



Statewide Blue Thumb Water Pollution Education Program
Final Report: January 1, 2016 – December 31, 2016

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Submitted by:

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***Oklahoma County Conservation District
Blue Thumb Volunteer Appreciation Night
June 28, 2016***

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The Blue Thumb Water Quality Education Program offers this final report of activities to the US Environmental Protection Agency, Region 6, as evidence of work completed in the calendar year of 2016.

Blue Thumb Program Description

Blue Thumb is a water quality education program that uses volunteers to monitor streams, screen groundwater, and educate the public about water pollution prevention. This is the only program in Oklahoma that supports volunteer stream monitoring. Blue Thumb has been going strong for 25 years.

Program Tasks

1. General Program Maintenance and Promotion
2. Statewide Watershed Education Events
3. Groundwater Education and Screening for Western Oklahoma
4. Support to Oklahoma’s Conservation Districts

1. General Program Maintenance and Promotion

The Blue Thumb Program took the success of its 2015 summer camp and again partnering with the Grand River Dam Authority (GRDA) developed a three-day educators’ workshop held June 1-3, 2016 at Langley, OK. Teachers from the Grand River watershed were invited to attend and learn about the watershed they teach in. Seventeen educators attended with each attendee receiving a small erosion model, Healthy People, Healthy Water Educators Workbook, a thumb drive with relevant materials loaded on it, and each made and took home a mini rainfall simulator.

Teachers went on a driving tour of the watershed and visited a local bat cave. Additionally, they went out on the GRDA testing boat, learned how to use the Enviroscope watershed model and visited a local stream to seine for fish and learn about the benthic macroinvertebrates that live in their watershed.



Several northeast Oklahoma teachers learned how to protect water quality where they live and teach.



Two thousand sixteen was also the year for the Blue Thumb Biennial Volunteer Conference. This year’s theme was Bugs, Fish and Stewardship! Volunteers were offered a pre-conference Google Earth workshop and learned how we identify fish and benthic macroinvertebrates. Attendees at

the conference were treated to a discussion on the geology of the canyon where the conference was held in west central Oklahoma by one of our Blue Thumb volunteers.

Volunteers left the conference with information on how to set up an educational display and with a small poster and stand to help spread the word about preventing nonpoint source pollution.



Volunteers learned a lot about bugs, geology and watershed mapping at the Blue Thumb Conference.



2016 - A Year of Change

Scary and exciting things happened to the Blue Thumb Program in 2016. August 31, 2016 saw the retirement of long-time Blue Thumb director Cheryl Cheadle. Cheryl was the creative, energetic force behind the program for nearly 25 years and her leaving left a hole that will take several people to fill.

Jean Lemmon, former Blue Thumb Quality Assurance Officer returned to the Blue Thumb family as the administrative director. She has taken over administrative duties, such as employee supervision and reporting and will provide support to the other staff as needed. A new Blue Thumb educator, Robert Barossi, was hired in December and will begin working in January 2017. With the additions of Jean and Rob, Blue Thumb will have its largest staff in many years.

The Conservation Commission has always been the lead agency for the Project W.E.T. program in Oklahoma. Project W.E.T. is Water Education for Teachers and is a training program and curriculum for teachers to educate students about all things water, including water quality and water quantity management. Until this year, that program had been housed in another division of the agency. Due to staff changes, that program has become a part of Blue Thumb and Candice Miller has been named as the Project W.E.T. coordinator. This is an exciting opportunity for the staff to better help educators provide activities for the classroom and provides for several additional educational tools.

Kim Shaw continues as the quality assurance officer and is working on new ways to help volunteers interpret their data and make it more readily available to the public. She works with the Oklahoma GIS office to keep the Blue Thumb clickable data map updated so anyone can go to www.bluethumbok.com and find information about the streams volunteers monitor.

Jeri Fleming still serves as the communications manager and is always working to find new ways to help educate the public and build new partnerships. She was instrumental in the development of the summer camps and teachers' workshop. She continues to maintain the Blue Thumb website, monitors and posts to the Facebook page, and started an Instagram account.

The scary part of 2016 was Cheryl's retirement; the exciting part is the new opportunities that the Blue Thumb staff constantly strives to find and develop.



2016 saw the retirement of long-time Blue Thumb director Cheryl Cheadle and the hiring of new educator Robert Barossi.

Summary information for Blue Thumb Program, 2016: Blue Thumb Volunteer Monitoring Program

At the heart of the Blue Thumb program are the volunteers who spend many hours each year monitoring streams, participating in quality assurance sessions, meticulously picking through preserved samples of macroinvertebrates and providing education to the public. In 2016, Blue Thumb volunteers monitored over 80 streams across Oklahoma, and Blue Thumb staff and volunteers reached over 11,000 people at various education events, and another approximately 5,000 were reached as a result of materials being handed out. Appendix D is comprised of 12 monthly pictorial reports highlighting many of these activities and our volunteers.

Quality Assurance Sessions for Ensuring Credible Monitoring Results

Ensuring quality data is collected and thus usable by the State of Oklahoma in reporting is built into all aspects of volunteer monitoring. Blue Thumb volunteers:

- ◆ Attend a 12 hour training that covers pollutants, watersheds, stream ecology, field collections, and chemical monitoring
- ◆ Either form a team, or are placed on existing teams to begin stream monitoring
- ◆ Submit data to quality assurance officer Kim Shaw
- ◆ Participate in field collections overseen by staff members
- ◆ Attend quarterly quality assurance sessions

The quality assurance (QA) sessions are held each quarter and volunteer participation is mandatory. Scheduling can be an issue, so Blue Thumb staff works to ensure all volunteers go through their quality assurance testing even if they miss a scheduled session.



Two times each year quality assurance sessions are held at the volunteers' monitoring site to ensure they are collecting water samples properly and from the correct location. The other two sessions are conducted indoors where volunteers answer questions and perform two tests with a known standard to test their knowledge, testing procedures, reagents and de-ionized water.

