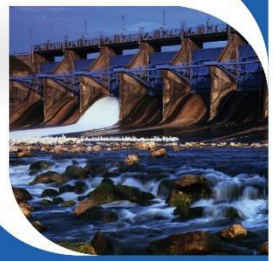
Village Creek-Lake Arlington Watershed Protection

Aaron Hoff
Trinity River Authority
February 2, 2017



Village Creek
Lake Arlington
WATERSHED
PROTECTION

Trinity River Authority of Texas
Enriching the Trinity basin as a resource for Texans

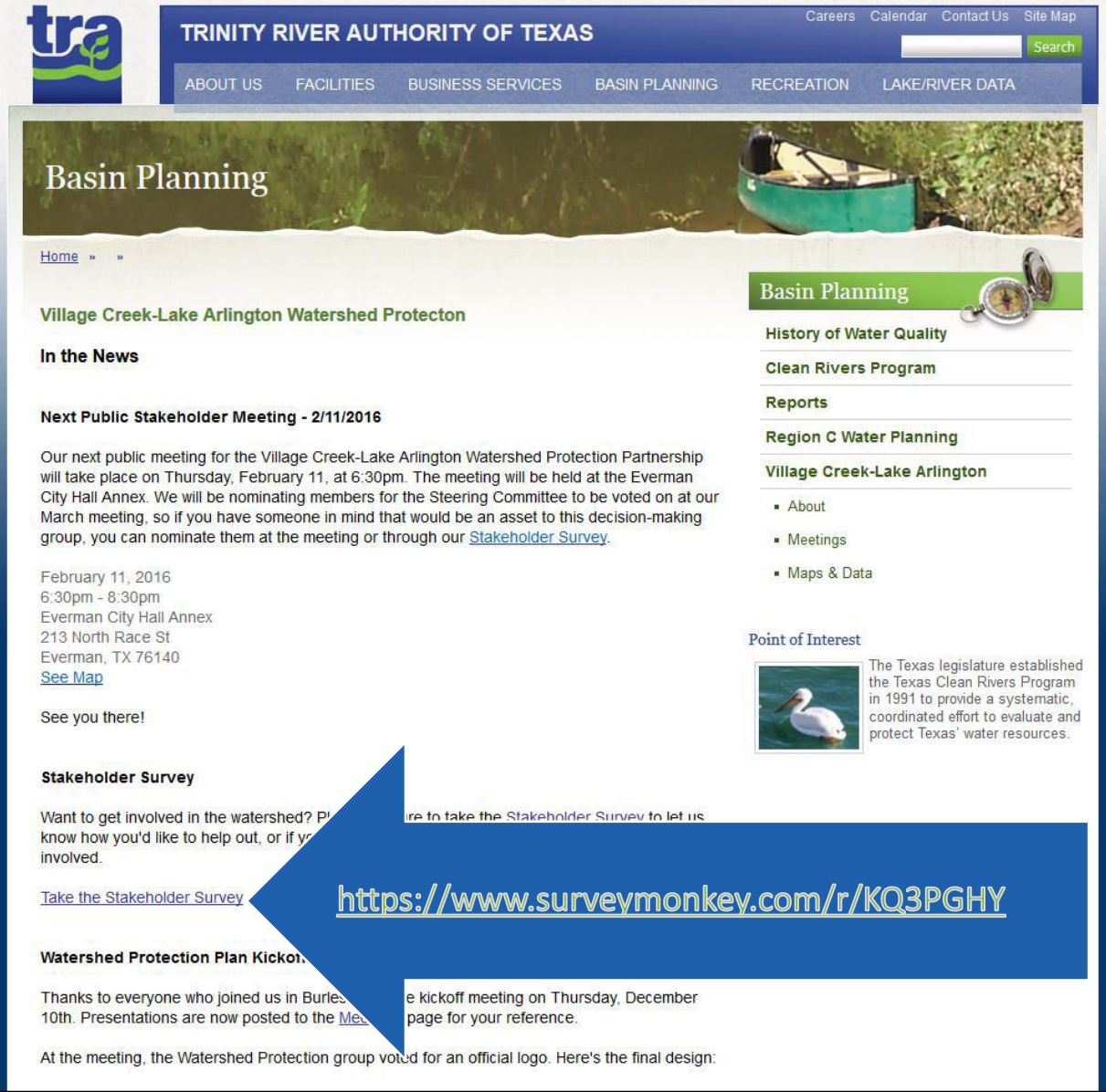
Recap from Last Meeting

- Discussed stormwater green infrastructure and LID components
  - *Fouad Jaber, Texas AgriLife Extension Service - Associate Professor & Extension Specialist*
- Discussed stormwater mitigation thru rainwater harvesting
  - *Dotty Woodson, Texas AgriLife Extension Service - Extension Program Specialist*
- Provided first water quality monitoring update
  - *Angela Kilpatrick, Trinity River Authority – Senior Environmental Scientist*
- Check the website for last meeting's presentations
  - http://www.trinityra.org/lakearlingtonvillagecreek

Meeting Overview

- NRCS Conservation Programs
  - *Michael Brooks, District Conservationist – USDA Natural Resource Conservation Service*
- Water Quality Management Plan Program
  - *Mitch Conine, Project Management Coordinator – Texas State Soil & Water Conservation Board*
- Water Quality Monitoring Update
  - *Angela Kilpatrick, Senior Environmental Scientist - Trinity River Authority*
- Overview of an Example WPP
- Upcoming Events and Path Forward
  - *Aaron Hoff, Watershed Coordinator - Trinity River Authority*
- Open Discussion and Closing Comments

http://www.trinityra.org/lakearlingtonvillagecreek



TRINITY RIVER AUTHORITY OF TEXAS

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ABOUT US FACILITIES BUSINESS SERVICES BASIN PLANNING RECREATION LAKE/RIVER DATA

Basin Planning

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Village Creek-Lake Arlington Watershed Protecton

In the News

Next Public Stakeholder Meeting - 2/11/2016

Our next public meeting for the Village Creek-Lake Arlington Watershed Protection Partnership will take place on Thursday, February 11, at 6:30pm. The meeting will be held at the Everman City Hall Annex. We will be nominating members for the Steering Committee to be voted on at our March meeting, so if you have someone in mind that would be an asset to this decision-making group, you can nominate them at the meeting or through our Stakeholder Survey.

February 11, 2016
6:30pm - 8:30pm
Everman City Hall Annex
213 North Race St
Everman, TX 76140
See Map

See you there!

Stakeholder Survey

Want to get involved in the watershed? Pl…re to take the Stakeholder Survey to let us know how you'd like to help out, or if y… involved.

Take the Stakeholder Survey

https://www.surveymonkey.com/r/KQ3PGHY

Watershed Protection Plan Kickof…

Thanks to everyone who joined us in Burle… kickoff meeting on Thursday, December 10th. Presentations are now posted to the Me… page for your reference.

At the meeting, the Watershed Protection group vot…d for an official logo. Here's the final design:

Basin Planning

- History of Water Quality
- Clean Rivers Program
- Reports
- Region C Water Planning
- Village Creek-Lake Arlington
  - About
  - Meetings
  - Maps & Data

Point of Interest

The Texas legislature established the Texas Clean Rivers Program in 1991 to provide a systematic, coordinated effort to evaluate and protect Texas' water resources.

Funding Source

ARLINGTON
THE AMERICAN DREAM CITY

EPA United States Environmental Protection Agency

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Funding provided by the Texas Commission on Environmental Quality through a Clean Water Act Section 319(h) grant from the U.S. Environmental Protection Agency, with match funding from the City of Arlington and in-kind contributions from TRA.

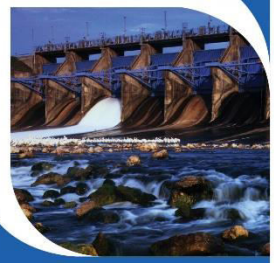
Ground Rules for Discussion Periods

- Please save questions until after each presentation has been given (unless speaker says otherwise)
- Any additional questions may be answered during the open discussion period at the end
- Please be respectful of others' time and points of view

Let’s get started!

http://www.trinityra.org/lakearlingtonvillagecreek

Aaron Hoff
Trinity River Authority
hoffa@trinityra.org
817.493.5581



USDA

United States Department of Agriculture

NRCS PROGRAMS

AND

PROGRAM DEVELOPMENT

Michael Brooks

District Conservationist

FY17

USDA

United States Department of Agriculture

NRCS Conservation Programs

2014 Farm Bill

FY17

Local Work Group (LWG)

Convened by local SWCD to provide advice to NRCS on:

- Ranking resource concerns to address specific land uses
- Recommending allocation percentages to each land use
- Providing input to conservationists for program direction
- Gathering input from an advisory standpoint
- Making screening tool recommendations
- Public outreach efforts

FY17

Local Can Mean

- County
- A portion of a county
- A watershed
- Multi-county region
- Other identified subdivision that has interested stakeholders

Public Involvement

- Anyone can participate
- Local, state and federal agencies
- Agricultural organizations
- Local agri-businesses
- Impacted stakeholders

FY17

State Technical Advisory Committee (STAC)

- Background
  - Required by the 1985 Food Security Act (1985 Farm Bill) Title XII.
  - The Secretary of Agriculture delegated implementation of the committee to NRCS.
  - Chaired by NRCS STC, but used by other USDA agencies as needed.

State Technical Advisory Committee

- Committee role
  - Provide information, analysis and recommendations regarding USDA programs
  - Are an advisory group
  - NRCS is charged to give strong consideration to recommendations of group

FY17

State Technical Advisory Committee

- Membership
  - USDA agencies and committees
  - Native American Tribes
  - Association of Soil & Water Conservation Districts
  - State government entities
  - State agricultural organizations
  - Agricultural non-profit organizations
  - Agribusinesses

FY17

STAC/LWG Interface

- How Do These Meetings Fit Together?
  - LWG sets the local priorities
  - STAC helps determine state priorities
  - LWG and STAC share the same members
  - Both identify resource concerns
  - Both determine resource concern priorities

Beginning Farmer/Rancher

- Has not operated a farm or ranch or someone who has operated a farm or ranch for not more than 10 consecutive years. This requirement applies to all members of an entity.
- Will materially and substantially participate in the operation of the farm or ranch.

Socially Disadvantaged Farmer/Rancher

- A member of a socially disadvantaged group whose members have been subjected to racial or ethnic prejudice because of their identity as members of the group without regard to their individual qualities.

Veteran Farmer/Rancher

- Has not operated a farm or ranch or someone who has operated a farm or ranch for not more than 10 consecutive years. This requirement applies to all members of an entity.
- Will materially and substantially participate in the operation of the farm or ranch.
- Must be identified as a Beginning Farmer/Rancher
- A veteran farmer or rancher that is not considered a Beginning Farmer/Rancher does not meet the requirements of the Farm Bill designated “Veteran Farmer/Rancher.”

Resource Concern and Practices

Degraded Plant Condition

Brush Management
Fence
Forage and Biomass Planting
Pipeline
Range Planting
Pumping Plant
Well
Watering Facility
Pond
Nutrient Management
Integrated Pest Management
Prescribed Grazing

Livestock Production Limitation

Brush Management
Fence
Pumping Plant
Well
Watering Facility
Pond

Inefficient Energy Use

Residue Management
Pumping Plants
Windbreak/Shelterbelt Establishment
Irrigation Reservoir

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United States Department of Agriculture

Resource Concern and Practices

Soil Erosion

Conservation Cover
Critical Area Planting
Diversion
Grade Stabilization Structure
Grassed Waterway
Terrace
Underground Outlet
Residue Management
Conservation Crop Rotation
Forage and Biomass Planting
Cover Crop

Soil Quality Degradation

Conservation Cover
Critical Area Planting
Grade Stabilization Structure
Residue Management
Conservation Crop Rotation
Forage and Biomass Planting
Cover Crop
Contour Farming
Prescribed Grazing

FY17

Resource Concern and Practice

Insufficient Water

Irrigation system, Sprinkler
Irrigation system, Microirrigation
Irrigation Water
Conveyance, Pipeline
Irrigation Water Management
Brush Management

Fish and Wildlife-Inadequate Habitat

Shallow Water Development and Management
Tree/Shrub Establishment
Upland Wildlife Habitat
Watering Facility

Water Quality Degradation

Contour Buffer Strips
Filter Strip
Well Decommissioning
Subsurface Drain
Waste Storage Facility
Waste Treatment Lagoon

Air Quality Impacts

Strip Cropping
Forage and Biomass Planting
Nutrient Management
Integrated Pest Management
Range Planting
Conservation Cover

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United States Department of Agriculture

Conservation Programs

FY17

USDA

United States Department of Agriculture

Environmental Quality Incentives Program (EQIP)

EQIP offers financial and technical assistance to agriculture producers to promote agriculture production and environmental quality as compatible goals.

FY17

EQIP Guidelines

- No minimum acreage size or amount of practice units.
- No caps to restrict participation against large or small operations.
- Average Non-Farm Adjusted Gross Income is less than $900,000 for Conservation Programs.
- Payment limitation is $450,000 for the current farm bill's life.
- No restrictions on the number of applications submitted by a participant.
- Payment method used will be the Payment Rate (PR) which reflects increases in agricultural input costs.
- Higher payment rate for historically underserved.

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Regional Conservation Partnership Program (RCPP)

- New program designed to be an all encompassing program focused project.
- Uses EQIP, CSP, ACEP-WRE and ACEP-ALE programs.
- Addresses a multitude of resource concerns.

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USDA

United States Department of Agriculture

Regional Conservation Partnership Program (RCPP)

RCPP connects partners with producers and private landowners to design and implement voluntary conservation solutions.
These voluntary conservation solutions benefit natural resources, agriculture and local economies. Learn more about partner and participant eligibility below.
Eligible Partners: Agricultural or silvicultural producer associations, farmer cooperatives or other groups of producers, state or local governments, American Indian tribes, municipal water treatment entities, water and irrigation districts, conservation-driven nongovernmental organizations and institutions of higher education.

