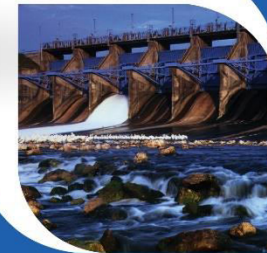


Village Creek-Lake Arlington Watershed Protection

Aaron Hoff

Trinity River Authority

March 24, 2016



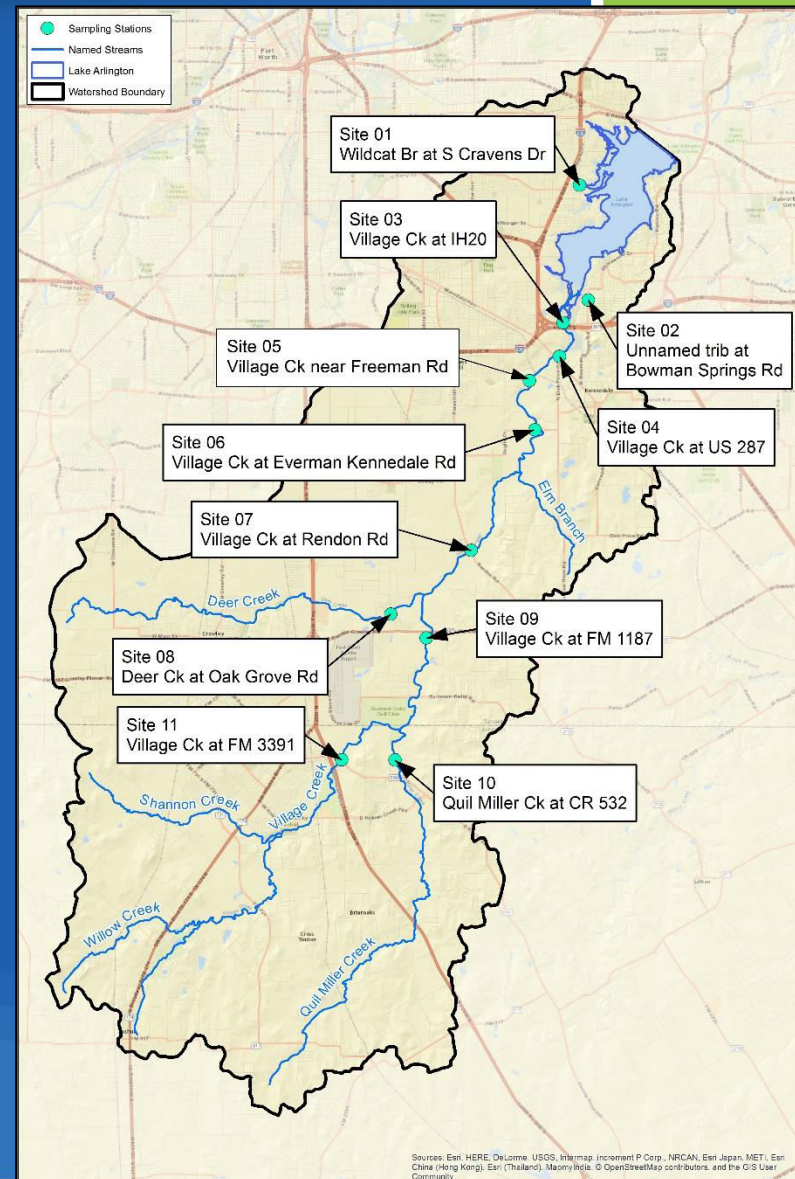
Recap from February

- Discussed the Goals of the Clean Water Act and EPA's perspective
- Presented draft Steering Committee Structure and draft Ground Rules
- Discussed monitoring approach alternatives
 - Voted to defer to TAG for finalization of monitoring plan
- Check the website for last meeting's presentations
 - <http://www.trinityra.org/lakeearlingtonvillagecreek>



Finalized Monitoring Plan

- All parameters at all 11 stations
- On the Lake:
 - Wildcat Branch to the west
 - Unnamed trib to the east
 - Top of Lake near IH-20
- On Village Creek
 - 5 sites, bracketing specific land uses and water inputs
- Major tributaries
 - Deer Creek – urban
 - Quil Miller – rural/agriculture



Meeting Overview

- Introduction to Simple Tools for WPP Development
 - Larry Hauck, Texas Institute for Applied Environmental Research – Lead Scientist
- Steering Committee Member Nominations and Voting
 - Aaron Hoff, Trinity River Authority – Watershed Coordinator
- Upcoming Events and Path Forward
 - Aaron Hoff, Trinity River Authority – Watershed Coordinator
- Open Discussion and Closing Comments



<http://www.trinityra.org/lakearlingtonvillagecreek>



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Village Creek-Lake Arlington Watershed Protection

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? Please take the Stakeholder Survey to let us know how you'd like to help out, or if you're already involved.

[Take the Stakeholder Survey](#)

Watershed Protection Plan Kickoff

Thanks to everyone who joined us in Burleson for the kickoff meeting on Thursday, December 10th. Presentations are now posted to the [Meeting](#) page for your reference.

At the meeting, the Watershed Protection group voted 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.

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

Funding Source

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
- Limit discussion to 5 minutes per person
- 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!

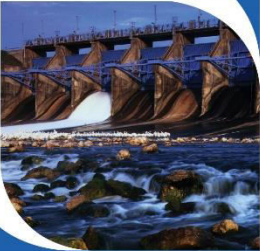
<http://www.trinityra.org/lakearlingtonvillagecreek>

Aaron Hoff

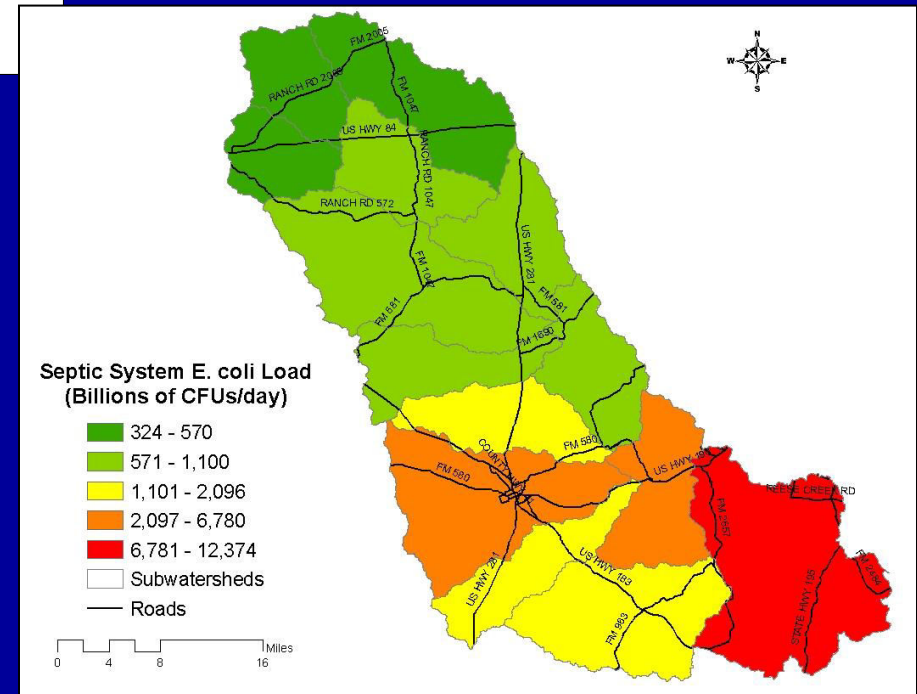
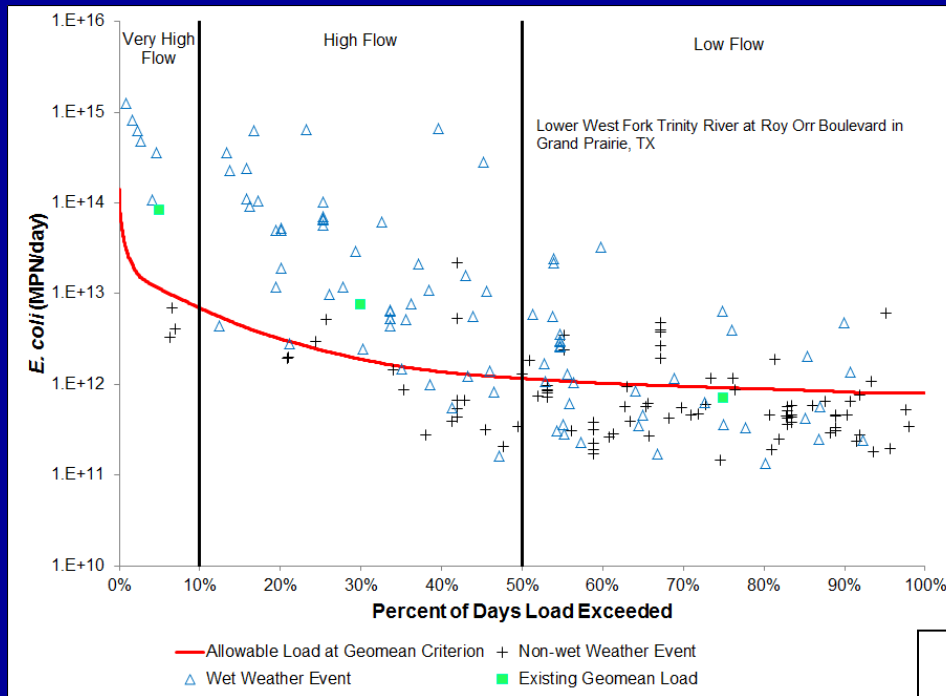
Trinity River Authority

hoffa@trinityra.org

817.493.5581



Introduction to Simple Tools for WPP Development



Thursday, Mar. 24, 2016
Larry Hauck
hauck@tiaer.tarleton.edu

Two Simple Tools

- Flow duration curves (FDCs) & load duration curves (LDCs)
 - Applicable for determining allowable loading of pollutants and percent reductions needed to restore water quality in streams & rivers
- SELECT – Spatially Explicit Load Enrichment Calculation Tool
 - Applicable for determining likely sources of loadings of pollutants and areas of highest loadings

Load Duration Curves

- Applicable for determining allowable loading of pollutants and percent reductions needed to restore water quality in streams & rivers
- Uses observed daily streamflow data
- Considers relevant water quality criteria or screening levels
- Combines observed flow and criteria to establish a curve of loading capacity
- Can be enhanced with observed water quality data

Load Duration Curves (continued)

- Combines measured concentrations of a pollutant with flow at the same time to develop a load
- The LDC illustrates the load of a pollutant versus the time that a given load is exceeded
- Time is illustrated as percentage of time
- Able to see if a stream is exceeding the criterion or screening level in terms of load (flow and measured concentrations)
- Able to calculate a percent reduction based on flow categories

