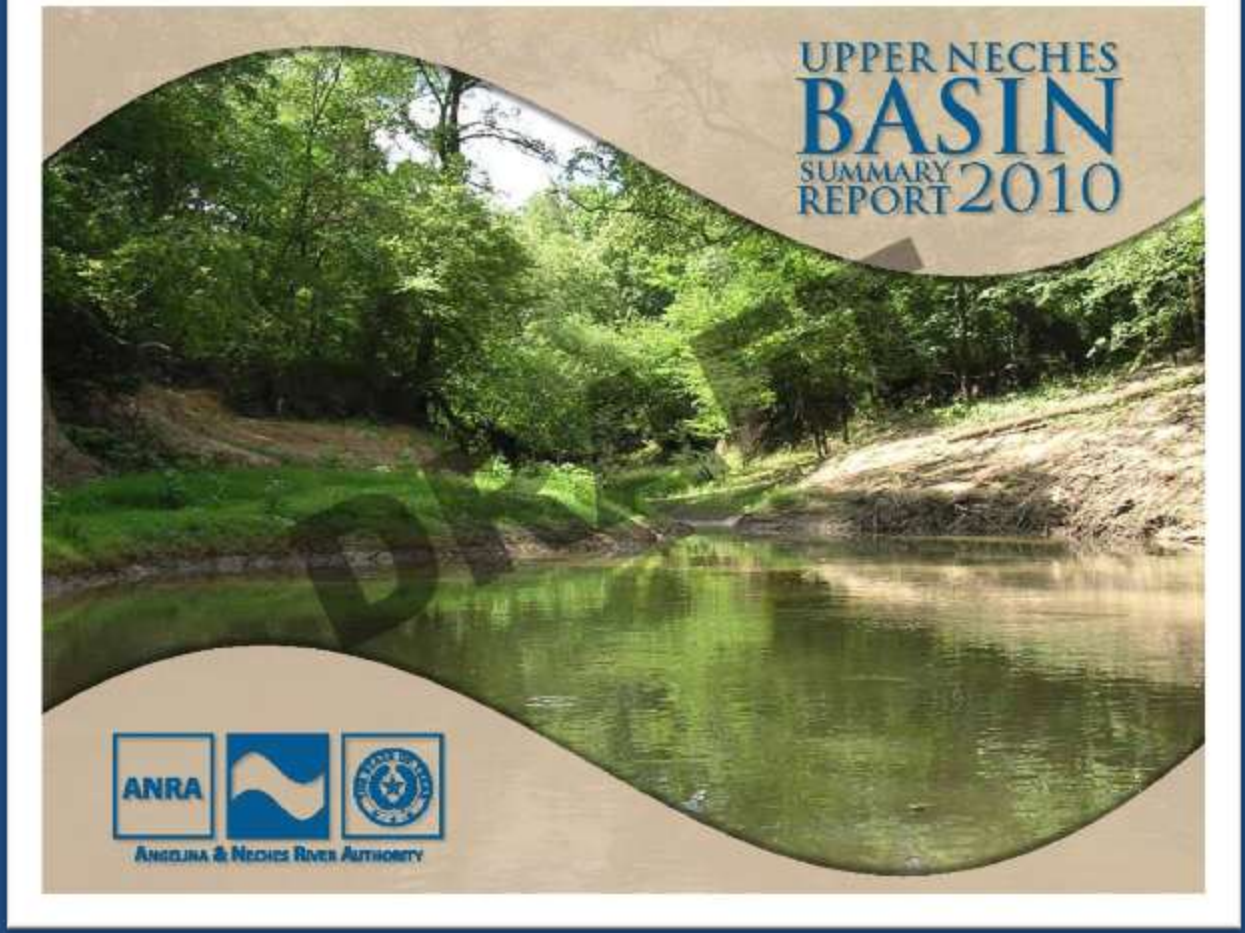
ANRA

ANGELINA & NECHES RIVER AUTHORITY

DRAFT 2010 Upper Neches Basin Summary Report

Overview & Discussion

ANGELINA & NECHES RIVER AUTHORITY



Available for download at http://www.anra.org

Outline of the Basin Summary Report

Executive Summary

Summary Report

1.0 Introduction

2.0 Public Involvement

3.0 Water Quality Review

- 3.1 Water Quality Terminology
- 3.2 Data Review Methodology
- 3.3 Sub-Basin Summaries