Eligible Participants**:** Under RCPP, eligible producers and landowners of agricultural land and non-industrial private forestland may enter into conservation program contracts or easement agreements under the framework of a partnership agreement. *Producers and landowners can contact a partner directly about participation in a project, or contact a local NRCS office for information about existing projects.*

FY17

Conservation Stewardship Program (CSP)

- CSP pays farmers who are improving conservation treatment on their working lands.
- Encourages the continuation of practices that benefit soil, water and air resources.
- A person or legal entity cannot receive CSP payments exceeding $200,000 during any five-year period.

FY17

ACEP – Agricultural Land Easement (ALE)

- Helps landowners restore and protect grassland, including rangeland and pastureland, and certain other lands, while maintaining the areas as grazing lands.

- Program emphasis is on support for grazing operations, plant and animal biodiversity, and grasslands under the greatest threat of conversion.

- Enrollment options:
  - Permanent easements

FY17

ACEP - Wetlands Reserve Easement (WRE)

A voluntary, non-regulatory, incentive-based program that helps private landowners, farmers and ranchers protect and restore wetlands on their property.

Enrollment options:

- Permanent easements
- 30-year easements
- 10 – year restoration agreement

FY17

National Ranking Tool

Four evaluation categories contribute to the overall score:

1. Cost effectiveness
2. National priorities
3. State issues
4. Local issues

FY17

County Base Funds
Land Use Allocations for 2017

Percentage of county base funds to be allocated to each land use:

Rangeland _____

Cropland-(Irrigated/Dryland) _____

Pastureland _____

FY17

Questions?

United States Department of Agriculture

Natural Resources Conservation Service

Helping People Help the Land

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FY17

Texas State Soil and Water Conservation Board Water Quality Management Plan Program

Village Creek-Lake Arlington WPP
Stakeholder Meeting
Everman, TX
February 2, 2017

Agency Role

Water Quality Mandate - Texas Agriculture Code §201.026

Texas State Soil and Water Conservation Board (TSSWCB) is the lead agency in Texas responsible for planning, implementing and managing programs and practices for abating agricultural and silvicultural nonpoint source water pollution.

Agency Role

- Provide technical and financial assistance to local soil and water conservation districts
  - *Local districts encourage landowners and agricultural producers to voluntarily conserve natural resources on their private lands through the implementation of best management practices*
- Results in a positive impact on state water resources, and protects soil quality which supports the strength of Texas' agricultural economy

How this gets done

TSSWCB administers several programs to achieve conservation goals across the state, they include:

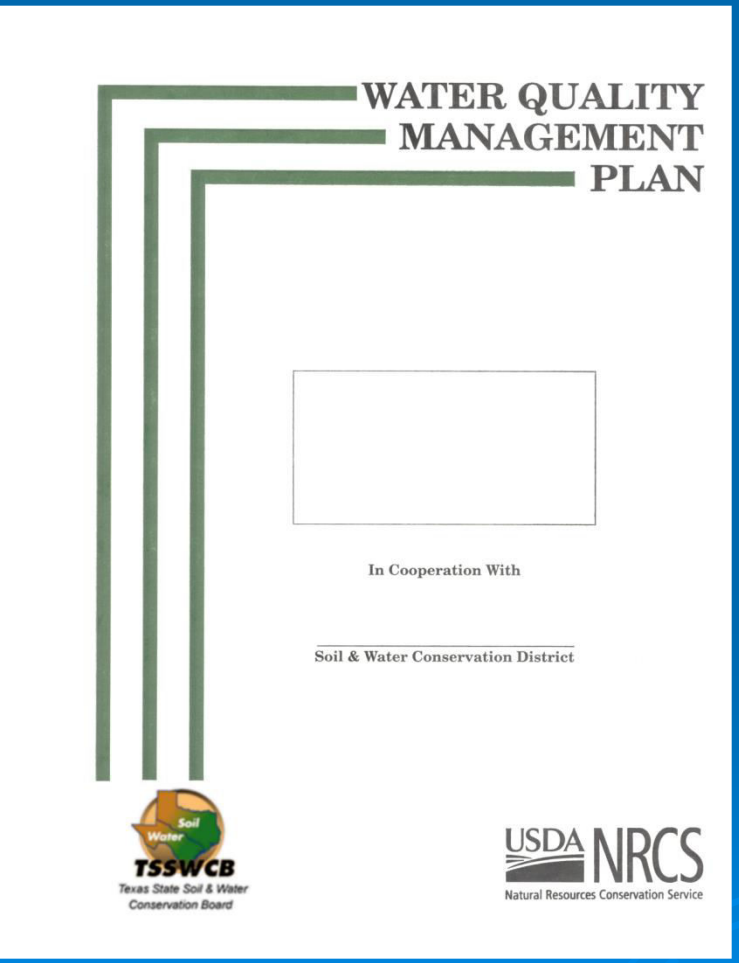
- Water Quality Management Plan Program
- Nonpoint Source Grant Program
- Water Supply Enhancement Program (Brush control)
- Flood Control Program

WQMP Program History

- Created by the 73rd Texas Legislature in 1993 through Senate Bill 503 (often referred to as 503 Program, or 503 plans, or 503 cost-share)

- Voluntary enrollment in WQMP Program for farmers and ranchers, except that the 77th Texas Legislature in 2001 (Senate Bill 1339) said poultry operations must obtain a WQMP

Water Quality Management Plans



- Site-specific plan for land improvement measures developed through SWCD for agricultural lands
- Provides farmers and ranchers a voluntary opportunity to achieve a level of pollution prevention or abatement consistent with state water quality standards
- Includes appropriate and essential land treatment practices, production practices, management measures, or technologies applicable to the planned land use
- Best available management and technology as described in NRCS Field Office Technical Guide

WQMPs

- Site specific plans with a combination of BMPs for the treatment of identified resource concerns
- Based on:
  - Soil types
  - Planned land use/production goals
  - Known/potential water quality/natural resource problems (SWAPA)
  - Other site specific factors (topo, etc.)

WQMPs

- Cover the entire farm or ranch
- Specifically designed to achieve pollution prevention/abatement
- Texas Water Code §26.121

FOTG “essential practices” for each land use:

- Cropland
  - Conservation crop rotation
  - Nutrient/Pest mgmt
  - Residue mgmt
- Pastureland
  - Prescribed grazing
  - Livestock water
  - Nutrient/Pest mgmt
- Rangeland
  - Prescribed grazing
  - Livestock water
- Forestland
  - Forest mgmt

Why have a WQMP?

- Abate/prevent erosion and promote conservation
- A strategic “management” plan for your operation
- “Assurance” policy – state-certified proof that you aren’t just sitting around doing nothing
- Demonstrate that voluntary conservation programs promote agricultural production and environmental quality as compatible goals
- Demonstrate that agriculture is doing our part to protect water quality
- Resolve water quality complaints through voluntary process with SWCD and TSSWCB

WQMPs

What Does A Plan Contain?

- District-Cooperator Agreement
- Request for Planning Assistance
- Soils Map & Interpretations
- Conservation Plan Map
- Narrative Record of decisions (practices) needed to implement WQMP
- Implementation schedule indicating years practices are to be applied
- Worksheets used during the inventory and planning process of developing WQMP
- NRCS Practice Standards and engineering designs
- Signature sheet to verify individual's privacy

How to get a WQMP?

- An individual requests planning assistance through their local SWCD
- The WQMP is usually developed by the SWCD Technician with NRCS and TSSWCB assistance
- The WQMP is approved by the landowner, the SWCD and NRCS and then certified by the TSSWCB
- Producer implements the WQMP on their land
- Annual status reviews are conducted to ensure that the landowner implements BMPs as agreed to in the implementation schedule

Financial Assistance

State (TSSWCB) or Federal (NRCS) assistance is obtainable for certain conservation practices

- TSSWCB
  - SB503 WQMP Financial Assistance
  - CWA Section 319 funding
- NRCS
  - Farm Bill Programs

Questions?

Mitch Conine
Project Management Coordinator

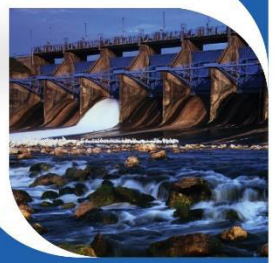
Texas State Soil and Water Conservation Board

254-773-2250 x 233

mconine@tsswcb.texas.gov
http://www.tsswcb.texas.gov/
http://www.tsswcb.texas.gov/cwp

Water Quality Monitoring Results

Angela Kilpatrick
Trinity River Authority
February 2, 2017

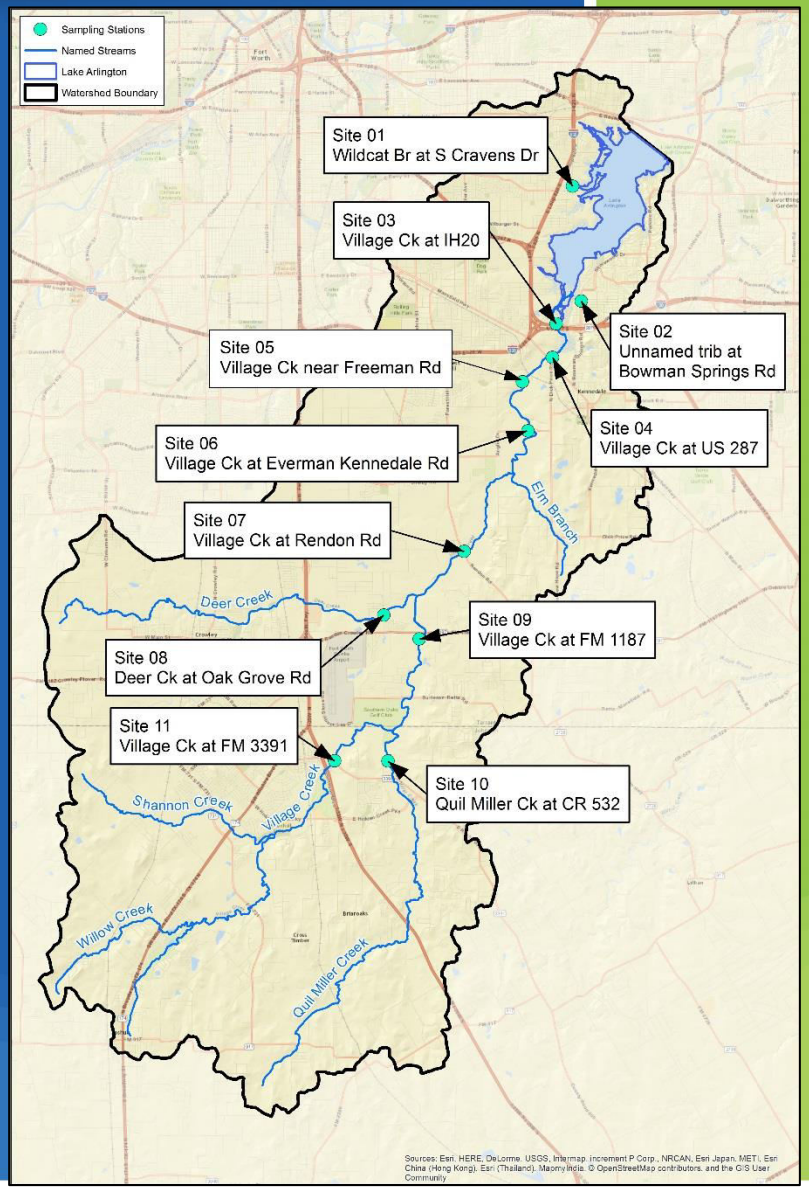


Village Creek
Lake Arlington
WATERSHED PROTECTION

Trinity River Authority of Texas
Enriching the Trinity basin as a resource for Texans

Monitoring Plan and Lab Analysis

- All parameters at all 11 stations
- Samples collected by PES staff are dropped off at CRWS lab for analysis of:
  - *E. coli*
  - Nitrate, Nitrite, Total Kjeldahl Nitrogen
  - Total Phosphorus, Orthophosphate
  - Chlorophyll a
  - TDS, TSS, VSS
- QC-approved data for June to October 2016 submitted to TCEQ



Evaluation Criteria

Analytical results were compared to TCEQ's water quality standards and screening levels to determine if values exceeded criteria

Site-specific Water Quality Criteria for the Village Creek-Lake Arlington Watershed (TCEQ)

Parameter	Segment ID	
	0828	0828A
Cl-1 (mg/L)	100	100
SO4-2 (mg/L)	100	-
TDS (mg/L)	300	300
DO (mg/L) grab minimum	3.0	2.0
DO (mg/L) 24 hour average	5.0	3.0
DO (mg/L) 24 hour minimum	3.0	2.0
pH range	6.5-9.0	6.5-9.0
E. coli #/100ml	126	126
Temperature (°F; °C)	95; 35	95; 35

Texas Nutrient Screening Levels and EPA Nutrient Reference Criteria

Parameter		TCEQ Screening Levels		EPA Reference Criteria				Other Sources
		Lake/Reservoir	Stream	Lake/Reservoir		Stream		
TKN	(mg/L)	-	-	0.38[a]	0.41[b]	0.3[a]	0.4[b]	
NO_2	(mg/L)	-	-	-	-	-	-	0.02[c]
NO_3	(mg/L)	0.37	1.95	-	-	-	-	
NO_2+NO_3	(mg/L)	-	-	0.017[a]	0.01[b]	0.125[a]	0.078[b]	
TP	(mg/L)	0.20	0.69	0.02[a]	0.019[b]	0.037[a]	0.038[b]	
OP	(mg/L)	0.05	0.37	-	-	-	-	
Chl-a[d]	(µg/L)	26.7	14.1	5.18[a]	2.875[b]	0.93[a]	1.238[b]	

[a] Reference conditions for aggregate Ecoregion IX waterbodies, upper 25th percentile of data from all seasons, 1990-1999.

