



Searching for the Source: Fecal Indicator Bacteria from West Augustine to the San Sebastian River



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Fecal Coliform Bacteria Trending in San Sebastian River



Figure 1: Site Map of San Sebastian River sample sites in Saint Augustine, FL.

San Sebastian River Water Quality

- The San Sebastian River is a tidally influenced river flowing west of Downtown Saint Augustine. It receives significant freshwater input from stormwater outfalls.
- The San Sebastian River is affected by potential wastewater contamination from the high density of Onsite Septic Tank Systems located in West Augustine.
- Monthly water quality sampling has been conducted since May 2019 at five sites along the river.

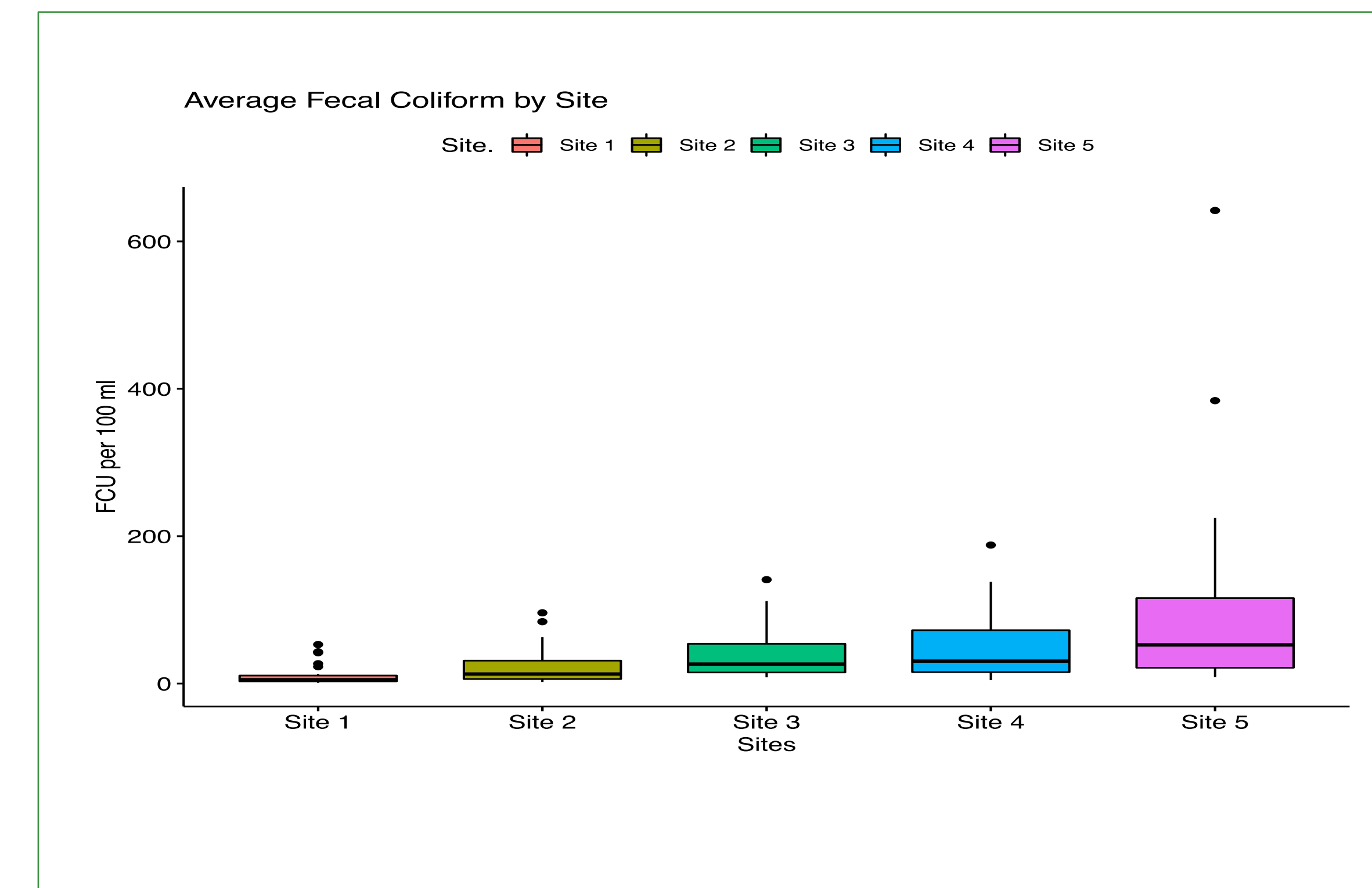
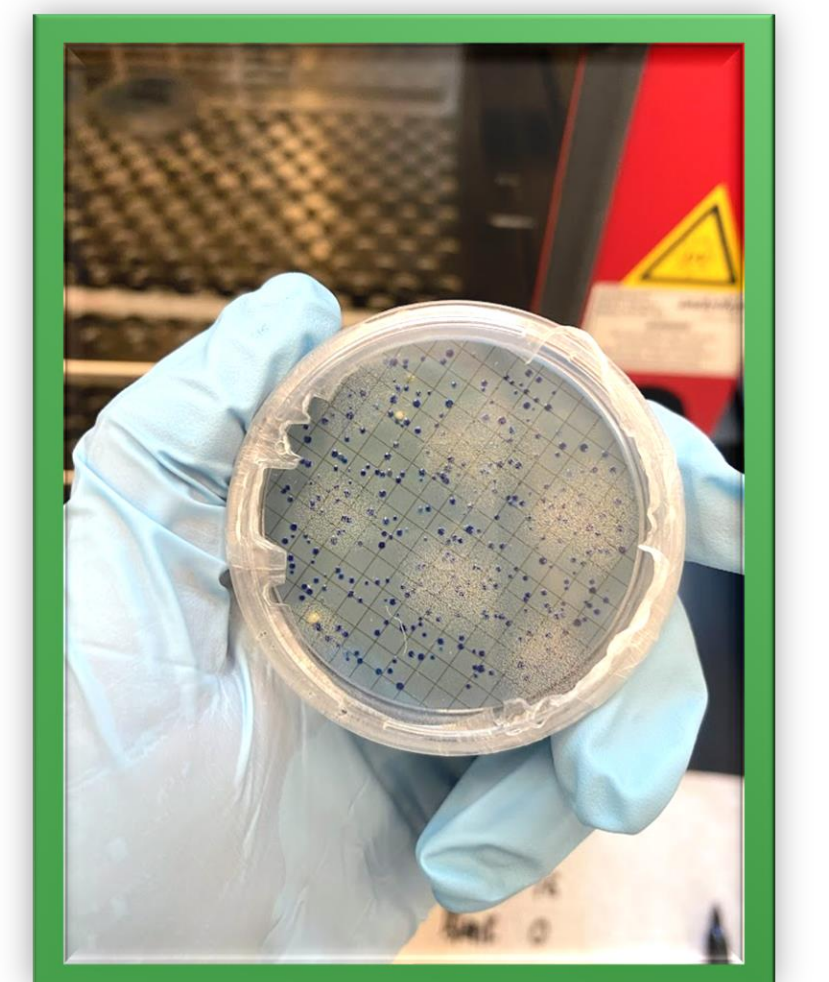


