TSSWCB for transmittal to EPA for their approval and signatures.

12% completed – On-going

**Subtask 2.2:** GBRA will implement the approved QAPP. GBRA will submit revisions and necessary amendments to the QAPP as needed.

- No work was performed under this task in this quarter.

0% completed – On-going

### **TASK 3. Support and Facilitation of WPP Implementation**

**Subtask 3.1:** Extension will continue to employ a Geronimo Creek Watershed Coordinator to engage and facilitate the Geronimo Creek Watershed Partnership. In coordination with GBRA, the Watershed Coordinator will be responsible for the general oversight and coordination of all project activities, be responsible for reporting requirements and directing educational activities, and serve as the primary conduit for interaction with landowners, citizens, and entities to facilitate the implementation of the WPP. The Watershed Coordinator shall successfully complete (or have already completed) the Texas Watershed Planning Short Course. The Watershed Coordinator shall participate in Texas Watershed Coordinator Roundtables and the TSSWCB Southeast and South Central Texas Regional Watershed Coordination Steering Committee meetings, as necessary.

- Texas AgriLife Extension has been working under the original project (08-06) until September 2012. All labor accrued in this quarter is being applied to that contract.
- April 18, 2012 – GBRA (Debbie Magin) met with Texas AgriLife Extension (Mark McFarland) to discuss invoices, status of tasks and report.

12% completed – On-going

**Subtask 3.2:** Extension will facilitate public participation and stakeholder involvement in the watershed planning process, specifically by facilitating meetings of the Partnership Steering Committee (at least quarterly) and Work Groups (as needed) to provide regular updates on the status of monitoring efforts, progress in identifying implementation funding, and movement towards water quality restoration and seek input and recommendations on needed activities. Extension will coordinate meetings, secure meeting locations, prepare and disseminate meeting notices and agendas. Meeting summaries will be prepared and posted to the project website. The WC will provide counties, cities and other partners with updates on progress of implementation of the WPP, if they are unable to regularly attend Partnership Steering Committee meetings.

- Texas AgriLife Extension and GBRA hosted two public meetings, one in Seguin at the GBRA River Annex and one at the River Haus at Landa Park in New Braunfels. The meetings were open to stakeholders and the general public to receive comments and questions on the draft Watershed Protection Plan. Texas AgriLife Extension performed this task under the original project (08-06). GBRA performed this task under this project.

10% completed – On-going

**Subtask 3.3:** Extension will assist governmental and non-governmental organizations (i.e., responsible parties in the Geronimo Creek WPP) in identification and acquisition of resources (financial and technical) to enable WPP implementation. Extension will actively seek and pursue funding opportunities and work with partners to develop grant proposals. The WC will work with state and federal agencies, as appropriate, to bring technical and financial resources to the watershed.

- April 11, 2012 - Texas AgriLife Extension coordinated a meeting between the city of Seguin and TCEQ to discuss possible urban 319 implementation projects. GBRA attended. Texas AgriLife Extension has been working under the original project (08-06) until September 2012. The meeting resulted in several potential ideas, including upgrades to storm water conveyance system in the Oak Village North subdivision and decommissioning of failing septic systems after they have connected to the city's new wastewater collection system being installed in the subdivision.
- In addition to the assistance given to the city of Seguin, AgriLife visited with the city of New Braunfels in hopes to get them to also plan on submitting a 319 proposal for the Alligator Creek watershed. New Braunfels declined to submit a proposal this year.

10% completed – On-going

**Subtask 3.4:** Extension will 1) evaluate and track progress toward achieving milestones established in the WPP; and, 2) work with GBRA to assess water quality data collected through the Clean Rivers Program, this project, and other data collection efforts in relation to achieving load reductions. Extension will develop, publish, print, and distribute to stakeholders, a biennial addendum to the Geronimo Creek WPP that describes modifications/updates to goals and milestones, explains new understandings of sources and cause of water quality issues, documents success in achieving goals and milestones, and success in achieving water quality improvement and load reductions. As the WPP will be published in fall 2011, this draft biennial addendum would most appropriately be published in fall 2013. This draft biennial addendum will function as the Final Report for this project.

