Development of a Watershed Protection Plan for the Concho River Basin
Texas State Soil and Water Conservation Board
Project #04-13
Nonpoint Source Summary Page
September 1, 2004 – August 31, 2007

1. Title of Project: Development of a Watershed Protection Plan for the Concho River Basin

Project Goals/Objectives: This project will provide an assessment of existing and potential water quality threats related to on-going non-point source (NPS) water pollution within the Concho River basin (located in West Texas) and will also provide a Watershed Protection Plan. Information obtained from this project will be made available to state, federal and local decision makers to promote the orderly restoration of the basin aquatic environment and to prevent additional degradation.

2. Project Tasks: Tasks contained within this workplan include the following: (1) Project Coordination (2) Quality Assurance, Data Collection and Assessment (3) Public Participation (4) Development of a Watershed Protection Plan

3. Measures of Success: The success of this project will be monitored within the specific project deliverables as follows: (1) Quarterly progress reports (2) Annual reports containing the accumulated data collected through approved QAPP protocols and the appropriate analysis of that data (3) Provision of records pertaining to the public participation effort (4) Specific recommendations to state, federal and local agencies regarding NPS issues within the basin based on the developed Watershed Protection Plan.

4. Project Type: Statewide ( ) Watershed (X) Demonstration ( ) Other ( )

5. Waterbody Type: River (X) Groundwater (X) Other ( )

6. Project Location: Concho River Basin to O.H. Ivie Reservoir; including the Concho River (segment 1421) and O.C. Fisher (segment 1425)

7. NPS Management Program Reference: State of Texas Agricultural/Silvicultural Nonpoint Source Management Program approved February 25, 2000.

8. NPS Assessment Report Status: Impaired (X) Impacted (X) Threatened ( ) TMDL ( ) Other (X) -all status designations present in study area.

9. Key Project Activities: Hire staff ( ) Monitoring (X) Regulatory Assistance ( ) Education (X) Implementation ( ) Demonstration (X) Other ( )

10. NPS Management Program Elements: Milestones from the *"Texas Non-point Source Pollution Assessment Report and Management Program*, to be implemented include: (1) Watershed approach to monitoring and assessment of Non-point Source water pollution (2) Coordination with federal, state and local agencies, (3) Committing to technology transfer, technical support, administrative support, and cooperation between agencies and programs for the prevention of NPS water pollution.

11. Project Costs: Federal ($375,240) Non Federal ($246,827) Total Project ($622,067)

12. Project Management: Texas State Soil and Water Conservation Board; *Project Lead:* Upper Colorado River Authority. *Cooperating Entities:*; Texas Water Development Board; Texas Commission on Environmental Quality, Clean Rivers program Upper Basin Steering Committee, all effected Soil and Water Conservation Districts; Natural Resources Conservation Service; United States Geological Survey; Sterling County Underground Water Conservation District; Texas Institute for Applied Environmental Research, City of San Angelo.

13. Project Period: September 1, 2004 through August 31, 2007.

Concho Watershed Protection Plan Development Project
Texas State Soil and Water Conservation Board
Project #04-13
Nonpoint Source Summary Page
September 1, 2004 – August 31

Problem/Need Statement:
The Concho River basin is currently experiencing a severe drought, as is most of west Texas. The four major reservoirs in the region are all currently below 20% of their designed, total capacity. As the availably of water resources in this region becomes more and more scarce, it is becoming increasingly important to protect the quality and conserve the usage of this limited resource.

