

Discussion of Status of Bacterial Water Quality Standards, Impairments, and TMDLs/WPPs

Lone Star Healthy Streams Steering Committee Meeting
October 24, 2011

- ### Status of Texas Bacteria Water Quality Standards – June 29, 2011
- EPA **approved** addition of secondary contact recreation 1 & 2
 - Secondary contact recreation 1
 - 630 cfu/100 mL (*E. coli*) & 175 cfu/100 mL (enterococci)
 - Secondary contact recreation 2
 - 1030 cfu/100 mL (*E. coli*)
 - EPA **approved** revision of bacteria criteria for noncontact recreation
 - 2060 cfu/100 mL (*E. coli*) & 350 cfu/100 mL (enterococci)

- ### Status of Texas Bacteria Water Quality Standards – June 29, 2011
- EPA **approved** removing requirement for use of single sample criterion for standards attainment determinations.
 - EPA **disapproved** adoption of provision exempting water from being assessed for bacterial criteria during high flow events.

- ### Definitions (2010 TSWQS)
- Primary contact recreation:** Water recreation activities, such as wading by children, swimming, water skiing, diving, tubing, surfing, and whitewater kayaking, canoeing, and rafting, involving a significant risk of ingestion of water.
 - Secondary contact recreation 1:** Water recreation activities, such as fishing, commercial and recreational boating, and limited body contact incidental to shoreline activity, not involving a significant risk of water ingestion and that commonly occur.
 - Secondary contact recreation 2:** Water recreation activities, such as fishing, commercial and recreational boating, and limited body contact incidental to shoreline activity, not involving a significant risk of water ingestion but that occur less frequently than for secondary contact recreation 1 due to (1) physical characteristics of the water body and/or (2) limited public access.
 - Noncontact recreation:** Activities, such as ship and barge traffic, birding, and using hike and bike trails near a water body, not involving a significant risk of water ingestion, and where primary and secondary contact recreation should not occur because of unsafe conditions.

- ### Change in designated use
- Unclassified Rivers and Streams
 - Primary contact recreation is presumed use
 - Secondary contact recreation 1 presumed to apply to rivers and streams where:
 - water recreation can occur, but the nature of the recreation does not involve a significant risk of ingestion, and
 - a **Basic RUAA Survey** demonstrates that primary contact recreation is unlikely to occur as follows:
 - during base flow conditions, average depth <0.5 m at mid-channel & no substantial pools >1 m deep, and
 - no existing recreational activities creating significant risk of ingestion or a use for primary contact recreation

- ### Change in designated use
- Classified Rivers and Streams
 - Designated recreational uses for classified water bodies are located in Appendix A of the TSWQS
 - Designated use changes require **Comprehensive RUAA** supporting new designation
 - >100 RUAAs ongoing
 - TCEQ leading >90
 - TSSWCB leading 12

Recreational Use Attainability Analysis

- Basic RUAA Survey
 - collect information on a water body, such as the presence or absence of water recreation activities, stream flow type, stream depth
 - establish/verify a presumed use
- Comprehensive RUAA
 - Basic RUAA Survey
 - Two or more field observation trips
 - Historical data review of recreational uses of water body back to November 28, 1975
 - At least five interviews to obtain information on existing and historical uses and stream type

Recreational Use Attainability Analysis

- Extensive Data Collection Effort

A. Check all prevailing conditions that promote recreational activities. Attach photos of evidence in upper limits of stream.

| | | | |
|-----------------------------|-------------------------|-----------------------------------|-------------------|
| Contaminants | State walkway | Road gravel impervious | Other |
| Playgrounds | Swimming access (ramp) | Paved area | None of the above |
| Pool area | Beach | Deck or calls | |
| Recreational | Boat launching | Commercial trailer | |
| Natural events | Commercial fishing | Nearby school | |
| Other recreational features | Tackle (public fishing) | Private Land Consider | |
| Golf Course | Feral parking lot | Park (national city county state) | |
| Sports field | Unapproved parking lot | Public Property | |
| Comments: | | | |

B. Check all prevailing conditions that impede recreational activities. Attach photos of evidence in upper limits of stream.

