

Oklahoma Blue Thumb Final Report: January 1, 2018 – December 31, 2018
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Tulsa County Conservation District

Blue Thumb Monitoring Training in Tulsa at Mooser Creek

November 4, 2018



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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 2018.

BLUE THUMB PROGRAM DESCRIPTION

Blue Thumb is the education arm of the Oklahoma Conservation Commission's Water Quality Division. It is a statewide citizen science effort focused on training volunteers to share their knowledge of water quality with others, with the goal of stream protection through education. Blue Thumb aims to inspire and empower people across the state to use education and monitoring to protect water in their region from non-point source pollution.

Program Tasks

1. General Program Maintenance and Promotion
2. Statewide Watershed Education Events
3. Groundwater Education and Screening
4. Support Oklahoma's Conservation Districts
5. Review Active Stream Monitoring List and Determine Site Status

TASK 1. GENERAL PROGRAM MAINTENANCE AND PROMOTION ACTIVITIES

Changes to Blue Thumb began almost immediately in 2018 with a complete restructure of volunteer trainings, of which nine were held this year. This year, Blue Thumb integrated Project WET into their volunteer trainings, allowing for a more in-depth look at non-point source pollution and how many activities can be used to educate the public. Project WET is a collection of education materials focused on water resources and designed for a variety of age groups. In addition to the Blue Thumb trainings, bug collections and Quality Assurance (QA) sessions across the state were performed by staff (Kim Shaw, Candice Miller, Robert Barossi, and Becky Zawalski) with established monitoring volunteers. Experienced volunteers also worked to set up and mentor new volunteer monitors who had completed training.



Blue Thumb Staff (from left to right): Candice Miller, Becky Zawalski, Jean Lemmon, Matthew Moelling (2018 Summer Intern), Kim Shaw.

In the spring, a key change in staffing occurred with the introduction of Becky Zawalski to the team. The new Field Educator came from Ohio after completing school in Texas, and brought a new excitement about bugs and fish with her. She hit the ground



running in the middle of bug picking season, as well as representing Blue Thumb at a variety of Natural Resource Days and Earth Day festivals. With this addition, Robert was able to take a step back from field work and focus more on communications and outreach duties. He was able to extend his reach to parts of the state that had previously been lacking in Blue Thumb presence.

Becky worked closely with Robert in his areas of responsibility in preparation to take over his duties. Robert's areas included parts of the northeastern Oklahoma (including Cherokee, Muskogee, and Ottawa Counties), southcentral Oklahoma (Pontotoc, Johnston, and Murray Counties), and the panhandle. Candice Miller kept her areas in Tulsa, the southeastern corner of the state and Stillwater and surrounding areas. Kim Shaw continued to manage the Oklahoma City metro area, Edmond, and Norman, and the southwestern part of the state, in addition to her duties at the Quality Assurance Officer.

In July, Robert decided to leave the program to be closer to his family in Vermont. With his departure, areas of responsibility were rearranged for a more even workload among staff. This rearrangement will cut down on travel for some members, and clarify communication between volunteers and staff. With three out of four staff members working primarily in the field, this granted the opportunity to create a new position within the program. Cheryl Cheadle rejoined Blue Thumb in September as the new Volunteer Coordinator. Cheryl will be the primary contact for current and future volunteers, as well as promote volunteer involvement across the state.

Change isn't finished with Blue Thumb yet. Later in the year, Jean Lemmon announced the date of her retirement. Blue Thumb hopes to find a new Program Director to join the team at the start of the New Year and will continue to learn from Jean until she leaves at the end of January. Blue Thumb anticipates new, fresh ideas and further opportunities for growth with the addition of a new Program Director.

2018 was a year of social media growth for Blue Thumb. Blue Thumb used several platforms to increase their reach to the public and other agencies. Between the Blue Thumb website, Twitter, Facebook, Instagram and YouTube, Blue Thumb covers most areas of social media. Blue Thumb is also developing a data collection app in coordination with Michigan Tech students. The app is currently in beta testing, but when the app is ready to be launched, it will enable volunteers to fill out data sheets on their mobile device and submit the data directly to Kim Shaw.

Blue Thumb also continues to expand the groups and organizations with which we partner. Through trainings, summer camps, educational events and conferences, Blue Thumb staff work toward engaging people of all ages and professions in stream education and monitoring.



MONTHLY MONITORING

Without volunteers and their passion, enthusiasm and dedication, Blue Thumb would not be able to achieve its goals and maintain continued success. Blue Thumb Volunteers are asked to give hours of their time without anything in return other than the knowledge that their hard work is going to protect creeks and streams in their local area and across the state. One of the major components of Blue Thumb is the volunteer monitoring program, which includes monthly chemical monitoring, participation in quarterly quality assurance sessions, as well as assisting Blue Thumb staff with benthic macroinvertebrate collections, macroinvertebrate subsampling, habitat assessments and fish collections.

Once a month Blue Thumb volunteers visit their monitoring location to conduct streamside observations and collect samples to test for chemicals in the water. This year Blue Thumb volunteers conducted routine monitoring at 91 sites in 27 counties in Oklahoma (Figure 1).

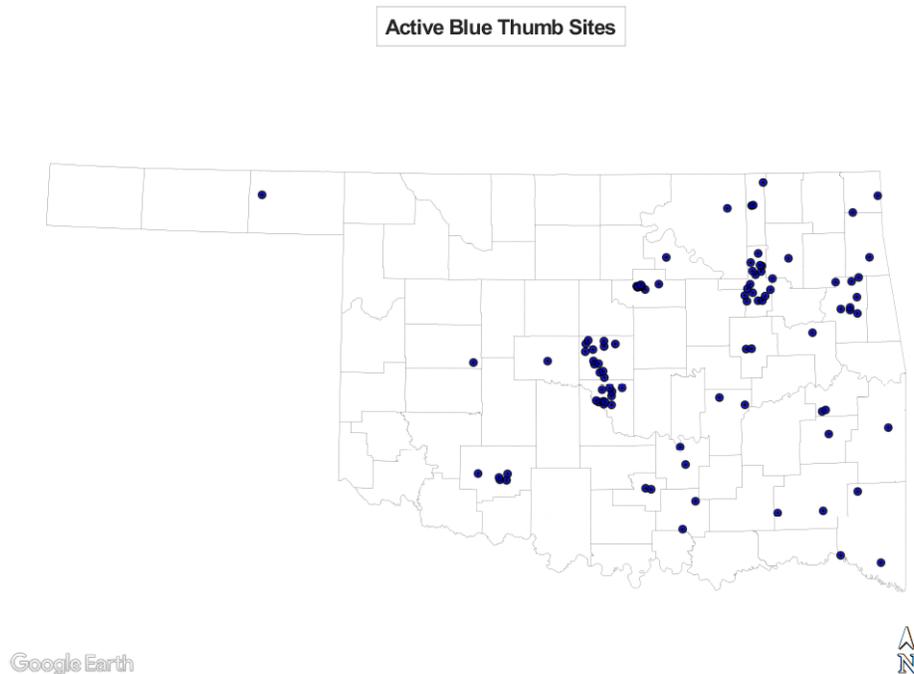


Figure 1. Blue Thumb stream monitoring sites.



A site visit, performed at the same time of day each month, starts with a site assessment during which the volunteer records:

- Air temperature
- Water temperature
- Water turbidity (via Secchi disk)
- Wind speed and direction
- Weather conditions
- Other observations (presence of trash, floating detritus, habitat alteration, flow alteration, iron participates, foam or scum, oil or grease, dead animals (including a fish kill), and significant algae)

After completing the site observations, the volunteer takes a water sample from a run upstream of a riffle. This sample will be tested for pH, nitrate nitrogen, nitrite nitrogen, ammonia nitrogen, orthophosphate phosphorus and chloride. The volunteer then fills the two bottles used for the dissolved oxygen test and adds reagents to “fix” the samples. The rest of the standard operating procedure to test the water samples can be completed indoors.

The volunteer completes the dissolved oxygen (DO) test and pH test as soon as possible after leaving the stream site. They also complete the remaining tests as soon as



Volunteers work together to gather data. Don Hayes uses a Secchi disk to measure turbidity while John Smith makes some stream side observations about the creek.



Volunteers perform a monthly monitoring test, which includes filling a bottle with sample water (left) and fixing it with reagents on site (right) for a dissolved oxygen test

possible, but the water sample can be refrigerated for up to twenty-four hours if testing cannot be completed immediately. Volunteers test their creek water for Dissolved Oxygen, pH, Ammonia, Nitrite, Nitrate, Orthophosphate phosphorus, and Chloride.

When testing is complete and the data sheet is filled out, volunteers submit the data to the Blue Thumb Quality Assurance Officer, Kim Shaw. Most volunteers use a fillable, online pdf form that they complete and email to Kim. Some volunteers scan and email their results but fax, mail, or hand delivery of data is



also acceptable. When the Blue Thumb App is ready to be launched, volunteers will have the ability to directly submit their data to Kim from any location with internet access. After Kim receives the data, she performs a quality assurance check and submits the data to the database administrator for the Oklahoma Conservation Commission. Volunteers are contacted by Blue Thumb staff if it appears that their data contain omissions, mistakes or abnormal results, or if it has been some time since they have submitted data.

Volunteers also have the option of conducting bacteriological testing from May through September.



Volunteers of all ages monitor across the state! College students collect bugs in Tahlequah (top left). A teacher brings her small children to help out with a bug collection in LeFlore County (top right). Middle school students use a kick net to look for bugs in Tulsa (bottom left). Two gentlemen braved the winter cold to collect bugs from their creek in Tulsa (bottom right).

Blue Thumb provides volunteers with the necessary supplies (e.g. Coliscan Easygel) and instructions to perform the tests. The supply kits contains a card with a color photo of bacteria growth, including *Escherichia coli* (*E. coli*), so volunteers may more easily and confidently identify it. A datasheet to



record results is also included. When the Blue Thumb App is ready to be launched, volunteers will be able to submit bacteriological results directly to Kim using a mobile device.

MACROINVERTEBRATE COLLECTIONS

In addition to chemical monitoring, Blue Thumb volunteers have the opportunity to conduct biological monitoring and habitat assessments alongside their area Blue Thumb staff person. Aquatic macroinvertebrate (“bug”) collections are performed twice a year, in winter (January 1-March 15) and summer (July 1-September 15). Collections are made according to the Oklahoma Conservation Commission’s Standard Operating Procedures (SOPs). If the stream contains riffles, macroinvertebrates are collected at three locations in the riffle or riffles. Collections are made in one square meter of substrate and are collected in a kick net that is also one square meter. Where feasible, field staff collect macroinvertebrates from riffles of varying velocities and substrate types. If the stream does not contain riffles, macroinvertebrates are collected from aquatic vegetation or woody debris.

Blue Thumb staff occasionally collect bugs on their own, but efforts are made to coordinate with the volunteer at each monitoring location and to include the volunteer in the collection of biological data. The summer and winter bug collections and the bug picking events also provide an opportunity for Blue Thumb staff to present quality assurance information to volunteers, and to perform quality assurance checks. Participating in macroinvertebrate collections gives the volunteer a deeper understanding of their creek; bug collections are also usually fun and exciting for both the volunteer and the Blue Thumb staff person. During macroinvertebrate collections, volunteers learn about aquatic ecology, food webs, life cycles of aquatic macroinvertebrates, which aquatic organisms are pollution-tolerant and which are pollution-sensitive, and how the biological, chemical and physical characteristics of the stream are interconnected. Volunteers can take this knowledge and use it to educate others in their community.

In 2018, 133 macroinvertebrate collections were conducted by Blue Thumb staff (Table 1).

Table 1: 2018 Benthic Macroinvertebrate Collections

Creek	Date
Crutch Creek: I-40	01/15/18
Tahlequah Town Branch: Spring Street	01/16/18
Spring Creek: Fram	01/19/18
Cedar Hollow Creek: Nickel Preserve	01/19/18
Baron Fork River: Welling Road	01/19/18
Coal Creek: Hwy 11	01/19/18



Creek	Date
Coal Creek: Morris Park	01/19/18
Delaware Creek: Camp Simpson Witch Hole	01/22/18
Brookhaven Creek: North of Main	01/22/18
Twin Hills Creek: E 121st St. S.	01/22/18
Adams Creek: Broken Arrow High School	01/22/18
Pennington Creek: West Road Trail	01/24/18
Guy Sandy Creek	01/24/18
Crutch Creek: First Baptist Church	01/24/18
Deep Fork Tributary: Classen	01/24/18
Tahlequah Ross Branch: Town Confluence	01/25/18
Little Sandy Creek: Hwy 99	01/25/18
Little Wewoka Creek	01/25/18
Deep Fork River: Rocky Shoals	01/25/18
Deep Fork River: Hwy 56 Bridge	01/25/18
Mustang Creek: Morgan Road	01/29/18
Little River: SW 34th St.	01/30/18
Fourmile Creek: Adams Park	01/30/18
Spring Creek: I-35	01/31/18
Bishop Creek: Constitution Street	02/01/18
Merkle Creek: Brooks Street	02/02/18
Little Deep Creek: Weatherford, Upstream of Treat	02/05/18
Stillwater Creek: Babcock Park	02/05/18
Sanborn-Hazen Lake Creek: Strickland Park	02/05/18
Boomer Creek: S. Perkins	02/05/18
Stillwater Creek: Brush Creek Road	02/05/18
Stillwater Creek: Brush Creek Road (Replicate)	02/05/18
Rock Creek: 60th Avenue NE	02/06/18
Sycamore Creek: D 4685	02/07/18
Sycamore Creek: D 4685 (Replicate)	02/07/18
Black Fork of Poteau River: CR D1513	02/07/18
Morris Creek: Gillham	02/07/18
Northeast Creek: MetroTech	02/08/18
Bishop Creek: Eastwoods Park	02/08/18
Cow Creek: Hwy 51	02/09/18
Sand Creek: Osage Hills State Park	02/12/18
Elm Creek: 66th Street North	02/12/18
Haikey Creek: 121st Street	02/12/18



Creek	Date
East Cache Creek: Rodgers Lane	02/13/18
East Cache Creek: Big Green	02/13/18
Wolf Creek: Gore Blvd.	02/13/18
Wolf Creek: McMahon Soccer Park	02/13/18
Mingo Creek: 46th Street North	02/13/18
Nickel Creek: 91st Street	02/13/18
Nickel Creek: 91st Street (Replicate)	02/13/18
Fred Creek: Evanston	02/14/18
Spunky Creek: Hwy 412	02/14/18
Owasso Creek	02/14/18
Guy James Creek: NW Eubanks St.	02/15/18
Tenmile Creek: Davis	02/15/18
Clear Creek	02/15/18
Mud Creek: E 2170 Road	02/15/18
Elm Creek: Indian Hills Road	02/16/18
Soldier Creek: Hwy 66	02/16/18
Lukfata Creek	02/16/18
Kiowa Creek: Hollow N1620	02/17/18
Sharp Creek: Smith Grove	02/17/18
Sharp Creek: Smith Silo	02/17/18
Dave Blue Creek: 60th Ave. SE	02/18/18
Feather Creek: Old Hwy 51	03/04/18
Horse Creek: S 540 Road	03/08/18
Crow Creek: Zink Park	03/09/18
Mooser Creek: Pepsi	03/09/18
Dog Creek: Blue Starr Dr.	03/10/18
Pecan Creek: S. Butler Rd.	03/10/18
Deer Creek: Coffee Creek Rd.	03/10/18
Flat Rock Creek: Hwy 75	03/10/18
Clear Boggy Creek: Hwy 377	03/12/18
Black Bear Creek: Railroad Yard	03/13/18
Deer Creek: Meridian Avenue	03/13/18
Deer Creek: Meridian Avenue (Replicate)	03/13/18
Crooked Oak Creek: SE 22nd St.	03/13/18
Little Sandy Creek: Chamber Loop	03/14/18
Rock Creek: Oklahoma Street	03/14/18
Chisholm Creek: 33rd & Western	03/14/18



Creek	Date
North Fork of Little River: SE 34th St.	03/14/18
Hog Creek: SE 149th	03/15/18
Sans Bois Creek	03/15/18
Beaver Creek: N 4370 Rd.	03/15/18
Beaver Creek: N 4370 Rd. (Replicate)	03/15/18
Cedar Hollow Creek: Nickel Preserve	07/06/18
Spring Creek: Three Spring Farm	07/06/18
Spring Creek: Three Spring Farm (Replicate)	07/06/18
Lukfata Creek	07/10/18
Mud Creek: E 2170 Road	07/10/18
Clear Creek	07/10/18
Little Sandy Creek: Chamber Loop	07/10/18
Guy Sandy Creek	07/10/18
Pennington Creek: West Road Trail	07/10/18
Rock Creek: Oklahoma Street	07/10/18
Crutch Creek: I-40	07/14/18
Spring Creek: I-35	07/17/18
Northeast Creek: MetroTech	07/17/18
Brookhaven Creek: North of Main	07/18/18
Bishop Creek: Constitution Street	07/18/18
Bishop Creek: Eastwoods Park	07/19/18
Soldier Creek: Hwy 66	07/27/18
Morris Creek: Gillham	08/02/18
East Cache Creek: Big Green	08/06/18
East Cache Creek: Rodgers Lane	08/06/18
West Cache Creek: Hwy 62	08/06/18
Sharp Creek: Smith Grove	08/18/18
Sharp Creek: Smith Silo	08/18/18
Pecan Creek: S. Butler Rd.	08/25/18
Baron Fork River: Welling Road	08/25/18
Tahlequah Ross Branch: Town Confluence	08/25/18
Guy James Creek: NW Eubanks St.	08/27/18
Mustang Creek: Morgan Road	08/27/18
Little Deep Creek: Weatherford, Upstream of Treat	08/27/18
West Elm Creek: S. Douglas	08/29/18
Duck Creek: Myers Park	08/29/18
Stillwater Creek: Babcock Park	08/30/18



Creek	Date
Sanborn-Hazen Lake Creek: Strickland Park	08/30/18
Cow Creek: Hwy 51	08/30/18
Boomer Creek: S. Perkins	08/30/18
Stillwater Creek: Brush Creek Road	08/30/18
Haikey Creek: 121st Street	09/04/18
Spring Creek: Martin Park	09/05/18
Coffee Creek: N. Sooner Rd.	09/05/18
Turkey Creek	09/05/18
Twin Hills Creek: E 121st St. S.	09/05/18
Adams Creek: Broken Arrow High School	09/05/18
Crow Creek: Zink Park	09/06/18
Elm Creek: 66th Street North	09/06/18
Clear Boggy Creek: Hwy 377	09/06/18
Little Sandy Creek: Hwy 99	09/06/18
Sand Creek: Osage Hills State Park	09/07/18
Mill Creek: N Daube Ranch Road	09/11/18
Sycamore Creek: D 4685	09/12/18
Beaver Creek: N4370 Rd.	09/13/18
Sans Bois Creek	09/14/18

MACROINVERTEBRATE SUBSAMPLING

Macroinvertebrate subsampling (“bug picking”) sessions are held indoors in the spring and fall.

Typically, a volunteer who monitors in the region will facilitate finding a location to complete the

picking. Staff communicate with volunteers in the region so several volunteers can come together to pick their bugs in one place at the same time.



A student picks through a sample that his professor collected over the summer.

These sessions follow Oklahoma Conservation Commission’s SOPs. Sessions begin with a staff member removing a sample from the Mason jar and putting it in a tray where it can be divided. Volunteers assist by flipping a coin to determine which half of the sample will be picked (the remainder is put back into the jar). Once the sample is divided into a subsample that will yield 100-150 bugs, the volunteers help remove large debris by “washing” the debris under a stream of water in a sieve to make sure all bugs are



retained in the subsample.

The subsample is then spread out in a tray divided into numbered squares. Squares are randomly selected and picked free of organisms until 100-150 macroinvertebrates have been picked. Selected squares must be completely picked once begun; a minimum of five squares must be picked. If more than 100 organisms result from fewer than five squares, the sample should be further subdivided. Blue Thumb staff observe and maintain quality control by checking that volunteers picked every bug out of the selected squares. Blue Thumb staff also ensure that everything picked is a macroinvertebrate and is identifiable (i.e. not missing any essential body parts, not exoskeletons). The picked subsample is finally transferred to a vial of ethanol. As bugs are transferred to the vial, they are counted again to make sure the number of bugs picked is accurate.

