WQ Management Developments
Nutrients, Bacteria

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Nutrient Criteria: National

- EPA and numerical nutrient criteria:
  - 1998 mandate: states to have criteria by 2004
  - Allowed state development plans and schedules
  - Established stringent national guidance criteria
    - Calculated from historical instream data
    - Separate for lakes, streams, reservoirs
    - Pooled for large, aggregate ecoregions
    - Criteria = 75th percentile of unimpacted sites
  - Urged by EPA Inspector General, Aug 2009
  - Lawsuits: Florida (Wisconsin, Kansas)

EPA Nutrient Criteria: Florida

- Lawsuit from Florida Wildlife Fed. & others in 2008
- EPA promulgated criteria for Florida lakes & streams in Dec 2010 – in effect Mar 2012
- EPA estuary criteria – propose in Nov 2011
- New countersuits – Florida cities, Ag Comm., etc.
- Lakes TP: 0.01-0.05 mg/L TN: 0.51-1.27 mg/L
- Streams TP: 0.06-0.49 mg/L TN: 0.67-1.87 mg/L
- Potential long term costs?
  - Regulated groups: $3 - $8 billion per year
  - EPA: $135 - $206 million per year

Why Are Nutrient Criteria Difficult?

- Lack of clear “use-based” thresholds, for uses such as recreation & aesthetics, aquatic life propagation, drinking water sources
- Responses to nutrients are highly variable – e.g., effect of TN,TP on Chl *a*
- No consensus on how to derive criteria
- Independent criteria, or “weight-of evidence”?
- Insufficiencies in historical monitoring data
- Initial EPA guidance criteria were problematic
- High concern about regulatory impacts

TCEQ Nutrient Criteria: Development

- Submitted plans to EPA in 2001, 2006
- Reservoirs, then streams & estuaries
- Convened advisory workgroup
- Separate criteria for each reservoir
- Set on historical conditions
- Adopted for 75 reservoirs – 6/30/10
- Based on Chlorophyll *a*
  (suspended algae)
- New permitting procedures for nutrients

Nutrient Criteria: Examples

Reservoir	Chl *a* (µg/L) Stand-alone	TP (mg/L) Not adopted	Transparency (meters) Not adopted
Eagle Mtn	25.4	0.07	0.80
Cedar Creek	30.4	0.07	0.80
Livingston	23.0	0.16	0.67
Lewisville	18.5	0.06	0.60
[Houston – not adopted]	[12.4]	0.18	0.28
Travis	3.7	0.03	3.13

2010 Nutrient Implementation Procedures

- In 2010 Standards Implementation Procedures
- Applied to increases in domestic discharges
- Sets framework for nutrient (TP) effluent limits
- Reservoirs – predict effects on “main pool”
- Relate TP to reservoir chlorophyll *a* criteria
- Streams and reservoirs – assess local impacts:
  - Apply site-specific screening factors
  - Level of concern – low, moderate, or high
  - Assess “weight-of-evidence”

Nutrient Screening: Local Factors for Streams

- Size of discharge
- Instream dilution
- Sensitivity to attached vegetation – type of bottom
- Sensitivity to attached vegetation – depth
- Sensitivity to nutrient enrichment – clarity
- Sensitivity to aquatic vegetation – observations
- Sensitivity to aquatic vegetation – sunlight, tree shading
- Streamflow sustainability
- Impoundments and pools
- Consistency with other permits
- Listed as a nutrient concern in WQ inventory?

Nutrient Screening: Example of Local Factor

- Factor: Instream dilution in streams

Concern level	Percent effluent in dry weather
Low	< 10 %
Moderate	10 to < 25 %
High	≥ 25 %

Nutrient Criteria: The Road Ahead

- Reconvene nutrient advisory committee
- Review data and academic research; and survey criteria development state-by-state (joint project with U. of Houston Clear Lake)
- Continue special stream surveys (> 100 so far)
- Develop criteria options for streams & estuaries:
  (1) Historical levels at reference sites
  (2) Relate TP,TN to D.O., algae, biological indices
- Consider in part for next standards revisions

Revised Recreational Standards (6/30/10)