Twice a year volunteers perform tests on known standards, which allow Blue Thumb staff to check:

- ◆ Volunteer skills
- ◆ Reagents
- ◆ Quality of de-ionized waters
- ◆ Cleanliness of test kits

- ◆ Volunteer knowledge

In the winter and summer, during benthic macroinvertebrate collection season, volunteers participate in on-site quality assurance sessions. This allows staff members to ensure:

- ◆ Volunteers take their samples and test for dissolved oxygen at the appropriate location in the stream
- ◆ Their rinse technique is correct
- ◆ All relevant items are taken to the site
- ◆ Air temperature is always taken before water temperature
- ◆ Secchi measurement is taken at deepest spot on site

The on-site quality assurance sessions also allow Blue Thumb staff and the volunteer(s) an opportunity to spend one-on-one time together. This helps develop a bond and allows staff and volunteer to get to know each other better. When a personal connection is made it serves to strengthen the program by helping the volunteer feel more a part of the overall program goals. This is important because many volunteers go out month after month on their own to do their monitoring and sharing “their” creek with staff for just an hour helps each of us better understand the commitment we each have to protecting water quality.

Assuring that the data received is accurate; quality assurance is incorporated throughout the Blue Thumb monitoring program. Besides the quarterly QA sessions, volunteers run each test twice to ensure they get repeatability on readings. If readings are more than two numbers off the volunteer is taught to rerun the test to figure out which is the correct number. If differing results still happen then the volunteer is taught to go back to the stream to get a new water sample and start over. Additionally, volunteers run blanks on several tests. When blanks are run the results should be no reading as the volunteers are using de-ionized (DI) water as their sample water. If a result other than 0 is read then the quality assurance officer will contact them and set up a time to meet and test their DI water, reagents and techniques.

As required by EPA the Blue Thumb Quality Assurance Officer updates and submits for approval a quality assurance plan. Appendix A of this report includes the most recent Blue Thumb Quality Assurance Plan.

May through September volunteers have the option of performing bacteria testing. This is the eighth year that Blue Thumb has provided the volunteers with the Coliscan Easygel. Included with the supplies is a sample card that is a color photo of a petri dish with bacteria grown and the colors that indicate *Escherichia coli* circled to help volunteers more easily identify it.

Beginning in November volunteers on Town Branch Creek began monitoring for *E. coli* every month as the stream is listed for bacteria and the volunteers have organized Friends of Town Branch to help bring awareness of the issue and to help improve the water quality of the stream. More information about this new watershed educational group is included later in this report.

Quality Assurance Sessions for Additional Blue Thumb Activities

Other important aspects of volunteers attending quality assurance sessions include

- ◆ Replenishing reagents

- ◆ Hearing important announcements
- ◆ Learning about new activities and techniques
- ◆ Benefiting from continuing education
- ◆ Signing up to help with education events
- ◆ Visiting with other volunteers



Group quality assurance sessions allow staff time to teach volunteers about the new tools acquired. Individual quality assurance sessions give both staff and volunteers an opportunity to get to know each other and have a little fun.

Macroinvertebrate Collections

Blue Thumb volunteers participate with staff in Blue Thumb field experiences, particularly the collection of benthic macroinvertebrates. Collections of these larval insects, snails, mussels, worms and other spineless creatures from the stream take place primarily in January/February and July/August of each year.

Blue Thumb volunteers learn early on that understanding stream health means gaining information on water chemistry, the life of the stream, and the stream's physical features. An important part of this effort is the re-occurring collection of macroinvertebrates. Normally these creatures are taken from a riffle with a kick net, according to Oklahoma Conservation Commission "standard operating procedures". Going outside with volunteers to make collections provides them with very important information, including:

- ◆ Field work takes place in all kinds of weather
- ◆ Macroinvertebrate collections are made with great attention to detail and according to standard operating procedure
- ◆ The life of a stream goes well beyond fish and land animals
- ◆ Aquatic insects frequently have very unique life histories that make it interesting to know more about your stream
- ◆ Aquatic insects are an important part of the stream's food web
- ◆ Macroinvertebrate collection results and habitat information are used together, so a combination of information is important

Macroinvertebrate collections made in 2016 include:

2016 Winter Bug Collections		
Name	M/F	Date
Delaware Creek: Hwy 97 Bridge	Macro	21-Jan-16
Deer Creek: Meridian Avenue	Macro	26-Jan-16
Mingo Creek: 46th Street North	Macro	26-Jan-16
Nickel Creek: 91st Street	Macro	26-Jan-16
Crutcho Creek: First Baptist Church	Macro	27-Jan-16
Crow Creek: Zink Park	Macro	27-Jan-16
Mooser Creek: Pepsi	Macro	27-Jan-16
Fred Creek: Evanston	Macro	27-Jan-16
Coal Creek: Hwy 11	Macro	28-Jan-16
Flat Rock Creek: Hwy 75	Macro	28-Jan-16
Sand Creek: Osage Hills State Park	Macro	28-Jan-16
Rock Creek: Hwy 33	Macro	29-Jan-16
Harlow Trib: Golden Acres	Macro	29-Jan-16
Ranch Creek: Owasso	Macro	30-Jan-16
Haikey Creek: 121st Street	Macro	30-Jan-16
Bishop Creek: Constitution Street	Macro	01-Feb-16
Little River: SW 34th St.	Macro	02-Feb-16
Spring Creek: Fram	Macro	02-Feb-16
Park Hill Branch Creek: Murrell Home	Macro	02-Feb-16

Tahlequah Town Branch: Spring Street	Macro	03-Feb-16
Cedar Hollow Creek: Nickel Preserve	Macro	03-Feb-16
Tahlequah Ross Branch: Town Confluence	Macro	03-Feb-16
Park Hill Branch: Parkhill Rd.	Macro	03-Feb-16
Little Deep Creek: Weatherford	Macro	04-Feb-16
Spring Creek: Martin Park	Macro	04-Feb-16
Elm Creek: Indian Hills Road	Macro	05-Feb-16
Merkle Creek: Brooks Street	Macro	05-Feb-16
Deer Creek: Hwy 4	Macro	08-Feb-16
Rock Creek: Oklahoma Street	Macro	10-Feb-16
Little Sandy Creek: Chamber Loop	Macro	10-Feb-16
Chisholm Creek: 33rd & Western	Macro	11-Feb-16
Guy James Creek: NW Eubanks St.	Macro	11-Feb-16
Unnamed Trib to Arkansas River	Macro	11-Feb-16
Dirty Creek: N4550 Rd.	Macro	11-Feb-16
Sans Bois Creek	Macro	11-Feb-16
Dirty Creek: N4550 Rd.	Macro	11-Feb-16
Crutcho Creek: I-40	Macro	12-Feb-16
Sharp Creek: Smith Grove	Macro	13-Feb-16
Sharp Creek: Smith Silo	Macro	13-Feb-16
Soldier Creek: Hwy 66	Macro	16-Feb-16