[b] Reference conditions for level III Ecoregion 29 waterbodies, upper 25th percentile of data from all seasons.

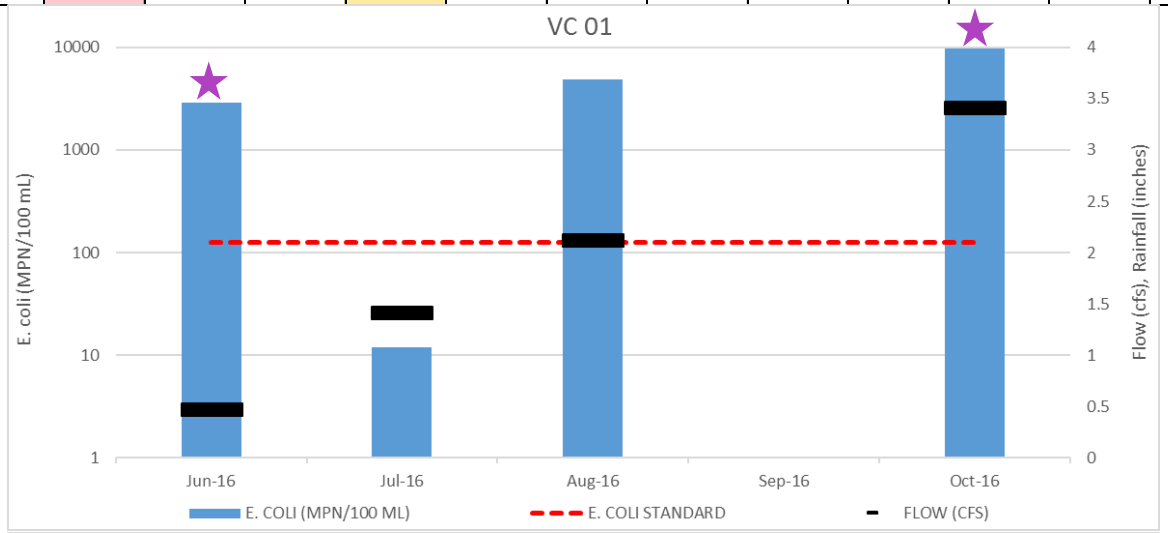
[c] For nitrite, concentrations above 0.02 mg/L (ppm) usually indicate polluted waters (Mesner, N., J. Geiger. 2010. Understanding Your Watershed: Nitrogen. Utah State University, Water Quality Extension.

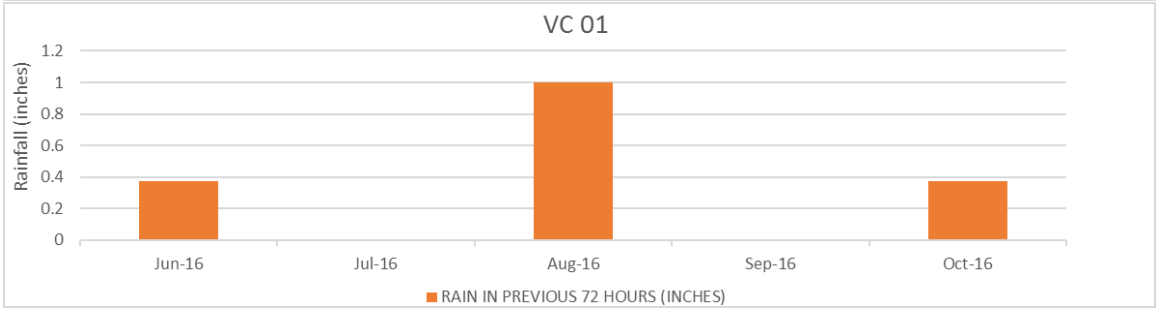
[d] Chlorophyll a, as measured by Spectrophotometric method with acid correction.

Site 1 – Wildcat Branch at Cravens

Date (mm/dd/yyyy)	CHLOROPHYLL-A SPECTROPHOTOMETRIC ACID. METH (UG/L)	E. COLI (MPN/100 ML)	NITRATE NITROGEN, TOTAL (MG/L)	NITRITE NITROGEN, TOTAL (MG/L)	NITROGEN, KJELDAHL, TOTAL (TKN) (MG/L)	ORTHOPHOSPHATE PHOSPHORUS,DISS (MG/L)	PHOSPHORUS, TOTAL, WET METHOD (MG/L)	RESIDUE,TOTAL FILTRABLE (DRIED AT 180C) (MG/L)	RESIDUE, TOTAL NONFILTRABLE (MG/L)	RESIDUE, VOLATILE NONFILTRABLE (MG/L)	OPTICAL BRIGHTENERS DETECTED (1=YES, 0=NO)	RAIN IN PREVIOUS 24 HOURS (INCHES)	RAIN IN PREVIOUS 72 HOURS (INCHES)	FLOW (CFS)
6/29/2016	17	2909	0.25	<0.05	1.08	0.04	0.14	164	10	<3	1	0.375	0.375	0.476
7/19/2016	17	12	<0.05	<0.05	0.65	<0.02	0.04	244	7	3	0	0	0	1.413
8/15/2016	4	>4839	0.33	<0.05	0.82	0.03	0.09	187	12	<8	0	0.63	1	2.125
10/20/2016	<3	>9678	0.41	<0.05	1.35	0.08	0.22	144	58	10	1	0.375	0.375	3.41

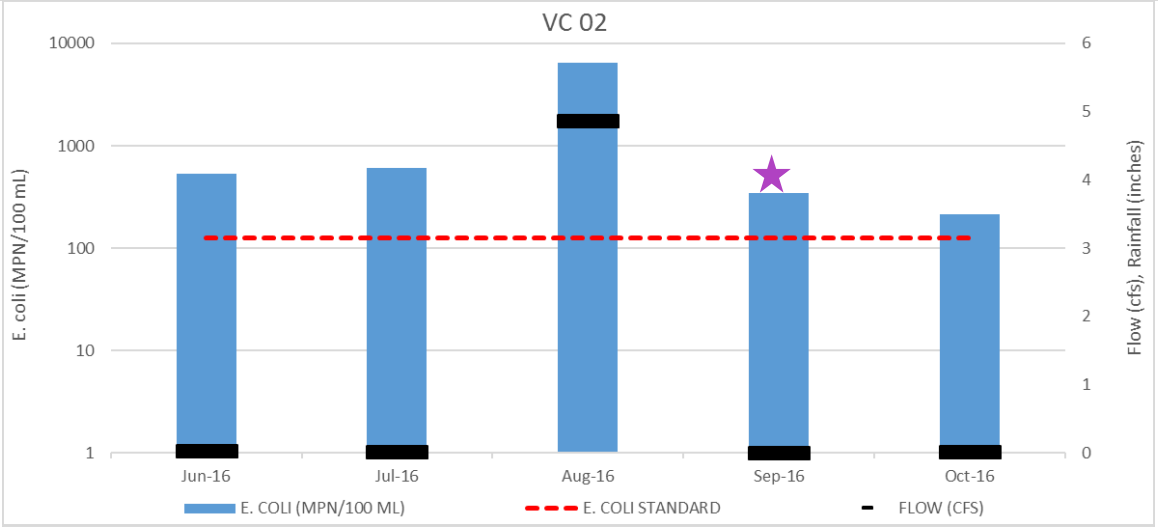
★ = Positive OB sample

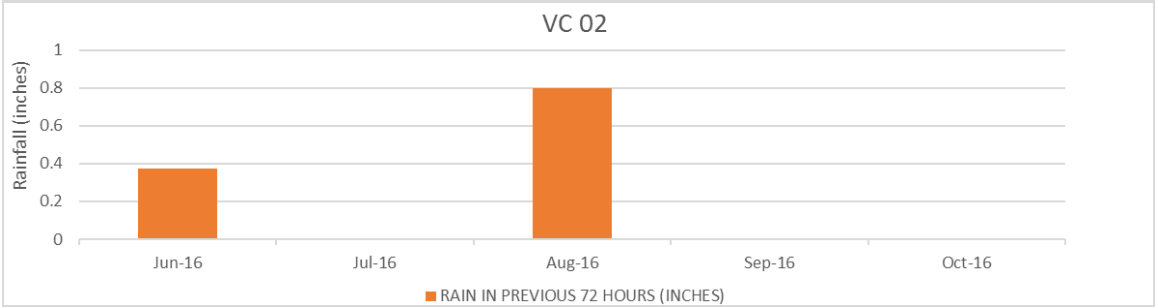




Site 2 – Unnamed trib at Bowman Springs Rd

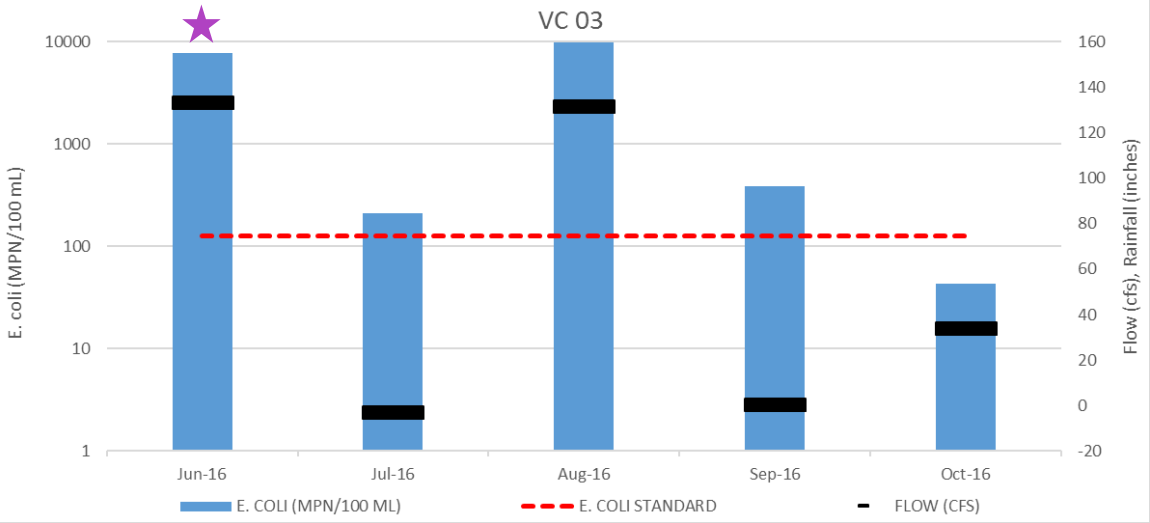
Date (mm/dd/yyyy)	CHLOROPHYLL-A SPECTROPHOTOMETRIC ACID. METH (UG/L)	E. COLI (MPN/100 ML)	NITRATE NITROGEN, TOTAL (MG/L)	NITRITE NITROGEN, TOTAL (MG/L)	NITROGEN, KJELDAHL, TOTAL (TKN) (MG/L)	ORTHOPHOSPHATE PHOSPHORUS,DISS (MG/L)	PHOSPHORUS, TOTAL, WET METHOD (MG/L)	RESIDUE,TOTAL FILTRABLE (DRIED AT 180C) (MG/L)	RESIDUE, TOTAL NONFILTRABLE (MG/L)	RESIDUE, VOLATILE NONFILTRABLE (MG/L)	OPTICAL BRIGHTENERS DETECTED (1=YES, 0=NO)	RAIN IN PREVIOUS 24 HOURS (INCHES)	RAIN IN PREVIOUS 72 HOURS (INCHES)	FLOW (CFS)
6/28/2016	11	534	0.2	<0.05	0.38	<0.02	0.02	1304	<2	<2	0	0.375	0.375	0.03
7/20/2016	<3	612	<0.05	<0.05	0.36	<0.02	0.02	1573	4	<2	0	0	0	0.017
8/17/2016	3	6510	0.4	<0.05	0.68	<0.02	0.06	240	19	<15	0	0	0.8	4.87
9/13/2016	<3	344	0.06	<0.05	0.22	<0.02	0.02	815	<3	<3	1	0	0	0.01
10/11/2016	6	213	<0.05	<0.05	0.26	<0.02	0.03	1093	8	<2	0	0	0	0.02