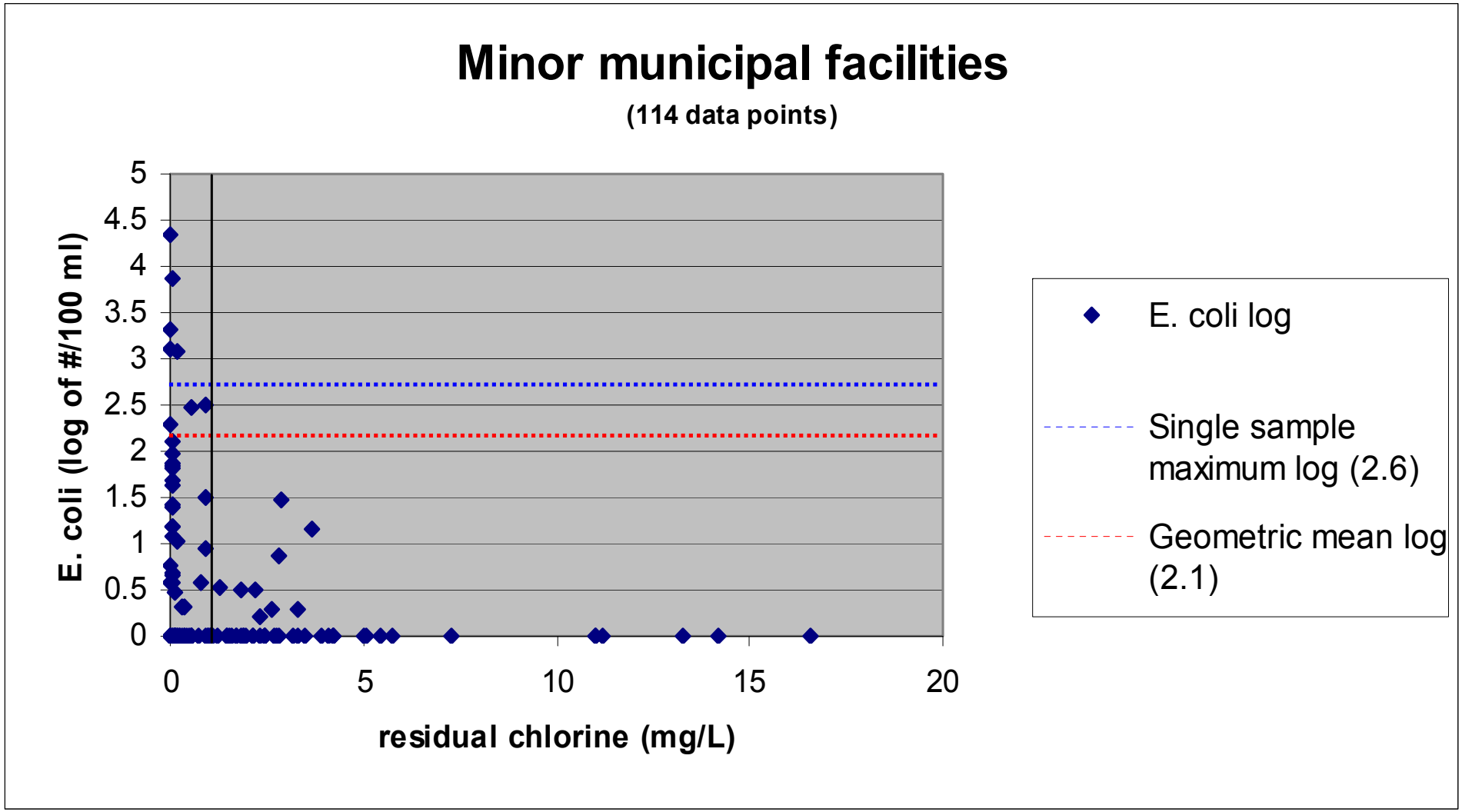
- Previously: Almost all water bodies primary contact
- 303 water bodies not meeting bacteria criteria (2010)
- Expand recreational categories
- Implement new use-attainability analyses
- Require bacteria limits in discharge permits
  - in addition to chlorination (11/4/09)

Recreation Uses	Indicator Bacteria Geometric Mean Criteria (colonies/100 ml)	
	E. coli (FW)	Enterococci (SW)
Previous Standards:		
Contact recreation	126	35
Noncontact rec.	605	168
Adopted Standards: (6/30/2010)		
Primary contact	126	35
Secondary contact 1	630	175
Secondary contact 2	1030	--
Noncontact rec.	2060	350

Recreational Use-Attainability

- Uses other than primary contact may be appropriate for some water bodies
- TCEQ has new recreational UAA procedures
- Surveys include physical & flow characteristics, + observed evidence of recreation
- Local input (interviews) important
- Initiated 124 recreational UAAs
- Involves major coordination effort and public participation

Effluent Bacteria: Houston TMDL Studies



Summary

- National interest in nutrient criteria is increasing, partly in response to new EPA criteria for Florida.
- TCEQ adopted criteria (Chl *a*) for 75 reservoirs, but EPA has not yet approved them.
- TCEQ is developing draft criteria with multiple options for streams and rivers, and for estuaries.
- TCEQ has adopted expanded recreational categories and criteria
- Numerous UAA reviews of individual small streams is continuing

- **Questions?**