Once the bugs have been transferred to the vial, they are sent to a taxonomist for identification. Volunteers are provided with materials that will help them identify and learn about the bugs they find, but they are not expected to be able to identify bugs on their own. Many volunteers develop the knowledge and ability to identify the bugs in their creek over time. Volunteers are also exposed to collections from other streams in their area. Through their experience collecting and picking macroinvertebrates, volunteers learn about their creek's biology and ecology. This knowledge can be used to inform their educational efforts in their community.

FISH COLLECTIONS

Fish collections occur in the summer, sometimes overlapping with bug collections; volunteers are invited to participate. Blue Thumb staff occasionally perform fish collections on their own, but prefer for volunteers to be involved in the process.

Fish collection sites are chosen in conjunction with the sites currently being monitored in the ambient monitoring program of the Commission. This allows for comparison of Blue Thumb monitoring locations with other sites in the same ecoregions made during the same timeframe. In 2018, most of the fish collections were made in the Lower Arkansas River Basin and the OKC/Norman metro area. Sites that were missed this year because of weather will be attempted in 2019.



Blue Thumb staff and summer intern perform a habitat assessment at a fish collection.



Fish collections take the majority of the day. They begin with a habitat assessment performed along a 400-meter stretch of the stream, stopping every 20 meters to record site observations. Site observations include water depth (at each quarter of the stream), water width, width of riparian area on either side of the stream, substrate, habitat, angle of banks, erosion of banks, vegetation (both in water and on banks), and canopy. This provides the volunteer an excellent opportunity to observe, examine, and explore their creek in much greater detail than when they perform their monthly monitoring.

Once the habitat assessment is complete, the same 400-meter stretch is seined for fish, stopping as many times as necessary to check the net. Every portion of the stream is seined until no new species are found. The lead collector identifies and counts the fish in the net. At least one representative of each species is preserved in a jug of 10% formalin. If a specimen is too large to fit in the jug, it is photographed. Any individuals that cannot be positively identified in the field are also kept and preserved. All other fish are counted, recorded on the field sheet and released.

Volunteers participate by pulling the seine or recording the numbers of fish. Staff teach volunteers about which characteristics help with identification, and which fish are sensitive or tolerant to pollution. Volunteers also learn about which habitats fish prefer, variations in species, and other wildlife they may encounter in the creek (bugs, snakes, turtles, frogs, toads, birds, etc).



Fish aren't the only things that live in the creek. A large red-eared slider turtle that was seined up (top left). Watch your fingers and toes! This common snapping turtle might nab you (top right). Green sunfish are tolerant to pollution (bottom left). Toads are common in creeks and sometimes in the seine (bottom right).



Blue Thumb staff conducted 18 fish collections in 2018 (Table 2).

Table 2: 2018 Fish Collections

Name	Date
Bishop Creek Tributary: Basket 12	06/08/18
Bishop Creek: Constitution Street	06/12/18
Guy James Creek: NW Eubanks St.	06/14/18
Bishop Creek: Eastwoods Park	06/18/18
Middle Creek: Buzzard Roost Ranch	07/02/18
Hog Creek: SE 149th	07/05/18
Northeast Creek: MetroTech	07/09/18
Little Wewoka Creek	07/16/18
Spring Creek: I-35	07/17/18
Brookhaven Creek: North of Main	07/18/18
Little River: SW 34th St.	07/19/18
Crutcho Creek: I-40	07/23/18
Crutcho Creek: First Baptist Church	07/24/18
Morris Creek: Gillham	08/02/18
Hog Creek: SE 149th (Replicate)	08/23/18
West Elm Creek: S. Douglas	08/29/18
Beaver Creek: N 4370 Rd.	09/13/18
Sans Bois Creek	09/14/18



Volunteers of all ages participated in several fish collections this summer, and found all types of life in their streams. Staff helps a volunteer seine the creek he monitors (left). Students took the reins and seined themselves as staff directs (right).



VOLUNTEER WRITTEN DATA INTERPRETATIONS

Blue Thumb volunteers are encouraged to write Data Reports on their streams using the chemical data, physical habitat assessments, macroinvertebrate collection results, and fish collection results. This helps volunteers learn more about water quality, their data and their stream. Blue Thumb staff offer one-on-one assistance to volunteers who are interested in developing data interpretations.



Volunteers use their data for multiple activities!



Once the volunteer has written the report, it is displayed on the Blue Thumb website in the interactive map. This not only enables the volunteer to access their report, but encourages them to explore other reports written by volunteers who monitor streams in the same county. They can also view reports for streams in different counties, giving the volunteer a better understanding of the streams across their ecoregion and the entire state of Oklahoma. Blue Thumb hopes that volunteers use their data interpretations as tools for watershed education.

This year, 14 volunteers wrote Data Reports on their streams (Table 3).



Table 3: Data reports that volunteers wrote on the creek that they monitor are a great way to examine the creek as a whole.

Creek	County	WBID
Bluff Creek: NW 150th	Oklahoma	OK620910-04-0140G
Chisholm Creek: Western	Oklahoma	OK620910-04-0100T
Cloudy Creek	Pushmataha	OK410210-02-0300H
Elm Creek: Indian Hills Road	Cleveland	OK520810-00-0100C
Fred Creek: Evanston	Tulsa	OK120420-01-0060G
Medicine Creek: Apache	Comanche	OK311300-04-0060G
Mingo Creek: 46th St. North	Tulsa	OK121300-01-0030C
Nickle Creek: W 91st St	Tulsa	OK120420-02-0040G
Rock Creek: Hwy 33	Creek	OK120420-02-0060G
Sixmile Creek: Kouba Farm	Canadian	OK520530-00-0050J
Spring Creek: Horinek	Kay	OK621000-03-0090M
Tenmile Creek: Davis	Pushmataha	OK410300-03-0270L
Turkey Creek: Bartlesville	Washington	OK121400-02-0030F
Wolf Creek: Gore Blvd	Comanche	OK311300-02-0040X

VOLUNTEER TRAINING SESSIONS

Volunteer Trainings are one of the most important aspects of the Blue Thumb program. Blue Thumb volunteers are the eyes and ears of creeks and streams across the state, expanding Blue Thumb’s reach much farther than what staff could accomplish alone. Trainings are the first opportunity



Becky Zawalski helps walk a volunteer through fixing her DO bottle stream side on a new monitoring site.

for volunteers to meet staff, receive an introduction to the important work of Blue Thumb, and learn about different ways

they can become involved. This is also where staff have the opportunity to immerse prospective volunteers in the monitoring process and train them to monitor a local creek. Trainings also provide an opportunity to introduce volunteers to educational tools they can use to spread their knowledge of water quality



Participants of January's Monitoring Training



throughout their community.

Trainings are organized by the Blue Thumb staff according to population centers and areas of interest. Each year there are usually trainings in the Oklahoma City, Tulsa, and Stillwater, with additional training locations selected by staff. Trainings scheduled in new areas of the state are promoted and marketed to attract participants.

Trainings in 2018 followed a different format than previous years with the incorporation of Project WET. Trainings were still held on two days: the first, Stream Ecology Education, is the introduction to stream health and Project WET; the second is Stream Monitoring, which covers all the specifics of collecting, recording and submitting monthly chemical data.

Blue Thumb conducted nine trainings in 2018 (Table 4). These included both Stream Ecology Education and Stream Monitoring Trainings. There were six Stream Ecology Education Trainings and three Stream Monitoring Trainings.



Blue Thumb Trainings are an integral part of the program... and fun, too!



Blue Thumb's Volunteer Training in Tahlequah was very unusual in comparison with the other Blue Thumb training sessions. There were several people who signed up for the training, but did not show up. Over the course of the first day, there were also several people who left and did not return. A few people who did not register for the training showed up halfway through, and then left after a few hours. As a result, the total number of participants cannot be definitively stated for this training day; the number listed above is the number of people that originally enrolled for the training.



Stream Ecology Education Trainings are generally indoors, and involve learning about Blue Thumb and non-point source pollution.

Blue Thumb fosters and maintains relationships with volunteers after trainings by speaking individually with each volunteer about next steps in education, monitoring, or both. After the trainings are finished, staff follow up with volunteers via email, phone, or in person to arrange educational events they can attend or work with them to find a monitoring site.

STREAM ECOLOGY EDUCATION TRAINING

Stream Ecology Education trainings were held in multiple places across the state as a stand-alone class. The Stream Ecology Education class includes an introduction to Blue Thumb, a trip to a nearby creek to kick for bugs and seine for fish, and several Project WET activities, including Blue Planet, Water Quality? Ask the Bugs!, Sum of the Parts (paired with an EnviroScape®), and An Incredible Journey. At the end of the day, all participants receive a Project WET book and certificate, encouraging them to become educators for water quality even if they are not teachers in the traditional sense.



Table 4. Blue Thumb Training Dates

City	Date	Type	Number of Participants
Norman	1/27/2018	Stream Ecology Education	21
Norman	1/28/2018	Stream Monitoring	21
Tulsa	5/10/2018	Stream Ecology Education	12
Sawyer	8/11/2018	Stream Ecology Education	19
Sawyer	8/12/2018	Stream Monitoring	15
Tahlequah*	9/22/2018	Stream Ecology Education	15
Stillwater	10/13/2018	Stream Ecology Education	25
Tulsa	11/3/2018	Stream Ecology Education	28
Tulsa	11/4/2018	Stream Monitoring	36

STREAM MONITORING TRAINING

The second part of Blue Thumb trainings is the Stream Monitoring Training. This portion of the training involves another visit to the stream and covers how and where to monitor, how to perform the chemical tests, and how to submit data. Stream Ecology Education Training is a prerequisite for Stream Monitoring Training. These trainings are also open to any current or past volunteers who would like a refresher on how to monitor. Once volunteers complete the training, they are ready to monitor a stream. Staff members either help the new volunteer join an existing team or find an appropriate site to monitor on their own. The area staff person will meet the new volunteer at their monitoring location the first time they monitor to assist and answer any questions.



MINI-ACADEMIES FOR MIDDLE SCHOOL, HIGH SCHOOL AND COLLEGE STUDENTS



Students perform both the stream side monitoring and the indoor chemical tests during a Mini-Academy.

Several Blue Thumb volunteers are teachers or professors who use monitoring to teach their students about stream ecology. Blue Thumb Mini-Academies provide short, intensive training to the students of active Blue Thumb volunteers. Mini-Academies provide students the opportunity to learn the proper way to monitor a creek directly from a Blue Thumb staff member without having to attend a full, two-day Blue Thumb Training. Mini-Academies also provide a refresher for the teacher or professor. After training, students can collect Blue Thumb data at the designated monitoring location. This affords students an in-depth and hands-on experience to learn about water quality and stream protection. Students can look for bugs and/or fish and gain a new understanding of creeks, their watershed, aquatic organisms and stream protection.

Blue Thumb hosted two mini-academies in 2018 (Table 5).

Table 5: Mini-Academies hosted by Blue Thumb in 2018

Date	Location	Number of Students
8/28/2018	Cameron University (Lawton)	5
8/31/2018	Southwest OSU (Weatherford)	10



BLUE THUMB QUALITY ASSURANCE



Jason Scott performs a DO test at a summer QA session under the watchful eye of Blue Thumb staff.

Quality Assurance (QA) is a critical component of the Blue Thumb Program. There are a number of built-in processes designed to ensure the validity of volunteer monitoring results. QA is an integral part of the Blue Thumb program because volunteer-collected data may be used by the State of Oklahoma or other parties. The Blue Thumb Quality Assurance Officer has updated and submitted a quality assurance project plan (QAPP) to the EPA for approval. The most current version is on file at the Conservation Commission's office.

Volunteers learn about the QA process at Stream Monitoring Trainings. They learn the proper streamside collection techniques and SOPs for completing the chemical tests. Blue Thumb staff lead volunteers through each procedure. The goal of the training is to prepare

volunteers who are confident in their understanding of how to complete the tests, why they are conducting the tests, how and why they achieve their results, and what to do once they have collected all of their data. New volunteers may receive additional training from seasoned volunteers if they are placed with an existing monitoring team. Teams are beneficial for safety, but also help maintain QA standards. If a new volunteer prefers to monitor at their own site, a Blue Thumb staff member assists with their first data collection and reinforces all of the QA procedures. Streamside assistance during the first monitoring session gives new volunteers the opportunity to ask questions in a less formal setting, and it gives the Blue Thumb staff an opportunity to correct any deviations from SOPs.

If needed, the staff member can assist new volunteers with their first round of indoor chemical tests. All volunteers are given a detailed copy of test procedures, and an opportunity to watch videos of Kim Shaw, the QA Officer, performing each test. The videos are available on the Blue Thumb website. Blue Thumb volunteers have ready access to written SOPs and explanatory videos; in addition, each time Blue Thumb staff interact with volunteers, staff encourage volunteers to ask questions about any part of the data collection process.



Students at OCU wash any bugs off large debris from the sample they will pick.



Quality Assurance Officer Kim Shaw directs some volunteers as they pick their samples in Tahlequah.

QA sessions are held four times a year with each monitoring volunteer. These mandatory sessions are held in conjunction with benthic macroinvertebrate collections in the winter and summer, and with macroinvertebrate subsampling (“bug picking”) in the spring and fall. Winter and summer QA sessions occur streamside and involve the volunteer demonstrating one of the data collection techniques (e.g. taking air or water temperature, using the Secchi disk to measure turbidity, filling the sample bottle, filling the DO bottles, etc.). If volunteers were unable to collect bugs at their site because of no flow, high flow or drought conditions, they are still required to complete a QA session. If they have no bug sample to pick, volunteers

are asked to attend a bug picking event to complete a QA session. Spring and fall QA sessions occur during bug picking events and entail the volunteer demonstrating a portion of the indoor test procedures. Blue Thumb staff prepare a known standard solution for the QA test so a target range can be compared to the volunteer’s result. Staff help the volunteer with any problems or issues they may have; staff also restock or replace bad or diminished DI water and reagents. During QA sessions, staff check equipment, and give volunteers short QA quizzes designed by the QA Officer and based upon common QA mistakes. Blue Thumb staff work hard to ensure that every volunteer goes through a QA session each quarter (2018 Fall QA session in Appendix A). Any QA lapses discovered during QA sessions are treated as valuable learning opportunities. The quarterly QA sessions also provide the opportunity to strengthen relationships between Blue Thumb staff and volunteers.

During QA sessions, volunteers and staff members get to know each other better and develop a sense of mutual trust and respect. While these QA sessions are taken seriously by both staff and volunteers, the sessions are conducted in an informal, relaxed and fun manner. Volunteers do not need to feel pressured, but rather supported, encouraged, and empowered. The QA process not only maintains data standards, but also boosts the volunteer’s level of confidence in their work and results. During QA sessions, volunteers also get an opportunity to meet each other, network about education events, receive program announcements from Blue Thumb staff, and offer feedback to Blue Thumb staff.



Stacy Murray performs an indoor QA to assure that she knows how to properly follow the rinse procedure and what volume of liquid is needed for each chemical test.



Additional QA procedures include running chemical tests twice to ensure repeatability, running the tests again if the two results are significantly different, using blanks, and resampling if inconsistencies cannot be resolved. The QA Officer is available to volunteers to answer questions about any QA procedures.

CONFERENCE PRESENTATIONS

In 2018, two volunteers gave Blue Thumb presentations at the Oklahoma Clean Lakes and Watersheds Association (OCLWA) Conference in April. Christine Pappas presented “From the Creek Bank to the Classroom: Using Blue Thumb Training in ECU’s Water Resource Policy and Management Master’s Degree Program”, and Larissa Balzer presented “Get to Know YOUR Creek: Engaging the Community Through Blue Thumb.”



Blue Thumb Volunteers are proud to present information about how they use Blue Thumb



Other Blue Thumb volunteers presented at OCLWA, but did not necessarily give talks related to Blue Thumb. These included: KC Sarita, Josephus Borsuah, Jahna Hill, Abu Mansaray, Tom Tolbert, Nick Shephard, and Terrie Becerra.

Jean Lemmon gave two presentations this year as well. She presented “Oklahoma Blue Thumb: Equipping and Empowering Citizens” at the Regional Technical Assistance Group (RTAG) meeting at EPA Region 6 in Dallas. Jean partnered with the City of Tulsa to present “Stormwater Education: Involving Citizens in Tulsa’s Crow Creek” at the Oklahoma Stormwater Conference in Oklahoma City. Candice Miller also gave a presentation entitled “Using Project WET to Empower an Existing Network of Citizen Scientists” at the Project WET Conference in Mystic, Connecticut in 2018.



Volunteers participated in a Project WET activity called Blue River, and interacted with the City of Tulsa and City of Tahlequah Stormwater Program Directors.

VOLUNTEER APPRECIATION LUNCHEON

Every other year, Blue Thumb holds a celebration to commemorate volunteers. This year, Blue Thumb and Friends of Blue Thumb hosted a Volunteer Appreciation Luncheon at the Oklahoma County OSU Extension Center in Oklahoma City. Volunteers received a free lunch, did some Project WET activities, and participated in a Stormwater Program panel. There were free giveaways for everyone, and Friends of Blue Thumb provided a special gift of printed socks to a few lucky volunteers. It was a relaxing morning and afternoon as volunteers from all over the state came together to meet one another and be recognized for their hard work and dedication. Blue Thumb would not be what it is today without dedicated and educated volunteers.

About twenty volunteers attended the Appreciation Luncheon; approximately twice that many volunteers signed up for the luncheon. It is unclear why so many declined to come after making the initial commitment; weather was fair and there were several volunteers who made the journey across the state to attend. Regardless, it was a wonderful opportunity for the entire Blue Thumb family to come together.

TASK 2. PRIORITY WATERSHED EDUCATION PROJECTS

Blue Thumb staff and volunteers organized and participated in several education events in 2018. This included three children's camps, a teacher's workshop, several Natural Resource Days and Earth Day celebrations (Appendix C and Appendix D).



EDUCATIONAL KIDS' SUMMER CAMPS



Kids had the chance to journal their findings at Town Branch Creek in Tahlequah, and float the Illinois River

Blue Thumb partnered with Grand River Dam Authority (GRDA) and Oklahoma State University (OSU) Extension 4-H to provide three multi-day educational camps for kids. A total of approximately 60 children, ages 6-12, attended the camps which were held in Tahlequah and Langley.

The first camp, Journey to the Bottom of the Creek (for ages 9-12), was held over two days in Tahlequah and featured a wide variety of educational activities. The first day was a mix of indoor and outdoor activities, where kids learned about watersheds, non-point source pollution, benthic macroinvertebrates and fish, the water cycle, water conservation, and aquifers. Fun activities were used to demonstrate these concepts including the Project “WET” activities: ‘Blue Planet’, ‘Macroinvertebrate Mayhem’, ‘Web of Conservation’, ‘H2Olympics’, and ‘An Incredible Journey’. Students also interacted with the EnviroScape® and Awesome Aquifers (designed by the Groundwater Foundation). Kids also had the opportunity to seine for fish and kick for bugs, get an in-depth look at the bottom of the creek with handheld nets, and record their findings and observations in field journals. On the second day, the kids had one more hands-on class using the Stream Trailer to show how erosion affects a man-made stream and a natural stream before they took a float trip on the Illinois River. The float trip gave the kids an



Becky Zawalski teaches some grade school students about non-point source pollution using an EnviroScape®



opportunity to apply what they had learned the day before, as well as another opportunity to look for fish and bugs and enjoy the beauty of the Illinois River.

The second camp, A Grand Adventure (for ages 6-8), was held in Langley at GRDA's Ecosystems and Education Center on the shore of Grand Lake at Pensacola Dam. Similar concepts as the Tahlequah camp were covered (watersheds, non-point source pollution, water conservation, aquifers, the water cycle, and other water-related topics) but using age-appropriate, hands-on activities, and once again seining for fish and kicking for bugs.



Kids had the chance to experience a creek first hand to learn all about bugs and fish and have some fun.

