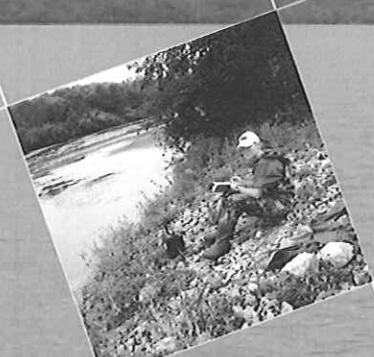


PROFESSIONAL ENGINEERING SERVICES TO PROVIDE
TOTAL MAXIMUM DAILY LOADS
FOR THE IMPAIRED STREAMS IN
THE WEST FORK RIVER WATERSHED

ORIGINAL

PROPOSAL

AUGUST 25, 2011



Submitted to:
West Virginia Department
of Environmental Protection

CDM



2740 Smallman St., Suite 100
Pittsburgh, Pennsylvania 15222
tel: 412 201-5500
fax: 412 201-5514

August 25, 2011

Chuck Bowman, Buyer Supervisor
Purchasing Division
P.O. Box 50130
Charleston, WV 25305-0130

Subject: Expression of Interest — Professional Engineering Services to Provide Total
Maximum Daily Loads for the Impaired Streams in the West Fork River
Watershed

Dear Mr. Bowman:

Camp Dresser & McKee Inc. (CDM) is pleased to express our interest in providing Professional Engineering Services to Provide Total Maximum Daily Loads for the Impaired Streams in the West Fork River Watershed. Please find attached a signed original copy and an electronic copy of our qualifications.

We are very excited about the opportunity to assist you with this challenging project. Please feel free to contact me with any questions at (412) 201-5500.

Very truly yours,

Matthew R. Sickles, P.E.
Vice President
Camp Dresser & McKee Inc.

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PURCHASING DIVISION
CHARLESTON WV

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Project Experience

Section Two

**CDM TMDL Vendor Qualification
Questionnaire**



Section 1: Project Experience

Introduction

CDM is a worldwide, full-service consulting, engineering, construction and operations firm helping public and private clients improve the environment and infrastructure. Since our founding in 1947, CDM has grown steadily to its current position as a leading professional in water, environment, transportation, energy and facilities.

On February 25, 2011, CDM and international transportation consultant Wilbur Smith Associates (WSA) joined forces. The combined organization of nearly 6,000 employees further expands our global presences and enhances our full-service capabilities. The addition of WSA's leading expertise in transportation enhances CDM's service portfolio and extends the firm's presence in Asia and the Middle East. Similarly, CDM enhances WSA's capabilities in water, environment and design-build services. In addition to compatible cultures, complementary capabilities and well-matched geographies, both firms are dedicated to exceptional client service and technical excellence. Together, our unwavering focus remains on creating innovative and lasting solutions that improve environmental value, quality of life and economic prosperity. With more than \$1 billion in annual revenues, we maintain the size, stability and resources to successfully undertake a diverse range of projects, applying local knowledge through a network of more than 125 offices worldwide while leveraging the full resources and expertise of our global staff.

TMDL Development and Implementation

CDM's experience includes extensive TMDL implementation support, including multiple projects for EPA and statewide TMDL programs for Florida, Mississippi, and Montana. This experience and our comprehensive understanding of national watershed planning trends will enable our team to deliver implementation plans and TMDLs that truly benefit communities.

CDM has successfully implemented TMDLs in a variety of applications nationwide and understands the key components that must be addressed during the process. Our team brings superior technical, financial, and management capabilities to the execution and coordination of the TMDL process, including:

- Real-world TMDL successes including our work in Illinois – CDM has developed TMDLs for various pollutants on six lakes and 15 streams within nine Illinois watersheds that have been approved by USEPA
- Modeling expertise and capabilities in estimating mass loading contributions from both point and nonpoint sources

Project Experience and References

Section One

- Watershed-wide data management capabilities and analysis
- Watershed/river and lake prioritizing based on contaminants
- Proven skills in stakeholder consensus building

Water Quality Studies and Analysis

CDM has developed programs for delineating, evaluating, and solving nonpoint source pollution problems throughout the United States, including multiple programs for the IEPA. These investigations have involved multi-jurisdictional and interagency cooperation in order to properly identify and separate the point source pollution problems from the nonpoint sources. Our team's experience working on the Chicago Area Waterways System Use Attainability Analysis will bring IEPA a solid understanding of water quality and stakeholder issues on several of the requested watersheds. In addition, our team has led national water quality research programs for the Water Environment Federation Research Foundation (WERF) and the American Society of Civil Engineers (ASCE).

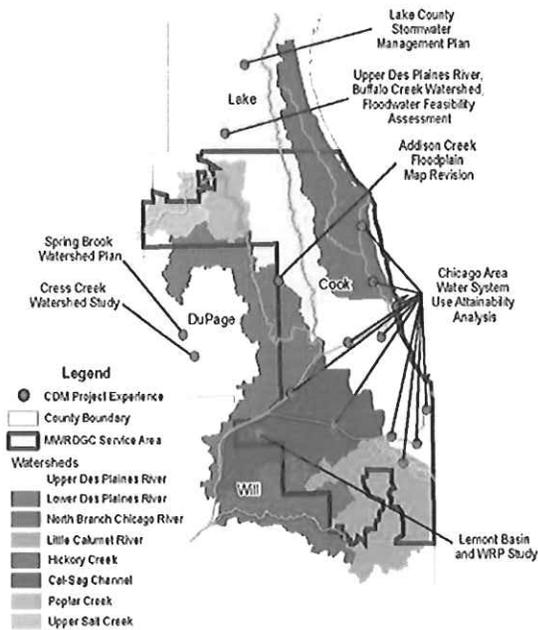


Figure 3-2 CDM's knowledge of Illinois watersheds keeps learning curves to a minimum.

Watershed Characterization/Prioritization

CDM has a proven track record in planning and implementing surface water quality management programs around a "watershed approach." By using the watershed approach, the problems in the watershed are analyzed in a holistic fashion, and based upon that analysis, a solution is developed to attain water quality standards. This was demonstrated in our Peruque Creek Watershed Management Plan, in which CDM identified sources of impairments and appropriate best management practices to control or eliminate pollutant loading to the watershed.



Our record of performance on previous projects demonstrates our ability to address each of the critical elements of this project, including data analysis and collection, model calibration, watershed prioritization, and TMDL development and implementation. Table 3-1, on the following pages, summarizes CDM's related project experience, with more detailed project descriptions of the most relevant projects to follow.

Project Experience and References

Section One

Table 2-1 CDM TMDL and Water Quality Experience

Project	TMDL	Watershed Characterization	Water Quality	Modeling	Data Collection and Analysis	Stakeholder Communication
Illinois Environmental Protection Agency TMDL Development	●	●	●	●	●	●
Development of Water Quality Guidance Documents for the U.S. Environmental Protection Agency	●	●	●	●	●	●
Initial TMDL Planning, Upper Clark Fork TMDL Planning Area, Montana Department of Environmental Quality	●	●	●	●	●	●
TMDL Development for Fall Creek, Pleasant Run and White River, Indianapolis, Indiana	●		●	●	●	
Kent Dam Pool Water Quality Improvements: A TMDL Case Study, Kent, Ohio	●		●	●	●	●
Development of TMDL for the South Platte Urban Watershed, Denver, Colorado	●	●	●	●	●	●
Boulder River Water Quality Management & TMDL Plan, Montana Department of Environmental Quality	●	●	●	●	●	●
Florida Department of Environment, TMDL Development	●	●	●	●	●	●
Los Angeles Bureau of Sanitation TMDL Implementation Planning	●		●		●	●
Jacksonville Master Stormwater Planning and TMDL Support, Florida	●	●	●	●	●	●
Rouge River National Wet Weather Demonstration Project, Wayne County, Michigan	●	●	●	●	●	●
Rouge River TMDL Plan, Michigan Department of Environmental Quality	●		●	●	●	
USEPA National Watershed Protection Program, Nationwide	●	●	●	●	●	●
Stormwater/Water Quality Standards (TMDL), Santa Ana Watershed Project Authority, California	●	●	●	●	●	●
Cleaner Rivers Through Effective Stakeholder TMDLs, Los Angeles, California	●		●	●	●	●
Santa Monica Bay Beaches Bacteria TMDL, California	●		●	●	●	●
Regional Watershed Implementation Plan and Malibu Creek TMDL Implementation Plan, Los Angeles County, California	●		●	●		●
TMDL Development for Montana Streams, U.S. Environmental Protection Agency	●	●	●	●	●	
Middle Rio Grande Fecal Coliform TMDL Assistance, Albuquerque, New Mexico	●	●	●	●	●	●
Integrated Resources Plan, Los Angeles, California	●	●	●	●	●	●
Peruque Creek Watershed Study, St. Louis, Missouri	●	●	●	●	●	●
Receiving Stream Analysis, Springboro, Ohio	●		●	●	●	
Waste Load Allocation Study for Treatment Plant Expansion, Norman, Oklahoma	●	●	●	●	●	

