# Water quality perspectives of water resource managers and stakeholders in southern coastal bend Texas

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## ABSTRACT

The purpose of this report is to inform the public about the variability, sources, distribution, and management efforts pertaining to water quality concerns (e.g., nutrient and/or sediment loading, salinity, etc.). These specific concerns can be described as an excess of nutrients and sediment in water sources and salinity is the measure of salt dissolved in a body of water (Guerrero et. al, 2020). This project was a case study and will investigate this dialogue gap by interviewing key stakeholders in south Texas pertaining to current water quality issues and their management. The stakeholders' dialogue was documented via semi-structured interviews which were coded to identify key themes across interview respondents. Results were categorized into five themes of primary water quality concerns: funding for water infrastructure and services, pollutants, industrial water use, economic development, and personal values of water users. Interview results were supported by articles from a literature review of primary scholarly articles found through EBSCO Information Services and the Jernigan Library. The general public was the intended audience for this report, and they will benefit from reading about this research by gaining a deeper understanding of their communities' water quality management policies and the science behind the water quality.

## INTRODUCTION

Nueces County (Figure 1) faces a very difficult challenge: ensuring the quality and sustainability of its water resources. With increasing urban development, agricultural demands, and the threat of climate change, the water quality here struggles to meet national standards.

- "Water quality monitoring indicates that sections of San Fernando and Petronila Creeks do not meet water quality standards established to protect contact recreation uses." (Gregory, et. al., 2022).

- "Almost every stakeholder and farmer from [the Wintergarden, lower Rio Grande Valley, and Coastal Bend areas] agreed that sustaining a steady supply of clean water is necessary for the continued growth and vitality of their respective subregions." (Flores-Lopez, et. al.,2022).

- "*Colonias* residents often construct wells to meet their water supply needs but pay little or no attention to drinking water standards." (Rowles III et. al, 2020).



**Figure 1.** Map of Nueces County, Texas (Google 2024)

## DISCUSSION

The results documented how key stakeholders play a part in water use. Concerns among respondents included growing water use by industrial users, septic systems being unreliable and contaminated, nutrient loading and other pollutants, drainage/flooding problems and lack of funding. Some limitations of the study included the low number of respondents given the difficulty in coordinating times for interviews or not providing a response due to prohibition by their respective employer.

E. Coli is a prevalent bacterium in water sampling areas in the Nueces County, specifically the areas that overlap with Baffin Bay (Figure 2). The high levels are due to livestock and nonpoint source pollution (Figure 3). Many stakeholders mentioned projects and solutions for the problems at hand, but their biggest challenge was finding enough funding to support these projects.

Human pollution is the biggest problem faced and public outreach is vital in remedying this.

Drainage and flooding issues can be mitigated with the use of retention ponds/basins but due to lack of public support, they are close to impossible to build.