Figure 2: Fecal Coliform results for 5 Sample Sites along the San Sebastian River. Fecal Coliform trends show higher results in the northern portion of the San Sebastian River.

Methods

- Fecal Coliform EPA Membrane Filtration Method



Enterococcus Bacteria Identified in Creeks & Ditches in West Augustine



Figure 3: Site Map of surface water sample sites containing Onsite Septic Tank System (shades of red) and Sewer System (shades of green) density in West Augustine, FL.

West Augustine Septic & Sewer System Water Quality Comparison

- High resolution water sampling for fecal indicator bacteria (Enterococcus) was carried out weekly in West Augustine.
- Sample sites were selected using a 0.25-mile radius, counting the density of parcels using either an Onsite Septic Tank System or connected to the Sewer System.
- Weekly sampling has been conducted since September 2022 at 6 sample sites.

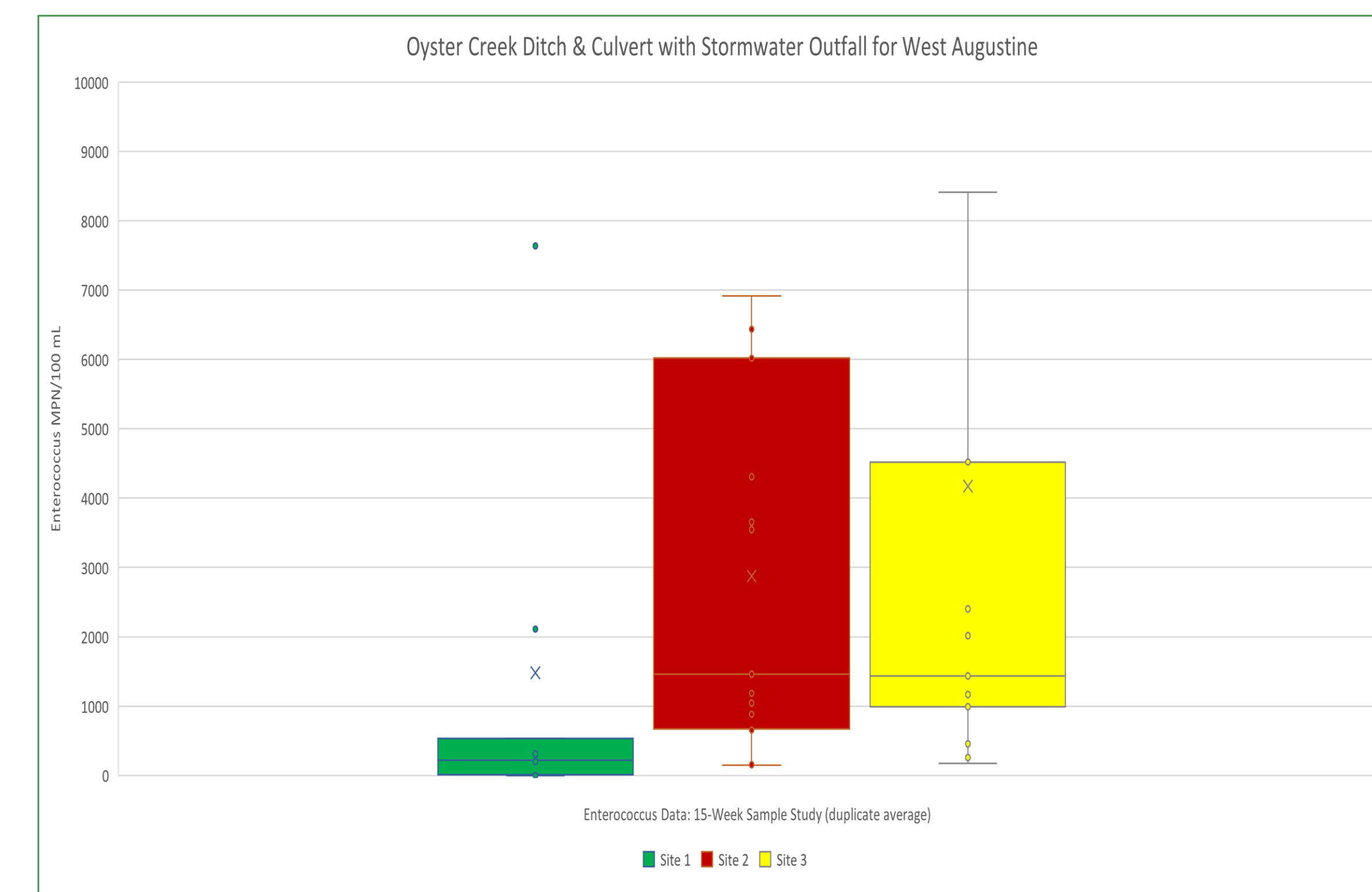


Figure 4: Enterococcus Bacteria results for 3 sample sites along Oyster Creek Ditch & Culvert Drainage with stormwater runoff.

Methods

- Enterococcus: ASTM Method (#D6503-99)



