

A Proposed Approach for Establishing Reservoir Nutrient Criteria for Texas





Inland Fisheries

Texas Parks and Wildlife Code

Sec. 12.0011. RESOURCE PROTECTION.

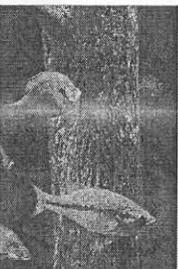
- a) The department is the state agency with primary responsibility for protecting the state's fish and wildlife resources.
- b) The department's resource protection activities include:
 - 2) providing recommendations that will protect fish and wildlife resources to local, state, and federal agencies that approve, permit, license, or construct developmental projects;
 - 3) providing information on fish and wildlife resources to any local, state, and federal agencies or private organizations that make decisions affecting those resources.




Texas Parks and Wildlife Code

Sec. 61.051. DUTY TO INVESTIGATE AND STUDY CERTAIN WILDLIFE RESOURCES.

- a) The department shall conduct scientific studies and investigations of 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.



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Contributors - TPWD Staff:

- Heart of the Hills Fisheries Science Center
- Water Quality Program
- River Studies Program

Monitoring

- Data must be collected under an approved Quality Assurance Project Plan or be of demonstrable, comparable quality.

Existing Procedures



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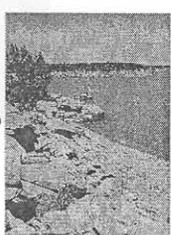
Monitoring

- 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.

Existing Procedures



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Monitoring Existing Procedures


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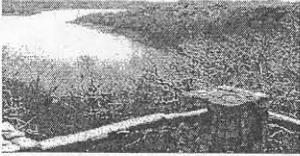
- Data must be collected under an approved Quality Assurance Project Plan or be of demonstrable, comparable quality.
- Sampling must be representative, covering at least two seasons and spanning at least two years.
- **Monthly or quarterly sampling is typical, but resources may limit monitoring frequency.**



Existing Procedures **Assessment**

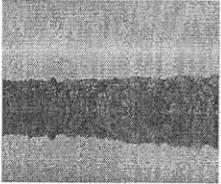

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- Every 2 years using the last 5 years of data.
- Surface measurements.
- Represents no more than 5,120 acres.

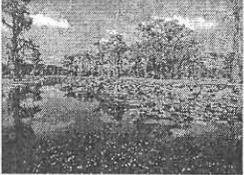


Assessment Existing Procedures

- Data are assessed using pass/fail and at least 10 samples are 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 $\leq 10\%$ of samples exceed the criteria.
- Partially supports its use if > 10 and $\leq 25\%$ of samples exceed criteria.
- Nonsupporting if $> 25\%$ of samples exceed criteria.



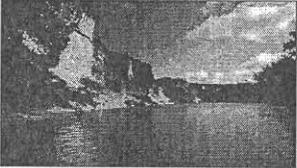
Proposed Approach



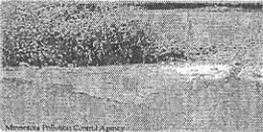
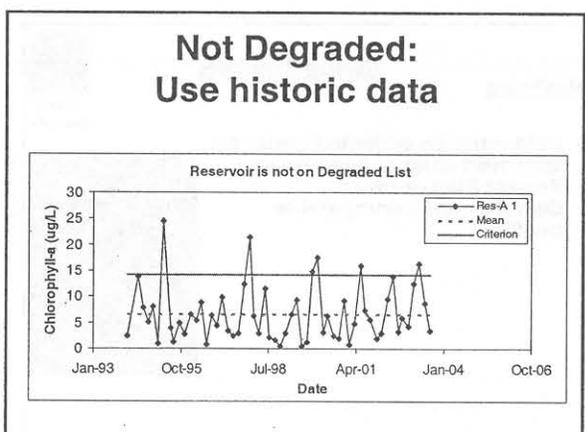
- Establish baseline, reservoir-specific criteria for nutrient parameters.
- All future assessments involve comparisons using these values.
- Select nutrient parameters that reflect nutrient levels within the reservoir and incorporate temporal variability