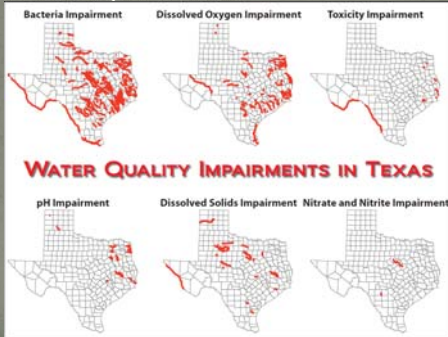
| | |
|------------------|-------------------|
| Private Property | Fence |
| No bridge span | Large dip traffic |
| Wetlands | Subsidence |
| Steep slopes | None of the above |
| No public access | Other |
| No shade | |
| Comments: | |

C. Check any indications of human use. Attach photos.

| | | | |
|---------------------|----------------|-------------------------|--------------------|
| Beach | RV/ATV tracks | NPDES Discharge | Organized event |
| Pipe crossings | Camping Sites | Game or wildlife | No Stream Presence |
| Drain pipelines | Fire pit area | Children's toys | |
| Feral parking areas | Fishing Tackle | Remnant's of K&M's pipe | |

- TCEQ Interpretation of Data Not Yet Clear

Current Impairments



Bacteria Impaired Waters

| Media | 2004 | 2006 | 2008 | Use |
|--------------|------|------|------|---------------|
| In water | 183 | 291 | 274 | Recreation |
| In shellfish | 14 | 21 | 21 | Oyster Waters |

Status of TMDLs

Category 4 - Standard not attained but no TMDLs are required.

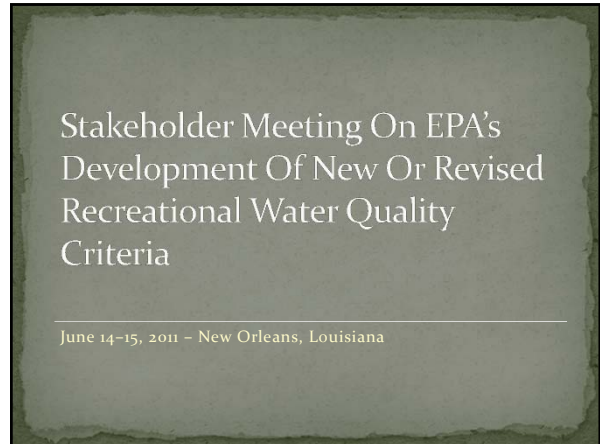
- TMDL completed & approved by EPA (53 impairments in 2008)
- Other controls expected to result in attainment of standards (9)
- Nonattainment of standard caused by pollution & water quality conditions can't be changed through TMDL process (7)

Category 5 - Standard not attained.

- TMDLs underway, scheduled, or to be scheduled (183 impairments in 2008)
- Review of standards to be conducted before TMDL scheduled (54)
- Additional data or information will be collected before TMDL scheduled (279)

Watershed Action Planning

- WAP process involves 3 levels of coordination:
 - Local Watershed Prioritization
 - Program Integration
 - Statewide Interagency Coordination
- WAP Strategies:
 - Standards Review
 - Watershed Evaluation
 - Watershed Protection Plan
 - Total Maximum Daily Load
 - Other



Water Quality Criteria Recommendations

- Intended to be used by states in adopting water quality standards to protect the designated use of swimming and similar water contact activities.
- Current recommendations are from 1986, and are based on protecting swimmers from exposure to water that contains organisms that indicate the presence of fecal contamination.
 - E. coli* (freshwater), Enterococci (freshwater and marine)
- State water quality standards are used to derive NPDES permit limits, make listing decisions, develop Total Maximum Daily Loads (TMDLs) and for beach monitoring and notification programs.

Stakeholder Meeting on the Development of New or Revised Water Quality Criteria 2

Chronology of Events (1)

- BEACH Act required EPA to conduct studies by October 2003, publish new or revised criteria by October 2005 based on these studies, and review every 5 years.
- In March 2007, EPA convened an Experts Workshop to discuss the state-of-the-science and obtain input on research needed for the next 2-3 years to develop the scientific foundation for the new criteria.
- In August 2007, EPA developed *Critical Path Science Plan* identifying research studies to be completed.

Stakeholder Meeting on the Development of New or Revised Water Quality Criteria 3

Chronology of Events (2)

- In 2008, EPA entered into a Settlement Agreement and Consent Decree to conduct studies in support of criteria development. Many of the studies were from the *Critical Path Science Plan*.
- By December 2010, EPA completed research studies in accordance with Consent Decree and Settlement Agreement.
- Current date for new criteria is October 15, 2012, per Consent Decree.

Stakeholder Meeting on the Development of New or Revised Water Quality Criteria 4

Current Thinking (1)

- Recommend 304(a) criteria that apply to all waters.
 - Consistency with 1986 criteria.
 - Allow for all states to take advantage of the newer science/qPCR tool.
 - Encourages consistency, as waters flow between states.
- Derive criteria based on research at POTW-impacted sites.
- Aim to carry forward into new criteria level of water quality protection afforded by current criteria recommendations.