- No work was performed under this task in this quarter.

0% completed– On-going

**Subtask 3.5:** Extension will coordinate education and outreach activities as identified in the Geronimo Creek WPP. GBRA will make presentations on the Geronimo Creek Partnership and WPP and general NPS pollution information to local schools and community organizations. Extension will support, promote, and participate in, as appropriate, any field days, demonstrations, site tours, or education events sponsored by AgriLife Extension, USDA-NRCS, and/or SWCDs for the Geronimo Creek watershed.

- GBRA Public Communications activities in quarter
  - April 24, 2012 - GBRA participated in a tour of the watershed for EPA.
  - June 4, 2012 – kiosk was moved from the Navarro HS library to the Seguin Outdoor Learning Center for use during the summer months.
  - April-June, 2012 – Cinde Thomas Jimenez worked with Seguin High School teachers, Betsy Flood and Jennifer Cooper, to develop a two week, intensive project-based learning class that used Geronimo Creek as the focus. While earning two class credits, the students made a press kit and spoke to the public about issues pertaining to the watershed. The students took a tour of the entire watershed, picked up trash along the creek and learned how water bugs can indicate the quality of water. On June 12, the students made a presentation to the Seguin ISD School Board on the issues impacting the Geronimo Creek, including information on pet waste and feral hogs. 21

students enrolled in the pilot class were selected from about 50 applicants from Seguin, Marion, Navarro and Lifegate high schools. See news release attached.

- April 23-26, 2012 - Cinde Thomas Jimenez gave presentations to elementary classes from Seguin ISD on the water quality in Geronimo Creek and its impact on the types of macroinvertebrates found in the creek.
- June 6, 2012 – Debbie Magin and Cinde Thomas Jimenez gave a tour of the Alligator and Geronimo Creek watersheds to the SHS project-based learning class. June 13, 2012 – Cinde Thomas Jimenez participated with the clean of Geronimo Creek by the SHS project-based learning class and discussed macroinvertebrates and water quality.

30% completed – On-going

**Subtask 3.6:** GBRA will include information about this project in GBRA newsletters (e.g., *River Run*) and Clean Rivers Program publications regarding progress to implement the Geronimo Creek WPP. GBRA will solicit content matter for these publications from Project Partners as appropriate.

- GBRA included a section on the status of the Geronimo Creek Watershed Protection Plan in the 2012 Basin Highlights Report. A copy of the article is attached.

20% completed– On-going

**Subtask 3.7:** Extension will develop, publish, and distribute 4 semi-annual newsletters that are designed to keep landowners and entities informed of ongoing WPP implementation activities, including water quality data collection and progress toward achieving milestones in the WPP. The newsletter shall be distributed as most appropriate to individual landowners and entities in the watershed. Extension will solicit content matter for the newsletters from project partners as appropriate.

- No work was performed under this task in this quarter.

0% completed – On-going

**Subtask 3.8:** Extension will facilitate communication with stakeholders in order to engage the public and affected entities in WPP implementation. Extension will utilize all appropriate communication mechanisms including direct mail, e-mail, the project website, and mass media (print, radio, television). Extension will develop and disseminate general project informational materials, including, but not limited to, flyers, brochures, letters, factsheets, news releases, and other appropriate promotional publications. Extension will develop and utilize a listserv (e.g., <http://listserv.tamu.edu/>) to facilitate direct discussion between stakeholders. Extension will explore the appropriate use of social media (i.e., Facebook) as a stakeholder communication mechanism for this watershed. Extension will solicit content matter for educational materials from project partners as appropriate.

- Texas AgriLife Extension performed this task under the original project (08-06). GBRA reviewed and commented on all publications and communications prepared for this task under this project.

5% completed – On-going

**Subtask 3.9:** Extension will make deliberate efforts to increase awareness of the WPP and secure implementation support thereof from county and municipal governments throughout the watershed.

- No work was performed under this task in this quarter.

