

**TEXAS STREAM TEAM  
COMMUNICATION PLAN**

**STATEWIDE CITIZEN MONITORING AND  
NONPOINT SOURCE POLLUTION OUTREACH PROGRAM**

**Prepared for:**

**TEXAS STREAM TEAM  
RIVER SYSTEMS INSTITUTE  
TEXAS STATE UNIVERSITY  
SAN MARCOS, TEXAS 78666**

**Prepared by:**

**B&H ENVIRONMENTAL CONSULTING, LLC  
3624 WEGNER ROAD  
NEW BRAUNFELS, TEXAS 78132**

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and the U.S. Environmental Protection Agency.

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Approved By: \_\_\_\_\_

Name: David M. Boylan, P.G.

Title: Principal Hydrogeologist

Company: B&H Environmental Consulting, LLC

Date: 8/22/11

Approved By: \_\_\_\_\_

Name: Emily Warren

Title: Interim Director

Company: Texas Stream Team

Date: 8/26/11

## LIST OF DEFINITIONS

- Ambient Condition:** Environmental condition, such as pressure or temperature, that is normal for a given location at a given time.
- Citizen Monitor:** A person who has attended a Texas Stream Team Water Quality Monitoring Workshop, participated in the workshop, and received a certificate of completion for his or her training.
- Group:** An assemblage of citizen monitors with a common goal of working within a particular watershed by monitoring water quality, managing water quality data, and/or performing public outreach or education activities. A group often works with local partners who may also be considered part of the group.
- Group Data Manager:** A person who works within a Texas Stream Team Group and is ultimately responsible for planning, organizing, and managing the accurate documentation of data for water quality analyses.
- Nonpoint Source Pollution:** Pollution from sources which diffuse and do not have a single point of origin or are not introduced into a stream from a specific outfall. The pollutants are generally carried off the land by storm water runoff.
- Partner:** A person, group, or organization who shares common goals with Texas Stream Team and is able to direct resources toward the support and facilitation of citizen monitoring and/or watershed outreach. Partner support could include direct donations, grant awards, staff to support training or other core activities, meeting space, event logistics, and others.
- Stakeholder:** A person or group that has an investment, share, or interest in something; such as a business or an industry, a group, an organization, or a system, who affects or can be affected by an organization's actions.

## **LIST OF ACRONYMS and ABREVIATIONS**

cfu:	colony forming units
CRP:	Clean Rivers Program
DO:	Dissolved Oxygen
GIS:	Geographic Information System
μS/cm:	microSiemens per centimeter
KAST:	TPWD Kills and Spills Team
mg/L:	milligrams per liter
ml:	milliliters
NPS:	Nonpoint source
QAPP:	Quality Assurance Project Plan
RRC:	Railroad Commission of Texas
SWQM:	Surface Water Quality Monitoring Program
TCEQ:	Texas Commission on Environmental Quality
TMDL:	Total Maximum Daily Loading
TPWD:	Texas Parks and Wildlife Department
TSSWCB:	Texas State Soil and Water Conservation Board
WPP:	Watershed Protection Plan

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Trained citizen monitors serve as NATURAL RESOURCE WITNESSES for local, regional, and state organizations and affiliates. Water resource management organizations need an actively engaged group of trained citizen and partner monitors to serve constructive and positive roles as natural resource witnesses. Trained monitors supplement professional data, identify nonpoint source (NPS) water pollution concerns, describe ambient water conditions and assist with state water quality projects. NPS water pollution by its nature is episodic, difficult to predict, and emanates from many locations. Therefore, trained monitors act as natural resource witnesses to potential polluting events.

A major purpose of this Communication Plan is to serve as a real resource for water resource agencies and potential, new, and veteran citizen monitors, and teachers and educators. Consequently, an important aspect of this plan is the presentation of the tools for monitors and partners of Texas Stream Team and the pathways necessary for individuals to effectively and efficiently determine what and how; why and when; and where and to whom questions, complaints, and praises are directed. This Communication Plan establishes the lines of communication so that data and information can be passed effectively, efficiently, and thoroughly.

A version of this plan is available on-line and a *Communication of Data and Incident-Field Reference Guide* is included with the water quality monitoring training packages that Texas Stream Team utilizes when new individuals and groups are trained to be Citizen Water Quality Monitors (Citizen Monitors). The *Field Reference Guide* is also available on-line.

## **1.1 WHAT IS THE PURPOSE OF THIS COMMUNICATION PLAN?**

This document provides guidance to certified citizen monitors, Texas Stream Team Partners, and Texas Stream Team staff for communication and information exchange with respect to water quality data.

This Communication Plan is designed as a flexible guidance document and as information is developed, the Communication Plan may be modified. This Communication Plan will be updated with each grant contract established between the Texas Commission on Environmental Quality (TCEQ) and Texas Stream Team. Versions shall be marked with a numeral and a date of revision. Current versions will be placed online at Texas Stream Team's Program Forms webpage <<http://txstreamteam.rivers.txstate.edu/publications/program-forms.html>>.

The *Communication of Data and Incident-Field Reference Guide* will be updated on the same schedule as the Communication Plan.

## 1.2 ABOUT TEXAS STREAM TEAM

River Systems Institute's Texas Stream Team, located at Texas State University – San Marcos, is a statewide citizen water quality monitoring and stakeholder outreach program. Texas Stream Team collaborates with water resource decision makers and the general public for improved environmental health and sustainable management. This program supports and enhances the public outreach objectives and priorities identified under the TCEQ and Texas State Soil and Water Conservation Board's (TSSWCB) NPS Program. Furthermore, the program supports projects identified by the TCEQ's Total Maximum Daily Loading (TMDL) Program, Texas Clean Rivers Program (CRP), Surface Water Quality Monitoring (SWQM) Program, and Texas Parks and Wildlife Department (TPWD).

Texas Stream Team is working with these various state-level programs to implement watershed-based planning throughout the state of Texas. Given the prevalence and growth of NPS water pollution issues in Texas' Clean Water Act Section 303(d) listed segments, trained Texas Stream Team monitors serve to support this effort by observing water quality and land use anomalies that can be used to target improvement activities in a watershed as identified by program partners. In addition, citizen and partner monitoring data are used for problem identification, local decision-making, research, and educational purposes, as deemed appropriate by the end users.

While data production is instrumental in generating an understanding of background and changing conditions, the physical presence of the citizen monitors at their respective monitoring sites often proves vital. By placing more "boots in the water", citizen monitors effectively position themselves to be potentially present during hard-to-detect NPS or other critical water pollution events, and thereby, serve effectively as natural resource witnesses.