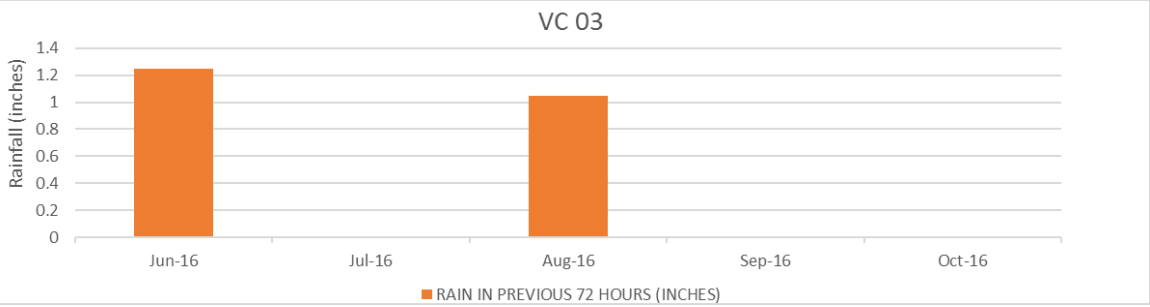




Site 3 – Village Creek at IH-20

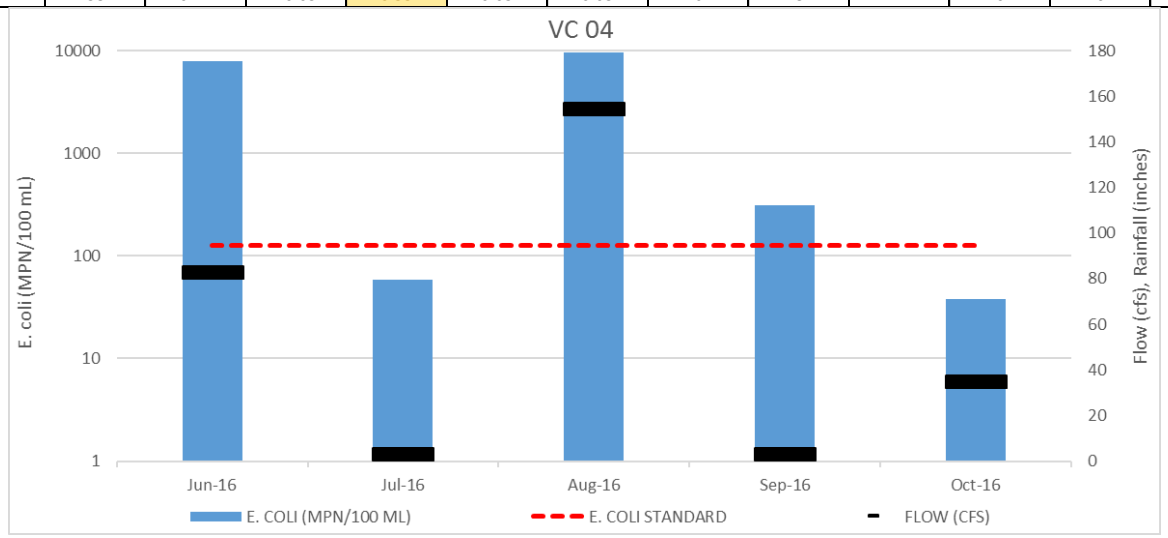
Date (mm/dd/yyyy)	CHLOROPHYLL-A SPECTROPHOTOMETRIC ACID. METH (UG/L)	E. COLI (MPN/100 ML)	NITRATE NITROGEN, TOTAL (MG/L)	NITRITE NITROGEN, TOTAL (MG/L)	NITROGEN, KJELDAHL, TOTAL (TKN) (MG/L)	ORTHOPHOSPHATE PHOSPHORUS,DISS (MG/L)	PHOSPHORUS, TOTAL, WET METHOD (MG/L)	RESIDUE,TOTAL FILTRABLE (DRIED AT 180C) (MG/L)	RESIDUE, TOTAL NONFILTRABLE (MG/L)	RESIDUE, VOLATILE NONFILTRABLE (MG/L)	OPTICAL BRIGHTENERS DETECTED (1=YES, 0=NO)	RAIN IN PREVIOUS 24 HOURS (INCHES)	RAIN IN PREVIOUS 72 HOURS (INCHES)	FLOW (CFS)
6/29/2016	9	7701	0.62	<0.05	0.96	0.11	0.35	233	116	<14	1	0.375	1.25	133.222
7/20/2016	12	212	0.14	<0.05	0.59	<0.02	0.05	238	20	3	0	0	0	-2.757
8/15/2016	6	>9678	0.23	<0.05	0.9	0.02	0.28	192	128	12	0	0.88	1.05	131.714
9/13/2016	8	384	0.63	<0.05	0.27	0.02	0.06	154	26	<3	0	0	0	0.378
10/11/2016	5	43	0.71	<0.05	0.56	0.03	0.06	171	13	2	0	0	0	34.09

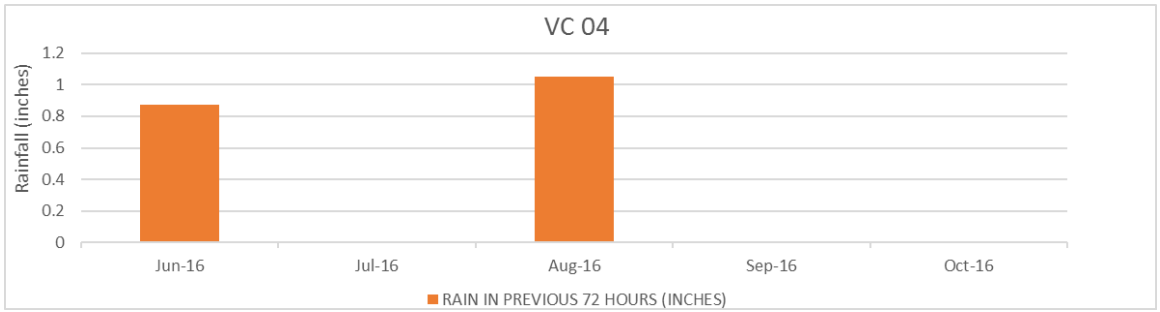




Site 4 – Village Creek at US-287 BUS

Date (mm/dd/yyyy)	CHLOROPHYLL-A SPECTROPHOTOMETRIC ACID. METH (UG/L)	E. COLI (MPN/100 ML)	NITRATE NITROGEN, TOTAL (MG/L)	NITRITE NITROGEN, TOTAL (MG/L)	NITROGEN, KJELDAHL, TOTAL (TKN) (MG/L)	ORTHOPHOSPHATE PHOSPHORUS,DISS (MG/L)	PHOSPHORUS, TOTAL, WET METHOD (MG/L)	RESIDUE,TOTAL FILTRABLE (DRIED AT 180C) (MG/L)	RESIDUE, TOTAL NONFILTRABLE (MG/L)	RESIDUE, VOLATILE NONFILTRABLE (MG/L)	OPTICAL BRIGHTENERS DETECTED (1=YES, 0=NO)	RAIN IN PREVIOUS 24 HOURS (INCHES)	RAIN IN PREVIOUS 72 HOURS (INCHES)	FLOW (CFS)
6/28/2016	11	7945	0.37	<0.05	0.61	<0.02	0.12	304	54	<6	0	0.875	0.875	82.731
7/20/2016	5	59	0.2	<0.05	0.42	<0.02	0.04	167	9	<2	0	0	0	3.281
8/15/2016	8	>9678	0.28	<0.05	0.88	0.04	0.33	179	152	<16	0	0.88	1.05	154.395
9/13/2016	4	314	0.56	<0.05	0.45	0.03	0.04	157	12	<3	0	0	0	3.31
10/11/2016	6	38	0.72	<0.05	0.53	0.03	0.05	161	8	<2	0	0	0	34.88

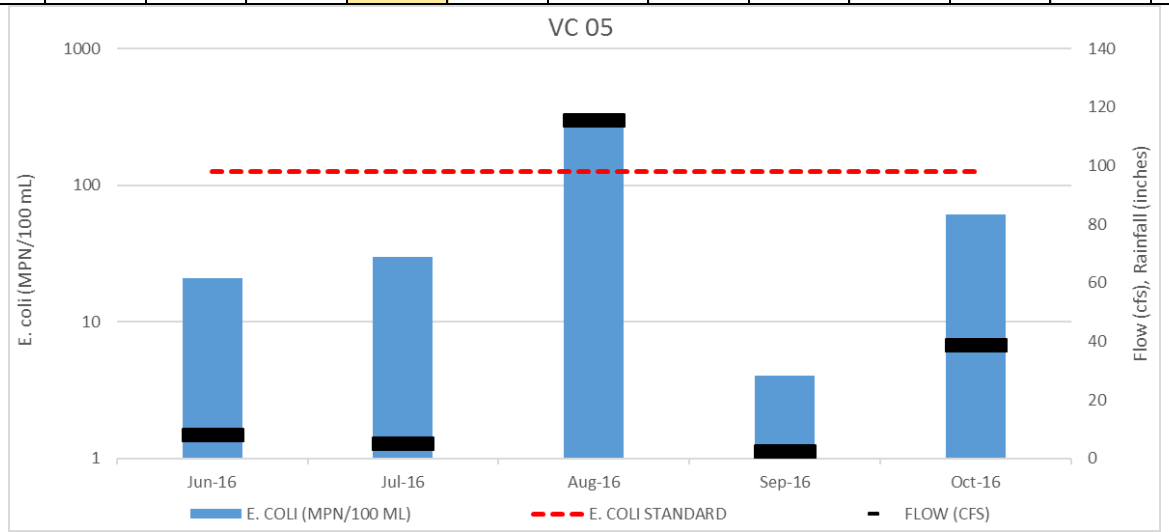


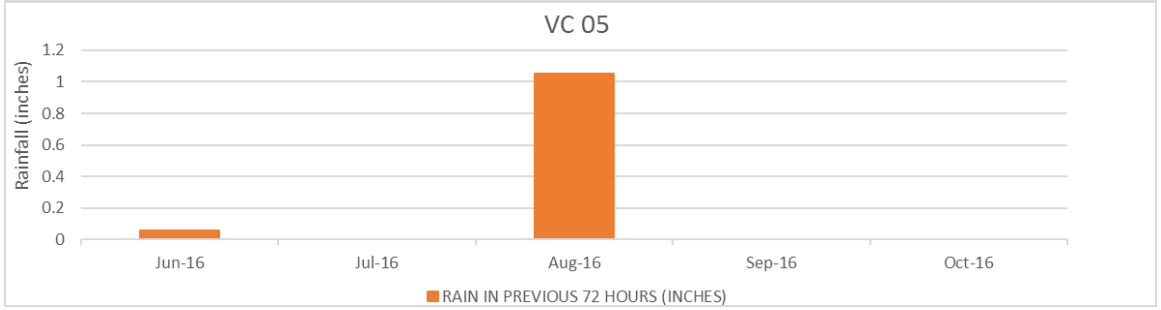


Site 5 – Village Creek near Freeman Dr

Date (mm/dd/yyyy)	CHLOROPHYLL-A SPECTROPHOTOMETRIC ACID. METH (UG/L)	E. COLI (MPN/100 ML)	NITRATE NITROGEN, TOTAL (MG/L)	NITRITE NITROGEN, TOTAL (MG/L)	NITROGEN, KJELDAHL, TOTAL (TKN) (MG/L)	ORTHOPHOSPHATE PHOSPHORUS,DISS (MG/L)	PHOSPHORUS, TOTAL, WET METHOD (MG/L)	RESIDUE,TOTAL FILTRABLE (DRIED AT 180C) (MG/L)	RESIDUE, TOTAL NONFILTRABLE (MG/L)	RESIDUE, VOLATILE NONFILTRABLE (MG/L)	OPTICAL BRIGHTENERS DETECTED (1=YES, 0=NO)	RAIN IN PREVIOUS 24 HOURS (INCHES)	RAIN IN PREVIOUS 72 HOURS (INCHES)	FLOW (CFS)
7/12/2016	6	21	0.17	<0.05	0.47	0.02	0.04	152	8	<2	0	0	0.055	8.1811
7/20/2016	<3	30	0.23	<0.05	0.42	<0.02	0.03	191	5	<2	0	0	0	5.046
8/17/2016	9	323	0.33	<0.05	0.45	<0.02	0.05	146	21	<9	0	0	1.05	115.7915
9/13/2016	<3	4	0.67	<0.05	0.48	0.03	0.04	172	4	<2	0	0	0	2.65
10/11/2016	8	61	0.74	<0.05	0.44	0.03	0.06	159	14	3	0	0	0	38.95

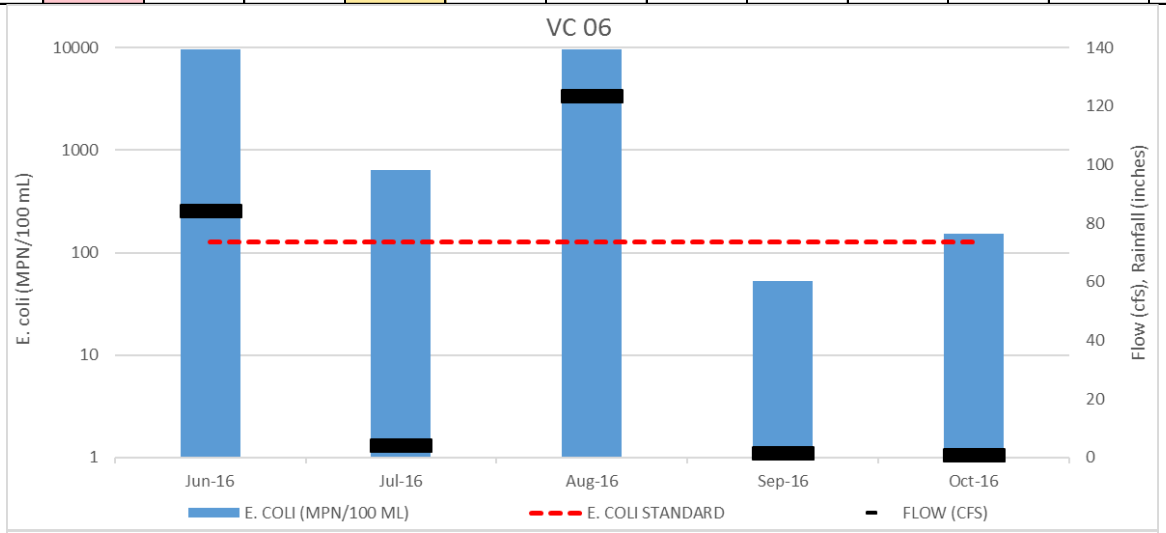
* “Jun-16” sample taken on 7/12/2016 (resample)