Stakeholder Meeting on the Development of New or Revised Water Quality Criteria 9

Current Thinking (2)

- Recommend culture methods for Enterococcus and *E.coli* in freshwaters, and Enterococcus in marine waters.
- Recommend Enterococcus qPCR method in freshwater and marine waters.
 - Faster approach to measuring fecal indicator bacteria.
 - EPA’s qPCR method performed well in temperate coastal waters as demonstrated at four Great Lakes and four Atlantic and Gulf Coast epi study locations.
 - Inhibition of the qPCR reaction have been observed.

Stakeholder Meeting on the Development of New or Revised Water Quality Criteria 10

Current Thinking (3)

- Use the general population epidemiological curve (the central tendency of the data).
 - Consistent with 1986 criteria approach.
 - Children are included in the general population.
 - Stronger statistical power.
- Use new definition of gastrointestinal illness that does not require fever.
 - The new definition gives an estimate of illness that is 4.5 times greater than the old definition at the same level of water quality.
 - Communication challenge to avoid the impression that more illnesses are being tolerated when water quality standard remains unchanged.

Stakeholder Meeting on the Development of New or Revised Water Quality Criteria 11

Current Thinking (4)

- Clarify the expression of criteria construct.
 - Maintain Geometric Mean and something akin to SSM.
 - Clarify intended uses for beach advisories, permitting, and assessment programs.
 - Eliminate “use intensity” range.
 - Identify explicit “duration” and “frequency” aspects of criteria.
- Provide tools for site-specific criteria derivation (QMRA with sanitary survey) and other flexibilities.
 - Science does not permit us to recommend different, nationally applicable criteria values for different sources (e.g., gulls).
 - Predictive models as tool to enhance implementation of criteria, particularly for beach programs.
- Use EPA and non-EPA research studies.

Stakeholder Meeting on the Development of New or Revised Water Quality Criteria 12

2011-2013 Schedule

- Conduct Scientific Peer-Review of Draft Criteria: Summer 2011
- Propose criteria (for public comment) : February-March 2012
- Sign for publication final criteria: October 2012
- Provide Draft Implementation Guidance: December 2012
- Provide Final Implementation Guidance: December 2013

Stakeholder Meeting on the Development of New or Revised Water Quality Criteria 13

Current Thinking on New Criteria

Goal: Support states and tribes considering alternate WQC by providing tools to:

(1) Adopt an indicator and/or method that differs from the indicators/methods recommended by EPA in new criteria.

- Tools/Methodologies:
 - Epidemiological Study
 - Sanitary Survey + QMRA
 - Water Quality Link Approach

Stakeholder Meeting on the Development of New or Revised Water Quality Criteria 3

Epidemiological Study

- States can conduct an epidemiological study to characterize risks to swimmers and derive state-wide or site-specific criterion values that are scientifically defensible and protective of the use.
- EPA no longer assumes that non-human sources represent a lower risk to swimmers. Differential risk would need to be demonstrated.
- EPA considered developing an alternative national criterion value for waters that are primarily impacted by non-human fecal contamination (for example, avian or wildlife).
- Unable to make a national determination that risk to swimmers exposed to non-human sources is different from risk to swimmers exposed to human sources.

Stakeholder Meeting on the Development of New or Revised Water Quality Criteria 5

Current Thinking: Expression of the Criteria (1)

- Desired condition will be described using two components that are both anchored in the same illness rate.
- Component 1: Geo Mean as derived under 1986 criteria.
- Component 2: Statistical Threshold Value (STV)
 - More appropriately describes the 75th percentile value SSM.

Stakeholder Meeting on the Development of New or Revised Water Quality Criteria



Current Thinking: Implementation Direction (3)

Attainment:

- Data collected over a recreational season will be used to calculate a GM for the water body. This GM will be compared to the RWQC GM.
- Additionally, no more than 25% of samples can exceed the STV (at the 75th percentile).
- A water body will have to meet BOTH the GM and the % of samples below/above the STV.

Stakeholder Meeting on the Development of New or Revised Water Quality Criteria



For More Information

- EPA's Rec Criteria and Beach Web Pages
 - www.epa.gov/waterscience/criteria/recreation
 - Completed Research
 - Experts Scientific Workshop Report and Executive Summary
 - Critical Path Science Plan
 - Criteria Development Plan & Schedule
 - Consent Decree & Settlement Agreement
 - Literature reviews
 - Stakeholder meeting summaries
 - www.epa.gov/beaches
 - BEACH Act text
 - Grants information
 - Beach Guidance Document
 - Local beach information
 - www.epa.gov/waterscience/criteria/humanhealth/microbial/#wqs
 - BEACH Act rule
 - Technical fact sheets

Stakeholder Meeting on the Development of New or Revised Water Quality Criteria

