

**Texas AgriLife Research
Texas Water Resources Institute**

**Water Quality Monitoring in the Buck Creek Watershed and Facilitation of Buck Creek
Watershed Partnership**

**FY 10 CWA 319(h)
TSSWCB Project No. 10-06**

Quarter no. 4 From 10.1.2011 Through 12.31.2011

I. Abstract

Work conducted this quarter has focused on stakeholder engagement. The creek continues to be dry due to exceptional drought conditions and has thus precluded any water quality monitoring. The second installation of the Buck Creek Watershed Partnership Newsletter was developed and distributed this quarter. Additionally, the next Buck Creek Watershed Partnership meeting was scheduled for early next quarter and will be used as a platform to discuss the recently released Buck Creek WPP.

II. Overall Progress and Results by Task

TASK 1: Project Coordination and Administration

Subtask 1.1: *TWRI 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 15th of January, April, July and October. QPRs shall be posted on the project website and distributed to all project partners.*

The following actions have been completed during this reporting period:

- a. Submitted Year 1, Quarter 4 report to TSSWCB on January 17, 2012.

50% Complete

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

The following actions have been completed during this reporting period:

- a. As of August 31, 2011, a total of \$33,987 or approximately 30% of project funding has been expended.

35% Complete

Subtask 1.3: *TWRI will host coordination meetings, conference calls, or TTVN meetings, as appropriate, with project partners in order to efficiently and effectively achieve project goals, coordinate efforts and summarize activities and achievements made throughout the course of this project. TWRI will develop*

lists of action items needed following each project coordination meeting and distribute to project personnel.

The following actions have been completed during this reporting period:

- a. Individual phone calls replaced the organized meeting preparing for the stakeholder meeting.

50% Complete

TASK 2: Quality Assurance Project Plan Development

Subtask 2.1: TWRI will develop a QAPP for activities in Task 3 consistent with EPA Requirements for Quality Assurance Project Plans (QA/R-5) and the TSSWCB Environmental Data Quality Management Plan.

The following actions have been completed during this reporting period:

- a. The QAPP was approved on April 12, 2011.

100% Complete

Subtask 2.2: TWRI will submit revisions and necessary amendments to the QAPP as needed.

The following actions have been completed during this reporting period:

- a. No activity to report at this time.

0% Complete

TASK 3: Water Quality Data Collection and Analysis

Subtask 3.1: AgriLife Vernon will conduct routine water quality monitoring collecting water samples, field parameters (DO, pH, temperature, specific conductance) and streamflow. Samples will be collected once monthly from 7 sampling sites in the Buck Creek watershed (Sites 3, 5, 6, 10A, 10C, 11, and 13). Total number of samples budgeted for collection through this subtask is 126; however, the number actually collected will likely be lower due to the ephemeral nature of the creek.

The following actions have been completed during this reporting period:

- a. Sampling trips to the creek were made, but no water was present during all three trips this quarter.
- b. No activity to report at this time; the creek remains dry.

10% Complete

Subtask 3.2: AgriLife Vernon will conduct biased flow water quality monitoring collecting water samples, field parameters (DO, pH, temperature, specific conductance) and streamflow during 6 storm events. Samples will be collected from 7 sampling sites in the Buck Creek watershed (Sites 3, 5, 6, 10A, 10C, 11, and 13). Total number of samples budgeted for collection through this subtask is 42.

The following actions have been completed during this reporting period:

- a. No activity to report at this time; the creek remains dry.

10% Complete

Subtask 3.3: *AgriLife Vernon will enumerate E. coli colonies in water samples collected in subtasks 3.1 and 3.2 using EPA Method 1603. E. coli counts will be recorded electronically and in hard copy format.*

The following actions have been completed during this reporting period:

- a. No activity to report at this time; the creek remains dry.

10% Complete

Subtask 3.4: *AgriLife Vernon will assess nitrate levels in water samples collected in subtasks 3.1 and 3.2 using EPA Method 353.2. Nitrate concentrations will be recorded electronically and in hard copy format.*

The following actions have been completed during this reporting period:

- a. No activity to report at this time; the creek remains dry.

10% Complete

Subtask 3.5: *AgriLife Vernon will record and store all water quality data in electronic and hard copy formats. TWRI will transfer quarterly monitoring data from activities in Task 3 to TSSWCB for inclusion in TCEQ SWQMIS. 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 TCEQ Surface Water Quality Monitoring Data Management Reference Guide. Data Correction Request Forms will be submitted to TSSWCB whenever errors are discovered in data already reported. TWRI will also provide necessary information on this monitoring regime to RRA for inclusion in the Coordinated Monitoring Schedule.*

The following actions have been completed during this reporting period:

- a. No activity to report at this time; the creek remains dry.

