

URBAN BAYOU BACTERIA SOURCE IDENTIFICATION STUDY

Sponsored by

TEXAS CLEAN RIVERS
PROGRAM
HOUSTON-GALVESTON
AREA COUNCIL





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Monitoring Performed by

TNRCC

**City of Houston Department of
Health and Human Services**



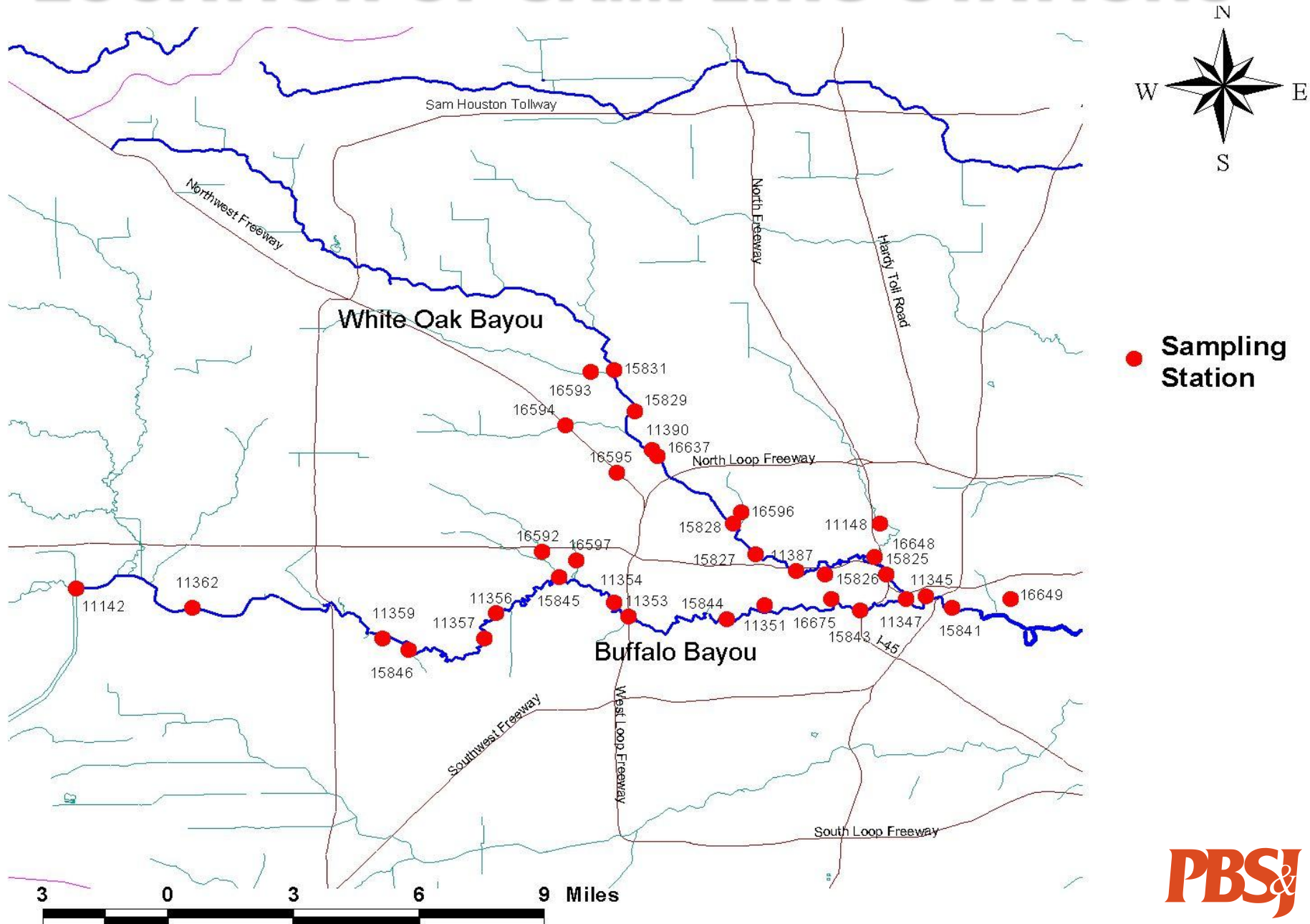
OBJECTIVES

- Use evolving DNA analysis technology to support TMDL process
- Combine routine agency monitoring with DNA analysis by Polymerase Chain Reaction (PCR) to shed light on sources of high bacteria levels
- Advance the science and understanding of indicator bacteria

