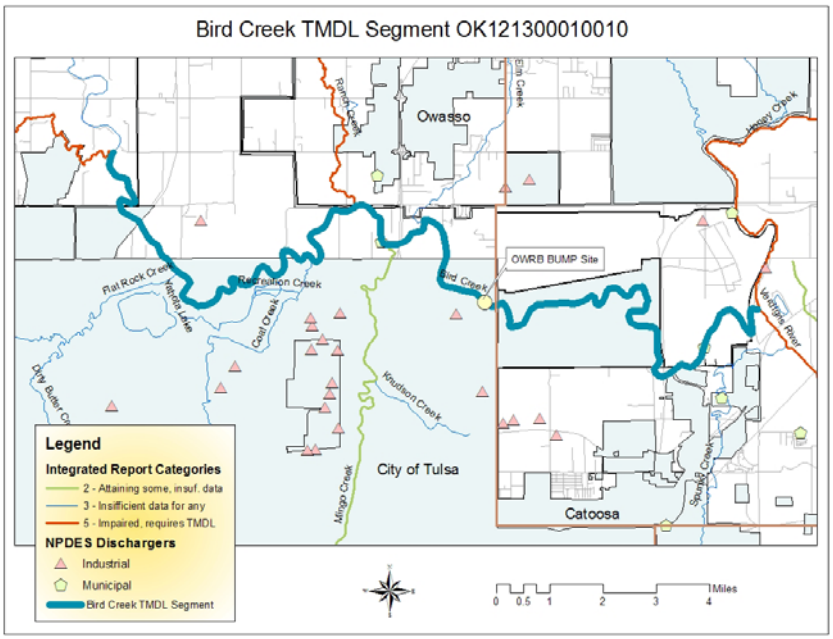
Project 3

Project Title: Development of TMDLs for Bird Creek - Pathogens and Turbidity

Agency: Indian Nations Council of Governments (INCOG)

Project Location:



Amount of Funding Requested:

Federal (95%): $ 98,500
Local Match (5%): $ 5,184
TOTAL: $103,684

Funding Mechanism: Assistance Agreement

Project Description:

In 1998 the State of Oklahoma listed Bird Creek segment OK121300010010 on the 303(d) List for impairment due to pesticides, nutrient enrichment / DO, and metals. Subsequent data were collected under Oklahoma's Beneficial Use Monitoring Program (BUMP) using a fixed monitoring site in the middle of segment OK121300010010. For the 2002 Integrated Water Quality Assessment Report, the Use Support Assessment Protocols (USAP) for Oklahoma were used to evaluate the recent BUMP data. As a result, this segment of Bird Creek waslisted as Category 5 impaired for metals (lead only), pathogens, dissolved oxygen (DO) and turbidity. The 2004 Integrated Assessment Report, approved by Oklahoma and presently begin reviewed for approval by EPA Region VI, states that the DO and metals Category 5 listings should be delisted because of recent data showing beneficial use attainment. Thus neither a dissolved oxygen nor a metals TMDL is required based upon the 2004 Assessment Report. Both

the 2004 Assessment Report and the current Oklahoma Pollutant Discharge Elimination System (OPDES) permit for the Tulsa Lower Bird Creek Regional wastewater treatment plant (WWTP) state that the TMDL for the remaining impairment parameters (pathogens and turbidity) is scheduled to be conducted by INCOG in 2005.