Example of LDC Development

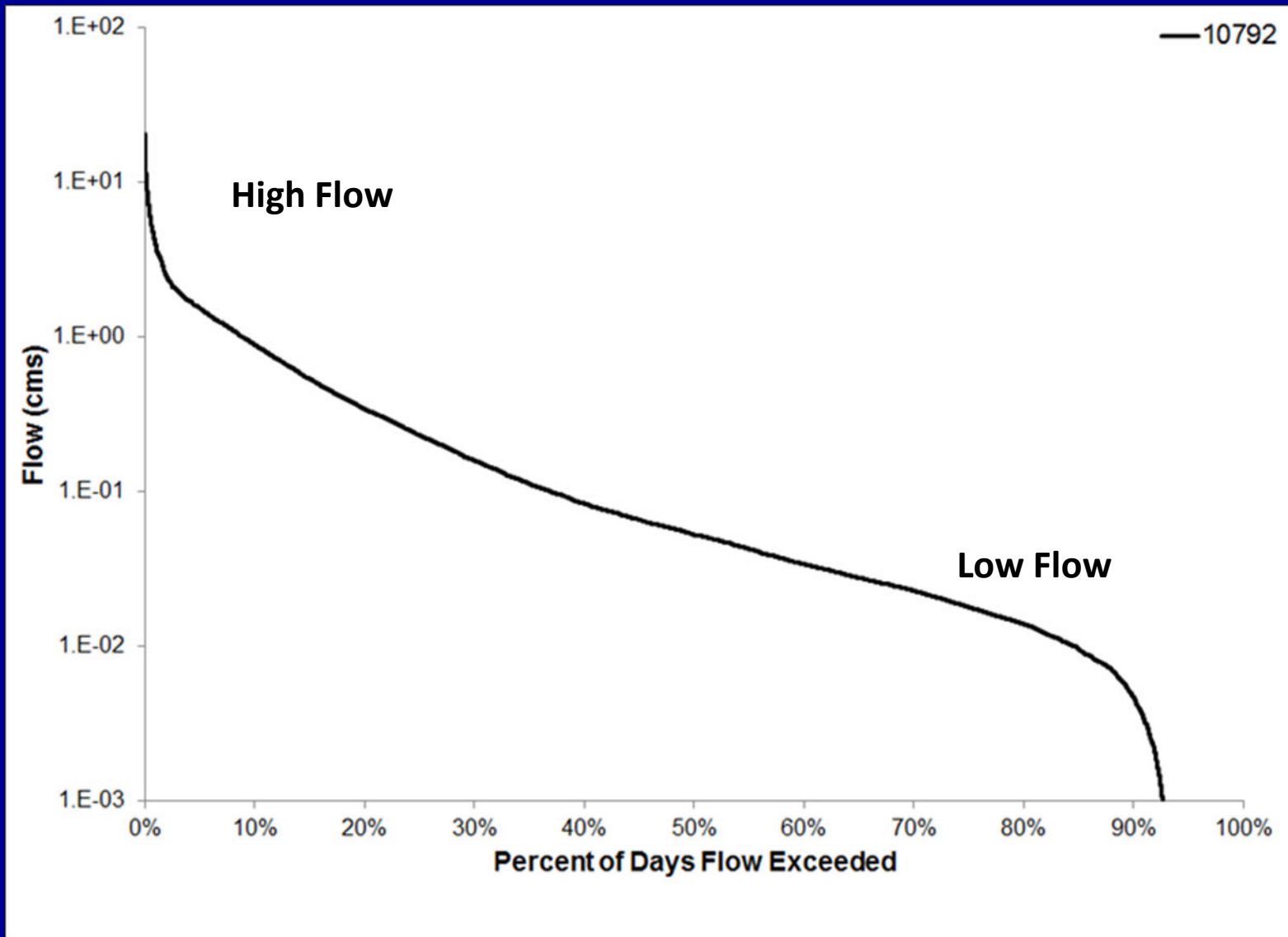
Example from: Lower West Fork
Trinity River Project

First Step:

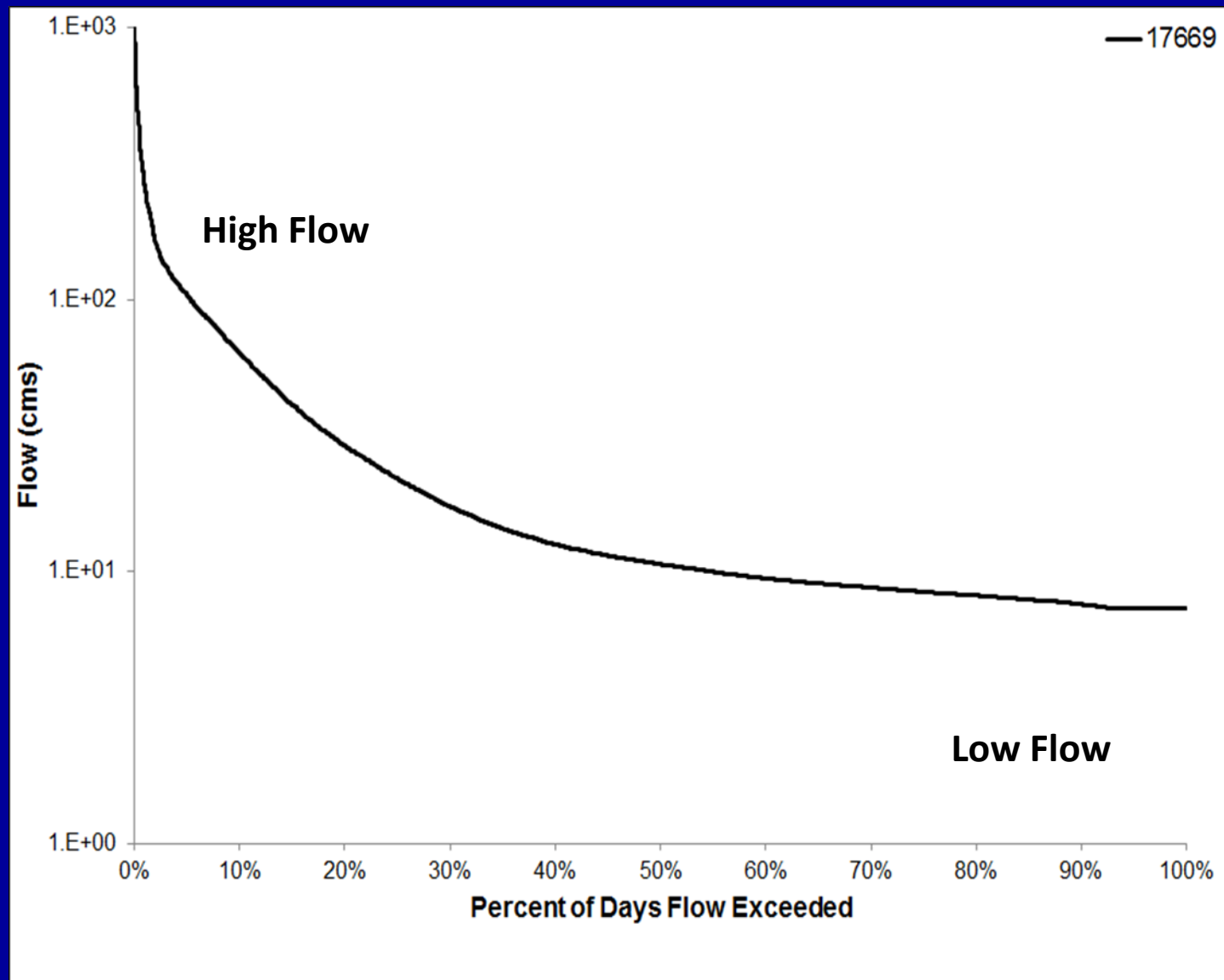
- Develop a daily streamflow record (for this example chose 25-year period of July 1, 1986 – June 30, 2011)
- Use U.S. Geological Survey gage streamflow data and drainage area ratio.
- Daily record of streamflow data ranked highest to lowest to give a flow duration curve.

Example Streamflow Computations for FDC (9-day record Mission River USGS gage)

| Original Data | | Sorted Streamflow | | DAR = 2.0 | Rank | % Days Flow Exceeded |
|---------------|------------|-------------------|------------|------------|------|----------------------|
| Date | Flow (cfs) | Date | Flow (cfs) | Flow (cfs) | | |
| 1/6/1998 | 31 | 1/13/1998 | 167 | 334 | 1 | 10% |
| 1/7/1998 | 37 | 1/12/1998 | 136 | 271 | 2 | 20% |
| 1/8/1998 | 121 | 1/8/1998 | 121 | 241 | 3 | 30% |
| 1/9/1998 | 83 | 1/9/1998 | 83 | 166 | 4 | 40% |
| 1/10/1998 | 54 | 1/10/1998 | 54 | 109 | 5 | 50% |
| 1/11/1998 | 39 | 1/11/1998 | 39 | 79 | 6 | 60% |
| 1/12/1998 | 136 | 1/7/1998 | 37 | 74 | 7 | 70% |
| 1/13/1998 | 167 | 1/14/1998 | 33 | 66 | 8 | 80% |
| 1/14/1998 | 33 | 1/6/1998 | 31 | 61 | 9 | 90% |



Flow Duration Curve: Kee Branch, Station 10792



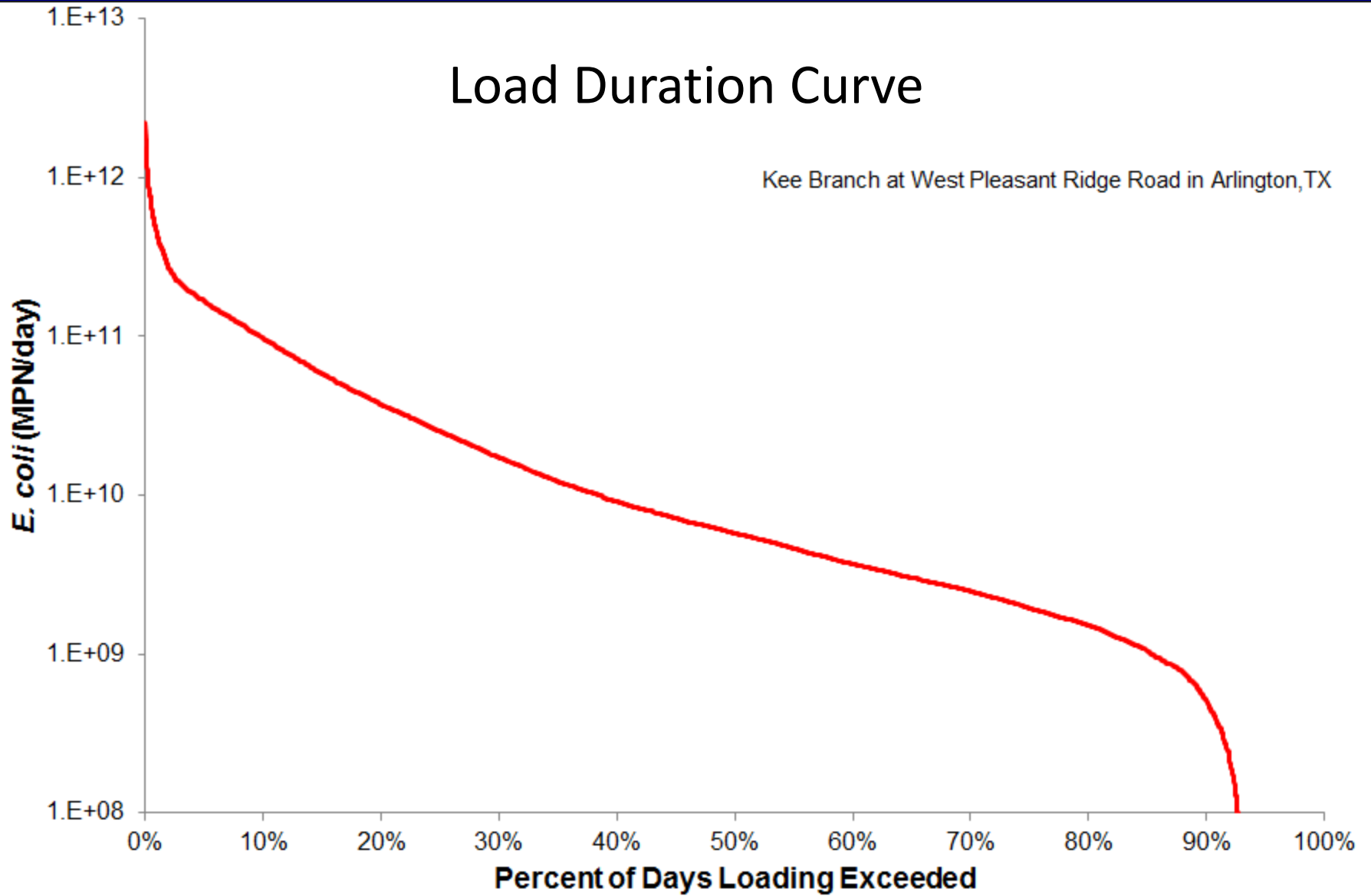
Flow Duration Curve: West Fork Trinity River,
Station 17669

Second Step:

- The flow duration curve is converted to a load duration curve by multiplying flow values along the curve by the relevant numeric criterion (in this case the geometric mean *E. coli* criterion of 126 MPN /100 ml) and the appropriate conversion factor to convert to cfu/day.
- The result is a curve representing maximum allowable loadings based on geometric mean criterion.