CHALLENGES

- Bacteroides are strict anaerobes with two species closely associated with humans
- At low flow, essentially all water in Buffalo and White Oak Bayous is treated wastewater
- Bayou waters are turbid, which has been found to interfere with PCR

LOCATION OF SAMPLING STATIONS



Buffalo Bayou at Westcott



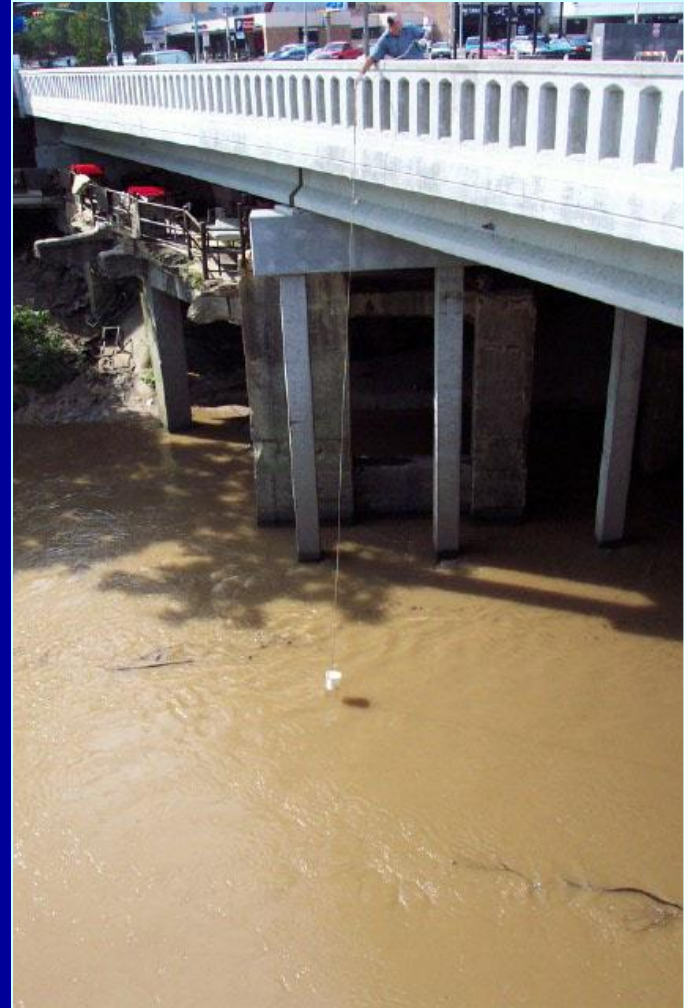
White Oak Bayou at Heights