Citizens must play their part by educating themselves, being responsive to public officials as well as providing input and feedback, and practicing correct disposal of pet waste and other harmful pollutants they may not know are contributing to water quality issues.
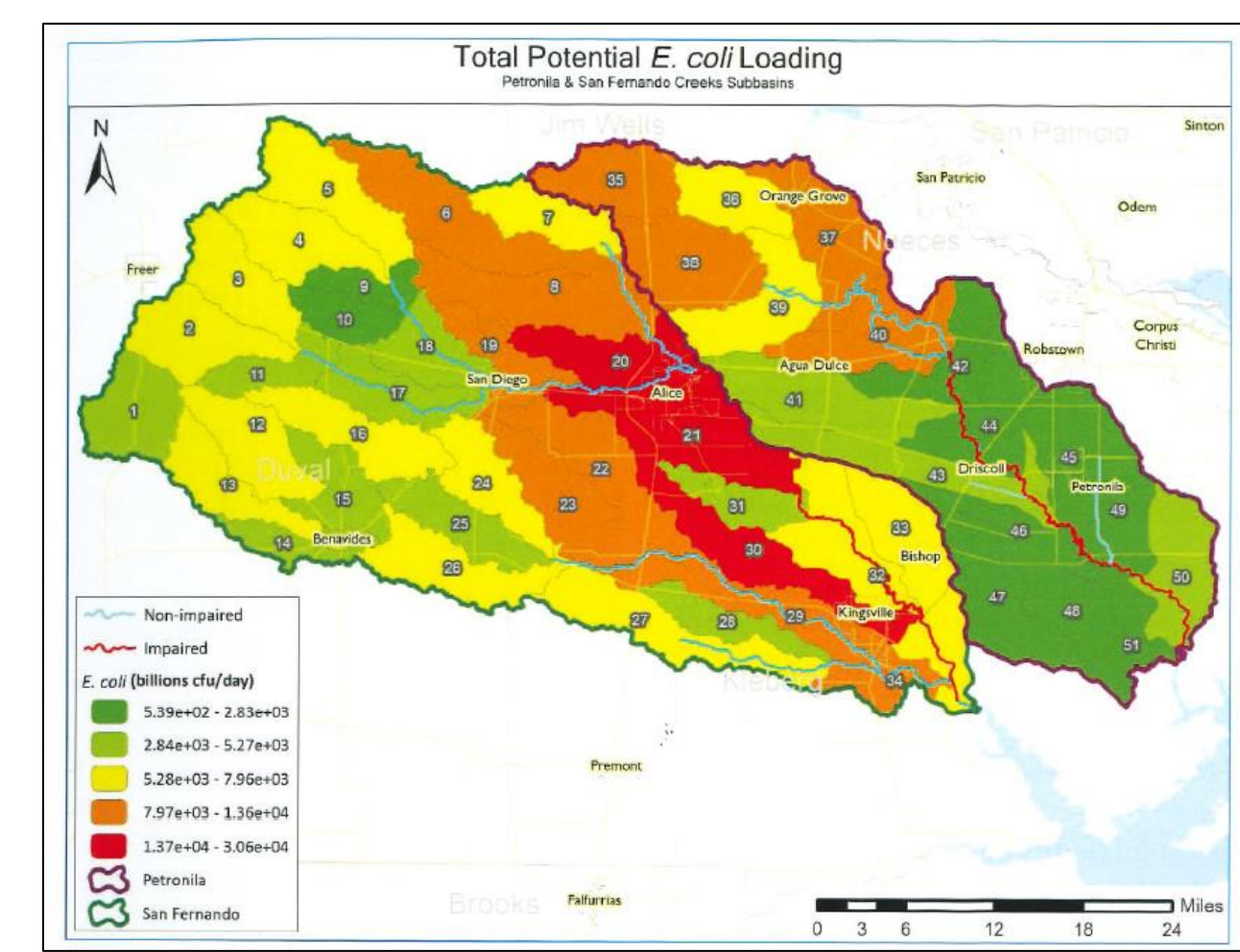


