CYPRESS CREEK

Let's keep it clean, clear & flowing

10

Celebrating 10 Years

Of stakeholder-driven watershed protection in the Cypress Creek Watershed

The Meadows Center for Water and the Environment
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No natural resource is more important to our future than Water. Water is what we do.

RESEARCH | STEWARDSHIP | SERVICE | EDUCATION | SERVICE

The Meadows Center
for Water and the Environment
Texas State University

The Cypress Creek Watershed

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QUICK FACTS

Stream Length: 15.7 miles

Land Use:

- 41.7% Evergreen Forest
- 27.9% Shrub / Scrub
- 11.0% Grassland / Herbaceous
- 9.4% Deciduous Forest
- 7.4% Developed, Open Space
- 1.6% Developed, Low Intensity

Drainage Area: 38.3 sq miles / 24,486 acres

100-yr Floodplain Area: 2.4 sq miles / 1,536 acres

Soil Types: Bolar, Brackett, Comfort and Doss

Legend

- Natural Area
- Water Quality Monitoring Sites
- FEMA 100-Year Floodplain
- City Limits

N

0.5 1 2 3 4 Miles

Sites Along the Creek

1 Cypress Creek, looking upstream from Jacob's Well.

2 Upper Cypress Creek, upstream from the City of Woodcreek.

3 Jacob's Well in Cypress Creek, near the City of Woodcreek.

4 Cypress Falls in the City of Woodcreek. The water supply tower can be seen in the background.

5 Upper Cypress Creek near the City of Woodcreek.

6 Low water dam along Cypress Creek.

7 Cypress Creek at Blue Hole Park in the City of Wimberley.

8 Ranch Road 12 Bridge in downtown Wimberley.

9 Stormwater outfall serving downtown Wimberley.

Cypress Creek Watershed Protection Plan

- Background – Cypress Creek listed in 2000 for inadequate DO. That year, and in subsequent years, the creek stopped flowing.
- Stakeholder partnership formed, led by Local Stakeholders, City of Wimberley, City of Woodcreek, Hays County, Wimberley Valley Watershed Association.
- TCEQ 319 funding to develop a science-based, stakeholder driven Watershed Protection Plan

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Cypress Creek Watershed Protection

- Activities to prevent pollution, protect flow
- Preserve water quality through local permitting, ordinances
- Improve tools for decision makers to calculate effects of land use changes on water quality
- Site-specific LID/Green Infrastructure demonstration sites
- Outreach and education efforts
- Monitoring and modeling water quality changes

Simply Stated:

The Cypress Creek Watershed Protection Plan aims to ensure that the long-term integrity and sustainability of the Cypress Creek watershed is preserved and that water quality standards are maintained for present and future generations.

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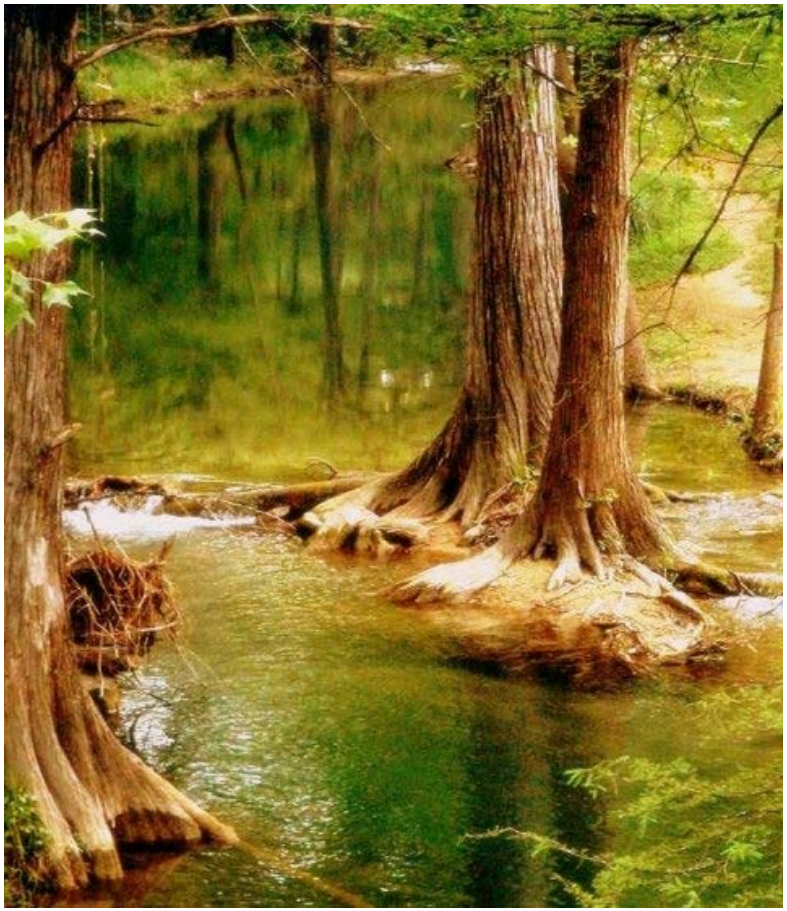
Water Quality and Land Use

	Concerns
Nitrogen	Residential and Commercial fertilizer applications, OSSFs, animal waste, overland flow/impervious cover, atmospheric deposition and low flows.
Total Suspended Solids	Anthropogenic activities, disturbed land cover, impervious cover and natural processes on undeveloped land, low flows.
E. coli	OSSFs, pets, wildlife, low flows.
Dissolved Oxygen	Low base flows limit aeration of water downstream of ground/source waters.
Oil and Grease	Residential wastewater, transportation corridors, improper waste management.
Impervious Cover increases	Increased urbanization.
Preferred Base Flows	Increased water use and well pumpage.