4.0 Recommendations and Conclusions

- 4.1 Recommendations and Comments
- 4.2 Conclusions

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

Activities and Accomplishments

Significant Findings

Recommendations

TO BE COMPLETED AFTER INPUT FROM THE BASIN STEERING COMMITTEE

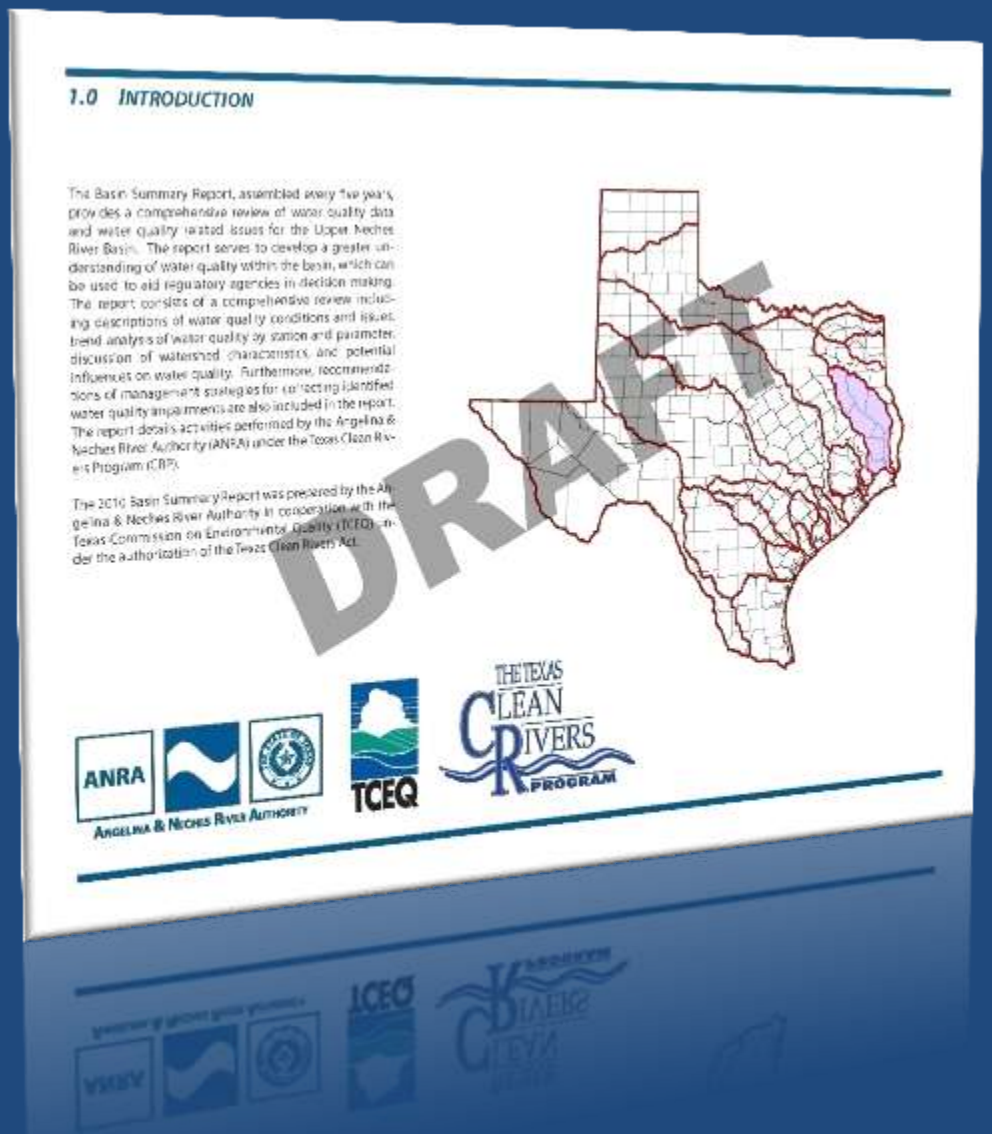
DRAFT

This section is a non-technical summary of the report.

Includes the following sections:

- *Activities and Accomplishments*
- *Significant Findings*
- *Recommendations*

1.0 INTRODUCTION



This section describes the purpose of the report and provides a discussion of the Clean Rivers Program.

Includes the following sections:

- *About the Angelina & Neches River Authority*
- *CRP and Basin Goals & Objectives*
- *Coordination and Cooperation with Other Entities in the Basin*
- *Descriptive Overview of the Neches Basin*
- *Summary of the Neches Basin Water Quality Characteristics*

2.0 Public Involvement

This section describes efforts to promote public involvement in water quality issues.

Includes the following sections:

- *ANRA Operations*
- *Public Information*
- *Environmental Laboratory*
- *Basin Steering Committee*
- *Texas Stream Team*

3.0 Water Quality Review

This section provides an overview of technical terms (including water quality parameters), data review methodology, and summaries of the water quality data for each Sub-Basin.

Includes the following sections:

- *Water Quality Terminology*
- *Data Review Methodology*
- *Sub-Basin Summaries*

3.1 Water Quality Terminology


Water Quality Parameters - Conventional Parameters

Ammonia-Nitrogen

Potential Impacts

Possible Sources/Causes

Chloride

Potential Impacts

Possible Sources/Causes

Chlorophyll a

Potential Impacts

Possible Sources/Causes

Escherichia coli (E.coli)

Potential Impacts

Possible Sources/Causes

Nitrate + Nitrite-Nitrogen

Potential Impacts

Possible Sources/Causes

Total Phosphorus and Dissolved Orthophosphorus

Potential Impacts

Possible Sources/Causes

DRAFT

Water Quality Parameters

For each Field and Conventional Parameter evaluated for the report, a narrative summary is provided that discusses:

