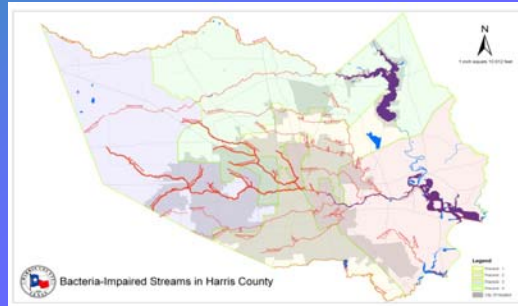


Bacteria TMDL's- They're Not the Same



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Harris County Watershed Protection Group

Presentation on March 5, 2008 to the Onsite Wastewater Treatment Research Council



Topics to be discussed today

- How big of a problem is bacteria?
- How was it decided that it is a problem?
- What makes bacteria different?
- Bacteria Water Quality Standards
- Co-Pollutant Theories
- Why Should I Care?

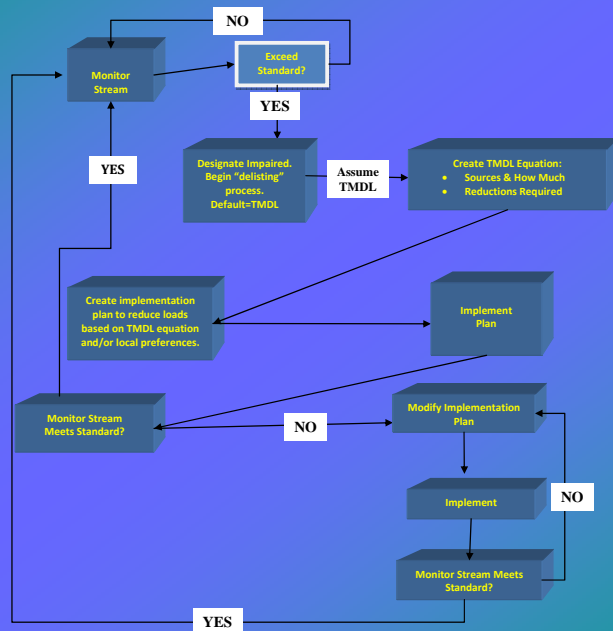


Bacteria's a Problem Statewide!

- 4,904 stream miles impaired of 21,044 stream miles assessed- 23% impaired
- 431 sq. miles of estuary impaired of 2,082 sq. miles assessed- 21% impaired
- 556 sq miles of Texas' shoreline impaired of 3,879 sq. miles assessed-14% impaired
- There are more stream miles impaired for bacteria in Texas than any other pollutant!

• Source: TCEQ Assessment Summary ; 2006 Texas Water Quality Inventory and 303(d) List (June 27, 2007)
http://www.tceq.state.tx.us/assets/public/compliance/monops/water/06twqi/2006_assess_summ.pdf

Process to determine if bacteria is a problem



Bacteria's not
like other
TMDL's:



There's no
smoking gun!

Many sources contribute, making
bacteria a regional problem
requiring regional solutions!

Regional Example- Buffalo & White Oak Bayous in Harris County area

Sources of bacteria from:

- Wastewater treatment plants (effluent),
- Wastewater treatment plants (biosolids),
- Storm Sewers,
- Sanitary Sewer Overflows,
- Stream bed sediments,
- Direct deposition (e.g.- wildlife), &
- On-site wastewater systems



PLUS- Instream Dynamics!!!!

Draft Buffalo & White Oak Bayou Bacteria TMDL Project

2006 assumptions:

OSSF's are the largest contributor of bacteria to the watersheds!

OSSF Failure rates: 25% of all OSSF's in the watersheds

Wastewater Production: 70 gallons/ person/ day

Delivery rate of pollutants into the receiving waterways: 100%

Current recommended decreases in bacteria coming from OSSF's: Results in bacteria reductions ranging from 83% - 100% in dry weather conditions and 98% - 99% in wet weather conditions

Source: Work Order No. 582-6-70860-01 "Total Maximum Daily Loads for Fecal Pathogens in Buffalo and Whiteoak Bayou", dated November, 2006, and prepared by University of Houston for Total Maximum Daily Load Program, Texas Commission on Environmental Quality

http://www.tceq.state.tx.us/assets/public/implementation/water/tmdl/22buffalobayou/22-finalreport_dec06.pdf

Draft Buffalo & White Oak Bayou Bacteria TMDL Project

2007- after TMDL team met with Harris County:

Harris County brought data to TCEQ study team, including that much of the watershed has newer, permitted OSSF's.

OSSF's are no longer considered the largest contributor of bacteria to the watersheds!

In Harris County's opinion, there is still room for improvement in the TCEQ's equation, but much more realistic numbers used.

Percent reductions required still very high!