Two examples of these hard-to-detect NPS pollution episodes include the following water bodies:

- Arroyo Colorado, where citizen monitors observed illicit dumping and reported the incident to the local coordinator; and
- Gilleland Creek, where citizen monitors discovered an area near the headwaters with elevated *E. coli* values and positioned additional monitoring stations to track the source or sources of the elevated values in the upper 0.25-mile section of the stream.

Texas Stream Team's network of certified citizen water quality monitors is uniquely positioned to improve the problem identification capacity of all water resource management agencies throughout the state of Texas.

### **1.3 WHY DO TEXANS BECOME WATER QUALITY MONITORS?**

Many individuals are introduced to water quality monitoring programs through their jobs, friends, environmental/educational organizations, or other sources. Individuals become water quality monitors for a variety of reasons. Potential individual monitors or partner monitors should consider several factors prior to seeking training as a citizen monitor. For instance, what are the monitor's goals and objectives in becoming certified? Can the monitor commit to monthly and regular monitoring duties regardless of weather and physical hardships?

Before joining the network, Texas Stream Team encourages new monitors to establish contacts with local and regional organizations that have jurisdiction over water resources in their area. These organizations generally provide local support for water polluting instances, and can provide valuable resources and information to individual monitors. It is strongly encouraged that monitors inform their local contacts about Texas Stream Team's use of the monitoring data to establish screening-level, ambient water conditions, and potential changes in water quality over time.

Citizen monitors visit their surface water quality monitoring site(s) generally one time each month. The data generated by the monitors provide the foundation for understanding present surface water quality conditions, which can then be compared to future conditions to establish trends. Copies of the Environmental Monitoring Form and Pollution Concern Form are included in Appendices A and B, respectively.

## **2.0 WHO ARE TEXAS STREAM TEAM STAFF AND HOW DO THEY UTILIZE THE DATA?**

To ensure the smooth flow of data and information between the groups involved with Texas Stream Team Monitoring Network, effective communication is essential. Conceptual flow diagrams of the lines of communication include the Citizen Monitor Training to Data Submittal Flow Chart (Appendix C) and the Data Validation/Communication Flow Chart (Appendix D).

### **2.1 HOW YOUR DATA ARE TRANSFERRED TO TEXAS STREAM TEAM**

Upon completion of the monitoring activity by the certified citizen or partner monitor, the Environmental Data Form is sent to the group data manager or Texas Stream Team for review. The data form can be transferred by way of hand-delivery to TST program offices, U.S. Postal Service, fax, iPhone App, or electronic e-mail address. Read appendix E to view the Texas Stream Team contact information. Electronic transfer of the Environmental Data Form is the preferred method. The group data manager will review each form for completeness and accuracy. Any questions will be directed to the originating certified citizen or partner monitor who generated the form. Upon data review and clarification of any issues, the data manager will sign the form and transmit it to Texas Stream Team by one of the means discussed above.

If the monitoring data are entered on-line through Texas Stream Team's Database (on-line data entry), the group data manager will review the data in order to determine if the data satisfies a certain criterion. This is known as data validation. If the data do not meet the criteria, the monitor will be contacted to discuss the best course of action. If the monitor cannot enter data into the on-line data system, data managers may enter the data from a hard copy of the Environmental Data Form, or a hard copy of the form can be sent to Texas Stream Team for entry into the database.

#### **2.1.1 Communicating Anomalies**

There are many variables influencing healthy water quality and responding to environmental concerns appropriately can be complex. Where concerns are documented, solutions to environmental problems can often take time.

Monitors and group data managers are most familiar with their monitoring locations and most anomalies may be quickly recognized if they occur. If anomalies are observed, please use common sense while determining how to proceed with your next action. The observation of any fish or freshwater mussel kills, harmful algal blooms or serious pollution which may cause the loss of fish and wildlife should be communicated to the Texas Parks and Wildlife Kills & Spills Team (KAST) as well as Texas Stream Team. Call 911 if there is an emergency that involves or threatens human life.

If there are data anomalies documented onsite (dissolved oxygen, pH, specific conductance, temperature), repeat the sampling collection and document findings. If sampling for *E. coli* and elevated values are observed, repeat the sampling as soon as possible and document these data. If elevated values are still documented, contact Texas Stream Team, your local partner, and local authorities to determine how to proceed.

Monitors may also observe other anomalies such as absence of aquatic life, presence of odors (such as chlorine or rotten eggs), illicit dumping, or significant changes to riparian corridors. In many instances, these observations are very important and they should be documented on the data sheets and communicated with Texas Stream Team and your local partner. For a list of contact information, see Section 6.0.

## **2.2 TEXAS STREAM TEAM ADMINISTRATIVE COORDINATOR**

The completed Environmental Monitoring Forms will be received by Texas Stream Team Administrative Coordinator by way of hand-delivery, the U.S. Postal Service, or the <[txstreamteam@txstate.edu](mailto:txstreamteam@txstate.edu)>e-mail address. Electronic e-mail of the Environmental Data Form is the preferred method. Once received, the Administrative Coordinator will date stamp the Environmental Data Form and transfer it to Texas Stream Team Statewide Monitoring Coordinator.

The Administrative Coordinator also receives Partner Activity Reports. These reports are required quarterly and submitted to the TCEQ NPS Project Manager.

## **2.3 TEXAS STREAM TEAM STATEWIDE MONITORING COORDINATOR**

The Statewide Monitoring Coordinator works with volunteers across the state and is responsible for training coordination, equipment and supplies, and Quality Assurance/Quality Control of the monitoring data. The Statewide Coordinator also reviews monitor's data, comments, and notes, looking for input from the monitor, such as if reagents are expired. If there is a data value that raises concern in the Coordinator's review, the monitor will be contacted directly by the Statewide Coordinator. If the data form is approved by the Statewide Coordinator, then it is forwarded to the Database Manager.

## **2.4 TEXAS STREAM TEAM DATABASE MANAGER**

Texas Stream Team Database Manager is responsible for entering citizen monitor data into the database, as well as trouble-shooting issues concerning the database. If the monitor's data are submitted using paper Environmental Data Forms, the Database Manager acts as reviewer of the Environmental Data Form for completeness and records the data.

## **2.5 TEXAS STREAM TEAM DATA SPECIALIST**

The Data Specialist trains new citizen and partner monitors in the methodology of data collection and is responsible for utilizing monitors' data to meet the goals of the program. Once data have been reviewed and approved, the Data Specialist creates data quality reports, sets of data for the on-line Data Forum, and writes, presents, and distributes data reports for various functions and events.

## **2.6 TEXAS STREAM TEAM EDUCATION & OUTREACH COORDINATOR**

The Education & Outreach Coordinator supports training of new citizen and partner monitors and manages teachers and student workshops. The Education & Outreach Coordinator manages program curriculum and publications, and is the main point of contact for partners in targeted watersheds (see Section 7.0 for more information).