Fecal Indicator Bacteria are Highest at Sites Dense with Septic Tank Systems

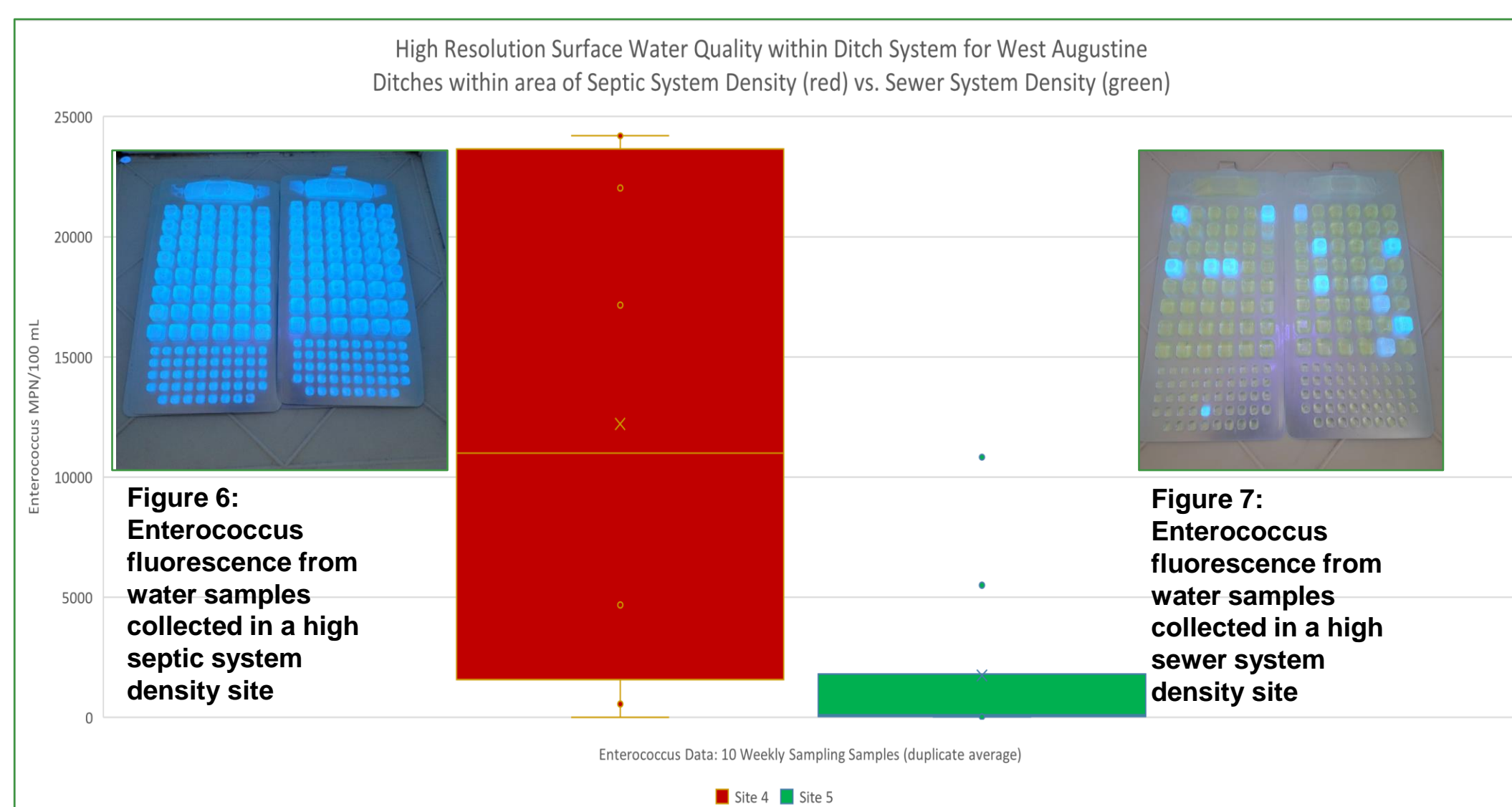
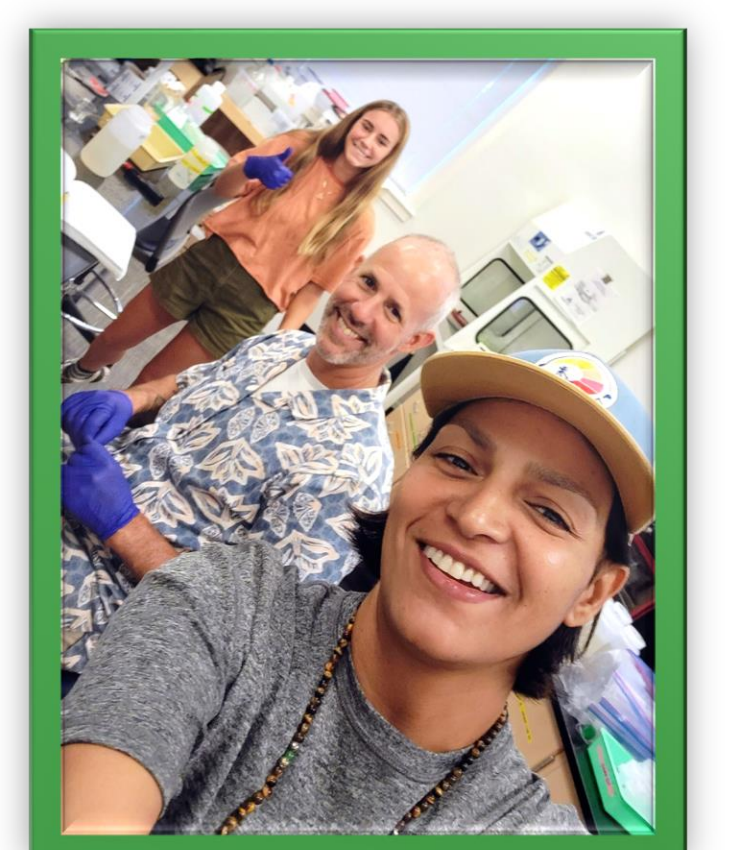


Figure 5: Enterococcus Bacteria comparison between areas with a high density of Onsite Septic Systems (red) compared to areas using the sewer system (green).

- Noteworthy trends include higher levels of fecal coliform bacteria in the northern portion of the San Sebastian River.
- Additionally, high Nitrogen, Nitrite (NO₂) + Nitrate (NO₃) as N and ammonium concentrations, plus increased biochemical oxygen demand, are revealed during summer months.
- Results indicate enterococcus concentrations (>5000 MPN/100 mL sample) are higher at sites associated with a high density of septic tank systems as compared with sites associated with samples taken in communities with high sewer system density.

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UNDERGRADUATE RESEARCH