Middle Creek: Buzzard Roost Ranch	Macro	17-Feb-16
Chisholm Creek: Sorghum Mill Rd.	Macro	17-Feb-16
Mustang Creek: Morgan Road	Macro	22-Feb-16
West Elm Creek: S. Douglas	Macro	22-Feb-16
Hog Creek: SE 149th	Macro	22-Feb-16
East Cache Creek: Big Green	Macro	22-Feb-16
East Cache Creek: Rodgers Lane	Macro	22-Feb-16
Wolf Creek: Gore Blvd.	Macro	22-Feb-16
Wolf Creek: McMahon Soccer Park	Macro	22-Feb-16
Post Oak Creek: Indianoma Road	Macro	22-Feb-16
Jimmy Creek: Prose	Macro	22-Feb-16
Spring Creek: I-35	Macro	22-Feb-16
Mud Creek: E 2170 Road	Macro	22-Feb-16
Yashoo Creek: Little River NWR	Macro	22-Feb-16
Buffalo Creek: Ballard	Macro	22-Feb-16
Bluff Creek: Battiest	Macro	22-Feb-16
Tiger Creek: E. Woods St.	Macro	02-Mar-16
Little Horse Creek	Macro	03-Mar-16
Spring Creek: Cooper's	Macro	07-Mar-16
Baron Fork River: Welling Road	Macro	07-Mar-16
Tar Creek: H Street N.E.	Macro	08-Mar-16

2016 Summer Bug Collections		
Name	M/F	Date
Tiger Creek: E. Woods St.	Macro	29-Jun-16
Yashoo Creek: Little River NWR	Macro	09-Jul-16
Crow Creek: Zink Park	Macro	11-Jul-16
Hickory Creek: Hwy 70	Macro	14-Jul-16
Rock Creek: Oklahoma Street	Macro	14-Jul-16
Little Deep Creek: Weatherford	Macro	25-Jul-16
Cloudy Creek: Glass	Macro	26-Jul-16
Wolf Creek: Gore Blvd.	Macro	28-Jul-16
Jimmy Creek: Prose	Macro	28-Jul-16
Bishop Creek: Eastwoods Park	Macro	01-Aug-16
Deep Fork River: Hwy 56 Bridge	Macro	03-Aug-16
Deep Fork River: Rocky Shoals	Macro	03-Aug-16
Choctaw Creek: Triple X Rd.	Macro	05-Aug-16
Wolf Creek: McMahon Soccer Park	Macro	05-Aug-16
Little River: SW 34th St.	Macro	10-Aug-16
Brookhaven Creek: North of Main	Macro	10-Aug-16
Crutcho Creek: First Baptist Church	Macro	10-Aug-16
Crutcho Creek: I-40	Macro	10-Aug-16
Chisholm Creek: Sorghum Mill Rd.	Macro	10-Aug-16

Deer Creek: Meridian Avenue	Macro	10-Aug-16
Deer Creek: Meridian Avenue	Macro-REP	10-Aug-16
Chisholm Creek: 33rd & Western	Macro	10-Aug-16
Tahlequah Town Branch: Spring Street	Macro	10-Aug-16
Cedar Hollow Creek: Nickel Preserve	Macro	10-Aug-16
Park Hill Branch Creek: Murrell Home	Macro	10-Aug-16
East Cache Creek: Big Green	Macro	11-Aug-16
East Cache Creek: Rodgers Lane	Macro	11-Aug-16
Baron Fork River: Welling Road	Macro	11-Aug-16
Spring Creek: Fram	Macro	11-Aug-16
Tahlequah Town Branch: Basin Street	Macro	11-Aug-16
Sharp Creek: Smith Grove	Macro	13-Aug-16
Sharp Creek: Smith Silo	Macro	13-Aug-16
Bishop Creek: Constitution Street	Macro	15-Aug-16
Soldier Creek: Hwy 66	Macro	16-Aug-16
Nickel Creek: 91st Street	Macro	17-Aug-16
Fred Creek: Evanston	Macro	17-Aug-16
Haikey Creek: 121st Street	Macro	17-Aug-16
Rock Creek: Hwy 33	Macro	17-Aug-16
Boomer Creek: 3rd Ave	Macro	17-Aug-16
Spring Creek: I-35	Macro	18-Aug-16

Flat Rock Creek: Hwy 75	Macro	18-Aug-16
Mooser Creek: Pepsi	Macro	18-Aug-16
Dirty Creek: N4370 Road	Macro	18-Aug-16
Coal Creek: Hwy 11	Macro	19-Aug-16
Mingo Creek: 46th Street North	Macro	24-Aug-16
Sanborn-Hazen Lake Creek: Strickland Park	Macro	24-Aug-16
Elm Creek: Indian Hills Road	Macro	26-Aug-16
Mustang Creek: Morgan Road	Macro	29-Aug-16
Merkle Creek: Brooks Street	Macro	30-Aug-16
Spunky Creek: Hwy 412	Macro	31-Aug-16
Little Sandy Creek: Chamber Loop	Macro	07-Sep-16
Little Sandy Creek: Hwy 99	Macro	07-Sep-16
Sand Creek: Osage Hills State Park	Macro	09-Sep-16
Stillwater Creek: Brush Creek Road	Macro	12-Sep-16
Stillwater Creek: Babcock Park	Macro	12-Sep-16
Boomer Creek: S. Perkins	Macro	12-Sep-16
Sans Bois Creek	Macro	13-Sep-16



Bug collections are held in the heat of summer and the cold of winter, but dedicated volunteers are always there to give us a helping kick.

The new year brought with it historic floods in eastern Oklahoma and again in southern Oklahoma, while western Oklahoma has been in an increasing drought. The winter macroinvertebrate collections, in particular in the areas with heaving flooding seemed to be off and even the crystal clear, gravel streams that generally don't have mud in the samples, did this year. However, by summer collections the eastern part of the state was in a mild drought, but the summer bug collections seem to have been improved. As weather patterns change it will be interesting to see how bug collections change as well.

Macroinvertebrate Subsampling

The spring and autumn quality assurance sessions are held in conjunction with macroinvertebrate subsampling. In these sessions, a portion of the "bugs" and other spineless creatures from the collection are removed from the algae, rocks, sticks, leaves, etc. Volunteers do the work of bug removal, but they are watched over by staff members who:

- ◆ Check to see that the items removed really were once alive
- ◆ Check "picked" squares to see that all bugs have been found and

- ◆ Transfer the chosen 100 to 150 creatures to a vial in preparation for a journey to the Oklahoma Conservation Commission contract taxonomist.