## **2.7 TEXAS STREAM TEAM PROGRAM DIRECTOR**

The Program Director interfaces with the partners and stakeholders on a regular basis. The Director is responsible for ensuring the program is operating in compliance with state of Texas, the TCEQ, and Texas State University standards. These responsibilities include compliance with EPA grant criteria and deliverables. The Program Director is also responsible for the management of Texas Stream Team program as well as improving relationships with interested groups and maintaining an understanding of the evolving local, state, and federal regulations with regard to surface water quality and identification of NPS sources of water pollution.

### **3.0 WHAT ENTITIES ARE INVOLVED IN DATA COMMUNICATION?**

#### **3.1 STAKEHOLDERS**

The stakeholders include those who live, work, or recreate in a watershed including permit holders, regulatory agencies, and organizations that provide hard (monetary funding) and soft (event space, meeting space, equipment, staff time, volunteers, etc.) donations to Texas Stream Team. Concerns and questions from stakeholders are directed to the Program Director.

#### **3.2 PROJECT PARTNERS**

The primary project partner for Texas Stream Team is the TCEQ. Communication with the TCEQ generally goes through the TCEQ's NPS Project Manager. Being grant-funded through the TCEQ's Nonpoint Source Program, Texas Stream Team is considered a sub-program of the TCEQ. The TCEQ NPS Project Manager reviews and approves Texas Stream Team's Scope of Work, Quality Assurance Project Plan (QAPP), and Communication Plan, as well as the quarterly progress reports.

Secondary partners include other state, and local entities, such as river authorities, schools, city governments, other TCEQ programs, TSSWCB programs, universities, and TPWD. Project partners are often involved with monitor data by acting as the main point of support for citizen water quality monitors.

#### **3.3 GENERAL PUBLIC**

Ultimately, monitoring data and reports are made available to the general public with the goal of elevating public awareness about the negative impacts of NPS pollution to the waters of the state. There are three main routes by which Texas Stream Team shares data with the public.

First, the general public can access information through Texas Stream Team's website and web resources < <http://txstreamteam.rivers.txstate.edu/> >. Second, the general public can be informed at public meetings sponsored by partners, in convenient areas across the state. Third, the general public can be informed through Texas Stream Team's quarterly newsletters and other program publications. A summary of the principle communication techniques is presented in Table 1.

**Table 1. Principal Communication Techniques**

<b>Product</b>	<b>Purpose</b>	<b>Update Frequency</b>	<b>Protocol</b>	<b>Responsibility</b>
Website	To explain Texas Stream Team program and provide links to resources that support citizen monitors and groups.	Ongoing	Content provided by staff and contributors; updated based on events and new information.	Texas Stream Team
News Releases/ Newsletter	News releases announce immediate and significant Partner and Citizen Monitor topics, public meetings, trainings, Texas Stream Team program and nonpoint source pollution prevention issues. Texas Stream Team Newsletter provides regular and more in-depth coverage of issues affecting the program, covers program changes, and highlights events and monitoring group successes.	News Releases as required; Newsletter Quarterly	Receives, plans and responds to communications about new releases and news via newsletter	Education & Outreach Coordinator
Data Forum	An interim tool to communicate water quality data collected by Texas Stream Team monitoring network during the development of the new Online Database and Dataviewer.	Continuous	A one-time method utilized to communicate data while the Texas Stream Team Dataviewer is being rebuilt	Data Specialist
Online Database	To receive data and provide public access to monitoring site data.	Continuous	Updated regularly by program staff and applicable users	Statewide Monitoring Coordinator, Database Manager, Partners, Groups, Citizen Monitors

<b>Product</b>	<b>Purpose</b>	<b>Update Frequency</b>	<b>Protocol</b>	<b>Responsibility</b>
Dataviewer (Google GIS map with data)	To pull data from online database and display it online for public access.	Continuous	Updated regularly by program staff and applicable users	Statewide Monitoring Coordinator, Database Manager, Partners, Groups, Citizen Monitors, Public
Data Reports	To present data in a meaningful way which can be used by professionals and the general public.	Quarterly	Reviewed by TCEQ project manager, coordinated with program partners	Data Specialist
Meetings (Steering Committee and Stakeholder)	To provide a physical setting at which to engage in dialogue with partners/public to determine areas of interest, offer services, and present data.	Continuous	Coordinated with program partners	Texas Stream Team
Social Media	To Communicate up-to-date news and announcements.	Continuous	Updated regularly by program staff and applicable users	Texas Stream Team
Internal Communication	To Work with employees, partners, and monitors to achieve goals.	Continuous	Maintain regular communications	Texas Stream Team and Partners
Volunteer Recognition Event	To Bring statewide citizen water quality monitors and partners together to show gratitude and provide a forum for communication.	Every other year	Tasks are assigned and carried out for completion of event; coordinated with program partners and TCEQ	Texas Stream Team Individual Staff Members
Meeting of the Monitors	To Bring statewide citizen water quality monitors and partners together to provide a forum for communication and opportunities for education/professional development.	Every other year	Tasks are assigned and carried out for completion of event; conference agenda approved by TCEQ	Texas Stream Team Staff Member

<b>Product</b>	<b>Purpose</b>	<b>Update Frequency</b>	<b>Protocol</b>	<b>Responsibility</b>
NPS Pollution Presentations	To educate students and other citizens about NPS pollution and ways to reduce their impact”.	Continuous	Staff coordinates presentations to ensure timing does not conflict and priority watersheds are served	Texas Stream Team
Curriculum	To provide resources for teachers and students on environmental science, specifically an understanding of water quality students on environmental science.	Continuous	Updates, investigates and coordinates the presentation of curriculum	Education & Outreach Coordinator
Partners Update Packet	To provide partner’s updates on cooperation in achieving goals and request for information from partners.	Quarterly	Relevant information is provided to TCEQ and partners in a timely manner	Program Director
Quarterly Progress Reports & Final Report	To Communicate Texas Stream Team program developments to the TCEQ.	Quarterly, at end of grant cycle	Prepared and delivered to TCEQ. Reviewed by TCEQ	Texas Stream Team, Program Director
Pollution Concern Form	To communicate pollution concerns, data anomalies with program partners and appropriate agencies	As necessary	TCEQ & Regional Water Authority notified; other authority/agencies and water quality professionals notified as relevant	Statewide monitoring coordinator supported by Data Specialist

#### **4.0 HOW ARE THE TCEQ AND OTHER PARTNERS INVOLVED IN THE COMMUNICATION LOOP?**

The U.S. Environmental Protection Agency, through its EPA Clean Water Act Section 319 funds, the TCEQ, Texas Parks and Wildlife Department (TPWD), the Railroad Commission (RRC), and other partners including river authorities, are tied together through common interests and responsibilities for water quality.