Project Experience and References

Section One

Table 2-1 CDM TMDL and Water Quality Experience

Project	TMDL	Watershed Characterization	Water Quality	Modeling	Data Collection and Analysis	Stakeholder Communication
Arid West Water Quality Research Project, Pima County, Arizona	●	●	●	●	●	●
CSO Program Support Activities, Philadelphia, Pennsylvania	●	●	●	●	●	●
Urban Runoff Model Review Study, U.S. EPA, Municipal Environmental Research Laboratory	●		●	●		
Areawide Waste Load Allocations, Mobile, Alabama	●		●	●	●	
Tiete River System Water Quality Study, Sao Paulo, Brazil	●	●	●	●	●	●
Urban Runoff Water Quality Management Plan for Monterey Bay Area, California	●	●	●		●	●
San Pablo Bay Watershed Restoration Planning, U.S. Army Corps of Engineers, San Francisco District, California	●	●	●	●	●	●
Boston Harbor Sewer and Receiving Water Modeling, CH2M Hill, Massachusetts	●		●	●	●	
Watershed Management Tool Kit, Massachusetts Department of Environmental Protection	●	●	●	●	●	●
Cocheco River Water Quality Study, Rochester, New Hampshire	●		●	●	●	
Metedeconk River Watershed Management Plan, Brick Township, New Jersey	●	●	●	●	●	●
Waste Load Allocation Study, Lawton, Oklahoma	●		●	●	●	
Water Resources Management Plan, Chester County, Pennsylvania	●	●	●	●	●	●
NPDES Negotiations and Stream Assessment of Burton, Still and Turkey Creeks, Bryan, Texas	●		●	●	●	
NPDES Negotiations and Use Attainability Analysis of Carters Creek, College Station, Texas	●		●	●		
Impact of Glycol Aircraft Deicers on the Kinnickinnic River Surface Water Resources, Milwaukee County, Wisconsin	●		●	●	●	●
Upper Tenmile Creek Watershed Investigation, Modeling and Remediation, Lewis and Clark County, Montana	●	●	●	●	●	●
Silver Bow Creek/Butte Area Superfund Site Investigation, Modeling, and Remediation, Montana	●		●	●	●	●
Clear Creek/Standley Lake Watershed Management, Jefferson, Gilpin, and Clear Creek Counties, Colorado	●	●	●	●	●	
Point and Nonpoint Source Loading Assessment, Sarasota Bay National Estuary Program, Florida	●	●	●	●	●	
Little Sarasota Bay Circulation Modeling Study, Sarasota County, Florida	●	●	●	●	●	
Tampa Bay National Estuary Program Tributary Loading Assessment, Tampa, Florida	●		●	●	●	
Re-Evaluation Study of SWCB's Potomac Estuary Embayment Standards, Virginia	●		●	●		

Project Experience and References

Section One

Table 2-1 CDM TMDL and Water Quality Experience

Project	TMDL	Watershed Characterization	Water Quality	Modeling	Data Collection and Analysis	Stakeholder Communication
Santa Margarita Watershed Water Supply Augmentation, Water Quality Protection and Environmental Enhancement Program, San Diego, California	●	●	●	●	●	●
Calcasieu Estuary Assessment and Restoration, Louisiana	●		●		●	●
University Lake Watershed Study, Orange County, North Carolina		●	●	●	●	
Assessment of the Impacts of CSOs in Milwaukee Harbor, Southeast Wisconsin Regional Planning Commission			●	●		
Water Quality Modeling of Chicago and Upper Illinois Waterways, Illinois			●	●		
WLA Model Development for the Grand Calumet River, Indiana		●	●	●	●	
Use Attainability Analysis/Site-Specific Standards, Flagstaff, Arizona		●	●	●	●	●
NPDES Negotiations/Water Body Survey and Use Assessment Work Plan for Segment 2-105 of the Rio Grande, Albuquerque, New Mexico			●	●	●	●
NPDES Negotiations/Use Attainability Analysis Work Plan/Use Attainability Analysis Study, Segment 2-110 of the Santa Fe River, Santa Fe, New Mexico			●	●	●	●
Merrimack River Watershed Assessment Study, Massachusetts and New Hampshire		●	●	●	●	
Oakland WWTP Site-Specific Ammonia Limits Study, Topeka, Kansas		●	●	●	●	●
NPDES Site-Specific Ammonia Limits for the Mill Creek Regional WWTP, Johnson County, Kansas		●	●	●	●	●
Waste Load Allocation Study for Treatment Plant Expansion, Stillwater, Oklahoma		●	●	●	●	
Development of a System-Wide Eutrophication Model of New York/New Jersey Harbor			●	●	●	
Reanalysis of Alternatives Denver, Colorado		●	●	●	●	
Red River of the North Ammonia-Nitrogen Effluent Studies and Wastewater Treatment Facility Plan, Moorhead, Minnesota			●	●	●	
Rio Grande Water Quality Modeling Study and NPDES Assistance, New Mexico			●	●	●	
Nine Mile Run Habitat Restoration Project, Pittsburgh, Pennsylvania		●	●		●	
Fecal Coliform Source Tracking Study, Denver, Colorado		●	●	●	●	
Use and Standards Attainment Project, New York City Department of Environmental Protection		●	●	●	●	●
Evaluation of Eliminating First Flush Stormwater Pollution Loads			●	●		
Waste Load Allocations and Nonpoint Source Assessment, Tuscaloosa, Alabama			●	●	●	
NPDES Negotiations for Phosphorus Limits, Cottonwood Sanitation District, Colorado			●	●	●	

Project Experience and References

Section One

Table 2-1 CDM TMDL and Water Quality Experience

Project	TMDL	Watershed Characterization	Water Quality	Modeling	Data Collection and Analysis	Stakeholder Communication
NPDES Negotiations and Site-Specific DO Standards for Segment 15 of the South Platte River, Metro Wastewater Reclamation District, Colorado			●	●	●	●
Lake Hart Basin Plan, Orlando, Florida			●	●	●	●
Halifax River Watershed Management Plan, Volusia County, Florida		●	●	●	●	●
Tomoka River Watershed Management Plan, Volusia County, Florida		●	●	●	●	●
Big Haynes Creek Watershed Management Plan, Atlanta Regional Commission, Georgia		●	●	●	●	●
Back River Watershed Water Quality Management Plan, Baltimore County, Maryland		●	●	●	●	●
Swift Creek Reservoir Watershed Management Plan, Chesterfield County, Virginia		●	●	●	●	
Western Reservoirs Raw Water Quality Management Plan, Newport News, Virginia			●	●	●	
Comprehensive Watershed Management Plan/Reservoir Protection Study, Stafford, Virginia			●	●	●	
Basin Creek Watershed Evaluation, Jefferson County, Montana		●	●	●	●	●
Water Treatment Alternatives Analysis, New World Mine, Cook City, Montana			●	●	●	●
Anaconda Smelter Superfund Site Investigation and Remediation, Anaconda, Montana			●	●	●	●
Receiving Water Quality Study, Denver International Airport, Colorado		●	●	●	●	●

Project Experience and References

Section One

Project Descriptions and References

TMDL Development, Illinois Environmental Protection Agency, Illinois

The Illinois Environmental Protection Agency (Illinois EPA) has a three step process for developing TMDLs. The stages are:

- Stage 1 – Watershed Characterization, Data Analysis, Methodology Selection
- Stage 2 – Data Collection (optional)
- Stage 3 – Model Calibration, TMDL Scenarios, and Implementation Plan

Project Dates: May 2001 – ongoing

Client Contact: Jenny Clark, Project Manager, Illinois EPA, 1021 North Grand Ave. East, Springfield, IL 62794, (217) 782-3362

Contract Amt: \$340,000 (to date under current contract)

Accidents/Injuries: None

In Illinois, CDM has completed Stage 1 TMDL development in 27 watersheds, collected Stage 2 data in 13 watersheds, and developed TMDLs and implementation plans within 17 watersheds. All TMDLs that have been developed by CDM for Illinois EPA have been approved by USEPA. CDM is currently completing Stage 3 TMDL development in three additional watersheds.

USEPA has approved TMDLs that CDM has established for 23 stream segments and 15 lakes within 17 watersheds for the following pollutants:

- Nutrients – nitrogen, phosphorus, nitrates
- Dissolved Oxygen
- Bacteria – fecal coliform
- Metals – manganese, copper, silver, mercury, boron
- Pesticides - atrazine
- Inorganics – sulfates, pH, salinity/total dissolved solids/chlorides
- Siltation
- Habitat alterations

The nuances and unique issues related to each watershed, based on different data availability, land uses, impairments, receiving water uses, etc., require that the approach be tailored to each application for each watershed. Establishing a link between pollutant loads and resulting water quality is one of the most important components of developing a TMDL. CDM's process for evaluating each watershed includes:

- Setting endpoints for the TMDLs

Project Experience and References

Section One

- Verifying impairments within the watersheds
- Source assessment based on EPA's BASINS model as the framework for data collection, watershed delineation, and loading prediction based on land use
- Establishing linkages for receiving water between sources and endpoints through modeling
- Determining a margin of safety and considering seasonal variations
- Developing implementation plans

Throughout the entire process, CDM has participated in public meetings to explain the TMDL process, technical information on modeling, allocation strategies, and implementation planning.

CDM has also completed extensive water quality monitoring in support of this project. CDM executed a large-scale monitoring program throughout southern Illinois in the summer of 2006. Recently, CDM performed in-situ sediment oxygen demand (SOD) monitoring in the DuPage River/Salt Creek watershed to lend confidence to dissolved oxygen modeling.