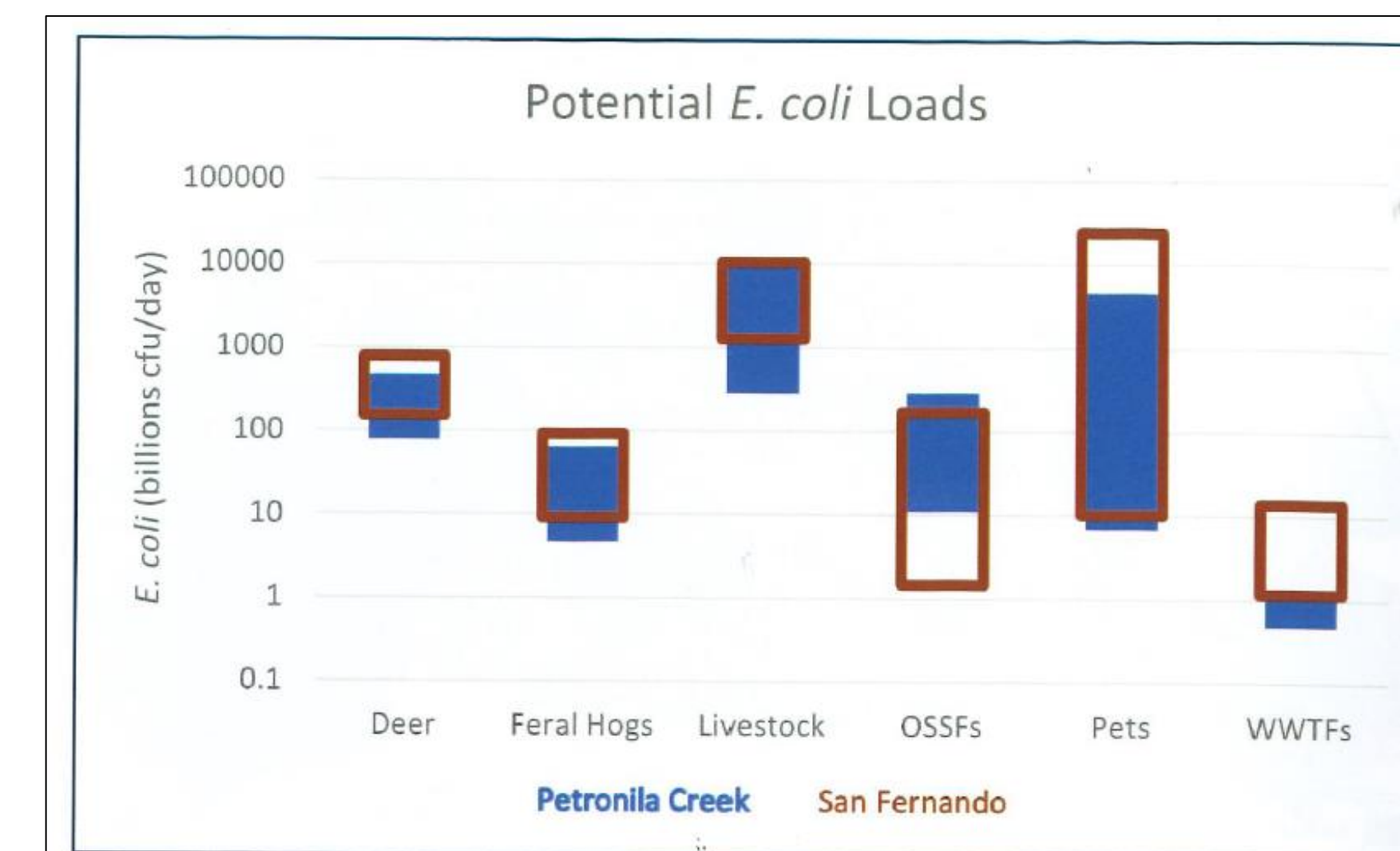**Figure 2**. Estimated potential *E. coli* loads from all assessed source catchments (Gregory 2022).



**Figure 3**. Estimated potential *E. coli* loads from all assessed sources (Gregory 2022).

## RESULTS

| Data Segment | Initial code | Notes | Subcategory |
|---|---|---|---|
| "Majority of the time there's not enough money to go around." | Funding | In reference to servicing three counties for drainage, sewage and septic issues. | Government grants and funding |
| "…dissolved oxygen was really low and then we also see very high chlorophyll and other indicators of really really high nutrient load in the water." | Pollutants and water quality | Specifically speaking about Baffin Bay and an algal bloom in 2012. Water sampling showed evidence of these qualities. | Nutrient and sediment loading and salinity issues |
| "I know all of those industries use more water throughout the coastal bend than any individual residential areas." | Water users | Common response across all interviews, all agreed that large industries generated the most water use in any given period of time. | Industry water use |
| "the big issue we're facing is how much water is needed to support economic growth, and what does [that] look like?" | Economic Development | Unique response. Almost all interviews mentioned the trade-off between good economy and conserving water. | Trade-off of water conservation and refineries |
| "Well, I think for me and for everyone who deals with water- we're all consumers of it so we don't want to manage water in an irresponsible or useless way." | Personal Values | Same response across all interviews. Common ground was that they acknowledged they are also water users. | Common ground with average citizen as a water user |

## METHODS

- An interview survey instrument was designed to gather input from respondents knowledgeable about water quality. Key stakeholders were contacted and interviewed using a snowball sampling method.
- Semi-structured interviews with respondents were conducted. Interviews were transcribed using Microsoft's online transcription tool.
- Transcribed interviews were open coded for general themse and then tabulated for frequency of responses.

Respondents included (but weren't limited to):
- Nueces River Authority
- Nueces Water Supply Corporation
- South Texas Water Authority
- Center for Coastal Studies
- Nueces County Commissioners
- Bring Baffin Back.

These were chosen due to their extensive knowledge regarding water quality and allocation of water resources.

## REFERENCES

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