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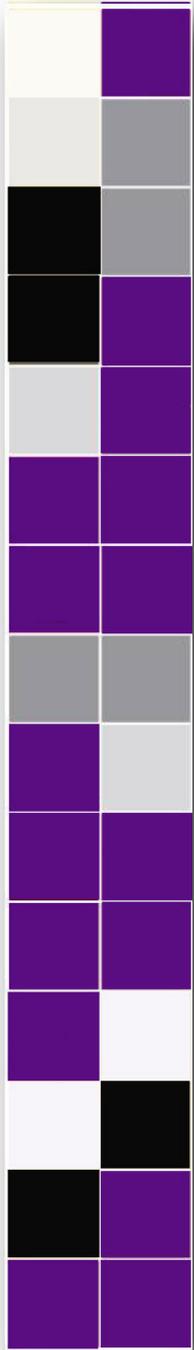


Nolan Creek/South Nolan Creek

Project Background

Texas Institute for Applied Environmental Research
Stephenville, Texas

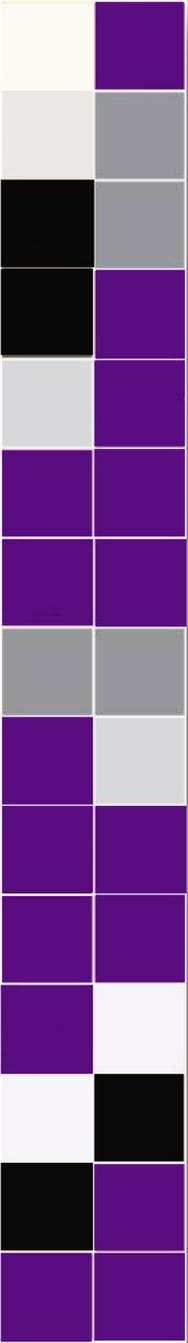
July 31, 2013



Federal Clean Water Act

- Objective is to “restore and maintain the chemical, physical and biological integrity of the Nation’s waters”





Federal Clean Water Act

- Interim goal is “water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water”
 - Commonly referred to as “fishable/swimmable” goal
- Administered and implemented by the U.S. Environmental Protection Agency (USEPA)



Water Quality Standards

- Clean Water Act
 - Requires States to establish Water Quality Standards to achieve objectives and goals of the Act
- Water Quality Standard
 - “the designated beneficial uses of a water segment and the water quality criteria necessary to protect those uses”



Water Quality Standards

- Uses include:
 1. Primary contact recreation (swimming)
 2. Aquatic life
 3. Domestic water supply
 4. Fish consumption
 5. Etc.



Water Quality Standards

- Parameters for evaluating uses include:
 1. Bacteria
 2. Nutrients
 3. Dissolved oxygen
 4. Salts
 5. Toxic substances, etc.



Water Quality Standards

- Primary Contact Recreation
 - Wading by Children
 - Swimming
 - Water Skiing
 - Diving
 - Surfing
- Criteria for *Escherichia coli* (*E. coli*) bacteria, for freshwater streams:
 - Geometric Mean: ≤ 126 colony-forming units



303(d) List

- Clean Water Act
 - Requires Texas identify water bodies failing to meet or not expected to meet water quality standards and not supporting their designated uses
- *Texas Water Quality Inventory and 303(d) List*
 - The list of Texas impaired water bodies
- Water bodies are broken out into categories
- 303(d) List
 - Submitted to U.S. EPA for review and approval every two years



Nolan Creek/South Nolan Creek Impairments

- 1996 Texas 303(d) List
 - Segment 1218
 - Bacteria
- 2010 Texas 303(d) List
 - Segment 1218_02
 - Bacteria
 - Segment 1218C
 - Bacteria
 - Segment 1218
 - Concern for Nutrients



What Are Bacteria?

- These bacteria are present in the intestinal tracts and feces of warm-blooded animals
- These bacteria are used as an indicator of the potential presence of pathogens
- Pathogens cause gastrointestinal (GI) illness



Why Bacteria?

- Elevated levels of bacteria (*E. coli*, *Enterococcus*, *fecal* coliform):
 - Indicate possible fecal contamination
 - Potential presence of disease-causing pathogens
 - *E. coli* O157:H7
 - *Salmonella*
 - *Giardia*
 - *Cryptosporidium*



Sources of Bacteria

- Improperly treated human waste
 - Wastewater treatment facilities
 - Septic systems
- Pet, livestock and wildlife feces
 - Buildup on land that washes off during rain events
- Direct deposition of feces
 - Pets, livestock and wildlife



What Are Nitrates?

- Inorganic form of nitrogen that is readily soluble in water and available as a nutrient for plants, including aquatic algae



Why Nitrates?

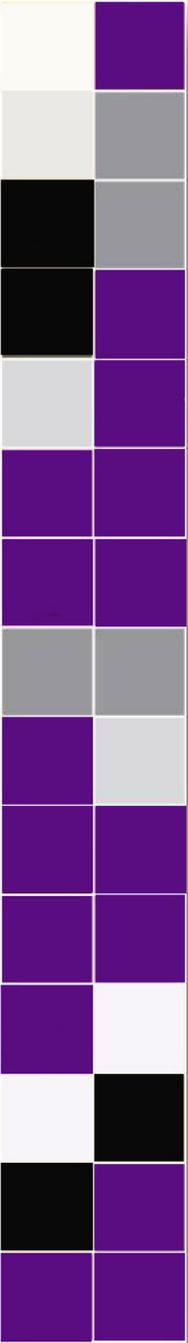
- Potential human health issues if high concentrations ($> 10\text{mg/L}$) occur in drinking water
- Environmental concerns with regard to excessive algae growth in surface waters or eutrophication



Sources of Nitrates

- Runoff or seepage from fertilized fields and pastures
- Municipal and industrial waste waters
- Septic systems
- Animal waste





Questions?

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