Load Duration Curve

Kee Branch at West Pleasant Ridge Road in Arlington, TX

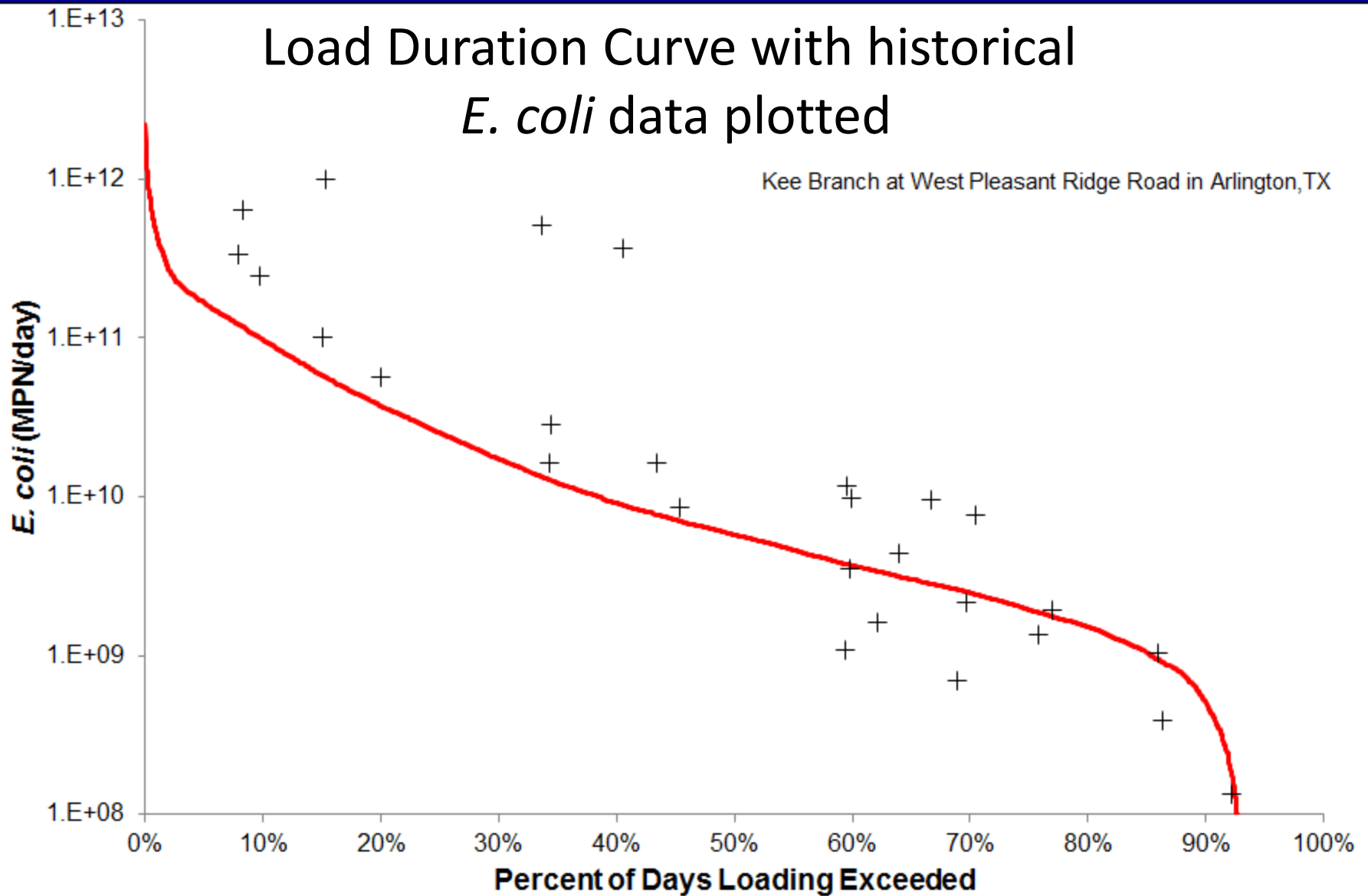


— Allowable Load at Geomean Criterion

Third Step:

- The existing *E. coli* concentration data for specific days are multiplied by the streamflow on that same day and the appropriate conversion factor to give units of cfu/day.

