

Project: 2 (formerly FY 05/6/7 Project 8) **Rev. 3-20-08 App. 3-26-08**

Agency: Oklahoma Department of Environmental Quality

Title: Load Reduction Goal Determination – Wister Lake

Project Location: HUC Watershed 11110105 – Wister Lake

Project Map: See attached.

Problem Statement:

Wister Lake is listed on the 2004 303(d) list for phosphorus, with the source of the impairment being listed as an “unknown source”. Since there is no point source discharge made directly to the lake, phosphorus loadings from point source discharges to streams contributing to the lake and non-point sources are believed to be the major cause of the impairment. The Clean Lake Study on Wister Lake, initiated in 1991, established a phosphorus reduction goal of 2 mg/L for point sources. According to recent data, this point source reduction goal has been achieved; however, it appears that phosphorus loadings resulting from watershed contributions continue to impact the quality of Wister Lake. While the 2004 list only includes Total P, we have more recent data showing impairment for turbidity, and Dissolved Oxygen. These impairments will be added to the 2006 list and will be addressed in this project.

While DEQ initially planned to develop a TMDL for Wister Lake, upon further consideration of the watershed contributions it was determined that a watershed-based plan would be better suited to address environmental concerns within the watershed. In light of the unique challenges associated with reducing watershed contributions, DEQ is proposing the use of a watershed-based plan in lieu of a TMDL for Wister Lake.

The DEQ will work with the Oklahoma Conservation Commission (OCC) to develop a watershed-based plan for the Wister Lake watershed, with DEQ performing the modeling required to support the development of the plan by OCC. Establishing a phosphorus and turbidity reduction goal for watershed contributions will be a key component of the watershed-based plan. The purpose of this project is to establish that load reduction goal, through watershed and lake modeling, and to evaluate existing data to identify those data sets that would support modeling efforts and the development of a watershed-based plan by OCC. The development of the watershed-based plan will be pursued as a separate project by OCC and should not be considered a component of this project.

As the use of a watershed-based plan in lieu of a TMDL is a new approach, DEQ recognizes the possibility that upon final review the plan may not be accepted as an alternative to a TMDL. If this were to occur, DEQ will utilize the results of this project to issue a TMDL at no additional cost.

Watershed Description:

The drainage basin of Wister Lake includes the following HUC-11 watersheds:

- HUC 11110105020
- HUC 11110105030
- HUC 11110105040
- HUC 11110105050
- HUC 11110105060

See attached map for the study areas.

Project Objectives:

There has been a significant amount of activity within the Wister Lake watershed by various environmental agencies. These efforts have resulted in a wealth of information pertaining to the watershed (e.g. water quality, land use, and BMP development). A major goal of this project is to promote building on the results of individual efforts to formulate a comprehensive plan for addressing environmental concerns within the Wister Lake watershed. This would include partnering with EPA to promote interest from the State of Arkansas in supporting a watershed-based plan effort and to facilitate the acquisition of relevant information for that portion of Wister Lake watershed that is in Arkansas. A few examples of historical and ongoing efforts include; the Clean Lake Study conducted by the Oklahoma Water Resources Board (1996), the implementation of watershed management programs within the Poteau River watershed by OCC (2000), recent watershed modeling efforts by Oklahoma State University, and ongoing efforts by OCC to promote BMP implementation within the watershed through the use of cost incentive programs. As OCC has already established a presence within the watershed, there is a unique opportunity to build on those efforts by partnering with OCC to develop a watershed-based management plan. We believe this partnership will have positive impact on water quality of Wister Lake and its contributing streams.

While the primary objective of this project is to establish a load reduction goal for phosphorus and turbidity according to the Oklahoma Water Quality Standards, project deliverables will be utilized to support OCC efforts to develop a watershed-based plan for the Wister Lake watershed.

Project Tasks:

Task 1. Collect and review the existing data

Existing data relevant to the Wister Lake watershed will be compiled and evaluated to identify those data sets that can support proposed modeling efforts and ultimately the development of a Watershed-based Plan.

As existing monitoring data for Wister Lake and contributing streams has already been evaluated and is considered to be sufficient to support the needs of this project, no additional monitoring will be required.

Data on Wister Lake is available from 1992 through 1994 and from 2001 through 2005 and data on contributing streams is available from 1991 through 2000. This data will not only allow us to analyze water quality trends within the watershed, but will also provide some insight into the effectiveness of BMPs that have currently been implemented within the watershed; providing direction on what the focus of future BMPs should be.

Task 2. Secondary Data Quality Assurance Project Plan (QAPP)

A Quality Assurance Project Plan will be written and submitted to EPA for approval before undertaking any water quality modeling. The QAPP will be submitted along with this revised workplan.

Task 3. Water Quality Modeling

This task will include two water quality models: i). Review and modify the SWAT (Soil & Water Assessment Tool) watershed model developed by Oklahoma State University and use the revised model to simulate pollutant loadings from the entire drainage area of Wister Lake; ii). Use EFDC (Environmental Fluid Dynamics Code) to model water quality for Wister Lake. Two separate EFDC models, run in 2-dimensional steady state mode, will be run to account seasonal differences. A Carlson's TSI of 62 will be used as an indirect target for phosphorus since the phosphorus is known to be tied to the growth of algae in fresh water lakes. Turbidity of 25 NTU will also be used as the water quality target. The modeling work will be contracted to qualified consultants. The goal of this task is to establish a load reduction goal for the impaired pollutants.

Task 4. Prepare Modeling Report

A report will be prepared to document the calibration of the SWAT and EFDC model and establishment of the load reduction goal. This report will be used by the OCC to develop the Watershed-based Plan.

Measures of Success:

The ultimate measure of success will be improved water quality in Wister Lake and its contributing streams through the development and implementation of the watershed-based plan. Since the load reduction goals are an essential component of a watershed-

based plan, the overall measure of success for this project is to establish such reduction goals so that the watershed-based plan can be successfully developed. The establishment of such reduction goals will include the evaluation of the impacts of point sources and non-point sources pollution.

Outputs:

1. Secondary Data QAPP
2. Modeling report for both SWAT and EFDC

Project Management:

This project will be managed by the Oklahoma Department of Environmental Quality. The DEQ will provide oversight for all project activities.

Project Duration:

5 months

Project Milestones:

1. Secondary Data QAPP Submitted
2. Establish a load reduction goal May 1, 2008
3. Modeling report June 30, 2008

Budget/Funding:

FY07 Base (project 8; to be spent in FY07)	\$103,477
FY08 Carryover (project 2; to be spent in FY08)\$11,498
Total	\$114,975