Current Implementation of the Cypress Creek Watershed Protection Plan

- Accepted by TCEQ and EPA
- Implementation grant funded
  - State/Federal Contribution $804,843
  - Partner and stakeholder Contributions $529,362
  - Total Cost: $1,334,205
- Timeline: Sept 2016– Aug 2019
  (anticipated extension through Feb 2020)



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Cypress Creek WPP Implementation Components

- Structural BMPs
- Non-structural BMPs (incentives, regulations, education)
- Source water protection
- Land management, conservation
- Research
- Monitoring

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Recent CCWPP Efforts

- Contract revision/amendment
  - EPA approved; TCEQ currently reviewing
- Finalizing Monitoring and Data Acquisition QAPP
  - Will begin monitoring additional surface water and groundwater sites in 2018
- Land conservation prioritization study completed (Phase I)
- Bacterial Source Tracking Study
- MOAs with City of Wimberley and City of Woodcreek

Ongoing/Historical Water Quality Monitoring

- Texas Clean Rivers Program – quality assured
- Watershed Plan (previous) - quality assured
- Watershed Plan (new) - quality assured
- Citizens' Wimberley Water Advisory Group – limited quality assurance
- City staff monitoring
- Texas Stream Team - quality assured

GBRA - Clean Rivers Program

- GBRA partners with TCEQ to administer the Clean Rivers Program (CRP) for the Guadalupe River and Lavaca-Guadalupe Coastal Basins.
- The Wimberley Valley Watershed Association (WVWA) began funding the program with help from the City of Wimberley in 2003. The program contributes monitoring data collected under the Guadalupe Basin CRP quality assurance project plan (QAPP) from the Blanco River and Cypress Creek watersheds.
- TCEQ and USEPA quality assure data and program efforts.
- Meadows Center staff (trained by GBRA and listed in the QAPP collects data. GBRA laboratory analyzes data/samples.
- TCEQ uses the data for decision making purposes, water quality impairment listings
- Data has been collected on many sites since 1998

https://www.tceq.texas.gov/waterquality/clean-rivers

Clean Rivers Program

Sites previously monitored monthly, now quarterly for:

- Temperature
- Conductivity
- Dissolved Oxygen
- pH Nitrate/Nitrite-Nitrogen
- Total Phosphorus
- Total Suspended Solids
- Ammonia
- E. coli (#/100 mL)
- Flow