Rock River Sediment and Phosphorus TMDL, USEPA and Wisconsin Department of Natural Resources, Wisconsin

Project Dates: 2008 - ongoing

Client Contact: Jean Chruscicki, USEPA
Region 5, Ralph Metcalfe Federal
Building, 77 West Jackson Blvd.
Chicago, IL 60604, (312) 353-1435

Contract Amt: \$210,000

Accidents/Injuries: None

The Rock River Basin covers 3,777 square miles extending over 10 counties in south central Wisconsin near the Illinois State Line. There are 3,900 total stream miles and 443 lakes and impoundments. CDM is developing a USEPA/ Wisconsin Department of Natural Resources (WDNR) led TMDL for the water bodies impaired by phosphorus and sediment within the basin. The Rock River Basin is impaired by sediment resulting in degraded habitat, and phosphorus resulting in low dissolved oxygen, impairing beneficial uses designated by the WDNR. The impairments to be addressed in this TMDL are in seven counties: Dane, Rock, Waukesha, Jefferson, Dodge, Walworth, and Fond du Lac. There are 18 segments in the lower reach of the Rock River and 28 segments in the upper reach.

Refinement of a SWAT water quality analysis and data assessment was performed as well as point source and non-point source loading evaluation to estimate baseline loading within the basin. Loadings from municipal and industrial wastewater treatment plants were analyzed to determine point source loads. Individual analysis of defined land uses, such as agricultural and MS4 permitted and non-permitted urban areas were analyzed to determine nonpoint source loads. Load proportioned allocation methods are being used to determine the amount of sediment and/or phosphorus that the water bodies can receive from both point and nonpoint sources

Project Experience and References

Section One

and still meet water quality targets. Advanced quantitative methods and analytical tools such as STELLA are being used to calculate and verify the TMDL analysis.

National Watershed Protection Program, USEPA

CDM, in conjunction with the Cadmus Group, Inc., was selected for a \$93.5 million, five-year indefinite delivery/indefinite quantity contract to support the USEPA's Assessment and Watershed Protection Division (AWPD). Under the contract, the project team will support AWPD's mission to:

- Monitor water quality
- Manage and display water quality information
- Assess and report water quality conditions to the public and Congress
- Formulate water quality management decisions
- Advance the protection and restoration of the nation's watersheds and water bodies through the use of point and nonpoint source pollution controls

Currently, CDM is working on TMDL projects in Montana, Idaho, and Washington as highlighted in the project descriptions on the following pages.

Water Quality Model Development for Hangman (Latah) Creek Watershed, Washington Department of Ecology, Washington and Idaho

Hangman (Latah) Creek is included on Washington State's 303(d) list due to water quality standard non-attainment for several water quality parameters, including ammonia, dissolved oxygen (DO), pH, temperature, fecal coliform, and zinc.

Project Dates: November 2006 – ongoing

Client Contact:

Joe Joy
Washington Department of Ecology
Environmental Assessment Program PO
Box 47600
Olympia, WA 98504-7600
(360) 407-6486

Contract Amount: \$55,000

Accidents/Injuries: None

Stakeholder Communication

For the Hangman (Latah) Creek watershed project, CDM helped a stakeholder group, comprised of local, state and federal environmental departments, to assimilate existing data, select a GIS-based water quality model for watershed and in-stream parameterization, and develop the model to simulate TMDL scenarios. The final modeling product allows the stakeholder group to effectively predict tributary nutrient concentrations and loads from four subwatersheds, develop numeric targets for pollutant reductions, recommend practices to reduce the impact of pollutant load sources, and develop implementation plans.

Project Experience and References

Section One

Data Analysis

CDM's approach to the TMDL analyses considered the unique issues related to subwatersheds, such as data availability, land use (agricultural vs. urban), and beneficial use impairments. CDM met all project deadlines and conducted an informative, well-received model training with the stakeholder group. At the request of the stakeholders' group, USEPA amended this project to retain CDM to further refine the Watershed Analysis Risk Management Framework (WARMF) model in the upper watershed, calibrate hydrology and water quality at four upper watershed sub-basins, and provide on-call technical support for the stakeholder group.

"Contractor (CDM) has responded well to planning and implementing the field program that was in constant change. This flexibility demonstrates the knowledge and experience of the contractor's team and the importance of this project to the contractor."

John Meyer, USEPA Region VI Performance Evaluation Board

TMDL Development, USEPA, Montana

CDM was contracted by the U.S Environmental Protection Agency (EPA) to provide technical support for completing Phase I Total Maximum Daily Load (TMDL) assessments for the Lower Smith River, Upper Smith River, Upper Red Rock Creek, Upper Gallatin River, Middle Madison River, Upper Madison River, Bighorn-Shoshone River, Rock Creek near Red Lodge, and Benton Lake TMDL planning areas (TPAs) in Montana. Phase I TMDL status reports were prepared for each area. Specific activities conducted for completion of the Phase I TMDLs include:

Watershed Characterization

Project Dates: 2003 – ongoing

Client Contact: Julie DalSoglio, Water Quality Program Manager
U.S. EPA Region VIII,
Federal Office Building
10 West 15th Street, Suite 3200
Helena, Montana 59626
(406) 457-5025

Contract Amt: \$1.5 million

Accidents/Injuries: None

Using available data, the current physical, chemical, and biological condition of the environment within the subject watersheds are characterized, including an assessment of soils, climate, topography, land use, vegetative cover, hydrography, and riparian characteristics/condition. Hydrogeographic factors, including drainage patterns, the relationship between groundwater and surface water, water withdrawals, diversions, dams, irrigation and returns, are evaluated and thoroughly described. Factors considered relative to specific streams and rivers include flow characteristics, channel morphology, bottom substrate, aquatic vegetation, water chemistry, fisheries, aquatic insects, and so forth.

The limnological characteristics for lakes are also evaluated.

Project Experience and References

Section One

Preliminary Water Quality Targets

For the purposes of developing a TMDL for a particular pollutant within a particular water body, it is necessary to establish quantitative water quality goals or endpoints, referred to as targets. A preliminary suite of water quality targets are being identified for all of the water body/pollutant combinations appearing on the 1996 303(d) list for each of the subject TPAs.

Water Quality Impairment Status

Water quality data for water bodies listed on the Montana 303(d) list are compiled and thoroughly evaluated for the purpose of verifying impairment status. Evaluations focus on determining whether the listed water bodies are truly impaired as a result of specific causes (e.g., sedimentation, metals, habitat alteration, etc.) and whether there are established links between causes of impairment and impacts to the beneficial uses of the water body. Water body-specific data are compared with the preliminary targets developed for the TPA to determine the status of impairment. Phase I TMDLs make the determination of "impaired," "not impaired," or "insufficient data to make determination."

Development of Methods for Linking Land Use Activities and BMPs to Tributary Nutrient Loading, USEPA, Lake Whatcom, Washington

As part of CDM's contract for the USEPA Watershed Protection Program, CDM is developing a methodology for linking land use and best management practices (BMPs) to tributary nutrient loadings from subwatersheds flowing into Lake Whatcom. This methodology will be an important tool to support current and future efforts to develop a TMDL by the Washington State Department of Ecology.

Data Analysis and Model Development

Lake Whatcom is a deep natural lake subject to seasonal thermal stratification. The lake is comprised of three primary basins separated by glacial sills. Land in the 66-square-mile watershed is primarily forested; however, there are areas of urban and residential land concentrated along the northwest portion of the watershed near the City of Bellingham and portions of the lakeshore. Lake Whatcom is included on Washington State's 303(d) list due to water quality standard non-attainment for several water quality parameters, DO and fecal coliform. CDM will work on the development of an analytical and/or modeling method to effectively predict the spatial, seasonal, and temporal variability in tributary nutrient concentrations discharged into the lake. To support TMDL allocations and implementation strategies, the method must be able to link nutrients to various land uses and assess potential reductions resulting from BMP implementation. Significant monitoring and analyses has already been conducted, and the analytical/modeling methodology developed will efficiently utilize the prior information and dovetail into ongoing water quality planning efforts.

Project Dates: November 2006 – ongoing

Client Contact:
Steve Hood
Washington Department of Ecology
1204 Railroad Avenue, Suite 200
Bellingham, WA 98225

Contract Amount: \$38,000

Accidents/Injuries: None

Project Experience and References

Section One

Total Maximum Daily Load Support, Florida Department of Environmental Protection, Florida

The Florida Department of Environmental Protection (FDEP) is charged with

Project Dates: 2000 – ongoing

Client Contact: Eric Livingston, FDEP,
Bureau of Watershed Management
2600 Blair Stone Road (MS #3510)
Tallahassee, FL 32399-2400
(850-245-8430)

Contract Amt: \$1,742,000 to date

Accidents/Injuries: None

implementing the TMDL program for Florida. Due to an expedited schedule, FDEP needed technical support to complete the hundreds of TMDLs required. For this reason, FDEP hired the Florida Atlantic University Center for Environmental Studies, with the help of CDM, to support the TMDL program.

TMDL Development Protocols

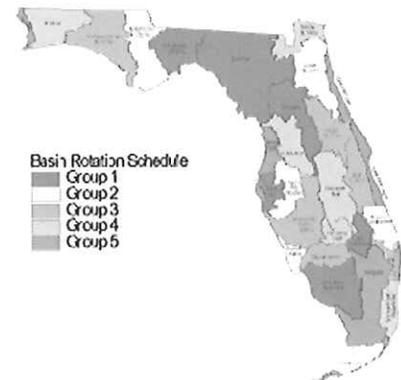
In order to standardize the execution of TMDL studies to be completed by FDEP, CDM is preparing a technical manual of TMDL protocols, including data collection and analysis, TMDL model development, validation and subsequent application for assimilative capacity determination and conceptual controls evaluation. The intent of the manual is to provide FDEP and other public or private agencies completing or reviewing TMDLs with standard parameters and protocols. CDM completed a *TMDL Development Protocol* report based on this evaluation.