Load Duration Curve with historical *E. coli* data plotted

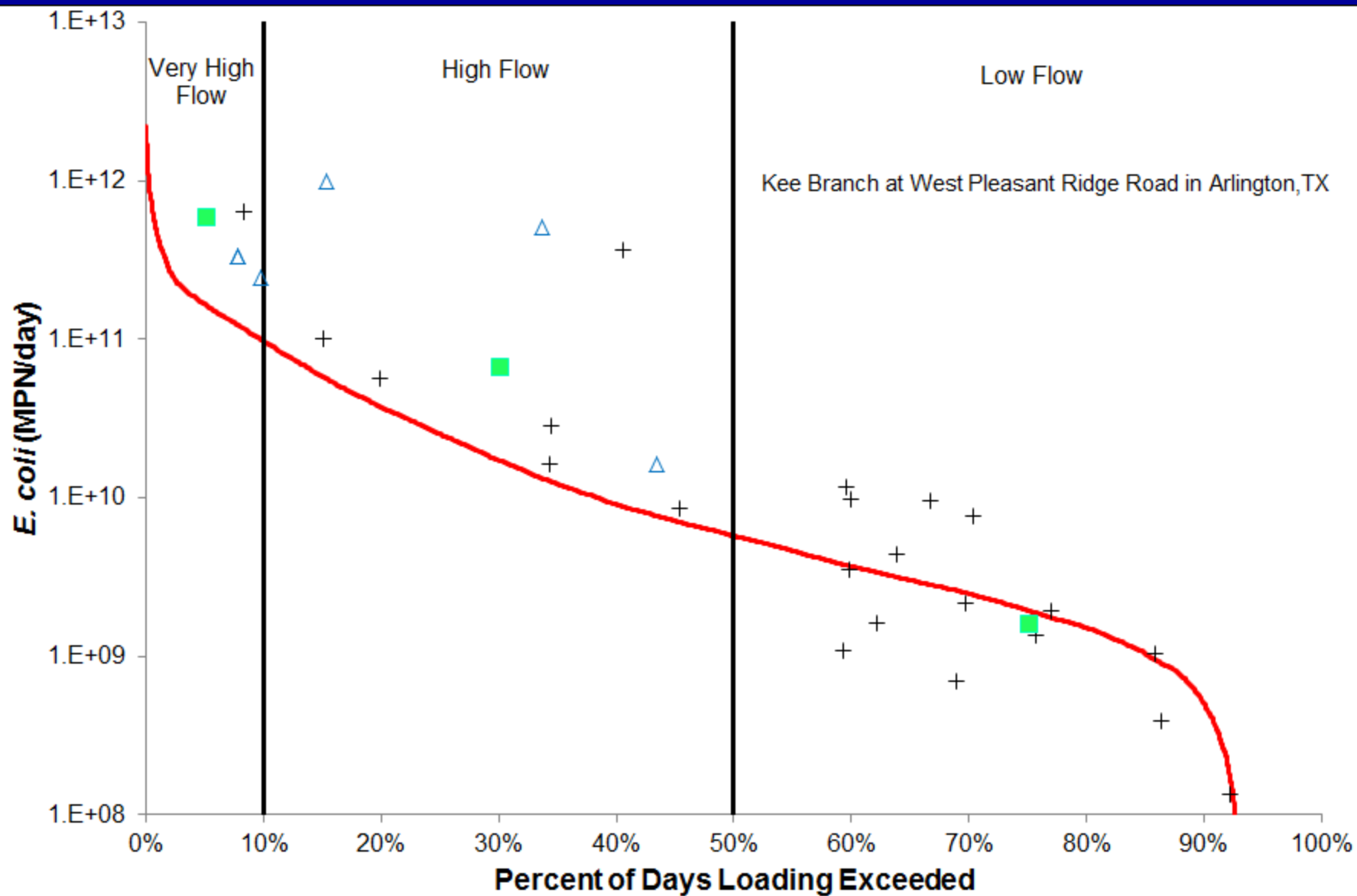


— Allowable Load at Geomean Criterion

+ Non-wet Weather Even

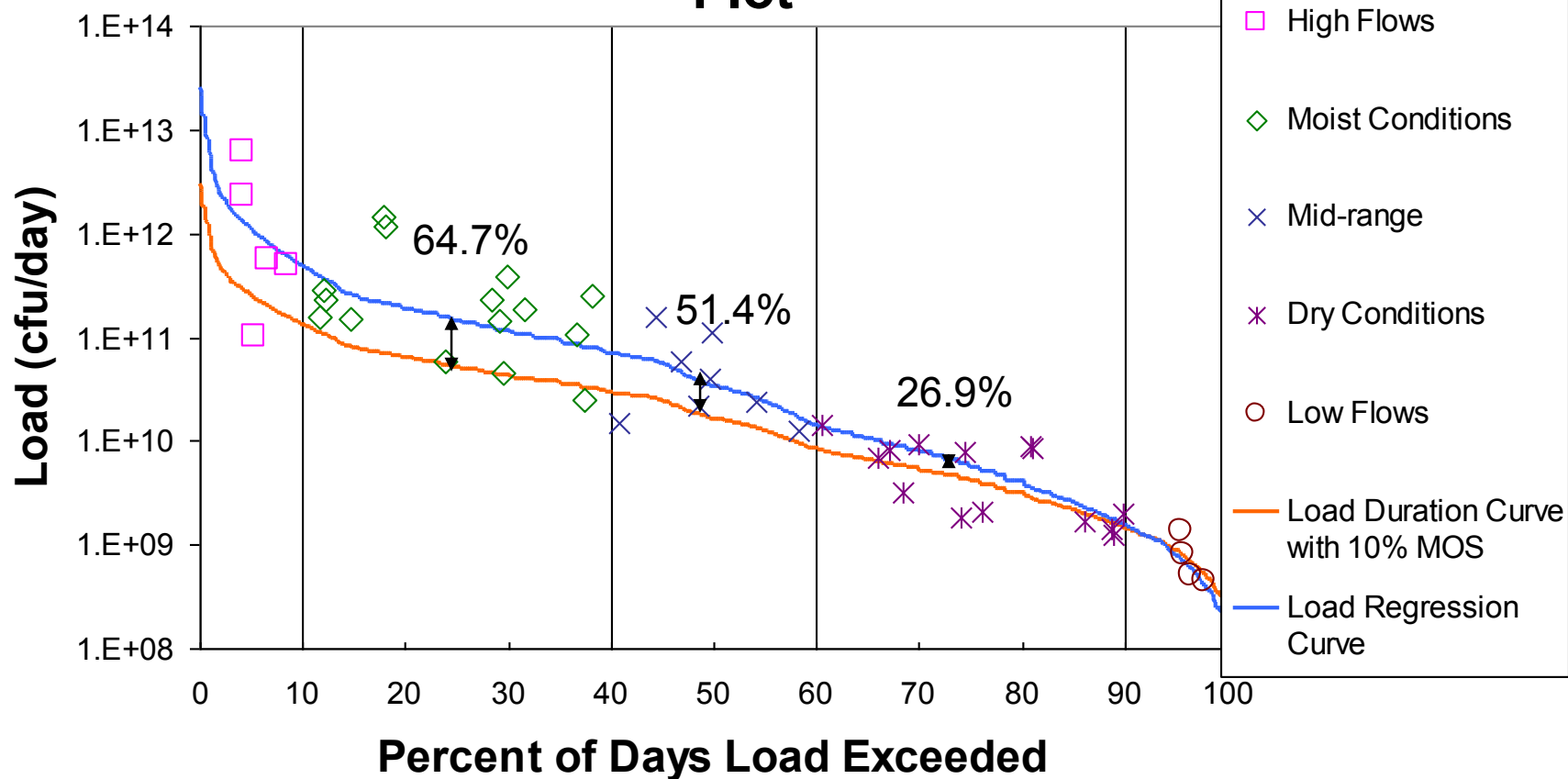
Last Step: Enhance LDCs

- Separate historical data into dry and wet weather influenced.
- Assign flow regimes:
 - Very High Flow (0 – 10%)
 - High Flow (10 - 50 %)
 - Low Flow (50 - 100%)
- Determine geometric mean by flow regime.



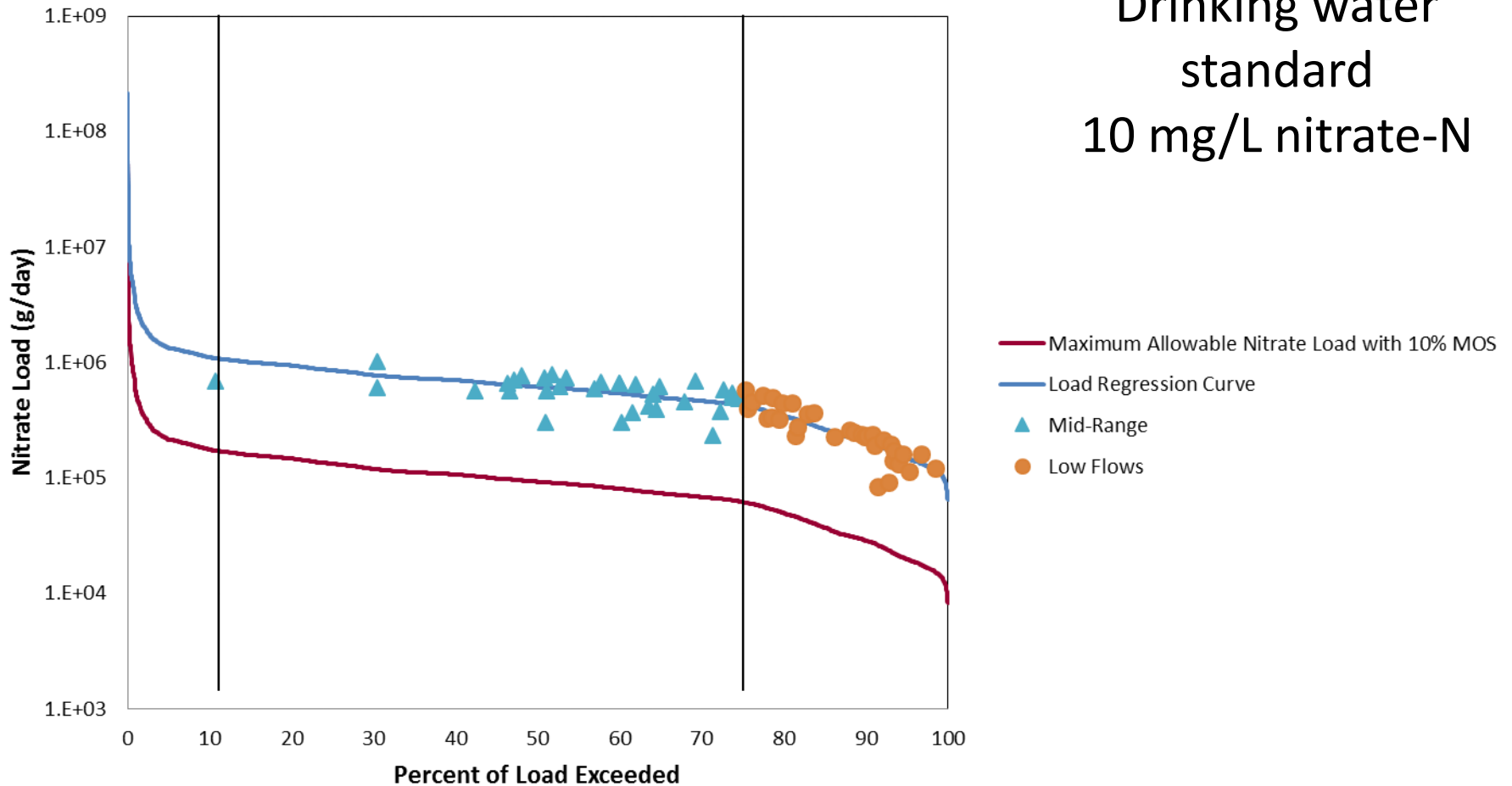
— Allowable Load at Geomean Criterion + Non-wet Weather Event
△ Wet Weather Event ■ Existing Geomean Load

Load Regression Model on Load Duration Curve Plot



Load Duration Curve for Nitrate Nitrogen

Haberle Rd Load Duration Curve



Source: Biological and Agricultural Engineering
Department, Texas A&M University

Spatially Explicit Load Enrichment Calculation Tool (SELECT)

- Applicable for determining likely sources of loadings of pollutants and areas of highest loadings and facilitating stakeholder interactions
- Can use readily available GIS data layers
 - Digital elevation models (DEMs)
 - Land use/land cover (e.g., NLCD 2006)
 - Soil layers (NRCS STATSGO & SSURGO)
 - Stream networks (USGS NHD), etc.
- Can use other readily available data sources
 - For example, USDA Agricultural Census Data

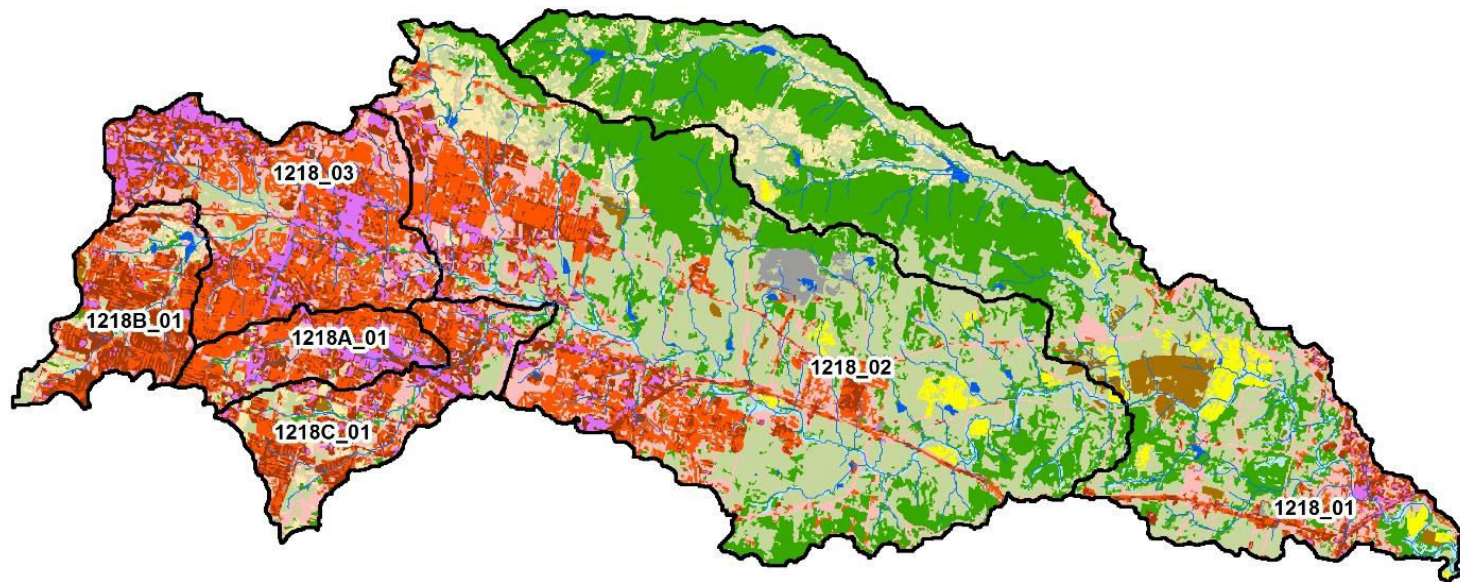
Examples of Sources Considered in SELECT

- Range and pastured cattle
- Other agricultural or domestic animals (sheep, goats, horses, cats, dogs)
- On-site sewage facilities (septic systems)
- Domestic wastewater treatment facilities
- Urban runoff
- Wildlife (e.g., deer)
- Feral hogs

Examples of Input Included in SELECT

- Census Blocks (U.S. Census Bureau)
- Soils (USDA-NRCS)
- Digital Elevation Map (BASINS)
- Urban Areas (TCEQ; U.S. Census Bureau)
- Land use / land cover (NCTCOG and USGS)
- Sub-watersheds & stream network (TCEQ; USGS)
- Livestock
 - Stakeholder input
 - Agricultural Statistics (USDA)
 - Poultry Operations within the watershed (TSSWCB)
- Wildlife
 - Stakeholder input
 - Wildlife experts input, Resource Management Unit data for Deer (TPWD)