These organizations are vital to Texas Stream Team network of monitors as they provide hard and soft donations; services-in-kind, such as water quality monitoring, data review, and regulatory interpretations; and regulatory and enforcement actions, when required. It is vital that all certified citizen monitors collecting data do so in a consistent manner in compliance with all prescribed methods and quality control procedures outlined in *Texas Stream Team Water Quality Monitoring Manual* and QAPP.

Monitoring data and reports are relayed to these organizations, as defined in the grant contract, directly by Texas Stream Team's Data Specialist.

Along with the soft and hard donations-in-kind given by the partners, the partners communicate monitoring station data and observations to Texas Stream Team. Like the citizen monitors, the partners fit the unique role of natural resource witnesses to episodic events that characterize NPS water pollution. The communication of data and observations by the partners will generally follow the same steps practiced by citizen monitors.

## **5.0 WHAT ARE SOME ASPECTS THAT AFFECT A MONITOR'S DATA?**

### **5.1 QUALITY ASSURANCE PROJECT PLAN**

The quality of the data that monitors collect is important because it allows the data to be relied on as supplemental information that state and local organizations can use to better understand the water quality of watersheds. Prior to conducting monitoring activities at a monitoring site, the details of Quality Assurance/Quality Control are taught and reviewed during water quality monitor trainings. Texas Stream Team offers quality control refresher trainings for monitors in order to maintain and improve the quality of data. Texas Stream Team's QAPP, a part of the grant contract between Texas Stream Team and the TCEQ, is reviewed and updated yearly.

### **5.2 EQUIPMENT CALIBRATION**

All meter equipment, such as specific conductance and pH meters, used during the monitoring activities must be calibrated prior to use according to the manufacturer's specifications in order to produce accurate results within the equipment's operating range. Calibration is valid for a 24-hour period. The calibration data must be entered on the Environmental Monitoring Form or the on-line database.

### **5.3 SCHEDULING OF WATER MONITORING**

Surface water samples will be collected from the designated monitoring site on a pre-determined schedule: generally once each month at the same time of the day. Data, such as dissolved oxygen (DO) and bacteria counts, are temperature dependent, and scheduling a sample collection for approximately the same time assists in standardizing the monitoring activity through seasonal changes in the course of a year.

### **5.4 WATER QUALITY PARAMETERS**

Citizen water quality monitors collect data on specific conductance, dissolved oxygen, water temperature, pH, Secchi Disk transparency, total depth, *E. coli* bacteria, orthophosphate, nitrate-nitrogen and various field observations in order to determine the suitability of a water body for aquatic life use and contact recreation. Observed values that indicate possible adverse effects differ for each water body. The TCEQ publishes particular standards for most of the water bodies in the state and makes these available online <[http://www.tceq.texas.gov/waterquality/standards/eq\\_swqs.html](http://www.tceq.texas.gov/waterquality/standards/eq_swqs.html)>.

### **5.4.1 Specific Conductance**

Specific conductance is a measure of the ability of a body of water to conduct electricity. Solids dissolved in a water body increase the conductivity because electricity moves through these materials with greater ease than it would move through pure water.

Monitors measure specific conductance to estimate the concentration of total dissolved solids (TDS). Specific conductance values recorded as microSiemens per centimeter ( $\mu\text{S}/\text{cm}$ ) are multiplied by 0.65 to be converted to TDS recorded as milligrams per liter (mg/L). High TDS may affect the aesthetic quality of the water by generating turbid water conditions, yellowing the color of washed clothes, and corroding plumbing fixtures. Mineral springs, carbonate deposits, salt deposits, and sea water intrusion are sources for naturally occurring high concentrations of TDS. Other sources can be attributed to oil exploration, drinking water treatment, chemicals, storm water and agricultural runoff, and wastewater discharges.

### **5.4.2 Dissolved Oxygen**

Many organisms that live in the water need oxygen to live. In water bodies where dissolved oxygen (DO) is low, organisms may not have sufficient oxygen to survive. Modifications to the riparian zone and other human activities that cause water temperatures to increase, along with increases in organic matter (either directly or through nutrient loading and resultant increased algal production) and bacterial activity may cause DO concentrations to decrease.

### **5.4.3 Water Temperature**

Water temperature affects the oxygen content of the water, with warmer water unable to hold as much oxygen. When water temperature is too cold or too hot, cold-blooded ectothermic organisms may either die or become weaker and more susceptible to other stresses, such as disease or parasites. Sources of cooler water could be related to reservoir releases. Warmer water can be caused by removing trees from riparian zones, soil erosion, or use of water by industry to cool equipment.

### **5.4.4 pH**

Most aquatic life is adapted to live within a narrow pH range. Different organisms can live at and adjust to differing pH ranges, but most fish die if pH is below 4 (the acidity of orange juice) or above 12 (the pH of ammonia). Potential causes of adverse pH fluctuations are industrial and wastewater discharge, runoff from quarry operations, and accidental spills.

#### **5.4.5 Secchi Disk Transparency and Total Depth**

The Secchi Disk is used to determine the clarity of the water, a condition known as turbidity. The disk is lowered into the water until it is no longer visible, and the depth is recorded. Readings equal to total depth indicate clear water. Reading results less than total depth indicate limited visibility. High quantities of total suspended solids (TSS) can lead to turbid conditions at the monitoring site. TSS increases turbidity which reduces light and decreases the production of oxygen by plants. At very high concentrations, suspended solids can also clog fish gills. Excessive TSS is the result of accelerated erosion and is often associated with high flows, where river banks are cut, or sediment is resuspended. It can also be the result of sheet erosion, where runoff of water causes a thin layer of soil to be carried by the water to the stream. Disturbing vegetation without proper barriers to slow down overland flow increases TSS.

#### **5.4.6 *E. coli* Bacteria**

*E.coli* (*Escherichia coli*) bacteria are typically not harmful to humans, but their presence is an indicator of recent fecal contamination that may contain pathogens dangerous to humans. Present in all warm bodied animals, these bacteria can be introduced to surface water through released feces and cause surface waters to become polluted. Poorly maintained or ineffective septic systems, pet wastes, overflow of domestic sewage from urban nonpoint sources, and runoff from animal feedlots and other production-related activities can elevate bacteria levels.