TMDL Support

As part of the program, CDM will be assigned various TMDL tasks, including data collection and analysis; application of hydrologic and hydraulic models for river, lake and estuarine systems; and simulating pollutant loads to provide the state with the scientific basis for developing a TMDL for particular waters.

TMDL Studies

CDM developed water quality receiving water models of the main stem of the Hillsborough River using EPA's WASP model. CDM developed and calibrated the main stem model for use by FDEP for TMDL development. CDM also trained FDEP staff on the WASP model. CDM has started working on a number of other TMDL model developments and data summary studies, including those for the Kissimmee River and Suwannee River. A reasonable assurance study for the Florida Keys started in 2006 to provide documentation to FDEP and the USEPA that there are sufficient activities ongoing or planned to achieve water quality goals in the Keys so that a TMDL study is not required. This study will include the support of a



CDM developed a standardized TMDL protocol for executing studies in Florida, minimizing hassles for public and private agency reviews.

Project Experience and References

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stakeholder committee of agencies involved in environmental programs in the Florida Keys.

Stormwater/Water Quality Standards (and TMDL), Santa Ana Watershed Project Authority, California

Project Dates: 2004-present

Client Contact: Jeffrey Beehler, Ph.D.
Environmental Project Manager
11615 Sterling Avenue
Riverside, California
92503 (951) 354-4239

Contract/Actual Bid Amount: \$600,000

Accidents/Injuries: None

CDM is assisting the Santa Ana Watershed Project Authority (SAWPA) and a taskforce consisting of representatives from SAWPA; the counties of San Bernardino, Orange and Riverside; the Santa Ana Regional Water Quality Control Board and EPA Region 9, with an evaluation of the REC-1 beneficial use designation (primary contact recreation) and associated bacteria water quality objectives in the Santa Ana River watershed. This project was initiated with the development of a work plan that recommended a phased approach to ensure that all water bodies in the region have been properly designated with appropriate existing and probable future beneficial uses. Existing receiving water data, use information, bacteria

monitoring data, flow data, and control measure information were collected and analyzed (Phase I).

Phase II will evaluate the most appropriate water quality objectives to protect beneficial uses, and Phase III will develop implementation and monitoring strategies to achieve the recommended water quality objectives.

Data Analysis

Under Phase I, CDM prepared an analysis of available technical data and scientific information to support updates to existing recreation-based beneficial use classifications to more accurately reflect the true nature of recreational uses occurring throughout the watershed. This analysis included development of a watershed-wide, GIS-based database of channel, flow, and water quality attributes; an inventory of recreational use activities; a characterization of flow and bacteria water quality throughout the watershed; and an inventory of existing major stormwater quality control measures.

Phase I activities were completed in early 2005, and based on the results and consensus among stakeholders that the project should move forward, Phase II activities were implemented. The focus of Phase II is on the development of a technically defensible approach for establishing subcategories of the REC-1 use, including developing a procedure that could be used for the use attainability analyses that needed to place waters in these subcategories. In addition, Phase II will look at alternative bacteria water quality objectives that could be applied to recreational use subcategories.

Project Experience and References

Section One

Middle Santa Ana River Pathogen TMDL Implementation, SAWPA, Santa Ana River Watershed, Southern California

Project Dates: 2007-2010

Client Contact: Rick Whetsel
11615 Sterling Avenue, Riverside,
California, 92503
951-354-4222

Contract/Actual Bid Amount: \$1 million

Accidents/Injuries: None

Six waterbodies in the Middle Santa Ana River (MSAR) watershed (southern California) are listed on the state 303(d) list of impaired waters due to high levels of fecal coliform and *E. coli* bacterial indicators. The MSAR Bacterial Indicator TMDL, adopted by the Santa Ana Regional Water Quality Board (Regional Board) in 2005, became effective May 16, 2007, when it was approved by the EPA Region 9. The MSAR Watershed TMDL Task Force, comprised of urban stormwater dischargers, agricultural operators and the Regional Board, are working collaboratively to implement the TMDL.

To provide support for TMDL implementation, the Riverside County Flood Control and Water Conservation District, San Bernardino County Flood Control District and Orange County Water District worked with the SAWPA in 2006 to obtain Proposition 40 state grant funds. Successful in their efforts, the *Middle Santa Ana River TMDL BMP Implementation Study* was funded and CDM was commissioned by the grant administrator, SAWPA, to provide the following technical services for the Task Force:

- Develop and implement a Regional Board-approved MSAR Watershed-wide Compliance Monitoring Program (including Monitoring Plan and Quality Assurance Project Plan) that is compliant with TMDL requirements. This program has been established and is currently into its fourth year of implementation.
- Develop Regional Board-approved Urban Source Evaluation Plan, which includes Urban Source Evaluation Monitoring Program that incorporates microbial source tracking sampling to identify priority areas for Best Management Plan (BMP) implementation. The approved plan continues to be implemented through the bacteria source evaluation studies in the watershed. Preliminary studies have been completed for Cypress Channel, Carbon Canyon Creek and Chris Basin.
- Prepare a comprehensive data analysis report that summarizes findings from watershed compliance and urban source monitoring activities. The completed 2009 report used risk assessment approach to prioritize subwatersheds for additional bacteria source evaluation studies.
- Implement a BMP Pilot Study to evaluate the effectiveness of selected BMPs for control of bacterial indicators in urban runoff. The findings from the completed study are reported in the project's BMP Control Strategy and Prioritization Plan.

Project Experience and References

Section One

- Prepare a BMP Control Strategy and Prioritization Plan to reduce bacterial indicator concentrations during dry weather. Final Plan was completed in February 2010.

Final Grant reports, which were submitted to the Regional Board in March 2010, have been approved and the project has been certified as complete by the Regional Board Grant Manager. The findings of this study are being used to identify and direct additional TMDL implementation activities.

Ross Barnett Reservoir Watershed Pathogen Source Assessment and Wastewater Management Plan, Mississippi Department of Environmental Quality, Jackson, Mississippi

Project Dates: September 2009 – September 2010

Client Contact: Donetta McCullom, Pearl River Basin Project Manager
P.O. Box 2261
Jackson, MS 39225-2261
Office Phone: 601-961-5348

Contract/Actual Bid Amount: \$244,580

Accidents/Injuries: None

CDM is currently contracted with MDEQ to complete a wastewater assessment for 5 subbasins within the Ross Barnett Reservoir watershed near Jackson, MS. The Ross Barnett Reservoir watershed is considered by many in Mississippi to be the most important watershed in the state. This is primarily because the reservoir, a 33,000 acre surface-water impoundment, is the state's largest water supply source; serving approximately 80% of the City of Jackson's water needs as well as the Nissan automotive plant in Canton. In addition to its use as a primary drinking water source, the reservoir is used extensively for recreation such as boating and fishing. The Reservoir is also an economic stimulant in both

Madison and Rankin Counties. CDM is working with watershed stakeholders to evaluate potential pathogen sources for future reduction to ensure the long-term biological health and condition of the reservoir. As part of the project, CDM is completing assessments of potential pathogen sources within the selected subbasins and is using available compiled data to evaluate current conditions of the reservoir and surrounding waterbodies to make recommendations to mitigate identified pathogen sources. A main component of this effort is to determine septic system and wastewater treatment practices in place within the selected subbasins and evaluate future plans for expanded service areas and upgraded processes. The final document will identify potential sources of pathogens within the selected subbasins and make recommendations for future effective wastewater management.

Project Experience and References

Section One

Turkey Creek Watershed Pathogen Study, Mississippi Department of Environmental Quality, Gulfport, Mississippi

In 2008, CDM completed a watershed study in the Gulfport, MS area to assess pathogen sources associated with the impaired recreational use of Turkey Creek. The project effort included collecting and analyzing data from multiple sources. The data that were reviewed for this study included regulatory information, water quality data, historic flow and climate records, treatment plant discharge monitoring reports and permit information, area land use practices, collection system information and area septic system data. Another large component of this project was engaging stakeholders in the historic Turkey Creek Community. The final step of the project included developing a watershed implementation plan that included a combination of treatment system upgrades and best management practices. The Turkey Creek watershed was identified as a high priority for USEPA and stakeholder involvement was a major component of the successful completion of the project.

Project Dates: 2008

Client Contact: Zoffee Dahmash,
Nonpoint Source Program Director
P.O. Box 2261
Jackson, MS 39225-2261
Office Phone:601-961-5348

Contract/Actual Bid Amount: \$150,000

Accidents/Injuries: None

Department of Environmental Quality Initial TMDL Planning, Montana Department of Environmental Quality, Upper Clark Fork River, Montana

Project Dates: January 2006 – March 2007

Client Contact: Jim Bond, TMDL
Planner, Montana Department of
Environmental Quality
Water Quality Protection Bureau
P.O. Box 200901
Helena, Montana 59620-0901
(406) 444-3548

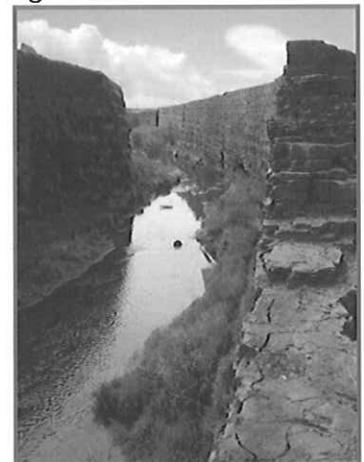
Contract Amt: \$85,000

Accidents/Injuries: None

The Upper Clark Fork TMDL planning area (TPA) encompasses approximately 1,495 square miles and thirty-one stream segments that appear on the current 303(d) list for Montana. CDM was tasked to develop a project work plan, perform watershed characterization, compile and organize all available water quality data, develop tables and graphics for visualizing the spatial distribution of available data, and perform an aerial assessment to delineate logical stream reach breaks based on natural and anthropogenic characteristics of the watershed and sources of pollution.

