BIOLOGICAL & AGRICULTURAL ENGINEERING
TEXAS A&M UNIVERSITY

# Rowlett Creek Watershed Characterization Project

## Stakeholder Meeting #2

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TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

EPA United States Environmental Protection Agency

Plano City of Excellence

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NORTH TEXAS MUNICIPAL WATER DISTRICT

SMU

# Agenda

- 2:00 Welcome/Introductions
- 2:05 Rowlett Creek Characterization project update
- 2:20 Stakeholder Participation: Rowlett Creek Watershed Partnership
- 2:40 Steering Committee & Ground Rules
- 2:45 Nominations
- 2:55 Discussion & Next Steps
- 3:00 Introduction to modeling and load duration curves in Watershed Planning
- 4:00 Adjourn

# https://agrilife.org/lid/rowlett-creek-watershed-characterization

## Rowlett Creek Watershed Characterization

### Announcement: Rowlett Creek Watershed Characterization Project Kick Off Meeting

May 20, 2021 10:00 AM Central Time (US and Canada)

Registration HERE

**Background Information:**

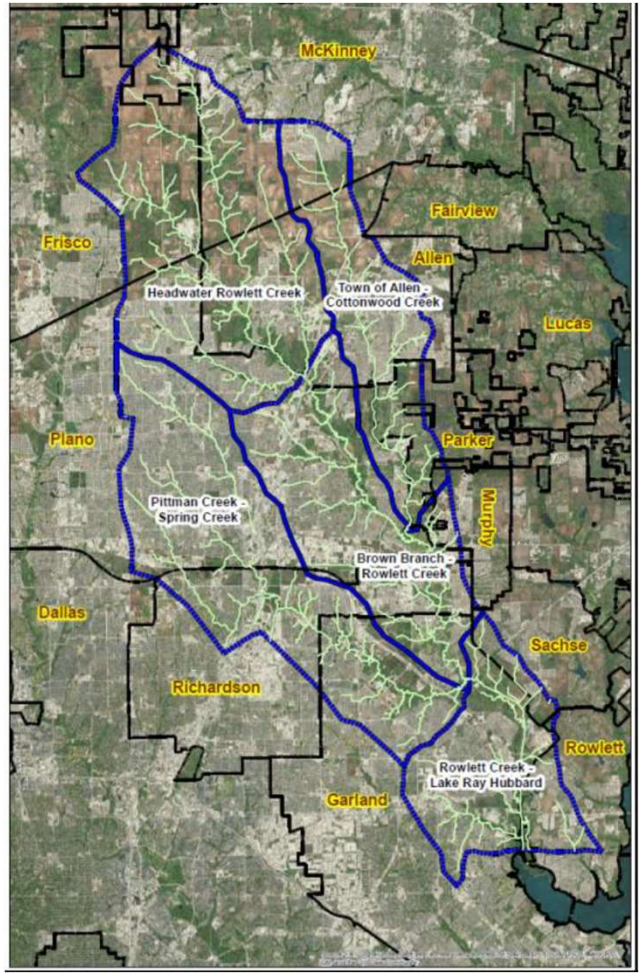
Rowlett Creek flows through the DFW Metroplex cities of Plano, Garland, Mckinney, Frisco, Allen, and Murphy, which constitute a highly urbanized watershed. The creek also flows to a major water supply reservoir owned by the City of Dallas. The majority of the creek is within the city limits of Plano. The City of Plano is the ninth most populous city in the state of Texas (2010 United States Census). Land uses in Plano consist of industrial

# Funding Sources

- 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 local match funding from Texas A&M AgriLife Extension, Southern Methodist University and the City of Plano