50% Complete

Subtask 3.6: *AgriLife Vernon will develop a Technical Report that summarizes data collection and analysis results.*

The following actions have been completed during this reporting period:

- a. No activity to report at this time.

0% Complete

TASK 4: Maintain Stakeholder Communication

Subtask 4.1: *TWRI and AgriLife Vernon will collaborate to develop and publish 4 semi-annual newsletters that provide updates on water quality data collection efforts and progress toward implementing the WPP and other relevant information. The newsletter shall be distributed as most appropriate to individual landowners and entities in the watershed.*

The following actions have been completed during this reporting period:

- a. The December newsletter was developed and published this quarter (see attached).

50% Complete

Subtask 4.2: AgriLife Vernon or TWRI as appropriate will provide information to RRA for inclusion in the Clean Rivers Program Basin Summary Report and Basin Highlights Report. TWRI and/or AgriLife Vernon shall participate in RRA-sponsored meetings of the Clean Rivers Program Basin Steering Committee and Coordinated Monitoring meetings.

The following actions have been completed during this reporting period:

- a. No new activity to report this quarter.

20% Complete

Subtask 4.3: TWRI will ensure that the currently existing Buck Creek website (<http://buckcreek.tamu.edu/>) will be updated periodically to reflect accurate and current information regarding the project, WPP, implementation and other activities.

The following actions have been completed during this reporting period:

- a. TWRI continues to maintain and update the project website.
- b. This quarter the website received 110 visits with 86% of those being new visits

92% Complete

Subtask 4.4: TWRI and AgriLife Vernon will host and facilitate meetings of the Buck Creek stakeholders. Meetings will be held at a minimum of once annually for a total of 2 planned meetings. These meetings will be held to provide updates on the status of monitoring efforts, progress in identifying implementation funding, and movement towards water quality restoration.

The following actions have been completed during this reporting period:

- a. A stakeholder meeting is being planned for early next quarter to discuss the Buck Creek WPP and provide a brief update on stream monitoring.

40% Complete

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

- Exceptional drought and irrigation within the watershed have led to the creek largely drying up except for isolated areas. As such, sampling has not occurred this quarter and will remain limited next quarter.

IV. Projected Work for Next Quarter

The following will be accomplished during the coming quarter:

- a. Continue sampling as planned.
- b. Host partnership meeting as needed to discuss WPP development.

Buck Creek Watershed Partnership

December 2011 Newsletter

<http://buckcreek.tamu.edu>

Buck Creek WPP Comments Needed

The Buck Creek Watershed Protection Plan (WPP) has undergone some major transformations over the past several months, and the draft is nearing completion. By now, you have hopefully received a copy of the draft WPP for your review and comment. With the amount of information included in the WPP, a brief overview of its major components will help you to navigate the document more quickly and provide some insight on selected components of the WPP where we especially hope to receive your comments.

Chapters 1 through 5 of the document provide background information on the WPP and provide a context for information in later chapters. Chapter specifics include:

- Chapter 1: Watershed Management: provides general information on watershed management and how this process can benefit Buck Creek
- Chapter 2: Regional History: provides a regional history of the area surrounding and including Buck Creek and highlights activities/events that have greatly influenced the area
- Chapter 3: The Buck Creek Watershed: describes the Buck Creek watershed and the physical characteristics it possesses
- Chapter 4: Water Quality Assessments and Standards: defines how water quality is assessed in Buck Creek by the State of Texas and water quality standards that Buck Creek must attain and identifies water quality monitoring locations in the watershed
- Chapter 5: Current Watershed Conditions: describes watershed demographics, production, watershed use and current water quality conditions

Chapters 6 through 13 encompass the heart of the WPP and describe the sources of potential watershed pollution, how these sources were assessed, watershed management goals and how efforts will be organized to meet these goals. Chapter specifics include:



- Chapter 6: Potential Sources of Pollution: describes potential sources of bacteria and nitrate loading here and their relative ability to influence instream water quality is discussed
- Chapter 7: Watershed Pollutant Source Assessment: describes the tools used (water quality monitoring, Load Duration Curve analysis, SELECT analysis, Bacterial Source Tracking and OSSF evaluations) to evaluate potential impacts of potential pollutant sources in the watershed
- Chapter 8: Watershed Goals: defines the water quality goals established by the Buck Creek Watershed Partnership over the course of the WPP development process
- Chapter 9: Watershed Management Strategies: describes the watershed management strategies proposed for meeting Watershed Goals and the

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technical assistance needs and sources required for implementing these management strategies