Nolan Creek Watershed Land Use/ Land Cover



2011 NLCD

Barren Land

Cultivated Crops

Developed, High Intensity

Developed, Low Intensity

Developed, Medium Intensity

Developed, Open Space

Forest

Grassland/Herbaceous

Open Water

Pasture/Hay

Shrub/Scrub

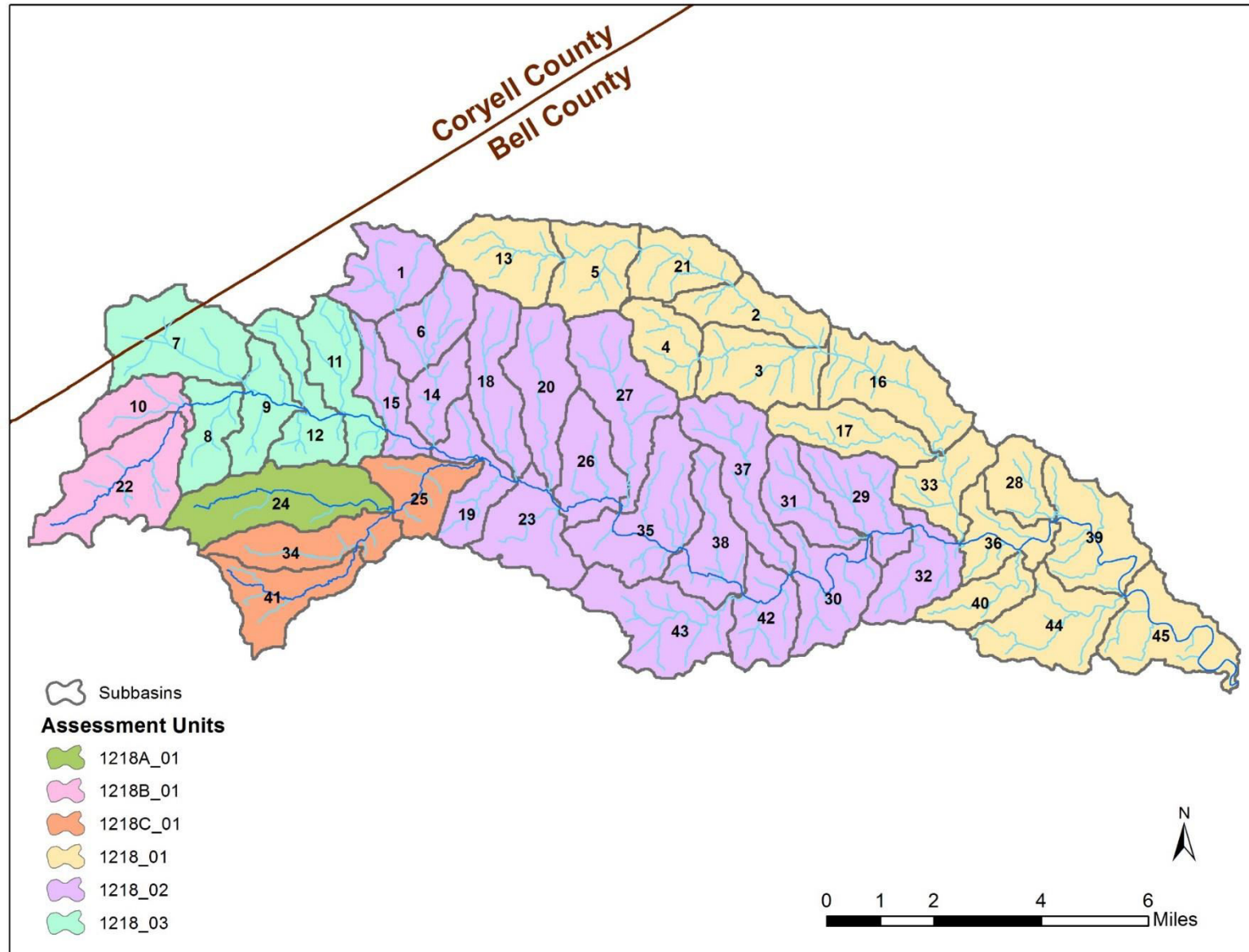
Wetlands

Assessment Units



0 1 2 4 6 Miles

Nolan Creek SELECT Subbasins



Examples of Information Used in SELECT

Septic System Data Requirements

$E. coli$ Load = Number of Systems * Failure Rate * People/home * Concentration * Discharge * Conversion Factors

- Number of Systems:
 - Number of homes from 911 addresses that are classified as residential
 - Remove homes within CCN boundary
- Failure Rate
 - Septic Drainfield Limitation Class – SSURGO soil
 - Very Limited (15%), Somewhat Limited (10%)
- People per Home
 - 2010 Census Blocks: Average Household Size
- Concentration
 - Fecal Coliform $10 \times 10^6 / 100 \text{ mL} = 5 \times 10^6 \text{ E. coli} / 100 \text{ mL}$
- Discharge
 - 60 gallons/person/day

Adapted from slide by Biological and Agricultural Engineering Department,
Texas A&M University

Feral Hog Data Requirements

- Density: 26 acres per animal
- Estimated feral hog population based on:
 - Land Use
 - Forest
 - Rangeland
 - Managed Pasture
 - Cultivated Crops
 - Used perennial streams with 300-foot buffer

Adapted from slide by Biological and Agricultural Engineering Department,
Texas A&M University

Cattle Data Requirements

- Stocking Density
 - 20 acres per animal for forest & rangeland;
 - 10 acres per animal for managed pasture
- Estimated cattle population based stocking density and:
 - Land Use Area
 - Forest
 - Rangeland
 - Managed Pasture

Adapted from slide by Biological and Agricultural Engineering Department,
Texas A&M University

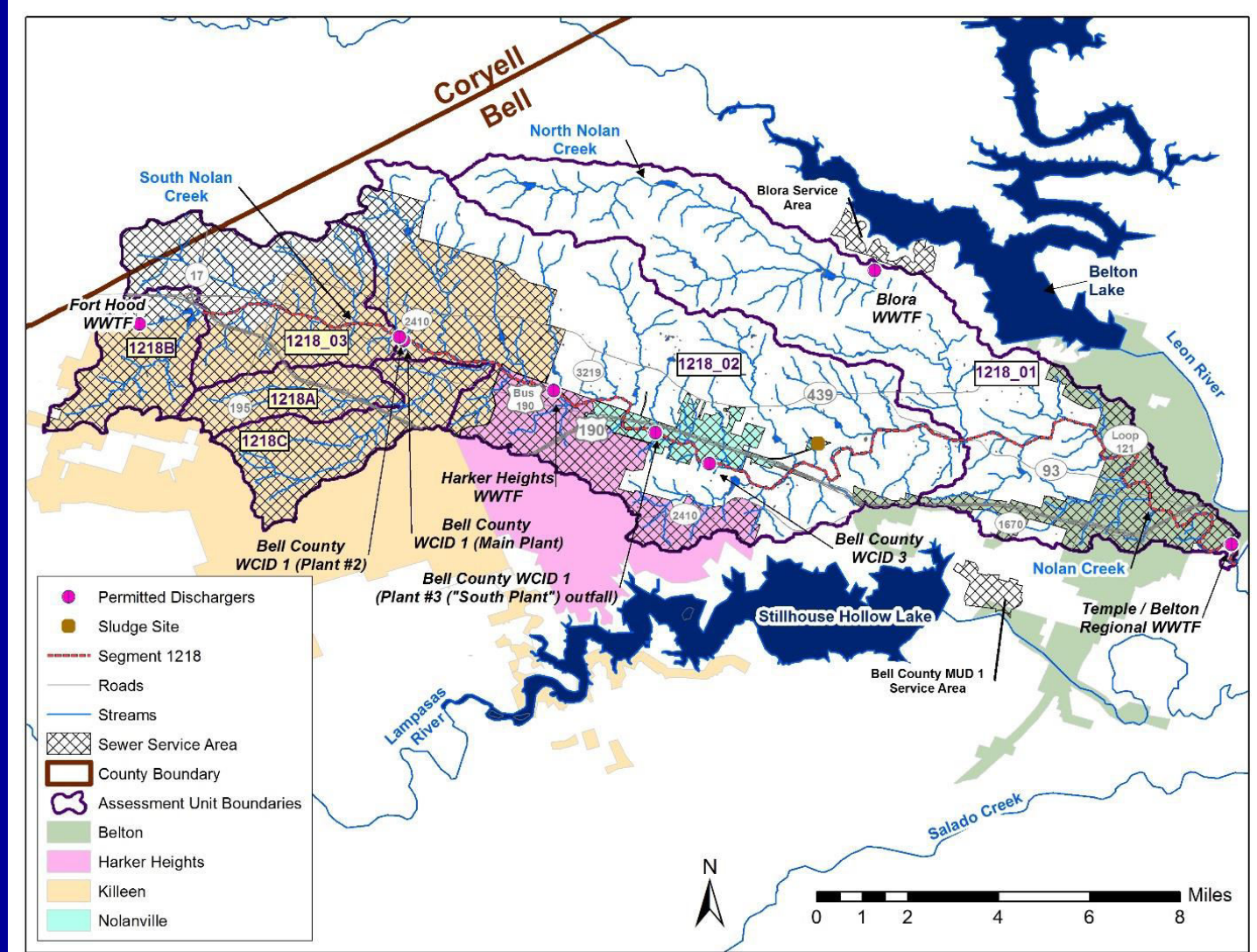
Example SELECT Application

NOLAN CREEK

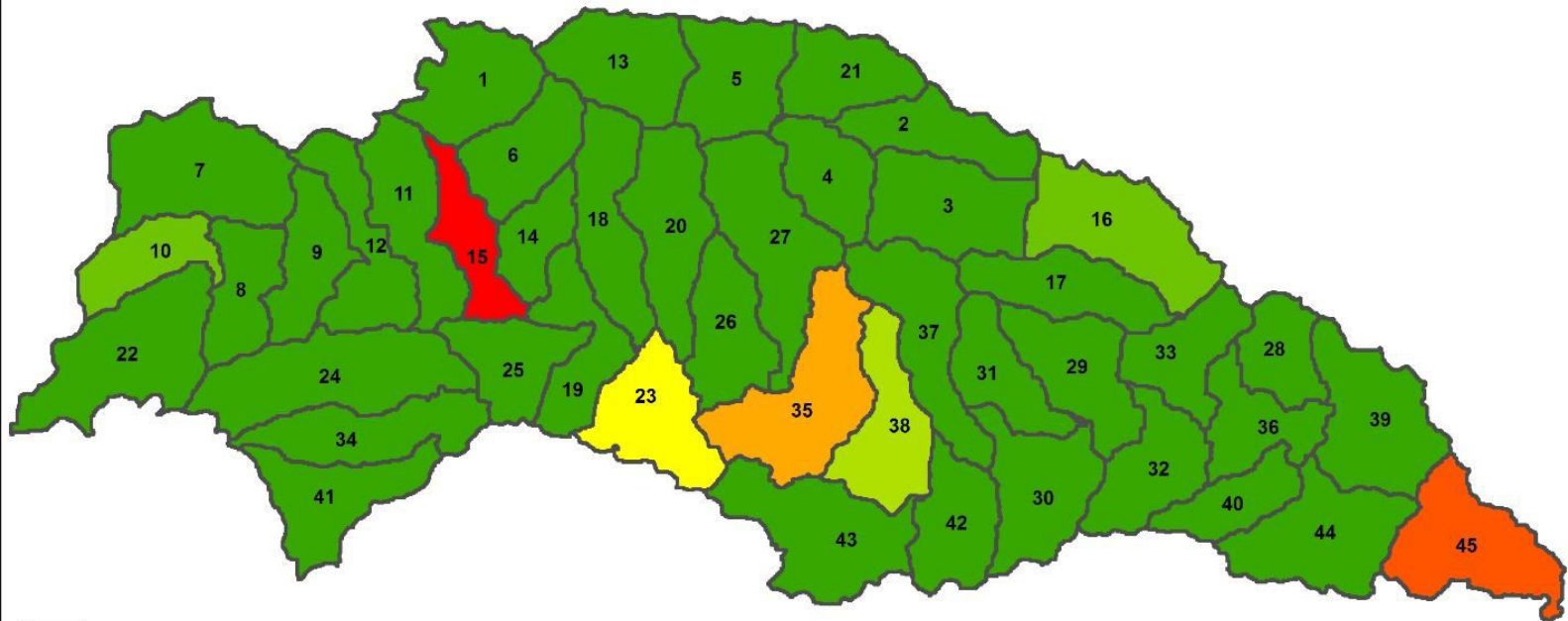
Partnership Meeting

Regulated Sources - Wastewater Treatment Facility (WWTF) Discharges

Note: Service area for WWTF discharges extends beyond the watershed largely following municipal boundaries