The Concho River basin lies within thirteen West Texas Counties and encompasses a watershed of approximately 4.5 million acres. Four major reservoirs, O.H. Ivie, O.C. Fisher, Twin Buttes and Lake Nasworthy are located within the watershed boundaries. These reservoirs provide potable water, either wholly or in part to approximately 500,000 residents. In addition, the streams and reservoirs of the Concho basin are utilized for agricultural production and in power generation. The Concho River itself, lies below San Angelo and enters O.H. Ivie Reservoir near Paint Rock, Texas. Above San Angelo, several major streams converge to form the Concho River; these include the North, South and Middle Concho Rivers, Spring Creek and Dove Creek *(see Figure 1 and Figure 2)*. Many historical springs feed into the tributaries of the Concho River. It is at these locations that the more environmentally sensitive aquatic habitats are commonly found. In 2002, the Concho River (segment 1421) was placed on the 303(d) List (category 5c) for having impaired macrobenthos communities. The O.C. Fisher Reservoir (segment 1425) was also listed for total dissolved solids and chlorides (also category 5c).

The Upper Colorado River Authority has identified numerous existing and potential sources of non-point source water pollution within the Concho River Basin. These include: urban runoff, feedlot waste, erosion from irrigated and non-irrigated cropland, on-site wastewater disposal, losses of perennial stream flows, and rangeland and pastureland management. Stream Segment 1421 within urban areas of the City of San Angelo, (primarily the North Concho River portion), have been the subject of a ten year program in implementation of BMP construction within that sub-watershed through the 319 program. This program has been highly sucessfull in improving water quality and providing opportunities for public education. This followed the provision and adoption of a NPS Urban Runoff Water Pollution Abatement Master Plan for a 4.75 mile stream reach of the North Concho through San Angelo. However, much of the urban watershed in San Angelo, including the heavily industrialized Pulliam Draw portion, remains uncontrolled and it is suspected that substantial water quality impacts could occur downstream of San Angelo. Within the proposed project, the 1994 Master Plan will be updated and expanded to include additional high risk urban areas of San Angelo. Water quality complaint investigations and routine monitoring conducted through the Texas Clean Rivers Program in recent years have also identified existing and potential water quality problems within the basin. These include difuse salinity sources likely from oil production facilities near the South Concho River, near Dove Creek and in the North Concho River sub-basin. Also, confined animal operations and extensive cultivation within the segment 1421 watershed have been the focus of numerous special studies and investigations regarding nutrient enrichment and water quality degradation. Entensive and growing rural development within the basin, particularly areas of sensitive aquatic habitats near source springs, has also been recognized as posing considerable risk to the basin water resources. Other areas of extensive development have been documented as having impact on groundwater resources through poorly designed and aging on-site disposal systems. Two completed watershed restoration feasibility studies completed within the basin have also provided considerable data and information regarding the influences of poor range management on basin water resources. A third study is currently underway on the Kickapoo Creek sub-basin and is being

conducted by the United States Corp of Engineers under it's watershed restoration (206) program. It is apparent that the basin requires a comprehensive assessment and development of a non-point source pollution abatement plan to coordinate, and prioritize efforts to address the problem.

General Project Description:
The proposed project is designed to evaluate and assess potential sources of non-point source water pollution on a basin wide basis and to provide for the development of control strategies through a planning process. This will occur through the integration of water quality monitoring in addition to existing, ongoing water quantity monitoring programs, the development of additional surface and groundwater monitoring activities and the coordination of assessment activities with other entities in the region. The proposed program anticipates coordination of program elements with other entities such as the Texas State Soil and Water Conservation Board, Texas Water Development Board, Sterling County Underground Water Conservation District, U.S Geological Survey, Texas Institute for Applied Environmental Research and the City of San Angelo. In addition, the Texas Clean Rivers Program and the Colorado River Basin CRP partners (through it's Upper Colorado River Basin Steering Committee and Coordinated Monitoring Program) will be participants in the project through utilization of this forum in an advisory role. The proposed project contains the following elements:

1. Monitoring and Assessment
    - Continue North Concho Watershed Monitoring Program
    - Continue Paired Watershed Monitoring
    - Develop Surface and Groundwater monitoring within remaining basins
    - Integration and assessment of all other approved water quality data collected within the basin (from TCEQ)
    - Development and maintenance of approved QAPP

2. Public Information and Involvement
    - Press Releases, Public Meetings, etc.
    - Area agency coordination
    - Upper Colorado River Basin CRP Steering Committee
    - Upper Colorado River Basin Coordinated Monitoring
    - Dissemination of project reports, etc.