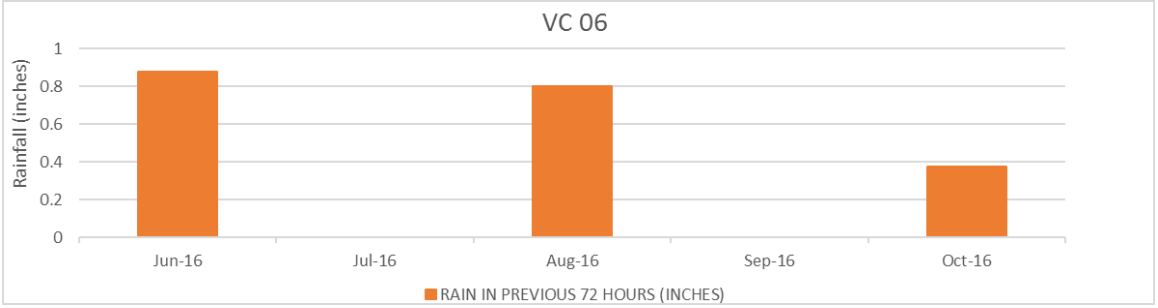




Site 6 – Village Creek at Everman-Kennedale Rd

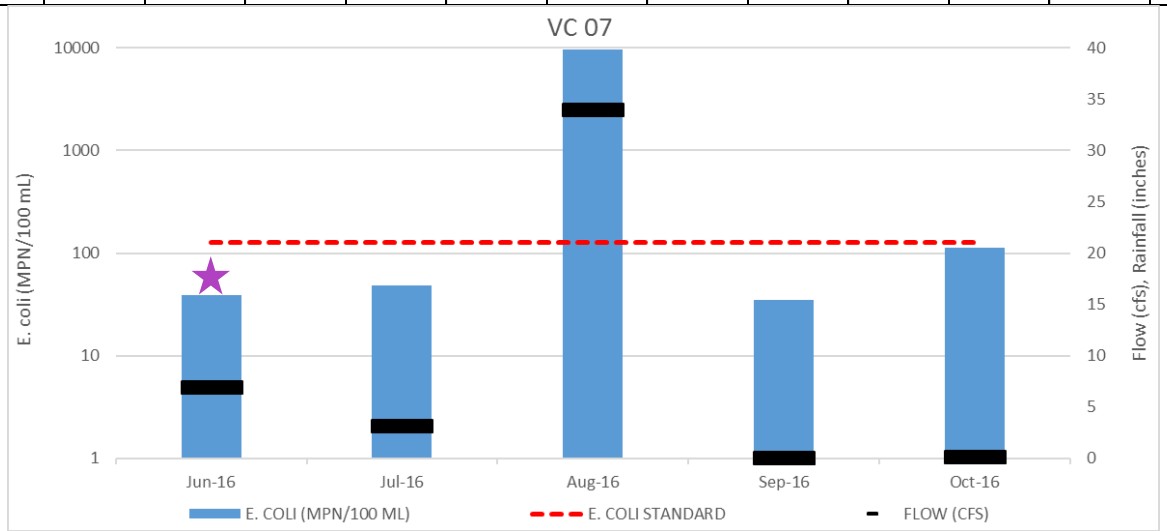
Date (mm/dd/yyyy)	CHLOROPHYLL-A SPECTROPHOTOMETRIC ACID. METH (UG/L)	E. COLI (MPN/100 ML)	NITRATE NITROGEN, TOTAL (MG/L)	NITRITE NITROGEN, TOTAL (MG/L)	NITROGEN, KJELDAHL, TOTAL (TKN) (MG/L)	ORTHOPHOSPHATE PHOSPHORUS,DISS (MG/L)	PHOSPHORUS, TOTAL, WET METHOD (MG/L)	RESIDUE,TOTAL FILTRABLE (DRIED AT 180C) (MG/L)	RESIDUE, TOTAL NONFILTRABLE (MG/L)	RESIDUE, VOLATILE NONFILTRABLE (MG/L)	OPTICAL BRIGHTENERS DETECTED (1=YES, 0=NO)	RAIN IN PREVIOUS 24 HOURS (INCHES)	RAIN IN PREVIOUS 72 HOURS (INCHES)	FLOW (CFS)
6/28/2016	7	>9678	0.44	<0.05	0.72	<0.02	0.17	276	87	<11	0	0.875	0.875	84.47
7/20/2016	3	643	<0.05	<0.05	0.21	<0.02	<0.02	481	5	<2	0	0	0	4.19
8/15/2016	8	>9678	0.35	<0.05	0.88	0.06	0.4	190	196	<20	0	0.63	0.8	123.674
9/13/2016	4	53	<0.05	<0.05	<0.2	<0.02	0.03	355	14	<2	0	0	0	1.6
10/10/2016	3	154	0.26	<0.05	0.44	0.04	0.09	216	22	<4	0	0	0.375	0.99

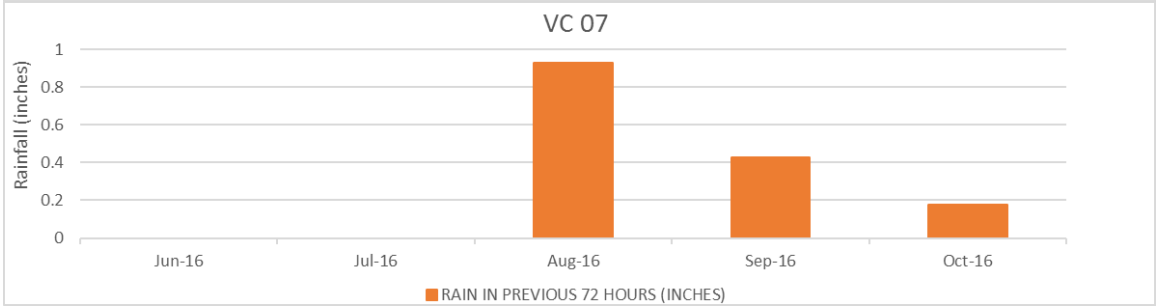




Site 7 – Village Creek at Rendon Rd

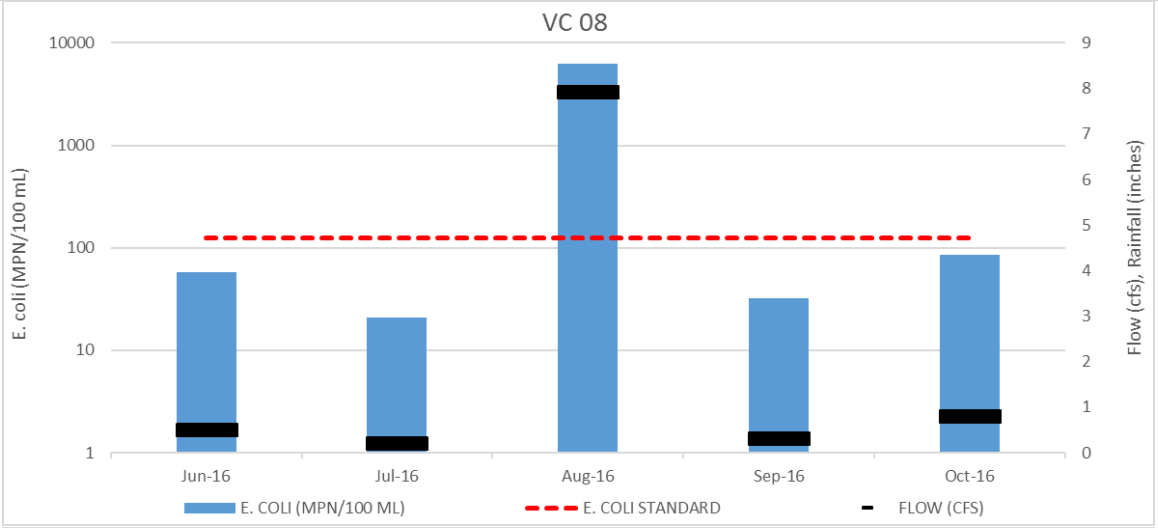
Date (mm/dd/yyyy)	CHLOROPHYLL-A SPECTROPHOTOMETRIC ACID. METH (UG/L)	E. COLI (MPN/100 ML)	NITRATE NITROGEN, TOTAL (MG/L)	NITRITE NITROGEN, TOTAL (MG/L)	NITROGEN, KJELDAHL, TOTAL (TKN) (MG/L)	ORTHOPHOSPHATE PHOSPHORUS,DISS (MG/L)	PHOSPHORUS, TOTAL, WET METHOD (MG/L)	RESIDUE,TOTAL FILTRABLE (DRIED AT 180C) (MG/L)	RESIDUE, TOTAL NONFILTRABLE (MG/L)	RESIDUE, VOLATILE NONFILTRABLE (MG/L)	OPTICAL BRIGHTENERS DETECTED (1=YES, 0=NO)	RAIN IN PREVIOUS 24 HOURS (INCHES)	RAIN IN PREVIOUS 72 HOURS (INCHES)	FLOW (CFS)
6/27/2016	<3	39	0.14	<0.05	0.45	<0.02	0.02	509	5	<2	1	0	0	7
7/20/2016	4	48	<0.05	<0.05	0.37	<0.02	<0.02	461	4	<2	0	0	0	3.2
8/15/2016	4	>9678	0.33	<0.05	0.81	0.07	0.25	202	58	<19	0	0.88	0.93	34
9/12/2016	<3	35	<0.05	<0.05	0.29	<0.02	0.03	304	5	<2	0	0	0.43	0.08
10/10/2016	<3	113	0.08	<0.05	0.38	0.03	0.05	223	3	<2	0	0	0.175	0.17

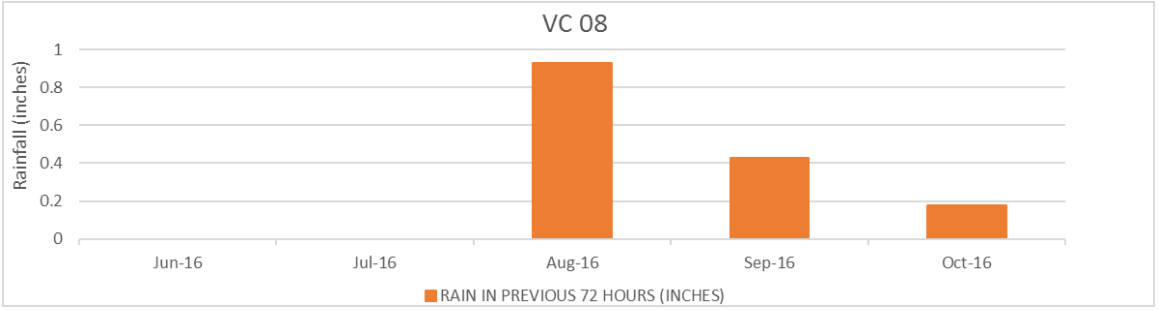




Site 8 – Deer Creek at Oak Grove Rd

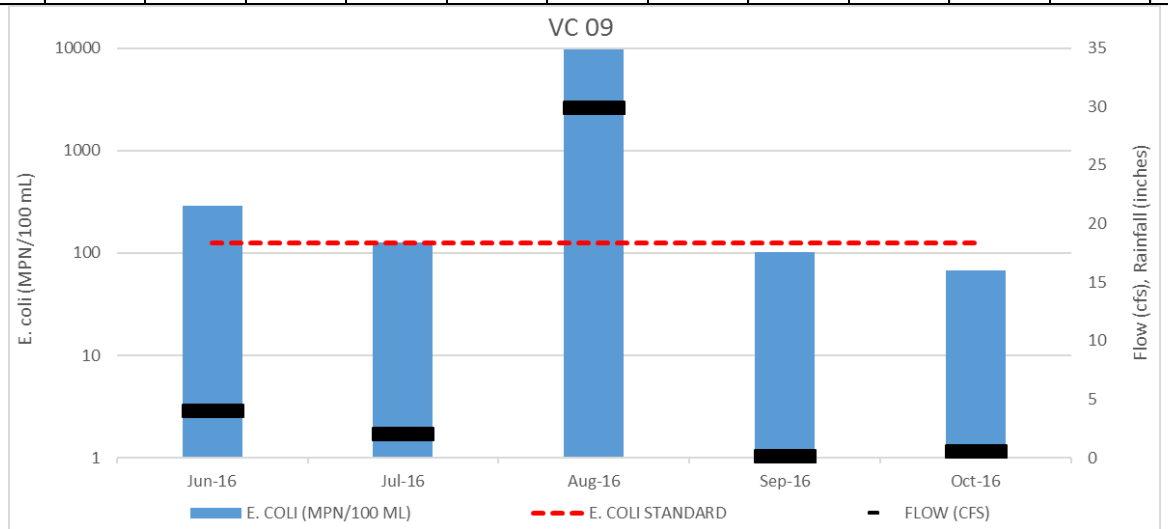
Date (mm/dd/yyyy)	CHLOROPHYLL-A SPECTROPHOTOMETRIC ACID. METH (UG/L)	E. COLI (MPN/100 ML)	NITRATE NITROGEN, TOTAL (MG/L)	NITRITE NITROGEN, TOTAL (MG/L)	NITROGEN, KJELDAHL, TOTAL (TKN) (MG/L)	ORTHOPHOSPHATE PHOSPHORUS,DISS (MG/L)	PHOSPHORUS, TOTAL, WET METHOD (MG/L)	RESIDUE,TOTAL FILTRABLE (DRIED AT 180C) (MG/L)	RESIDUE, TOTAL NONFILTRABLE (MG/L)	RESIDUE, VOLATILE NONFILTRABLE (MG/L)	OPTICAL BRIGHTENERS DETECTED (1=YES, 0=NO)	RAIN IN PREVIOUS 24 HOURS (INCHES)	RAIN IN PREVIOUS 72 HOURS (INCHES)	FLOW (CFS)
6/27/2016	4	58	0.54	<0.05	0.49	<0.02	<0.02	350	4	<2	0	0	0	0.5
7/19/2016	4	21	0.15	<0.05	0.45	<0.02	<0.02	309	5	<2	0	0	0	0.214
8/15/2016	8	6212	0.39	<0.05	0.71	0.04	0.26	212	137	<14	0	0.88	0.93	7.92
9/12/2016	4	32	<0.05	<0.05	0.31	<0.02	0.03	268	7	<2	0	0	0.43	0.32
10/10/2016	5	86	0.1	<0.05	0.42	<0.02	0.04	253	10	2	0	0	0.175	0.8