0% completed– On-going

**Subtask 3.10:** Extension will maintain a spreadsheet of watershed stakeholders and affected parties for use in engaging the public in the watershed planning process. The spreadsheet will be added to based upon previous efforts of Extension in TSSWCB project 08-06. The spreadsheet will represent a diverse cross section of Geronimo Creek landowners, citizens, local businesses, local and regional governmental entities and elected officials, state and federal agencies, and environmental and special interest groups.

- Texas AgriLife Extension performed this task under the original project (08-06). GBRA performed this task under this project.

0% completed – On-going

**Subtask 3.11:** Extension will attend and participate in other public meetings as appropriate in order to communicate project goals, activities and accomplishments to affected parties. Such meetings may include, but are not limited to, city councils, county commissioners' courts, Clean Rivers Program Basin Steering Committee and Coordinated Monitoring, local soil and water conservation districts (SWCDs), groundwater conservation districts and other appropriate meetings of critical watershed stakeholder groups.

- No work was performed under this task in this quarter.

0% completed – On-going

#### **TASK 4. Water Quality Data Collection and Analysis**

**Subtask 4.1:** GBRA will conduct routine ambient monitoring at seven sites once per month, collecting field, conventional, flow and bacteria parameter groups. The QAPP developed in Task 2 will precisely identify the sites. The sampling period extends over 21 months. The number of samples planned for collection through this subtask is 147. Currently, routine ambient monitoring is conducted monthly at one station by GBRA (12576) through the Clean Rivers Program. Sampling through this subtask will complement existing routine ambient monitoring regimes such that routine water quality monitoring is conducted monthly at eight sites in the Geronimo Creek watershed. GBRA's Regional Laboratory will conduct sample analyses. Field parameters are pH, temperature, dissolved oxygen and conductance. Conventional parameters are total suspended solids, turbidity, sulfate, chloride, nitrate nitrogen, ammonia nitrogen, total kjeldahl nitrogen,

chlorophyll-a, pheophytin, total hardness, and total phosphorus. Flow parameters are flow collected by gage, electric, mechanical or Doppler, including severity. Bacteria parameter is *E. coli* enumerated using USEPA Method 1603.

- No work was performed under this task in this quarter. Monitoring will commence when QAPP is approved and signed.

0% completed – On-going

**Subtask 4.2:** GBRA will conduct routine ambient monitoring at six sites once per quarter year, collecting field, conventional, flow and bacteria parameter groups; specific parameters are defined in Subtask 4.1. The QAPP developed in Task 2 will precisely identify the sites. The sampling period extends over seven seasons. The number of samples planned for collection through this subtask is 42. Spatial and seasonal variation will be captured in these snapshots of watershed water quality. GBRA's Regional Laboratory will conduct sample analyses.

- No work was performed under this task in this quarter. Monitoring will commence when QAPP is approved and signed.

0% completed – On-going

**Subtask 4.3:** GBRA will conduct biased flow monitoring at fourteen sites once per season under wet conditions, collecting field, conventional, flow and bacteria parameter groups; specific parameters are defined in Subtask 4.1. These sites shall be the same as the sites for routine ambient monitoring described in subtasks 4.1-4.2. If a storm event was captured under routine monitoring in subtasks 4.1-4.2, a separate biased flow sample will not be collected under this subtask. The QAPP developed in Task 2 will precisely identify the sites. The sampling period extends over seven seasons. The number of samples planned for collection through this subtask is 98. Spatial, seasonal and meteorological variation will be captured in these snapshots of watershed water quality. GBRA's Regional Laboratory will conduct sample analyses.

- No work was performed under this task in this quarter. Monitoring will commence when QAPP is approved and signed.

0% completed – On-going

**Subtask 4.4:** GBRA will conduct routine groundwater monitoring at up to four sites (e.g., two spring and two wells) once per quarter year, collecting field, conventional, flow and bacteria parameter groups; specific parameters are defined in Subtask 4.1. The QAPP developed in Task 2 will precisely identify the sites. The sampling period extends over seven quarters. The number of samples planned for collection through this subtask is 28. GBRA's Regional Laboratory will conduct sample analyses.

- No work was performed under this task in this quarter. Monitoring will commence when QAPP is approved and signed.