- Potential Impacts
- Possible Sources/Causes

3.2 Data Review Methodology

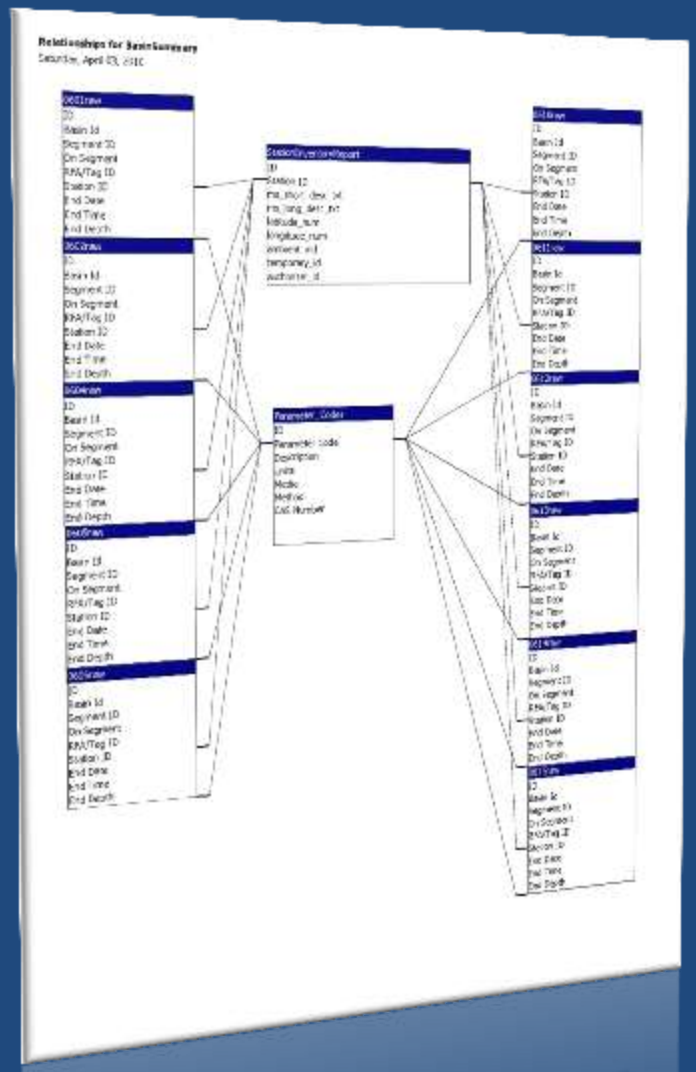
Trend Analysis

This section details the methods used to compile and evaluate the data for the Basin Summary Report.

Topics discussed include:

- Evaluation Period (9/1/99 – 8/31/09)
- Data Management
- Parameters evaluated
- Statistical Analysis

ANRA's Data Review Methodology

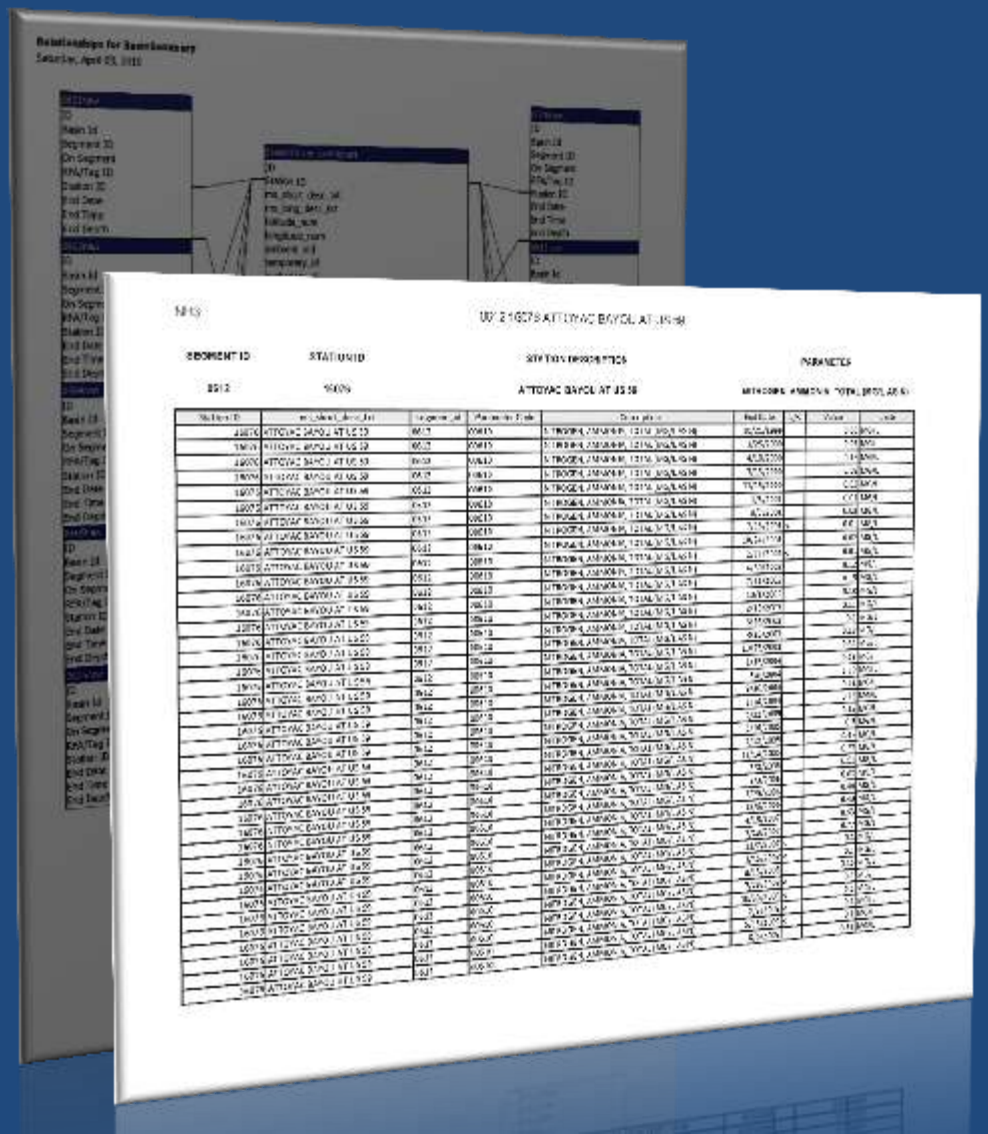


Relational Database

Data was exported from TCEQ's Surface Water Quality Monitoring Information System (SWQMIS)

The raw data was used to create a MS Access database

ANRA's Data Review Methodology (cont.)