While it is the role of the taxonomist to identify the creatures submitted, information on the various bugs of the sample is shared with volunteers during subsampling. Reference information on larval insect species, worms, snails, etc. is available, and many volunteers have become familiar with the creatures of their stream. Even a budding stream ecologist can grasp the importance of finding a diversity of creatures in their sample.

Of additional benefit to the volunteers are the books about aquatic insects that are available at all subsampling events. Often the bug pickers want to know what a certain bug looks like once it exits the watery world to become an adult. On more than one occasion, “gift” books that tell about macroinvertebrates have been made available to volunteers.

It is one of the biggest benefits of the Blue Thumb Program that volunteers are involved in a “full circle” approach. Volunteers, who perform chemical monitoring, go to the site and help with the collection, and then participate in macroinvertebrate subsampling, get to experience the whole macroinvertebrate effort.



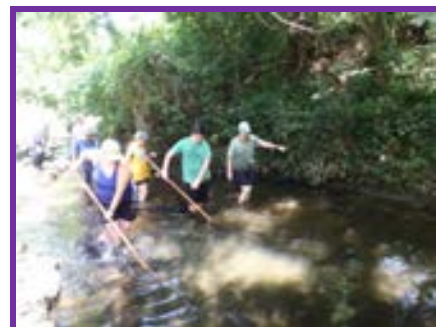
Volunteers first wash their sample over a sieve to get out the large debris then they randomly (based on a random number generated sheet) pick through squares until they have between 100 – 150 bugs. Then staff transfers the bugs to a small vial to send off for identification.

Fish Collections

Blue Thumb fish collections are performed on the individual streams approximately once every five years. Fish collections are held in conjunction with habitat assessments. Volunteers probably get their best introduction to streams when they participate in these activities.



Staff and volunteers alike enjoy fish collection season. It's a great time to be in the water!



For the time frame of this report, fish were collected from:

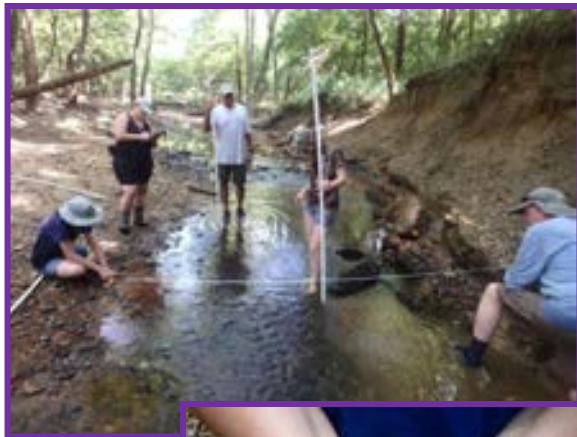
2016 Fish Collections		
Name	M/F	Date
Tiger Creek: E. Woods St.	Fish	29-Jun-16
Crow Creek: Zink Park	Fish	11-Jul-16
Cloudy Creek: Glass	Fish	26-Jul-16
Wolf Creek: Gore Blvd.	Fish	28-Jul-16
Wolf Creek: Gore Blvd.	Fish - REP	02-Aug-16
Turkey Creek	Fish	03-Aug-16
Bluff Creek: Battiest	Fish	08-Aug-16
Yashoo Creek: Little River NWR	Fish	09-Aug-16
Soldier Creek: Hwy 66	Fish	16-Aug-16
Coal Creek: Hwy 11	Fish	19-Aug-16
Tenmile Creek: Davis	Fish	22-Aug-16
Mingo Creek: 46th Street North	Fish	24-Aug-16

Sites to receive a fish collection are selected primarily by ecoregion, and Oklahoma’s ecoregions receive collections through rotation. In addition, some new sites are added to the mix each year, or a site that was missed the previous year might be added.

Volunteers work with Blue Thumb staff to seine a 400 meter reach of stream. The staff member is the “lead collector”. This person is responsible for fish identification, deciding what fish will be kept as representative specimens, and photographing larger fish that will be released. The fish collection allows volunteers to experience:

- ◆ The variety of fish living in the stream
- ◆ Different fish occupying different stream habitats
- ◆ The individual sizes, builds, and colorations of fish
- ◆ The effort that must go into a fish collection to achieve reliable results and
- ◆ The importance of labeling, record-keeping and documenting the collection.

Assessing the stream habitat, done just before the fish collection, is also an “eye opening” experience for volunteers. This on-site effort is essentially a look at the stream from the viewpoint of a fish, and in some cases the viewpoint of a macroinvertebrate. As people, we tend to always view things from a people perspective. It is interesting to seek out the undercut banks, make note of the woody debris, and contemplate the size of the rocks in the runs so that we can understand what kind of “home” the stream really is.



Fish collections allow the volunteers to learn the importance of good habitat, see the diversity of fish in their stream and seining the day away in a creek during the heat of summer is a nice, cool break from their normal routine.

Volunteer Training Sessions

The Blue Thumb Program recruits volunteers in new areas, and also recruits new volunteers to enter existing program areas. This is another important aspect of the maintenance and promotion task.

Blue Thumb Trainings held in 2016:

- ◆ January 22 – 23 Norman (22)
- ◆ February 19 – 20 Stillwater (29)
- ◆ July 14 – 15 Sulphur (18)
- ◆ October 28 – 29 Owasso (20)

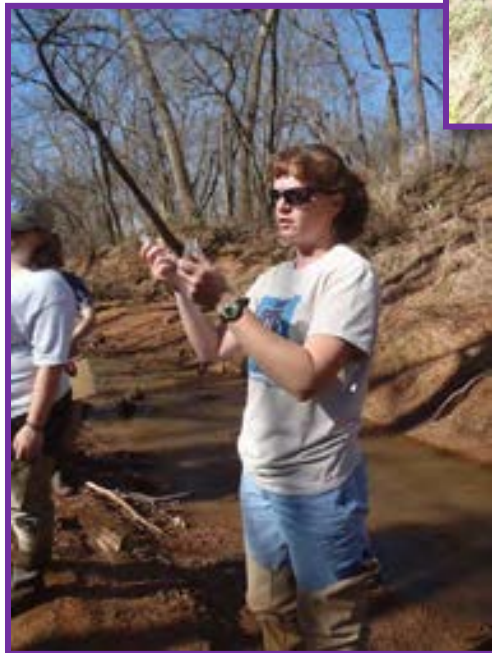
Blue Thumb training sessions introduce and educate participants in the subject areas of:

- ◆ Stream monitoring
- ◆ Stream ecology

- ◆ Watersheds
- ◆ Common pollutants
- ◆ Communications
- ◆ Stewardship and
- ◆ Field collections

Blue Thumb volunteers graduate from training ready to join a team and begin monthly monitoring on a site. They spend much of their volunteer time doing chemical monitoring. Chemical tests performed are:

- ◆ Temperature
- ◆ Secchi depth
- ◆ Dissolved oxygen
- ◆ pH
- ◆ Nitrate /Nitrite
- ◆ Ammonia nitrogen
- ◆ Orthophosphate phosphorus
- ◆ Chloride



Future volunteers learn proper collection techniques as described by Kim Shaw, quality assurance officer as part of Blue Thumb training. They also spend time learning about watersheds, nonpoint source pollution and proper chemical testing techniques. With the online instructional videos that were added last year to the website, Blue Thumb volunteers have all the tools they need to be successful.

Mini-academies for Middle School, High School and College Students

Blue Thumb mini-academies are offered to the students of teachers who have completed Blue Thumb training. Sometimes teachers like the opportunity to have the students taught by Blue

Thumb staff and it serves as a refresher for them as well. The time frame of this grant was the sixth year to offer mini-academies, and these events have been an excellent way to increase student interest and improve the quality of data received. Each mini-academy has a personality of its own, but essentially the students learn the testing procedures. Where more time is scheduled, students also go to the stream to gather sample water and make observations. Blue Thumb staff members view the mini-academies as very valuable experiences.

While these academies have been offered for six years, the request for them continues to grow and more educators are incorporating them into their curriculum. Blue Thumb staff generally tries to schedule enough time to also take the students to the stream to give them a short stream experience. Some of the students haven't ever pulled a seine or seen a crawdad and these experiences will stick with them as they mature into adults and make a difference in the world around them.

Mini-academies held in 2016:

- ◆ January 13, Southwestern Oklahoma State University (Deer Creek Conservation District)
- ◆ January 21, College of Muscogee Nation (Okmulgee County Conservation District)
- ◆ September 2, Southwestern Oklahoma State University (Deer Creek Conservation District)
- ◆ September 7, Wes Watkins Technology Center (Hughes County Conservation District)
- ◆ September 13, Cameron University (Comanche County Conservation District)
- ◆ September 15, Oklahoma School of Innovation & Experiential Learning (Wagoner County Conservation District)
- ◆ October 7, University of Tulsa (Tulsa County Conservation District)
- ◆ October 17, Hodgen Middle School (Leflore County Conservation District)



Mini-academies introduces new people to the Blue Thumb program and water quality monitoring that might not otherwise find out about us. It is always exciting when we run into someone who says they did Blue Thumb in school and now are working in an environmental field!

2. Blue Thumb Watershed Education Events

Appendix C is comprised of the Blue Thumb monthly reports. They include more detailed information on all the educational events Blue Thumb organizes and participates in. This section will highlight some of the major events staff and volunteers participated in during 2016.

Bugs, Fish and Stewardship!

The biennial Blue Thumb volunteer conference was held at Canyon Camp outside of Hinton and was attended by volunteers, Oklahoma Conservation Commission leadership and Friends of Blue Thumb board of directors. Dr. Mike Smolen, one of the founders of the Blue Thumb program, organized a pre-conference workshop on using Google Earth to develop watershed maps for educational purposes. Dr. Dharmendra Saraswat from Purdue University taught the workshop and also made a presentation at the conference on free mapping products available on the internet. The workshop filled up quickly and now volunteers are armed with new ways to educate.



Volunteers also got the opportunity to see bugs up close through a microscope and Conservation Commission taxonomist Nathan Carter explained how he identifies macroinvertebrates by their mouth parts. In a related session, Commission water quality



Volunteers heard updates from three watershed education groups; got an up close and personal look at macroinvertebrate identification techniques; took data from a stream and learned how to decipher it into something everyone can understand at the Blue Thumb Conference.



specialist Wes Shockley helped volunteers understand fish identification techniques. Taking the data collected and turning it into something the public can understand was the focus of a session headed up by Kim Shaw. She helped volunteers decipher what the data meant and explained the data interpretation report development process. Jeri tagged on at the end and talked to the volunteers about making presentations, setting up an informational booth and that the Blue Thumb staff is there to help them disseminate their information. At the end of the conference, as previously mentioned, volunteers were given a small display poster, an easel and a document stand to use as the foundation for a display at community events.

A Grand Adventure!

In 2015, Blue Thumb offered one summer camp in partnership with the Grand River Dam Authority. It was such a success that for 2016 the two partnered again, but this year offered two sessions, one in June and one in July. Each session had over 20 kids that participated. The kids again got a life-jacket, a small bug net, a t-shirt and lunch. While most of the campers were new, a few repeat campers had such a great time last year, they came back for 2016.

The kids actually retained quite a bit of what they learned as Jeri found out at a natural resource day in Vinita. Two campers attended the event and helped Jeri demonstrate the stream trailer to their classmates. The camps have been a great experience for staff and campers alike and this is a partnership that will continue in 2017 and expand to include a camp in the Illinois River watershed.



***A Grand Adventure!
was had by all who
attended, from the
youngest to the oldest!***

Statewide Watershed Education Events

Exciting things have been happening with the Oklahoma Conservation Commission's "watershed coalition" initiatives. Volunteer Jahna Hill began organizing Tahlequah area residents to form Friends of Town Branch Creek to help raise awareness about nonpoint source pollution issues in the clear, cool stream that runs through the entire city of Tahlequah, including several parks where children often play on hot summer days. The stream is listed on Oklahoma's 303(d) list for E. coli and the group's goals include identifying sources, educating the public and city leadership about the problem and monitoring the stream's chemistry and monitoring for E. coli.

The Crow Creek Community has made great strides in educating the public and in developing a native prairie plot on three contiguous city-owned floodplain lots. This effort has strengthened the relationship between the Commission, its volunteers, the city of Tulsa and the Tulsa County Conservation District. This has really become a community effort!