0% completed – On-going

**Subtask 4.5:** GBRA will transfer monitoring data from activities in subtasks 4.1-4.4 to TSSWCB for inclusion in the TCEQ SWQMIS at least quarterly. Data will be transferred in the correct format using the TCEQ file structure along with a completed Data Summary, as described in the most recent version of the *TCEQ Surface Water Quality Monitoring Data Management Reference Guide*. GBRA will post data from monitoring activities collected in subtasks 4.1-4.4 to the project website in a timely manner. GBRA will submit Station Location Requests to TCEQ, as needed, to obtain TCEQ station numbers for new monitoring sites. Data Correction Request Forms will be submitted to TSSWCB whenever errors are discovered in data already reported. All monitoring data files, data summary reports and data correction request forms will also be provided to Extension. GBRA will input monitoring regime, as detailed in the QAPP, into the TCEQ CMS.

- No work was performed under this task in this quarter.

0% completed – On-going

**Subtask 4.6:** GBRA will develop a final Assessment Data Report summarizing water quality data collected through Task 4. The Report shall, at a minimum, provide an assessment of water quality with respect to effectiveness of BMPs implemented and a discussion of interim short-term progress in achieving the Geronimo Creek WPP water quality goals. GBRA will summarize the results from Task 4 in the GBRA's Clean Rivers Program Basin Highlights Report and Basin Summary Report. GBRA will provide updates on the results and activities of Task 4 to the Steering Committee.

- No work was performed under this task in this quarter.

0% completed– On-going

### **III. Related Issues/Current Problems and Favorable or Unusual Developments**

The watershed protection plan is still in development. It is anticipated that the WPP will be submitted to EPA in September 2012. Water quality monitoring should start as soon as the QAPP has been approved and signed which should be in August 2012.

### **IV. Projected Work for Next Quarter**

The following will be accomplished during the coming quarter:

- a. Monitoring will begin.
- b. Webpage will be updated and improved.
- c. Watershed protection plan will be submitted to EPA.



## Response to Public Comment on the Draft

### Geronimo and Alligator Creeks Watershed Protection Plan

Tracking Number	Commenter	Summary of Request or Comment	Summary of Action or Explanation
1	Mark Gustafson, Ph.D, Steering Committee member	Chapter 1 could use more information about the benthic macroinvertebrate and fish communities.	Comment is appreciated and information regarding benthic macroinvertebrate and fish communities have been added to the draft WPP as a result of this comment.
2	Lee Rahe, Ph.D, citizen	The city limits for New Braunfels in figure 7.1 is incorrect.	Comments are appreciated and Figure 7.1 has been corrected as a result of this comment.
3	Frank Dietz, Steering Committee member	Comment is complementary of the report and asks for a stronger emphasis to put more responsibility on watershed school districts.	Comment is appreciated and the Partnership has begun to partner with area school districts through GBRA's Public Education Coordinator and will continue to seek ways to expand these relationships. No changes were made to the document as a result of the comment.
4	Lee Gudgell, Steering Committee member	Comments submitted pertain to Chapter 7 and the specifics describing the targeted monitoring and biological and habitat assessments.	Comments are appreciated and have been incorporated to make the draft WPP more accurate, since monitoring schedules have been slightly modified since the original language was drafted for the WPP.
5	John Fisher, Steering Committee member	<p>1) Comments submitted disagree with dog populations, urban versus rural populations' relative contributions, and ordinances by the City of Seguin that relate to dog waste.</p> <p>2) Comments submitted suggest that raccoon populations are largely responsible for elevated bacteria concentrations.</p>	<p>1) Dog populations and their distribution in the watershed were thoroughly vetted by the Urban Nonpoint Source Work Group and the Steering Committee. Dog populations and spatial distribution were determined based upon SELECT (Spatially Explicit Load Enrichment Calculation Tool), U.S. Census data, and a combination of local stakeholder information and insight from local veterinarians. Furthermore, information presented in the draft WPP regarding dog ordinances by the City of Seguin is merely a representation of what is already contained in City ordinances. Watershed protection plans contain activities and programs that are voluntary. Though ordinances may be regulatory, their adoption by a city is entirely voluntary. Recently obtained information from the City of Seguin lawyer, Mr. Quitner stated that Seguin does not have plans to develop new ordinances regarding pets in the near term. Modifications have been made to the document as a result of this new information.</p> <p>2) The issue of raccoon populations and their potential impact on water quality was thoroughly vetted by the Urban Nonpoint Source Work Group, the Agricultural Nonpoint Source Work Group, and the Steering Committee. Unfortunately, census</p>