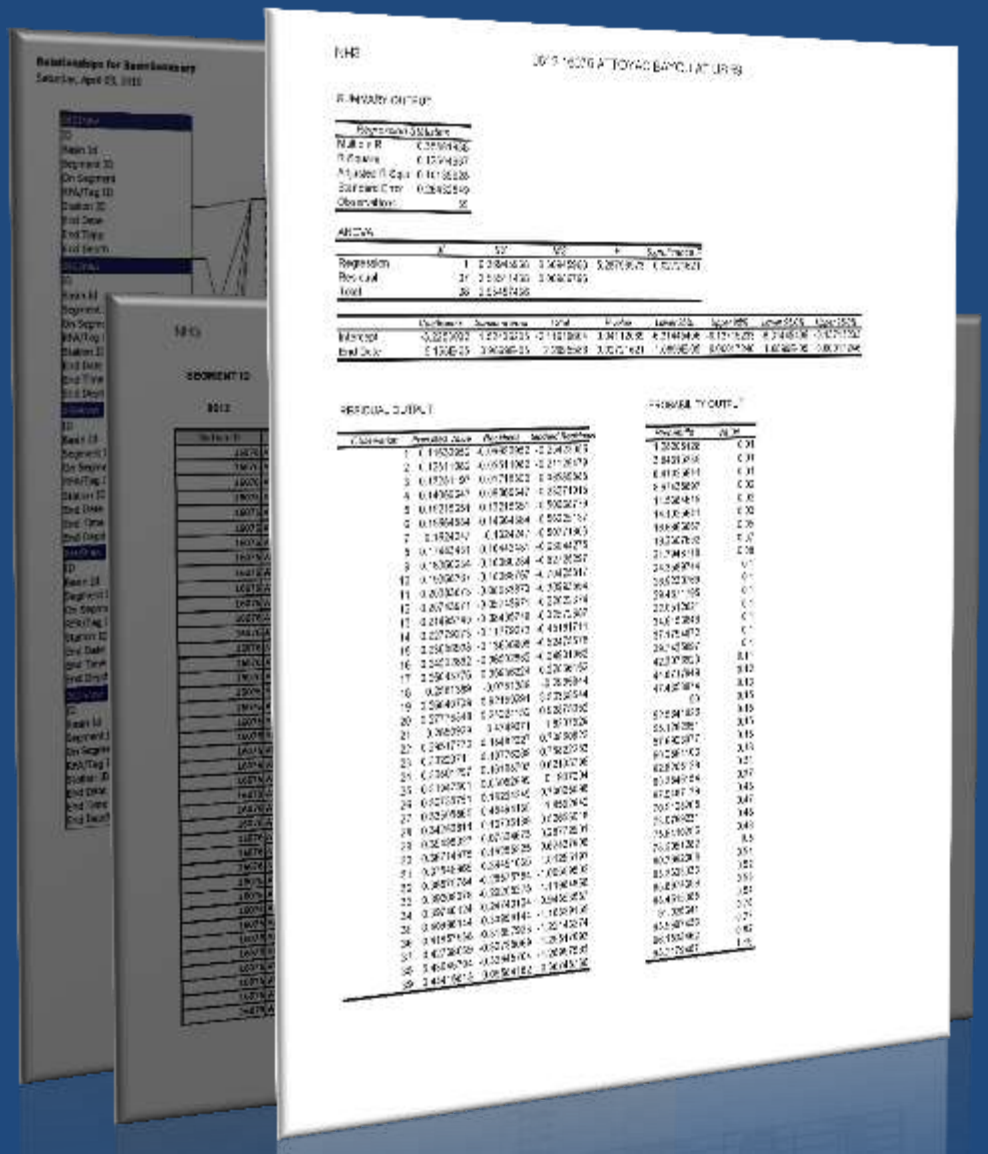


Monitoring Station Summaries

Data was queried in the Access database and exported to MS Excel for data evaluation and graphing.

For each monitoring station, tables were created for the individual water quality parameter.

ANRA's Data Review Methodology (cont.)