The third camp was also titled A Grand Adventure, but was for ages 9-12. This two-day event was also held at the GRDA Ecosystems and Education Center. The same concepts as the previous camps were taught, and the same activities were used. This camp, however, included a few more activities, such as a tour of the Pensacola Dam, a boat ride with demonstrations on water quality, and a tour of the GRDA Police Boats. These kids also had the chance to visit a creek and kick for bugs, seine for fish, use hand nets to search for bugs, swim, and enjoy the creek.

EDUCATOR'S WORKSHOP: RIVEROLOGY 101

Once again, Blue Thumb partnered with GRDA, OSU Extension 4-H, Ag in the Classroom, and Oklahoma Water Survey to offer a three-day teacher's workshop entitled Riverology 101. Fourteen teachers came from all over the state to participate in the workshop; they taught a range of grades from elementary to high school. The workshop was held at GRDA's Education and Ecosystems Center. The teachers' lodging was covered by Blue Thumb and meals were provided by GRDA.

The first day of the workshop included an introduction and ice breaker with the Project WET activity, Blue Planet, followed by a tour of the Pensacola Dam and a demonstration of the Stream Trailer and how teachers can use it in their classrooms. Teachers also learned about the Rainfall Simulator and the



connections between healthy soil and healthy streams. They participated in Project “WET” activities including, ‘An Incredible Journey’, ‘Are you thirsty?’, learned about the Solid Waste Trunk (from the Oklahoma State Cooperative Extension), and made Awesome Aquifers (a Groundwater Foundation project). They learned how they can use each of these activities in their classrooms, and how to modify the lessons to fit their curriculum.

Day Two of the workshop consisted of a float trip down the Illinois River. Teachers enjoyed the river and applied the concepts they learned the previous day. The group stopped at several points to learn more about the river. During one such stop, Blue Thumb showed them how to seine for fish and use a kick net to look for bugs. Following the float trip, teachers enjoyed a presentation from NOAA on River Forecasting during dinner provided by the FFA.



Teachers that participated in the workshop got a chance to tour Pensacola Dam and learned invaluable information with several activities, including the Stream Trailer.

The third day, teachers got to enjoy a tour of Grand Lake from GRDA’s Police Boats, where they were taken to interesting spots on the lake, learned about its history, water use and applicable water law. When they returned, teachers were given a demonstration about non-point source pollution using the EnviroScape® and Project WET’s Sum of the Parts. At the end of the workshop, the teachers who participated received a Project WET book and certificate, and dozens of resources from participating sponsors that they can use for their lesson plans.



Teachers had a great time on the second day floating the Illinois River and applying concepts they learned the day before

OTHER STATEWIDE WATERSHED EDUCATION EVENTS

In 2018, Blue Thumb staff and volunteers offered educational programming across the state (Table 6). This included programs where Blue Thumb took the lead role in organizing, promoting, planning, and executing events, and events where Blue Thumb was one participant among many. Many of these programs were visits to schools to present to a single classroom, a grade level, or an entire school.



Oaks Mission students braved the cold and rain to learn about their local creek (left), while Peggs students search under rocks for bugs (right).



Education events are for all ages!

Table 6: List of Education Events that Blue Thumb staff and volunteers participated in during 2018.

Event	Date	Location	People
Oklahoma Mentor Day	1/19/2018	Oklahoma University, Norman	250
Environmental Education Expo	2/2/2018	OCU	40
Classroom Event	2/28/2018	Cashion School	35
Science Class	3/1/2018	OU Popular Science Class	6
Fish Talk	3/5/2018	OCU	7
Biology Club	3/8/2018	UCO Biology Club	20
Home and Garden Show	3/10/2018	Tulsa	300
Creek Walk	3/14/2018	Wright City	35
Classroom Event	3/15/2018	East Elementary 2nd Grade, Weatherford	170



Event	Date	Location	People
Water Appreciation Day	3/20/2018	OKC Capitol	40
Lake McMurtry Spring Celebration	3/31/2018	Lake McMurtry	400
Girl Scout Event	4/7/2018	SWOSU, Weatherford	35
Earthfest	4/7/2018	Martin Nature Park, OKC	200
TCC Presentation	4/10/2018	Coal Creek, Tulsa	17
Outdoor Classroom	4/18/2018	Caddo County	314
OKA Water Fest	4/19/2018	Ada	530
Conservation Fair	4/20/2018	Pawnee County	300
Earth Day	4/22/2018	Norman	50
Earth Day	4/22/2018	Tulsa	80
Natural Resource Day	4/25/2018	Kingfisher	225
Arbuckle Simpson Nature Festival	4/26/2018	Tishomingo	130
TPS CommUNITY Earth Day	4/27/2018	Tulsa	2000
Natural Resource Day	4/27/2018	Marlow	200
Natural Resource Day	4/27/2018	Sulphur	132
Natural Resource Day	4/30/2018	Noble County	226
Outdoor Classroom	5/1/2018	Harper County	50
Natural Resource Day	5/2/2018	Caney Valley, Bartlesville	677
Natural Resource Day	5/3/2018	Duncan	200
Clean-up	5/5/2018	Mooser Creek, Tulsa	15
Camp	5/5/2018	Camp McFadden	600
Natural Resource Day	5/8/2018	Pittsburgh County, McAlester	100
Outdoor Classroom	5/9/2018	Cotton County	80
Outdoor Classroom	5/10/2018	Pawnee County	105
Natural Resource Day	5/11/2018	Ottawa County, Miami	209
Clean-up	5/19/2018	Joe Creek, Tulsa	17
Conservation Day	5/19/2018	Beaver County	52
Outdoor Festival	5/19/2018	Will Rogers Park, OKC	200
Festival	5/19/2018	Water/Landscape Fest, OKC	150
Camp	5/22/2018	Camp McFadden	50
Camp	5/24/2018	Arbuckle Water Eco-Camp	12
Camp	6/6/2018	Lake McMurtry Camp, Stillwater	12
Fishing Derby	6/8/2018	Wyandotte Fishing Derby	60



Event	Date	Location	People
Festival	6/15/2018	Forestry Festival, Broken Bow	250
Youth Day	6/22/2018	Otoe-Missouri Environmental Youth Day, Red Rock	40
STEAM	6/23/2018	SAGE STEAM booth, SWOSU Weatherford	50
Creek Walk	6/25/2018	Upward Bound Creek Walk, Ada	30
Camp	7/10/2018	Camp Discover, Broken Bow	35
Festival	7/13/2018	Greer County Festival, Magnum	50
Camp	7/16/2018	B'nai Emunah Explorer Camp, Tulsa	15
Camp	7/16/2018	Harrel Nature Center Summer Camp, Broken Arrow	20
Camp	7/17/2018	Woolaroc Summer Camp	52
Camp	7/24/2018	Woolaroc Summer Camp	35
Booth	8/2/2018	Education Table, Sustainable Tulsa	150
Girl Scout Event	8/4/2018	Girl Scout Troop, Blanchard	6
Booth	8/9/2018	Women in Ag Conference	100
Class	8/16/2018	Keystone Homeschool Coop, Edmond	30
Outdoor Classroom	8/28/2018	Fort Sill Apache Tribe	150
Festival	9/1/2018	Choctaw Festival, Tuskahoma	106
Festival	9/7/2018	Lost Creek Water Festival, Wyandotte	280
Clean-up	9/15/2018	Crow Creek, Tulsa	20
Festival	9/15/2018	Tahlequah H2O	150
Class	9/18/2018	OACD Leadership Conference, Tahlequah	15
Booth	9/22/2018	Monarchs on the Mountain	350
Creek Experience	9/25/2018	Del City Creek Experience	52
Creek Experience	9/26/2018	Spring Creek, Oaks Mission	30
Creek Experience	9/27/2018	Spring Creek, Peggs	40
Creek Walk	9/27/2018	Creek Walk, Kingston	95
Natural Resource Day	9/28/2018	Lake Arcadia	100
Outdoor Classroom	10/11/2018	H2Oklahoma, Keystone State Park	172
Natural Resource Day	10/17/2018	Lake Arcadia	100
Natural Resource Day	10/24/2018	Craig County	118
Natural Resource Day	10/30/2018	Old Fort Reno	42
Natural Resource Day	10/31/2018	Lake Arcadia	52
Natural Resource Day	11/1/2018	Murray County	390



Event	Date	Location	People
Clean-up	11/3/2018	Lake Thunderbird	15
Class	11/8/2018	Bartlesville High School	121
Class	11/12/2018	University of Tulsa	35
Booth	11/12/2018	STEM night, Duncan	600
Class	11/19/2018	Fish ID, OCU, OKC	2
Booth	11/27/2018	STEM night, Stillwater	1000
Booth	12/5/2018	Governor's Water Conference	452
Booth	12/8/2018	Tulsa Farm Show	63
Booth	12/20/2018	Creek Nation Conservation District	34

TASK 3. GROUNDWATER EDUCATION/SCREENING PROGRAM FOR WESTERN OKLAHOMA

Blue Thumb led three groundwater screenings this year as requested by conservation districts (CDs) (Table 7).

Table 7: Groundwater screenings are important aspects of Blue Thumb.

County	Date	Samples	Testers
Buffalo	5/7/2018	34	20
Custer	10/16/2017	38	5
Caddo	11/29/2018	40	6

Groundwater screenings are important opportunities for landowners to better understand the health of their drinking water. Ground water screenings also provide conservation districts information about the area's water supplies. If abnormal results are found, landowners are referred to the Oklahoma Department of Environmental Quality for further testing.

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 Blue Thumb, so the number of screenings done each year varies. Results from each of the groundwater



screenings in 2018 are located in Appendix B.



Groundwater screenings are great for volunteers to get together and know each other.

TASK 4. BLUE THUMB EFFORTS TO SUPPORT CONSERVATION DISTRICTS

Blue Thumb supports conservation districts primarily through Natural Resource Days, Earth Day events, and outdoor classrooms. Outreach to conservation districts is important and prioritized by Blue Thumb staff; when Blue Thumb staff are unable to attend, capable Blue Thumb volunteers or other Oklahoma Conservation Commission employees are asked to represent the program at events. The goal of this outreach is to provide education about non-point source pollution and water quality to



conservation districts (see above list for counties, dates, and number of attendees).



Natural Resource Days occur all over the state!

Blue Thumb staff also make an effort attend conservation district meetings throughout the year. At the 2018 Oklahoma Association of Conservation Districts (OACD) Area Meetings, Blue Thumb had a table to offer conservation districts more information on how Blue Thumb can assist in their long-range planning. Examples of assistance include loaning educational tools and activities for events and distributing 2019 Blue Thumb calendars. Friends of Blue Thumb assists conservation districts by providing small grants for projects to address non-point source pollution. Friends of Blue Thumb gave a short presentation highlighting a district that received grants in 2018. The presentation also provided information on the grant application process.

TASK 5. REVIEW ACTIVE STREAM MONITORING LIST AND DETERMINE SITE STATUS

Blue Thumb asks a lot of their volunteers; volunteer monitoring is time- and labor-intensive. Blue Thumb also relies on volunteers to help fill educational requests. Sometimes monthly monitoring falls through the cracks. Blue Thumb staff work diligently to ensure that sites remain active and that volunteers receive help and encouragement when needed.



The Quality Assurance Officer reviews volunteer-submitted data every month and records whether or not that volunteer or volunteer team has submitted data. At quarterly QA sessions, staff have a chance to interact with volunteers who have not submitted data in a while. Volunteers fail to submit data for many reasons: lack of reliable internet access, circumstances that make it difficult or impossible to monitor for a few months, or the desire to stop monitoring. Sometimes volunteers that monitor alone get overwhelmed and ask to join an existing team. Blue Thumb staff do their best to help volunteers navigate situations that make regular monitoring difficult.

If a volunteer can no longer commit to monitoring a stream, Blue Thumb staff requires that they turn in their test kit. Kits may be returned at quarterly QA sessions, a bug collection, or whenever the volunteer and staff member can arrange to meet. The test kits are expensive; it is important to retrieve unused kits so they can be redistributed to new volunteers. When a volunteer stops monitoring their stream, Blue Thumb removes the site from the active monitoring list until a new volunteer, or a returning volunteer, begins monitoring at the site again.

Sometimes a stream is removed from the active site list because it no longer meets Blue Thumb requirements. In order for a stream to be monitored, Blue Thumb requires it be wadeable, accessible, have a riffle and be flowing year round. Blue Thumb must also have landowner permission to access the site if the site is not located on public property. If a stream consistently dries up in the summer, and bugs cannot be collected during the summer, and/or volunteers cannot perform monthly monitoring because of a lack of water, the stream may be removed from the active site list. Activity in the watershed can also affect sites. For instance, damming or construction may alter flow so drastically the stream can no longer be safely monitored. In situations such as this, the stream may be removed from the active site list and staff will work to find the volunteer a new site.

BLUE THUMB MEASURES OF SUCCESS

1. CONTINUATION OF EXISTING PROGRAMS

Measure of Success: Continuation of at least 75% of existing programs with active monitoring or other Blue Thumb events.

Blue Thumb monitored 27 counties in 2018 an increase from 24 counties in 2017:

Adair	Comanche	Johnston
Beaver	Custer	Latimer
Canadian	Delaware	Leflore
Cherokee	Haskell	McCurtain
Cleveland	Hughes	Murray



Muskogee	Osage	Pushmataha
Nowata	Ottawa	Rogers
Oklahoma	Payne	Tulsa
Okmulgee	Pontotoc	Washington

Other events, such as educational programs (Natural Resource Days, Earth Days, Outdoor Classrooms, Creek Clean-ups, Trainings, booths and exhibits) and groundwater screenings occurred in 22 counties in 2018: an increase from 11 in 2017

Caddo	Greer	Oklahoma
Canadian	Harper	Payne
Cherokee	Hughes	Pontotoc
Choctaw	Johnston	Pushmataha
Cleveland	Kingfisher	Tulsa
Comanche	LeFlore	Washington
Creek	McCurtain	
Custer	Murray	

Blue Thumb Monthly Reports (Appendix C) provide further details regarding these events.

2. MONITOR ACTIVE STREAM SITES AND COMPLETE BLUE THUMB DATA REPORTS

Measure of Success: Continue monitoring active Blue Thumb stream sites and draft data reports on approximately five sites annually through the Blue Thumb program.

In 2019, Blue Thumb volunteers monitored 91 sites up from 73 sites in 2017.

In 2018, 14 volunteers wrote data reports for their creeks:

Bluff Creek: NW 150 th	Fred Creek: Evanston	Sixmile Creek: Kouba Farm
Chisholm Creek: Western	Medicine Creek: Apache	Spring Creek: Horinek
Cloudy Creek	Mingo Creek: 46 th St. North	Tenmile Creek: Davis
Elm Creek: Indian Hills	Nickle Creek: W 91 st St	Turkey Creek: Bartlesville
Road	Rock Creek: Hwy 33	Wolf Creek: Gore Blvd

The reports were from the Central Great Plains, Cross Timbers, Ouachita Mountains, and Central Irregular Plains Ecoregions. All of these data reports have been added to the Interactive Map on the Blue Thumb website.



3. BLUE THUMB VOLUNTEER EXHIBITS/PRESENTATIONS

Measure of Success: Blue Thumb Volunteers will staff exhibits/provide presentations to professional organizations at least twice

In 2018, two volunteers gave Blue Thumb presentations:

Christine Pappas (April, 2018) “From the Creek Bank to the Classroom: Using Blue Thumb Training in ECU’s Water Resource Policy and Management Master’s Degree Program”, Oklahoma Clean Lakes and Watershed Conference, Stillwater, OK.

Larissa Balzer (April, 2018) “Get to Know YOUR Creek: Engaging the Community Through Blue Thumb.”, Oklahoma Clean Lakes and Watershed Conference, Stillwater, OK.

4. BLUE THUMB WATERSHED EVENTS

Measure of Success: Blue Thumb Volunteers will staff exhibits/provide presentations to professional organizations at least twice

- In addition to presenting at OCLWA, Jahna Hill has used her data from Blue Thumb for TahlequaH2O Celebration, a Friends of Town Branch Creek activity. She uses her data to educate others on why water quality is important and how it can help in their local community with the Stormwater Program.
- Volunteers and citizens are using data from Spring Creek in Delaware County to help develop informed decisions on activities in their watershed.
- Karen Chapman used her data to staff an informational table at the Norman Environmental Control Advisory Board, and helped to organize a Creek Clean Up with the City of Norman.
- Volunteer Shelly Gaines used an EnviroScape® at Oklahoma Water Fest to teach about the effects of non-point source pollution and stormwater runoff.
- Other volunteers use their experiences in Blue Thumb to organize creek experiences, like Beth Rooney, who requested a creek experience along Spring Creek for Peggs and Oaks Mission Schools in Cherokee County, and Christine Paradise in Del City, where students learned how to kick for bugs and seine for fish. Students also learned why these organisms are important to stream health.
- At Outdoor Fest in Oklahoma, Theron Blunck and Phil Morris helped present the EnviroScape®. Karen Chapman, Susan Smith and Bill Hickman also used the EnviroScape® at the Norman Earth Day.



LESSONS LEARNED/OBSTACLES OVERCOME

2018 was interesting and busy for Blue Thumb. The program experienced lots of changes: Becky joined the team, Rob departed, and Cheryl returned. Despite program and staffing changes, Blue Thumb is stronger than ever and continues to grow. Changes will continue with Jean's retirement at the end of January. Jean will facilitate the transition to a new Program Director early in the new year.

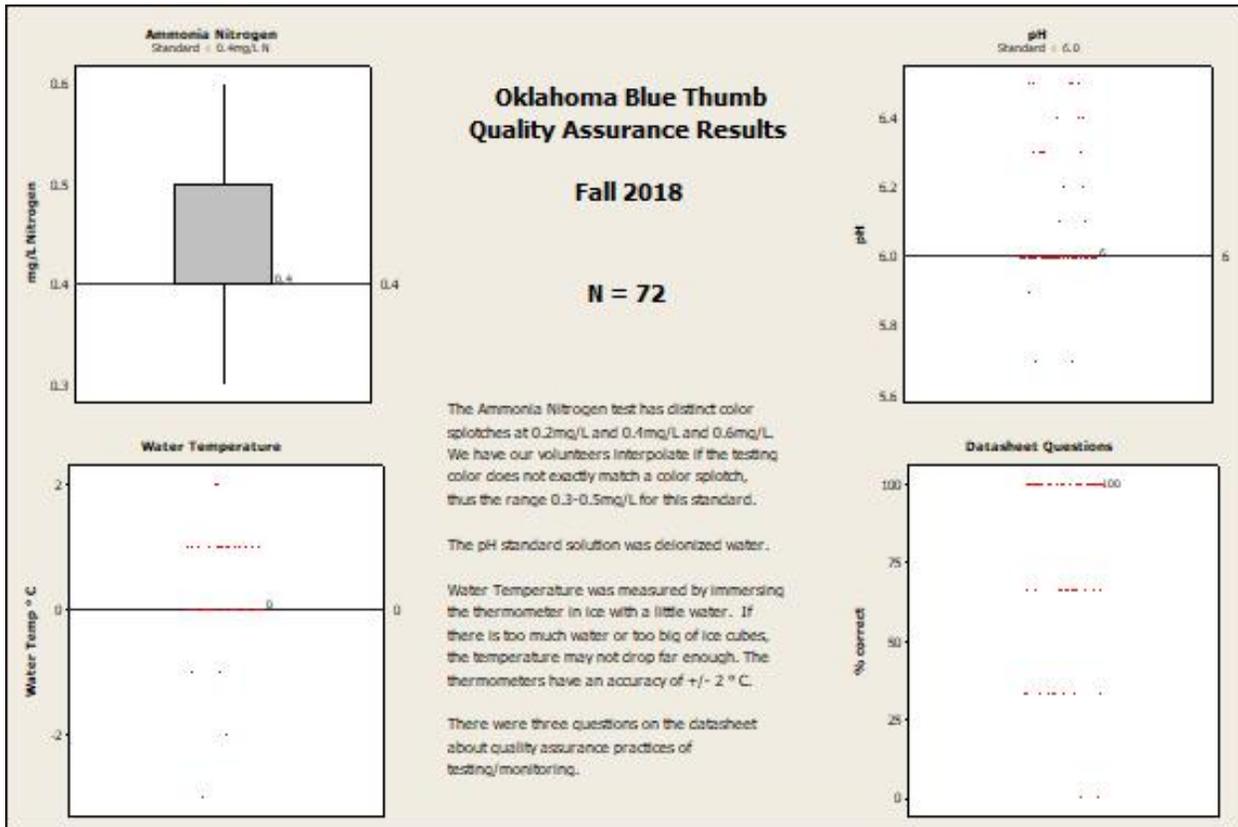
During 2018, Blue Thumb expanded its social media reach. Growth in this area is expected to continue in 2019. The Oklahoma Conservation Commission plans to hire a new Public Information Officer who will assist with this effort. Blue Thumb staff will continue to evaluate the program and make the necessary changes, starting with reassigning areas of the state to make workloads more even, reduce staff travel, and involve more volunteers in education events.