Friends of Pennington Creek was slow to start due to flooding, but 2016 proved to be eventful with a regatta and a creek clean-up! April was a busy month for the group with education events at the Chickasaw Nation Capitol Grounds, a creek cleanup and the first annual Pennington Creek Canoe and Kayak Regatta. Another creek clean-up was held in September and plans are underway for the second annual Regatta.



Since the organization and management of a watershed coalition can be time consuming for staff, future efforts will come about through the initiative of volunteers with support from the Commission and Blue Thumb staff.

The EPA Region 6 Stormwater Conference was held in Oklahoma City in October and Blue Thumb was excited to offer a ½ day workshop. The workshop included information on educating the public and what we had to offer Oklahoma communities. Kim and Jeri did a presentation on what Blue Thumb is, demonstrated the Enviroscape, the tabletop rainfall simulator, let participants make fish prints, and Kim did a short course on fish and benthic macroinvertebrate identification. About 18 stormwater professionals got a look at what can be done in a fun and interactive way to educate the public on reducing nonpoint source pollution and impacts to water quality.



3. Groundwater Education and Screening Events for Western Oklahoma

Blue Thumb Groundwater Screening

April 6 – Harper County

August 17 – Creek County

October 19 – Weatherford (Deer Creek Conservation District)

Again this year, Blue Thumb offered three groundwater screenings as requested by conservation districts. These are important opportunities for landowners to better understand the health of their drinking water and provide the conservation districts information about the area's water supplies.

If abnormal results are found landowners are referred to the Oklahoma Department of Environmental Quality. Quality control is built into the groundwater screenings through intense training efforts and oversight by Blue Thumb staff during testing. Washing of testing equipment is done after every 10th sample for the Nitrate test to ensure buildup does not affect the results.

Districts request screening from us, so the amount of screenings done each year varies. That said, at this year's conservation district area meetings there was a strong reminder to the districts that they can contact us to set up a screening, so we hope to see this number increase in 2017. Results for each of the groundwater screenings are included in Appendix B.



Performing the various tests for a groundwater screening takes several volunteers. Sometimes conservation district directors and Conservation Commission staff pitch in and sometimes an excellent teaching opportunity for students is provided.

4. Support to Oklahoma's Conservation Districts

By working with Oklahoma's 85 conservation districts, Blue Thumb is able to reach more people for both trainings and education. The districts play an important role in getting information out to landowners by making available Blue Thumb calendars, services catalogs and inviting staff to participate in natural resource days.

This year Blue Thumb staff participated in 18 natural resource days with conservation districts, reaching over 2,000 students. Conservation districts also show appreciation to Blue Thumb volunteers. In June the Oklahoma County Conservation District gave back to volunteers in Oklahoma and surrounding counties by holding a volunteer appreciation dinner where each volunteer received a Cabela's gift card. Funding for the event was provided by a grant from Friends of Blue Thumb.



Blue Thumb Measures of Success

A. Continuation of at least 75% of existing Blue Thumb Programs

Blue Thumb has met this Measure of Success. Monitoring takes place in the following counties:

Beaver	McCurtain
Blaine	Murray
Canadian	Muskogee
Cherokee	Oklahoma
Cleveland	Okmulgee
Comanche	Osage
Creek	Ottawa
Hughes	Payne
Johnston	Pontotoc
Kay	Pushmataha
Latimer	Roger Mills
LeFlore	Rogers
Lincoln	Stephens
Logan	Tulsa
McClain	Woodward

Other counties are involved through groundwater screenings and education events. The monthly reports included in the appendices provide more information on district/Blue Thumb collaboration.

B. Friends of Blue Thumb

The Oklahoma Blue Thumb Association is undergoing reorganization and has changed its name to Friends of Blue Thumb. The original name caused confusion with volunteers, which the name change has alleviated. Additionally, the organization has made all active Blue Thumb volunteers members and dues optional. Non-active volunteers can join for a nominal membership fee of \$10 annually.

Friends of Blue Thumb again helped sponsor the two kid's summer camps and the teachers' workshop. Through sponsorships and registration fees they also covered the meals and lodging costs for the Blue Thumb conference.

Since Cheryl's retirement, she has become more actively involved in the organization and it is anticipated that volunteers will receive more support in the future.

C. Blue Thumb Data Reports

Data reports in various stages of completion include the following streams:

- ◆ Bishop Creek: Constitution (Cleveland County)
- ◆ Pennington Creek: West Trail Road
- ◆ Crutch Creek: First Baptist Church
- ◆ Middle Creek: Buzzard Roost Ranch

The number of data reports started in 2016 is down from 2015, but the number for 2017 will exceed this year. The timing of when data reports are written varies due to when data is received.

At the Blue Thumb conference this year, how volunteers can use their data reports was highlighted and we anticipate volunteers will begin using them more as educational tools.

Because the staff is still waiting on the volunteers to complete the above listed data interpretations, none are included in this year's final report.

D. Volunteers will Make Blue Thumb Presentations – Two Annually

Blue Thumb volunteers went above and beyond in 2016 with their presentations. Two volunteers, George Fulk – Barren Fork Creek and Jim Leach – Soldier Creek, gave presentations. Mr. Fulk took the data interpretation that he wrote and turned it into a presentation about land use changes and water quality trends he had seen over the years. Mr. Leach discussed why he volunteers and general information about all that Blue Thumb offers its volunteers.

But the volunteers didn't stop there! Mr. Fulk also made his presentation at the Interior Highlands Mollusk Conservation meeting on May 18 in Tahlequah. Several news articles resulted from this presentation, which led to discussions on issues facing the stream.



Volunteers Mary and George Fulk, Jim Leach and Joyce Varner shared their Blue Thumb experiences at the 2016 Oklahoma Clean Lakes and Watersheds Association meeting.

While not specifically a presentation, four volunteers from Stillwater made a short video on what they do when they go to a stream to do their monthly monitoring. The four volunteers did this on their own and presented the video at the Blue Thumb Conference. The video is also posted on the Blue Thumb YouTube channel and was featured on the website.

E. Volunteers Using Data for Watershed Education

Volunteers have been very active in helping staff spread the word about nonpoint source pollution. As mentioned previously, Jahna Hill is working to organize Friends of Town Branch

Creek and organized a group of core stakeholders to preform monthly bacteria monitoring on three sites on Town Branch Creek. Additionally, she manned a booth at the Tahlequah Farmer's Market and spoke at a rally promoting clean water.