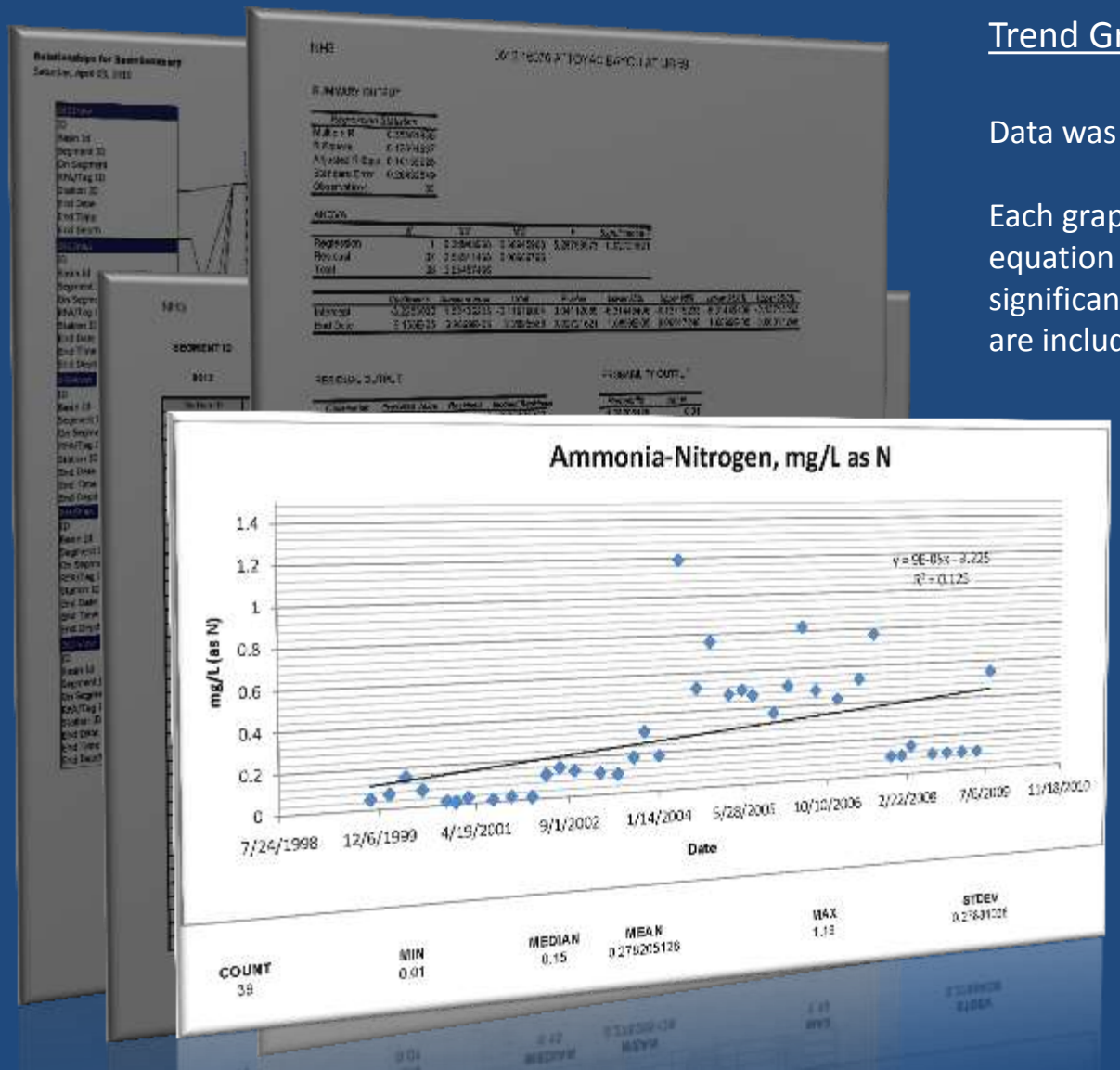


Statistical Analysis

For each parameter meeting criteria (minimum of 20 data points, with continuous monitoring), linear regression against time was performed.

Trends were considered significant with a *t-stat* ≥ |2| and a *p-value* < 0.1

ANRA's Data Review Methodology (cont.)