- Chapter 10: Sources of Financial Assistance: provides an overview of currently available sources of financial assistance and how they are feasible for use in Buck Creek
- Chapter 11: Education and Outreach: describes the education and outreach efforts that have been carried out in the past and those that are proposed for the future as well as the need that these programs address
- Chapter 12: Measuring Success: outlines how the successful implementation of this WPP will be documented
- Chapter 13: Implementation Schedule: provides an estimated timeline for WPP implementation as well as cumulative cost estimates for implementing the WPP

Within this section, chapters 8, 9, 11 and 13 include the true backbone of the plan. We strongly urge you to review these four chapters closely and ensure that you agree with the information and/or approaches included in these sections of the plan. If you do not agree with their contents or have any comments on how these chapters can be improved, we want to hear about it.

We will host a meeting of the Buck Creek Watershed Partnership on 6-8 p.m. on January 10, 2012 at Wellington Auditorium, 802 10th St., so that each of you will have a chance to discuss this plan with us in person. Additionally, we will be accepting written comments by email or on paper through January 20, 2012. You can email or mail comments directly to Lucas Gregory at lfgregory@ag.tamu.edu or 1500 Research Parkway, Ste 110; 2260 TAMU; College Station, TX 77843-2260.

Elevated Nitrates a Concern in Buck Creek

Elevated nitrate levels in Buck Creek remain a concern on the 2010 Texas Integrated Report for Clean Water Act Sections 305(b) and 303(d) developed by the TCEQ. No water quality standard for nitrate currently exists, but the state uses a "screening level" of 1.95 mg/L for nitrates. If more than 20 percent of water quality samples exceed this level, then a waterbody is noted as having a concern for elevated nitrates. The lower half of Buck Creek consistently exceeds the designated screening level while the upper portion of the creek does not.

This stark variation in nitrate levels observed in the creek suggests that there is a major source of nitrate entering the creek somewhere around its confluence with House Log Creek. Using stakeholder information and Phyllis Dyers' observations, it is clear that groundwater flowing to the creek through small springs is the dominant source of stream flow below House Log Creek.

This information led us to look at groundwater nitrate levels recorded in the Texas Water Development Board's Groundwater Database. Data available in this source includes well depth, date drilled, nitrate levels and the aquifer that it is pulling water from. The Blaine and Seymour aquifers that lie beneath the Buck Creek Watershed are notorious for elevated nitrate levels and the data found for wells in the Buck Creek area are no different. Not all of the listed wells are in the Buck Creek Watershed, but the data does provide some perspective of nitrate levels in regional groundwater supplies.

Water Well Quick Facts

Childress County				
	Aquifer	Nitrate (mg/L)	Well Depth	Well Date
Minimum Depth	Seymour	<20 mg/L	14 ft	1940
Maximum Depth	Blaine	15.05 mg/L	360 ft	1989
Lowest Nitrate	Blaine	0 mg/L	313 ft	1953
Highest Nitrate	Blaine	150 mg/L	124 ft	1940
Average of 51 Wells	Blaine	34.32 mg/L	181 ft	N/A
Average of 9 Wells	Seymour	30.86 mg/L	71 ft	N/A
Collingsworth County				
	Aquifer	Nitrate (mg/L)	Well Depth	Well Date
Minimum Depth	Blaine	<20 mg/L	22 ft	1938
Maximum Depth	Blaine	3.3 mg/L	300 ft	1960
Lowest Nitrate	Blaine	<0.04 mg/L	165 ft	1996
Highest Nitrate	Seymour	172.7 mg/L	110 ft	2004
Average of 83 Wells	Blaine	27 mg/L	104 ft	N/A
Average of 8 Wells	Seymour	56.52 mg/L	82 ft	N/A

The Water Well Quick Facts provides an overview of what we were able to find in existing groundwater data records. This information does not prove that groundwater is the source of elevated nitrates in Buck Creek; however, it does illustrate that groundwater has the potential to push instream nitrate levels well above the 1.95 mg/L nitrate screening level currently used by TCEQ. To verify the source of nitrates in Buck Creek, nitrate samples from springs or in locations where water seeps back into the creek are needed to verify that groundwater is the main source of nitrates entering Buck Creek.

Buck Creek Landowners Share Memories of Droughts

By Laura Bentz

As people speak and hear about the drought in Texas, there is often much discussion of numbers. Reports come out regularly on the heat index, the number of days without rain, the number of riverbeds that have run dry. But behind all of those numbers are people, many of whom are struggling to survive in the only lifestyle that they've known. For many in the older generations, this is not the first but the second major drought that they have lived through. What follows are the stories of some of those people.