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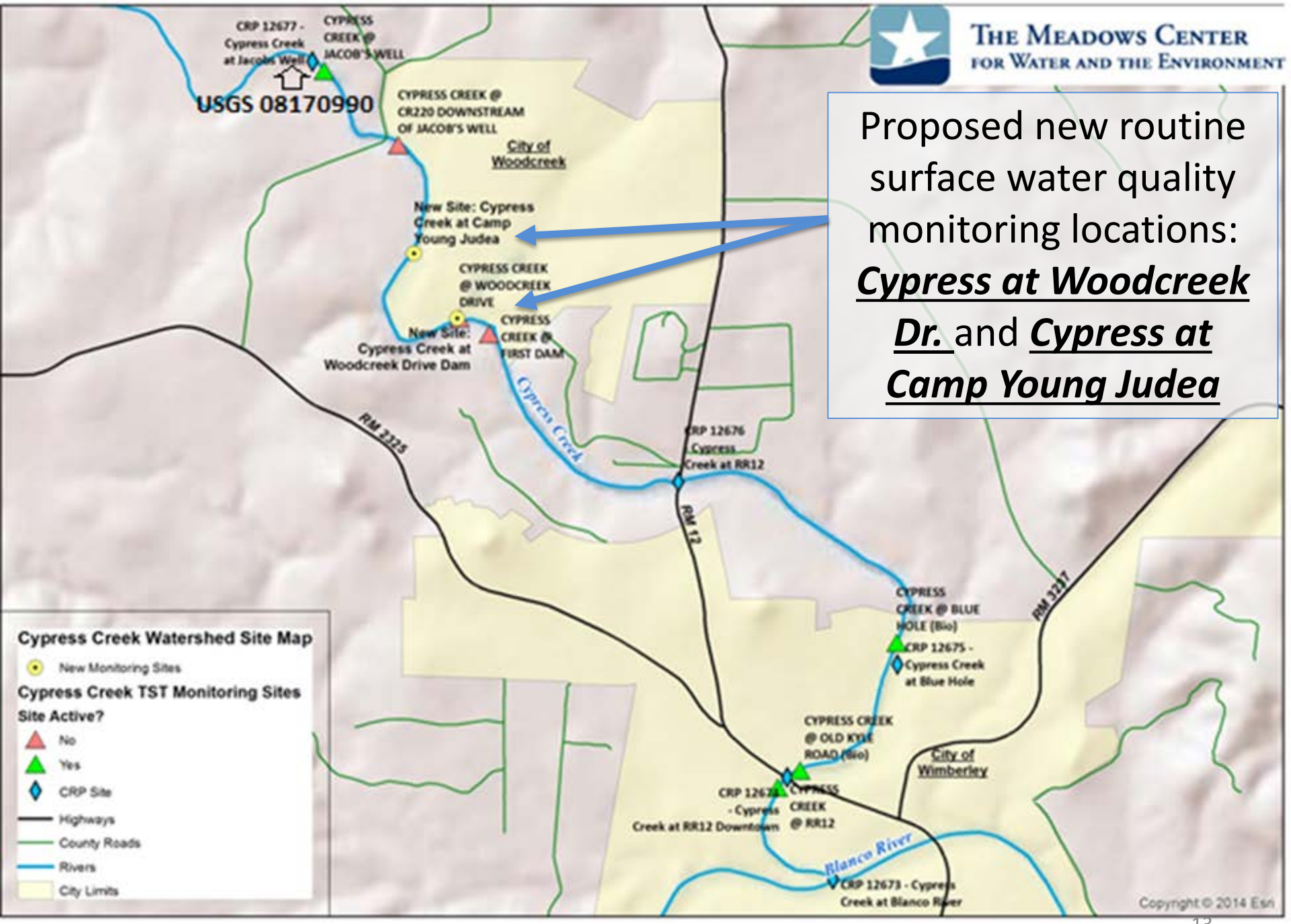
The Meadows Center for Water and the Environment
Proposed new routine surface water quality monitoring locations: Cypress at Woodcreek Dr. and Cypress at Camp Young Judea
CRP 12677 - Cypress Creek at Jacobs Well
CYPRESS CREEK @ JACOB'S WELL
USGS 08170990
CYPRESS CREEK @ CR220 DOWNSTREAM OF JACOB'S WELL
City of Woodcreek
New Site: Cypress Creek at Camp Young Judea
CYPRESS CREEK @ WOODCREEK DRIVE
New Site: Cypress Creek at Woodcreek Drive Dam
CYPRESS CREEK @ FIRST DAM
Cypress Creek
RM 2325
CRP 12676 Cypress Creek at RR12
