Nutrient Criteria Development Advisory Work Group
Meeting Summary
April 13, 2005
Austin, Texas

Welcome and Introductions - Mark Fisher

Meeting Rules and General Work Group purpose - Katherine Flannery

Results of TWCA's Uses Study - Glenn Clingenpeel (Handout #1)

- Study consisted of 8 different reservoirs
  - Travis
  - Georgetown, the smallest
  - Bridgeport
  - Lake Fork
  - Cedar Creek
  - Livingston, the largest
  - Granger
  - Canyon
- Study Approach
  - Simultaneous measurements of chlorophyll concentration and survey of users' perceptions of use impairment
  - Two locations in each reservoir, twice per month
    - Main body
    - Cove
  - Wanted to have largest range possible
- Water Quality Sampling - Sample Period and Types
  - 2003: June - September
  - 2004: April - September
  - One depth-composited sample collected at each site (1 ft, 3 ft, 6 ft)
  - Field measurements recorded at sample depths
- Field Parameters Measured
  - Dissolved oxygen
  - pH
  - Secchi disc depth
  - Specific conductivity
  - Temperature
- Laboratory Parameters Measured
  - For Algae
    - ✓ Chlorophyll *a*
    - ✓ Pheophytin
  - For Nutrients
    - ✓ Nitrate

        - ✓ Nitrite
        - ✓ Total Kjeldahl
        - ✓ Phosphorus, Total
    - For Clarity
        - ✓ Suspended solids, Total
        - ✓ Suspended Solids, Volatile
        - ✓ Turbidity
- 5 Questions in Survey
    - How green is the water?
    - How is water for recreation?
    - If conditions are bad, why? Algae or mud?
    - Primary Activity
    - Frequency of visitation
- Perception of Amount of Algae Present
    - No algae, or crystal clear water
    - A little algae visible
    - Definite algae visible
    - Very green, some scum present and/or mild odor apparent
    - Pea soup green with one or more of the following: massive floating scums on lake of washed up on shore, strong, foul odor, or fish kill
- Perception of Degree of Use Impairment
    - Beautiful, could not be nicer
    - Very minor aesthetic problems; excellent for swimming, boating
    - Swimming and aesthetic enjoyment slightly impaired
    - Desire to swim and level of enjoyment substantially reduced
    - Swimming and aesthetic enjoyment of the lake nearly impossible
- 7 Surveys per visit, per site
    - 2 from sampling crew
    - 5 from recreational visitor
- Other study provisions:
    - Avoid samples influenced by runoff
    - Take water quality samples and user surveys in same area
    - Survey persons who have already been on lake or shore
    - Avoid locations with significant stands of aquatic vegetation
    - Perform all chlorophyll analyses at one lab
- Results
    - Over 1,800 surveys
    - Over 5,700 water quality measurements
    - 95% of surveys can be correlated with water quality data
    - See charts in Handout

USGS Update of Reservoir Groupings and Chlorophyll *a* vs. Total Phosphorous Correlations - Richard Kiesling

- Conducted trend analysis

- Not enough data for some reservoirs to determine if there are trends or not
- Conducted reservoir groupings
- Performed PCN analysis
- Volume, surface area, drainage area were important factors in grouping some reservoirs
- Spacial distribution in the state appeared to be important; therefore ecoregion was appropriate
- Data for analysis was the summer annual means

TPWD Inland Fisheries Data - John Taylor (Handout #2)

- Texas Parks and Wildlife Department motto
  To manage and conserve the natural and cultural resources of Texas and to provide hunting, fishing and outdoor recreation opportunities for the use and enjoyment of present and future generations
- What does TPWD do?
  - Manage fisheries resources in:
    - ✓ Over 800 public impoundments
    - ✓ 80,000 miles of rivers and streams
    - ✓ About 1.7 million acres in total
- Importance of Resource
  - Used as recreation by 1.8 million anglers (16 years and older)
  - Fishing generates $3.1 billion in economic output annually
- Inland Fisheries Staff
  - Over 230 staff across state, 15 management districts, and 3 different regions
  - Regional Management Offices in San Angelo, Waco and Tyler
  - Five hatcheries
- Several groups working behind the scenes
  - HOH Fisheries Science Center
  - Freshwater Resources group
  - Kills & Spills Team
  - Fish Health & Chemical laboratories
  - Data Administration and Analysis Group
- Over half of income for TPWD comes from Licenses and Stamps
- Survey Sportfish
  - Electrofishing boats - collect shallow water fish
  - Gill nets - Open water fish
  - Trap nets - Crappie
- Survey Anglers
  - While fishing, to determine what they catch and how much they fish
  - Use mail and/or phone surveys for attitudes/opinions and economics
- Survey Habitat
  - Identify and manage noxious vegetation
  - Lake-wide habitat surveys
  - Currently updating procedures using latest technology
- Survey Water Quality