#### **5.4.7 Nutrients**

Citizen monitors conduct tests on two nutrients: orthophosphate-phosphorus and nitrate-nitrogen. Nutrients can increase plant and algae growth. When these plants and algae die or other sources of nutrients are released, bacteria that aid in decomposition use oxygen. This typically reduces the dissolved oxygen in the water. High levels of nitrates and nitrites can produce Nitrite Toxicity, or “brown blood disease,” in fish. This disease reduces the ability of blood to transport oxygen throughout the organism’s body. Nutrients can be found in effluent released from wastewater treatment plants, fertilizers, and urban or agricultural runoff carrying animal waste. Soil erosion from construction sites, farms, lawns, and gardens can add nutrients to the water.

## **6.0 WHAT ARE THE STEPS FOR MONITORS DURING A POLLUTION CONCERN?**

There are myriad variables influencing healthy water quality, and responding appropriately to environmental concerns can involve numerous and complex solutions, solutions that appear to be contradictory approaches. Where concerns are documented, solutions to environmental problems can often take time.

Monitors and group data managers are most familiar with their monitoring locations and most anomalies might be quickly recognized if they occur. If anomalies are observed, please use common sense while determining how to proceed with your next action. The observation of any fish and freshwater mussel kills, harmful algal blooms or acute pollution which may cause the loss of fish and wildlife should be communicated to the TPWD Kills & Spills Team (also known as KAST), TCEQ, the local river authority as well as Texas Stream Team. Call 911 if there is an emergency that involves or threatens human life.

If there are data anomalies documented onsite (dissolved oxygen, pH, specific conductance, temperature), repeat the sampling collection and document findings. If sampling for *E. coli* bacteria and elevated values are observed, repeat the sampling as soon as possible and document the data. If elevated values are still documented, contact Texas Stream Team and your local partner to determine how to proceed.

Monitors may also observe other anomalies such as absence of aquatic life, presence of odors such as chlorine or rotten eggs, illicit dumping, or significant changes to riparian corridors. In many instances, these observations are very important and they should be documented on the data sheet and communicated with Texas Stream Team and your local partner.

## 6.1 STEPS IN REPORTING AN INCIDENT

Concern / Incident Type	Actions To Take
Water quality data anomalies (dissolved oxygen, pH, specific conductivity, temperature)	<ol style="list-style-type: none"> <li>1. Repeat the water quality parameter test(s).</li> <li>2. If data anomaly is confirmed, fill out and submit a <i>Pollution Concern Form</i> with <i>Environmental Monitoring Form</i>.</li> <li>3. Follow up by phone with Texas Stream Team.</li> <li>4. If additional assistance is needed, call your group leader or partner (as applicable).</li> </ol>
Spills of all hazardous substances, temperature)	<ol style="list-style-type: none"> <li>1. Call the Texas Commission on Environmental Quality (TCEQ) Hotline.</li> <li>2. Submit <i>Pollution Concern Form</i> with <i>Environmental Monitoring Form</i>.</li> </ol>
Fish kills, (any type of pollution which may cause loss of fish and wildlife), and harmful algal blooms	<ol style="list-style-type: none"> <li>1. Call Texas Parks and Wildlife Kills &amp; Spills Team Hotline (TPWD KAST).</li> <li>2. Submit <i>Pollution Concern Form</i> with <i>Environmental Monitoring Form</i>.</li> </ol>
Gas and Oil exploration, development, or production spills	<ol style="list-style-type: none"> <li>1. Call Railroad Commission of Texas 24-hour Accident Reporting Emergency Number.</li> <li>2. Submit <i>Pollution Concern Form</i> with <i>Environmental Monitoring Form</i>.</li> </ol>
Oil spill in Texas coastal water	<ol style="list-style-type: none"> <li>1. Call Texas General Land Office Oil Spill Reporting Hotline.</li> <li>2. Submit <i>Pollution Concern Form</i> with <i>Environmental Monitoring Form</i>.</li> </ol>

**Table 2. Environmental Concerns Contact List**

TCEQ Environmental Complaints Hotline		888/777-3186
<b>TCEQ Regional Offices</b>	Abilene	325/698-9674
	Amarillo	806/353-9251
	Austin	512/339-2929
	Beaumont	409/898-3838
	Corpus Christi	361/825-3100
	Dallas - Fort Worth	817/588-5800
	El Paso	915/834-4949
	Harlingen	956/425-6010
	Houston	713/767-3500
	Laredo	956/791-6611
	Lubbock	806/796-7092
	Midland	432/570-1359
	San Angelo	325/655-9479
	San Antonio	210/490-3096
Tyler	903/535-5100	
Waco	254/751-0335	
TPWD KAST 24-Hour Communication Center		512/389-4848
<b>TPWD KAST Regions</b>	Region 1 (central to west Texas)	512/353-3474
	Region 2 (north Texas)	245/867-7956 245/867-7986
	Region 3 (northeast Texas)	903/566-2518 903/566-8387
	Region 4 (upper Gulf coast)	281/534-0138
	Region 5 (lower Gulf coast)	361/825-3246
Railroad Commission of Texas 24-hour Accident Reporting Emergency Number		512/463-6788
General Land Office Coastal Oil Spill Reporting Hotline		800/832-8224

### Table 3. Clean Rivers Program Contact List

If you would like to get involved as a stakeholder in the Clean Rivers Program (CRP), you may contribute your data, ideas and concerns through steering committee meetings, public meetings, and/or other forums. To find out about meetings, call the appropriate CRP Regional Water Authority.

Basin(s)	CRP Regional Water Authority	Telephone
Canadian River, Red River	Red River Authority	940/723-2236
Sulphur River	Sulphur River Basin Authority	903/223-7887
Cypress Creek	Northeast Texas Municipal Water District	903/639-7538
Sabine River	Sabine River Authority	409/746-3284
Upper Neches River	Angelina and Neches River Authority	936/633-7527
Lower Neches River, Neches-Trinity, Coastal	Lower Neches Valley Authority	409/898-0561
Trinity River	Trinity River Authority	817/467-4343
Brazos-Colorado Coastal, San Jacinto River, San Jacinto-Brazos Coastal, Trinity-San Jacinto Coastal	Houston-Galveston Area Council	713/993-4549
Brazos River	Brazos River Authority	254/761-3100
Colorado River, Lavaca-Colorado Coastal	Lower Colorado River Authority	512/473-3200
Lavaca River	Lavaca-Navidad River Authority	361/782-5229
Guadalupe River, Lavaca-Guadalupe Coastal	Guadalupe-Blanco River Authority	830/379-5822
San Antonio River	San Antonio River Authority	210/227-1373
Nueces River, Nueces-Rio Grande Coastal, San Antonio-Nueces Coastal	Nueces River Authority	361/653-2110
Rio Grande	International Boundary and Water Commission - US Section	915/832-4701

Spills of all hazardous substances, including refined petroleum products from pipelines; releases of crude oil being transported over the roadway; and discharges of any substances that may cause pollution should be reported to the TCEQ. Fish and freshwater mussel kills, any type of pollution which may cause loss of fish and wildlife, and harmful algal blooms should be reported to TPWD KAST. Spills or discharges from all activities associated with the exploration, development, or production, including storage or pipeline transportation (excluding highway transport and refined product spills), of oil, gas, and geothermal resources should be reported to RRC.