6	Forrest Mims III, citizen	<p>1) Comments submitted suggest that the report should clearly state that the origin of nitrates in the Geronimo and Alligator Creeks is from natural sources.</p> <p>2) Comments submitted questions the level of contact recreation in Geronimo Creek and application of the contact recreation standard at all flow conditions.</p> <p>3) Comments submitted discuss the costs of implementation, paying special attention to the potential new feral hog management position and the associated estimated cost.</p> <p>4) Comments submitted suggest many minor editorial changes.</p>	<p>data for raccoon populations is presently unavailable for most areas of Texas. The Partnership understands that raccoon populations exist in the watershed and can potentially impact water quality. In order to address this concern, wildlife surveys are recommended in the draft WPP. No changes were made to the document as a result of the comment.</p> <p>1) Data collection and analysis of nitrates in ground and surface water contained in the draft WPP are preliminary at best. A study is planned to attempt to accurately characterize the source(s) of nitrates in the creeks and to determine any linkage between ground water nitrate concentrations and surface water concentrations. No changes were made to the document as a result of the comment.</p> <p>2) Waters of the state are considered to support the contact recreation standard across all flows. No changes were made to the document as a result of this comment.</p> <p>3) Estimated costs for implementation are based upon information from stakeholders. Many of the estimated costs are for activities and programs that counties and municipalities are already funding as part of their regular operations. Some activities may require additional financial assistance in the form of grants, loans, or some alternative funding source. The Geronimo and Alligator Creeks WPP is a voluntary plan meaning that activities and programs identified in the draft plan are voluntary (except for the portions that deal with Phase II stormwater permits and the Sanitary Sewer Overflow Initiative). Clarification has been added to the cost estimate for the feral hog management position as a result of the comment. Actual annual salary will be less than half of the total annual estimate.</p> <p>4) Some comments submitted have resulted in minor modification to the document.</p>
7	United States Environmental Protection Agency	<p>1) According to Chapter 4 (page 27), the recommended watershed load reduction for E. coli is 26% at mid-range flows. This is based on load duration curve (LDC) analysis for data collected at the TCEQ/CRP monitoring site at Haberle Road. The LDC from this site indicates that compliance with water quality criteria is met at low flows and that there is insufficient data for analysis of high flows. The plan also states that data for a historic TCEQ/CRP monitoring site at SH-123 "were analyzed to provide supplemental information." LDCs for this site indicate load reductions of 8% at high flows, 22% at mid-range flows, and</p>	<p>1) As a result of comments submitted, additional information has been included in Chapter 4 of the draft WPP to support the use of the Haberle Road sampling station to represent the watershed and to address the issue of low-flow load reduction goals.</p> <p>2) As a result of comments submitted, modifications were made to the draft WPP Chapters 7 and 8 to address this issue. Due to the highly variable efficiency ratings of certain management measures, it is difficult at best to make a direct link to instream water quality. For this reason, adaptive management will be utilized by stakeholders, and milestones were added to the document to better indicate when critical decisions will need to be made.</p> <p>3) The schedule for implementation of the identified management measures is based on available resources, financial ability, and political will. Many management measures identified in the WPP are part of ongoing and budgeted operations of counties and municipalities. Minor modifications have been made to the document to add clarity based upon the comments submitted.</p> <p>4) As a result of comments submitted, modifications have been made to Chapter 7 to clarify the Adaptive Implementation process for the project.</p>

21% at low-range flows would be needed to meet water quality criteria. Given the similarity in the period of record for the two sites and the lack of high flow data at the Haberle site, please explain why the Haberle site should be considered representative of the watershed and the best location for developing reduction targets for the entire watershed. Consider that load reduction goals for the watershed do not need to be tied to a single monitoring site and may be informed by a variety of information sources. It appears that load reduction goals for low-range flows would be appropriate for this watershed, based on the LDC analysis of data from SH-123 and the selection of management measures that are expected to improve water quality at low-range flows (OSSF measures).