3. Water Quality Assessment and Planning
    - Maintenance and analysis of accumulated water quality, hydrologic and hydrogeological data.
    - Assess existing and potential sources of Non-point source water pollution within basin
    - Identify, develop and evaluate alternative control strategies

4. Reporting
    - Provide Quarterly Project Reporting
    - Provide Watershed Protection Plan

Discussion:
This proposed planning project will utilize all existing and previous water resource programs and develop additional data collection programs specifically designed to enhanse and augment existing programs as related to non-point sources within the basin. This includes all previous and existing monitoring within the basin conducted under the coordinated monitoring protocols of the Texas Clean Rivers Program and/or previous data collections conducted under 319 approved QAPPs. Agencies involved with this

program include the Texas Commission on Environmental Quality, United States Geological Survey, Lower Colorado River Authority, Colorado River Municipal Water District and Upper Colorado River Authority and all data collected under the program is found in the TCEQ water quality data base and 319 project files. All new data collections proposed within this project will be developed under QAPP requirements of the program.

The analysis of water quality data and completion of field investigations will allow the creation of an inventory of existing and highly potential sources of NPS water pollution within the basin including the location of at risk stream segments, potential and existing pollutant(s), existing effects and water quality conditions and potential short term and long term effects. Utilizing the Upper Colorado River Basin Clean Rivers Program Steering Committee, which is made up primarily of basin stake holders, alternative structural and non-structural BMPs will be identified for each of the at risk stream segments. These alternatives will be screened and "best fit" solutions identified and prioritized on a basin wide basis. Following completion of this process, a watershed protection plan will be prepared including discussion and presentation of all project data collected and/or utilized, presentation of all output and processes involved in the identification of at risk stream segments and presentation of all output and processes involved in the identification and prioritization of NPS BMPs.

Tasks, Objectives, Schedules, and Estimated Costs:

TASK 1: PROJECT COORDINATION

Cost: $24,000(Federal); $16,000(Nonfederal); $40,000(Total)

Objective:
Management of all of the administrative functions required for support of the program.

- Informative and timely progress reports
- Participation in conference calls and planning meetings
- Timely and accurate reimbursement forms and statements
- Proper backup documentation to support allowable costs
- Responsibility for subcontractors, from procurement through oversight
- Participation in any required fiscal monitoring reviews
- Timely & accurate deliverables to meet the intent of the workplan/contract
- Budget monitoring and cost accountability

Task Description:
Work within this task includes the preparation of all quarterly reports, the watershed assessment report, Watershed Protection Plan, coordination of staff and subcontractor efforts, maintenance of financial and technical files, coordination with participating and contracting agency staff, preparation of reimbursement forms and statements and general program supervision. The work will generally be consistent with meeting program objectives as outlined above.

Task Deliverables: September 1, 2004 through August 31, 2007

A. Quarterly Progress Reports to include; Status of deliverables, narrative description of program activities and description of dl monitoring. To be submitted to the TSSWCB by the 15th day following the end of the federal FY quarter (January 15, April 15, July 15, October 15).
B. Submittal of Reimbursement forms and statements with quarterly reports.

C. Copies of executed sub-agreements as completed.
D. Attendance at all required coordination or planning meetings with sub-contractors and TSSWCB staff.
E. Printing and submittal of the Watershed Protection Plan containing the nine elements required in the FY 2004 CWA Section 319 Grant Guidelines.

TASK 2: DATA COLLECTIONS AND ASSESSMENT
Cost: $327,041 (Federal); $218,027 (Nonfederal); $545,068 (Total)

Objectives:
Conduct monitoring to support a thorough evaluation of NPS issues and aid the development of a Watershed Protection Plan.