Volunteers provided education at a number of events across the state such as:

- ◆ Walmart in Stillwater
- ◆ Camp McFadden Outdoor Expo
- ◆ Edmond Farmer's Market
- ◆ Stillwater Farmer's Market
- ◆ ScienceFest
- ◆ Boo HaHa
- ◆ Camp Loughridge
- ◆ Har-Ber Village
- ◆ BioBlitz



Without volunteers helping spread the word about nonpoint source pollution prevention, staff would not be able to reach as many people as they do.



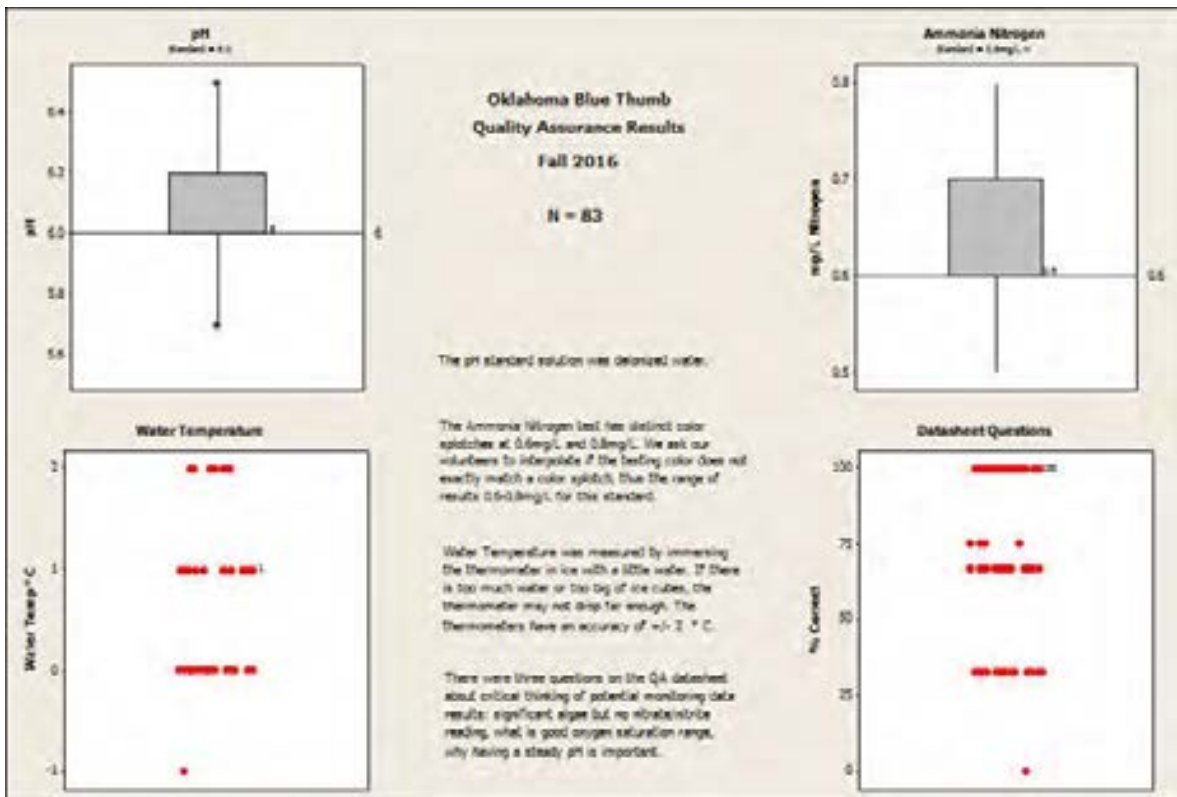
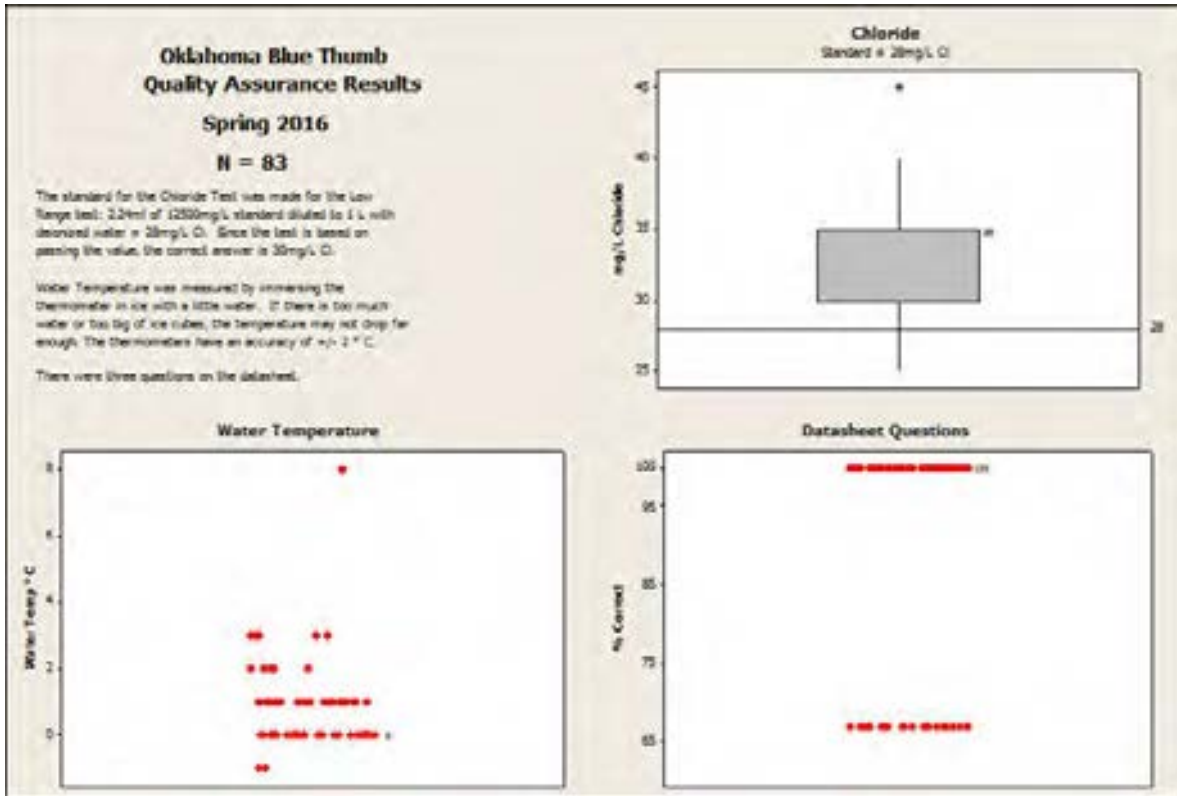
Lessons Learned/Obstacles Overcome

This year Blue Thumb had to overcome a huge obstacle in the retirement of their fearless leader, which left the program in a somewhat state of flux as leadership determined how to fill the hole left. Even through the uncertainty of having no director, the staff pulled together and organized the biennial conference, finished the calendar, held a regularly scheduled training, put together the annual newsletter, and performed their regular duties of bug picking and quality assurance sessions. In addition to that, they worked with leadership to hire a new staff member and welcomed a new director.