White Oak Bayou at Studewood

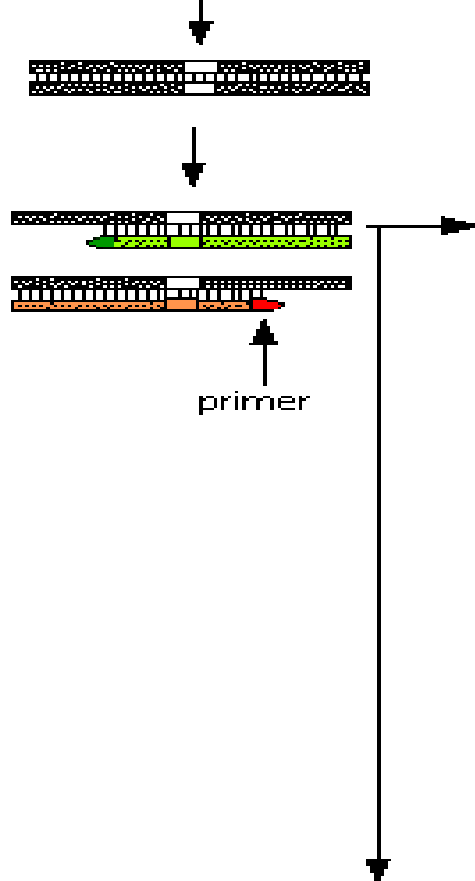


Buffalo Bayou at Main

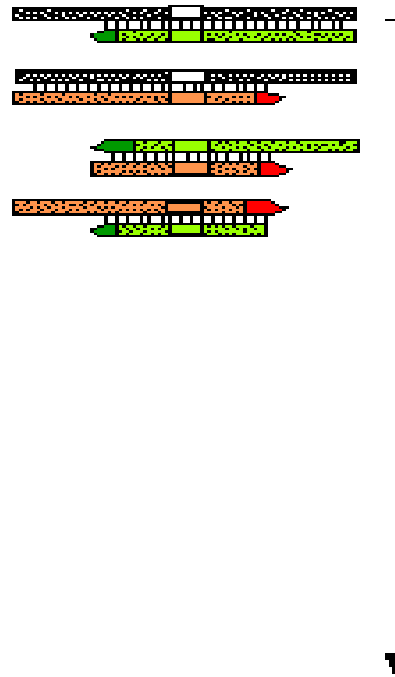


POLYMERASE CHAIN REACTION

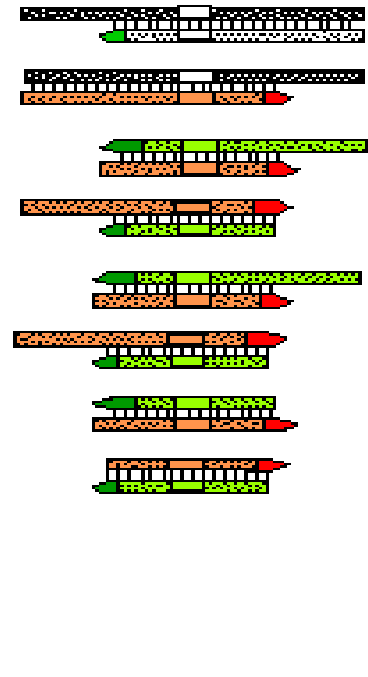
DNA region of interest.



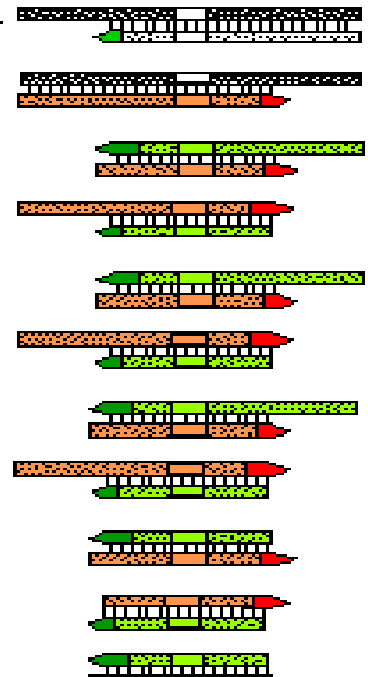
1.
DNA is denatured. Primers attach to each strand. A new DNA strand is synthesized behind primers on each template strand.