RM 12
CYPRESS CREEK @ BLUE HOLE (Bio)
CRP 12675 - Cypress Creek at Blue Hole
RM 3237
CYPRESS CREEK @ OLD KYLE ROAD (Bio)
City of Wimberley
CRP 12674 - Cypress Creek at RR12 Downtown
CYPRESS CREEK @ RR12
Blanco River
CRP 12673 - Cypress Creek at Blanco River
Cypress Creek Watershed Site Map
New Monitoring Sites
Cypress Creek TST Monitoring Sites
Site Active?
No
Yes
CRP Site
Highways
County Roads
Rivers
City Limits
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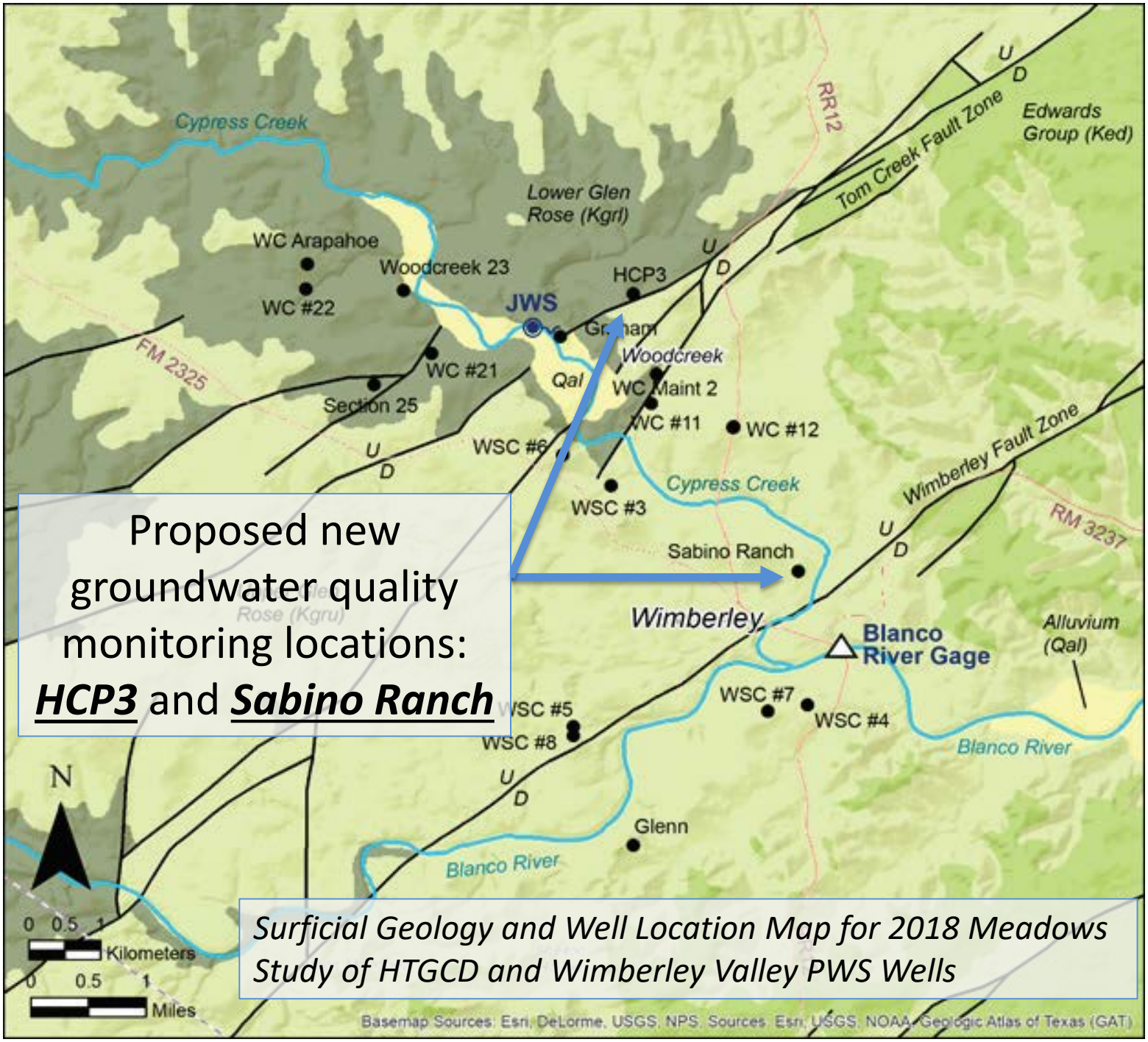
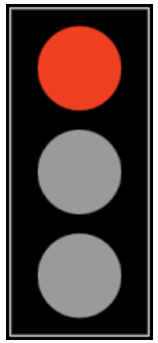
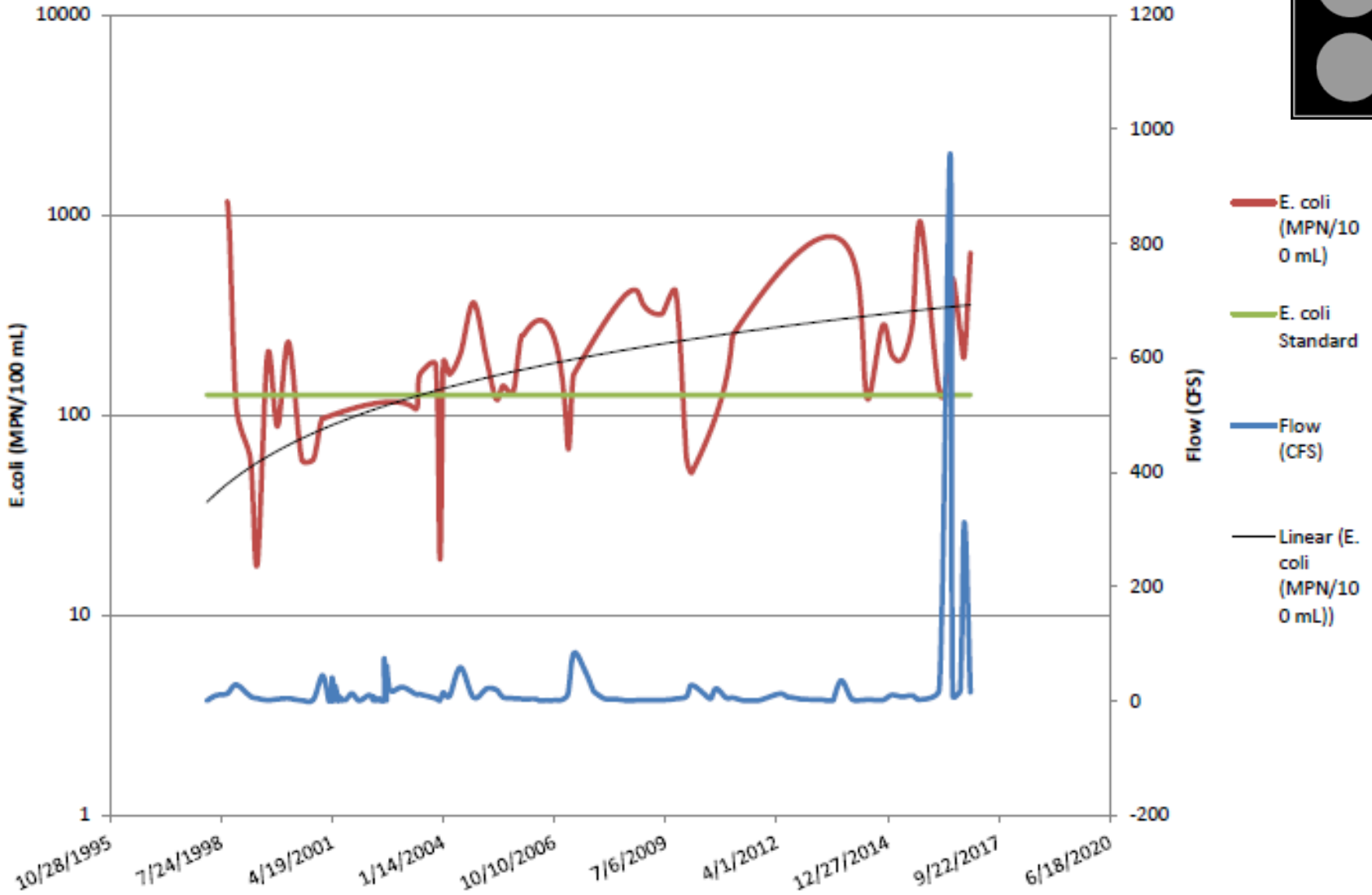