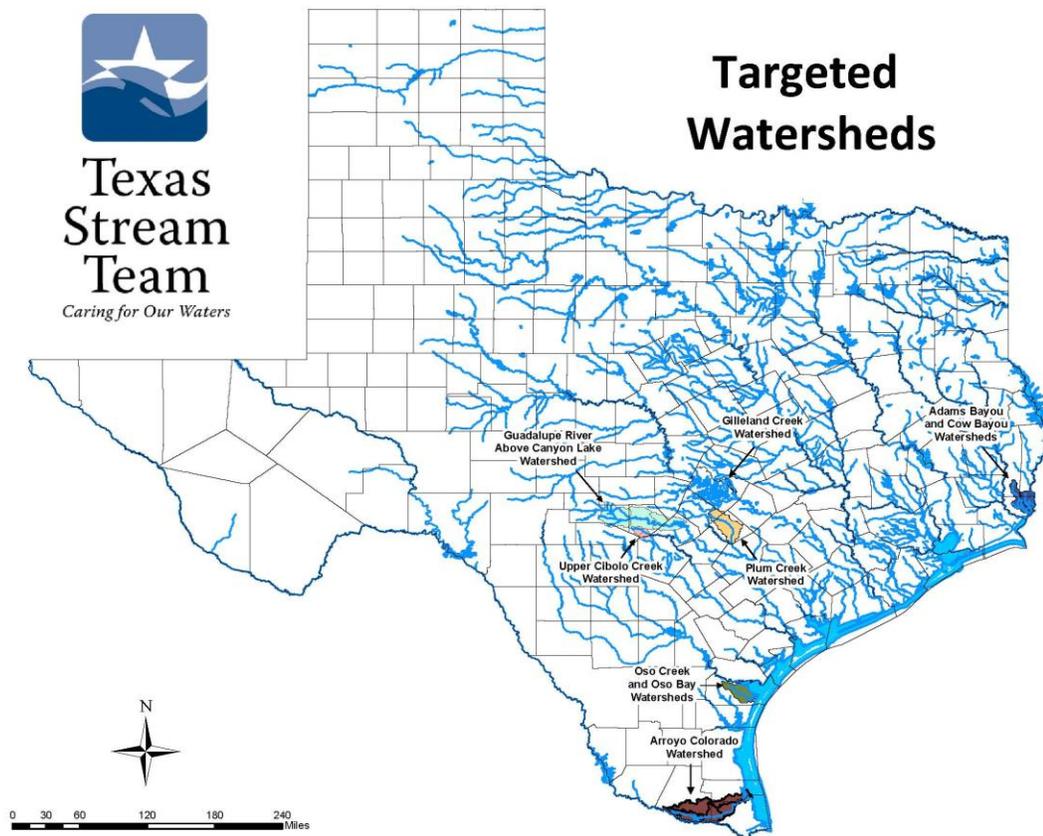
**If you are unsure whether or not what you are witnessing constitutes a water quality pollution complaint, call Texas Stream Team (1-877-506-1401).**

## 7.0 WHAT ARE TEXAS STREAM TEAM'S TARGETED WATERSHEDS?

The TCEQ identifies targeted watersheds as areas of priority for support and work for Texas Stream Team. Some of these watersheds are being managed through the TCEQ TMDL program while others are being managed through the TCEQ NPS program or TSSWCB NPS program as a Watershed Protection Plan (WPP). The unique nature of each TMDL and WPP project requires specific actions and timelines to address and solve water quality impairments. The grant contract for Texas Stream Team program defines which watersheds receive extra watershed services during the grant cycle.

List of Targeted Watersheds (alphabetical order):

Arroyo Colorado WPP;  
Upper Cibolo Creek WPP;  
Gilleland Creek TMDL;  
Guadalupe River Above Canyon Lake TMDL;  
Orange County TMDL; and  
Oso Bay and Oso Creek TMDL;  
Plum Creek WPP.



## **8.0 WHAT ARE TEXAS STREAM TEAM'S WATERSHED SERVICES?**

Texas Stream Team's watershed services are a collection of support services offered to partners managing TMDL and WPP projects. The following are the services available for utilization within targeted watershed projects.

- Volunteer water quality monitoring;
- NPS pollution watershed outreach presentations;
- An assortment of curricula and related written and electronic materials for use in classrooms and field lessons;
- Watershed tours;
- Watershed surveys;
- Intensive bacterial snapshots;
- Biological monitoring demonstrations;
- Geographic Information System (GIS) and map-based visual aids;
- Water quality communications;
- Partnership development in existing and newly identified watershed areas in need of monitoring;
- Grant and project development facilitation;
- Participation in partner development facilitation;
- Participation in partner scoping meetings;
- Participation in TMDL and WPP stakeholder meetings;
- River and lake clean-up projects;
- Storm water drain stenciling;
- Land use surveys; and
- Other small-scale community action projects and watershed activities proposed by partners and citizen monitors.

## **9.0 CONCLUSIONS**

Our stewardship of the waters of the state of Texas is dependent on our present generation of Texans who are involved in natural resource evaluation and management. The work that we do today is for ourselves and our posterity. Through the wise and judicial use of our water resources, we and future Texans will benefit by having clean water that supports healthy recreational use, human consumption, and productive populations of native plants and animals.

**APPENDIX A**

**Environmental Monitoring Form**

Prepared in cooperation with the Texas Commission on Environmental Quality and the United States Environmental Protection Agency.