Source: Work Order No. 582-6-70860-09 "Total Maximum Daily Loads for Indicator Bacteria in Buffalo and Whiteoak Bayou, Quarterly Report 2", dated March, 2007., and prepared by University of Houston for Total Maximum Daily Load Program, Texas Commission on Environmental Quality

<http://www.tceq.state.tx.us/assets/public/implementation/water/tmdl/22buffalobayou/22-march2007rpt.pdf>

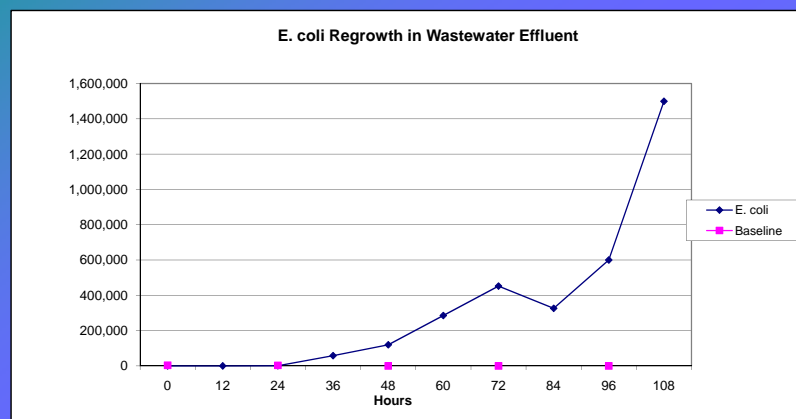
Bacteria: 5 + 5 doesn't equal 10

5 bacteria here plus 5 bacteria there does not equal 10 bacteria downstream. They are living organisms that can reproduce (or regrow) quicker than bunnies and, under the right circumstances, can die off too!



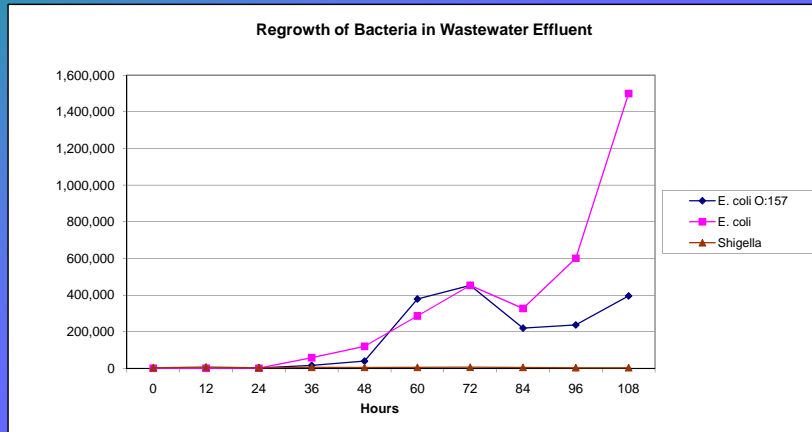
So are they multiplying or dying off in our streams?

Harris County sponsored research through NSF:



Source: FINAL REPORT: RESEARCH STUDY: *Regrowth Potential of Water Pathogens in Sediment and Sewage Treatment Plant Effluent and Affinity of Water Pathogens to Attach to Soil Fractions*. By NSF International Engineering & Research Services (January 17, 2007)

And how did E. coli regrow compared to pathogens:



Source: FINAL REPORT: RESEARCH STUDY: *Regrowth Potential of Water Pathogens in Sediment and Sewage Treatment Plant Effluent and Affinity of Water Pathogens to Attach to Soil Fractions*. By NSF International Engineering & Research Services (January 17, 2007)

Bacteria Regrowth

- But other studies have shown die-off
Much is not known!
- We need better science to understand what is going on



Speaking of better science...

- Bacteria Water Quality Standards are measuring indicator species- NOT the pathogens themselves



- Science isn't there yet, but the regulations sure are



Regardless----

Raw or partially treated sewage that gets released IS a problem- no matter what the standard is!

The other side of Water Quality Standards: Stream Uses

- Contact Recreation (default)



- Non-Contact Recreation (only 2 in TX)



But shades of grey are being created by TCEQ- Get involved!

Contact Recreation Example in Harris County



Co-Pollutants and their Implications

Nutrients and Solids are being theorized as “co-pollutants”.



Nutrient standards
being developed now

Theories that I've heard:

- Nutrients fuel bacteria regrowth
- Bacteria clings to solids as a medium for regrowth



And another theory:

- Bacteria hides in solids, so chlorine disinfection won't work if the bacteria has surrounded itself in a solid particles

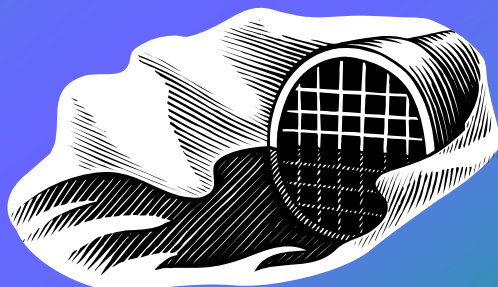


And a fact:

Disinfection works better on cleaner effluent!

Implication:

- New treatment technologies that better address bacteria, nutrients and solids will likely have a greater appeal in the near future!



So Why Should I Care?



Environmental Stewardship



It's your backyard!

Not doing it for you?

How about Health?
It could be your drinking water supply
that you're protecting



Still Not Doing It For You?

In affected areas,
it will be mandated and it will cost money!



Be prepared for Changes

- Changes are likely in the way that on-site systems will be designed, permitted, installed and maintained in areas where bacteria is a problem.



Be a Part of the Solution!

- Participate in the process and let your voice be heard!
- Volunteer your expertise



Be a Part of the Solution!



- Contact your local government or TCEQ to determine if there are impaired waterways in your area, and how to participate.
- Attend TCEQ Water Quality Standards Stakeholder Group meetings.

You Can Impact Your Future
or
You Can Accept What's Handed
to You



The Choice Is Yours

