

Nutrient Criteria Work Group
May 20, 2002
Meeting Summary

Welcome & Introductions - Barbara Henry

Welcome - Mark Vickery

- EPA requires the development of criteria & standards
- Aquatic growth needs to be addressed

Meeting Rules & General Work Group Purpose - Barbara Henry

- Morning session - informative with Speakers from various organizations
- Afternoon session - everyone will have an opportunity to give input

Specific Work Group Purpose and plan for the day - Jim Davenport

- General Overview

Status of EPA Requirements and Guidance - Sidne Tiemann

- (See handout)
- EPA developed a National Strategy in July, 1998
- Federal Regulation Notice was submitted in Jan, 2001
- TNRCC drafted a plan to EPA in November, 2001
- State plans were due to EPA in December, 2001
- States will need to adopt criteria by December, 2004
- EPA Criteria Documents were proposed for
 - Lakes & Reservoirs in April, 2000
 - Rivers & Streams in July, 2000
 - Estuaries & Coastal Waters - October, 2001
 - Wetlands - ?

Texas Current Methods of Control Nutrients - Sidne Tiemann

- (See handouts)
- Will focus on Texas Ecoregions which are the following:
 - III Xeric West
 - IV Great Plains Grass & Shrub lands
 - V S. Central Cultivated Great Plains
 - IX SE Temperate Forested Plains and Hills
 - X TX-LA Coastal and Mississippi Alluvial Plains
- Current Nutrient Controls are located in Section 307.4(e) Narrative Criteria - Nutrient parameters which states, "Shall not cause excessive growth of aquatic vegetation which impairs an existing, attainable, or designated use."

General Plan for Nutrient Development - Sidne Tiemann

- (See handout - Nutrient Criteria Development Plan Draft 11/9/01)
- TNRCC Draft Plan - November 30, 2001
- Staged approach
- Reservoirs, first focus
- Plan will evaluate the following alternatives:
 - Direct concentrations
 - Direct indicators of eutrophication
 - “Translator” procedures
 - Water quality uses
 - Percentiles - EPA guidance
 - Spatial and temporal scales
- General plan will also consist of the following:
 - Data analysis
 - Existing data
 - EPA funding through USGS
 - Workgroups
 - Next triennial review of standards

Data Manipulation per EPA Guidance - Evan Hornig

- EPA Published Criteria (See handouts)
- USGS
- Draft Aggregation
- Data used by EPA & published criteria
- Data used by TNRCC
- Preliminary results using TNRCC data
- Methods used for determining criteria - Medians of each site
- Texas used EPA methodology (See “EPA Method) handout)
- Region 33 had the highest levels of nitrogen
- Higher levels of Chlorophyll *a* were found in lakes during fall & summer
- Use historic load and will be looking harder a historical data
- EPA data analysis is identical analysis - data sets are different
- Took median from all samples taken from the site

Comparisons of 25th Percentiles for Different Scales to Set Criteria - Sidne Tiemann

- EPA Data Analysis
- EPA Criteria Guidance Per Aggregate Ecoregion
- STORET data
- Seasonal annual median for each site
- Decade median of seasonal annual medians
- 25th percentile of seasonal medians
- Median of the 4-25th percentiles
- TNRCC calculations will use EPA guidance method, TN, TP, and Chlorophyll *a*

“Potential Impacts from Nutrient Related Standards in Five North Central Texas Reservoirs,” Woody Frossard, Tarrant Regional Water District

- Data set from all five reservoirs
- Trend Study - 1989- 2000
- TOC Parameter
- SDWA added TOC to drinking water criteria
- Acquired samples from reservoirs and tributaries
- Cedar Creek and Kings Creek nutrient levels and their effects
- Ten years of sampling data
- Chlorophyll *a* has been doubling every 10 years in Cedar Creek
- Chlorophyll *a* or nutrient TMDLs appear inevitable
- PS & NPS loads have to be documented
- Does PS vs NPS loads or both are difficult to locate point source
- Determine impact of watershed nutrient loads on reservoir
- Acquired samples of phosphorus, nitrogen, and other nutrients in Cedar Creek over 1,000 miles as a whole
- Concentrations were higher during June & July of 2000 especially close to wastewater discharge sample sites
- Wet years versus dry years

“Influence of Basin Morphometry and Water Residence Time on the Trophic Status of the Reservoirs of the Guadalupe River,” Dr. Al Groeger, Southwest Texas State University

