

PROJECT 2 (Formerly FY 05/6/7 Project 2)

Agency: Oklahoma Water Resources Board

Title: Development, testing and drafting of Nutrient Limited Watershed (NLW) Impairment Study protocols to allow for listing of lakes for nutrients as Category 5 in the Oklahoma Integrated Report.

Project Description:

The Oklahoma Surface Water Monitoring Strategy recommends Nutrient Limited Watershed studies be conducted on identified lakes to either confirm or refute the nutrient threatened status and determine if an impaired condition exists.

The OWQS and implementation rules (USAP) allow determination of a threatened by nutrients condition for water quality reporting purposes. The “threatened” condition is not however a regulatory trigger and does not initiate the TMDL process outlined in the section 303d of the clean water act. The USAP does not establish clear-cut rules for determining when a water body is impaired by nutrients. In recognition of the complexity of nutrient impairment, the USAP references the need for a Nutrient Impairment Study. A nutrient impairment study is a scientific investigation of a waterbody detailing its beneficial use support status, a determination if nutrients are a cause of non-attainment and, if possible, a determination of what nutrient level will allow attainment of impaired beneficial uses. A nutrient impairment study must provide documentation that must pass public review and potentially even court challenges.

Nutrients themselves are not generally considered a direct cause of impairment. Impairments are most easily determined through the application of numerical criteria and the USAP. Impairment may also be determined based upon the narrative criteria within the standards; however, such a determination made outside of the USAP is highly vulnerable. Impairment must be attributed to nutrients through models and empirical relationships or by weight of evidence.

785:45-5-19(C)(2) Nutrients.

(A) Narrative criterion applicable to all waters of the state. Nutrients from point source discharges or other sources shall not cause excessive growth of periphyton, phytoplankton, or aquatic macrophyte communities, which impairs any existing or designated beneficial use.

785:45-1-2. Definitions

"NLW Impairment Study" means a scientific process of surveying the chemical, physical and biological characteristics of a nutrient threatened reservoir to determine whether the reservoir's beneficial uses are being impaired by human-induced eutrophication

The economic consequences of listing a water body as impaired by nutrients can be considerable. Once listed, a water body enters the TMDL process. The TMDL then may become the basis for stringent discharge permit limits and, potentially, costly upgrades of sewage treatment works. A

nutrient TMDL may also drive more stringent animal waste regulations and non-point source (NPS) control requirements.

Given the consequences of a nutrient impairment determination, an Impairment Study must do the following:

1. Establish with a high level of confidence that impairment exists or does not exist. It must identify the primary cause of impairment. The impairment determination must be defensible and should be in accord with the Use Support Assessment Protocols of 785:45-15 or have substantial evidence in support of the resulting decision.
2. If impairment is confirmed, a nutrient impairment study must establish a relationship between nutrients and the impairment.
3. If possible, it should establish target nutrient levels, where the waterbody would cease to be impaired.

Nutrients may potentially contribute to impairment of the following beneficial uses:

- Aesthetics
- Fish and wild life propagation
- Primary body contact recreation-
- Public and private water supplies

Numerical criteria and assessment protocol have been established for some nutrient related parameters such as dissolved oxygen and pH. Where a water body is deemed impaired by application of the assessment protocols and that impairment can be attributed to nutrient(s), then that waterbody shall also be deemed impaired by the nutrient parameter(s) as well.

Following OAC **785:46-15-10** study results may cause the NLW designation to be removed or for additional listing actions for the 303(d) list and identification of the reservoir as a nutrient impaired reservoir and as eutrophic.

785:46-15-10. Nutrients

*(e) **Consequence of identification as NLW; results of study.** If a lake or its watershed is identified as NLW in Appendix A of OAC 785:45, then the Board or other appropriate state environmental agency may cause an NLW Impairment Study to be performed. The beneficial uses designated for lakes identified in OAC 785:45 Appendix A as NLW shall be presumed to be fully supported but threatened, unless an NLW Impairment Study demonstrates that the uses are partially supported or not supported; provided, if an NLW Impairment Study demonstrates that the uses are not threatened, then the Board shall consider deleting the NLW identification.*

*(f) **Consequence of assessment that use is threatened by nutrients.** If it is determined that one or more beneficial uses designated for a waterbody are threatened by nutrients, then that waterbody shall be presumed to be nutrient-threatened. If it is determined or presumed, in accordance with this Section, that a waterbody is nutrient-threatened, then before the waterbody is determined to be*

nutrient-impaired, an NLW Impairment Study if a lake or an impairment study if a stream must be completed by the appropriate state environmental agency.