Nolan Creek - SELECT Potential Total Loads for WWTF



Subbasin

E. coli (cfu/day)

0.00000e+000

1.00000e-005 - 4.29219e+008

4.29220e+008 - 3.21914e+009

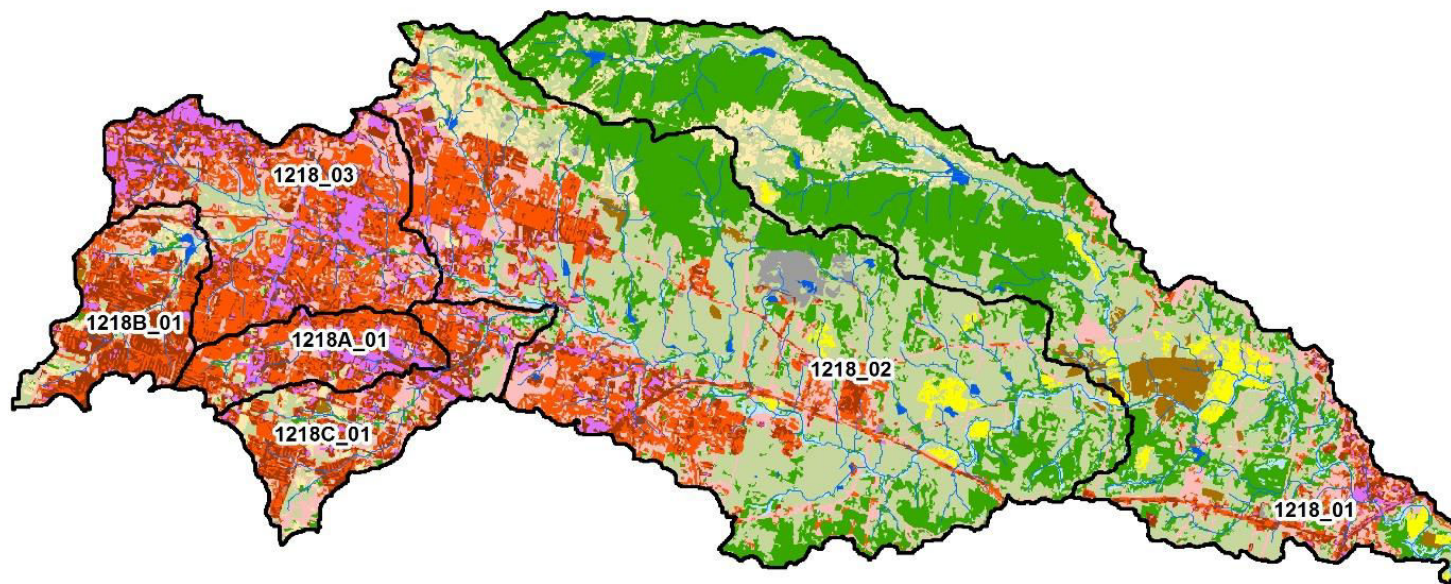
3.21915e+009 - 1.43073e+010

1.43074e+010 - 2.86146e+010

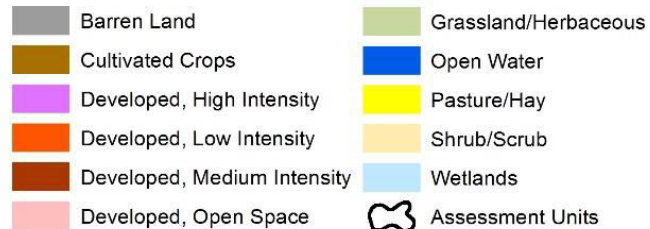
2.86147e+010 - 4.76910e+010

4.76911e+010 - 1.14458e+011

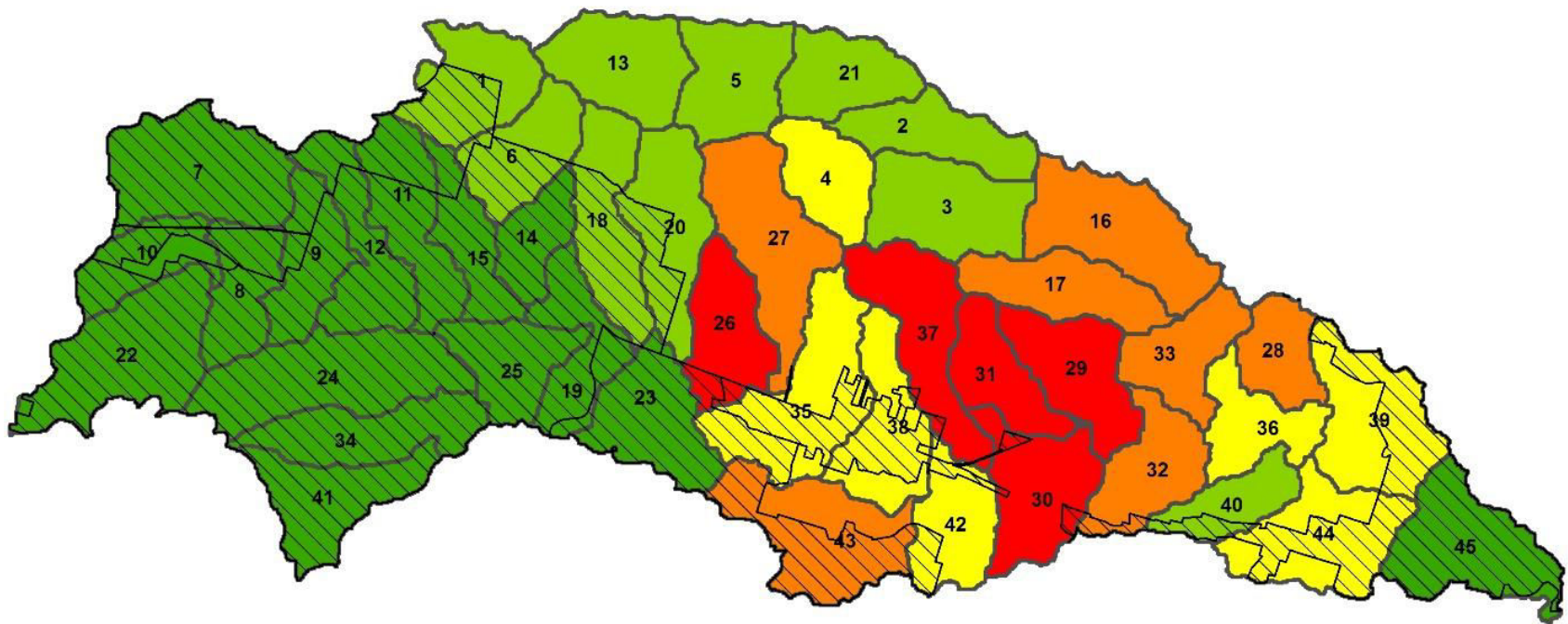
Land Use/ Land Cover



2011 NLCD



Nolan Creek - SELECT Potential Total Loads for Cattle



Municipal Boundaries

Subbasin

E. coli (cfu/day)

0.00000e+000 - 4.83993e+011

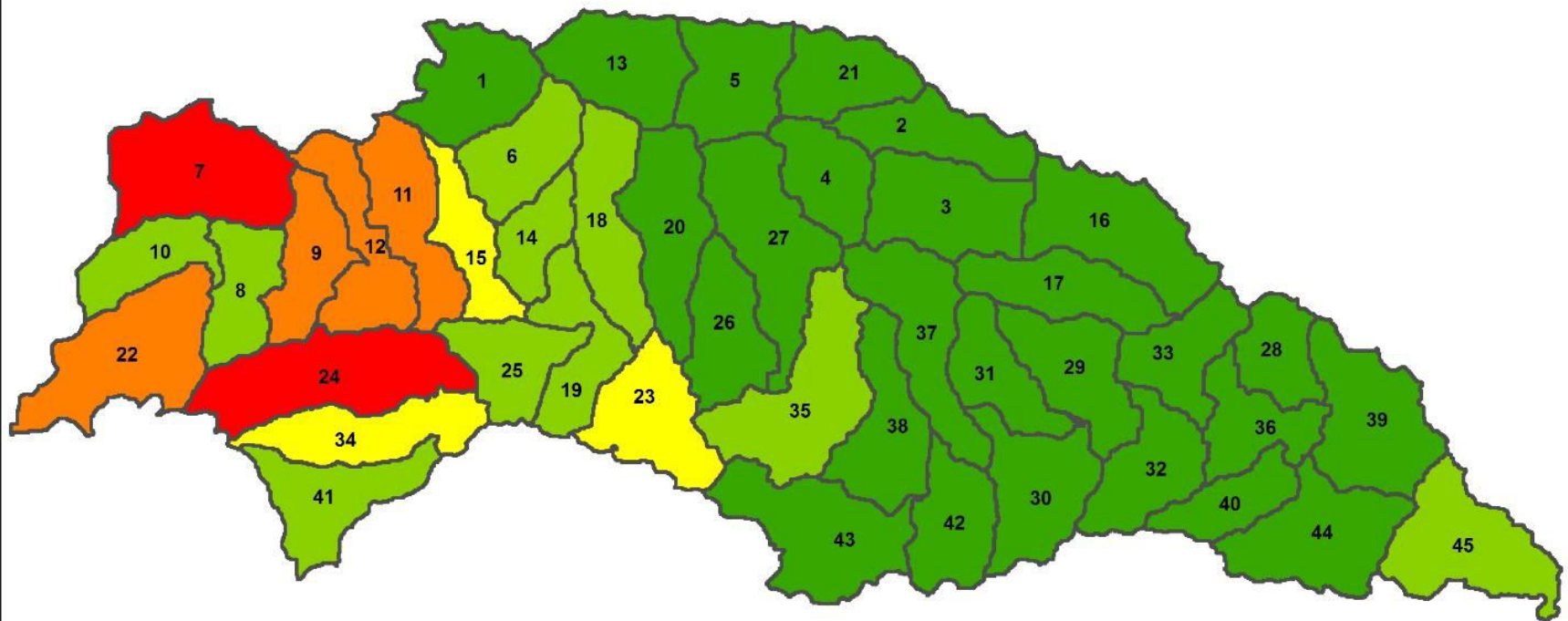
4.83994e+011 - 3.07629e+012

3.07630e+012 - 4.71343e+012

4.71344e+012 - 6.20208e+012

6.20209e+012 - 9.06204e+012

Nolan Creek - SELECT Potential Total Loads for Urban Stormwater



Subbasin

E. coli (cfu\day)

0.00000e+000 - 5.50229e+011

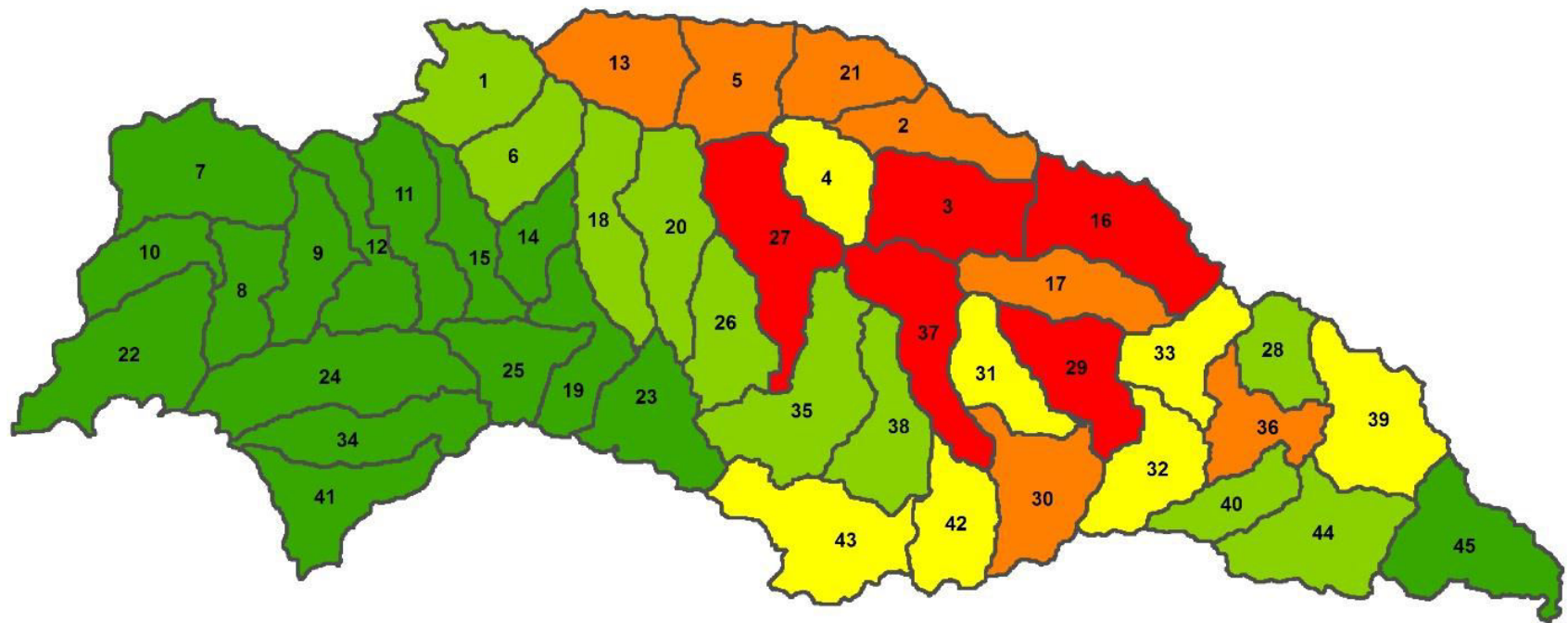
5.50230e+011 - 4.07802e+012

4.07803e+012 - 6.77827e+012