- Samples of Guadalupe River - (See handouts of presentation)
- Influence on how reservoirs are going to respond
- Reservoirs respond differently on the interim
- Canyon Lake water quality tends to be very high - 6/19/99 Chlorophyll *a* is less than 5mm per liter - may have the best water quality - 1.25 years - median retention
- Lake Dunlap - 5 stations - wastewater treatment plant dumps in the River and affects sampling site - 4.4 days - August median - 6 days retention
- Reservoirs respond differently in dry & wet years- during dry periods higher levels of soluble reactive phosphorus (SRP) vs during wet years
- Dunlap surface Chlorophyll *a* , 2000
- Chlorophyll *a* and SRP - upstream lower levels and downstream higher levels
- Higher levels of Algae growth potential next to sewage treatment plant
- Meadow Lake surface Chlorophyll *a* 2000

“Numeric Nutrient Criteria: a Case Study,” Glenn C. Clingenpeel, Trinity River Authority

- Project Manager for Clean Rivers Program
- Potential impacts in the Trinity River
- 1999 Study 25 & 75 percentile - Nutrient Stream standards on Trinity River Basin
- Potential methodology for developing stream standards
- Potential impacts using EPA methodology in Trinity River
- Define potential numeric criteria and compare to existing data - total nitrogen & phosphorus
- Discuss ramifications and controls

- EPA rule of thumb - tremendous range using 25 & 75 Percentile methodology
- Possible Control - nutrient removal from point sources in Dallas/Ft. Worth area
- Lake Livingston - estimate phosphorus growth rate - has to be brought down to lower Chlorophyll *a*
- Expect a universal relationship between phosphorus & Chlorophyll *a*
- Nutrient Removal Estimate 0.06 - 0.5 mg - 10-118 million & a year 65 million gallons (?)
- Standards have been developed and are identified by uses
- Statewide numeric screening

“The Meaning of Nutrient Concentrations in the Estuaries,” David Brock, Texas Water Development Board

- Estuary Concentration Pertinent Parameters (See copy of Presentation)
- Aspects of our estuaries are pertinent to nutrient processes.
- Sediments are very active and is the site of high rates of biological production, respiration, and transformations of nutrients.
- Salinity is a controlling factor, mediating, for example, the release of phosphorus absorbed on clay particles.
- Bays are generally broad and shallow.
- Variation in parameters - Galveston Bay System
- All nutrients are processed in estuaries
- Metadata: Most statistics shown are based on 1990-2001 data.
- Matagorda Bay - total phosphoreus - Mg/L 0-0.07 (?)
- Ammonia is used in the recycling in estuaries
- 75 percentile - Corpus Christi Bay
- Large amounts of variation between drought periods & wet periods
- Productivity and concentration - direct correlation
- Unique coastal systems have complications with residence nutrients
- If a trend exists in the parameter, there may be information they can use
- Has not explored all possibilities or useful statistics - only an introduction

General Perspectives and Suggestions on Direction of Investigation from Work Group Members - Jim Davenport

- Does TNRCC have a total account of segments to be assessed under the 25 Percentile? - Over 50% will have TMDLs under the levels today.
- Issue is developing criteria
- Using ambient based approach, 95 Percentile people could live with and not every segment could not be on a TMDL list.
- Modify Glenn’s proposal - look for trends - see if you have a real data problem
- Look at use and problems or potential use problems
- Critical issue - What is the impairment you are dealing with? How would you address the problem? - Ranking mechanism
- Biological response to nutrient - Problem taking 75th or 25th Percentile - look at loads - need more sophisticated approach - When do we look at and do we have time?
- Use proactive standard instead of reactive, such as, focusing on concerns about streams being on the TMDL list.