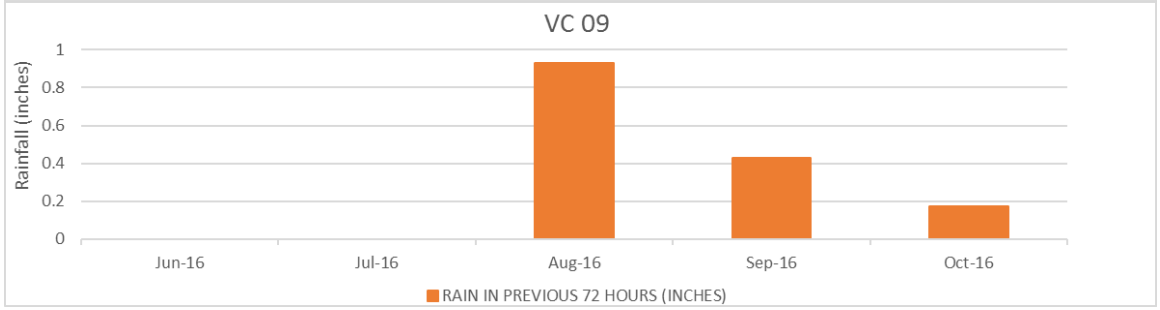




Site 9 – Village Creek at FM 1187

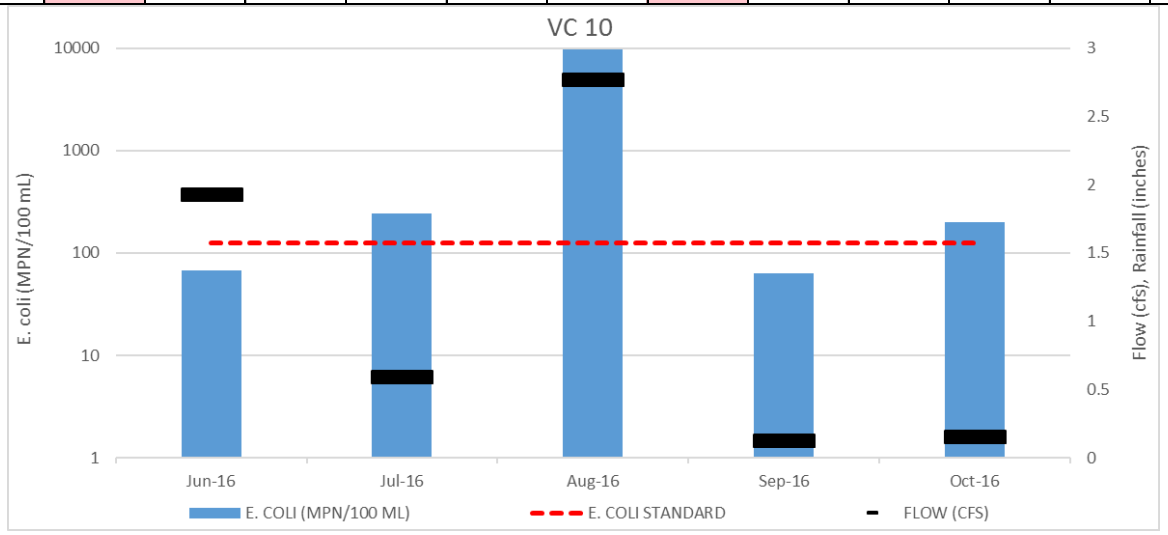
Date (mm/dd/yyyy)	CHLOROPHYLL-A SPECTROPHOTOMETRIC ACID. METH (UG/L)	E. COLI (MPN/100 ML)	NITRATE NITROGEN, TOTAL (MG/L)	NITRITE NITROGEN, TOTAL (MG/L)	NITROGEN, KJELDAHL, TOTAL (TKN) (MG/L)	ORTHOPHOSPHATE PHOSPHORUS,DISS (MG/L)	PHOSPHORUS, TOTAL, WET METHOD (MG/L)	RESIDUE,TOTAL FILTRABLE (DRIED AT 180C) (MG/L)	RESIDUE, TOTAL NONFILTRABLE (MG/L)	RESIDUE, VOLATILE NONFILTRABLE (MG/L)	OPTICAL BRIGHTENERS DETECTED (1=YES, 0=NO)	RAIN IN PREVIOUS 24 HOURS (INCHES)	RAIN IN PREVIOUS 72 HOURS (INCHES)	FLOW (CFS)
6/27/2016	5	289	0.31	<0.05	0.42	<0.02	0.03	558	8	<2	0	0	0	4.033
7/19/2016	<3	127	0.4	<0.05	0.5	<0.02	0.02	501	4	<2	0	0	0	2.09
8/15/2016	8	>9678	0.37	<0.05	0.83	0.08	0.28	204	54	<17	0	0.88	0.93	29.93
9/12/2016	4	102	1.17	<0.05	0.29	0.03	0.07	402	16	<3	0	0	0.43	0.2
10/10/2016	<3	67	0.96	<0.05	0.36	0.1	0.13	246	2	<2	0	0	0.175	0.59

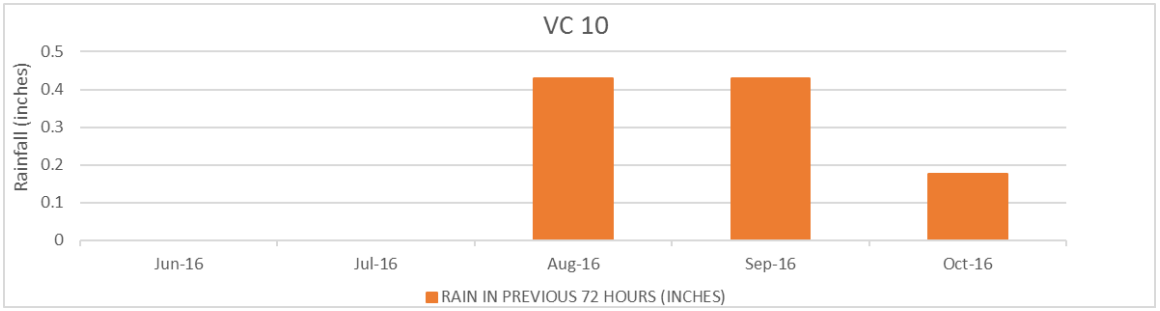




Site 10 – Quil Miller Creek at CR 532

Date (mm/dd/yyyy)	CHLOROPHYLL-A SPECTROPHOTOMETRIC ACID. METH (UG/L)	E. COLI (MPN/100 ML)	NITRATE NITROGEN, TOTAL (MG/L)	NITRITE NITROGEN, TOTAL (MG/L)	NITROGEN, KJELDAHL, TOTAL (TKN) (MG/L)	ORTHOPHOSPHATE PHOSPHORUS,DISS (MG/L)	PHOSPHORUS, TOTAL, WET METHOD (MG/L)	RESIDUE,TOTAL FILTRABLE (DRIED AT 180C) (MG/L)	RESIDUE, TOTAL NONFILTRABLE (MG/L)	RESIDUE, VOLATILE NONFILTRABLE (MG/L)	OPTICAL BRIGHTENERS DETECTED (1=YES, 0=NO)	RAIN IN PREVIOUS 24 HOURS (INCHES)	RAIN IN PREVIOUS 72 HOURS (INCHES)	FLOW (CFS)
6/27/2016	<3	68	0.29	<0.05	0.39	0.07	0.05	676	3	<2	0	0	0	1.932
7/19/2016	<3	245	0.12	<0.05	0.26	0.04	0.05	613	4	<2	0	0	0	0.598
8/15/2016	<3	>9678	0.43	<0.05	0.99	0.17	0.38	234	54	<14	0	0.38	0.43	2.77
9/12/2016	<3	64	<0.05	<0.05	0.21	0.05	0.06	528	32	<3	0	0	0.43	0.13
10/10/2016	<3	200	<0.05	<0.05	0.22	0.05	0.06	410	7	<2	0	0	0.175	0.16





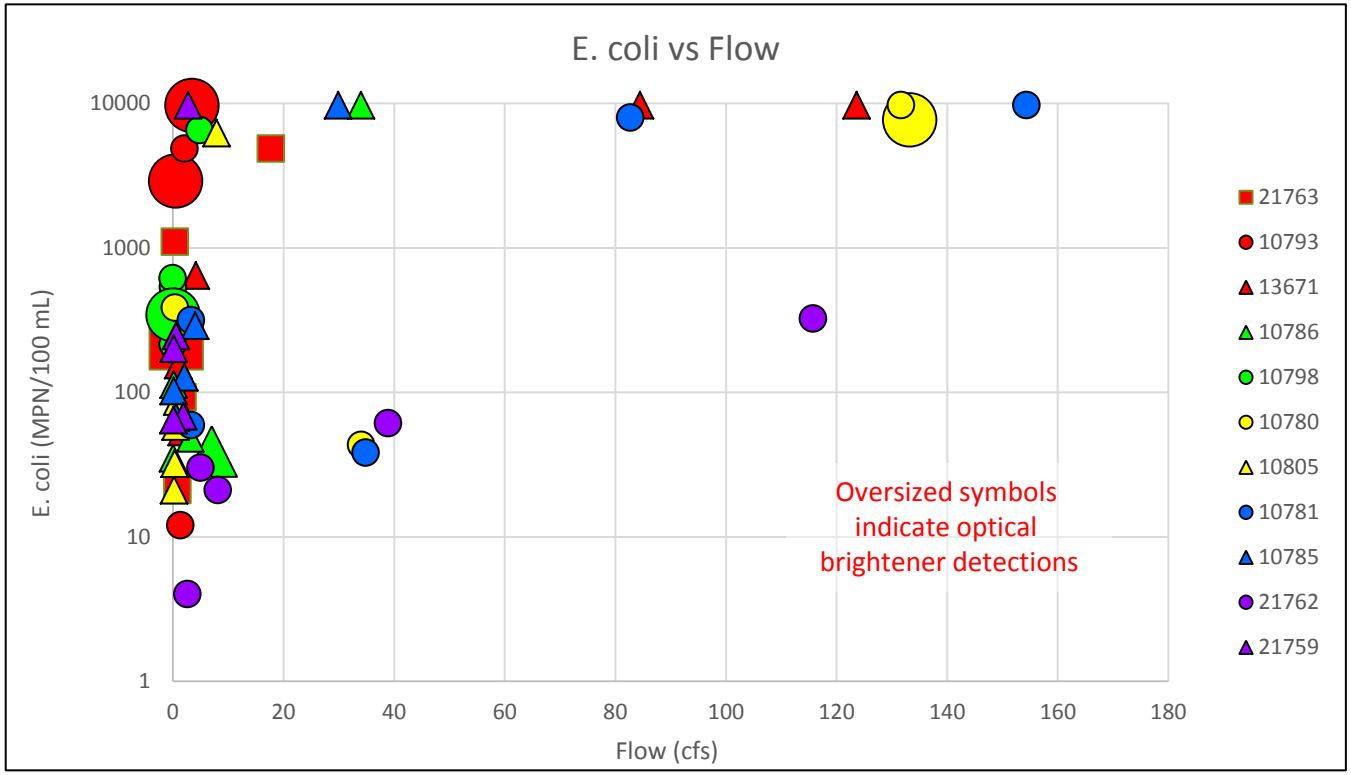
Site 11 – Village Creek at FM 3391

Date (mm/dd/yyyy)	CHLOROPHYLL-A SPECTROPHOTOMETRIC ACID. METH (UG/L)	E. COLI (MPN/100 ML)	NITRATE NITROGEN, TOTAL (MG/L)	NITRITE NITROGEN, TOTAL (MG/L)	NITROGEN, KJELDAHL, TOTAL (TKN) (MG/L)	ORTHOPHOSPHATE PHOSPHORUS,DISS (MG/L)	PHOSPHORUS, TOTAL, WET METHOD (MG/L)	RESIDUE,TOTAL FILTRABLE (DRIED AT 180C) (MG/L)	RESIDUE, TOTAL NONFILTRABLE (MG/L)	RESIDUE, VOLATILE NONFILTRABLE (MG/L)	OPTICAL BRIGHTENERS DETECTED (1=YES, 0=NO)	RAIN IN PREVIOUS 24 HOURS (INCHES)	RAIN IN PREVIOUS 72 HOURS (INCHES)	FLOW (CFS)
6/27/2016	<3	92	2.45	0.07	0.67	0.1	0.14	553	8	<2	0	0	0	1.814
7/19/2016	<3	21	<0.05	<0.05	0.41	0.18	0.2	515	8	<2	0	0	0	0.881
8/15/2016	6	>4839	0.34	<0.05	0.72	0.13	0.22	158	40	<8	0	0.38	0.43	17.78
9/12/2016	<3	1095	<0.05	<0.05	0.48	0.23	0.25	370	7	<3	0	0	0.43	0.39
10/10/2016	<3	220	2.14	0.06	0.58	0.52	0.56	303	8	<2	1	0	0.175	0.59

Optical Brighteners

Results for data collected:
Jun 2016 – Oct 2016

(*E. coli* plotted on log scale)



Potential Sources with positive OB hits

- High *E. coli*, low flow: malfunctioning septic systems or wastewater infrastructure, greywater
- High *E. coli,* high flow: large wastewater pipeline break, sanitary sewer overflow
- Low *E. coli* , varying flows: various chemicals, pesticides, dyes, car washes

OB testing is not intended to provide definite results, but instead provide us with another means of identifying possible sources.