Proposed new groundwater quality monitoring locations: ***HCP3*** and ***Sabino Ranch***

Surficial Geology and Well Location Map for 2018 Meadows Study of HTGCD and Wimberley Valley PWS Wells

Fecal Coliform at Downtown Wimberley





Trends in Bacteria – Downtown and Blanco Confluence

- *E. coli* values downtown are consistently higher than those upstream
- Data trends show a steady increase in bacteria downtown and at the confluence with the Blanco
- Blanco River *E. coli* concentration are low above Cypress Creek and return to lower levels downstream of the confluence

2017 Bacterial Source Tracking - Observations

Excerpt from Cypress Creek BST Final Report Analysis and Recommendations

- Livestock or wildlife were identified as the source for 90% (18 of 20) of the isolates analyzed by SAML using a 7-way ID.
  - While this does not eliminate other sources, it indicates that livestock and wildlife are a substantial source of *E. coli* bacteria present in this reach of Cypress Creek during both dry and wet weather conditions
- This study indicates substantial bacteria loading in Cypress Creek at one or more locations over the approximately ½ mile reach of Cypress Creek studied.
  - Considerable increases in recorded *E. coli* concentrations noted during each sampling event (both wet and dry weather conditions) moving from upstream Site #1 to downstream Site #2
  - Data indicate Site #1 is achieving water quality protective of safe contact recreation during baseflow conditions while *E. coli* concentrations at Site #2 exceeded contact recreation standards during each sampling event
- For more information on this project, please visit the http://www.cypresscreekproject.net/bacterial-source-tracking/

For Thought - Drivers of Water Quality

Declining groundwater levels – lower flows result in worsening water quality

Impacts of drought – lower flows, increased temperatures negatively affect dissolved oxygen and bacteria

Growth, development – increased impervious cover/increased stormwater flows; nonpoint source pollution from homes, cars, businesses; changes in wildlife habitat/patterns; aging infrastructure

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CCWPP BMPs

- Demonstration BMPs
  - Rainwater cisterns and rain gardens
  - First BMP installed at the Patsy Glenn Refuge as a demonstration workshop on 10/21/17
    - Partners included the Wimberley Birding Society, Hays County Master Naturalists and the Wimberley Valley Watershed Association
    - http://www.cypresscreekproject.net/patsy-glenn-rwh-system
- Biofiltration and Stormwater BMPs coming soon

Rainwater Collection

Put stormwater to beneficial use

Can help meet in-door and out-door demands

Sole supply for some homes in rural areas

Reduced runoff volume

Not a water rights issue

Rain Gardens

Runoff volume management and infiltration

Water quality, creek erosion, and flood mitigation benefits

Native vegetation “watered” by rain events

Permeable Pavements/Pavers

Infiltrate stormwater to promote recharge

Reduce runoff volume

Provide water quality treatment, protect streams, flood reduction benefits

Can store stormwater below the pavement surface, under-ground detention

Cypress Creek WPP Outreach and Education

Education and Outreach Activities

- 6/1/17 TAMU Riparian & Stream Ecosystem Workshop
- 7/13/17 Blanco River / Onion Creek Water Forum
- 7/27/17 TWON "Well-Educated" Workshop
- 10/13/17 Texas A&M AgriLife Extension Service "Healthy Lands and Healthy Waters" Workshop
- 10/21/17 Rainwater Harvesting Demonstration Workshop
- 3/3/18 National Center for Appropriate Technology (NCAT) Soil for Water Workshop
- TST Water Quality Monitoring trainings held and more to be scheduled in Wimberley this spring