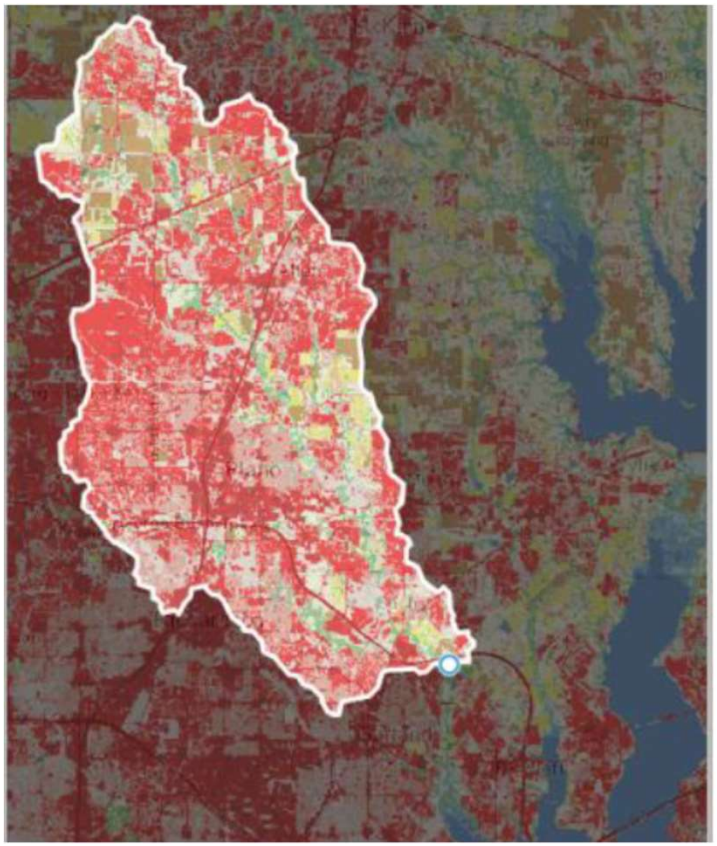
# Rowlett Creek Water Quality

- Significant portion of East Fork of Trinity
- Drains into Lake Ray Hubbard
- Flows through Plano (the ninth most populated in city in the state of Texas (2010 Census), Garland, McKinney, Frisco, Allen, and Murphy
- Highly urbanized
- Exposed to water quality and habitat degradation caused from human activity, urban runoff, and erosion
- Tributaries include
  - Pittman  and Spring Creek;
  - Cottonwood Creek



# Land Use and Land Cover

| Class Name | Area (ac) | Coverage (%) |
|---|---|---|
| Open Water | 128.44 | 0.16 |
| Perennial Ice/Snow | 0 | 0 |
| Developed, Open Space | 9941.75 | 12.59 |
| Developed, Low Intensity | 19206.72 | 24.33 |
| Developed, Medium Intensity | 25623.78 | 32.45 |
| Developed, High Intensity | 6735.69 | 8.53 |
| Barren Land (Rock/Sand/Clay) | 66.69 | 0.08 |
| Deciduous Forest | 3660.54 | 4.64 |
| Evergreen Forest | 165.49 | 0.21 |
| Mixed Forest | 0 | 0 |
| Shrub/Scrub | 0 | 0 |
| Grassland/Herbaceous | 6547.97 | 8.29 |
| Pasture/Hay | 1805.57 | 2.29 |
| Cultivated Crops | 4833.79 | 6.12 |
| Woody Wetlands | 212.42 | 0.27 |
| Emergent Herbaceous Wetlands | 19.76 | 0.03 |
| Total | 78951.08 | 100 |

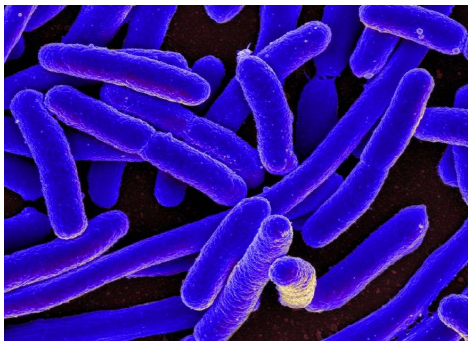


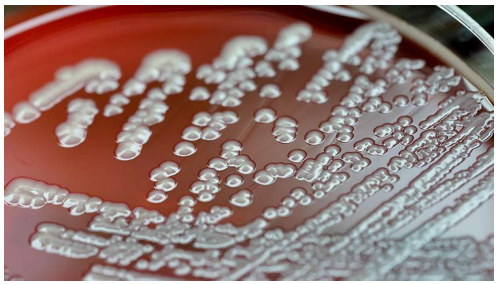
# Rowlett Creek Impairment

- The Texas Commission on Environmental Quality (TCEQ) produces the Texas Integrated Report of Surface Water Quality every two (2) years.
- The most recent publication in May 2020 identified that of the 2,681 assessment units (AUs) in Texas, 325 AUs are impaired for bacteria, 148 AUs are concerned with near nonattainment for bacteria, 231 AUs are listed as a concern for nitrate, and 164 AUs are listed as a concern for total phosphorus (TCEQ, 2020).