Correlation Analysis

Results for data collected at all sites:
Jun 2016 – Oct 2016

Parameter	Secchi Depth (m)	Turbidity (NFU)	Flow (cfs)	Days Since Precipitation	24-hr Rain Total (inches)	72-hr Rain Total (inches)	TKN (mg/L)	TP (mg/L)	TSS (mg/L)	VSS (mg/L)
TKN (mg/L)	-0.5409	0.5540		-0.5823	0.6559	0.5750				
TP (mg/L)		0.5410		-0.5253	0.5505	0.5467	0.6413			
TSS (mg/L)					0.7656	0.7207	0.5975	0.6637		
VSS (mg/L)					0.7573	0.7636	0.7692	0.6329		
E. coli (MPN/100 mL)	-0.6942	0.7229	0.5742	-0.6548	0.8965	0.7985	0.7835	0.6484	0.8010	0.8987

** Each of the coefficients in the table below has a p-value of 0.000038 or less; the correlations between each set of parameters is actual and significant.*
***Arbitrary cutoff of +/- 0.5 was defined to indicate those correlations which may be significant.*

Significant correlations

- TSS, VSS ▶ Rainfall
- TKN ▶ TSS, VSS, Recent rainfall
- *E. coli* ▶ Recent rainfall, TKN, TP, TSS, VSS

Based on this limited dataset, the correlation coefficients above seem to indicate that constituents such as E. coli, nutrients, and solids are being introduced to the watershed primarily through non-point source runoff, and is most likely a non-point source issue.

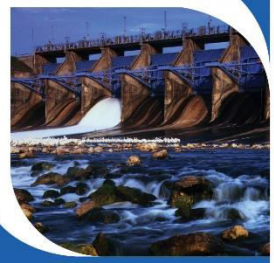
Moving Forward

- Will submit additional data in Spring 2017
- Continue to analyze water quality samples at TRA-CRWS through May 2017
- TRA will run statistical and load duration curve analysis using CRWS data
- Data will be used to guide development of the Village Creek-Lake Arlington WPP

Questions?

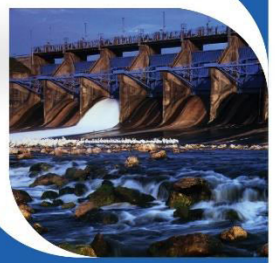
http://www.trinityra.org/lakearlingtonvillagecreek

Aaron Hoff
Trinity River Authority
hoffa@trinityra.org
817.493.5581



Review of an Example WPP

Aaron Hoff
Trinity River Authority
February 2, 2017



Village Creek
Lake Arlington
WATERSHED PROTECTION

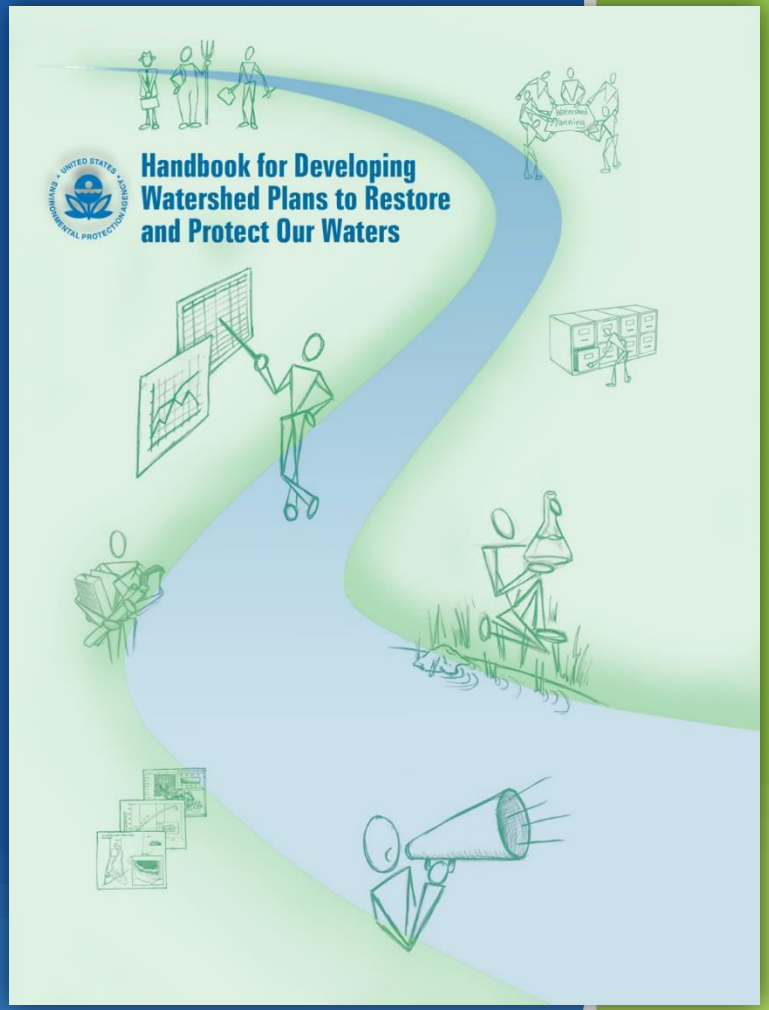
Trinity River Authority of Texas
Enriching the Trinity basin as a resource for Texans

Overview

- What's a WPP?
- Nine Elements of a WPP
- Six Steps for WPP Development
- Components of the VCLA WPP

Review – What's a WPP?

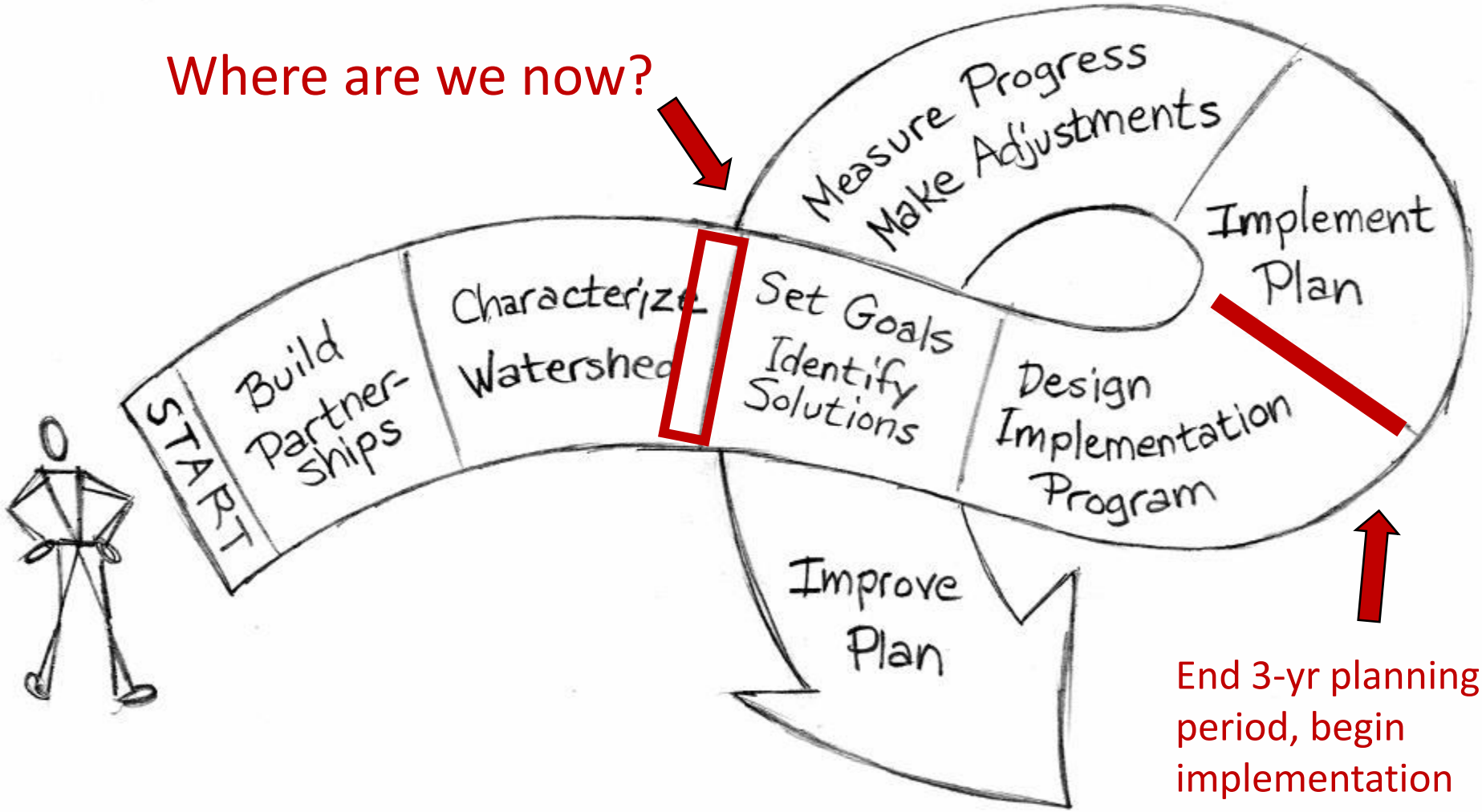
- Voluntary plan developed through local stakeholder coordination
- Watershed scale, multi-jurisdictional approach to watershed management and water quality protection
- Follows EPA's Nine Element Plan Handbook
  - *Handbook for Developing Watershed Plans to Restore and Protect our Waters*, March 2008



Nine Elements that Must be Included

1) Identify causes & sources of pollution
2) Estimate load reductions expected
3) Describe mgmt measures & targeted critical areas
4) Estimate technical and financial assistance needed
5) Develop education/outreach components
6) Develop schedule for implementation
7) Describe interim, measurable milestones
8) Identify indicators to measure progress
9) Develop a monitoring component

Six Steps in Watershed Planning



Step 1: Build Partnerships

- Identify key stakeholders
- Identify issues of concern
- Set preliminary goals
- Develop indicators
- Conduct public outreach

Step 2: Characterize Watershed

- Gather existing data and create a watershed inventory
- Identify data gaps and collect additional data if needed
- Analyze data
- Identify causes and sources of pollution that need to be controlled
- Estimate pollutant loads

Step 3: Set Goals, Identify Solutions

- Set overall goals and management objectives
- Develop indicators/targets
- Determine needed load reductions
- Identify critical areas
- Develop management measures to achieve goals

Step 4: Design Implementation Program

- Implementation schedule
- Interim milestones
- Criteria to measure progress
- Monitoring components
- Education/outreach components
- Evaluation process
- Identify technical/$$$ assistance
- Assign responsibility for reviewing/revising the plan

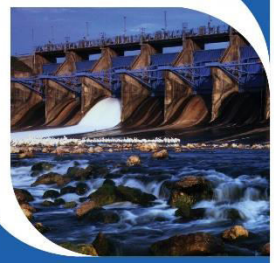
Step 5: Implement the WPP

- Implement management strategies
- Conduct monitoring
- Conduct information/education activities

Step 6: Evaluate, Adapt, Improve

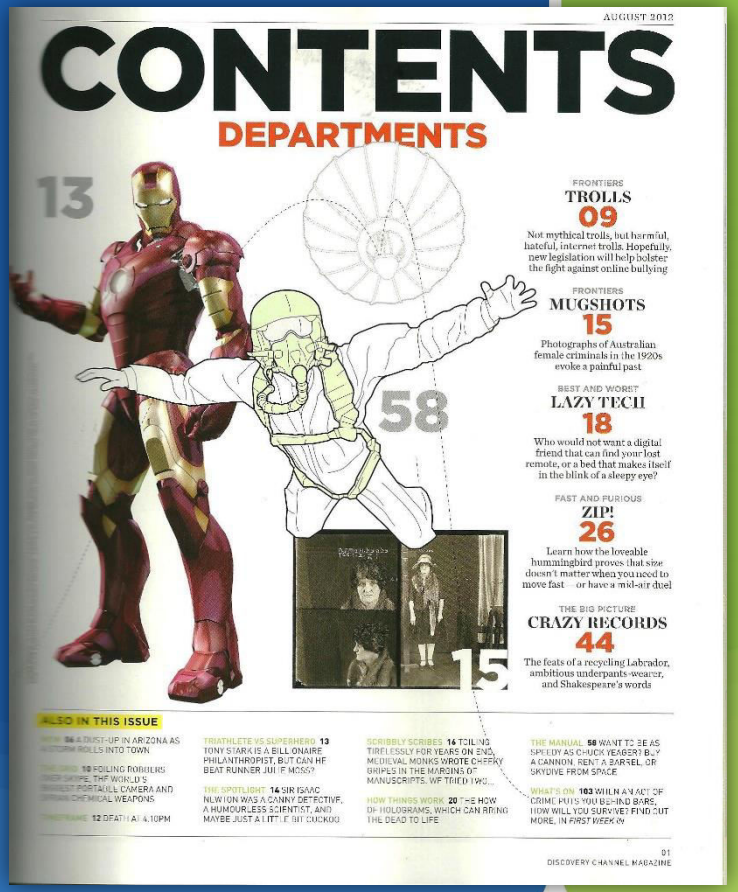
- Review and evaluate information
- Be a team player – share
- Cover progress in annual work plans
- Report back to stakeholders and others
- Make adjustments to program

Components of the VCLA WPP



Typical Introduction Sections

- Table of Contents
- List of Figures and Tables
- Executive Summary
- Overview of the Village Creek-Lake Arlington Watershed



AUGUST 2012

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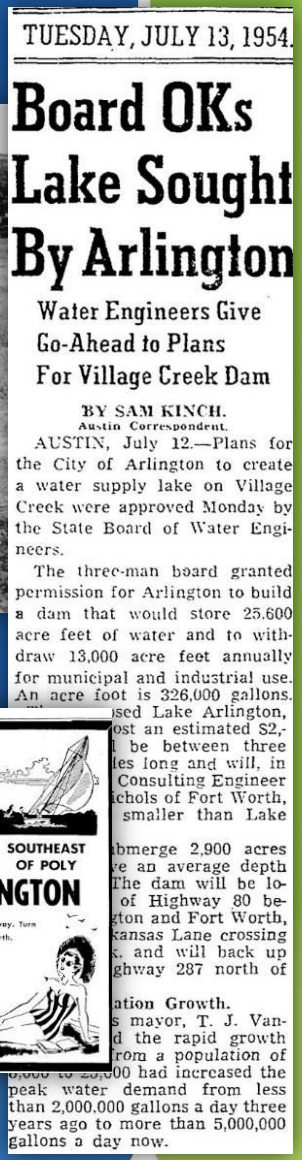
01
DISCOVERY CHANNEL MAGAZINE

Watershed Overview

- Watershed history
- Watershed boundaries
- Watershed Characteristics
  - landuse/landcover, climate
  - water resources, agriculture
  - economy, soils
  - geography, topography
- Historical/current water quality
- Potential sources of pollution



TUESDAY, JULY 13, 1954

Board OKs Lake Sought By Arlington

Water Engineers Give Go-Ahead to Plans For Village Creek Dam

BY SAM KINCH.
Austin Correspondent.