6.77828e+012 - 1.56216e+013

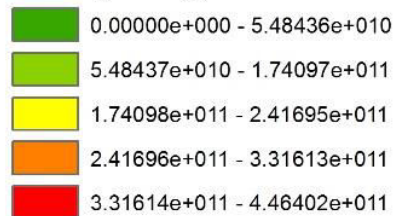
1.56217e+013 - 2.83363e+013

Nolan Creek - SELECT Potential Total Loads for Feral Hogs

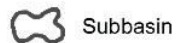
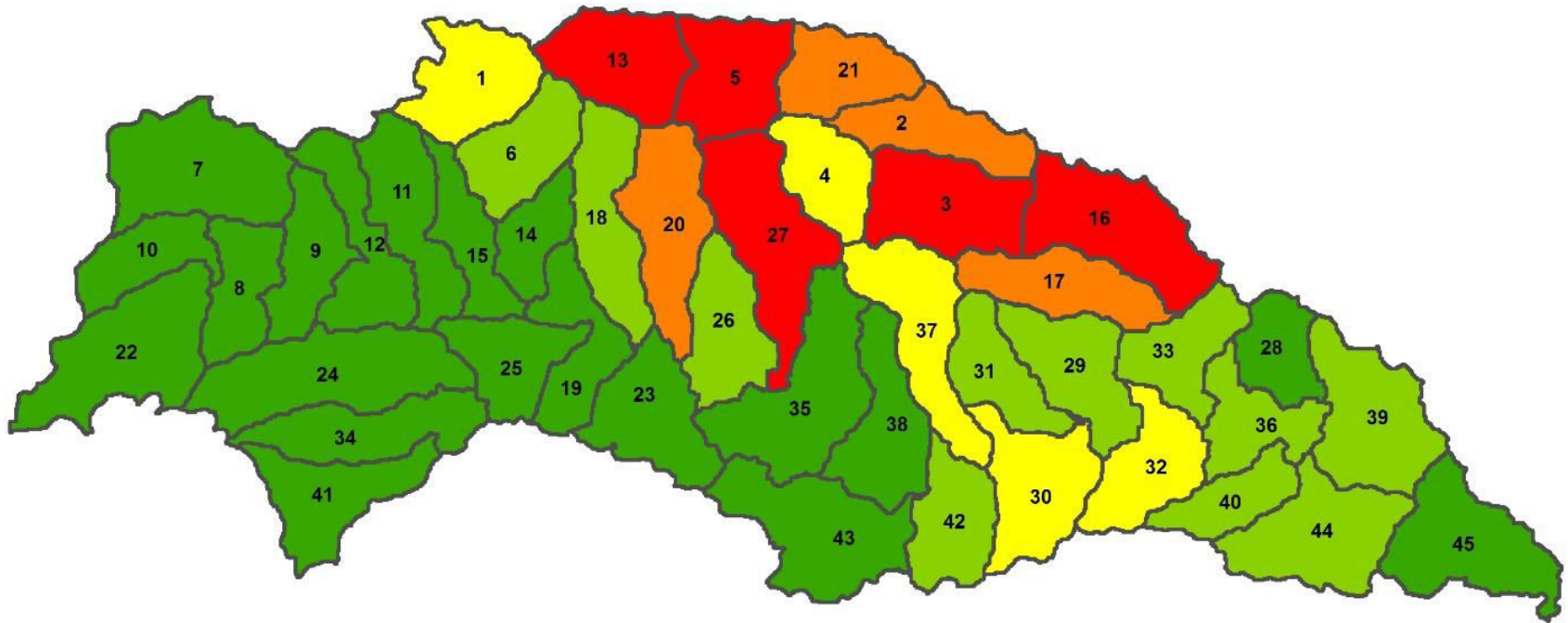


Subbasin

E. coli (cfu/day)



Nolan Creek - SELECT Potential Total Loads for Deer

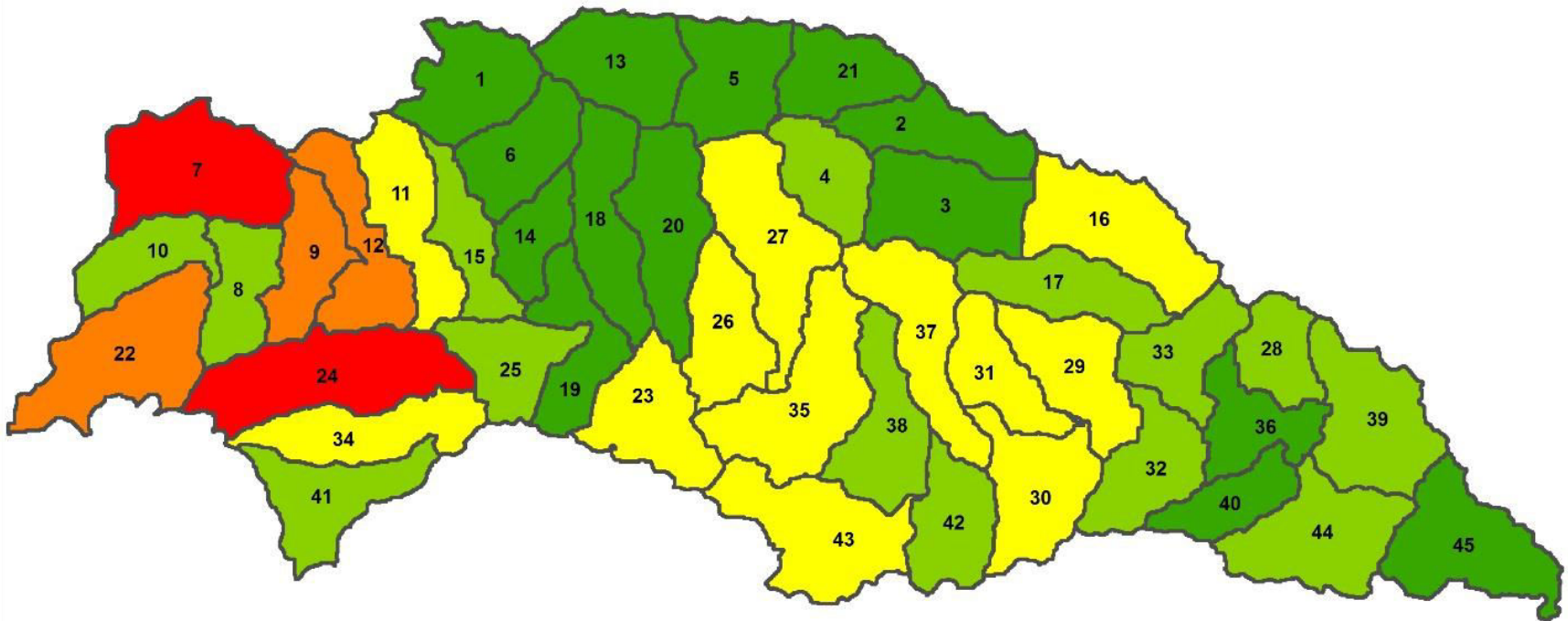


Subbasin

E. coli (cfu/day)



Nolan Creek - SELECT Potential Total Loads



Subbasin

E. coli (cfu\day)



Thank You

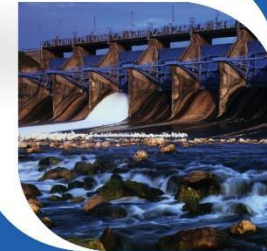
Questions?

Steering Committee Nominations

Aaron Hoff

Trinity River Authority

March 24, 2016



Stakeholder Participation



Who is a stakeholder?

- A stakeholder is anyone who:
 - Makes and implements decisions
 - Is affected by those decisions
 - Participates in the planning process
 - Assisting with implementation
 - Impeding the process
- **Don't have to live here to be a stakeholder!**



Why is stakeholder involvement important?