# Rowlett Creek Water Quality

- Rowlett Creek was placed on the 2014 Texas Integrated Report -303(d) List (IR) for bacteria and is still currently listed in the 2020 IR.
- Rowlett Creek was also listed on the 2014 Texas IR for Water Bodies with Concerns for Use Attainment and Screening Levels as having a concern for nitrate and is still currently listed in the 2020 IR.



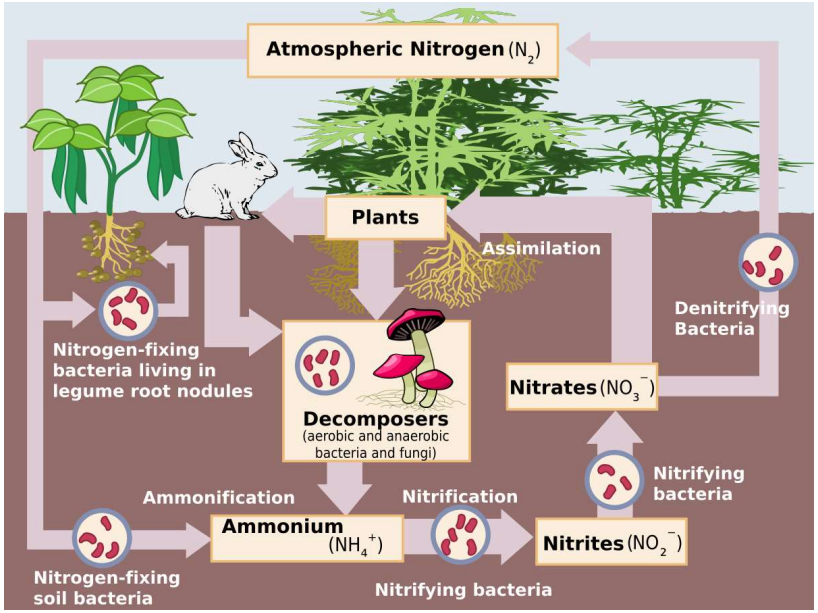


# *Escherichia coli (E. coli)*

- Found in intestines of warm-blooded animals
- Most strains harmless
- Used as indicator bacteria
  - Indicator bacteria are surrogates used to measure the potential presence of fecal material and associated fecal pathogens.

# Nitrate Nitrogen

- Commonly found in fertilizer
- Can be produced by biological/chemical conversion of other nitrogen species
- Can be harmful in drinking water
- Causes Algal blooms, reduced dissolved oxygen and sometimes fish kills

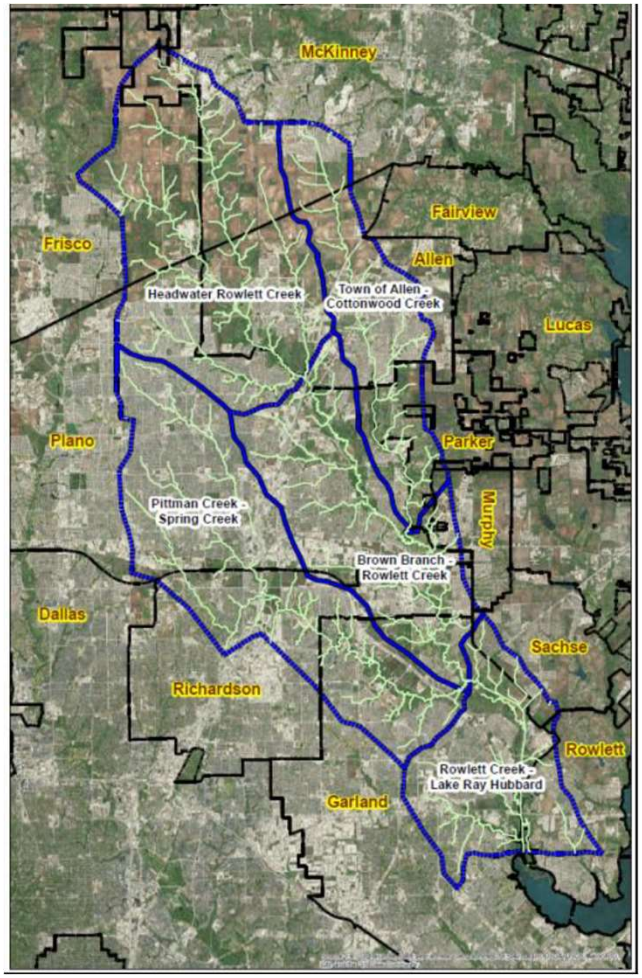



NPS.gov

# Current Activities from this Project

- Data Collection
  - Existing Sources
  - Site Monitoring

- Modeling
  - Identify sources of pollution
  - Determine reduction needs to reduce impairment
- Stakeholder Meetings
  - Share information with stakeholders
  - Begin the process of approving a Watershed Protection Plan