Data Compilation and Organization

Pertinent technical data and information were obtained from all known resources. The DEQ used sufficient credible data review/impairment use determination files and previously completed TMDL-related as a starting point for data compilation. A reference list was then compiled that identified available and relevant data sets, reports, and other pertinent information as appropriate (e.g., maps,



CDM's plan for data collection in the Upper Clark Fork River watershed selected the most relevant elements to easily facilitate electronic

Project Experience and References

Section One

aerial photographs, GIS layers, etc.). The reference list was used by DEQ to identify and select the most relevant data for developing water quality targets to support impairment status determinations.

Watershed Characterization

CDM prepared a baseline condition watershed characterization report describing the existing conditions of the watershed and associated water bodies. This report includes a general summary of hydrology, climate, topography, vegetation cover, stream morphology, water chemistry, land use, land ownership, economy, population, jurisdictional boundaries and other applicable information.

Data Analysis and Review

Data were organized for review of the impairment status of each pollutant listing for all 303(d) listed streams in the Upper Clark Fork TPA. All narrative pollutant-related draft targets/indicators that reflect Montana's water quality standards were identified and justified. The draft target/supporting indicators for the various pollutants of concern were applied to all water body/pollutant combinations in the Upper Clark Fork TPA, and the impairment status of each water body was updated based on its conformance to those targets (where sufficient data were available to perform the update). Any data needs for making an impairment status determination based on the draft targets were identified.

Little Calumet Watershed Characterization, Metropolitan Water Reclamation District of Greater Chicago, Chicago, Illinois

Project Dates: Nov. 2006 – March 2007

Client Contact: John Murray,
Senior Supervising Engineer,
MWRDGC, 100 E. Erie Street, Chicago,
IL 60611
312-751-7918

Contract/Actual Bid Amount: \$242,560
– first phase

Accidents/Injuries: None

CDM developed a detailed watershed plan for the Metropolitan Water Reclamation District of Greater Chicago (MWRDGC) for the Little Calumet River Watershed in the south Chicago suburbs. The watershed plan is being developed in two phases.

Data Collection/Analysis

The first phase consisted of comprehensive data collection from several sources, including previous planning efforts, existing models, water quality data and impairments, historical flow data, land use information, floodplain mapping, and other critical data. CDM worked with the local watershed communities to identify problem areas within the watershed and to collect necessary information about the problems. CDM closely coordinated with the local Watershed Planning Council led by the South Suburban Mayors and Managers Association, and with several State of Illinois and federal agencies to collect the best available data. Criteria for model development and modeling tool selection, along with identification of additional data needs, were part of this effort.

Project Experience and References

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Modeling

The second phase of the plan consisted of developing an updated watershed planning model for use in analyzing improvement scenarios and making recommendations for watershed improvements.

DuPage River/Salt Creek Workgroup (DRSCW) – TMDL Implementation - Chloride Education and Reduction Program Study

In response to recent TMDL requirements within the DuPage River (East and West Branch) and Salt Creek, CDM conducted a special water quality study for the DuPage River/Salt Creek Workgroup aimed at determining alternatives for reducing chloride loadings. A review and analysis of existing road salting and deicing practices and education and reduction programs related to chloride usage was performed. CDM is an active, contributing member of the workgroup, and is working closely with the workgroup's chloride subcommittee on this special study. Study progress has been presented at the workgroup's annual meeting.

Project Dates: May 2006 – May 2007

Client Contact: Stephen McCracken,
The Conservation Foundation
10S404 Knoch Knolls Road
Naperville, IL 60565
630-428-4500

Contract/Final Bid Amount: \$31,757

Accidents/Injuries: None

“Thanks for your staff’s work on the SOD analysis.

The team was easy to work with and focused on the task. Also welcome was CDMs pricing of the bid on the scope, which based on our experience with SOD analysis was right on target.”

Stephen McCracken, The Conservation Foundation

Alternative Evaluation

CDM evaluated the effectiveness of different alternatives that could result in reduced chloride levels, including public education, operator training, implementing anti-icing programs, alternative deicing agents, and improved storage and maintenance procedures. Alternatives with potential for chloride reduction were analyzed to produce reduction predictions within the watershed. Recommendations for alternative practices that should result in chloride reductions were developed.

This work led to the development of a schedule and cost estimate for implementing the recommended deicing alternatives throughout the watershed. CDM has also developed protocols and recommendations for monitoring the effectiveness of implemented alternative deicing practices, or pilot studies of alternatives.

Project Experience and References

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Total Maximum Daily Load Plan-Bacteria, Michigan Department of Environmental Quality, Michigan

Project Dates: 2006 – 2007

Client Contact: Ms. Kelly Cave, P.E.
Director of Watershed Management
Wayne County Dept. of Environment
415 Clifford Street
Detroit, MI 48226
313 224 8282

Contract Amt: N/A

Accidents/Injuries: None

The Michigan Department of Environmental Quality (DEQ) has received a grant from USEPA to develop a plan to address *E. coli* in the Rouge River. The TMDL analyzed data from the river to define sources and target areas for reductions, with the goal of meeting state water quality standards. The TMDL process, lead by a CDM-DEQ partnership, involved stakeholder input, public meetings, and a public comment period.

The Rouge River has historically had levels of *E. coli* resulting from combined sewer overflows and nonpoint source pollution that make the water unsafe for body contact. The TMDL focused on *E. coli* sources from the Rouge River Main, Upper, Middle, Lower, Bell and Franklin Branches, and Evans Ditch.

The DEQ has partnered with local organizations to determine *E. coli* sample locations and share data that will help identify the sources of contamination. Once the sources were identified, efforts were focused on eliminating or reducing them.

North Santa Monica Bay Watersheds Regional Watershed Implementation Plan and Malibu Creek Watershed Bacteria Total Maximum Daily Load Implementation Plan, Los Angeles County, California

Project Dates: August 2005 – July 2007

Client Contact: Angela George, Los Angeles County Department of Public Works
900 South Fremont Avenue, 11th Floor,
Alhambra, CA
91803, 626-458-4341

Contract/Actual Bid Amount: \$1.1 million

Accidents/Injuries: None

CDM was retained by the County of Los Angeles and other responsible agencies in the North Santa Monica Bay Watersheds (NSMBW) to assist in developing an Implementation Plan to address the requirements of the Malibu Creek Watershed Dry- and Wet-Weather Bacteria TMDL and to develop a Regional Watershed Implementation Plan (RWIP) for the entire NSMBW area.

NSMBW Regional Implementation Plan

The NSMBW are unique because a majority of the watersheds contain a large amount of open space and several natural creeks. The NSMBW also support small percentages of urban, residential, and business communities. However, there are limited flood control facilities. As a result, floods often convey pollutants that impact natural waterways and the northern beaches of the Santa Monica Bay. The flooding poses a serious challenge for dischargers to comply with three primary regulations of concern, which are the National Pollutant Discharge Elimination System (NPDES) Permit, TMDLs, and Assembly Bill 885 (AB 885).

Project Experience and References

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In coordinating and developing the RWIP, CDM performed the following analysis and evaluations:

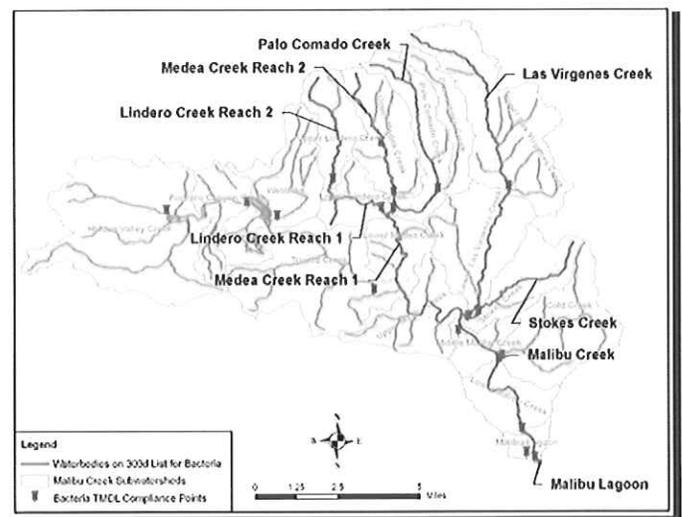
- Treatment and management option evaluation to identify potential treatment requirements, technologies, and best management practice (BMP) options for specific areas of dry- and/or wet- weather runoff. The evaluation includes cost estimates and the associated risk assessment.
- Investigation and identification of potential sites for facility construction (storage, diversion, conveyance, and treatment), including a preliminary feasibility analysis of constructing proposed structures at these identified sites and planning-level cost estimates.
- Facilitation of monthly stakeholder workshops to communicate the overall plans for the project, get feedback on public concerns, field questions regarding the project, and gain issues for consideration when evaluating alternative components and plans.

The development of the Malibu Creek Watershed Bacteria TMDL Implementation Plan was prepared in parallel with development of the RWIP. When the TMDL Implementation Plan was completed, it was included as one component of the RWIP.