AUSTIN, July 12.—Plans for the City of Arlington to create a water supply lake on Village Creek were approved Monday by the State Board of Water Engineers.

The three-man board granted permission for Arlington to build a dam that would store 25,600 acre feet of water and to withdraw 13,000 acre feet annually for municipal and industrial use. An acre foot is 326,000 gallons.

...sed Lake Arlington, ...ost an estimated $2,- ... be between three ...les long and will, in ... Consulting Engineer ...ichols of Fort Worth, ... smaller than Lake

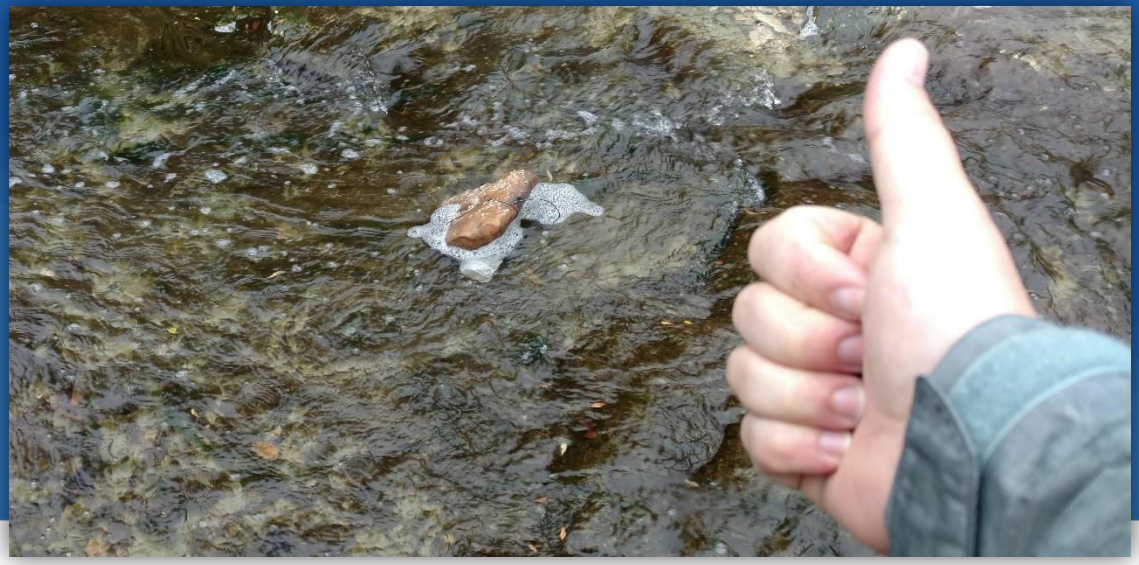
...bmerge 2,900 acres ...e an average depth The dam will be lo- ... of Highway 80 be- ...gton and Fort Worth, ...kansas Lane crossing ...k. and will back up ...ghway 287 north of

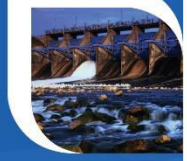
...ation Growth.

... mayor, T. J. Van- ...d the rapid growth ...rom a population of ...000 had increased the peak water demand from less than 2,000,000 gallons a day three years ago to more than 5,000,000 gallons a day now.

Watershed Management

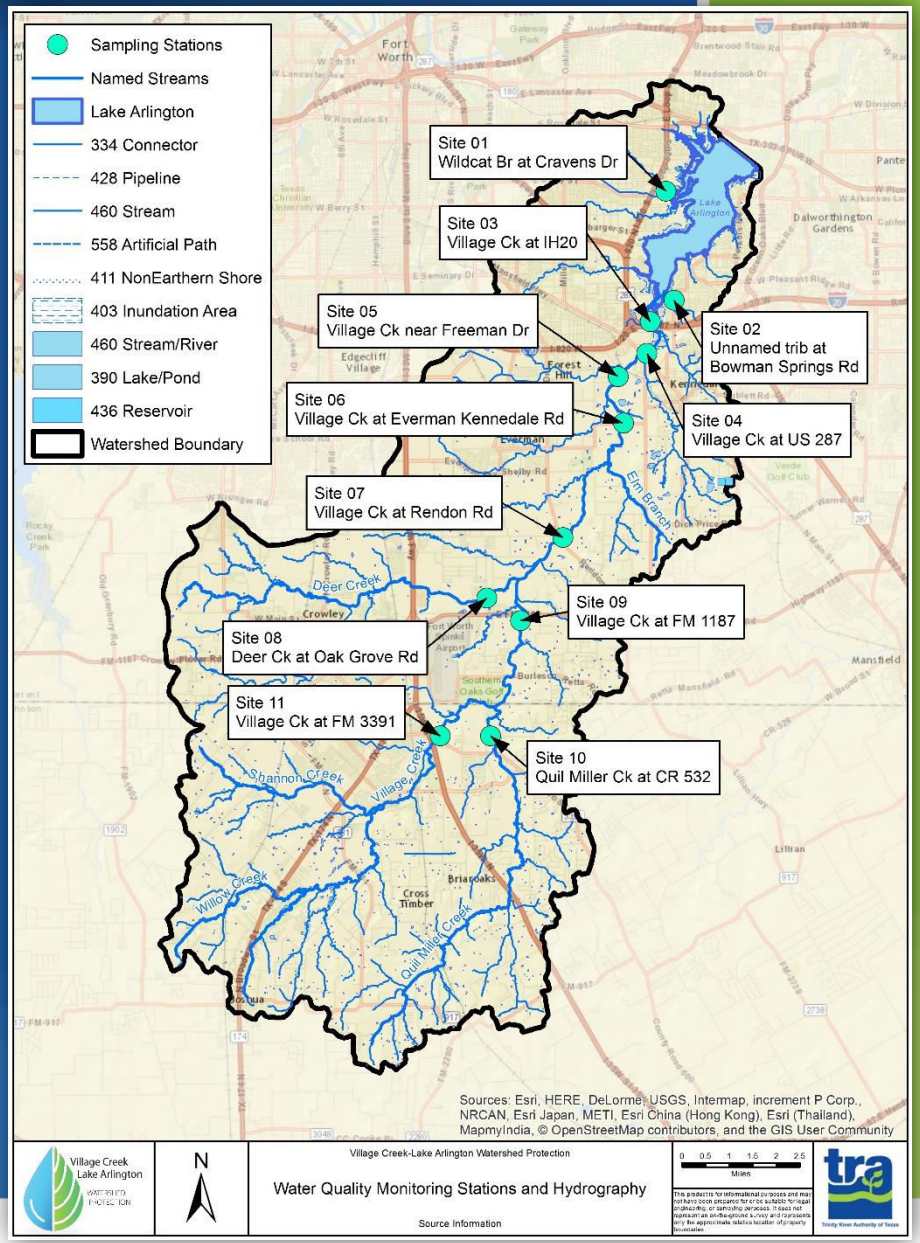
- Definition of a watershed
- A watershed's impacts on water quality
- Watershed management approach
  - Adaptive management strategies
- WPP Development process
- Private property rights





Watershed Analysis Results

- Water quality monitoring
- SELECT analysis
- Other source identification studies
- Load duration curve analysis

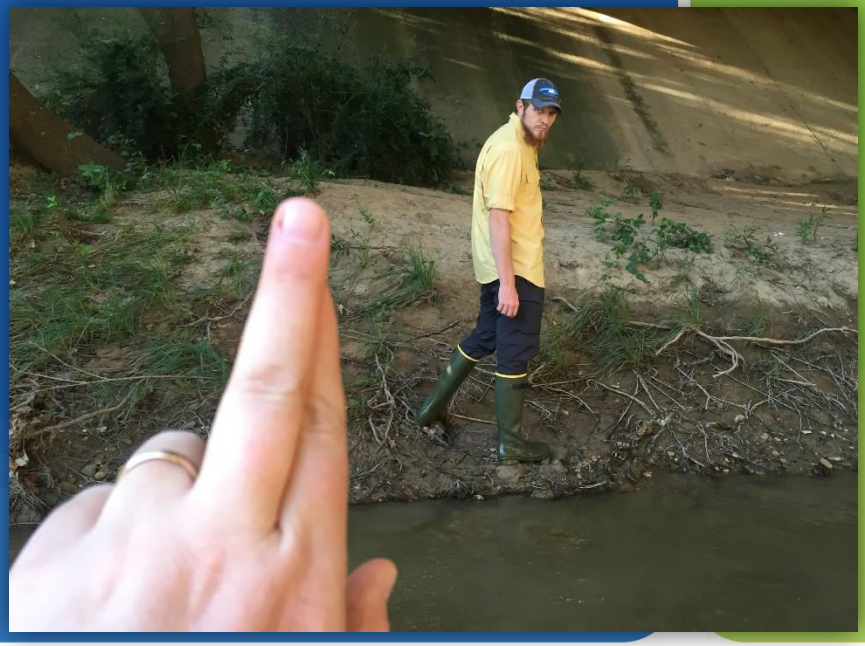


Concerns and Management

- Bacteria, Nitrates, chlorophyll-a
  - Causes and Sources
  - Critical management areas
  - Estimated load reductions
  - Needed management measures
  - Technical assistance

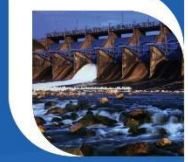
Measures of Success

- Shown by continued water quality monitoring
- Number of management measures implemented in watershed
- Removal from the 303(d) list



Implementation and Goals

- Proposed implementation schedule
- Costs and sources of financial/technical assistance
- Measurable milestones

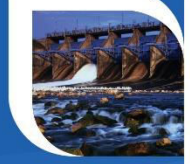


Other Suggestions?

- WPP is a stakeholder-driven document
- Can include any additional information that the Partnership and Steering Committee believe is important

Example WPPs

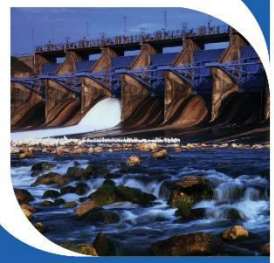
- Attoyac Bayou
  - Website: http://attoyac.tamu.edu/
  - WPP document: http://attoyac.tamu.edu/media/459079/attoyac-bayou-wpp_finalreduced.pdf
- Plum Creek
  - Website: http://plumcreek.tamu.edu/
  - WPP document/updates: http://plumcreek.tamu.edu/wpp/



Questions?

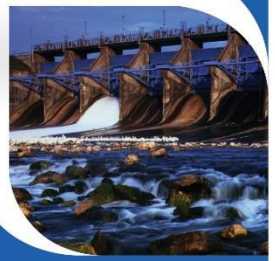
http://www.trinityra.org/lakearlingtonvillagecreek

Aaron Hoff
Trinity River Authority
hoffa@trinityra.org
817.493.5581



Upcoming Events and Path Forward

Aaron Hoff
Trinity River Authority
February 2, 2017



Trinity River Authority of Texas
Enriching the Trinity basin as a resource for Texans

TEXAS STREAM TEAM

Saturday, February 25, 2017
9:00 a.m. – 2:00 p.m.

Trinity River Audubon Center
6500 Great Trinity Forest Way
Dallas, Texas 75217

Join the ranks of thousands of people who protect Texas waterways!

Learn how to become a citizen scientist and become a water quality monitor for Texas Stream Team. Training is Free!
Lunch provided by Texas A&M Agrilife Research – Stephenville.

The Meadows Center for Water and the Environment
Texas State University
Texas Stream Team

Sign up at ***http://bit.ly/TST-02-25-17***
or email ***wbstreamteam@txstate.edu***

JOINSTREAMTEAM.ORG

TEXAS STREAM TEAM

Water Quality Monitoring Training
9 Continuing Education hours for Teachers

Texas Stream Team is a long-running citizen scientist program looking for teachers like you to help monitor surface water in Texas. Join the ranks of thousands of people who protect Texas waterways!

Teachers are invited to participate in a FREE teacher training that counts for 9 CE hours. Water quality testing kits are usually provided by local partners without any cost to teachers.

Water Quality Education Training
Saturday, February 25, 2017
9:00 a.m. – 2:00 p.m.

Trinity River Audubon Center
6500 Great Trinity Forest Way
Dallas, Texas 75217

Your students who become TST citizen scientists will:

- Measure a waterbody under a teacher's supervision based on class objectives;
- Apply abstract concepts of biology, chemistry, and ecology to the local environment; and
- Contribute to a statewide database that informs public policy and resource management.

The FREE Texas Stream Team curriculum:

- Provides TEKS-aligned lessons, exercises, and evaluation materials for Middle and High school;
- Is an adaptable teaching tool that lends itself to cross-disciplinary instruction; and
- Provides the framework for a multitude of field investigations.

For more information, please contact
Will Butler at wbstreamteam@txstate.edu

JOINSTREAMTEAM.ORG

Future Events and Meetings

- 3rd Steering Committee Meeting
  - Tentative for 3rd week of March
  - Review content for WPP Chapters 1 & 2
    - Watershed Overview
    - Watershed Management
  - Discuss and approve nutrient screening levels
- Next Group Meeting
  - Tentative for May 4, 2017
    - Alternate dates: 5/11, 5/18
  - Present WPP Chapters 1 & 2
  - Water quality monitoring update

Open Comment Period

If you have additional concerns or comments, please send them to:

Aaron Hoff
Trinity River Authority
hoffa@trinityra.org
817.493.5581

http://www.trinityra.org/lakearlingtonvillagecreek