INCOG is the designated Areawide Water Quality Management Planning (WQMP) agency having responsibility for TMDLs in its area and for amending the State's WQMP for the INCOG area. INCOG is presently completing a revision to the dissolved oxygen TMDL for lower Bird Creek and the Verdigris River into which Bird Creek flows. The Bird Creek portion of this TMDL revision lies in the lower part of segment 121300010010. The TMDLs for the remaining parameters of l pathogens and turbidity have been scheduled by the Oklahoma Department of Environmental Quality (ODEQ) to be performed by INCOG in 2005. In order to accomplish these TMDLs, sufficient data must first be collected to calibrate the models and support other analytical tools necessary to quantify loads for the three parameters. This Bird Creek segment receives point source discharges and nonpoint source runoff from Tulsa metropolitan urban areas as well as agricultural and mineral extraction activities. Characterization of nonpoint sources for pathogens and turbidity will require targeted monitoring of Bird Creek and key tributaries. Both runoff and base flow conditions will be sampled. INCOG will consult with local and State agencies to optimize site locations and sampling methods. To help differentiate between human and non-human sources for bacteria, INCOG will use a portable field flurorometer to measure optical brighteners concurrently with bacteria collections. Additional bacteria and chemical tracer data from a FY 05 604(b) grant will suppliment this project's data. INCOG will consult with the ODEQ on the best analytical approach to perform the metals and pathogen TMDL. The ODEQ is presently developing EPA based TMDL methods for conducting turbidity and pathogen TMDLs using a Load Duration Curve method. INCOG will consult with the ODEQ to target the pathogen and turbidity monitoring for use by this method. Turbidity data from the Phase I study will be used by INCOG in the future to develop the ODEQ approved turbidity TMDL methodology currently under development by ODEQ. The DO data collected during this grant project can be used along with other monitoring data to make impairment listing decisions.

Oklahoma does not have numerical water quality standards (WQS) for suspended solids. The State's numerical standard for turbidity can apply to stream conditions dominated by organic constituents (e.g. phytoplankton) or by inorganic particulates (e.g. due to stream bank erosion or soil loss from construction, cultivation or over-grazing). It is therefore necessary to first establish the nature of the excess turbidity that has resulted in the 303(d) listing. For turbidity, a Phase I TMDL study must first be undertaken to characterize turbidity and suspended solids in Bird Creek before a TMDL can be developed to address this impairment cause. The Phase II TMDL for turbidity will be developed in the future by INCOG subsequent to this grant. The monitoring program will be conducted within the same geographical area with many common stations for pathogens, lead and turbidity thus conserving grant resources and time.

Project Objectives:

1. *INCOG will act as Lead Agency and will be supported through an Assistance Agreement with the Oklahoma Office of Secretary of Environment (OSE);*
2. *Develop a sampling plan for Bird Creek and tributaries after consulting with the ODEQ and other State and Federal agencies on parameters, sampling protocols, site locations, and existing data;*
3. *Prepare a Quality Assurance Project Plan (QAPP) that will cover all monitoring and analytical activities including TMDL modeling and analysis;*
4. *Conduct monitoring of Bird Creek and selected tributaries for pathogens, optical brighteners, turbidity, TSS, and other particulate related parameters (e.g. total organic carbon or other parameters that can distinguish the nature of turbidity for a more accurate TMDL);*
5. *Based upon ODEQ recommendations, develop a TMDL for pathogens based upon monitoring data used to calibrate the TMDL models and assign loads for point and nonpoint sources;*
6. *As part of the Phase I TMDL for turbidity, analyze monitoring data related to particulates to characterize the organic / inorganic nature of the turbidity in Bird Creek (the actual turbidity TMDL will be developed by INCOG subsequent to the Phase I effort conducted under this grant);*
7. *Prepare draft and final reports of the TMDLs for pathogens; and*
8. *Prepare draft and final reports of the Phase I TMDL data evaluation for turbidity.*

Expected Accomplishments:

A high priority TMDL (for pathogens) and Phase I of a TMDL for turbidity will be completed under this grant for segment OK121300010010 of Bird Creek. This segment is listed as a Category 5 impaired stream in the Oklahoma Integrated Water Quality Assessment Report for 2004 as requiring TMDLs for these parameters. INCOG has been designated by the ODEQ as the agency responsible for conducting these TMDLs in 2005. A Communication Plan will be developed by INCOG that provides the results of the TMDL for pathogens as well as data from Phase I of the TMDL for turbidity. INCOG will work closely with the ODEQ and all State and local agencies and interested parties to ensure that the TMDL data and results are scientifically established and available for review.