Sub-Task 2.1 Monitoring:
The on-going surface and groundwater monitoring programs on the North Concho watershed will be expanded to include the entire Concho River basin, specifically focusing on monitoring and assessment needs that are currently not being achieved to evaluate NPS issues. This will include the characterization of urban runoff loadings to the lower portions of stream segment 1421, evaluation of regulated and unregulated confined animal operations within segment 1421 below San Angelo and assessment of the effects on surface and groundwater quality of on-site wastewater disposal primarily in Northern Tom Green County. The design of these monitoring programs will be developed through the QAPP process and submitted for approval.

Sub-Task 2.2 Hydrology:
This task requires the continued cooperation of the USGS in the operation and maintenance of full telemetry flow stations that were added to the North Concho watershed during the initial program year. These stations are in addition to existing USGS stations financed by other sources. USGS data will be supplementary to data collected by the UCRA at additional quarterly base flow measurement stations. This data will be tabulated, analyzed and prepared for inclusion in the Watershed Protection Plan.

As an added assessment tool, the UCRA proposes to prepare and submit Watershed Run-off Event Reports following every storm event that produces measurable increases in stream flow at any of the stream flow stations. Included in these run-off reports will be detailed analyses of hydrographs and flow data from USGS gaging stations, rainfall amount estimates generated by Doppler Radar from the National Weather Service, volumetric flow estimates at various points on the watershed, channel transmission loss calculations, a narrative description of the storm/run-off event, and the net increase in reservoir contents following the event.

Sub-Task 2.3 Analyze Existing Data:
In addition to monitoring, it is proposed to retrieve and analyze all of the water quality data collected within the Concho basin under an approved QAPP to evaluate all NPS issues within the study area including those that may be attributable to the Texas Brush Control Program.

Sub-Task 2.4 Paired Watershed Studies:
Under this sub-task, UCRA proposes to operate, maintain and collect/analyze data from the existing two sets (four stations) of experimental sites designed to monitor and determine the effects of brush control on the water balance, water yield and water quality within the watershed. Each of the sites has been instrumented with Campbell Scientific Data Loggers and Sensors that automatically records evapotranspiration using Bowen ratio/energy balance methods, precipitation, wind speed and direction, air temperature, relative humidity and other pertinent data. Surface water flows will also be sampled and

monitored at two sites. Brush has been treated in one of the mesquite sites (June, 2002) and will be treated in one of the juniper sites during this contract period.

This sub-task requires weekly site visits to collect data via download into a laptop computer and/or collection of additional data by other means. Data will be transmitted electronically from the UCRA to the Texas Institute for Applied Environmental Research (TIAER) for verification and analysis. If it is deemed beneficial to the project, site visit intervals may be adjusted during the contract period to enhance the quality of data being collected. UCRA staff will perform existing field operation and maintenance programs. UCRA and/or TIAER staff will maintain and repair equipment as required, and will replace equipment units or parts as needed. TIAER staff will also conduct regular monthly site visits. Storm water samples will be collected at the juniper sites following mechanical removal of brush from one of the sites. The controlled environment and similarities of the two sites will allow for a comprehensive evaluation of the water quality impacts of the practice. At a minimum, three (3) storm events will be sampled. Accumulated data will be reviewed, verified and analyzed throughout the contract period. Detailed data reports will be prepared and submitted with the annual program and interim reports. A major portion of the analytical work effort within this task will be provided through the TIAER agreement with the UCRA.

Task Deliverables: September 1, 2004 through August 31, 2007

A. Implementation of an approved basin wide surface and groundwater monitoring program as developed and approved through the QAPP process.
B. The collection, retrieval and reporting of real time full telemetry flow data available from USGS flow stations within the watershed
C. The retrieval, analysis and reporting of all water quality data currently being collected within the basin under approved QAPP.
D. Quarterly base flow stream measurements at selected sites in the watershed.
E. Additional opportunistic stream flow measurements.
F. Hydrologic, hydrogeological and water quality data tabulation, analysis and reporting.
G. Watershed Rainfall & Runoff Event Reports submitted with quarterly reports and included in annual reports.
H. Weekly site visits to collect data from paired watershed sites.
I. Weekly transmittal of data to TIAERS project staff.
J. Preparation and submittal of quarterly and annual data summaries and analysis, consistent with the project reporting requirements.