Don Ray Crook
Childress County

Can you describe the 1950s drought?

Terrible. A long time period without sizable rain. Hot. Dry. The same thing we had this year, except scattered out over five years. It was bad.

We would have water wells that would run dry. It lasted, I would say, '53, '54, '55, '56 and ended the spring of '57. I had a stockpile that I stretched out. We did whatever we had to do for the cattle. There were feed programs going on, so we would use that and stretch what we had as far as we could. By the end of it, I had sold about half my cattle. Three weeks later it started raining, and a month and a half after that I needed those cattle back. I grew myself back into business.

How is the drought today compared to the drought of the 1950s?

For one year, this was much worse than the drought of the 1950s. For one year we had nothing, from last October to this October we had 1.2 inches of rain on my land. None of the crops came up except for the ones I have under irrigation. No grass has grown from

the first of May until now. Weather this year was much more severe, our temperature over 100, almost no rain, 30-50 mile winds each day. That was the severity of it.

Through the years I've built up a stockpile of feed. It's enough to go 6 to 8 more months, but at the first of the year I'll be selling off a bunch of cattle.

What do you think will happen in the future?

In the whole county there has been zero acres of dry land crops. That's going to affect all of our businesses all the way through. The severity of it is yet to come. The economy part of it is yet to come. People don't have any money to spend.

I'm 81 years old and I'm still farming and ranching. The 1950s was when I first started on my own. Back then we could farm and work with less, much, much less than we can now. We worked with smaller tractors, and we had to work for longer hours, but now everything is so expensive. I don't see how our farmers can survive this. I really don't.

Minnie Bradley
Childress County

How does this year's drought compare to the drought of the 1950s?

1956, according to Childress County records and mine, was the driest year in history with 10.56 inches of rain. This year is drier, and for a year we've had about an inch of rain with over 100 degree temperatures, with Childress County the hottest county in Texas several times.

If the drought lasts into the future, what do you think will happen?

We will be able to hold on if 2012 has some rain in the spring. If not, we'll be doing something else. We moved out here in 1956 and didn't have any money but were able to buy this place because it had been completely eaten out. We rebuilt the fences and fixed the land. 2011 was worse than '56, but we've learned a lot.

This year, there was no rain in the growing season at all. We weaned our calves with no moisture on their back at all. Now that's unheard of.

You see, they test you to see if you have enough metal in you.

Do you think people will be able to get through this drought?

Now, most people's cattle are much larger than they were in '56. They take more grass (increasing cost and decreasing food supply). We've kept ours medium size, and I think that's how we've kept most of our herd together.

Lacy Montgomery
Collingsworth County

What is happening because of this year's drought?

We have had some really good rain recently, but it has not replaced the creek. The drought lasted really from last fall until just recently. We didn't get to plant. Last year they didn't get to plant anything.

On fields where we have grown wheat, we are planning on making it grass (for grazing). Because of the drought we have had to sell some of the cattle. Now that it has rained we are hoping to buy some back. We have 20 some cows left, and we are going to try to keep them.

How many cattle did you have previously?

About 140

Sharon Starkey
Childress County

What do you remember about the drought in the 1950s?

I remember my dad had to let all the help go. Then my brother and sister and I had to help with all the work. We just about killed ourselves doing all the work. I just remember how dry it was. My dad sold a lot of the

cattle. He would have never sold them if it had not been so dry.

How has this drought been affecting you?

Well, we had a cow-calf operation and we sold all of our cows except for 10. That was after leasing our land (recently) when we had dropped to 65 cows. Before that we had 150 cows.

How do you think this will affect the future?

Nothing's going to grow in the winter, so we'll have to wait until the spring. Some of the native grass died. I expect the economy will get worse before it gets better. Around this area we have a lot of irrigation, but crops are not doing too well. The price of cotton is very high, but unless the grade is good, you've got about 50 cents. There are not any jobs in town. You can't go get a job if your livestock or crops fail.

Next Partnership Meeting Set

Jan. 10, 2012, 6-8 p.m.

Wellington Auditorium, 802 10th St.

Light refreshments and meeting sign-in will begin at 5:30 p.m.

If you didn't get a copy of the draft WPP and would like one, contact Lucas Gregory and he will email a copy or send you a copy of the printed draft. The plan will also be available on the Buck Creek website at <http://buck-creek.tamu.edu>

Comments to the plan can be sent to Lucas Gregory at lfgregory@ag.tamu.edu or 1500 Research Pkwy, Ste. 110; 2260 TAMU; College Station, TX 77843-2260 or brought to the Jan. 10 meeting.

Contact Information	
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