# Watershed Characterization Timeline

**Completed:**

- Monitoring sites selection
- Stakeholder Bulding

**On-Going:**

- Water Quality Monitoring
- Modeling Development
- Stakeholder Meetings
- Data Analysis and Modeling

**Phase II starting September 2022:**

- Watershed Protection Plan Development

# Upcoming Meetings Tentative Dates:

- February 23, 2022: Stakeholder Meeting #3
- April 27, 2022: Stakeholder Meeting #4
- May 25, 2022: Stakeholder Meeting #5
- July 27, 2022: Stakeholder Meeting #6

Quarterly meetings will be announced for Phase II at a later date

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# Stakeholder Involvement and Organization

# 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!*

# Who is a Stakeholder

- Citizens/citizen groups
- Community/religious organizations
- Local businesses & industries
- Landowners
- Local government staff & officials
- Academia
- NGOs
- Environmental/conservation groups

# Why Engage Stakeholders?

- 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

# GOAL – develop a plan that will drive implementation

- Locally-driven and stakeholder supported
- Improve water quality in Rowlett Creek and tributaries
- Protect water quality in North DFW
- Increase awareness of the watershed, issues, and planning process

# Proposed Group Structure

- **Watershed Protection Partnership (Partnership)**
  - The Rowlett Creek Watershed Protection Partnership (Partnership) will function as the overall stakeholder group
  - The Partnership will be responsible for many of the decisions towards the beginning of the project's lifespan and will act as the initial coordinating body responsible for electing the initial Steering Committee members

# Rules for the Partnership

- No formal meeting ground rules will be adopted for the Partnership meetings, but attendees are asked to abide by a few simple rules of etiquette during meetings:
- Save questions until after each presentation has been given (unless otherwise instructed by the presenter).
- Limit discussion to 5 minutes per person.
- Any additional questions may be answered during the open discussion period before the meeting's end.
- To be respectful of others' time and points of view.

# Proposed Group Structure

- **Steering Committee (Committee)**
  - Core group of stakeholders will act as the voting body of the Partnership
  - The Committee will vote on key watershed decisions and review potential water quality improvement BMPs for applicability in the watershed.
  - These recommendations may eventually become part of the WPP, which the Committee will review on a chapter-by-chapter basis.

# 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

# Steering Committee Formation

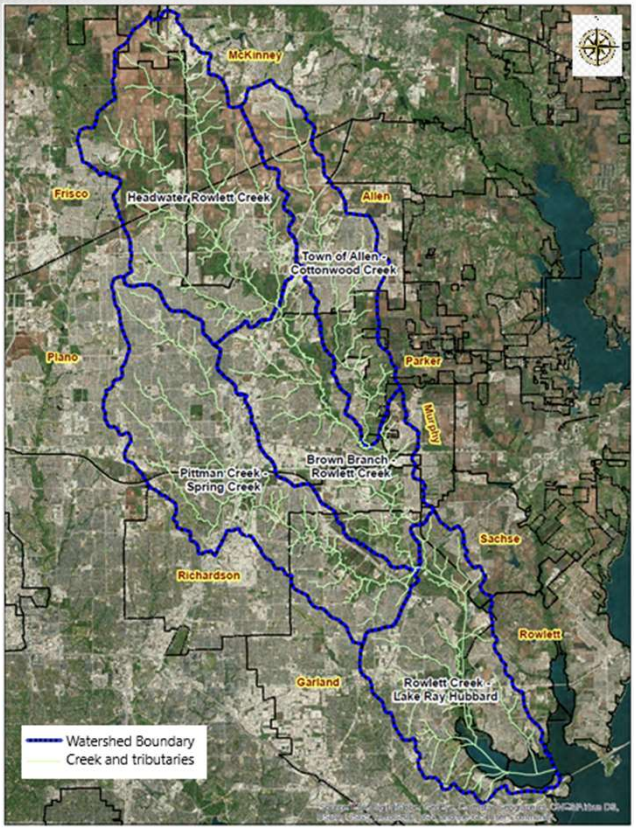
- Surveys will be used to solicit participation in the steering committee
- Initial meeting will be held to establish the goals of the committee, assess membership and determine if additional participation is required