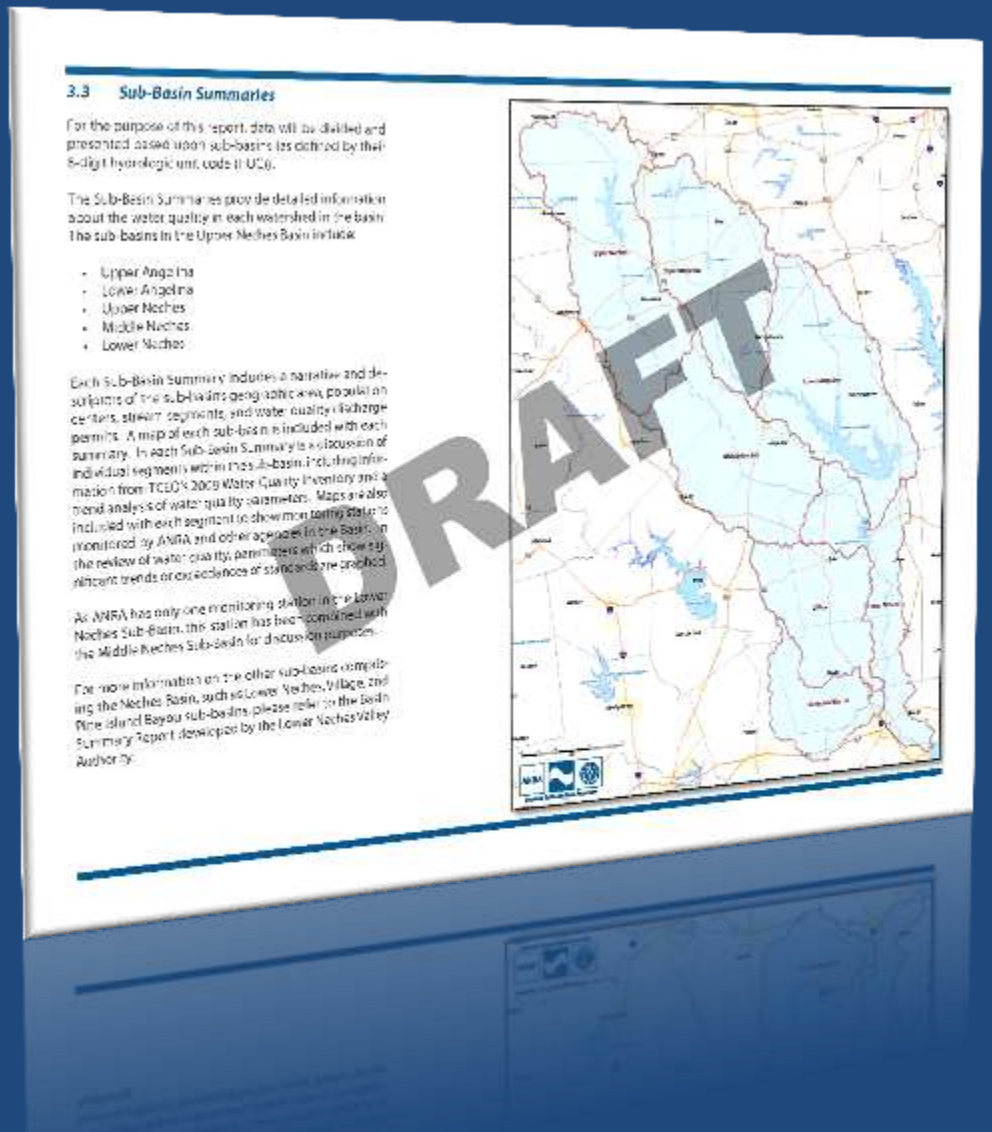


Trend Graphs

Data was plotted against time.

Each graph includes a trendline and equation of the line. For statistically significant trends, the *t-stat* and *p-value* are included on the graph.

3.3 Sub-Basin Summaries



Data is divided and presented based upon Sub-Basins as defined by their 8-digit hydrologic unit code.

The Sub-Basins in the Upper Neches Basin are:

- Upper Angelina
- Lower Angelina
- Upper Neches
- Middle Neches
- Lower Neches

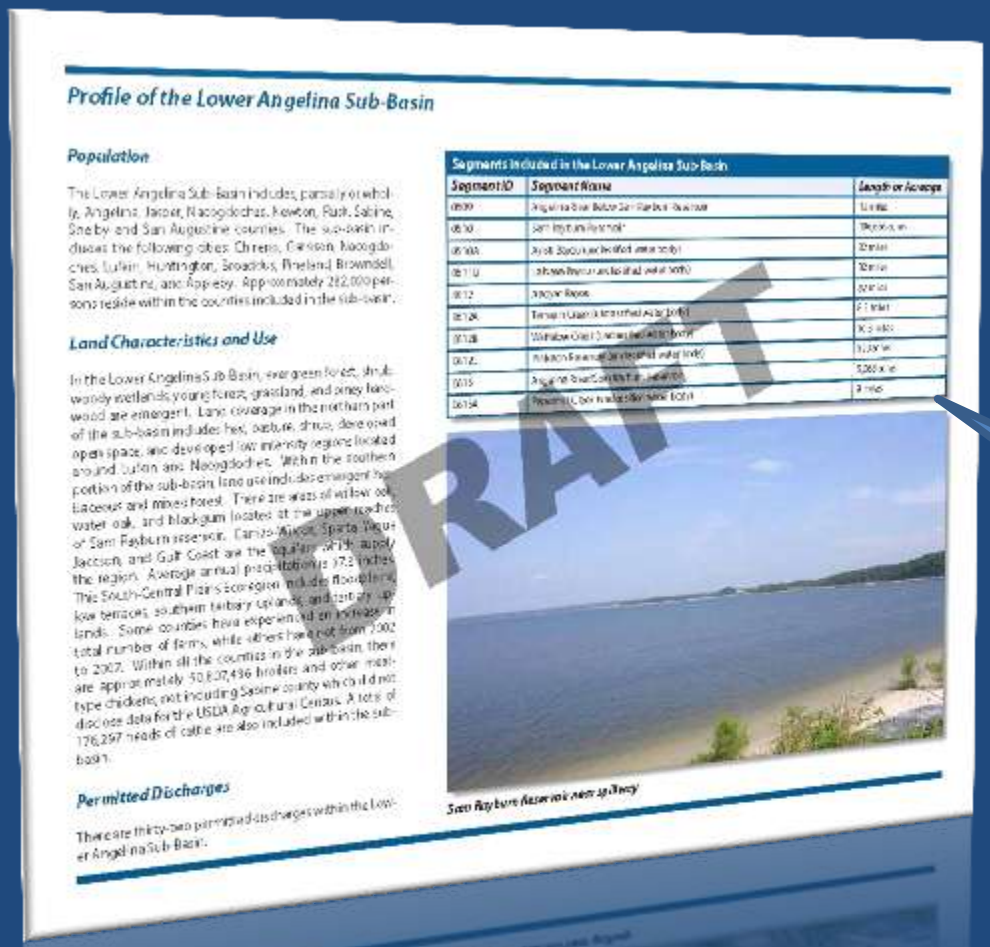
Sub-Basins Included in the Basin Summary Report

Layout of the Sub-Basin Summaries

Each Sub-Basin Summary begins with a map of the Sub-Basin. Each map identifies:

- *ANRA Monitoring Stations*
- *TCEQ Monitoring Stations*
- *LNVA Monitoring Stations (where applicable)*
- *City of Tyler Monitoring Stations (where applicable)*
- *Segments*
- *Segment Boundaries*
- *Cities*
- *Major Highways*

Layout of the Sub-Basin Summaries (cont.)