The incorporation of Project WET into Blue Thumb Volunteer Trainings is new, and staff are still determining what works well and what needs to be adjusted. 2019 will see further format changes as staff evaluate trainings to increase participant engagement, enjoyment and learning. Staff have also evaluated statewide program coverage and will attempt to increase program presence in areas with low coverage. Part of increasing program reach involves training effective volunteer monitors and educators in areas of the state where Blue Thumb presence has not been particularly strong.

With so many moving parts to the Blue Thumb program, communication between staff and staff and volunteers can be challenging. Blue Thumb is working hard to keep the lines of communication open, not only between staff, but also between staff and volunteers. The Volunteer Coordinator and new Program Director will facilitate better communication. In 2019, Blue Thumb will continue doing what it does so well: promoting the protection of Oklahoma streams through volunteer monitoring and education. We look forward to a year of program growth in 2019.

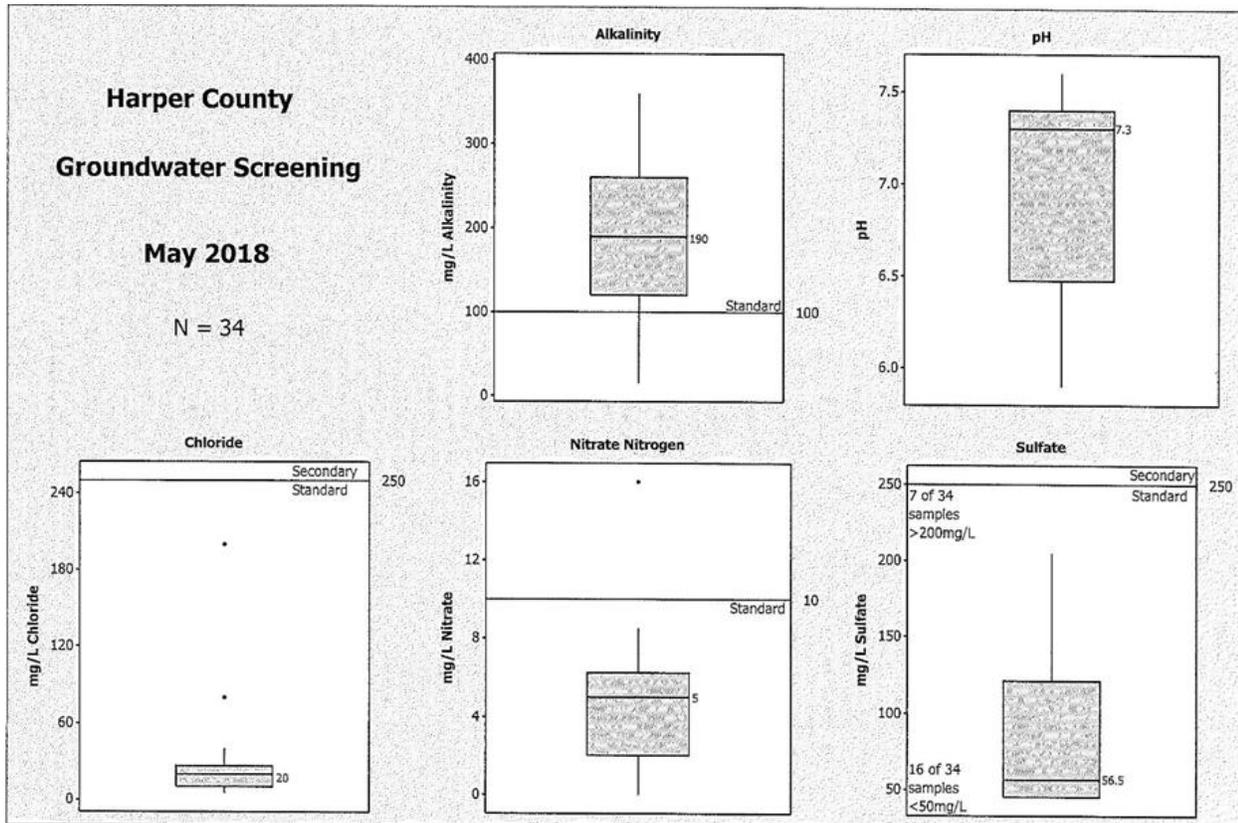


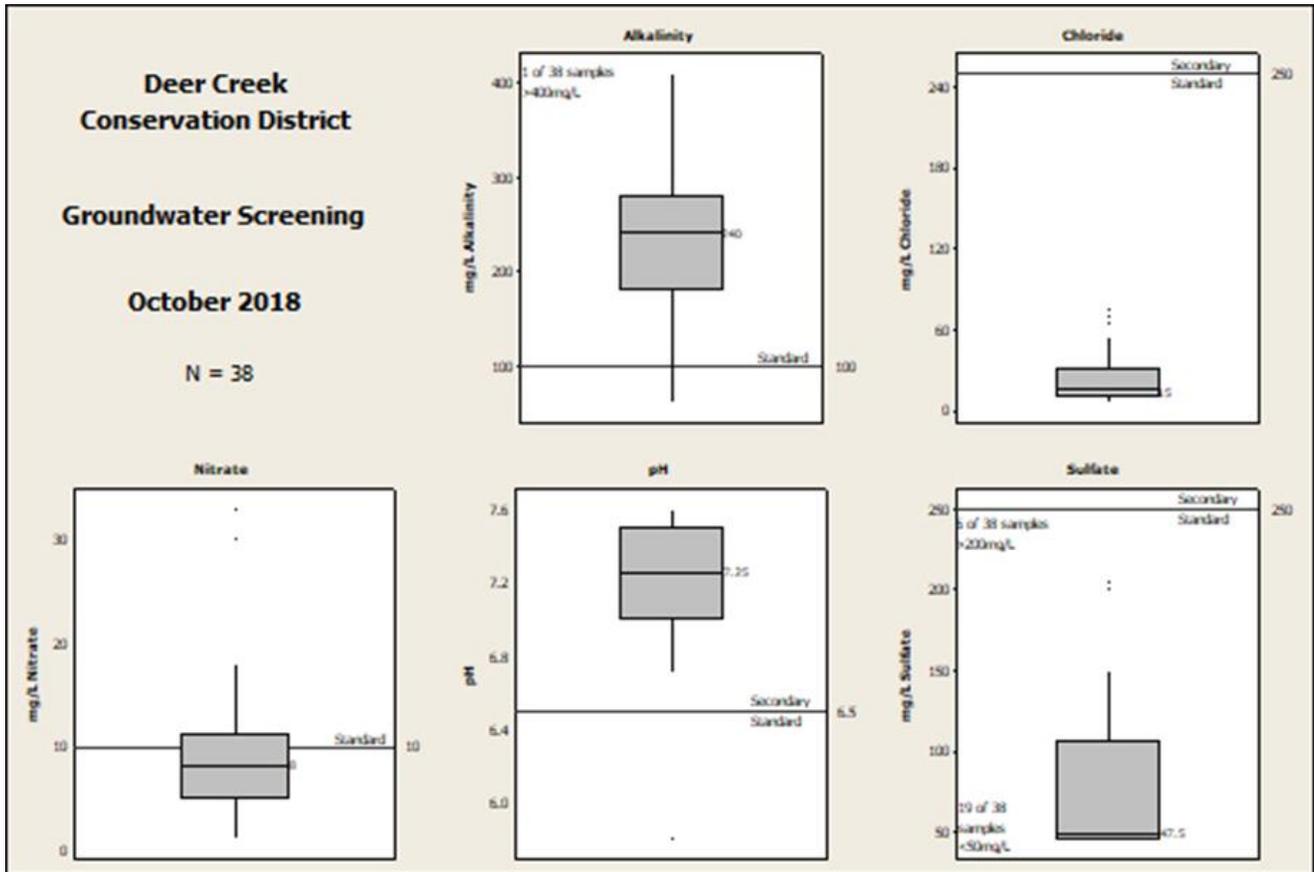
APPENDIX A. QUALITY ASSURANCE

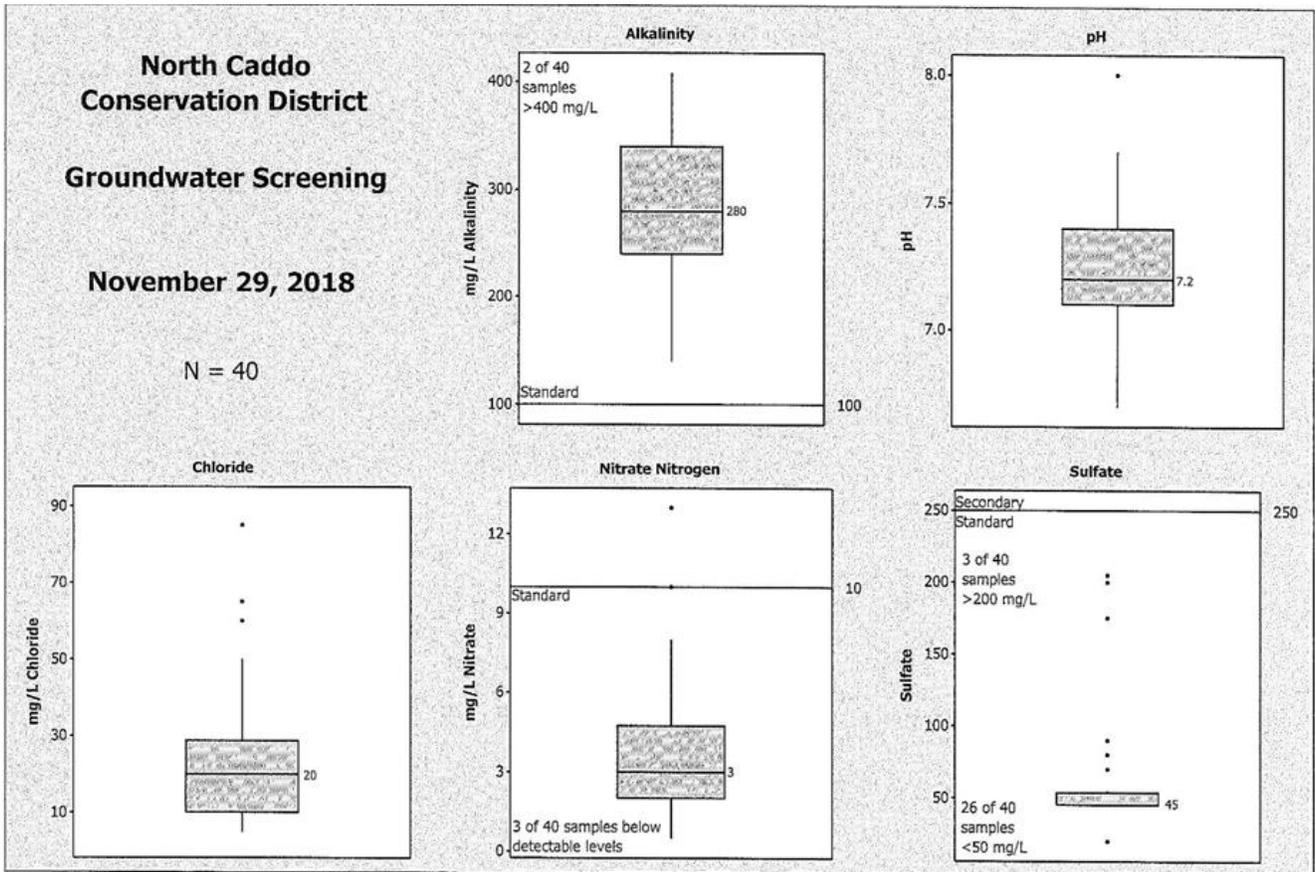




APPENDIX B. GROUNDWATER SCREENING RESULTS









APPENDIX C. MONTHLY REPORTS

Blue Thumb January Report

Blue Thumb Water Quality Education Program

Water Quality Division, Oklahoma Conservation Commission

Report for Rob Barossi, Candice Miller, Kim Shaw, Jean Lemmon

Compiled activity summary for December: 54 total people reached (December is typically a very slow month for blue Thumb because many citizens are already busy between Thanksgiving and Christmas.)

Ongoing activities:

- Contacts with volunteers (bug picking and Quality Assurance sessions)
- Preparing documentation for hiring new Blue Thumb Field Educator (currently an open position)

January activities (scheduled public events):

- Bug collections/QA
- 1/12: Enid Farm Show booth 100 people
- 1/18: Grand Adventure/Riverology 101 planning meeting, Tulsa
- 1/19: Oklahoma Mentor Day, OU Norman 250 people
- 1/25: Blue Thumb App phone meeting with Michigan Tech students 20 people
- 1/27: Introduction to Blue Thumb Training, Norman 21 people
- 1/28: Blue Thumb Monitoring Training, Norman
- 1/30: Blue Thumb App phone meeting with MI Tech students 20 people

February activities

- Bug collections/QA
- 2/2: Environmental Education Expo, OCU



Blue Thumb February Report

Blue Thumb Water Quality Education Program

Water Quality Division, Oklahoma Conservation Commission

Report for Rob Barossi, Candice Miller, Kim Shaw, Jean Lemmon

Compiled activity summary for January: 410 total people reached

Ongoing activities:

- Contacts with volunteers (bug collections and Quality Assurance sessions)
- Collecting and reviewing applications for the new Blue Thumb Field Educator (44 applicants)
- Collecting applications for Blue Thumb Summer Intern
- Working with Michigan Tech class designing a Blue Thumb phone app

February activities

- Bug collections/QA
- 2/1 Friends of Blue Thumb meeting, OKC (6 attendees)
- 2/2: Environmental Education Expo, OCU (40 people)
- 2/24-27: OACD Annual Meeting
- 2/28: Cashion School (33 students, 2 adults)

March activities

- 3/1: OU Class on writing data reports
- 3/5: Fish Talk, OCU
- 3/6: Blue Thumb Staff Meeting
- 3/8: UCO Biology Club
- 3/20: Water Appreciation Day at the Capitol
- 3/21: Ecofest, Tulsa Community College
- 3/31: Lake McMurry Spring Celebration



April activities

- 4/3: Blue Thumb Staff Meeting
- 4/4-5: OCLWA, Stillwater, BT volunteer and staff presentations
- 4/7: Girl Scout event at SWOSU, Weatherford
- 4/10: Ag Day at the Capitol
- 4/10: TCC Presentation
- 4/12: Conservation Day at the Capitol
- 4/13: BlueSTEM Day, Ft. Reno
- 4/16-19 (?): Fish School, Tulsa
- 4/20: TPS CommUNITY Earth Day, Tulsa
- 4/20: Pawnee County Conservation Fair
- 4/22: Stream Trailer at Norman Earth Day (Blane Stacy)
- 4/24: Dewey County NRD, Taloga
- 4/25-26: Kingfisher NRD
- 4/26: Arbuckle Simpson Nature Festival, Tishomingo
- 4/27: Marlow NRD
- 4/28: Pennington Creek Regatta, Tishomingo
- 4/30: Noble County NRD



Blue Thumb March Report

Blue Thumb Water Quality Education Program

Water Quality Division, Oklahoma Conservation Commission

Report for Rob Barossi, Candice Miller, Kim Shaw, Jean Lemmon

Compiled activity summary for February: 81 total people reached

Ongoing activities:

- Contacts with volunteers (bug collections and Quality Assurance sessions)
- Reviewing applications and interviewing for Blue Thumb Field Educator; offered to Becky Zawalski who will start in April.
- Collecting applications for Blue Thumb Summer Intern
- Working with Michigan Tech class designing a Blue Thumb phone app
- High School senior, Gabrielle Jones, interning during Spring Break and after school

March activities:

- 3/1: OU Popular Science Class presentation on writing data reports (6 students working on reports)
- 3/5: Fish Talk, OCU (6 students, 1 adult)
- 3/6: Blue Thumb Staff Meeting
- 3/6-7: Interviews for Blue Thumb Field Educator
- 3/2-13: EnviroScape®, Tulsa (186 students, 13 adults)
- 3/8: Oklahoma Environmental Education Committee, OKC (12 adults)
- 3/8: UCO Biology Club, 1 hour presentation followed by Q&A (17 students, 3 faculty)
- 3/10: Home and Garden Show, Tulsa (300 people)
- 3/12: Incredible Journey, Grove (185 students)
- 3/14: Creek Walk, Wright City
- 3/15: Friends of Blue Thumb board meeting, OKC
- 3/15: East Elementary 2nd Grade Classes, Weatherford (160 students, 10 adults)
- 3/20: Water Appreciation Day at the Capitol (40 adults)
- 3/27: Eastern Oklahoma State College guest speaker, Wilburton. (45 students)
- 3/28: OSU Environmental Science Club



- 3/31: Lake McMurtry Spring Celebration (400 People)

April activities

- 4/3: Blue Thumb Staff Meeting
- 4/4-5: OCLWA, Stillwater, BT volunteer and staff presentations
- 4/7: Girl Scout event at SWOSU, Weatherford
- 4/10: Ag Day at the Capitol
- 4/10: TCC Presentation
- 4/12: Conservation Day at the Capitol
- 4/13: BlueSTEM Day, Ft. Reno
- 4/18-19: Fish School
- 4/18: Outdoor Classroom, Caddo County
- 4/19: OKA Water Fest, Ada
- 4/20: TPS CommUNITY Earth Day, Tulsa
- 4/20: Pawnee County Conservation Fair
- 4/22: Stream Trailer at Norman Earth Day (Blane Stacy)
- 4/24: Dewey County NRD, Taloga
- 4/25-26: Kingfisher NRD
- 4/26: Arbuckle Simpson Nature Festival, Tishomingo
- 4/27: Marlow NRD
- 4/27: Sulphur NRD
- 4/28: Pennington Creek Regatta, Tishomingo
- 4/30: Noble County NRD

May activities

- 5/2-3: Caney Valley NRD, Bartlesville
- 5/3: Duncan NRD
- 5/3: ScienceFest
- 5/7: Groundwater screening, Harper County
- 5/9: Cotton County Outdoor Classroom
- 5/10: Pawnee Outdoor Classroom
- 5/19: Outdoor Fest: Will Rogers Park, OKC
- 5/24: Arbuckle Water Eco-Camp



Blue Thumb April Report

Blue Thumb Water Quality Education Program

Water Quality division, Oklahoma Conservation Commission

Report for Rob Barossi, Candice Miller, Kim Shaw, Becky Zawalski, Jean Lemmon

Compiled activity for March: 1385 total people reached

Ongoing activities:

- Contacts with volunteers (bug sub-sampling and Quality Assurance Sessions)
- Reviewing applications and interviewing for Blue Thumb summer intern; offered to Matthew Moelling who will start in May
- Working with Michigan Tech class designing Blue Thumb phone app
- High school senior, Gabrielle Jones, interning after school

April activities: (Many activities scheduled this month have been cancelled or rescheduled because of the teacher walkout.)