MCW TMDL Implementation Plan

On March 21, 2003, the United States Environmental Protection Agency (USEPA) established a Bacteria TMDL for the Malibu Creek Watershed in an effort to meet a deadline specified in a consent decree. In December 2004, the Los Angeles Regional Water Quality Control Board (Regional Board) approved a Bacteria TMDL for Malibu Creek Watershed that included the requirement for an implementation plan. This new Bacteria TMDL for Malibu Creek became effective on January 24, 2006 and supersedes the March 21, 2003 TMDL.

The proposed TMDL requires each responsible agency to submit a plan outlining how it intends to cooperatively achieve compliance with the



Creating a regional watershed implementation plan will help minimize pollutant impacts on the natural waterways and the northern beaches of Santa Monica Bay.

Project Experience and References

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TMDL within one year of the effective date. A joint Bacteria TMDL Implementation Plan for the Malibu Creek Watershed is being coordinated among the Counties of Los Angeles and Ventura; the County of Ventura Watershed Protection District; Caltrans; and the Cities of Agoura Hills, Calabasas, Malibu, Thousand Oaks, and Westlake Village.

CDM assisted the County of Los Angeles, in conjunction with the other participating agencies and working with the Regional Board, in preparing a detailed, integrated TMDL Implementation Plan for Malibu Creek Watershed to address the compliance requirement of the existing and future TMDLs in an iterative, adaptive manner.

Watershed Characterization

As part of this integrated approach, CDM proposed to address not only bacteria, but also other water quality impairments in the Malibu Creek Watershed, such as nutrients, trash, metals, and organics. This approach called for subwatershed prioritization, best management plan selections, and alternative evaluations. At the request of the participating agencies, this Integrated TMDLIP included a quantitative analysis that estimated water quality improvements as a result of the plan's implementation.

Stakeholder Communication

An important element of the Implementation Plan development was the incorporation of the input of multiple city and county departments as well as other affected stakeholders. CDM assisted the County by organizing facilitating monthly stakeholder meeting in addition to key milestone meetings.

Arid West Water Quality Research Project, Pima County, Arizona

Project Dates: Jan. 2000 – 2007

Client Contact: Mr. Ed Curley, Capital Development Manager, 201 North Stone Avenue, 8th Floor, Tucson, AZ 85701, (520) 740-6638

Contract/Actual Bid Amount:
\$1.2 million

Accidents/Injuries: None

The Pima County Wastewater Management Department, through cooperative-agreement funding from USEPA, conducted the Arid West Water Quality Research Project. The purpose of the project was to improve the scientific basis for regulation of water quality and protection of species, habitats and uses of effluent-driven and ephemeral waters in the arid West.

Data Analysis

CDM was the overall scientific manager of the project, which produced the following major pieces of research: dischargers survey, habitat characterization study and extant criteria study. The objectives of the discharger survey were to obtain information on water quality issues and problems faced by dischargers in the arid West and gather basic data, such as discharge rates, designated uses of receiving waters and the physical, chemical and biological characteristics of receiving waters. The purpose of the habitat characterization study was to conduct a historical data review and reconnaissance-

Project Experience and References

Section One

level field evaluation of the physical, chemical and biological characteristics of 10 effluent-dependent waters in the arid West. The extant criteria study identified unique characteristics of ephemeral and effluent-dependent watercourses that warrant modifications to ambient water quality criteria or their implementation. It used copper, selenium, diazinon and ammonia for model criteria as the basis for evaluation.

CDM completed the habitat characterization study, which focused on 10 case study sites in the arid West. The team developed the following key findings:

- Physical habitat of an effluent-dependent watercourse is determined not just by the physical dynamics resulting from the effluent discharge but by other physical limitations imposed on the ecosystem by multiple stressors
- Differences exist between the chemical composition of arid streams and whole effluent toxicity (WET) chemistry
- Creation of conceptual model of effluent-dependent water ecosystem
- Aquatic and terrestrial biological communities are a reflection of the physical and chemical template resulting from instream flow characteristics (natural and effluent driven)
- Increased levels of treatment may not be a cost-effective approach to improving aquatic communities

One regulatory recommendation of the habitat characterization study was that a new type of designated use, such as an effluent-dependent water body, and associated criteria be developed for these types of systems. This could also apply to headwater streams in more humid areas of the country.

Fox River Study Group Water Quality Data Acquisition and Management, Illinois

Project Dates: 2005-2006

Client Contact: Cindy Skrukud
Sierra Club, Illinois Chapter
200 N. Michigan Avenue, Suite 505
Chicago, IL 60601
815.675.2594

Contract/Final Bid Amount: \$48,000

Accidents/Injuries: None

CDM was contracted by the Fox River Study Group (FRSG) to perform water quality data collection for the Fox River watershed in the western Chicago suburbs. CDM's data collection efforts were used to develop loading information for the watershed's water quality model. To obtain the most complete possible data set, data was both downloaded from the USEPA Envirofacts website (which contains extensive data from monthly discharge monitoring reports submitted by NPDES permittees) and solicited from both public and private facilities. In many cases, facilities that responded to the request submitted daily data, data for parameters not reported on the DMR, and other detailed information of potential benefit to the model development that was not available through Envirofacts alone.

Project Experience and References

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The water quality constituents of most interest for the FRSG included:

- Dissolved oxygen
- Chlorophyll *a*
- Algal biomass
- Nitrogen (all forms)
- Chemical oxygen demand (COD) and biological oxygen demand (BOD)
- Suspended solids (SS), water temperature (T)
- Chloride, phosphorus (all forms)
- Bacteria (*E. coli*, fecal coliform, total coliform)
- pH

Data Analysis and Collection

CDM prepared a current list of NPDES facilities located within the project area and refined it by removing all facilities that were located upstream. Additional attributes of the NPDES facilities database that were updated included the location of the facilities, contact personnel, telephone numbers and addresses. Finally, the facilities were separated into two lists, one list containing publicly owned facilities and the other privately owned facilities. A summary of parameters monitored by each facility for NPDES reporting purposes was also developed.

Two sets of water quality data were collected. One set consisted of data requested directly from the NPDES facilities in the watershed, and the other set consisted of data downloaded from the USEPA's Envirofacts database. The information gathered during was entered into a database that could be used by the Illinois State Water Survey for developing a water quality model for the watershed.

Receiving Water Quality Study, Denver International Airport, Colorado

Project Dates: 2001 – 2006

Client Contact: Janell Barrilleaux,
Director of Environmental Programs
Denver International Airport, 7th Floor
AOB, 8500 Pena Blvd, Denver, CO
80249
(303) 342-2730

Contract/Actual Bid Amount: \$150,000

Accidents/Injuries: None

Denver International Airport (DIA) faces continuous and evolving regulatory pressures for compliance with water quality standards established for water bodies receiving stormwater runoff from the facility. DIA, like most airports, seasonally utilizes chemicals for aircraft and pavement deicing to enhance the safety of air travel and airport operations. The open-air application of these chemicals to aircraft and pavement surfaces creates a potential for mitigation of deicing fluids to the storm sewer and to receiving streams. Typical aircraft deicing fluids exert significant oxygen demand that can deplete DO in receiving waters.

Project Experience and References

Section One

CDM is conducting a receiving water study to address DO in the receiving waters surrounding DIA. This study will support evaluation of permit conditions and water quality standards for DO. CDM is evaluating DIA receiving waters in two parts: evaluation of existing conditions and evaluation of storm event runoff loading conditions. Existing conditions analysis includes bioassessment, physical analysis and chemical analysis to examine the appropriateness of the DO standards and designated uses of the streams. The storm event analysis will establish a correlation between chemical oxygen demand (COD) and DO to evaluate appropriate permit conditions for the receiving waters.

As part of the project, CDM facilitates stakeholder meetings with the Colorado Department of Public Health and Environment, USEPA, and the Colorado Division of Wildlife. This group reviewed the study design and will review study findings as they relate to discharge permit conditions and receiving water quality standards.

Chicago Area Waterways Use Attainability Analysis, Illinois EPA, Chicago, Illinois

Project Dates: 2003 – 2005

Client Contact: Rob Sulski, IEPA
9511 West Harrison Street
Des Plaines, Illinois 60018
(847) 294-4000

Contract/Final Bid Amount: \$571,492

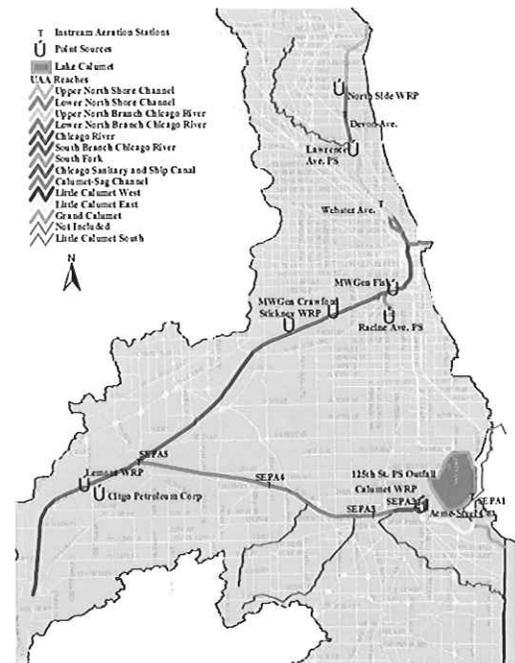
Accidents/Injuries: None

Chicago's waterway system is one of the city's icons and is considered the city's second shoreline. Meandering among many of the most famous streets and landmarks, the Chicago Area Waterways System (CAWS) consists of 78 miles of canals and modified streams. Many of these canals were built in the early 20th century by the Metropolitan Wastewater Reclamation District of Greater Chicago

(MWRD) to divert wastewater and stormwater from Lake Michigan, the city's main drinking water supply.