2) The Plan includes well-developed sections on water quality targets (Table 7.1), implementation schedule (Tables 8.1, 8.2), and load reductions (Table 8.3). It appears, however, that predictions of water quality targets are not linked to the anticipated load reductions that would be achieved based on the implementation schedule. Linking these components is essential in assessing the effectiveness of the management measures in restoring water quality and can provide a useful framework for an adaptive management process. Please provide a summary that brings these elements together. See section 9.6 of EPA's Handbook for Developing Watershed Plans to Restore and Protect Our Waters for additional

			<p>information.</p> <p>3) Prioritization of management measures should include an economic analysis, such as a cost-benefit or similar analysis. Please provide a description of the economic evaluations used to select and prioritize the management measures proposed in the WPP. If no economic analysis was conducted as part of the WPP development process, EPA recommends including this analysis to communicate the relative effectiveness and cost of implementing individual management measures. Chapter 11 of EPA's Handbook for <u>Developing Watershed Plans to Restore and Protect Our Waters</u> contains some useful examples of economic considerations and analyses.</p> <p>4) Adaptive management is critical to assessing the effectiveness of the WPP and ensuring that the goals of the Partnership will be achieved. Please provide a comprehensive description of the adaptive management process that will be used during implementation of the WPP. Section 13.6 of EPA's <u>Handbook for Developing Watershed Plans to Restore and Protect Our Waters</u> contains a good description of the components of an adaptive management framework, as well as examples of how they can be used.</p>		
8	Texas State Soil and Water Conservation Board		<p>Numerous technical and editorial comments were submitted in order to make the document consistent with other Texas State Soil and Water Conservation Board WPPs.</p>		<p>Modifications were made to the document as a result of some of the comments.</p>

## Students get inside view of Geronimo Creek watershed

Posted Tuesday, June 12, 2012 12:00 am | Updated: 8:57 am, Tue Jun 12, 2012.

Jessica Limmer |

Clad in waders and armed with nets, a group of teenagers huddles together on the banks of the Geronimo Creek.

While many of their classmates are just waking up, they cluster around a handful of mud looking for tiny aquatic creatures.

“I think these are fair water bugs, here,” one says.

“Look, that one has pincers on its butt!” another adds.

Summer school is in session.

This summer, Seguin ISD is piloting a project-based learning class in partnership with Guadalupe-Blanco River Authority.

Cinde Thomas-Jimenez, GBRA environmental education administrator, said part of GBRA’s watershed protection plan includes an education component, which the class will help to fulfill.

“While earning two class credits, the students will make a press kit and speak to the public about issues pertaining to the watershed,” she said. “But this first part of the class is all about getting acquainted with it.”

While projects such as picking up litter or looking at water creatures might not be so much fun alone, junior Lindsey Muenchow said they become fun when part of a class effort.

“We were jumping around and just having a lot of fun with it,” she said. “It’s definitely more fun that just sitting in a classroom all day.”

Seguin High School teachers Betsy Flood and Jennifer Cooper said students are have taken a tour of the entire watershed, picked up trash along the creek and learned how water bugs can indicate the quality of water.

The group is assisted by volunteers Troy DePalermo, a seventh-grade science teacher, and son Colby, a senior at Seguin High School.

Project-based learning is a method of teaching involving hands-on projects with real-world applications. While much of the time is spent on projects and field trips, the group did repair to Seguin Outdoor Learning Center's classroom long enough for Thomas-Jimenez to explain how scientists determine water quality by identifying three sections of water bugs: Ones that indicate excellent water quality, fair water quality and poor water quality. The bugs in question included mollusks, crustaceans, worms and other tiny creatures, which students then set off to find.

"One bug is fun to watch from underneath because you can see it breathe. Another one can pinch you pretty good," she told the wide-eyed students. "I'll let you find that one out for yourselves."

