

Project: 2 (No Cost Time Extension approved Dec. 2006)

Title: LOWER BIRD CREEK BACTERIAL SOURCE TRACKING

Agency: INCOG

Objective:

The objective of Task 200 is to provide resources for INCOG to conduct chemical monitoring for bacterial source tracking (BST) concurrently with an existing FY-04 104(b)(3) study of bacteria sources and TMDL development in the lower Bird Creek watershed. This lower Bird Creek segment (WBID OK121300010010) is listed as Category 5 impaired for pathogens requiring a TMDL in Oklahoma's 2002 and 2004 Integrated Water Quality Assessment Reports. The FY-04 104(b)(3) INCOG study will begin monitoring for chemicals and bacteria in fall 2005. This FY-05 604(b) study will provide additional chemical data to help distinguish human versus non-human sources of bacteria. This workplan will achieve Environmental Results under EPA Order 5700.7 and meet EPA's Strategic Plan for Oklahoma, Goal 2 Objective 2 Sub-objective 2.2.1 PAM 52, "Percentage of the TMDLs required for waters currently on the 303(d) list that are established or approved by EPA..." INCOG will partner with local, State and Federal agencies to optimize sampling methods and coordinate monitoring activities and data sharing.

Background:

In 2002 the State of Oklahoma listed Bird Creek segment OK121300010010 on the 303(d) List as Category 5 impaired for metals (lead only), pathogens, dissolved oxygen (DO) and turbidity. Subsequent data were collected under Oklahoma's Beneficial Use Monitoring Program (BUMP) and from the USGS. The Use Support Assessment Protocols (USAP) for Oklahoma were used to evaluate the BUMP data. As a result of this evaluation, the 2004 Integrated Assessment Report states that the DO and metals Category 5 listings should be delisted because of recent data showing beneficial use attainment. The TMDL for pathogens is scheduled to be conducted by INCOG in 2005-06 under the FY-04 104(b)(3) grant along with monitoring of turbidity as a Phase I TMDL characterization.

In order to accomplish the pathogen TMDL, sufficient data must first be collected to calibrate the model and differentiate, as much as possible, between human and non-human sources of bacteria. If specific human sources of bacteria are identified, then they can be addressed in the Phase I and Phase II stormwater programs in the Tulsa area. It is recognized that the science and technology is not yet fully developed to easily characterize human versus non-human bacteria sources. The FY-04 104(b)(3) workplan is being revised to include fluorometric monitoring for optical brighteners concurrently with bacteria sampling. However, additional chemical BST parameters are frequently cited in the literature as being necessary to enhance reliability of source tracking studies. The chemical BST methods considered most successful to date are optical brighteners coupled with a human surrogate such as caffeine and/or the human

fecal steroid coprostanol. There are numerous alternatives, all having merit, but no one technique or combination of techniques is universally accepted. Most chemical methods and genetic sequencing methods are too expensive for use in average studies, and genetic based tests require a library of bacteria genotypes to be established within each watershed prior to stream sampling thus increasing costs further. Utilization of less expensive chemical BST monitoring can be an effective means to detect human sources of bacteria.

The lower 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 partner with the U.S. Geological Survey (USGS), the Oklahoma Conservation Commission and the City of Tulsa to develop the sampling protocols and coordinate stream monitoring and data collection efforts between agencies.

Approach:

INCOG will use 604(b) funds to:

1. Host one or more meetings between USGS, City of Tulsa, OCC, INCOG, ODEQ and OWRB to determine the best monitoring strategy (parameters, sampling sites, frequency, and how monitoring efforts and data sharing can be coordinated.
2. Develop a QAPP for all data collection and analytical activities - this may be incorporated into the FY-04 104(b)(3) QAPP.
3. Conduct the BST monitoring in concert with the bacteria and optical brightener monitoring scheduled under FY-04 104(b)(3).
4. Coordinate all data collection activities with partners.
5. Analyze data from all sources and prepare a summary report of the results.

Grant outputs are presented below including a Data Summary Report at the end of the grant that summarizes all data collected and evaluated under the grant.

Outputs: Task 201: Semi-annual Progress Reports
Task 202: QAPP
Task 203: Data Summary Report

Project Schedule: Task 201: Due by June 15 and Dec 15 each year
Task 202: September 30, 2007
Task 203: August 31, 2009

Resource Allocation:

Federal: \$20,000
 Match: none

Project Budget:

| | |
|---|-----------|
| Salary | 7,699 |
| Fringe (0.5199) | 4,003 |
| Indirect (0.2989) | 3,498 |
| Contracts | 4,000 |
| Supplies (computer & repair, misc. office supplies) | 300 |
| Equipment | 0 |
| Travel | 300 |
| | <hr/> |
| | \$ 20,000 |

Budget Breakdown by Task:

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|--|-----------|
| Task 201: Semi-annual Progress Reports | 1,120 |
| Task 202: QAPP | 1,650 |
| Task 203: Data Summary Report | 17,230 |
| | <hr/> |
| | \$ 20,000 |

Manpower Allocation:

| <u>Position</u> <u>indirects)</u> | <u>Number of</u> <u>Positions</u> | <u>Manpower</u> <u>Allocations(MY)</u> | <u>Cost Allocations</u> <u>(excl. fringe &</u> |
|--|--------------------------------------|---|---|
| Project Manager | 1 | 0.005 | 333 |
| Senior Civil Engineer | 1 | 0.030 | 1,560 |
| Princ. Envir. Planner | 1 | 0.103 | 5,356 |
| Data Assistant | 1 | 0.016 | 432 |
| | | | <hr/> |
| Total personnel costs (does not include fringe or indirects) | | | \$ 7,681 |