TASK3: PUBLIC PARTICIPATION AND OUTREACH

Cost: $10,800 (Federal); $7,200 (Nonfederal);$18,000 (Total)

Objectives:
To follow are objectives included with the implementation of this work task:

- To involve the general public, civic groups, UCRA basin partners and interested governmental entities in assisting the UCRA in project planning and implementation
- To keep the public and other interested entities informed of project progress.
- To inform the public and other interested entities of the monitored hydrologic benefits resulting from the program.
- To involve existing Clean Rivers Program advisory entities (Steering Committee, Coordinated Monitoring processes) as project advisory partners.

- To provide decision makers with a comprehensive assessment and abatement plan to address NPS issues within the Concho River basin.

Task Description:
As a part of this project, a comprehensive public outreach and education effort will be instituted as related to NPS water pollution within the watershed. This effort will include all previously successful activities conducted by the contractor such as, coordination and cooperation with public entities, public awareness and education through press releases**,** project area tours for officials and members of the press, meetings with civic groups, Soil & Water Conservation Districts, Underground Water Conservation Districts and cooperating organizations and involvement with the UCRA Texas Watch Program. Initially, this program will focus on soliciting input into the planning phase of the project. Following this, the public will be kept informed of project implementation progress. In addition to the above, the UCRA will utilize an existing CRP Upper Basin Steering Committee as an advisory group.

Task Deliverables: September 1, 2004 through August 31, 2007

A. The UCRA will maintain and submit quarterly records of public outreach to the TSSWCB which includes the following:

    - Meeting dates, times, locations, attendee lists, agendas
    - Any curricula, evaluation forms
    - Press releases
    - Media reprints or other records

TASK 4: WATER QUALITY ASSESSMENT AND PLANNING
Cost: $13,565 (Federal); $5,600 (Nonfederal); $19,165 (Total)

Objective:
To assess the water quality implications of existing and potential NPS water pollution within the basin, based on the continuing data collections, and develop control strategies within a basin wide Protection Plan (Watershed Protection Plan).

Task Description:
Work within this task includes the evaluation and analysis of all program data collections and observations and the development of a NPS water quality assessment based on that evaluation and analysis. Utilizing the assessment, potential alternative management strategies will be identified, evaluated and used in the preparation of a Watershed Protection Plan designed to address NPS issues. The prepared Watershed Protection Plan will include a watershed assessment report, the results of all data collections, data analysis, identification of alternatives, a description of the screening process regarding various alternatives and recommended actions.

Task Deliverables: September 1, 2004 – August 31, 2007

A. Data and analysis reporting through quarterly reports.
B. Draft Watershed Protection Plan to TSSWCB 7-15-07
C. Final Watershed Protection Plan to TSSWCB 8-31-07

Project Lead:

Fred Teagarden, Senior Hydrologist
Upper Colorado River Authority
512 Orient
San Angelo, Texas 76903
Phone: 325-655-0565
Fax: 325-655-1371

TSSWCB Project Contact:

Jay Bragg, NPS Team
P.O. Box 658
Temple, Texas 76503
Phone: 254-773-2250 ext 234
Fax: 254-773-3311
jbragg@tsswcb.state.tx.us

Concho Watershed Protection Plan Development Project
Texas State Soil and Water Conservation Board
Project #04-13 (Budget Revision 11-6-06)