Pinching bugs aside, junior Lindsay Koenan said the class was thoroughly enjoyable.

"We are really hoping this kind of class gets picked up and included in the regular school year," Koenan said.

Cooper said the 21 students in the pilot class were selected from about 50 applicants from Seguin, Marion, Navarro and Lifegate high schools. Priority was given to Seguin students, she added.

Flood, a technology teacher, said the idea comes out of the district's visioning committee and the teachers and students hope that more project-based classes will be available in future semesters.

The group's first speaking engagement will be during tonight's Seguin ISD board meeting, which starts at 6:30 p.m. at 1221 E. Kingsbury St.

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# STATUS

## Geronimo Creek

# Watershed Protection Plan

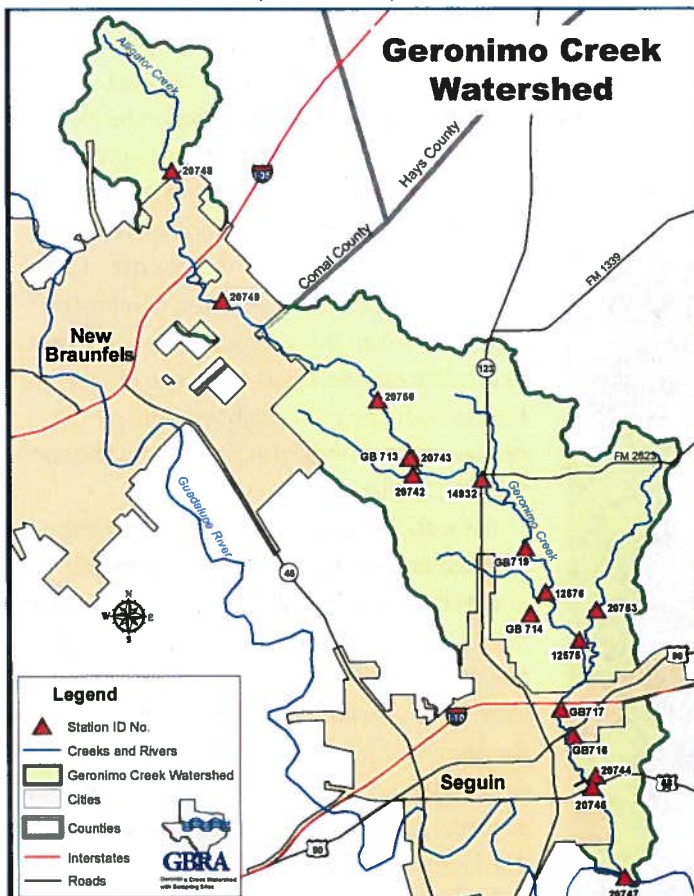
Beginning in 2009 and continuing through 2011, GBRA partnered with Texas AgriLife Extension on a Texas State Soil and Water Conservation Board (TSSWCB) CWA Section 319(h) grant to prepare a watershed protection plan for Geronimo Creek and its tributary, Alligator Creek. The creeks are located in Comal and Guadalupe counties. The almost 70-square-mile Geronimo Creek watershed lies within the larger Guadalupe River Basin. The upper portion of the Alligator Creek watershed lies in the extra-territorial jurisdiction (ETJ) of New Braunfels. Alligator Creek begins on the west side of Interstate 35 and flows southeast, travelling through a rapidly developing area of the Austin-

San Antonio corridor. The lower portion of the Geronimo Creek watershed is in the ETJ of Seguin. This area of the watershed is also projected to see tremendous growth, largely due to the intersection of Interstate 10 and Tollway 130 to the east.

As development and population growth continue, the percentage of urban land use will rise and play an increasingly dominant role in the hydrology and water quality of Geronimo Creek and its tributaries. Data gathered during routine water quality sampling of Geronimo Creek indicates the stream is impaired for elevated bacteria concentrations and has nutrient enrichment concerns for nitrate-nitrogen. High bacteria concentrations do not support contact recreation use. High levels of nitrogen can cause algal blooms and excessive growth of aquatic vegetation, which can lead to lowering the available oxygen in the water for fish to survive. To date, chlorophyll a concentrations have not been elevated at the monitoring site and the dissolved oxygen levels do not appear to be affected by algae or the growth of aquatic vegetation.