- 4/3: Blue Thumb Staff Meeting
- 4/4-5: OCLWA, Stillwater, BT volunteer presentations
- 4/7: Girl Scout event at SWOSU, Weatherford (35 students)
- 4/7: Earthfest, Martin Nature Park, Oklahoma City (200 people)
- 4/10: Ag Day at the Capitol
- 4/10: TCC Presentation, Coal Creek, Tulsa (17 students)
- 4/18: Caddo County Outdoor Classroom (314 people)
- 4/19: Fish School – Day 1
- 4/19: OKA Water Fest, Ada (530 people)
- 4/20: Pawnee County Conservation Fair (300 students)
- 4/22: Stream Trailer at Norman Earth Day (50 people)
- 4/22: Earth Day, Tulsa
- 4/23: Soil Health Field Day
- 4/25-26: Kingfisher NRD (225 people)
- 4/26: Arbuckle Simpson Nature Festival, Tishomingo (120 students, 10 adults)
- 4/27: TPS CommUNITY Earth Day, Tulsa (2000 people)



- 4/27: Marlow NRD (200 students)
- 4/27: Sulphur NRD (125 students, 7 teachers)
- 4/28: Pennington Creek Regatta, Tishomingo
- 4/30: Noble County NRD (226 students)

May activities:

- 5/1: Harper County Outdoor Classroom
- 5/2-3: Caney Valley NRD, Bartlesville
- 5/3: Duncan NRD
- 5/3: Pittsburgh County NRD, McAlester
- 5/5: Mooser Creek Clean-up, Tulsa
- 5/5-6: Camp McFadden, Kay County
- 5/7: Groundwater screening, Harper County
- 5/9: Cotton County Outdoor Classroom
- 5/9: Introduction to Blue Thumb, Tulsa
- 5/10: Pawnee Outdoor Classroom
- 5/11: Ottawa County NRD, Miami
- 5/12: Crow Creek Meadow Work Day, Tulsa
- 5/15: Riverology 101/Summer Camp meeting, Tulsa
- 5/16: Green School Summit
- 5/18: Friends of Blue Thumb meeting
- 5/19: City of Tulsa Creek Clean-up, Joe Creek
- 5/19: Outdoor Fest: Will Rogers Park, OKC
- 5/22-23: Camp McFadden, Kay County
- 5/24: Arbuckle Water Eco-Camp

June activities:

- 6/5: Blue Thumb Staff Meeting
- 6/23: 4H Volunteer Conference
- 6/25: Summer Camp, Jenks
- 6/25: Upward Bound Creek Walk, Ada
- 6/27-28: Tahlequah Summer Camp



Blue Thumb May Report

Blue Thumb Water Quality Education Program

Water Quality division, Oklahoma Conservation Commission

Report for Rob Barossi, Candice Miller, Kim Shaw, Becky Zawalski, Jean Lemmon

Compiled activity for April: 4400 total people reached

Ongoing activities:

- Contacts with volunteers (bug sub-sampling and Quality Assurance Sessions)
- Onboarding new Blue Thumb summer intern, Matthew Moelling
- Working with Michigan Tech class designing Blue Thumb phone app

May activities:

- 5/1: Harper County Outdoor Classroom (50 people)
- 5/2-3: Caney Valley NRD, Bartlesville (642 students, 35 adults)
- 5/3: Duncan NRD
- 5/5: Mooser Creek Clean-up, Tulsa
- 5/5-6: Camp McFadden, Kay County (600 people)
- 5/7: Groundwater screening, Harper County (20 HS students tested 34 samples)
- 5/8: Pittsburgh County NRD, McAlester (100 people)
- 5/8: Rotary Presentation, Dell City (20 people)
- 5/9: Cotton County Outdoor Classroom (80 people)
- 5/9: Introduction to Blue Thumb, Tulsa (12 people)
- 5/10: Pawnee Outdoor Classroom (105 people)
- 5/11: Ottawa County NRD, Miami (209 people)
- 5/12: Crow Creek Meadow Work Day, Tulsa (12 people)
- 5/15: Riverology 101/Summer Camp meeting, Tulsa
- 5/16: Green School Summit
- 5/18: Friends of Blue Thumb meeting
- 5/19: City of Tulsa Creek Clean-up, Joe Creek (17 people)
- 5/19: Beaver County Youth Conservation Day
- 5/19: Outdoor Fest: Will Rogers Park, OKC



- 5/19: Water/Landscape Fest, OKC
- 5/22-23: Camp McFadden, Kay County
- 5/24: Arbuckle Water Eco-Camp
- 5/30: Full Staff Meeting: Trey Lam farm

June activities:

- 6/5: Blue Thumb Staff Meeting
- 6/6: Lake McMurtry Camp, Stillwater
- 6/22: Otoe-Missouria Environmental Youth Day, Red Rock
- 6/23: 4H Volunteer Conference
- 6/25: Summer Camp, Jenks
- 6/25: Upward Bound Creek Walk, Ada
- 6/27-28: Tahlequah Summer Camp

July activities:

- 7/3: Blue Thumb staff meeting
- 7/10: Camp Discover, Broken Bow
- 7/11: GRDA Camp (6-8 year-olds), Langley
- 7/12-13: GRDA Camp (9-11 year-olds), Langley
- 7/17: Woolaroc Summer Camp
- 7/18-20: Riverology 101, Teacher Workshop, Langley
- 7/24: Woolaroc Summer Camp
- 7/26: TyPROS Program, Tulsa



Blue Thumb June Report

Blue Thumb Water Quality Education Program

Water Quality Division, Oklahoma Conservation Commission

Report for Rob Barossi, Candice Miller, Kim Shaw, Becky Zawalski, Jean Lemmon

Compiled activity for May: 2691 total people reached

Ongoing activities

- Contacts with volunteers (fish/bug collections and Quality Assurance sessions)
- Beta testing the new Blue Thumb phone app
- Volunteer data report meetings
- Publications updates: Catalog of Services, 2019 calendar, exhibit materials

June activities:

- Fish collections
- 6/5: Blue Thumb Staff Meeting
- 6/6: Lake McMurtry Camp, Stillwater (12 students)
- 6/8: Wyandotte Fishing Derby
- 6/15-16: Forestry Festival, Broken Bow
- 6/22: Otoe-Missouria Environmental Youth Day, Red Rock
- 6/23: 4H Volunteer Conference
- 6/23: SAGE STEAM booth, SWOSU Weatherford
- 6/25: Summer Camp, Jenks
- 6/25: Upward Bound Creek Walk, Ada
- 6/27-28: Tahlequah Summer Camp

July activities:

- Fish and macroinvertebrate collections
- 7/3: Blue Thumb staff meeting



- 7/10: Camp Discover, Broken Bow
- 7/11: GRDA Camp (6-8 year-olds), Langley
- 7/12-13: GRDA Camp (9-11 year-olds), Langley
- 7/16: Harrel Nature Center Summer Camp, Broken Arrow
- 7/17: Woolaroc Summer Camp
- 7/18: Stormwater workshop presentation, OKC
- 7/18-20: Riverology 101, Teacher Workshop, Langley
- 7/24: Woolaroc Summer Camp
- 7/26: TyPROS Program, Tulsa



Blue Thumb July Report

Blue Thumb Water Quality Education Program

Water Quality Division, Oklahoma Conservation Commission

Report for Rob Barossi, Candice Miller, Kim Shaw, Becky Zawalski, Jean Lemmon

Compiled activity for June: XX total people reached

Ongoing activities

- Rob Barossi resigned effective 7/20 to go to Vermont
- Contacts with volunteers (fish/bug collections and Quality Assurance sessions)
- Beta testing the new Blue Thumb phone app
- Publications updates: Catalog of Services, 2019 calendar

July activities:

- Fish and macroinvertebrate collections
- 7/3: Blue Thumb staff meeting
- 7/10: Camp Discover, Broken Bow
- 7/11: GRDA Camp (6-8 year-olds), Langley (20 students)
- 7/12-13: GRDA Camp (9-11 year-olds), Langley (20 students)
- 7/13: Ag in the Classroom State Summer Conference
- 7/13: Greer County Festival, Mangum
- 7/16: B'nai Emunah Explorer Camp, Tulsa (10 students, 5 adults)
- 7/16: Harrel Nature Center Summer Camp, Broken Arrow (20 people)
- 7/17: Board of Adjustment Meeting, Sapulpa (dirt mining)
- 7/17: Woolaroc Summer Camp
- 7/18: Stormwater workshop presentation, OKC (75 professionals)
- 7/18-20: Riverology 101, Teacher Workshop, Langley
- 7/20: OU group, Norman
- 7/24: Woolaroc Summer Camp
- 7/26: TyPROS Program, Tulsa



August activities:

- Fish and macroinvertebrate collections
- 8/4: Girl Scout troop, Blanchard
- 8/7: Blue Thumb staff meeting
- 8/9-10: Women in Ag conference
- 8/11: Introduction to Blue Thumb, Sawyer
- 8/12: Blue Thumb Monitoring Training, Sawyer
- 8/28: Cameron University mini academy, Lawton
- 8/29: Southwest OSU mini academy, Weatherford



Blue Thumb August Report

Blue Thumb Water Quality Education Program

Water Quality Division, Oklahoma Conservation Commission

Report for Cheryl Cheadle, Candice Miller, Kim Shaw, Becky Zawalski, Jean Lemmon

Compiled activity for July: 337+ total people reached

Ongoing activities

- Contacts with volunteers (fish/bug collections and Quality Assurance sessions)
- Beta testing the new Blue Thumb phone app
- Publications updates: 2019 calendar

August activities:

- Fish and macroinvertebrate collections
- 8/2: BT Education Table, Sustainable Tulsa (150 people)
- 8/4: Girl Scout troop, Blanchard (6 girls)
- 8/7: Blue Thumb staff meeting
- 8/9-10: Women in Ag conference
- 8/11: Introduction to Blue Thumb, Sawyer (19 participants)
- 8/12: Blue Thumb Monitoring Training, Sawyer (15 participants)
- 8/12: Spring Creek Public Meeting, Kansas, OK (200 people)
- 8/16: Crow Creek Community Leadership Team meeting, Tulsa
- 8/21: Keystone Homeschool Coop, Edmond
- 8/28: Fort Sill Apache Tribe Outdoor Classroom
- 8/28: Cameron University mini academy, Lawton
- 8/31: Southwest OSU mini academy, Weatherford
- 8/30: Martin Park creek experience, OKC



September activities

- 9/7: Lost Creek Water Festival, Wyandotte
- 9/10-14: Project WET National Conference
- 9/12: Friends of Blue Thumb board meeting
- 9/15: Crow Creek Clean-up, Tulsa
- 9/18: OACD Leadership Training, Tahlequah
- 9/19: YMCA, Edmond
- 9/20: Full Staff Meeting, Tahlequah
- 9/20: Sierra Club Meeting, Edmond
- 9/22: Introduction to Blue Thumb, Tahlequah
- 9/22: Monarchs on the Mountain, Tulsa
- 9/25: Del City Creek Experience, Del City
- 9/27: Spring Creek, Creek Experience, Peggs and Kansas
- 9/27: Creek Walk, Kingston
- 9/28: Natural Resource Day, Lake Arcadia
- 9/29: Friends of Blue Thumb Volunteer Appreciation Luncheon, OKC



Blue Thumb September Report

Blue Thumb Water Quality Education Program

Water Quality Division, Oklahoma Conservation commission

Report for Cheryl Cheadle, Candice Miller, Kim Shaw, Becky Zawalski, Jean Lemmon

Compiled activity for August: 616+ total people reached

Ongoing activities

- Contacts with volunteers (fish/bug collections and Quality Assurance sessions)
- Beta testing the new Blue Thumb phone app
- Delivery of the 2019 Blue Thumb calendar

September activities:

- 9/1: Choctaw Festival, Tuskahoma (106 people in one day of 3-day event)
- 9/7: Lost Creek Water Festival, Wyandotte (280 children)
- 9/10-14: Project WET National Conference
- 9/12: Friends of Blue Thumb board meeting
- 9/15: Crow Creek Clean-up, Tulsa (20 people)
- 9/15: Tahlequah H2O (150 people)
- 9/18: OACD Leadership Training, Tahlequah (15 people)
- 9/19: YMCA, Edmond
- 9/20: Full Staff Meeting, Tahlequah
- 9/20: Sierra Club Meeting, Edmond
- 9/21: Creek Experience, Martin Park, Oklahoma City
- 9/22: Introduction to Blue Thumb, Tahlequah
- 9/22: Monarchs on the Mountain, Tulsa
- 9/25: Del City Creek Experience, Del City
- 9/25: Creek Walk, Midwest City
- 9/26: Spring Creek, Creek Experience, Oaks Mission
- 9/27: Spring Creek, Creek Experience, Peggs
- 9/27: Creek Walk, Kingston
- 9/27: Green Schools Summit, Tulsa



- 9/28: Natural Resource Day, Lake Arcadia
- 9/29: Friends of Blue Thumb Volunteer Appreciation Luncheon, OKC

October activities:

- 10/2: Blue Thumb Staff Meeting
- 10/11: H2Oklahoma, Keystone State Park
- 10/13: Eastwoods Park, Norman
- 10/13: Introduction to Blue Thumb, Stillwater
- 10/15: Education Day, Cashion
- 10/16: Groundwater Screening, Weatherford
- 10/23-25: EPA QAPP Training, Oklahoma City
- 10/27: BooHaHa, Tulsa



Blue Thumb October Report

Blue Thumb Water Quality Education Program

Water Quality Division, Oklahoma Conservation Commission

Report for Cheryl Cheadle, Candice Miller, Kim Shaw, Becky Zawalski, Jean Lemmon

Compiled activity for September: 3042+ total people reached

Ongoing activities:

- Contacts with volunteers (bug sub-sampling and Quality Assurance sessions)
- Redesign the new Blue Thumb phone app

October activities:

- Macroinvertebrate subsampling (bug picking) and QA sessions for volunteers
- 10/2: Blue Thumb Staff Meeting
- 10/11: H2Oklahoma, Keystone State Park (172 students)
- 10/13: Eastwoods Park education/creek clean-up day, Norman
- 10/13: Introduction to Blue Thumb, Stillwater
- 10/15: Friends of Blue Thumb meeting
- 10/16: Groundwater Screening, Weatherford (38 samples, 5 volunteers)
- 10/17: Natural Resource Day, Lake Arcadia (100 people)
- 10/23-25: EPA QAPP Training, Oklahoma City
- 10/24: Natural Resource Day, Craig County
- 10/27: BooHaHa, Tulsa
- 10/29: Blue Thumb Stillwater Area Volunteer Get-Together
- 10/30: Natural Resource Day, Old Fort Reno
- 10/31: Natural Resource Day, Lake Arcadia

November activities:

- 11/1: Natural Resource Day, Murray County



- 11/2: Area I Meeting, Woodward
- 11/3: Introduction to Blue Thumb, Tulsa
- 11/3: Lake Thunderbird Workshop and Cleanup Event, Norman
- 11/4: Blue Thumb Monitor Training, Tulsa
- 11/5: Area II Meeting, Oklahoma City
- 11/6: Area IV Meeting, Clinton
- 11/8: Bartlesville High School
- 11/12: University of Tulsa
- 11/12: STEM event, Duncan
- 11/13: Area III Meeting, Pryor/Choteau
- 11/14: Medford FFA
- 11/15: Area V Meeting, Idabel
- 11/19: Fish Identification, Oklahoma City University
- 11/27: STEM night, Stillwater
- 11/29: Groundwater Screening, Hinton
- 11/29: STEM night, Choteau Middle School



Blue Thumb November Report

Blue Thumb Water Quality Education Program

Water Quality Division, Oklahoma Conservation Commission

Report for Cheryl Cheadle, Candice Miller, Kim Shaw, Becky Zawalski, Jean Lemmon

Compiled activity for October: 625 total people reached

Ongoing activities:

- Contacts with volunteers (bug sub-sampling and Quality Assurance sessions)
- Redesign the new Blue Thumb phone app
- Volunteer “get-togethers” held in conjunction with QA sessions

November activities:

- 11/1: Natural Resource Day, Murray County (379 4th graders, 21 teachers, with volunteer Karen Chapman)
- 11/2: Area I Meeting, Woodward
- 11/3: Introduction to Blue Thumb, Tulsa (27 attendees)
- 11/3: Lake Thunderbird Workshop and Cleanup Event, Norman
- 11/4: Blue Thumb Monitor Training, Tulsa (33 attendees)
- 11/5: Area II Meeting, Oklahoma City
- 11/6: Area IV Meeting, Clinton
- 11/8: Bartlesville High School
- 11/12: University of Tulsa
- 11/12: STEM event, Duncan
- 11/13: Area III Meeting, Pryor/Choteau
- 11/14: Medford FFA
- 11/15: Area V Meeting, Idabel
- 11/19: Fish Identification, Oklahoma City University
- 11/27: STEM night, Stillwater
- 11/29: Groundwater Screening, Hinton
- 11/29: STEM night, Choteau Middle School
- 11/30: Keep Oklahoma Beautiful Banquet, Oklahoma City



December activities:

- 12/4: Volunteer Potluck, Tahlequah
- 12/6: Volunteer Potluck, Tulsa
- 12/13: OCC Staff Meeting, Regional Food Bank, Oklahoma City
- 12/13: Tulsa County Local Meeting (Crow Creek), Tulsa



Blue Thumb December Report

Blue Thumb Water Quality Education Program

Water Quality Division, Oklahoma Conservation Commission

Report for Cheryl Cheadle, Candice Miller, Kim Shaw, Becky Zawalski, Jean Lemmon

Compiled activity for November: 1525 total people reached

Ongoing activities:

- Contacts with volunteers (bug sub-sampling and Quality Assurance sessions)
- Redesign of the new Blue Thumb phone app
- Volunteer “get-togethers” held in conjunction with QA sessions

December activities:

- 12/4: Volunteer Potluck, Tahlequah
- 12/5-6: Governor’s Water Conference
- 12/6: Volunteer Potluck, Tulsa
- 12/12: Friends of Blue Thumb Board Meeting
- 12/13: OCC Staff Meeting, Regional Food Bank, Oklahoma City
- 12/20: Creek Nation conservation District Fair/Open House



January activities:

- 1/8: Blue Thumb Staff Meeting
- 1/8: Mini-academy, SWOSU, Weatherford
- 1/9: BlueSTEM meeting, El Reno
- 1/10: Tulsa County Conservation District Board Meeting
- 1/12: Spring Creek Coalition Annual Meeting, Peggs
- 1/17: Creek County Conservation District Board Meeting, Bristow
- 1/22: City of Edmond Watershed Signage Meeting

1/23: Rotary Club Meeting, Bristow



APPENDIX D. MONTHLY PICTORIAL REPORTS



First Training of 2018 and A New Training Format



Blue Thumb's first volunteer training of 2018 will be held in Norman on the weekend of January 27th and 28th. This will be an exciting training as we try an entirely new format. The first day of training will be a day-long introduction to Blue Thumb, volunteer opportunities within the program, and educational activities volunteers can use to educate in their communities. Day two will be another full day, focused on creek monitoring and providing in-depth instruction on all monitoring procedures and tests. This change is designed to allow volunteers to really focus on their interests and passions, whether it's educating, monitoring or something else. Hopefully, volunteers will enjoy the new format as much as the volunteers in this photo from last year's Oklahoma City training.

A Frigid Start to Winter Bug Collections

Now that the calendar has hit January, it's time to begin our winter bug collections, which run from January 1st to March 15th. Spending time at the creek in the cold is inevitable and unavoidable, and a few recent bug collections have found our staff and volunteers braving some very low temperatures. Kim and her mom (below left) were at Crutch Creek at I-40 in Del city, doing their monitoring and bug collection in temperatures just above freezing. In Tahlequah, Rob met volunteer Jahna Hill (below right) for a bug collection and quality assurance session at Town Branch Creek. While the thermometer was reading air temperature in the single digits, the "real feel" temperature on Jahna's weather app was 0 degrees. The cold even managed to make the kick net freeze solid (center).





Blue Thumb—In Pictures

February 2018



Winter Bug Collection Season!



Ice covering a very elevated Lightning Creek makes any kind of monitoring impossible.

Bug collecting is in full swing, with the season lasting until March 15th. Kim, Candice and Rob are crisscrossing the state, meeting with volunteers and completing benthic macroinvertebrate collections at a wide variety of streams. They are also braving some very, very cold temperatures for the collections and the quality assurance sessions that usually occur at the same time.



On a chilly day, Hodgen students collect bugs in the Black Fork of the Poteau River.