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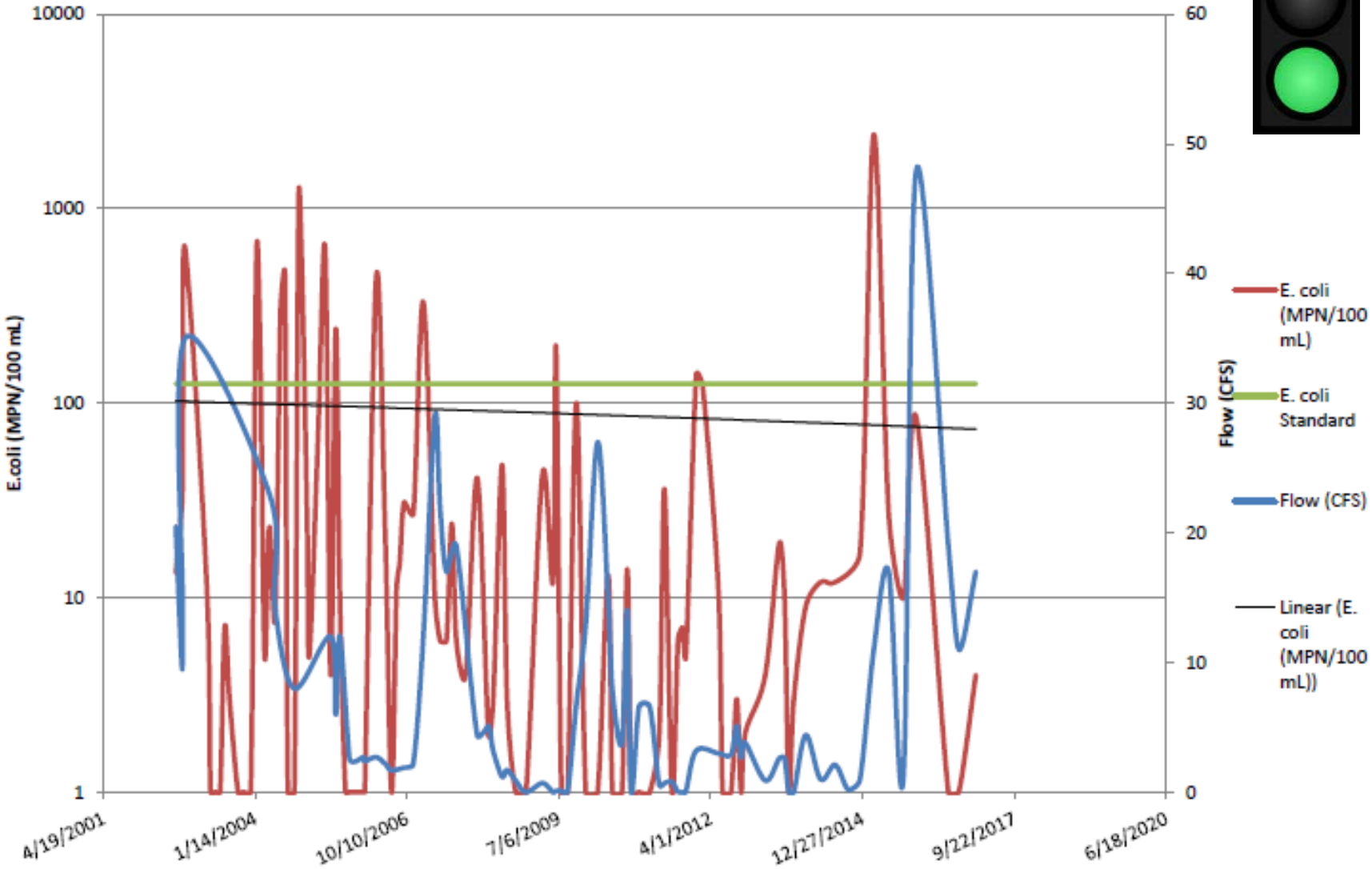
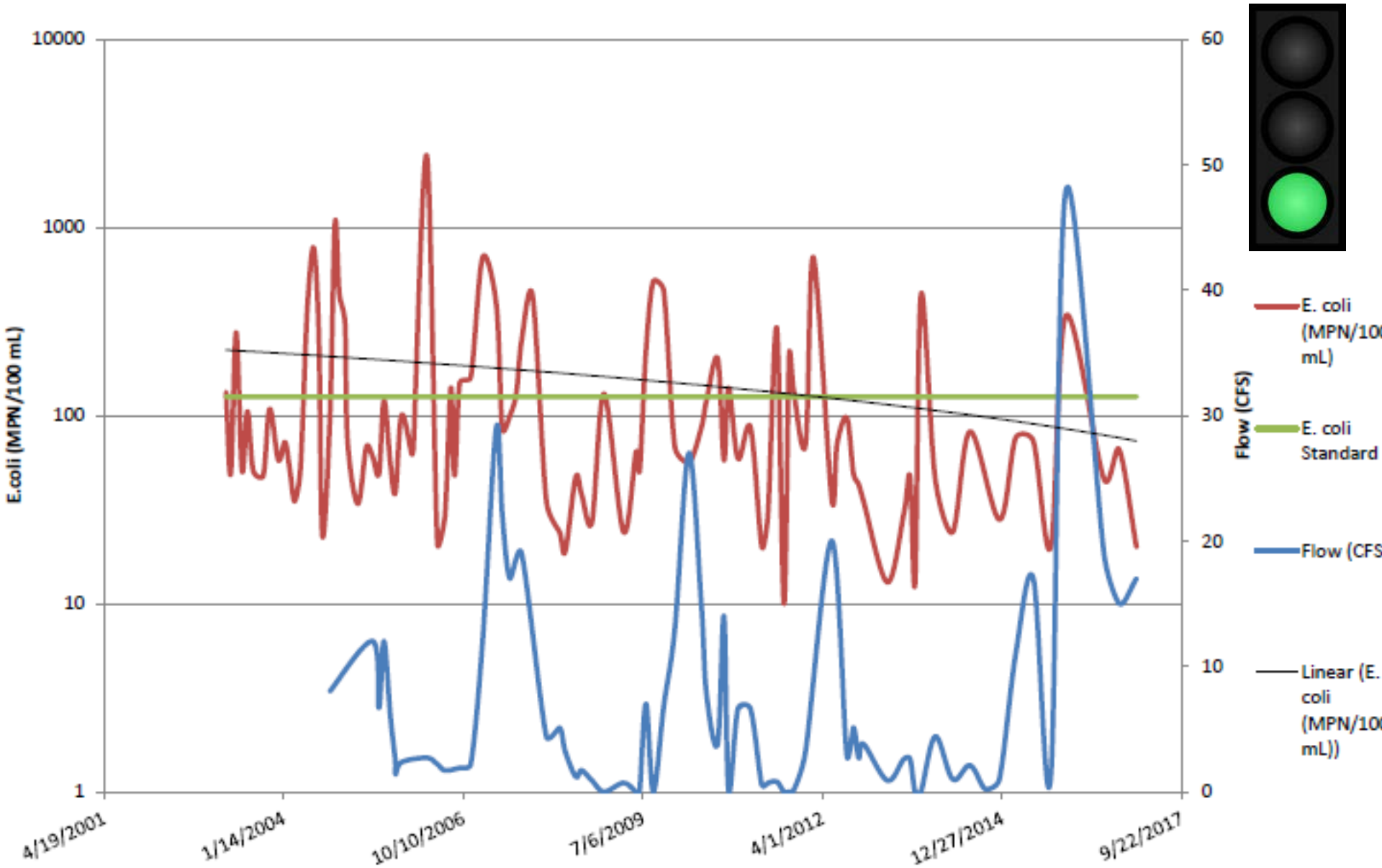
Fecal Coliform at Jacob's Well