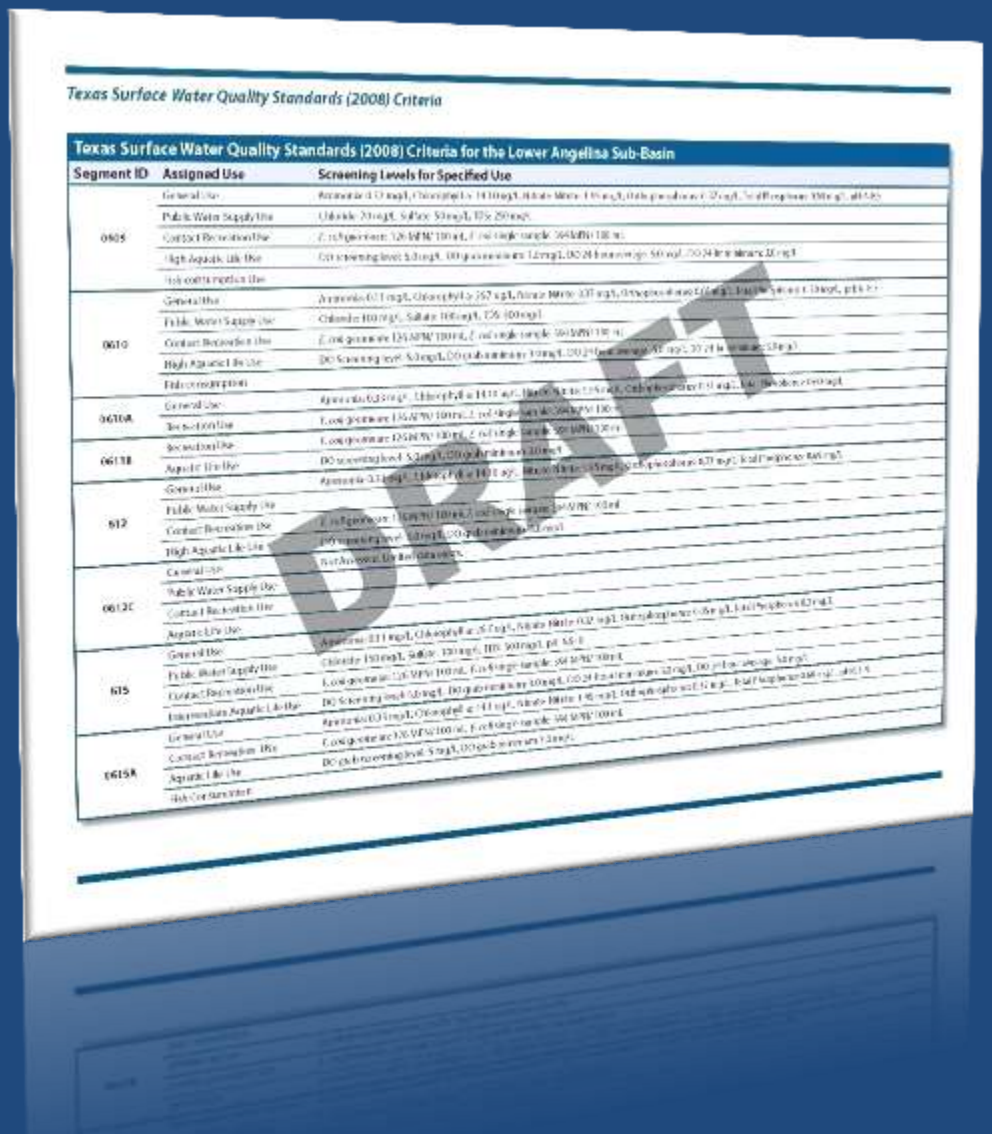


Profiles of each Sub-Basin include narrative discussions of:

- *Population*
- *Land Characteristics and Use*
- *Permitted Discharges*

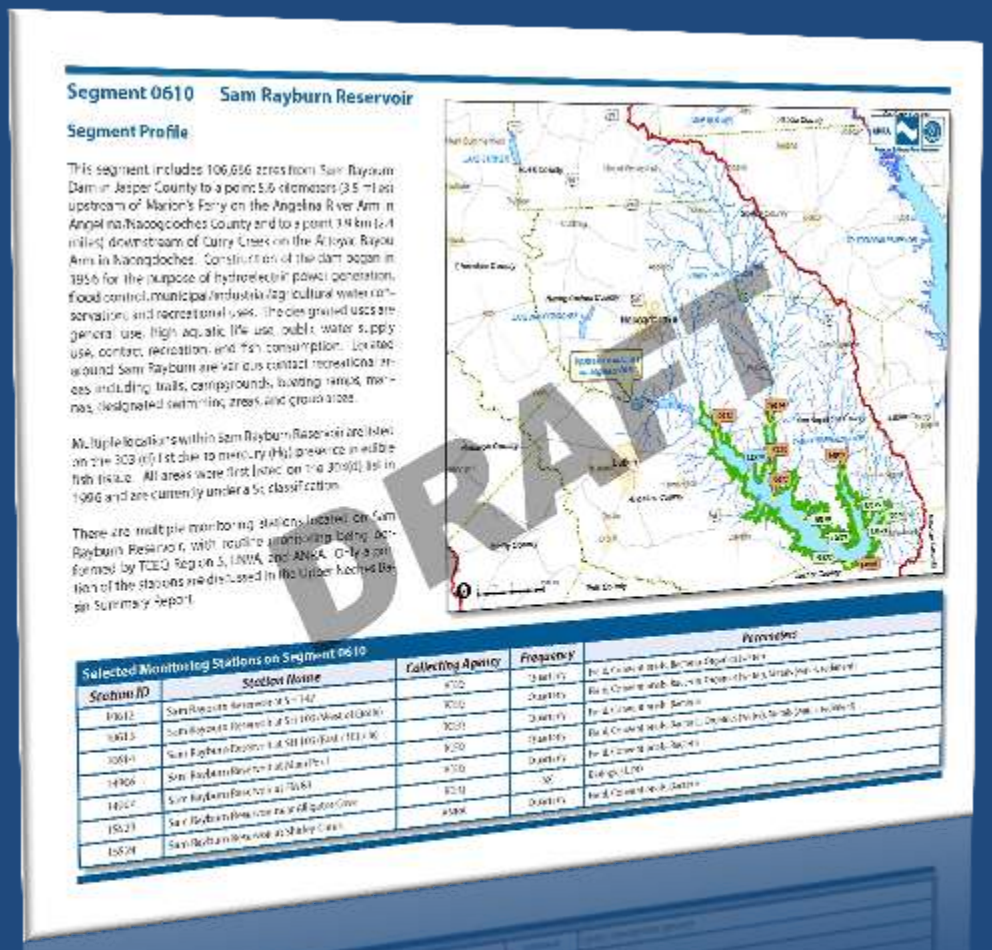
Each profile includes a table listing the segments included in each Sub-Basin.