Oklahoma School of Innovation and Experiential Learning students brave chilly temps at Twill Hills Creek.



The chill doesn't stop volunteers from having fun collecting bugs in Little Deep Creek in Weatherford.



The water is cold but insulated gloves help our volunteers find all the bugs under the rocks at Rock Creek in Cleveland County.

Quality Assurance Sessions



One aspect of the winter quality assurance session is making sure volunteers take temperatures correctly. For example, air temperature must always be taken before water temperature, as demonstrated here by OCC's own Karla Spinner, who is also a Blue Thumb volunteer, monitoring Little River with her mom.

Bug collections are the perfect time to conduct quality assurance sessions with volunteers. This time around, volunteers are being asked to fill out the data sheet they use every month when they do their monitoring tests and habitat assessment at their stream site. This way, Blue Thumb staff can ensure volunteers are following proper procedures for their monitoring and tests as well as filling out the data sheet properly.



Volunteer John Holman of Murray County demonstrates another important part of winter quality assurance, proper use of a Secchi disk. The disk, a method for measuring water clarity, must be used at the deepest point the volunteer can access close to their monitoring spot.



Highly Successful First Training of 2018



During the first day of training, volunteers learned about a number of educational activities they can use to teach about water in their community, including this one, "Water Quality? Ask the bugs!"

We had an excellent training in Norman on the weekend of January 27th and 28th, very successful for a few reasons. It was the first-ever training using our brand new format. The first day featured an all-day introduction to Blue Thumb with a focus on educational activities that volunteers are encouraged and empowered to use to educate in their own communities. For day two, volunteers who were interested in monitoring a creek took part in an all-day training focused on learning about water quality and all of the chemical tests that volunteers utilize every month to measure the quality and health of their streams. Both days featured a visit to Little River in Norman, where volunteers collected bugs and fish on the first day and conducted stream-side monitoring procedures during the monitoring training day.

New Volunteers Get Creek Experience



One of the best parts of a volunteer training is getting the participants out to a creek, to kick for bugs (left) and seine for fish (right), as we did in Little River for the training in Norman. These are experiences many of the new volunteers haven't had before and they often leave the training excited to do it again.



Education, Education, Education



Kim brought live creek bugs to Oklahoma Mentor Day in Norman, where Blue Thumb volunteer Karen Chapman also had a table, using the EnviroScape to teach about nonpoint source pollution.



At the Environmental Education Expo, Candice joined OCC soil health educators Blane Stacy and Greg Scott to teach educators how to use a rainfall simulator to teach about runoff in their classrooms.



Blue Thumb—In Pictures

March 2018



Volunteer Spotlight!



Dr. Christine Pappas is the Chair of the Political Science and Legal Studies Department at East Central University in Ada. For the past year, she has also been a Blue Thumb volunteer, monitoring Little Sandy Creek with her students. For more of Christine's story, in her own words, and to find out what monitoring with Blue Thumb means to her and her students, visit our Facebook page at: www.facebook.com/bluethumbok



Bug Collection Season Comes to an End

The early part of the bug collection season saw frigid temperatures and volunteers braving the cold to assist Blue Thumb staff with collections and complete their quarterly quality assurance sessions. During February and March, it warmed up considerably and there was little rain to cause delays or cancellations of bug collections. Over the last few weeks, collections have taken place across the state, from Grove (top left) to Kinta (top right) and Ada (bottom left) to Stillwater (bottom right).





Lots of New Blue Thumb Volunteers!



One of best things about all the volunteer trainings we've had over the past year is all the new volunteers who have started monitoring a creek site. All of the volunteers on the left attended the most recent training in Norman and have begun working with Kim to monitor in that area. On the right are two new volunteers and one volunteer team who are monitoring new sites that have never been monitored before, in (top to bottom) Pawnee, Tahlequah and Claremore. We're very excited to have all of our new volunteers join the team!!



Education, Education, Education



Volunteer Ahndria Ablett borrowed one of our EnviroScape watershed models and educated kids at an event in Ada. We love to see our volunteers doing education in their communities!



Rob was in Cashion with OCC Soil Educator Blane Stacy and Blue Thumb volunteer Phil Morris, educating fifth graders. The kids got to experience the EnviroScape watershed model, the stream trailer erosion demonstration and make fish prints to take home with them.



Rob was at East Elementary in Weatherford, where all second grade classes got to learn about water pollution and runoff, make fish prints to take home and interact with live creek bugs.



Blue Thumb—In Pictures

April 2018



Join Us in Welcoming Our New Team Member!



This month, we were excited to be joined by our new Blue Thumb Field Educator, Becky Zawalski. She joins us from Ohio, after having completed her graduate degree in Texas. To learn more of her story, check out our interview with Becky at the Blue Thumb Blog: www.bluthumbok.com/the-blue-thumb-blog



Bug Picking Sessions Begin

As soon as winter bug collection season ends, we begin scheduling bug subsampling (“picking”) events. These are scheduled with the assistance of volunteers who often secure a space such as a classroom for the events, which can last anywhere from four hours to an entire day. Volunteers in the surrounding area are brought together to go through their creek sample, picking bugs out of randomly selected squares. After the squares are picked by volunteers, Kim and Candice check each square to make sure every bug has been removed from it. These are great opportunities for volunteers to get even more in-depth knowledge of their creek and what’s living there. Recent bug picking events were held at OKC Metro Tech (top left), in Tahlequah (top center), Wyandotte (top right), Stillwater (bottom left), and at OCU (bottom right).





Spring Quality Assurance

The Quality Assurance procedures built into the Blue Thumb program are an integral and invaluable part of what we do. Quarterly QA sessions allow us to monitor how volunteers are conducting their work and to find areas for improvement. It's also a great opportunity to catch up with our volunteers and always fun to hear how they're doing. During bug picking sessions this spring, volunteers are being asked to fill their testing equipment with water, to ensure they are filling to the proper volume.



Blue Thumb at OCLWA

The Blue Thumb program was well represented at the Oklahoma Clean Lakes and Watersheds Association Conference, held in Stillwater at the beginning of April. Volunteer Terrie Becerra (left) gave a presentation on how students at East Central University are incorporating Blue Thumb monitoring into their education and volunteer Larissa Balzer (right) gave a presentation on how volunteers in Norman are using their Blue Thumb data and experiences as part of their activism and advocacy efforts in that city. A number of other current or former Blue Thumb volunteers also gave presentations on a variety of topics.



Education, Education, Education



Volunteer Vanessa McKinzey joined Rob at Lake McMurtry's Spring Celebration, where they used the stream trailer to demonstrate erosion and riparian areas.



Volunteer Rachel Giles brought the EnviroScape to EarthFest at Martin Nature Park, where she used it to teach about nonpoint source pollution and stormwater runoff.



Kim braved some icy winter weather to be at the Girl Scout STEM Meet at SWOSU, where kids got to see live creek bugs, learn from the EnviroScape and make fish prints.

Five Years!



At the April Commission Meeting, our own Candice Miller was recognized for five years of service with the Oklahoma Conservation Commission. Read about how she was recognized and see more of her great work at our Facebook page, www.facebook.com/bluethumbok



Blue Thumb—In Pictures

May 2018



Volunteer Spotlight!



Bob Coffey is a high school teacher in Wyandotte who recently returned to Blue Thumb and monitoring a creek that he previously monitored all the way back in 2000. As with many of our long-term volunteers, Bob continues to be an enthusiastic supporter of the program, one who has always prioritized his students' involvement with and education through Blue Thumb monitoring. Read more about Bob at www.facebook.com/bluethumbok



Bug Picking Sessions Continue

While this is a very busy time of year for educational events (see page two for more on that!), it's also bug picking season. That means we're travelling throughout the state, working with volunteers to pick through creek samples they collected this winter. It's a great time to catch up with our volunteers while they have fun learning even more about the ecology of their stream. These are just a few examples of bug picking events in Edmond (left), Howe (center), and Lawton (right).



Volunteer QA

Along with bug picking, volunteers like our team from Brookhaven Creek in Norman, pictured below, are taking part in their quarterly quality assurance sessions.



Groundwater Screening

Kim was in Buffalo this month, where local students tested 34 well water samples from around the area. This activity teaches them important science lessons while getting them involved in the monitoring and protection of their community's water resources.





2018's Second Blue Thumb Training



Jean and Candice were in Tulsa this month, hosting a Blue Thumb training for new volunteers. Participants collected bugs, seined for fish and learned all about the educational activities they can use in their community.



Blue Thumb Volunteers at Educational Events

During April and May, 13 Blue Thumb volunteers assisted with educational events across the state. They worked at natural resource days, outdoor classrooms, water festivals and Earth Day events, bringing water quality education to more people than the Blue Thumb staff would have been able to on their own. This included Ashleigh Barnett at Caney Valley Conservation District's natural resource day (left) and Shelly Gaines at the Oka Institute Water Festival in Ada (right).



Education, Education, Education

This has been a very busy two months for education, with over 7,000 people reached in April and May combined. Just in May alone, we've been to 16 educational events in 13 different counties. Below are just a few examples of the events we've been to but you can read all about where we've been and what we've accomplished by checking out our latest blog at

www.bluethumbok.com/the-blue-thumb-blog



Rob and Becky were in Caddo County CD, along with soil health educator Blane Stacy, where they educated kids with live creek bugs, the EnviroScape watershed model and the stream trailer.



Rob brought live creek bugs to Cotton County CD for their outdoor classroom. Live creek bugs also made an appearance this month at educational days in Ottawa County CD and Pawnee County CD.



Candice and Becky were in Noble County CD, where kids got to make fish prints and learn about bugs by playing Macroinvertebrate Mayhem.



Blue Thumb—In Pictures

June 2018



Get to Know our Summer Intern

Summer is always busy for Blue Thumb, primarily due to biological collections, collecting fish and bugs, that occur in creeks and streams across the state.

Most summers, the team is joined by an intern, usually a local college student, who spends the bulk of his or her time out in the field, assisting with fish and bug collections. This summer, we're excited to have Matthew Moelling, a student at Oklahoma City University, joining us. Read all about him at our blog: www.bluethumbok.com/the-blue-thumb-blog



Bug Picking and QA Sessions Come to an End

It's been another busy and successful spring for bug picking and QA sessions with volunteers. The Blue Thumb staff met with numerous volunteers who got to experience the process of picking bugs from their samples and learned even more about their creeks. As always, it was a great opportunity for staff and volunteers to spend time catching up and getting to know each other.



Kim met with volunteers in Hugo for their bug picking and QA, and worked with them on data interpretation reports.



Candice met with volunteers from the Bartlesville area on the campus of Rogers State University.

A Busy Saturday

One recent Saturday, Blue Thumb was in four different places. Jean and Candice brought the EnviroScape and fish printing to a cleanup event at Joe Creek in Tulsa (left). Volunteers Karen Chapman and Beth Landon were at the Water, Landscape and Environmental Education Expo in OKC (center), and Becky joined volunteers Phil Morris and Theron Blunck at OutdoorFest at Will Rogers Park in OKC (right). Rob was in Beaver County that day as well, at a Youth Conservation Day event.





Summer Fish Collections!

Summertime means many things, from trips to the lake to afternoons at the baseball field. For Blue Thumb, it means fish collections. While they happen every summer, they only occur in certain areas of the state, which is determined on a rotating basis, with each region getting collections every four or five years. Collecting information on which fish, how many species, and how many of each, provides invaluable water quality data and helps to determine the health of a creek. This year, collections are happening in Oklahoma City/Norman, the central part of the state, and in the east-central and southeast parts of the state.



Tributary to
Bishop Creek in
Norman



Bishop Creek in
Norman



Bishop Creek at
Eastwoods Park
in Norman



Guy James
Creek in
Oklahoma City

Education, Education, Education

Things have slowed down a bit when it comes to education, after the whirlwind months of April and May. Summer largely means educating at summer camps, with many of them happening in the coming weeks. Blue Thumb has partnered again this year with Grand River Dam Authority and OSU Extension 4-H for multi-day kids' camps in Tahlequah and Langley, which are happening at the very end of June and beginning of July. Before we get to that, here are a few of our recent education programs:



Kim, Rob, Becky and Matthew were at Lake McMurtry, working with their summer camp participants. The kids got to see the stream trailer and learn all about erosion and riparian areas. Then, they got to collect bugs and seine for fish in the lake.



Rob was in Wyandotte for the Eastern Shawnee Tribe's fishing derby. The kids got to fish in the pond and then stopped at the education stations, including the EnviroScape, where they learned about nonpoint source pollution and runoff.



Candice and Rob were in Sulphur for the Arbuckle-Simpson Water Eco-Camp. The kids got to learn from the stream trailer and EnviroScape, then Candice took them into the creek, where they collected bugs and fish.



Blue Thumb—In Pictures July 2018



Some Sad News

As you may have heard, this month we are saying goodbye to one of our own. Rob Barossi has been with us for more than a year and has made some incredible differences within Blue Thumb, from starting the monthly blog to really expanding our reach within Oklahoma. While we will miss him greatly as he moves to Vermont, we are excited about where he will end up. Good luck on your next great adventure, Rob! You'll always have a home here in Oklahoma!



Summer Bug Collections Commence!

On a much lighter note, after a few months rest from bug picking, summer bug collections have once again resumed! Lasting until the middle of August, Candice, Kim, and Becky will be traveling once more to conduct macroinvertebrate collections and perform QA, in all manners of heat. Hopefully creeks don't dry up before we can get those bugs!



Volunteer carefully performs this season's QA under the watchful eye of Blue Thumb staff



Rob and Becky help volunteers do their bug collections, which they will pick through come fall

Fun in the Sun

This month, Blue Thumb, GRDA, and OSU Extension held two kids day camps, one in Langley and one in Tahlequah. Held for groups between 6-12 years old, each camp taught about the water cycle, water quality, and streams. Kids enjoyed a tour of the Pensacola Dam, the GRDA police boats, and several other educational activities. They also had the opportunity to kick for bugs and seine for fish, Blue Thumb style!





Fish, Fish, and More Fish!

July was very busy when it came to fish collections, with eleven total scheduled for this month alone. Because of the rotating basin schedule, this years collections are mostly around the central part of the state, in more urban areas like OKC and Norman. We were joined by volunteers at their creeks to help out with the fish collections, and we were constantly surprised by the amount of fish species that we caught, including all manners of sunfish, some shiners, a few catfish, and even some common carp. Some of these urban areas had over 13 different species! Of course, we also managed to seine up some reptiles and amphibians as well.



Can you spot the small gar?



Longear Sunfish, which is moderately tolerant of pollution



Red Shiners are tolerant of pollution



Common Snapping Turtle that got caught in the seine

Education, Education, Education

During the middle of the month, Blue Thumb collaborated with several other organizations, including OSU Extension 4-H, OU Water Survey, Ag in the Classroom, and the Grand River Dam Authority (GRDA) to host Riverology 101. This was a 3-day workshop held in the northeast that brought teachers from all over the state. During this time, we showed them some tools that helped to bring some new, fresh, and hands on learning to their classrooms, in addition to teaching them about water quality and non-point source pollution.



OSU Extension and Rob demonstrate the Stream Trailer to teachers. This is a great way to talk about erosion and the differences between a healthy riparian area and a non-healthy riparian area.



Jeri Fleming from OU Water Survey shows the teachers how to make edible aquifers. It's a messy but delicious activity, and the teachers really seemed to enjoy it.



At the very end of the workshop, GRDA took the teachers out on a police boat tour of Grand Lake. Of course, we managed to squeeze a bit of education about water law and some of Grand Lake's history in between the fun.



Blue Thumb—In Pictures

August 2018



Changes Keep on Coming

Blue Thumb is very excited to announce the return of Cheryl Cheadle back to the program! Cheryl created Blue Thumb in 1992 and has done nothing but live and breathe Blue Thumb since. She stepped away for a couple years but continued to monitor a stream and be involved with the charitable foundation, Friends of Blue Thumb. She will be the new Volunteer Coordinator and a familiar face of Blue Thumb around the state. Welcome back, Cheryl! We are thrilled to have you back aboard!



Fishing is winding down

Last month was filled to the brim with fish collections, but this month holds many fewer fish days for Blue Thumb. Most of the fishing this month has been postponed because of the numerous rain events across the state. Fishing season is still going strong, though, and we've had a few exciting catches!



Spotted Gar caught at Morris Creek in Howe



It's never too early to start your kids on a fish collection!

A Bug's Life

We are in the heart of bug collection season! This month, Kim, Candice, and Becky have been traveling all over the state attempting to collect bugs with volunteers. It's been a little more difficult this year between the sweltering heat drying up a lot of the creeks and the high amounts of rain that we've gotten. Big rain events can sweep the bugs downstream, so we usually have to wait at least 10 days before they re-establish themselves. But perseverance is key, and we've gotten some of them done!





Welcome New Volunteers!

In the middle of August, Blue Thumb held a two day training in Sawyer, Oklahoma. The first day, prospective volunteers joined us and learned all about the history of Blue Thumb, what we do, and participated in several Project WET activities. They enjoyed a few hours at a local creek learning how to kick for bugs and seine for fish. At the end of the day, they received their very own Blue Thumb t-shirts and Project WET certificates, finally full-fledged volunteers! The following day, most of the same group returned for monitoring training. They were taught how to do chemical monitoring at a creek and why it is important.



Becky talks about Sum of the Parts, a Project Wet activity.



Doing chemical tests on creek water is always fun-just ask these volunteers!



Volunteers use some creative teamwork to obtain a Secchi disk reading.



Newly minted Blue Thumb Volunteers!

Education, Education, Education

Even with our busy summer fish and bug collections, Blue Thumb always makes time for education. Whether it's a training for new volunteers, a creek experience with Girl Scouts, a conference, or a field day for fresh students, Blue Thumb is eager to participate. It's important to teach people of all ages what Blue Thumb does, and why it's important to protect our creeks. After all, we're teaching Oklahomans about the importance of water quality, and what they, as citizen scientists, can do to help.



Kim spent a Saturday with Brownie Troop 37 in Blanchard. She used the Enviroscope to teach them about nonpoint source pollution and led them on a creek walk, where they looked for fish and bugs (and even found a big snake!).



Becky traveled to Apache for an outdoor classroom, where she taught 3rd-5th graders about nonpoint source pollution using the enviroscope.



Becky and Soil Health Coordinator Amy Seiger presented a booth at the 2018 Women in Ag and Small Business Conference, letting others know about Blue Thumb, the Soil Health Program, and all that we offer!



Blue Thumb—In Pictures

September 2018



It's a Festival!

Cheryl Cheadle hit the ground running and started out the month by attending the Choctaw Tribe's Annual Festival in Tuskahoma and spread information about Blue Thumb. A week later, she was in Wyandotte working with the Eastern Shawnee Tribe at their Lost Creek Festival.



(Left): Cheryl speaks with potential new BT Volunteers. (Right): Cheryl uses the Eviroscape to teach kids about non-point source pollution



Monarchs on the Mountain

At the Turkey Creek Mountain Urban Wilderness Monarchs on the Mountain Festival in Tulsa, Blue Thumb's Cheryl Cheadle and Jean Lemmon were joined by Oklahoma Conservation Commission's Judith Wilkins to talk with the public about taking care of Monarch butterflies and other pollinators. Cheryl was adamant about recruiting new Blue Thumb volunteers, while Jean took the opportunity to educate about the Crow Creek Watershed. Judith helped with the Friends of Blue Thumb exhibit, and all three were happy with the assistance of Blue Thumb volunteers Susan Henning and school teacher, Jennifer Kelly.



More Volunteers Join the Family

Blue Thumb hosted another training this month, this time in Tahlequah. Jahna Hill from Tahlequah Stormwater Program gave a short presentation to explain her involvement in both, and how Blue Thumb benefits the program. Blue Thumb showed them some of the tools they can use and what is available for them to check out. New volunteers went out to a local creek to do some seining and a bug kick, and then received their Project WET certificates and their t-shirts, finally ready to volunteer!