- It's the key to developing an effective WPP
- Stakeholder representation must be well-distributed
 - Amongst multiple users with varying needs
 - Throughout the entire watershed
- Local knowledge
 - Know the watershed
 - Know what works, what doesn't
 - Different perspectives based on watershed use

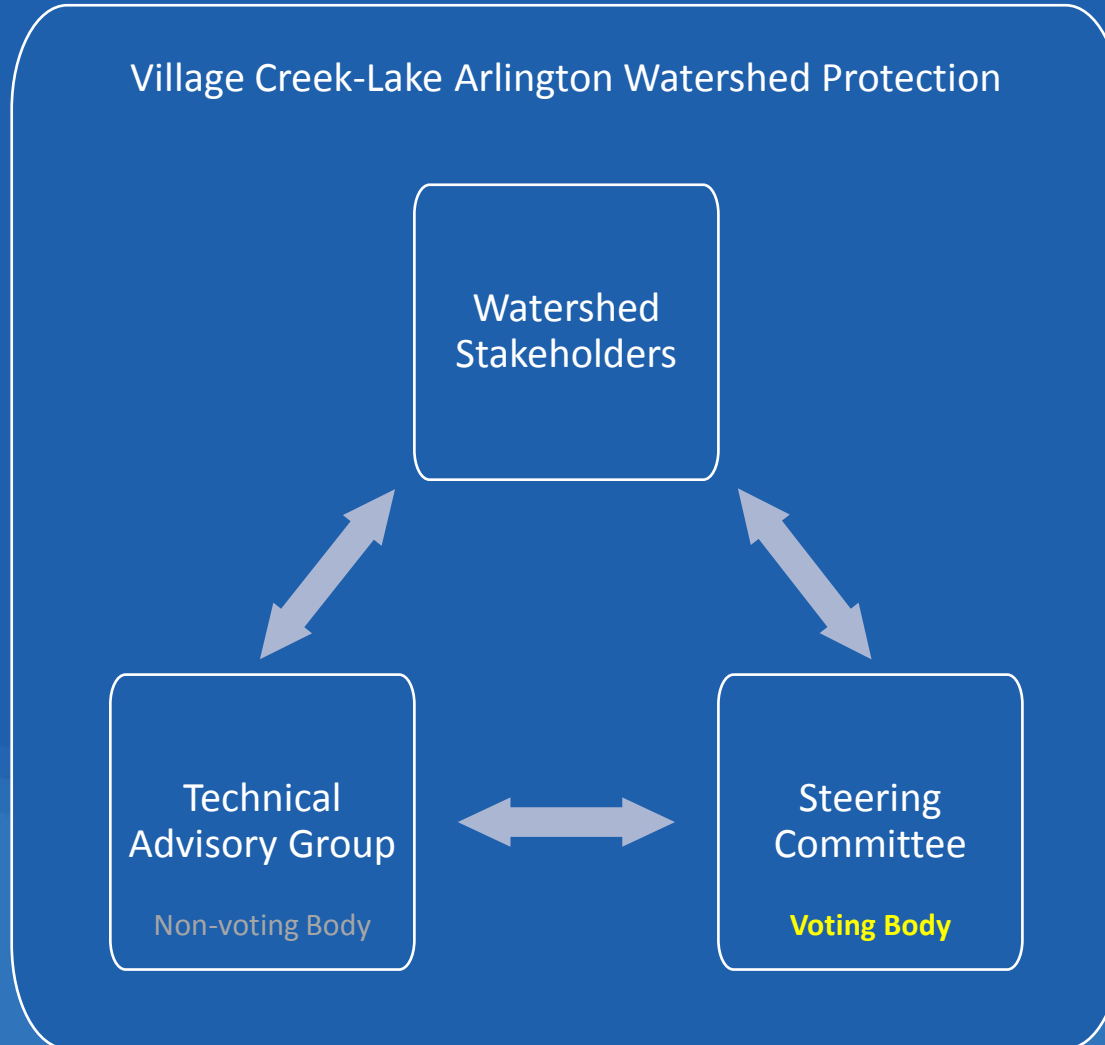


Building the Stakeholder Group

- Increase awareness of the watershed, issues, and planning process
 - Start off with informational meetings
 - Provide informative outreach materials
- Encourage participation
 - Group meetings
 - Steering committees
 - Public feedback
- **GOAL – develop a plan that will drive implementation**
 - Locally-driven and stakeholder supported
 - Improve water quality in Village Creek
 - Protect water quality in Lake Arlington

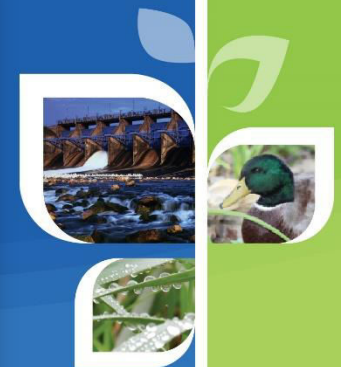


Proposed Partnership Structure



How can I get involved?

- Attend and participate at public meetings
- Provide feedback during the WPP's public comment period
- Serve as Steering Committee member
 - Vote on important watershed issues
 - Vote on WPP components



Obligations

- Partnership meetings held semi-annually
 - Schedule set by the group
 - No formal membership
- Steering Committee may meet more frequently
 - Semi-annually, offset with partnership meetings
 - At the recommendation of the Partnership
 - If Partnership cannot reach consensus
 - Committee participation is expected for all Committee meetings throughout project duration, planned for August 2018



The Steering Committee

- Decides what is included in the plan
 - What solutions go into the WPP
 - What components are most likely to achieve those solutions
- Will be asked to agree to and abide by a set of ground rules
- **GOAL – develop a plan that will drive implementation**
- Time Frame
 - Planning, data collection, and reporting - through August 2018
 - Implementation - beyond 2018
- Committee will continue to function after the WPP has been developed to assist with implementation of the Plan



Steering Committee Formation

- Will use a 'Focus Group' perspective for member selection
 - Organizations
 - Individual landowners
 - Businesses
 - Local agencies
- Focus Groups will nominate members to represent their interests on the Steering Committee
- Initial Committee meeting
 - Set ground rules
 - Assess membership
 - determine if additional participation is required



Steering Committee Functions

- Members will provide a community perspective on a number of interests
 - Environmental
 - Public health
 - Business
- Members will strive for consensus in decisions
- Needs to be of practical size to function
- Ad hoc workgroups
 - Created at Committee's discretion
 - Address specific tasks or issues
- Members will sign and adopt the final WPP document



Proposed Steering Committee Members



Proposed Steering Committee Members (15)

- **Municipalities (4)**

- Rep #1 (Lake Arlington)
- Rep #2 (Village Creek)
- Rep #3 (at large)
- Rep #4 (at large)

- **Regional Authorities (2)**

- TCWSP
- TRWD

- **Industry (2)**

- Industry Rep #1
- Industry Rep #2

- **Private Landowners (4)**

- Rep #1 (Lake Arlington)
- Rep #2 (Village Creek)
- Rep #3 (Agriculture)
- Rep # 4 (Agriculture)

- **Local Resource Agencies (2)**

- Dalworth SWCD
- Texas AgriLife Extension

- **Counties (1)**

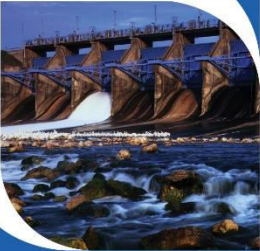
- Tarrant/Johnson



Open Discussion Period

<http://www.trinityra.org/lakearlingtonvillagecreek>

Aaron Hoff
Trinity River Authority
hoffa@trinityra.org
817.493.5581

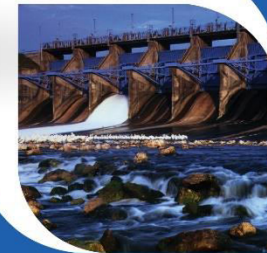


Upcoming Events and Path Forward

Aaron Hoff

Trinity River Authority

March 24, 2016



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

Texas Riparian & Stream Ecosystem Workshop





Texas Riparian and Stream Ecosystem Education Program

Nikki Dictson

Texas Water Resources Institute

<http://texasriparian.org> and
<http://www.facebook.com/TexasRiparianAssociation>

*Funding is provided by the U.S. Environmental Protection Agency
through the Texas State Soil and Water Conservation Board.*

Texas Riparian & Stream Ecosystem Education Goals

- Promote healthy watersheds and improve water quality through riparian and stream ecosystem education
- Increase citizen awareness and understanding of the nature and function of riparian zones, their benefits and management practices to protect them and minimize NPS pollution
- Enhance interactive learning opportunities for riparian education through online tools on TexasRiparian.org and RemarkableRiparian.org Website
- Connect landowners with local technical and financial resources to improve management and promote healthy watersheds and riparian areas

Marketing

texasriparian.org



Riparian & Stream Ecosystems Village Creek - Lake Arlington Watershed

May 24, 2016

8:00 a.m. - 4:00 p.m.

Trinity River Authority General Office
5300 South Collins, Arlington, Texas 76018

Online RSVP and Agenda: naturalresourcestraining.tamu.edu/schedule

For more information and to register please contact Nikki Dictson at 979-458-5915 or n-dictson@tamu.edu.

Continuing Education Units available: Texas Department of Agriculture Pesticide Applicators License – 3 CEUs; Texas Water Resources Institute – 1 CEU; Texas Nutrient Management Planning Specialists – 6 hours; Texas Floodplain Management Association – 7 CECs; Texas Board of Architectural Examiners "Acceptable for HSW credit"; and CEUs for Professional Engineers.

The Tarrant County AgriLife Extension and Trinity River Authority are the local hosts for this workshop. Instruction includes both indoor classroom presentations and outdoor field portion along the river to discover the role of riparian vegetation in properly functioning riparian systems. A catered BBQ lunch is available for \$10 or you may select to bring your own lunch. RSVP online at the link above and either pay for lunch ahead of time online at the link, by completing the form below and send to Nikki Dictson, 1500 Research Pkwy, Ste 110, College Station, TX 77843-2260, or with cash at the door.

First name: _____ Last name: _____

Email address: _____ Phone: _____

Org./Employer: _____ Lunch Options: ☐ I would like to buy the lunch
☐ I would like to bring my own



Funding provided through a Clean Water Act nonpoint source grant from the Texas State Soil and Water Conservation Board and U.S. Environmental Protection Agency.

- News Releases through AgriLife Today
- Listserv - TEXASRIPARIAN@LISTSERV.TAMU.EDU
- Website - <http://texasriparian.org>
- Facebook - <http://www.facebook.com/TexasRiparianAssociation>
- Online Registration – <http://naturalresourcestraining.tamu.edu/schedule/>

Riparian & Stream Ecosystems



Village Creek-Lake Arlington Watershed Agenda - May 24, 2016

- 8:00 Meeting Registration
- 8:15 Welcome & Introductions
 - Fred Hall, Texas AgriLife Extension Service, Tarrant County
- 8:30 Program Overview, Watershed & Riparian Management & Water Quality
 - Nikki Dictson, Texas Water Resources Institute
- 9:15 How Creeks Function & Bear Creek Example
 - Melissa Parker, Texas Parks and Wildlife Department
- 10:00 Break
- 10:15 Riparian Vegetation
 - Ricky Linex, USDA Natural Resources Conservation Service (NRCS)
- 11:00 Management Practices, Local Resources and Photo Monitoring of Streams
 - Nikki Dictson, Texas Water Resources Institute
- 11:45 Lunch
- 12:00 Village Creek-Lake Arlington Watershed
 - Aaron Hoff, Trinity River Authority
- 12:15 Stream Trailer Exhibit
 - Tina Hendon, Tarrant Regional Water District
- 1:00 Lanes Balance Presentation
- 1:30 Trip to the Creek (Split into groups for 2-3 stations)
 - Creek Walk – NRCS and TPWD
 - Assistance for Improving the Health of Creeks – Kyle Wright, NRCS
 - Feral Hogs – Josh Helcel, AgriLife Extension Service
- 4:00 Wrap Up Evaluation and Head for Home!

<http://texasriparian.org/> and <https://www.facebook.com/TexasRiparianAssociation>



Future Meetings and General Timeline



What's next?

- Riparian & Stream Ecosystems Workshop
 - May 24, 2016, 8:00am – 4:00pm
 - TRA General Office – Arlington
 - Dress comfortable, bring sunscreen
- First Steering Committee Meeting
 - Held this summer
 - Schedule & location up to members
 - Will approve Committee ground rules and assess membership
- Next Group Meeting
 - Tentative for Thursday, September 22nd
 - Tentative Topics for meeting
 - Sampling update
 - Urban BMPs
 - Low Impact Development



Open Comment Period

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

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<http://www.trinityra.org/lakearlingtonvillagecreek>