# Proposed Steering Committee Members (16)

- Contributing Partners
  - City #1 (Plano)
  - City #2
  - City #3
  - City #4
- Counties
  - Collin
  - Dallas
- Water Authority
  - North Texas Municipal Water District
- Education
  - Collin College
- Private Owners/Residents
  - Rep #1
  - Rep #2
  - Rep #3
  - Rep #4
- Local Agencies
  - SWCD Rep
  - Texas A&M AgriLife Extension Agents (2)
- Industry/Businesses
  - Rep #1
  - Rep #2

# Using Load Duration Curves and SELECT for Data Analysis

# What Are We Currently Measuring?



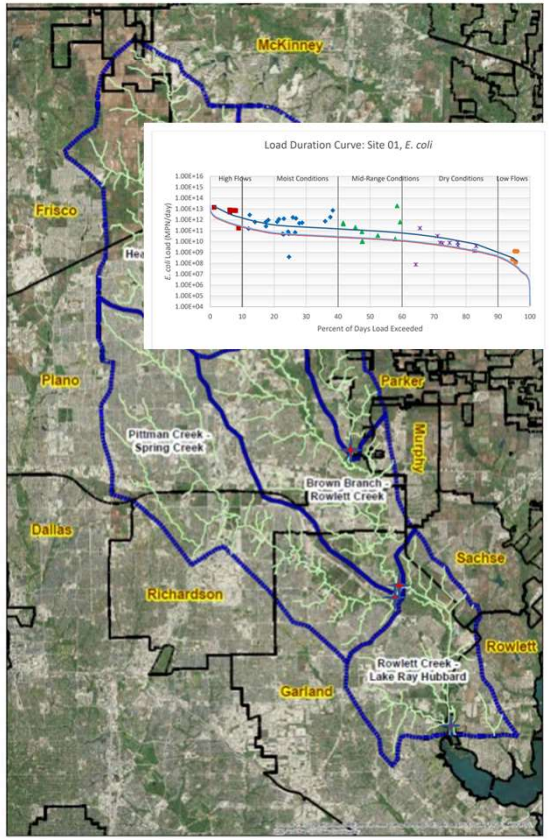

- Loadings
  - Collect flow and water quality samples
  - Parameter concentration x flow = Loading
- What parameters are we testing:
  - Bacteria (*E. coli)*
  - Total Suspended Solids (TSS)
  - Nitrate/Nitrite Nitrogen
  - Total Kjeldahl Nitrogen
  - Ammonia Nitrogen
  - Total Phosphorus

# What Will the Data Tell Us

- Establishes baseline knowledge
- Monitoring results can show changes over time
  - Are there any trends?
  - Does the time of year matter?
- Data can show potential areas of concern
  - Is land use a major factor?
  - Are parameters highest in a particular tributary?
- OR...is something else entirely different going on that we haven't considered?

# How Will We Use the Data?

- To Promote group discussion and provide basis for informed decisions
- To calculate Load duration curves
- Ultimately, use information to to make decision for integration in the WPP



# Load Duration Curves (LDCs)

- LDCs use the collected field data to quantify pollutant loads
  - Parameter concentration x Flow = Loading
- LDC graphs are useful for interpreting gaps between allowable vs. actual loads
- Gaps represent the pollutant load reduction needed to reach the water quality goals of the WPP