Data Collection/Analysis

Chicago set out to improve the CAWS water quality, spurring an increase in the number of residents wanting to live and work along the water, as well as expanding recreational interest. On behalf of the Illinois Environmental Protection Agency (IEPA), CDM facilitated IEPA's stakeholder group in an analysis of the waterway's existing condition and recommendation of use designations and associated water quality standards. This



CDM assisted the IEPA with the development of water quality standards that will allow greater recreational use.

Project Experience and References

Section One

comprehensive and in-depth evaluation helped to determine how the waterways have changed and if, as a result, any other uses are appropriate. The collected data, comprehensive stakeholder input, and analytical results were used to conduct an integrated analysis of current and potential classifications, uses, and associated water quality standards. This information was used as the foundation for a strategic plan that identified the agreed-upon uses and the timeline for achieving them.

The City, along with MWRD, worked with IEPA to identify the appropriate and cost-effective measures to meet their common goal of improving water quality in the area waterways. As improvements begin to take place, CDM assisted with important public outreach activities that helped all the stakeholders achieve ultimate water quality management success—turning the waterways into a multi-use asset for urban and economic improvements.

Santa Monica Bay Beaches Wet Weather Bacteria TMDL Implementation Plan, Jurisdictions 2 and 3, Los Angeles, California

Project Dates: May 2003-May 2005

Client Contact: Dr. Shahram Kharaghani, Division Manager, Watershed Protection Division, City of Los Angeles, Bureau of Sanitation
1149 S. Broadway, Floor 10, Los Angeles, CA 90015
213-485-0587

Contract/Actual Bid Amount: \$250,000

Accidents/Injuries: None

The Wet Weather Bacteria TMDL for Santa Monica Bay beaches was among the first four of more than 60 TMDLs anticipated to govern the discharge of wastewater, urban runoff, and stormwater in the Los Angeles River, Ballona Creek, Dominguez Channel, and Santa Monica Bay watersheds. The Wet Weather Bacteria TMDL divided the Santa Monica Bay coastline into seven jurisdictions. Jurisdiction 2, led by the City of Los Angeles, and Jurisdiction 3, led by the City of Santa Monica, jointly prepared a single Implementation Plan. Jurisdictions 2 and 3 include the Cities of Los Angeles, Santa Monica, and El Segundo; the County of Los Angeles; and the California Department of Transportation (Caltrans).

TMDL Implementation Plan

The CDM/CH2M Hill team developed the Implementation Plan using an integrated water resources approach, which takes a holistic view of regional water resources management by integrating planning for future wastewater, stormwater, recycled water, and potable water needs and systems. The Implementation Plan focused on beneficial reuse of stormwater and addressing multiple pollutants for which Santa Monica Bay and its watersheds are listed on the Clean Water Act Section 303(d) List as impaired. By following an integrated planning approach, Jurisdictions 2 and 3 may be granted up to 18 years for implementation and compliance with this TMDL, instead of the usual 10-year time frame required to implement an end-of-pipe, non-integrated plan.

Project Experience and References

Section One

Stakeholder Communication

An important element of the Implementation Plan development was the incorporation of the input of multiple city departments as well as other affected stakeholders. To facilitate public involvement, the CDM team assisted the city in organizing four informative stakeholder workshops. Stakeholders included the Los Angeles City Council, government leaders from the cities of Santa Monica and El Segundo, nonprofit environmental organizations like Heal the Bay and Santa Monica Bay Keeper, and neighborhood councils. The first workshop focused on the initial approach to the development of the implementation plan. The workshop served to communicate the overall plans for the project, solicit feedback on public concerns, field questions regarding the project, and identify issues for consideration when evaluating alternative plans. The workshop was well attended, and the client felt it was successful. These workshops proved very successful in developing stakeholder support for the agencies' plan.

Santa Monica Bay Beaches TMDL Implementation Plan, Jurisdictions 5 and 6, Los Angeles, California

Project Dates: May 2003-May 2005

Client Contact: Dr. Shahram Kharaghani
Division Manager
Watershed Protection Division
City of Los Angeles Bureau of Sanitation
2714 Media Center Dr.
10th Floor
Los Angeles, CA 90065
(213) 485-0587

Contract/Actual Bid Amount: \$167,870

Accidents/Injuries: None

CDM assisted the City of Redondo Beach and other responsible agencies in Jurisdictions 5 and 6 of Santa Monica Bay to develop a joint implementation plan to address the requirements of the Santa Monica Bay Beaches TMDL for both wet and dry weather.

The TMDL divides the Santa Monica Bay coastline into seven jurisdictions. Jurisdictions 5 and 6, led by the City of Redondo Beach, affect approximately 5.9 miles of shoreline and a 3,095-acre watershed. Jurisdictions 5 and 6 consist of the Cities of Redondo Beach, Manhattan Beach, Torrance, Hermosa Beach, and El Segundo; the County of Los Angeles; and the California Department of Transportation (Caltrans). The TMDL requires that bacterial indicators at the beaches not exceed standards set for

contact recreation (e.g., swimming) more than 17 days per year during wet weather and zero days per year during dry weather. The goal of this TMDL is to improve water quality in Santa Monica Bay and reduce recreational health risks.

To develop an effective implementation plan, CDM provided:

- Management support, including facilitation of stakeholder workshops
- Best management practices (BMP) evaluation, including flow diversion



CDM's three integrated TMDL Implementation Plans for six of the seven jurisdictions identified in Los Angeles will improve water quality in the area.

Project Experience and References

Section One

and treatment, and siting investigations to identify sites for potential structural facilities

- Hydrologic analysis of the stormwater collection system to determine stormwater runoff quantities
- Beneficial use evaluation, including groundwater replenishment, barrier injection, and direct reuse for non-potable uses

In addition to the research and development of an implementation plan, CDM prepared a funding strategy document that included a review of the client's rate structure, identification of costs to implement proposed solutions, and identification of potential sources of funding.

Spring Brook Watershed Plan, DuPage County, Illinois

Project Dates: May 2003 – Dec. 2005

Client Contact: Chris Vonnahme, Senior
Project Engineer
421 N. County Farm Road
Wheaton, IL 60187
630-407-6800

Contract/Actual Bid Amount: \$119,700

Accidents/Injuries: None

DuPage County retained CDM to prepare a stormwater management plan for the Spring Brook tributary to Salt Creek. The Spring Brook watershed covers nearly 15 square miles in Cook and DuPage counties, along with portions in Itasca, Roselle, Bloomingdale and Schaumburg. Twelve miles of main channel and six miles of three tributaries were evaluated for the plan. Key elements of the project included:

- Identifying flood problem areas
- Analyzing flood damages
- Formulating flood management alternatives
- Selecting alternatives and plan development
- Mapping the floodplain
- Developing a stormwater management plan report
- Preparing a public presentation of the plan

Data Analysis

Watershed analysis was conducted using a USGS FEQ unsteady flow hydraulic model of the stream system previously developed by CDM for DuPage County.

Additionally, modeling of flood heights from historical storm events was superimposed on county topographic maps to identify flood-prone structures. CDM conducted field surveys of more than 100 structures to determine low-water entry and first-floor elevations. This structure data was used as input to a DEC-2 flood

Project Experience and References

Section One

damage model to calculate damages during a simulated 45-year historical series of flood events. This damage analysis was the basis for developing flood mitigation projects for the watershed.

Stakeholder Involvement

CDM also prepared a watershed plan report for distribution to the public and approval by the County Board. It presented the costs and flood mitigation benefits of each of the ten flood management alternatives developed during the project.

Santa Margarita Watershed Water Supply Augmentation, Water Quality Protection and Environmental Enhancement Program, San Diego, California

Project Dates: Aug. 2002 – Sept. 2003

Client Contact: Bill Steele
U.S. Bureau of Reclamation, Southern
California Area Office, Temecula
951.695.5310

Contract/Actual Bid Amount: \$180,000

Accidents/Injuries: None

CDM worked with the U.S. Bureau of Reclamation and seven watershed partners to develop a preliminary model to address the water quality issues and evaluate the effectiveness of the tool for determining the assimilative capacity of the Santa Margarita River and its ability to resolve long-term issues of effluent discharge to the river. The Santa Margarita watershed is located north of San Diego and is experiencing rapid urban development. The modeling tool to be utilized for the project is WARMF. It is hoped that this modeling and analysis effort will support the following future activities within the watershed:

- Scientific development of a TMDL for Santa Margarita Lagoon.
- Estimation of assimilative capacity of the SMR: Involves applying data to the watershed model to estimate the assimilative capacity of the river and address the issues associated with the Four-Party Agreement between Rancho California Water District, Eastern Municipal Water District, Fallbrook Public Utilities District, and the U.S. Marine Corps's Camp Pendleton.
- Identification relationships between habitat health and water quality: Involves applying the data to the watershed model to compare current and projected water quality and quantity to habitat needs in the critical reaches of the watershed.