Bye Bye, Bugs

Bug collection season officially ended on September 15. It was a mad rush the first two weeks of the month to try to get all the collections finished. Normally, Blue Thumb staff can spread out the collections over the season (which is from July 1-September 15), but this year, the rains put a damper in most of the plans. When it rains as much as it did this season, Blue Thumb has to wait 7-10 days in order to do a bug collection, for the bugs to re-establish themselves. But this year, it rained so much that most of the collections had to wait until the last few weeks. Some sites weren't able to be done at all.



Several high school students helped do a bug collection at Adam's Creek in Broken Arrow



Turkey Creek in Bartlesville had just enough flow. The volunteers kept their good spirits through the rain!



A hellgrammite gets caught in the kick net! These fellows are indicators of pretty decent water!



QA is an important part of Blue Thumb. It ensures that the volunteers are collecting viable data

Education, Education, Education

This month, Blue Thumb was happy to help out with the Oklahoma Association of Conservation Districts with their Leadership Conference in Tahlequah. They spent a couple of days learning about conservation from Cherokee Nation, the Oklahoma Conservation Commission, including the Water Quality Division. Blue Thumb showed them how to kick for bugs and explained why bugs were an important part of biological collections to help keep our creeks and streams healthy.



Some leaders learn how to pull a seine along the Illinois River. They ended up finding some great fish, including a Central Stoneroller, some minnows, and even a Madtom.



Becky and Cheryl show the leaders what they kicked up when they performed a bug collection. The bugs were great, with a stonefly being the best invert. Other bugs included several mayflies, caddis flies, and some huge hellgrammites.



Leaders listen intently to Brooks and Greg from Oklahoma Conservation Commission Water Quality as they give more in depth information about fishing and electroshocking. Executive Director Trey Lam was an avid participant.



Blue Thumb—In Pictures

October 2018



Work hard, play harder

Blue Thumb is very proud to welcome so many new volunteers to the family! We had a training this month in Stillwater, and they braved the cold and rain to come out and learn all about Blue Thumb and be certified as an Education Volunteer. They participated in several Project WET activities and took a trip out to a local creek to do some bug kicking and fish seining, as well as learn more about the critters that they caught. At the end of the day, they received their Project WET certificates and a Blue Thumb T-shirt, ready to go out and teach the public about water conservation and non-point source pollution.



Participants get to know each other and learn how much water is on Earth by playing Blue Planet.



Even in the rain, everyone came out to the creek to look at bugs and fish.



“Water Quality? Ask the Bugs!” is a fun, hands on Project WET activity that demonstrates why water bugs are important.



It’s always fun when you find life in a creek! Just ask this new volunteer about what she seined up!

Groundwater Screening!

Blue Thumb’s Quality Assurance Office Kim Shaw helped with a groundwater screening in Weatherford that was conducted by the Deer Creek Conservation District. Water Quality Finance Director Ed Crall helped with the testing. 38 local citizens brought water samples from their wells to be tested. 5 of them had high nitrate concentrations (15-30 mg/L N). Water that contains higher than 10 mg/L N could be potentially harmful to the elderly and young of the year by causing Blue Baby Syndrome, so it’s always a good idea to get your groundwater tested!





Don't bug out, it's picking season!

Following bug collection season, volunteers are able to pick through the sample that they collected. Using a subsampling method, their sample is split down several times and then laid out in a tray with a grid. They then pick through randomly selected squares for 80-150 bugs. These bugs are then shipped off to a taxonomist, where they are identified. During this time, volunteers are also put through another Quality Assurance (QA), to continue to make sure they are performing their testing to the best possible standard.



Right: Volunteers perform a QA under the watchful eye of a Blue Thumb staff. This ensures that volunteers are performing to the best of their abilities, and that their data can continue to be used for reports.



Above: A volunteer carefully picks through their bug sample that they helped collect during the summer. This process can take anywhere between 2-4 hours; it all depends on how many bugs are present in the squares, and how much debris is in the sample.



Left: Cleaning the bug sample before picking is an important aspect of the picking process. This ensures no large debris, like leaves or twigs, are in the sample. We have to wash them in the sieve, to make sure any bugs clinging to them remain in the bug sample.

Education, Education, Education

Do you know everything about water conservation? If not, you could ask the 5th graders from Drumright, Kellyville, and Oilton! They spent an entire day learning all about the different ways they can help out Oklahoma water at Lake Keystone. Oklahoma Conservation Commission had Soil Health and Water Quality personnel there, and several other state agencies attended. H2Oklahoma is a yearly celebration that rotates locations so that everyone is able to participate in this massive experience.



Students are "shrunk down" to the size of a water droplet as they experience the water cycle through An Incredible Journey. They get to make a bracelet that shows where they went through the cycle.



Students learned all about non-point source pollution from the Enviroscope. This watershed model is a great way to show how things we humans do everyday effect the water we need.



Healthy soil means healthy water! Students had the opportunity to learn about the different types of soil and how they effect water and groundwater through the Rainfall Simulator.



Blue Thumb—In Pictures November 2018



All work, some play

With an influx in new Blue Thumb volunteers over the past few months, Blue Thumb invited them to come together to learn how to monitor a local stream. Earlier this month, following another Volunteer Training, Blue Thumb hosted a Monitoring Training, where staff members walked new and interested volunteers through how to perform monthly chemical monitoring. Blue Thumb has monitoring volunteers all over the state, who go out once a month and take chemical tests such as Dissolved Oxygen, pH, Nitrates and Nitrites, Ammonia, Ortho-Phosphate, and Chloride. This provides a snapshot of how a creek is doing at that particular moment in time, and can let volunteers and others know if something has changed within their watershed.



Left: These three youngsters were very excited to show off how good they were at monitoring.



Right: Measuring pH requires a bit of standing and some light.



Left: Testing for Chloride is sometimes a two person job.



Right: Very proud monitoring volunteers! Taking samples at the creek is only a small part of the monitoring process.

Conservation District Area Meetings

Every year, Blue Thumb staff attends the Oklahoma Association of Conservation District Area Meetings, held over 2-3 weeks in November. Blue Thumb (and Friends of Blue Thumb) helps to support Conservation Districts with whatever plans they may have coming up. It is also an opportunity to meet new staff and make announcements, as well as provide Blue Thumb calendars. Do you have your 2019 Blue Thumb calendar yet?





Pick some bugs, not your nose!

November was bug picking month for our Blue Thumb volunteers! Spanning the entire state, bug picking continued as Kim, Becky, and Candice traveled to almost every corner this month, from Cherokee County, Beaver County, McCurtain County, and Comanche County and everywhere in between. Volunteers that monitored a creek were able to pick through what they helped collect this summer and get to see a different side of their creek than they normally do.



Above: Becky shows a student what to look for while picking through a grid square.

Below: A team works together to pick through their sample.



Above: Several volunteers pick through their different creeks together.

Below: It's never too early to learn how to pick bugs!



Above: Tahlequah volunteers always find Stoneflies in Spring Creek.

Below: Even Stormwater employees get in on the bug action.



Education, Education, Education

With cold weather, there's not a lot of chances to go out and learn about creeks and water quality. But just because there aren't a lot of opportunities doesn't mean that there are none. Whether it be fourth graders, high school students, or college students, learning about keeping creeks and watersheds healthy is an important lesson. Blue Thumb has several tools that can span any age, and some that can be used for everyone, like the EnviroScape, that teaches about how non-point source pollution effects a watershed... and the water we need to live.



Cheryl brought the EnviroScape to Bartlesville High School to teach them about how every day things contribute to pollution in a watershed.



Kim explains how to identify fish species and why it is important to a very attentive student at Oklahoma City University.



Candice also uses an EnviroScape to show non-point source pollution to some fourth graders at a Natural Resource Day in Garvin County.



Blue Thumb—In Pictures

December 2018



Volunteer Makes a Difference

You can make a huge difference within the community when it comes to non-point source pollution. Don't believe us? Just ask Karen Chapman! This Super Blue Thumb Volunteer monitors Bishop Creek in Norman, as well as spends hours cleaning it up, using Blue Thumb tools and activities to educate others, and talks to council and board members about preserving one of the world's most precious resource. It is no wonder that she received Keep Oklahoma Beautiful's Champion Volunteer Award. Congratulations Karen! You are a great example of what it means to walk the walk and truly helping to keep Oklahoma beautiful!



Karen proudly shows off her Keep Oklahoma Beautiful Champion Volunteer Award. We are so proud of you, Karen, and all the work you do!

So Many Creeks, So Little Time

The end of the year is generally slow for Blue Thumb, but that doesn't mean there isn't work to be done! With all of the new trainings this past year, the number of volunteers interested in monitoring a creek has increased. These tenacious volunteers have braved the cold and wind to get established on a site. Way to go, everyone!





Until Next Year, Bugs

December wrapped up this season’s bug picking. Sessions were held in Wyandotte, Tulsa, Hugo, Howe, and several people even braved the icy conditions to come out to Norman. Volunteers also participated in their quarterly Quality Assurance (QA), to assure that they were performing to the best of their ability and that their equipment was operating correctly. Cheryl also gave a small presentation about what volunteers can do to educate the public about non-point source pollution and the important work that Blue Thumb does.



Volunteers braved the ice and snow to pick their bug samples at a bug picking and QA session in Norman.



These students had a blast performing their QA and picking through their bug samples at Wyandotte High School.



Education, Education, Education

December for most people means holidays, cold weather, hot chocolate... but not if you’re a Blue Thumber! Education about non-point source pollution doesn’t stop for any weather. Whether it just be informational brochures or actual activities and tools, Blue Thumb staff and volunteers always deliver. Snow or shine, we go wherever they are needed (sort of like a certain jolly man dressed in red...).



Jean took some benthic macroinvertebrates to Langston High School’s Career Fair to teach students about what Blue Thumb does and why it’s important.



Gabriel from Tulsa County Conservation District joined Cheryl at the Tulsa Farm Show to inform interested and happy folks how Blue Thumb can help them.



APPENDIX E. BLUE THUMB PUBLICATIONS

Blue Thumb Education Brochure: Pages 1 – 2

Everyone can help keep our streams and rivers clean!

We all have an impact on our streams and rivers, whether we mean to or not. Below are ways you can help reduce yours...

- Use household and lawn chemicals cautiously—reading and following label directions, and properly dispose of containers
- Have your soil tested so you know what your fertilizer needs are, and do not apply chemicals when rain is predicted
- Pick up pet waste
- Leave a buffer along streams when performing farming and construction activities
- Practice no-till farming to reduce soil erosion and conserve soil moisture
- Keep vehicles and heavy equipment in good repair to eliminate fluid leaks

Take time to be outdoors. You will be inspired to help others protect our water resources if you stay motivated about the beauty around you.

Contact Blue Thumb about scheduling a creek walk or other outdoor event!



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Blue Thumb Water Quality Education Program



Stream Protection Through Education

Oklahoma's Blue Thumb Program is a statewide citizen science program that trains volunteers to help educate other about creeks and streams and share their knowledge of water quality with others. The goal of Blue Thumb is to empower people to protect water in their region from nonpoint source pollution.



Over 75 Oklahoma streams are being monitored by Blue Thumb volunteers - citizens like you! Become part of this important network of volunteers who collect valuable data and educate in their communities about how to protect this most precious resource.



Blue Thumb is the education program of the Water Quality Division of the Oklahoma Conservation Commission.

Funding provided through the US Environmental Protection Agency Region 6 (Section 319(h) of the Clean Water Act) via the State of Oklahoma Office of The Secretary of Energy and Environment.



Blue Thumb Education ~ Volunteers in Action!

Volunteers get involved in Blue Thumb to know more about a local stream and to help the public do a better job of reducing water pollution. Blue Thumb volunteers are active in all aspects of stream education.



You too can become a Blue Thumb volunteer!

Blue Thumb is the education arm of the Water Quality Division of the Oklahoma Conservation Commission. Anyone who is passionate about water conservation and wants to be a helping hand to our most precious resource is encouraged to become a Blue Thumb volunteer.

Education



Blue Thumb staff and volunteers provide many different types of stream protection education at a number of events, including Natural Resource Days, Earth Day Events, ScienceFest, H2Oklahoma, exhibits, and so much more.



Blue Thumb volunteers are asked to extend their expertise in their local areas! Blue Thumb staff members are at many education events, but when volunteers help, our reach is greatly extended. Maybe you can do a Project WET activity with youth, demonstrate pollution prevention with an EnviroScape, or take an exhibit to a local festival or the county fair.

Your Blue Thumb staff members will help you feel ready for these types of events.



Your volunteer efforts might come in the form of planning a local creek walk. This authentic stream ecology experience combines education and monitoring aspects of Blue Thumb so that participants learn what lives in a creek by helping to make collections. They learn to see fish and bug habitat, and how the plants along the stream banks protect the water and are good for the area wildlife. Blue Thumb staff members make the activity happen, but a volunteer might be in the driver's seat to set up the event.



Blue Thumb staff and volunteers also use several Project WET activities at many events for a variety of different groups, experiences, and ages.



For more information regarding Project WET, contact Candice Miller at Candice.miller@conservation.ok.gov



Blue Thumb Monitoring Brochure: Pages 1 – 2

Everyone can help keep our streams and rivers clean!

We all have an impact on our streams and rivers, whether we mean to or not. Below are ways you can help reduce yours...

- Use household and lawn chemicals cautiously—reading and following label directions, and properly dispose of containers
- Have your soil tested so you know what your fertilizer needs are, and do not apply chemicals when rain is predicted
- Pick up pet waste
- Leave a buffer along streams when performing farming and construction activities
- Practice no-till farming to reduce soil erosion and conserve soil moisture
- Keep vehicles and heavy equipment in good repair to eliminate fluid leaks

Take time to be outdoors. You will be inspired to help others protect our water resources if you stay motivated about the beauty around you.

Contact Blue Thumb about scheduling a creek walk or other outdoor event!



Blue Thumb Staff

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[facebook.com/BlueThumbOK](https://www.facebook.com/BlueThumbOK)

Blue Thumb

Water Quality Monitoring



Stream Protection Through Education

Oklahoma's Blue Thumb Program is a statewide citizen science program that trains volunteers to monitor creeks and streams and share their knowledge of water quality with others. The goal of Blue Thumb is to empower people to protect water in their region from nonpoint source pollution.



Over 75 Oklahoma streams are being monitored by Blue Thumb volunteers - citizens like you! Become part of this important network of volunteers who collect valuable data and educate in their communities about how to protect this most precious resource.



Blue Thumb is the education program of the Water Quality Division of the Oklahoma Conservation Commission.

Funding provided through the US Environmental Protection Agency Region 6 (Section 319(h) of the Clean Water Act) via the State of Oklahoma Office of The Secretary of Energy and Environment.



Blue Thumb Monitoring ~ Volunteers in Action!

Volunteers get involved in Blue Thumb to know more about a local stream and to help the public do a better job of reducing water pollution. Blue Thumb volunteers are active in all aspects of stream monitoring.



You too can become a Blue Thumb volunteer!

Biological Collections



Biological collections provide the best look at a stream. Benthic macroinvertebrates and fish live in the water. Physical changes to the stream and/or the addition of pollutants can make their stream home less hospitable, and more sensitive species are the first to disappear.



Chemical Monitoring



Chemical monitoring is a profile of the water's chemical properties at an instant in time. Blue Thumb volunteers attend a one and a half day training session that teaches them to perform tests for the following parameters:

- Dissolved oxygen
- Ammonia nitrate
- Water clarity
- Temperature
- Chloride
- Orthophosphate
- Nitrate/Nitrite
- pH



After receiving a test kit volunteers complete their chemical monitoring and submit data each month.

Physical Features



The physical features of a stream are as important to fish and aquatic insects as good water chemistry. Fish need structures to hide under, aquatic insects need rocks or vegetation to escape predators. While habitat assessments are done along with fish collections, additional habitat information is recorded each time a volunteer is on site.





Blue Thumb and Soil Health Catalogue of Services: Pages 1 – 8

About the Oklahoma Conservation Commission

The Oklahoma Conservation Commission was established in 1937 through the Conservation District Enabling Act. The agency's mission is to provide assistance to Oklahoma's 84 conservation districts and the public through voluntary programs that enable Oklahomans to protect, conserve, and restore Oklahoma's renewable natural resources.

The Conservation District Enabling Act gave citizens the opportunity to form their own conservation districts, which are legal subdivisions of state government. The primary goal of districts is to assist citizens in practicing conservation management of the state's renewable natural resources, especially soil and water. Find your local conservation district by visiting our website. The goals of the Oklahoma Conservation Commission would not be met with out the help of our many partners including the Oklahoma Association of Conservation Districts and USDA-Natural Resources Conservation Service.



Education Programs

The Oklahoma Conservation Commission has provided conservation education to Oklahomans since 1975. We work through an array of programs to educate Oklahomans of all ages about natural resources, with an emphasis on soil and water.


conservation.ok.gov
info@conservation.ok.gov
405-521-2384

 Oklahoma Conservation Commission

 @Conservation_OK

 Oklahoma Conservation Commission





Oklahoma Blue Thumb

Oklahoma's Blue Thumb Program is the education program of the Water Quality Division of the Oklahoma Conservation Commission. The goal of stream protection through education is achieved through a citizen scientist monitoring program and numerous educational programs and activities, many of which are listed in this catalog. Blue Thumb offers most events for free. When there are expenses, such as to cover the cost of training materials, there might be a small charge, which can be discussed during planning of activities. For more information, visit our website at <http://bluethumbok.com> and our Facebook page at www.facebook.com/bluethumbok. You can also contact us for more information or with questions:

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918-625-1159
jean.lemmon@conservation.ok.gov

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Blue Thumb Programs

Training for New Blue Thumb Volunteers

Full-day introduction to Blue Thumb and education, held in various locations across the state. Learn about watersheds, nonpoint source pollution, water quality and how you can educate about these issues in your community. Volunteers interested in monitoring a creek attend a second full-day training focused on water quality and chemical tests.



Exhibits and Handouts

Blue Thumb frequently makes exhibit materials available to volunteers who are working with us to spread the stream protection message. A variety of scenic panels work as a background. Display boards talk about the Blue Thumb Program. Handouts are available as well, and we often work with people to tailor a handout for their specific audience.





Blue Thumb Programs

Groundwater Screening

The Blue Thumb Program offers Groundwater Screenings. While bacteria is not included, several parameters, including nitrates, are tested for. Conservation districts typically sponsor these events, with local volunteers actually performing the tests.



Fish Printing

Provides an easy-to-make item that can be taken home, which includes water quality information on the back of the paper. Several types of rubber fish available with a variety of colors.

Blue Thumb Mini-Academy

Designed to help teachers train their students how to conduct chemical water quality tests. One (or less) day of training prepares students for monitoring, allows them to perform real science and can be tailored to each individual teacher's needs.



Soil Health Program

Oklahoma's Soil Health program promotes soil health and conservation practices through education. This is a statewide initiative that teaches easy techniques for understanding, assessing, and restoring soil health. The goal of the soil Health program is to teach and grow the principles of soil health so that Oklahoma's agriculture production systems, food, air, and water quality can be conserved and protected for current and future generation. For more information on Soil Health contact:

Amy Seiger
405-522-4739
amy.seiger@conservation.ok.gov

Blane Stacy
405-522-4833
blane.stacy@conservation.ok.gov



For information on any OCC program contact Chris Cox at 405-522-5954 or christopher.cox@conservation.ok.gov



Soil Health Education

Understanding Soil Health

Soil Health 101

This introduction to Soil Health basics focuses on defining Soil Health and discusses the five principles of Soil Health that anyone can incorporate into conservation planning for farming, ranching, or urban settings. *Indoor, outdoor, or both.*

Soil Health 201

A continuation of the five soil health principles designed around your region. Our specialist focus more in depth for the concerns for that conservation district and implanting soil health practices that can be applied in a variety of landscapes and people across disciplines.

Assessing Soil Health

Tools & Methods for Assessing Soil Health

Meet the 'Soil Health Tool Bucket,' a 5-gallon bucket that includes the supplies and tools needed to determine soil health. This workshop demonstrates how to use these tools. Learn how to measure soil infiltration, pH, temperature, compaction, aggregate stability, biological activity, and more! *Indoor/outdoor, or outdoor only.*

Assessing Soil Health Field Day

Let's diagnose that soil! Apply what you learned in the tool bucket training. Use the tools and compare the results to the NRCS Soil Health Card to determine the soil health of at least two fields. What's the cause and what's the solution? This training focuses on diagnosing soil health problems, influences of crop or pasture production, and how soil health principles can be applied for improvement. *Indoor/outdoor or outdoor only.*

Blue Thumb Programs

Project WET

Provides educators with tools to teach about the value of water through fun, interactive lessons. Provides classroom-ready teaching aids and activities that can be used across a range of subjects and age groups.