    - Geo-referenced coordinates
    - Air and water temperatures
    - Instantaneous dissolved oxygen
    - Turbidity/secchi disk transparency
    - Conductivity
- Standardized Procedures
    - Began standardized sampling in 1975
    - Initiated standardized electronic data archive in 1985
    - Set requirements for cost-effective data collection
    - Ensure data quality and integrity through these procedures and multi-level verification checks
- Science Review Findings:
    - *"The Inland Fisheries Division has developed an impressive set of Fisheries Assessment Procedures that are conceptually sound and are generally accepted within the fisheries science community*
- What has been learned from the surveys
    - Relative abundance of different sportfish species
    - Demography of fish populations (size, age)
    - How fast fish are growing
    - How much effort anglers expend
    - What anglers catch
- What has not been learned from the survey
    - How many fish there are (Biomass)
    - Abundance of species that might be indicators of ecosystem health
    - Information on species or sizes not vulnerable to our gears
- How the information is used
    - Used to develop management recommendations for harvest regulations, stocking, habitat manipulations
    - Inform public of results and recommendations
- Harvest regulations
    - A range of bag and length limits are used statewide
    - Goal of regulation is to optimize fishing
    - Regulations reflect state of fish populations and angler effort, given widely ranging conditions among reservoirs
- 2004 Stockings (See chart on Handout)
- Habitat Manipulations
    - Native vegetation restoration
    - Noxious plant control
    - Fish attractors
    - Spawning substrate
    - Water level manipulation
- What's been accomplished so far
    - Improved fishing
    - More opportunities, larger fish, greater variety of fish
    - Better access to fishing

- More information on location, techniques, stewardship
- Safeguard the environment

TPWD Criteria Proposal - Garry Garrett (Handout #3)

- Texas Parks and Wildlife Department is the state agency with primary responsibility for protecting the state's fish and wildlife resources.
- Section 61.051 - Duty to investigate and study certain wildlife resources
  - Studies all species of game animals, game birds, and aquatic animal life to determine: effects of any factors or conditions causing increases or decreases in supply
- Existing procedures for Monitoring:
  - Data must be collected under an approved Quality Assurance Project Plan or be of demonstrable, comparable quality
  - Sampling must be representative, covering at least two seasons and spanning at least two years
  - Monthly or quarterly sampling is typical, but resources may limit monitoring frequency
- Existing Procedures for Assessment:
  - Every 2 years using the last 5 years of data
  - Surface measurements taken
  - Monitoring site represents no more than 5, 120 acres
  - Data assessed using pass/fail and at least 10 samples required for assessment. If <10 samples are available, a water body may be placed on a concerns list, but will not be placed on the state's list of impaired waters.
  - Fully supports its use if ≤10% of samples exceed the criteria
  - Partially supports its used if >10 and ≤25% of samples exceed criteria.
  - Nonsupporting if >25% of samples exceed criteria.
- Proposed Approach
  - Establish baseline, reservoir-specific criteria for nutrient parameters
  - All future assessments involve comparisons using these values.
  - Select nutrient parameters that reflect nutrient levels within the reservoir and incorporate temporal variability.
- Methods for Establishing Baseline:
  - If not degraded, use historic data for that reservoir
  - If currently degraded
    - ✓ Use best 5 years
    - ✓ Use comparable, non degraded reservoirs
    - ✓ Use TCEQ 2000 Screening levels
- No Degradation Policy
  - Maintains current water quality and prevents further degradation
  - Protects current reservoir uses
  - Reflects localized conditions
  - Relatively simple to implement
  - Is within current TCEQ regulatory guidance