3.
Another round: DNA is denatured, primers are attached, and the number of DNA strands are doubled.

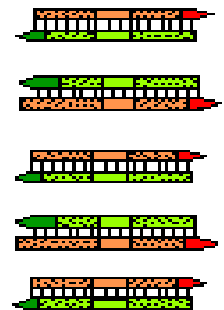


4.
Another round: DNA is denatured, primers are attached, and the number of DNA strands are doubled.

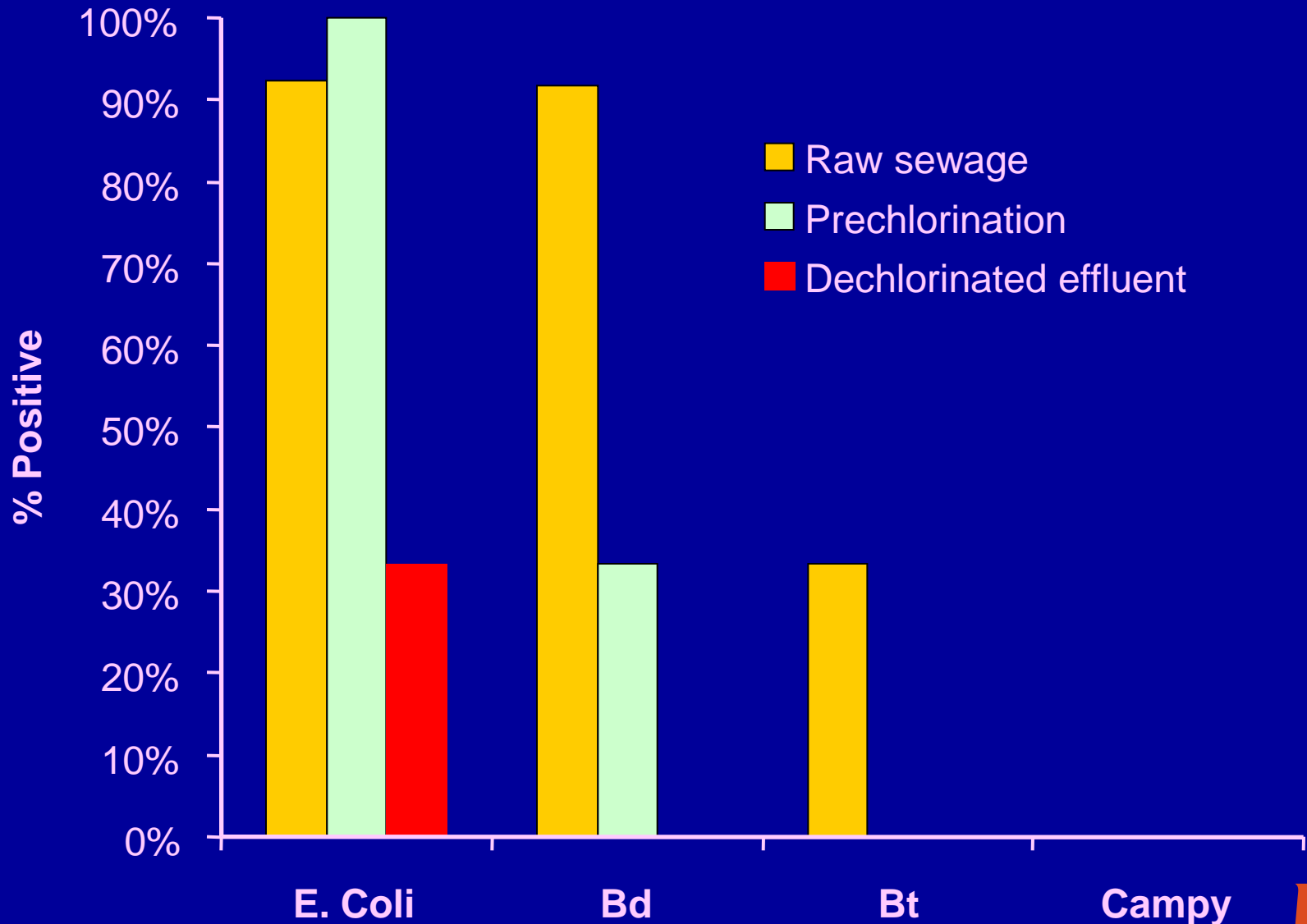


2.
Another round: DNA is denatured, primers are attached, and the number of DNA strands are doubled.

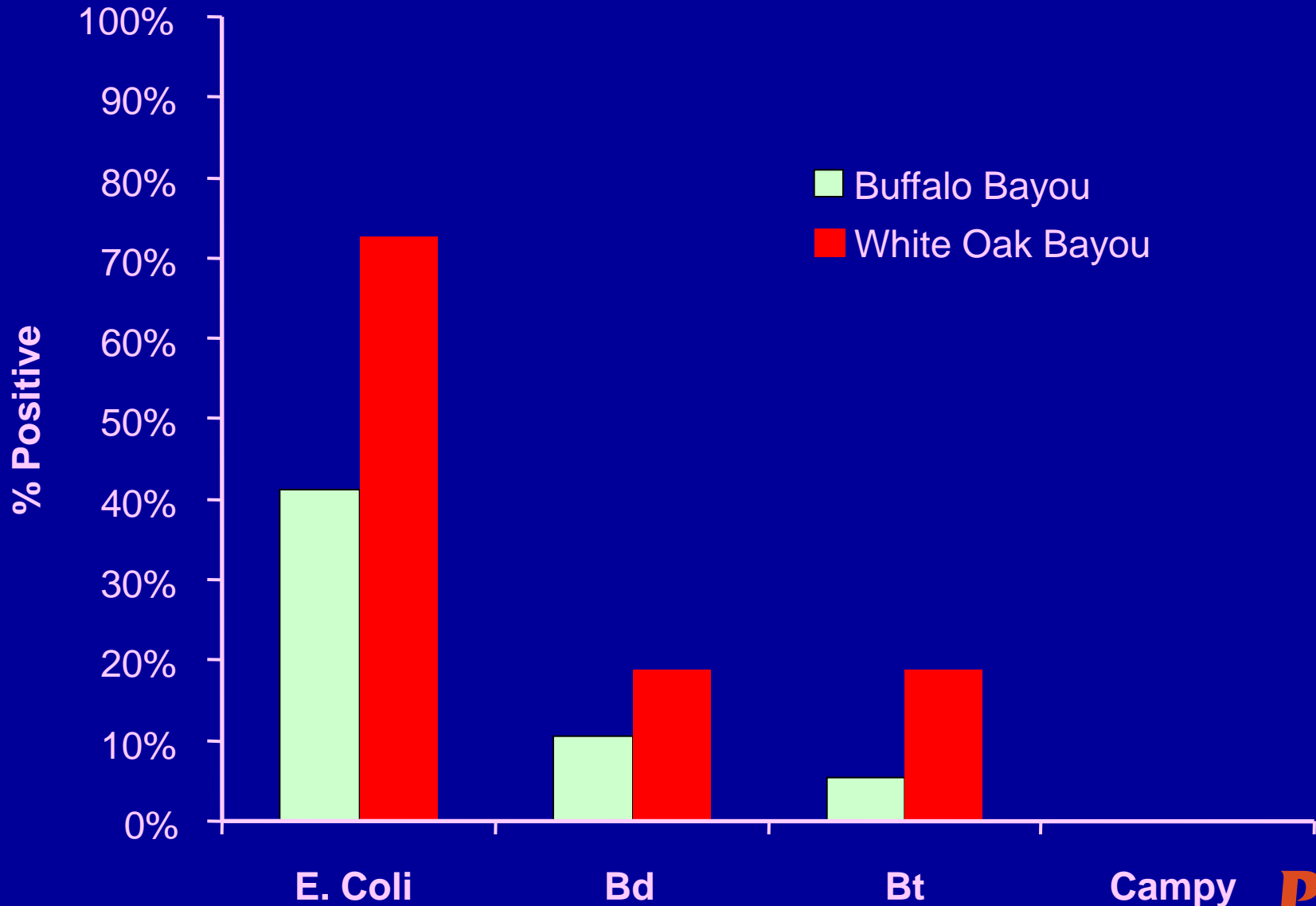
5.
Continued rounds of amplification swiftly produce large numbers of identical fragments. Each fragment contains the DNA region of interest.



WASTEWATER SAMPLES



BAYOU SAMPLES



FINDINGS

- Bacteroides seems to work, as they were found in raw sewage but not in treated WW
- Bd better marker than Bt
- Where EC genetic material was found, Bd was found in 16% of bayou samples
- WO had higher Bd % than BB
- Small tribs with higher EC had up to 45% Bd