The Geronimo and Alligator creeks watershed protection planning project is a locally driven process to develop and implement a plan that will improve and protect water quality in the watershed now and into the future. Watershed planning is driven by local stakeholders and includes the following key tasks: 1) identify desired water quality conditions and measurable goals, 2) prioritize appropriate management practices and needed education and awareness programs to achieve those goals, 3) assist in the development of the watershed protection plan (WPP), 4) lead implementation of the plan at the local level, and 5) communicate implications of the WPP to other interested constituents within the watershed.

Geronimo Creek has been monitored by GBRA as part of the CRP since late 1996. The creek was monitored at the State Highway 123 crossing until August 2003, at which



# Status Geronimo Creek Watershed Protection Plan

time the routine monitoring site was moved to the Haberle Road crossing. The new site was a previous TCEQ monitoring site as well as an ecoregion reference site.

The 2008 Texas Water Quality Inventory listed Geronimo Creek (Segment 1804A) with a concern due to elevated nitrate-nitrogen concentrations because all 60 measurements exceeded the screening level of 1.95 mg/L. In addition, the stream is listed as impaired because the geometric mean for *E. coli* bacteria (162 organisms per 100 milliliters) exceeded the contact recreation stream standard of 126 organisms per 100 milliliters. As part of the grant, GBRA staff also monitored water quality at an additional 19 sites throughout the watershed. The original funding called for a 12-month monitoring schedule. Because of a severe drought during the monitoring period, that schedule was extended to 18 months. The data is available on the GBRA Geronimo Creek Watershed webpage at [www.geronimocreek.org](http://www.geronimocreek.org).

A stakeholder committee made up of 25 local citizens representing landowners, cities, counties and special interest groups have met both as a whole committee and in topical work groups. The topical work groups covering urban, agricultural and wastewater issues directed inputs for modeling of the creek to determine the major sources of the bacterial impairments. The urban group felt that urban runoff and pet populations were the major sources of bacteria in the urbanized areas of the watershed; the consensus of the agricultural work group was that feral hogs, wildlife and various livestock were major sources in the rural areas. Because the only wastewater discharge in the watershed is at the confluence of the creek and the Guadalupe River, the wastewater work group focused on failing septic systems and malfunctioning wastewater collection lines as possible sources of the bacterial and nutrient impairments.

The modeling results have shown that there needs to be a 26 percent reduction in the bacterial load at medium flows in the middle portion of Geronimo Creek in order to meet the state stream standard. Some of the management measures that the stakeholders will be recommending in the watershed protection plan include:

- 1) Pet waste stations in the urbanized areas, along with outreach and education focusing on the impacts of pet waste.
- 2) Best management practices and workshops, such as water quality management plans and riparian management, for agricultural producers in the rural portions of the county.
- 3) Workshops and distribution of information for landowners on management and control of feral hogs.
- 4) Financial assistance to the cities to fund engineering for improvements to storm water collection systems.

To address the nutrient impairment, GBRA has submitted a proposal for funding an isotope study that will look at the concentrations of nitrate-nitrogen in both the surface and groundwater in the Geronimo Creek watershed. In order to help direct efforts and funding toward the most likely or most influential source(s) of nitrate, the project will look to isotopic signatures of nitrogen and oxygen in the nitrates. The ratios of the isotopes of nitrogen and oxygen in nitrate often are useful for determining sources of nitrates in groundwater and surface water. Isotopic ratios are expressed as the ratio of the heavier isotope to the lighter isotope relative to a standard in parts per thousand (USGS, 2011).

The watershed protection plan is being drafted and reviewed by the stakeholder committee and TSSWCB. There will be a public comment period prior to the submittal of the plan to EPA. Additional funding has been received to resume watershed monitoring for another two years. Information on the Geronimo Creek Watershed Protection Plan process and draft report are available at [www.geronimocreek.org](http://www.geronimocreek.org).