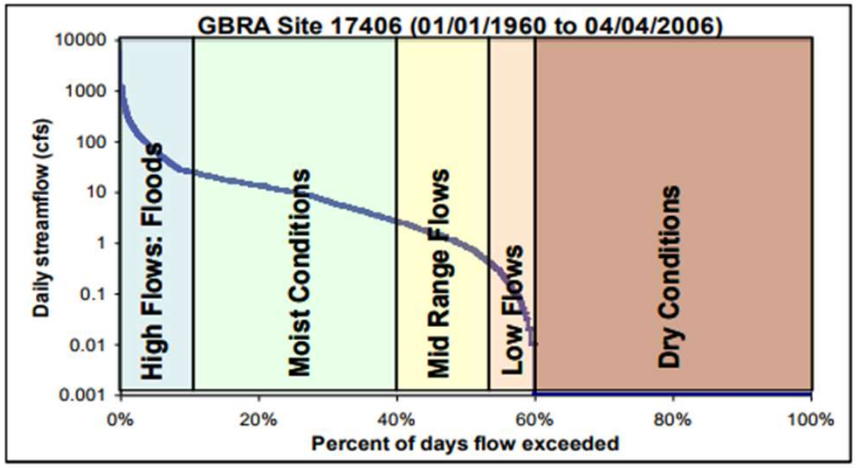



*Figure 9 Example of Flow Duration Curve*

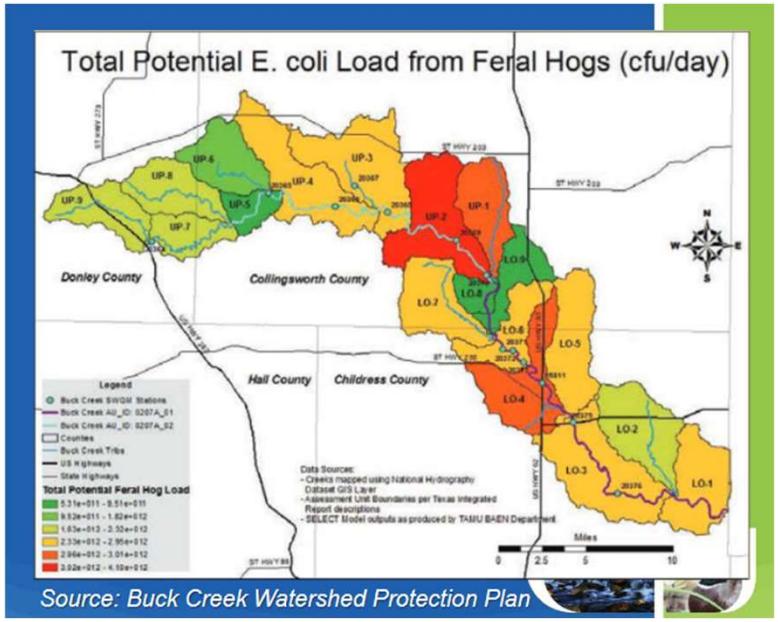
*Source: Flow Duration Curve (FDC) for streamflow conditions at GBRA monitoring station 17406 on Plum Creek, near Uhland, TX. The flow data at 17406 was obtained from the nearest USGS gage station 8172400, after adjusting for subwatershed aerial contribution during runoff events.*

# SELECT

- Spatially Explicit Load Enrichment Calculation Tool
- Analytical approach for determining potential bacteria loads in specific areas of a watershed
- Spatial data inputs
  - Land use data
  - Population data (human and animal)
- Literature values for fecal production rates
- SELECT does *not* account for any natural or anthropogenic mitigation processes
  - Results in an overestimation of potential sources
  - Provides a “worst-case scenario”

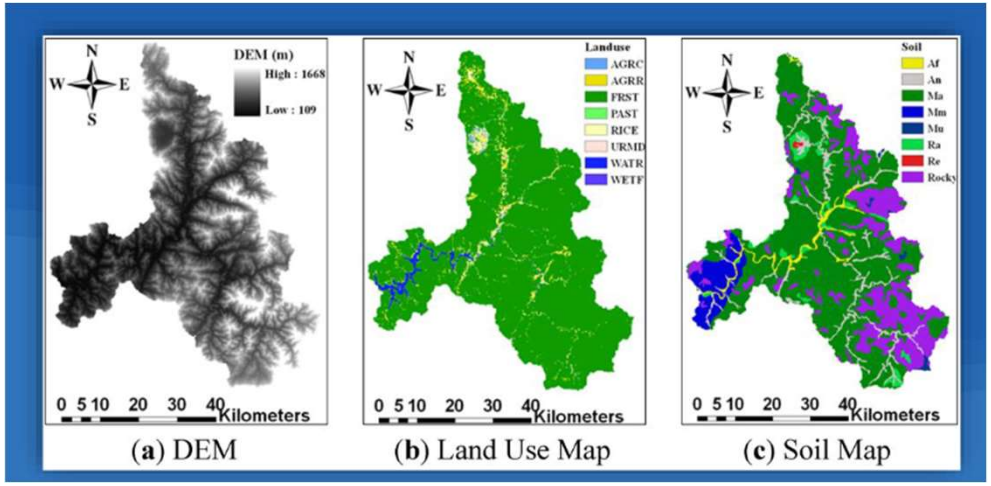
# SELECT

- Evaluates selected pollutant sources separately
- Determines which "catchments" have the greatest contribution to the overall pollutant load
- Targets areas for potential management practices



# SWAT Model

- Soil and Water Assessment Tool (SWAT)
- Identifies contributing areas and quantifies loadings for pollutants
- Used to calculate flows where there are no gauges



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# Questions, Discussion

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