- Locate uses that will prevent the problems
- Will focus on reservoirs
- Discussed how to address the problem - will use EPA methodology
- There is no standard on aquatic water
- Congress stated the need to tie water quality standards to uses

Discussion on Focused Questions - Jim Davenport

Form Criteria should take - Options for Setting Target Value of the Criteria (Alternative forms of nutrient criteria) - Jim Davenport

- We can't keep putting the deadline off - need to set some standards
- Could we agree on an 85 Percentile?
- Need dual approach - standard and flexibility
- TML has concern about their reservoir - identify real world problems
- Set screening criteria 85 Percentile - is there evidence of problems - If so, write for that segment - look at trends over time
- Take numerical standards - give limited period of time - do an assessment - If you get there, you will not get on the list, but if you do, you will get on the list.
- Focus on time and resources - find the problems and fix them
- What are appropriate biological criteria? States use algae by itself. - Figure out the obtainable use - use obtainability analysis - start with 85 Percentile - Build a database - what does impairment look like? What is the appropriate target - Chlorophyll *a*, etc.?
- Set algae based biological criteria
- Need better Chlorophyll *a* data
- Options for setting target form criteria should be taken
- Sampling of data is not being done the way it needs to be sampled.
- Focus on ambient - 2 problems
 - How much do you trust the database?
 - Percentiles are questionable
- Chlorophyll *a* numbers need to be looked at - sensitive handling of samples.
- Can't tie use with the data
- Can't base statistical analysis on seasonal or annual basis
- Need to do something with the numbers we have
- Work on the process as we move along the way
- Could data, criteria and uses all be part of the process to EPA?
- Put screening process in place
- Part of approach is to prevent instead of looking at problems
- Biological criteria - it's about building a consensus
- Use site by site data analysis to build for TMDL
- Dissolved oxygen (DO) standard has a lot of slush in it - Treatment of wastewater has improved
- Select analysis - DO and pH can be used now - DO in morning & pH in late afternoon - Data is more reliable and is tied to an impact. - Chlorophyll *a* is for use in a lake parameter not a reservoir or estuary
- Samples of Chlorophyll *a* can vary by how it is handled, weather, etc.
- There are other standards on segment by segment

- There are many different approaches to aquatic life for screening approach
- Need to build consensus of impairment
- Seasonality is very important

Types of Data Analysis Need for Reservoirs, Streams & Rivers, and Estuaries - Sidne Tiemann

- Need to do data analysis
- Implement a standardized method for Chlorophyll *a* - to be completed in a year
- Need to be careful about which stations & locations to include
- Are we looking for a reference number or a specific number?
- What is the impairment?
- Need to investigate near dam information
- Spatial weighted with GIS information
- pH and DO can be used to set screening
- Need to have data analysis where you have DO, pH and Chlorophyll *a*
- Categorize by looking at basins or watershed
- Basin makes more sense than ecoregions
- Looking for alternative for Criteria - Long term alternative approach
- Will never get to a particular number that address poor water quality. It will be more a range of numbers.
- Each reservoir will meet its own criteria
- Need suggestions on what to consider as use impairments
- Will use Modeling & Criteria Development as some of the steps
- Test Methodology - collecting data on algae & streams - random sampling

Priorities for Data Evaluation and Criteria Development by Water Body Type Next Steps for Analysis - Sidne Tiemann

- Tie data to use on impairments
- Write a standard or use a screening mechanism
- Data gap - Greens vs Greens (?)
- Pick a test case such as Cedar Creek
- Techniques that are already out there and test cases

Where do we go from here? - Jim Davenport

- Look at other states
- Use more work on data approach - use place analysis & screen analysis
- Use as small permit criteria - setting the criteria
- Issues of implementation - how do we put these on the ground - focused on getting numbers
- Have something more specific for the group
- Put information out on the Web and take input through e-mail

**Nutrient Criteria Development Work Group
Attendee List**

Mark R. Ernst	Tarrant Regional Water District
Woody Frossard	Tarrant Regional Water District
Dolan McKnight	North Texas Municipal Water District
Al Groeger	SWTSU
Pat Radloff	TPWD
Tiffany Morgan	BRA
Kyle Headley	BRA
Trish Shaw	BRA
David Brock	TWDB
Sara Burgin	Brown McCarroll
David Bass	LCRA
Lisa McCurley	Hill Country Environmental
Alicia Reinmund	LCRA
Linda Fernandez	Fernandez Group, Inc.
Jim Mathews	TML
Chris Pasch	Pasch Cons.
Glenn Clingenpeel	TRA
Peggy Glass	TWCA
Paul Jensen	PBS & J
Richard Kiesling	USGS
Myron Hess	NWF
Mahendra Mohite	Roy F. Weston, Inc.
John Barred	CCC
Cecilia Jasper	BASF
Bruce Lawton	EEO Resources Inc.
Randy Palachek	Parsons
Scott Gross	URS
Lauren Kalisek	Lloyd Gosselink et al