ITEMIZE BUDGET

Object Class Category	Federal Funds	Non-Federal Match	Total Costs
1. Personnel			
Senior Hydrologist @ 20% effort	$34,301	$22,868	$57,169
Staff Hydrologist @ 35% effort	$25,013	$16,675	$41,688
Staff Hydrogeologist @ 25% effort	$26,712	$17,808	$44,520
Office Manager @ 10% effort	$16,294	$10,862	$27,156
Education/Outreach Facilitator @ 10% effort	$17,172	$11,448	$28,620
Subtotal Personnel	$119,492	$79,661	$199,153
2. Fringe Benefits @ 24.7%	$29,514	$19,676	$49,191
Subtotal Fringe Benefits	$29,514	$19,676	$49,191
3. Travel			
Mileage	$5,700	$3,800	$9,500
Watershed Training	$5,000	$0	$5,000
Subtotal	$10,700	$3,800	$14,500
4. Equipment	$3,200	$2,800	$6,000
5. Supplies	$3,900	$600	$4,500
6. Contractual			
Lab Services	$11,000	$8,000	$19,000
USGS	$60,500	$42,000	$102,500
UWCD	$3,600	$2,400	$6,000
TIAER	$84,000	$56,000	$140,000
Subtotal	$159,100	$108,400	$267,500
7. Construction	$0	$0	$0
8. Other	$1,500	$0	$1,500
9. Total Direct Costs	$327,406	$214,937	$542,343
10. Indirect Costs	$47,834	$31,890	$79,724
11. Total Project Costs	**$375,240**	**$246,827**	**$622,067**