Outputs/Deliverables:

Project Outputs:	Task 301:	Semi-annual Progress Reports
	Task 302:	QAPP for TMDL Monitoring and Models
	Task 303:	Draft Data Report and TMDL for Pathogens
	Task 304:	Draft Report for Phase I of TMDL for Turbidity

	Task 305:	Final Data Report and TMDL for Pathogens
	Task 306:	Final Report for Phase I of TMDL for Turbidity
Project Schedule**:**	Task 301:	Due by June 15 and Dec 15 each year
	Task 302:	September 30, 2007
	Task 303:	April 30, 2009
	Task 304:	December 31, 2008
	Task 305:	August 31, 2009
	Task 306:	April 30, 2009

How Project Meets Evaluation Criteria:

This proposal conforms to the proposal contents and priority areas specified in the January 27, 2004 letter from EPA Region VI's Donna Miller to OSE. Section 104(b)(3) funds are the primary means for funding of INCOG's TMDL projects. This project will result in the completion of a TMDL in a high priority watershed in Northeast Oklahoma, and will also fund completion of Phase I of the TMDL for turbidity in the same watershed. Because these multiple TMDL studies will share the same geographical area and many common monitoring sites, the study will conserve grant resources and time. INCOG will work closely with the State's TMDL and permitting agency, the ODEQ, as well as other State and local entities to develop sampling protocols and TMDLs having scientific validity. Because pathogen TMDL protocols are presently under development in Oklahoma, it is expected that the TMDL tools developed under this grant will be transferable to future TMDLs in Oklahoma. There are numerous waterbodies across Oklahoma that are now listed as impaired and awaiting TMDLs for pathogens and turbidity. It is important that TMDLs in Oklahoma for these parameters be designed for applicability to other streams and rely upon protocols that are effective yet can be performed with modest resources. The ODEQ is presently developing TMDL methodologies, and INCOG will use the ODEQ's recommended TMDL tools for this project. The data gaps that now exist concerning the relationship between turbidity and suspended solids impede the ability to adequately address these parameters in Oklahoma. The data collected for the Phase I TMDL study for turbidity will provide insight into particulate characteristics in large order stream segments in Northeast Oklahoma having significant urban land uses.

ESTIMATED LABORATORY COSTS:

Pathogen Analyses (1):

Number of Parameters per Sample (2)	Total Number of Sampling Events	Number of Sites per Event	Number of QA samples per event	Number of Lab Samples incl. QA Samples	Estimated Unit cost per Parameter	Subtotal
3	11	10	1	121	$17.83	$6,472

(1) Fecal coliform, E. coli, enterococci analyzed for each lab sample.

Hardness Analysis at Lab (field QA of Hardness kit) (QA Samples):

Number of Parameters per Sample	Total Number of Sampling Events	Number of Sites per Event	Number of QA samples per event	Number of Lab Samples incl. QA Samples	Estimated Unit cost per Parameter	Subtotal
1	8	1	0	8	$20	$160

Turbidity Analysis at Lab (field QA of turbidity kit) (QA Samples):

Number of Parameters per Sample	Total Number of Sampling Events	Number of Sites per Event	Number of QA samples per event	Number of Lab Samples incl. QA Samples	Estimated Unit cost per Parameter	Subtotal
1	8	1	0	8	$20	$160

TSS Analysis:

Number of Parameters per Sample	Total Number of Sampling Events	Number of Sites per Event	Number of QA samples per event	Number of Lab Samples incl. QA Samples	Estimated Unit cost per Parameter	Subtotal
1	8	8	2	80	$25	$2,000

TOC Analysis:

Number of Parameters per Sample	Total Number of Sampling Events	Number of Sites per Event	Number of QA samples per event	Number of Lab Samples incl. QA Samples	Estimated Unit cost per Parameter	Subtotal
1	8	8	2	80	$40	$3,200

Estimated Total Lab Costs For Metals, Pathogens and Particulates

Total Number of Sampling Events	Total Lab Costs
11	$11,992

ESTIMATED COST OF SUPPLIES AND TRAVEL:

Supplies:	Computer / repair	3,000
	Misc. office supplies	508
	Field supplies	1,000
	Fluorometer	4,000
Travel:		1,000
	TOTAL:	**9,508**