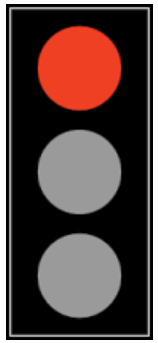


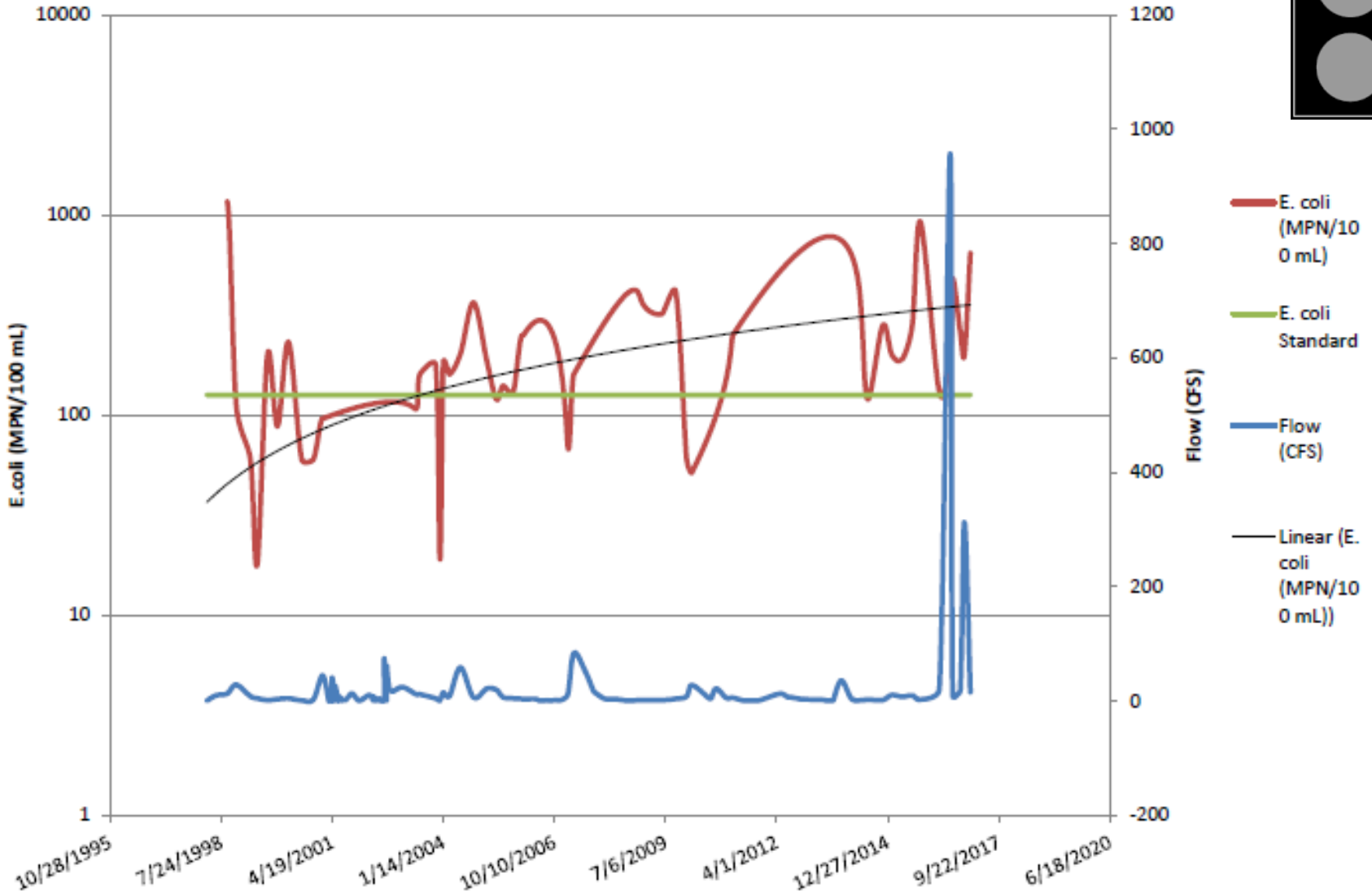
Fecal Coliform at Leeway Cottages (RR 12 Upstream)