# Texas Stream Team

## ENVIRONMENTAL MONITORING FORM

PLEASE PRINT (Black Ink or #2 Pencil)

Send to:  
**Texas Stream Team**  
 Texas State University  
 The Landing  
 601 University Drive  
 San Marcos, TX 78666-4616  
 Toll Free: (877) 506-1401  
 Email: [txstreamteam@txstate.edu](mailto:txstreamteam@txstate.edu)

Group ID #

Monitor's Name

Station ID #

Site Description

Sample Date  M  M  D  D  Y  Y

Sample Time (military)  H  H  M  M

Sample Depth (meters)  (not total depth)

**Meter Calibration:** (Within 24 hours of sampling.) **Store and calibrate standard at room temperature.**

Calibration	Date	Time	Standard Value	Standard Temp (°C)	Initial Meter Reading	Meter Adjusted To	Post Test (pH Meter)
Conductivity							
pH (7.0)							

**Core Tests and Measurements:**

- CONDUCTIVITY (µS/cm)  
 TDS Tester 3 (Low)  TDS Tester 4 (High)  Other
- AIR TEMPERATURE (°C)
- WATER TEMPERATURE (°C)
- DISSOLVED OXYGEN (mg/L)  
 Average 1st titration \_\_\_\_\_ 2nd titration \_\_\_\_\_
- pH (standard units)
- SECCHI DISK TRANSPARENCY (meters)
- TOTAL DEPTH (meters)
- TRANSPARENCY TUBE (meters)  
 Average 1st reading \_\_\_\_\_ 2nd reading \_\_\_\_\_

**Reagents/Media:** Are any reagents (or media) expired?  Yes  No  
 List any expired:

**Bacteria Test:**

*E. COLI* (colonies/100 mL)  
 Average Sample 1 \_\_\_\_\_ Sample 2 \_\_\_\_\_

INCUBATION: Period (hrs) \_\_\_\_\_ (28-31 hrs) Temp. (°C) \_\_\_\_\_ (33+/-3°C)  
 SAMPLE 1: Sample size \_\_\_\_\_ mL Dilution factor (100/sample size) \_\_\_\_\_  
 Colonies counted \_\_\_\_\_ x dilution factor \_\_\_\_\_ = \_\_\_\_\_ colonies/100 mL  
 SAMPLE 2: Sample size \_\_\_\_\_ mL Dilution factor (100/sample size) \_\_\_\_\_  
 Colonies counted \_\_\_\_\_ x dilution factor \_\_\_\_\_ = \_\_\_\_\_ colonies/100 mL  
 FIELD BLANK: *E. coli* colony growth (circle one) YES / NO  
 DATA QUALITY REVIEW: Checklist completed (circle one) YES / NO

**Field Observations:**

- FLOW SEVERITY: 1-no flow 2-low 3-normal 4-flood 5-high 6-dry
- ALGAE COVER: 1-absent 2-rare (<25%) 3-common (26-50%) 4-abundant (51-75%) 5-dominant (>75%)
- WATER COLOR: 1-no color 2-light green 3-dark green 4-tan 5-red 6-green/brown 7-black
- WATER CLARITY: 1-clear 2-cloudy 3-turbid
- WATER SURFACE: 1-clear 2-scum 3-foam 4-debris 5-sheen
- WATER CONDITIONS: 1-calm 2-ripples 3-waves 4-white caps
- WATER ODOR: 1-none 2-oil 3-acrid (pungent) 4-sewage 5-rotten egg 6-fishy 7-musky
- PRESENT WEATHER: 1-clear 2-cloudy 3-overcast 4-rain
- DAYS SINCE LAST SIGNIFICANT PRECIPITATION (runoff)
- RAINFALL ACCUMULATION (inches, last 3 days)

**Additional Tests Conducted (nutrients, etc.):**

TYPE: \_\_\_\_\_  
 FECAL COLIFORM (colonies/100 mL)  
 Source of readings:  Certified Lab  Monitor

**Coastal Area Salinity Tests and Observations:**

SALINITY (ppt)  SAMPLE TEMP (°C)  
 TIDE STAGE: 1-low 2-falling 3-slack 4-rising 5-high

**Measurement Comments and Field Observations:**

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

minutes TOTAL TIME SPENT SAMPLING AND TRAVELING  miles TOTAL ROUNDTRIP DISTANCE TRAVELED  TOTAL NUMBER OF PARTICIPANTS

I CERTIFY THAT ALL PROCEDURES HAVE BEEN FOLLOWED AND THIS INFORMATION IS ACCURATE TO THE BEST OF MY ABILITY.

\_\_\_\_\_  
 CERTIFIED MONITOR'S SIGNATURE DATE DATA MANAGER'S SIGNATURE DATE  
White - Texas Stream Team Yellow - Volunteer Data Manager or Texas Stream Team Partner Pink - Volunteer Monitor

**APPENDIX B**

**Pollution Concern Form**



# Texas Stream Team

*Caring for Our Waters*

## Pollution Concern Form

Please refer to the *Communication of Data and Incident - Field Reference Guide* for pollution concern communication protocols.

Date \_\_\_\_\_ Time \_\_\_\_\_

Name \_\_\_\_\_

Phone \_\_\_\_\_

Email \_\_\_\_\_

Site Description (site I.D., site name, physical description, landmarks)

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Describe the type of issue

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Describe any communication steps, in addition to this form, you have taken regarding this issue

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Please Include Photos with form as applicable