Layout of the Sub-Basin Summaries (cont.)



Each Sub-Basin Summary includes the 2008 Texas Surface Water Quality Standards for segments in that Sub-Basin.

Layout of the Sub-Basin Summaries (cont.)



Segment Profiles

A Segment Profile is available for each segment in the Sub-Basin. Each profile includes a:

- *Narrative Summary*
- *Segment Map*
- *List of Monitoring Stations*

Layout of the Sub-Basin Summaries (cont.)

Monitoring Station Data Review

For each monitoring station, results of water quality parameter analyses are discussed.

Graphs are included to show items of interest (statistically significant trends, exceedances, etc.).

Layout of the Sub-Basin Summaries (cont.)

Summary for the Lower Angelina Sub-Basin

Water Quality Issues Summary for the Lower Angelina Sub-Basin

Water Quality Issue	*Affected Area*	*Possible Influences/Causes*	*Possible Effects*	*Possible Solutions/Actions Taken*
Mercury in edible fish tissue	Since 1956, Sam Rayburn Reservoir has been listed on the 303 (d) list	• Atmospheric deposition • Unknown sources	• Causes serious health concerns that affect the public, including children and pregnant women • Bioaccumulation over years of consumption is threatening; fishing is primary use of water	• [illegible] • Enforce strict limitations on air permits • Ensure safe disposal of mercury-containing products for the general public
Elevated bacteria levels; Currently listed on 303 (d) list due to impairments	Segment 0610A Ayish Bayou Segment 0611 Angelina River above Sam Rayburn from US 84 to lower boundary Segment 0611B La Nana Bayou (mouth to SH7) Segment 0612 Attoyac Bayou	• Agricultural activities including cattle farming and poultry activities within the area may induce non-point source pollution via runoff • Point source municipal discharge • Unknown	• Risk for contact recreation • [illegible]	• [illegible]
Significant decreasing trend of dissolved oxygen levels	Observed at two stations at Sam Rayburn Reservoir [illegible] 147; SH 103)	• Aquatic invasive plants (Giant Salvinia)	• Detrimental to aquatic community	• [illegible]
Significant decreasing trend of nitrate-nitrite, total phosphorus, and chloride levels	Several stations at Sam Rayburn Reservoir	• Closure of Abitibi Paper Mill has reduced the nutrient loading entering the reservoir • Efficient On-site Sewage Facilities (OSSF) program around Sam Rayburn	• Decreases in excess nutrient loading for aquatic community	• Continued monitoring

<u>Water Quality Issues Summary</u>

A Summary of Water Quality Issues is included for each Sub-Basin.

Each Summary includes a discussion of each:

- *Water Quality Issue*
- *Affected Area*
- *Possible Influences/Causes*
- *Possible Effects*
- *Possible Solutions/Actions Taken*

4.0 Recommendations and Conclusions

This section includes:

- recommendations and comments made by stakeholders
- an outline of recommendations to protect and improve water quality in the basin
- priorities to address water quality
- the long-term vision of how basin efforts need to be directed

Steering Committee input is needed to develop this section of the report.

Steering Committee Member Comments

Examples of comments received thus far:

- Specify that the report refers to the 2008 303(d) list, as the 2010 list is still a draft
- Verify and correct rainfall data
- Include Fish Consumption Use for all water bodies
- Report sample size for all graphs
- Report *t-stat* and *p-value* for all graphs, not just those showing statistically significant trends (to maintain consistency)
- Query for special studies or intensive surveys to have a more complete sample set

Steering Committee Member Comments

Examples of comments received thus far (continued):

- Remove lines connecting data points from DO graphs (to maintain consistency)
- List the criteria, especially for graphs with exceedances
- Examine and/or add a qualifying statement regarding the effect of laboratory limits of quantification on trends (false trends?)
- Compare different constituents (Chl-*a* vs Flow, DO vs Flow, etc.) to look for correlations or explanatory trends
- Look for more seasonal trends
- Provide more graphs of data that exceed criteria
- Draw conclusions and give reasons why trends are occurring

Steering Committee Member Comments

Comments from the Steering Committee Members are a crucial part of this process, and help to increase our understanding of issues in the basin.

Comments will be incorporated into the Final Basin Summary Report.

Please direct Questions, Comments, and Recommendations to:

Brian Sims
ANRA Environmental Division Manager
PO Box 387
Lufkin, TX 75902
Phone: 936-633-7527
Email: bsims@anra.org