Methods of Establishing Baseline

- If not degraded, use historic data for that reservoir

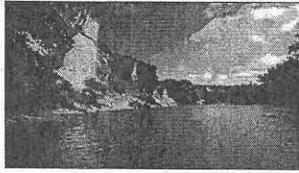


- If currently degraded
 - Use best 5 years
 - Use comparable, non-degraded reservoirs
 - Use TCEQ 2002 Screening Levels

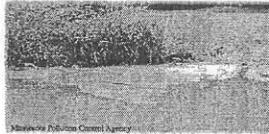



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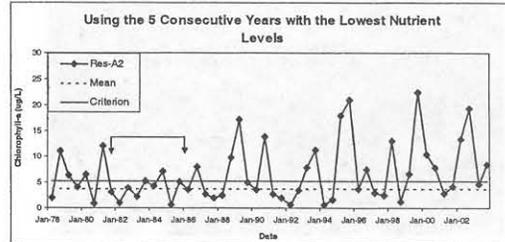


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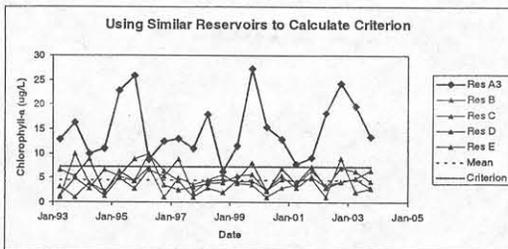


Texas Inland Fisheries Control Agency

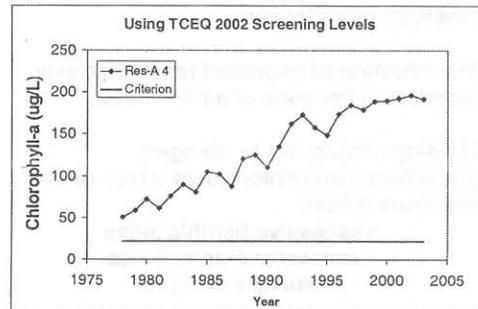
**Degraded:
Use 5 best years**



**Degraded:
Use comparable reservoirs**



**Degraded:
Use TCEQ 2002 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

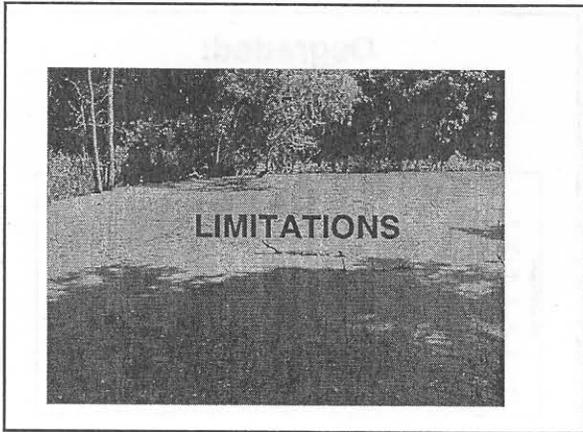


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**ORTHOPHOSPHORUS
NITRATE-NITRITE
CHLOROPHYLL- α**

- 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

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➤ **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.

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➤ **Surface sampling ignores any effects of reservoir stratification.**

➤ **Identification of degraded reservoirs may be affected because of limited data.**

➤ **Limiting monitoring to nitrogen, phosphorus and chlorophyll-*a* may miss impairment from:**

- excessive benthic algae
- excessive macrophytes
- blue-green algae

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NO-DEGRADATION POLICY

➤ Provides reservoir-specific protection from nutrient overloading of public waters

➤ Assures continued quality habitat and recreation for future generations