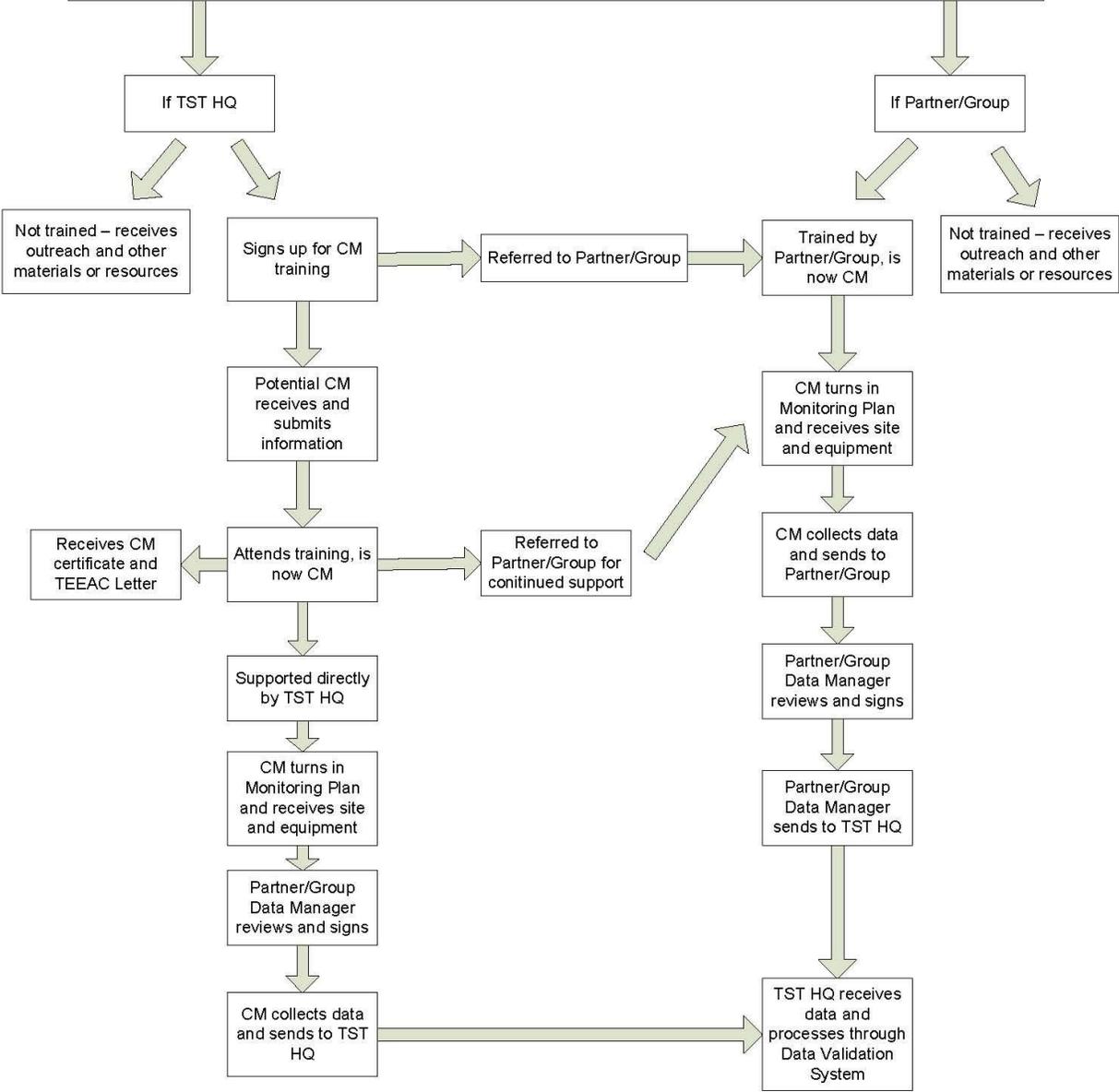
## **APPENDIX C**

### **Water Quality Monitor Training to Data Submittal Flow Chart**

From initial CM Training to Data Submittal Flow Chart

TST HQ = Texas Stream Team Headquarters  
 TEEAC = Texas Environmental Education Advisory Committee  
 CM = Citizen Monitor

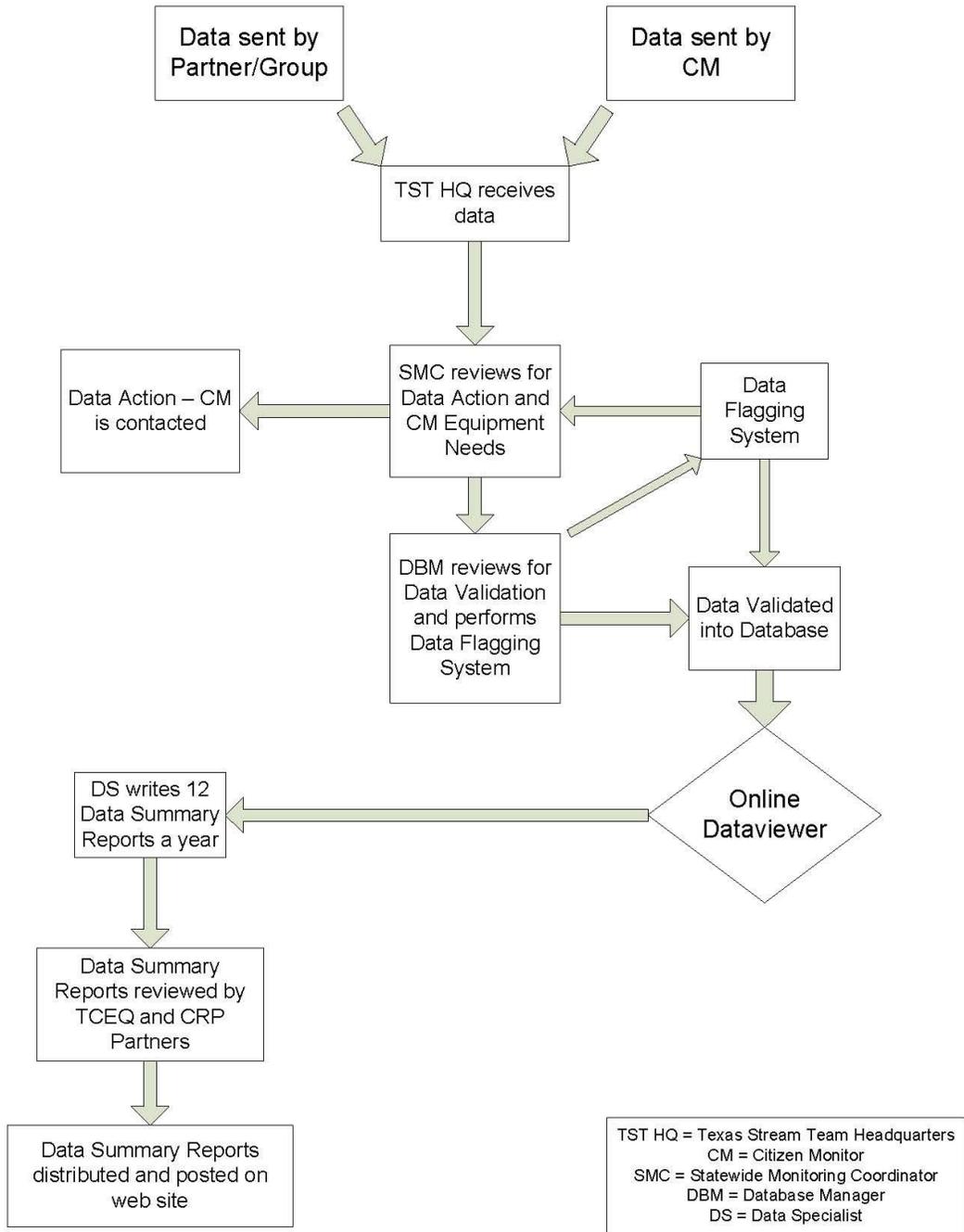
Potential CM contacts TST HQ or Partner/Group



## **APPENDIX D**

### **Data Validation/Communication Flow Chart**

Data Validation/Communication Flow Chart



**APPENDIX E**

**Texas Stream Team Contacts List**

### **Texas Stream Team Contact List**

Hand delivery of data / information	Please call for directions to Texas State University Campus
Postal Mailing Address	Texas State University Texas Stream Team 601 University Drive, San Marcos, TX 78666
Toll free number	1-877/506-1401
Phone number	512/245-1346
Fax number	512/245-2095
Email	txstreamteam@txstate.edu