(g) *Result of impairment study.*

(1) *Impaired or threatened.* *If, independent of or in addition to the process set forth in (b) of this Section, an impairment study of a waterbody demonstrates that a waterbody is impaired or threatened by nutrients, then the appropriate state environmental agency shall initiate the appropriate listing procedure developed by the Secretary of Environment pursuant to 27A O.S. 1-2-101.*

(2) *Not threatened nor impaired.* *If, independent of or in addition to the process set forth in (b) of this Section, an impairment study of a waterbody demonstrates that a waterbody is neither threatened nor impaired by nutrients, then the appropriate state environmental agency shall initiate the appropriate de-listing procedure developed by the Secretary of Environment pursuant to 27A O.S. 1-2-101.*

This proposal will define acceptable data standards for NLW studies and a process to determine whether impairment is due to cultural eutrophication. Potential outcomes of this proposal are refinement of OWRB rules relating the NLW and delineating the fate of NLW listing once an impairment decision is made.

Project Tasks:

Task 1: Establish data requirement

Data requirements will be established to determine the impairment status of reservoirs in Oklahoma from nutrient impacts. In addition, the role of nutrients in the impairment status of reservoirs will be determined.

Time frame: November 2006 to June 2007

Deliverables: None

Task 2: Reconcile data needs from Task 1

The data needs outlined in Task 1 will drive the development of one scheme for assessing nutrient impairment status. From this work a draft methodology for determining nutrient impairment will be created.

Time frame: April 2007 to June 2007

Deliverables: None

Task 3: Informal meetings on draft protocol

An informal meeting(s) will be convened to discuss the developed protocol. Notification to parties listed in the Oklahoma Water Quality Standards e-mail/snail mail list will be conducted.

Time frame: November 2006 to January 2008

Deliverables: None

Task 4: Draft secondary data QAPP for NLW impairment

A secondary QAPP for determining NLW impairment will be developed and submitted to the OSE for state agency review and comment.

Time frame: December 2006 to March 2007

Deliverables: Approved Secondary QAPP

Task 5: Existing data review and protocol development

Review and compile recent reservoir data and test draft protocol on one or more reservoirs as resources allow.

Time frame: June 2007 to December 2007

Deliverables: None

Task 6: Report results and circulate for comment

A final technical document will be developed incorporating any comments received.

Time frame: January 2008 to February 2008

Deliverables: Final Technical Report

Outcomes:

1. A Technical Report outlining requirements and process of Nutrient Limited Watershed Studies in reservoirs will be written.
2. Potential refinement of OWRB rules relating to NLW listing and establishment of acceptable data standards for NLW studies

Timeline:

Establish Data Requirements	June 2007
Draft Methodology and Secondary Data QAPP	March 2007(Submitted)
Test Draft Protocol.....	December 2007
Technical Report.....	February 2008

Deliverables:

Secondary Data QAPP
 Technical Report (Reservoir NLW Impairment Study)

Budget:

PROJECT BUDGET				
Personnel	Person Yrs.	Expenditure	Expenditure	
			FY07	FY08
Water Quality Division Chief	0.00	\$ -		
Environmental Programs Manager III	0.20	\$ 11,870	4,565	\$ 7,305
Carl Albert Executive Fellow	0.54	\$ 14,822	6,147	\$ 8,675
Total Person Years =	0.74	Sub-total = \$	26,692	\$ 15,980
Benefits				
56.68% of Salary for Fringe Benefits		\$ 15,129	\$ 6,072	\$ 9,057
71.18% of Salary for Indirect Costs		\$ 18,999	\$ 7,625	\$ 11,374
Lodging & Per Diem				
Travel & Per Diem (Per State Travel Act)		\$ -		
Supplies				
Project Supplies and Materials		\$ -		
Data Processing Materials		\$ 2,972		\$ 2,972
Equipment Maintenance		\$ -		
Report Costs, Data Management & Printing Costs		\$ 208		\$ 208
		Supplies Sub-total = \$	3,180	\$ 3,180
TOTAL PROJECT COST = \$			64,000	\$ 24,409
			\$ 39,591	

Project Duration: 16 months