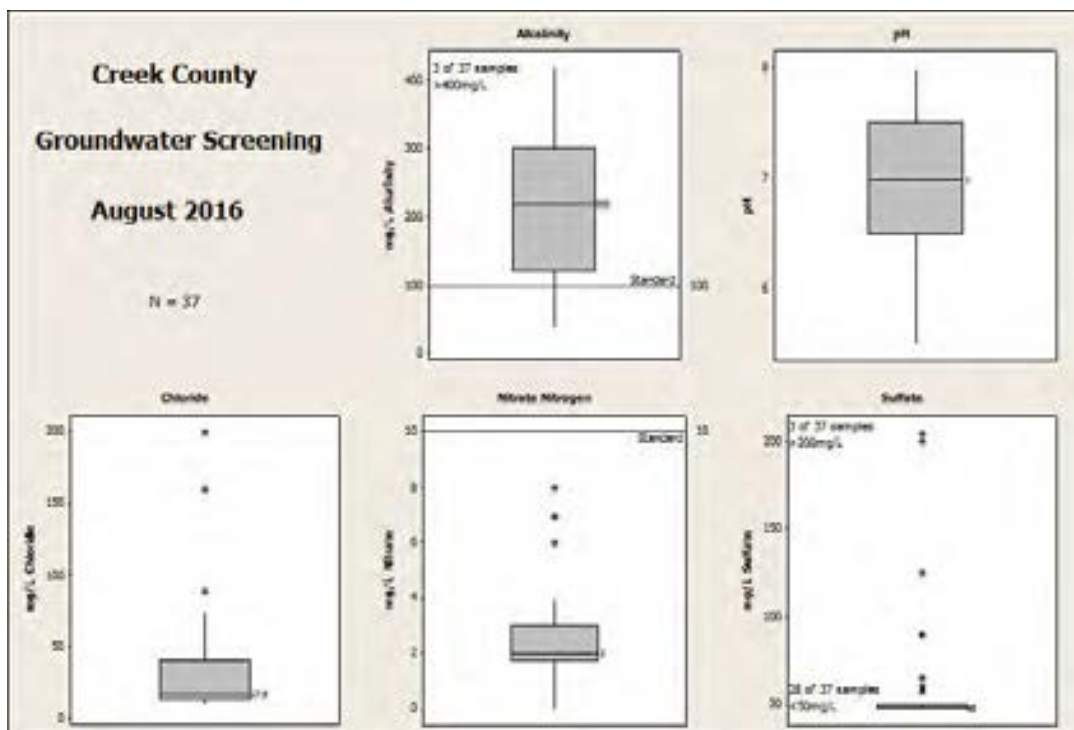
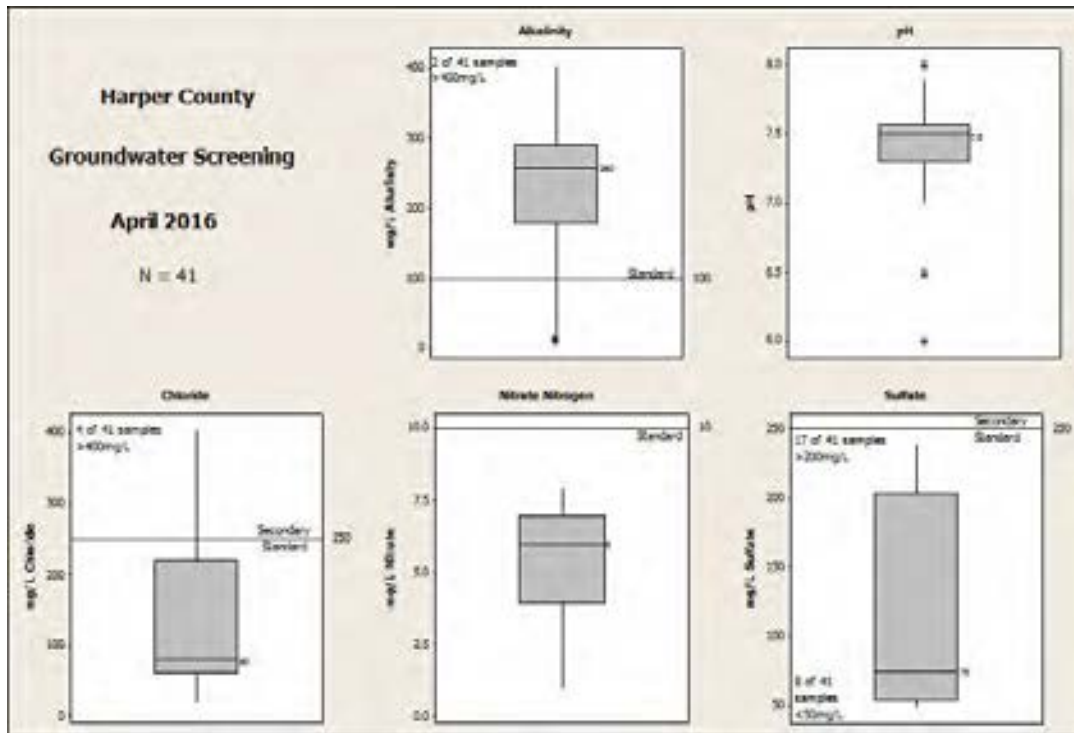
The lesson learned is that Blue Thumb staff is very committed to their volunteers and worked to ensure their volunteers felt comfortable with the continuation of Blue Thumb through it all. Staff believes 2017 will be another year of growth and improvement in the program and is excited about ideas the newest team member will bring to the table.



Appendix A – Quality Assurance



Appendix B – Groundwater Screening Results



**Deer Creek
Conservation District**

Groundwater Screening

October 2016

N = 38