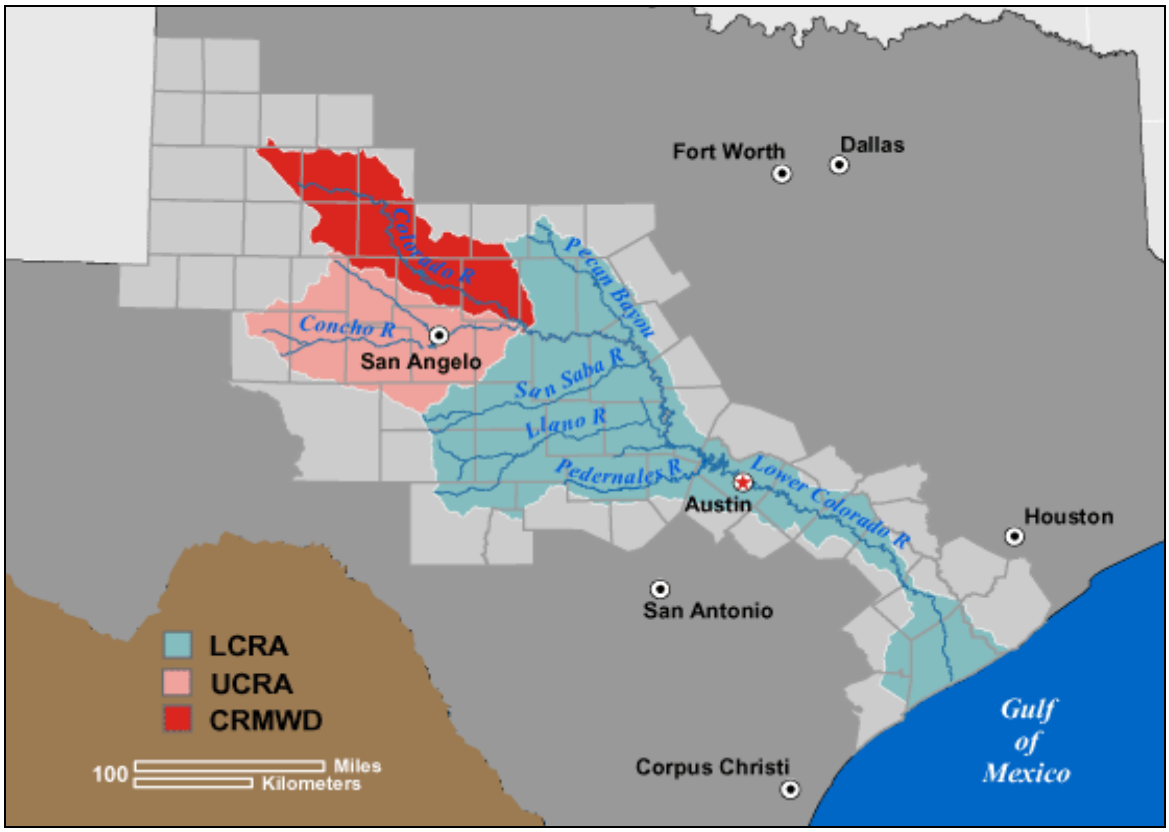

Figure 1. Colorado River Basin

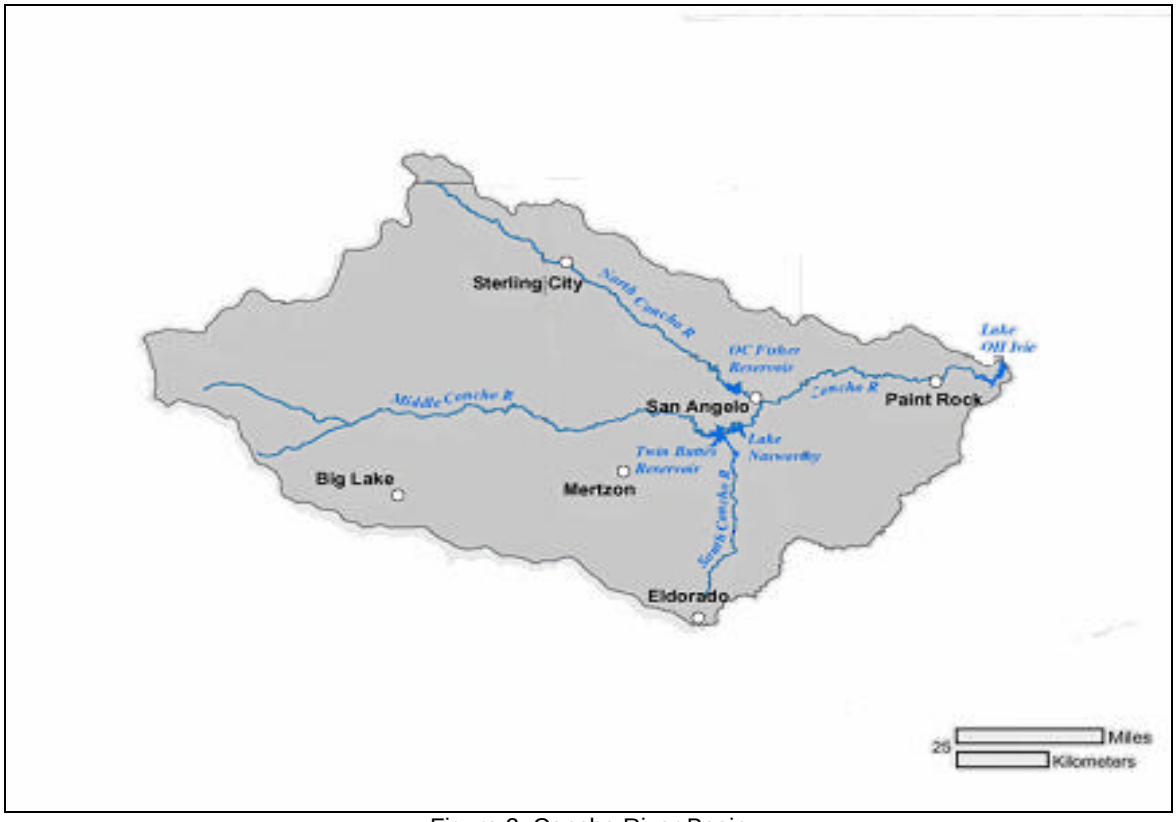

Figure 2. Concho River Basin