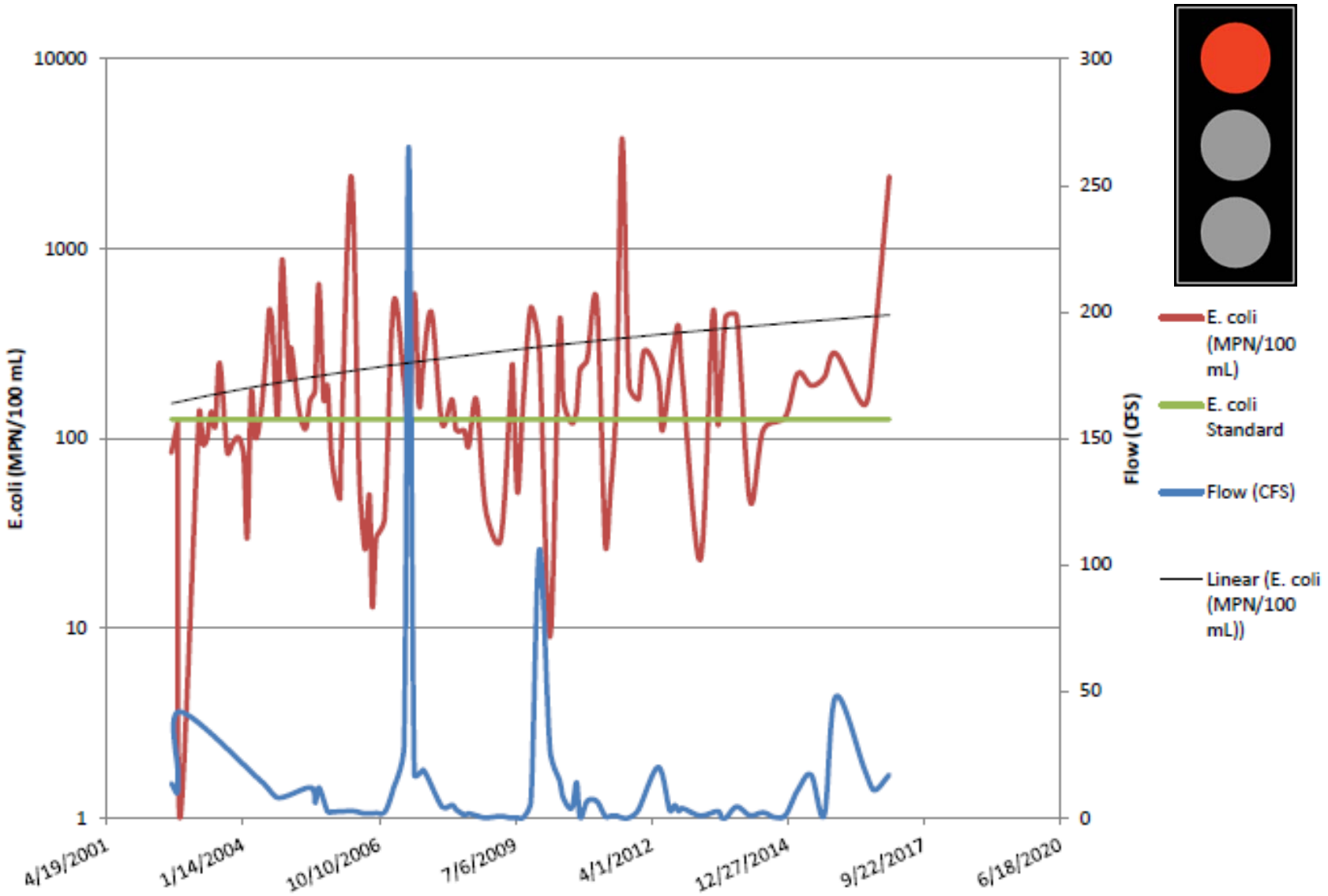
Fecal Coliform at Blue Hole

Fecal Coliform at Downtown Wimberley





Fecal Coliform at Cypress/Blanco Confluence



Fecal Coliform at RR 12 Bridge

Blanco River