- Orthophosphorus, Nitrate-Nitrite, Chlorophyll *a*
  - These three variables address many of the major causes for degraded water quality
  - TCEQ, river authorities, USGS, and other monitoring agencies already measure these parameters
  - Measurement of these three variables at the dam can be indicative of the quality of the water being discharged downstream
- Limitations
  - Single, standardized locations limit the ability to assess changes in nutrient input
    - ✓ Nutrients may cause problems within specific embayments, yet not reduce water quality at the dam site
    - ✓ Nitrogen and phosphorus can be reduced by passage through a reservoir
    - ✓ There may be a time lag in detection of increased nutrient inputs because of dilution
    - ✓ Future development of nutrient criteria by the TCEQ for rivers and streams, estuaries, wetlands, and coves and embayments in reservoirs should incorporate temporal and spatial variability and allow sources of nutrient inputs to be better identified
  - Surface sampling ignores an effects of reservoir stratification
  - Identification of degraded reservoirs may be affected because of limited data
  - Limiting monitoring to nitrogen, phosphorous and chlorophyll *a* may miss impairment from:
    - ✓ excessive benthic algae
    - ✓ excessive macrophytes
      - blue-green algae
- No-Degradation Policy
  - Provides reservoir-specific protection from nutrient overloading of public waters
  - Assures continued quality habitat and recreation for future generations

Status of criteria on least impacted reservoirs - Jim Davenport (Handout #5 & #6)

- Status of Reservoir Criteria
  - Iterative “least impacted” list
  - Use-based study
  - Reservoir grouping analyses
  - Chl *a*, N, P relationships
  - “Small” decisions; tinkering

Focus Question #1 - For the “least impacted” reservoir option, should we consider adding additional reservoirs with higher urban plus agriculture land use, such as reservoirs with 10-20%? Which ones? (Handout #7 &#8)

- Group #1
  - Focused on question of what was “least impacted”
  - Is it a reference group? If so it shouldn’t be expanded
  - If the expansion is to include reservoirs that are under represented in the state,

then that would be appropriate
    - If least impacted, they suggested that if antidegradation criteria was set it would be ok to expand the list and beyond to some reservoirs without problems
- Group #2
    - Use of land use was not meaningful and it did not capture what was going on in the watershed, but it may be a good starting point
- Created list of impacted reservoirs based on best professional judgement (BPJ) and list of least impacted based on BPJ. BPJ was more meaningful and flexible.
- Suggested basing implementation of criteria by looking at data and other studies on eutrophication, such as 10 ug/L as a cut off or 25 ug/L for chlorophyll *a*.
- Using 10% land use was a filter to filter out reservoirs with the least number of problems from those with more. Land use has not been correlated to land use. Suggested a land use based loading analysis.

Focus Question #2 - Which reservoirs with nutrient concerns should we focus on for criteria development of some type?

- Group # 1
    - Focus on:
        - ✓ Water supply lakes (municipal drinking water)
        - ✓ Lakes with good availability of data (an understanding of "what's happening"
        - ✓ Lake with concerns in chl *a*or vegetation or benthic algae might get higher focus (response variables)
        - ✓ Human-oriented cause of nutrient concerns (i.e., we have more control)
    - Those dominated by water fowl would be weighted less
    - Reservoirs with no data could also be factored in

- Group # 2
    - Weren't sure what consideration to give the list
    - Some areas with impact and others are concerns
    - Waco, Lake Whitney, Palo Duro, and Richland Chambers already have a lot of work on them, so they would not be a priority
    - Lake Tanglewood needs more study
    - Remove Mitchell from the list, since it is a sludge storage for the City of San Antonio.
    - Leave LBJ and Lake Houston on the list.
    - Have no idea of conditions of Lake Lavon

Infrastucture Update - Sidne Tieman

- Revised plan: December 2004 - Components
    - Background and status
    - Description of methods
    - List of database constituents

    - List of “least impacted” reservoirs
    - Draft schedule
- Schedule for Reservoirs
    - Relate N, P to chl *a* - 2/28/05
    - Present to workgroup - 3/15/05
    - Evaluate use-based criteria - 6/30/05
    - Send EPA draft criteria - 8/31/05
    - Consider standards revision - [2006]
- Data Base - Least Impacted reservoirs
    - Land use <10%
    - Main pool/near dam stations
    - Surface values, <0.06 meters
- Data Base
    - Relationship data base
    - All reservoirs
    - All SWQM stations
    - Incorporate USGS data
    - Resolving duplicate data
    -

Nest Steps in Criteria Development - Jim Davenport

- Impending Issues
    - Reconciling different approaches
    - Parameters to use?; Chl *a* reliability
    - Stream study update
    - Impacted reservoirs: initial steps
- Impending Issues - Implementation
    - Wastewater permit evaluation
    - Assessing instream attainment
    - Watershed management
    - TMDLs

Next Workgroup Meeting - July 12, 2005

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