EnviroScape

Create pollution in a watershed and see how storm water runoff carries it downhill and into your local waterways. Learn about what it means to live in a watershed and how both urban and rural areas can and will impact water quality.



Incredible Journey

Learn all about the water cycle and the many places water travels in its journey. Getting to make a bracelet along the way provides something fun to take home as well as a reminder of what drives the water cycle and why it's important.





Blue Thumb Programs

Creek Walks

A creek walk is really a stream ecology experience. Learn what lives in a nearby creek by seining for fish and looking under rocks for bugs. Learn all about what lives in our waters and why it's important.



Stream Trailer

See the difference between a healthy riparian area and an unhealthy riparian area, and the amount of erosion that happens with each. Learn how water moves in a channelized stream versus a naturally meandering stream and how that water impacts the land along the water's edge.

Creek Cleanup

Remove litter and junk from the streams in your area while learning about nonpoint source pollution and other factors that impact the water's health. If you know of a stream that needs cleaning, let us know!



Soil Health Education

Restoring Soil Health

Customized Field Days

Design your field day based on your needs and interests. These adaptable soil health field days can look at custom equipment and use, designing a cover crop seed mix, crop rotations, soil sampling, and more. We will work with your conservation district and our other partners to design and present a field day featuring knowledgeable speakers. Just tell us what you need! *Indoor, outdoor, or both.*

Customize Your Soil Health Field Day

- | | |
|---|---|
| <input type="checkbox"/> Cover crop planning & design | <input type="checkbox"/> Plant ID |
| <input checked="" type="checkbox"/> Forage mix design & use | <input type="checkbox"/> Water quality |
| <input type="checkbox"/> Companion plantings | <input type="checkbox"/> Ecosystem services |
| <input type="checkbox"/> Grazing management | <input type="checkbox"/> Other: _____ |
| <input checked="" type="checkbox"/> Grazing system planning | |
| <input type="checkbox"/> Infiltration testing | |
| <input type="checkbox"/> Irrigation | |
| <input type="checkbox"/> Erosion | |
| <input type="checkbox"/> Sprayers & settings | |
| <input checked="" type="checkbox"/> Soil sampling | |
| <input type="checkbox"/> Equipment selection & settings | |

1. Find a producer to host.
2. Choose 3 or 4 topics your producers want to know about.
3. We'll provide the experts!



Plant ID for Soil Health

What plants are growing in a location tells a lot about the soil below. Learn to identify what's growing so you can make informed decisions about how to manage your plants and land. The training covers native- and introduced-plant identification, focusing on basic plant anatomy and terminology. Discussions include how plants interact with the soil; how traditional pasture/range management affects soil health; what plants can be used to benefit soil health; and beneficial plants for wildlife and soil microbes. Plant ID can take place indoor, outdoor, or both.



Soil Health Exhibits

The following exhibits and activities are available for demonstration by the Soil Health Team. We will present at any type of function or field day, either in conjunction with another soil health activity/training/workshop, or as a stand-alone exhibit at your event.

Rainfall Simulator (image 1)

How does your soil react to a heavy rain? How does a covered soil react compared to a bare soil? The rainfall simulator shows real time reactions to a simulated "good ol' Oklahoma rainstorm" and its effects on the soil. Up to 5 soil pans can be compared side by side at the same time. Parameters such as runoff, erosion, water infiltration and storage, effectiveness of litter and mulch, and even compost, can be demonstrated. Soil Samples collected locally when possible.



Soil Health Educational Display (image 2)

The Soil Health program has available for check-out an educational display board. This display is great for county fairs, natural resource days, and any other event where a booth space is used for display. The display can be outfitted in a variety of ways, tailoring it to your audience. Included are several 'Soil Facts' placards and banners that attach via Velcro to the fabric display board.

Soil Health Exhibits

Soil Profile Interactive Lesson (image 3)

This interactive exhibit demonstrates the profile of the soil set up as a walk through exhibit. The pop up canopy is fitted to hold twelve 3'X6' soil profile display posters along the walls, or can be outfitted as a walk through tunnel with tables as the sides. Images on the panels consist of a basic soil profile, a forest soil, a grassland soil, a wetland soil, soil components, soil forming factors, soil organisms, and the functions of soil. Great for Natural Resource Days, Earth Day activities, or as an addition to science classroom activities.



Soil Health and Blue Thumb

Tabletop Rainfall Simulator (image 4)

Similar to the full size rainfall simulator, this display is scaled down to fit on a table top. Stations can be set up, with a 'rain cloud' tray, the soil sample collector tray, an infiltration tray and a runoff/erosion collection tray. Excellent for indoor use where the full size unit is impractical to use. This is a highly effective and visual demonstration of erosion and runoff, perfect for educating about soil health or water quality. It can be requested through the soil health team or the Blue Thumb team.



Living in Town Educational Flyer: Pages 1 – 2

Living in Town

Protecting streams and rivers

A stream reflects the activities that take place within its watershed, which is an area of land where the water under it and draining off of it goes into one stream. Everyone lives in a watershed, so what you do on the land affects a waterbody near you.

Pollutants and non-sustainable land uses can leave a stream shallow, hot, full of sediment and algae, and with eroding banks. A degraded stream does not make for good drinking water, it cannot be a home to fish, and unstable banks and flash floods can even make the stream a hazard. One landowner's actions can cause problems for both upstream and downstream neighbors.

As Blue Thumb staff members travel the state, they frequently see examples of abused waterbodies. This publication was developed to help landowners better understand the impacts they have on Oklahoma's streams and rivers, and provide information on ways they can help protect water resources.

Blue Thumb is a water quality education program that supports volunteers who monitor streams and educate the public about stream and river protection. If you find this publication helpful and you would like to know more visit www.bluethumbok.com, or contact a Blue Thumb staff member.

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Living in Town

Protecting streams and rivers

Living in an urban area has many benefits. Generally you are close to work, school, shopping and a variety of entertainment opportunities. One of those entertainment opportunities might be spending time in a park enjoying the outdoors. Maybe that park has a stream running through it and you remember playing in just such a stream as a child. The question now is, would you let your child play in that same stream?



The more urban an area, the greater impact on the streams that run through it. However, there are lots of things that can be done to improve our urban streams. For example, the stream above has eroding banks and no



vegetation. In contrast, the stream to the left is also in an urban park, but its banks are not eroding and vegetation is making a comeback. Look inside to discover how you can help your community improve its water quality and make your park visit more enjoyable.

www.bluethumbok.com
www.facebook.com/BlueThumbOK



Living in Town

Being a good steward

Think of all the neighborhoods that exist across our great country! Many people don't realize that what they do to their yard and what they let leak onto driveways and roads has an effect on their community's waterways. Good management of your yard makes for a healthier environment for all creatures, both terrestrial and aquatic.

How a city manages its land also has an effect on the environment. When herbicides and pesticides are sprayed, the aquatic life in nearby streams is affected. Mowing all the way to the edge of the bank reduces shade and the ability of vegetation to absorb pollutants. Plants reduce soil erosion; roots stabilize banks and stems and leaves offer relief from raindrop impact.

Some things you can do in your yard include:

- 6 Leave riparian zones undisturbed (the land bordering a waterbody).
- 6 Read and follow directions before applying fertilizers, pesticides or herbicides to your lawn.
- 6 Make your yard a haven for native plants, which benefits wildlife and pollinators.
- 6 Build a rain garden to help reduce runoff from your yard.
- 6 Visit your local conservation district for information on rain barrels and rain gardens.
- 6 Visit your county's OSU Extension office.
- 6 Find groups that encourage proper land management.

6 Become a Blue Thumb volunteer!



www.bluethumbok.com

www.facebook.com/BlueThumbOK

Living in Town

Why the riparian area matters

A healthy riparian area provides many benefits to both the aquatic and terrestrial areas around a stream. When you maintain a healthy riparian area, you provide beneficial services to your upstream and downstream neighbors.



An unhealthy, or completely missing, riparian area causes many problems in a stream. When you remove all vegetation from your bank, it can have negative effects on your upstream and downstream neighbors.





Living on the Land Educational Flyer: Pages 1 – 2

Living on the Land

Protecting streams and rivers

A stream reflects the activities that take place within its watershed, which is an area of land where the water under it and draining off of it goes into one stream. Everyone lives in a watershed, so what you do on the land effects a waterbody near you.

Pollutants and non-sustainable land uses can leave a stream shallow, hot, full of sediment and algae, and with eroding banks. A degraded stream does not make for good drinking water, it cannot be a home to fish, and unstable banks and flash floods can even make the stream a hazard. One landowner's actions can cause problems for both upstream and downstream neighbors.

As Blue Thumb staff members travel the state they frequently see examples of abused waterbodies. This publication was developed to help landowners better understand the impacts they have on Oklahoma's streams and rivers, and provide information on ways they can help protect water resources.

Blue Thumb is a water quality education program that supports volunteers who monitor streams and help educate the public about stream and river protection. If you find this publication helpful and you would like to know more visit www.bluthumbok.com, or contact a Blue Thumb staff member.

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405-761-7401



Living on the Land

Protecting streams and rivers

Living in a rural setting has many benefits; privacy, space and the chance to enjoy the natural resources on your property. However, with these benefits comes the responsibility of being a good neighbor and a good steward of those natural resources.

One of the most important things you can do for yourself, your neighbors and everyone living

downstream of you is to *protect any streams or rivers that flow through your*



property. You have a choice, your stream or river can be raw and eroding (top picture) or it can function properly and offer habitat (left picture). Look inside to discover how you can be a good steward.



www.bluthumbok.com
www.facebook.com/BlueThumbOK





Living on the Land

Being a Good Steward

Whether you are new to the country or have been here awhile, keep in mind what it means to be a steward of the land.

- 6 Leave riparian zones undisturbed (the land bordering a waterbody)**
 - 6 Leave at least a 30' buffer between the water's edge and your farming, grazing or other land disturbing practices
 - 6 Fence cattle and horses out of the creek and provide alternative water sources for them
- 6 Do not overgraze**
 - 6 Consider implementing a rotational grazing regime
 - 6 Don't exceed the land's carrying capacity
- 6 Learn about no-till farming**
- 6 Keep ATVs in upland areas and on designated trails**
- 6 Leave areas in native plants for wildlife and pollinators**
 - 6 Native grasses have deep fibrous roots that can help prevent erosion, both in the field and along a streambank
- 6 Get involved in conservation planning**
 - 6 Visit your local conservation district
 - 6 Visit your county's OSU Extension office
 - 6 Find groups that encourage proper land management
- 6 Become a Blue Thumb volunteer!**



www.bluethumbok.com

www.facebook.com/BlueThumbOK

Living on the Land

Protecting streams and rivers

A healthy riparian area provides many benefits to both the aquatic and terrestrial areas around a stream. When you maintain a healthy riparian area it provides beneficial services to your upstream and downstream neighbors.



An unhealthy, or completely missing riparian area causes many problems in a stream. When you remove all vegetation from your bank, it can have negative effects on your upstream and downstream neighbors.





Blue Thumb Volunteer Training Flyers



Blue Thumb

Introduction Volunteer Training & Project WET Workshop

Thursday May 10, 2018
8:30am - 4:30pm
Tulsa Westside YMCA Nature Center
5400 S Olympia Avenue, Tulsa
Registration: \$15
To Register:
www.blue-thumb-tulsa-may10.eventbrite.com



Learn about stream ecology while visiting a local creek where you will seine for fish and sample benthic macroinvertebrates!



Learn how to use education tools and outreach materials by gaining hands-on experience!



All participants will receive a Project WET 2.0 Guide filled with water activities and additional resources!

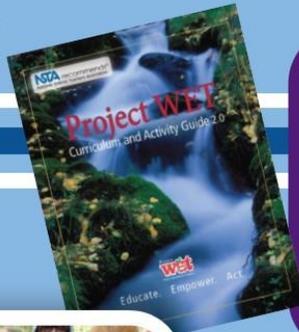
For more information, please visit our website www.bluthumbok.com





Blue Thumb

Introduction Volunteer Training/Project WET Workshop
AND Monitoring Training



Introduction Volunteer Training/Project WET

Saturday, August 11, 2018

8:30am - 4:30pm

Sawyer Senior Center

US-70 & OK-147, Sawyer

Registration: \$ 15

To Register:

www.eventbrite.com/e/blue-thumb-volunteer-training-in-sawyer-tickets-46993390496



Learn how to use education tools and outreach materials by gaining hands-on experience!

*All participants will receive a Project WET 2.0 Guide filled with water activities and additional resources!

Blue Thumb Monitoring Training

Sunday, August 12, 2018

8:30am - 4:30pm

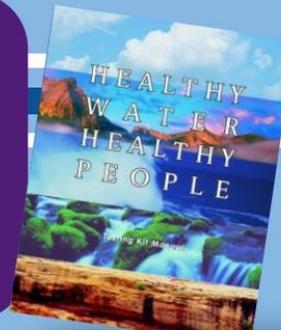
Sawyer Senior Center

US-70 & OK-147, Sawyer

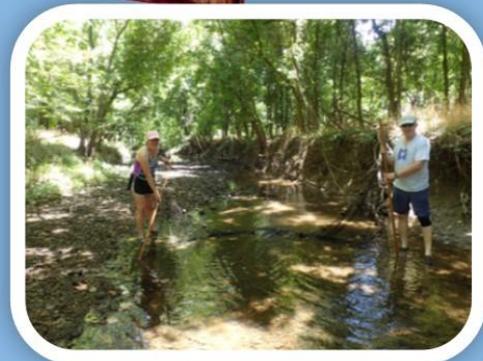
Registration: \$ 10

To Register:

www.eventbrite.com/e/blue-thumb-monitoring-training-in-sawyer-tickets-46993783672



Learn about stream ecology and conducting water quality tests while visiting a local creek where you will seine for fish and sample benthic macroinvertebrates!
*All participants will receive a Healthy Water, Healthy People: Field Monitoring Guide!



For more information, please visit our website www.bluethumbok.com





Blue Thumb

Introduction Volunteer Training/Project WET Workshop AND Monitoring Training



Introduction Volunteer Training/Project WET

Saturday, August 11, 2018

8:30am - 4:30pm

Sawyer Senior Center

US-70 & OK-147, Sawyer

Registration: \$ 15

To Register:

www.eventbrite.com/e/blue-thumb-volunteer-training-in-sawyer-tickets-46993390496



Learn how to use education tools and outreach materials by gaining hands-on experience!

*All participants will receive a Project WET 2.0 Guide filled with water activities and additional resources!

Blue Thumb Monitoring Training

Sunday, August 12, 2018

8:30am - 4:30pm

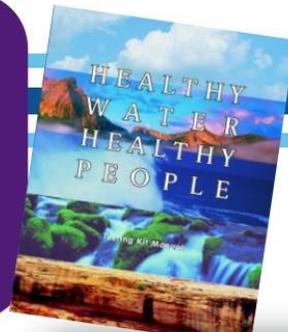
Sawyer Senior Center

US-70 & OK-147, Sawyer

Registration: \$ 10

To Register:

www.eventbrite.com/e/blue-thumb-monitoring-training-in-sawyer-tickets-46993783672



Learn about stream ecology and conducting water quality tests while visiting a local creek where you will seine for fish and sample benthic macroinvertebrates!

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Oklahoma Blue Thumb

Stream Protection Through Education



The education arm
of the
Water Quality
Division
of the
Oklahoma
Conservation
Commission.



Funded by the
Environmental
Protection
Agency, through
the Clean Water
Act, Section
319.

Blue Thumb has a Number of Training Workshops for New Volunteers Coming Up this Fall:

September 22nd in Tahlequah

October 13th in Stillwater

November 3rd in Tulsa



These trainings will provide an Introduction to Blue Thumb, what the program does, how our volunteers can get involved, educational tools you can use in your own community and Project WET. Attendees will take home their own Project WET activity book.



November 4th in Tulsa

This training will provide an introduction to water quality monitoring, chemical water quality tests and how our volunteers monitor a creek every month. Participants must attend one of the introductory training sessions before attending this one.



VOLUNTEER
TRAINING



TAHLEQUAH

What: Introduction to Blue Thumb and Project WET

When: Saturday, September 22, 8:30am-4:30pm

Where: Tahlequah Armory Municipal Center, 100 N Water

Registration: \$15, www.bluethumbok.com

Includes: Project WET Guide 2.0, Visit to a Local Stream
and Information about Stream Ecology and Water Pollution

Stream Protection Through Education

Give Oklahoma's Water a Hand, Volunteer Today!

www.bluethumbok.com



VOLUNTEER
TRAINING



STILLWATER

What: Introduction to Blue Thumb and Project WET

When: Saturday, October 13, 8:30am-4:30pm

Where: Biosystems & Ag Engineering Lab, 323 N Cleveland

Registration: \$15, www.bluethumbok.com

Includes: Project WET Guide 2.0, Visit to a Local Stream
and Information about Stream Ecology and Water Pollution

Stream Protection Through Education

Give Oklahoma's Water a Hand, Volunteer Today!

www.bluethumbok.com



Blue Thumb Training

"Stream Protection Through Education"



Become a volunteer!

Westside YMCA Nature Center

5400 S Olympia Ave, Tulsa

November 3 & 4, 2018

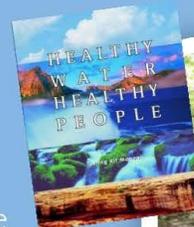
8:30am - 4:30pm



During the Introduction to Blue Thumb, learn how to use education tools and outreach materials by gaining hands-on experience! All participants will receive a Project WET 2.0 Guide filled with water activities and additional resources!



At monitoring training, learn about stream ecology and conducting water quality tests while visiting a local creek! All participants will receive a Healthy Water, Healthy People: Field Monitoring Guide!



To Register:

Introduction to Blue Thumb/Project WET Workshop - \$15

Saturday, November 3 8:30am - 4:30pm

www.eventbrite.com/e/blue-thumb-volunteer-training-in-tulsa-tickets-46996399496

Blue Thumb Monitoring Training - \$10

Sunday, November 4 8:30am - 4:30pm

www.eventbrite.com/e/blue-thumb-monitoring-training-in-tulsa-tickets-46996969200



Blue Thumb Training

"Stream Protection Through Education"



Become a volunteer!

Westside YMCA Nature Center

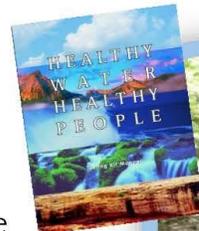
5400 S Olympia Ave, Tulsa

November 3 & 4, 2018

8:30am - 4:30pm



During the Introduction to Blue Thumb, learn how to use education tools and outreach materials by gaining hands-on experience! All participants will receive a Project WET 2.0 Guide filled with water activities and additional resources!



At monitoring training, learn about stream ecology and conducting water quality tests while visiting a local creek! All participants will receive a Healthy Water, Healthy People: Field Monitoring Guide!



To Register:

Introduction to Blue Thumb/Project WET Workshop - \$15

Saturday, November 3 8:30am - 4:30pm

www.eventbrite.com/e/blue-thumb-volunteer-training-in-tulsa-tickets-46996399496

Blue Thumb Monitoring Training - \$10

Sunday, November 4 8:30am - 4:30pm

www.eventbrite.com/e/blue-thumb-monitoring-training-in-tulsa-tickets-46996969200





Volunteer Appreciation Luncheon Flyer

You're Invited to Blue Thumb's Volunteer Luncheon

Date: Sept. 29th, 2018

Time: 10:00 AM - 2:30 PM



Where: OSU Extension
Center in Oklahoma City
2500 NE 63rd Street
Oklahoma City, OK 73111

The Luncheon is free for you and one guest if you RSVP by 9/7/18.
The cost is \$15 for additional guests or if you RSVP after 9/7/18.

To RSVP visit www.bluethumbok.com