Project Experience and References

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Basin Creek/Upper Tenmile Creek Watershed Restoration, USEPA, Lewis and Clark County, Montana

Project Dates: 1999 – 2003

Client Contact: Mr. Mike Bishop, USEPA
Region VII, Montana Office, 10 West 15th
St., Suite 3200, Helena, MT
(406) 457-4051

Contract/Actual Bid Amount:
\$3,799,000

Accidents/Injuries: None

CDM assisted USEPA with planning and conducting comprehensive assessment and evaluation of restoration alternatives for mine waste contamination sites throughout the Basin Creek and Upper Tenmile watersheds in Montana. The Upper Tenmile Creek watershed provides 80 percent of the water supply to the City of Helena. CDM assisted with a remedial investigation (RI), risk assessments and a feasibility study (FS) for watershed restoration, and selection and conceptual design of restoration alternatives within a two-year timeframe.

CDM prepared a comprehensive work plan, including field sampling plans, health and safety plan and QA project plan for all work.

CDM's services included:

Alternative Evaluation

CDM prepared draft and final RI and FS reports presenting all methods, results, conclusions and recommendations for additional data collection, assessment, and restoration alternatives. In the Tenmile Basin, CDM assisted with evaluation of modifications to the City of Helena's water storage and management approaches that would potentially allow the maintenance of augmented in-stream flows to benefit the local fishery. A technical analysis of costs and improvements in water quality and in-stream flows that might be expected under various potential alternatives was also included in the assessment.

Water Quality Studies

CDM analyzed contaminant loading from waste sources; developed, calibrated, and used USEPA's WASP5 water quality simulation model to evaluate contaminant mass loading consistent with an ongoing TMDL study for the watershed; and applied the RUSLE Version 1.06 model to estimate potential erosion of mine waste, transport of materials into streams, and potential reduction in erosion rates through various reclamation alternatives.

Other Services

CDM conducted field investigations, including in-stream sediment sampling, well sampling and stormwater and snowmelt sampling, and provided risk assessment and GIS/data management support. CDM also prepared a community relations plan for the assessment and restoration work in the watersheds.

Project Experience and References

Section One

Project Dates: Jan. 2001 – April 2002

Client Contact: Mr. Pat Callahan, P.E.,
Program Manager, Sewer Capacity Dept.
of Water Resources, City of Fort Wayne,
One Main Street, Room 480, Ft. Wayne,
IN 46802, (260) 427-1160

Contract/Actual Bid Amount: \$138,504

Accidents/Injuries: None

Use Attainability Analysis, Fort Wayne, Indiana

The City of Fort Wayne was seeking to establish a CSO program that was affordable for residents, while remaining in compliance with state and federal guidelines. Part of this task was to develop a UAA, a study on the existing and future uses of the Fort Wayne-area rivers and streams. Indiana's Senate Enrolled Act 431 stipulates that water quality standards can be temporarily suspended during wet weather provided that certain conditions are met. A UAA needed to be completed to

demonstrate why designated (recreational) uses could not be feasibly met. The analysis could also show that existing uses of the streams are in fact not the designated uses, or that widespread economic hardship would occur if investments were made to attempt to meet recreational standards. CDM performed several activities in support of UAA preparation. This involved the following tasks:

- Characterizing the stream uses and describing alternatives to comply with the designated uses
- Summarizing CSO data from the long-term control plan
- Identifying sensitive and priority areas
- Presenting existing conditions to the public
- Describing alternatives to comply with designated uses

The project included public presentations, a white paper on water quality and designated uses, an affordability analysis, and a report on the strategy for completing the UAA to support suspension of use during wet weather. With the knowledge gained from these activities, the city's Long-Term Control Plan was finalized in the summer of 2001.

Boneyard Creek Stormwater Improvements, Champaign, Illinois

Project Dates: 1994 – 2002

Client Contact: Steve Carter, City
Manager, City of Champaign, 702
Edgebrook Dr., Champaign, IL 61820,
(217) 351-4400

Contract/Actual Bid Amount: \$495,000

Accidents/Injuries: None

Originally a shallow prairie drainageway, Boneyard Creek had been lowered, rerouted, improved, and enclosed along various reaches several times over more than 60 years. These uncoordinated improvements, combined with unmitigated urban development, had resulted in regular, serious flooding problems along much of the channel. The City of Champaign retained CDM to review the previously recommended improvements and to assist in developing an improvement plan to solve its flooding problems. CDM provided the following services:

- Development of hydrologic and hydraulic computer models to represent the rainfall runoff and flow processes in the watershed. We developed the

Project Experience and References

Section One

RUNOFF and EXTRAN blocks of SWMM to evaluate the flows in the stormwater system.

- Development of a HEC-2 model to evaluate backwater effects at 32 hydraulic structures.
- Development and evaluation of 23 conveyance and storage improvement scenarios.
- Development and evaluation of conveyance improvements for the University of Illinois reach.
- Coordination with numerous stakeholders in the watershed. CDM also made presentations to various public and neighborhood groups.
- Preparation of regulatory permits for the proposed channel improvements.
- Preparation of hydraulic design of channel modifications, bridge improvements, and control structures.
- Review of developer plans and specifications for proposed joint city/developer storage improvements.
- Development of construction cost estimates and an implementation plan for the various improvement plan components.

Preparation of the improvement plan involved several tasks that were critical to final acceptance of the plan, including evaluating alternatives and coordinating with the major stakeholders. CDM evaluated 23 alternatives, including enlarging the channel, off-line storage of up to 200 acre-feet, and "distributed storage" in numerous locations throughout the six-square-mile watershed.

Johnson County Wastewater and City of Topeka Ammonia WLA Studies for the Kansas River, Kansas

Project Dates: Sept. 1998 – June 2001

Client Contact: Mr. John Metzler,
Johnson County Wastewater, 7311 West
130th St., Suite 100, Overland Park, KS
66213
(913) 681-3200

Contract/Actual Bid Amount: \$600,000

Accidents/Injuries: None

CDM conducted a multijurisdictional WLA study for ammonia in the Kansas River for WWTP discharges from the City of Topeka and Johnson County wastewater plants, both located in eastern Kansas. Upgraded use classifications for the middle and lower Kansas River required that more stringent ammonia limitations for the WWTPs be analyzed. The basis for these ammonia limitations was a reduction in the size of the default mixing zone utilized in standard WLA studies by the Kansas Department of Health and Environment. The reduction in default mixing zone size was related to upgraded use classification. The following

activities were conducted as part of the study:

Project Experience and References

Section One

- Bioassessment and habitat survey
- Mixing zone delineation using a dye tracer study
- Water quality sampling
- Stakeholder facilitation

The bioassessment and habitat survey were conducted to collect baseline biological information on the Kansas River. In addition, a literature search on early life stages of fish was also conducted to assess the appropriateness of the early life stage absent provision of the 1999 USEPA Ammonia Criteria. The mixing zone delineation was a field study used to validate predictions of USEPA's CORMIX mixing zone model. The mixing zone model was the basis for the WLA and was used to compare the size of the actual mixing zone versus the assumed size used for WLA purposes. Water quality sampling was conducted to establish baseline information as well as comparisons with TMDLs to be developed in the future for the Lower Kansas River. CDM facilitated a stakeholder group consisting of the Kansas Department of Health and Environment, USEPA, Kansas Biological Survey, U.S. Fish and Wildlife, Kansas Department of Wildlife and Parks, Sierra Club, League of Women Voters and the Kansas River Keepers. The stakeholder group reviewed the study work plan, results and recommendations.

FEMA Map Revision of Addison Creek, Cook and DuPage Counties, Illinois

Project Dates: 1998 – 2000

Client Contact: Mr. Arlen Juhl, Illinois Dept. of Natural Resources, Office of Water Resources, 3215 Executive Park Drive, Springfield, IL 62794 (217) 782-4377

Contract/Final Bid Amount: \$92,000

Accidents/Injuries: None

CDM assisted the Illinois Department of Natural Resources Office of Water Resources (IDNR/OWR) in obtaining a FEMA map revision of Addison Creek, located west of Chicago in Cook and DuPage counties. IDNR/OWR completed a planning study for Addison Creek in 1993 that resulted in the delineation of a more detailed floodplain map. CDM's work also included conducting a reservoir dewatering optimization plan for the reservoirs on the creek. At the time, reservoir dewatering operations caused double pumping by downstream reservoirs, increasing dewatering time and operation costs, and may have prolonged flooding in some areas. CDM's tasks included:

- Updating the HEC-1 and HEC-2 models developed for the IDNR/OWR Planning Study with additional cross section data
- Preparing floodplain/floodway maps and water surface profiles
- Preparing the application for FEMA map revision
- Collecting data on reservoir dimensions, pump station capacities and current operation procedures

Project Experience and References

Section One

- Developing a dynamic model of the reservoir/pump station system
- Conducting an analysis of the reservoir pump operations
- Identifying and quantifying operation problems and recommending solutions
- Preparing the final reservoir operation plan

Development of Water Quality Guidance Documents for USEPA

Development of Guidelines for Nonpoint Source Controls in WLA Studies

For the USEPA Office of Water and Office of Program Policy and Evaluation, CDM developed guidelines for use in WLA studies to determine

whether nonpoint source discharges are significant compared to the point sources, whether controls placed on nonpoint sources could have significant impact on water quality, and what tradeoff between point and nonpoint source discharges would result in the desired water quality. The results of this project were incorporated into national policy guidelines for use by those conducting WLA studies and writing NPDES permits.

Project Dates: 1990s

Client Contact: Reference unavailable

Contract/Actual Bid Amount: \$250,000

Accidents/Injuries: None

Study of Nonpoint Pollution Controls Cost-Effectiveness

As part of USEPA's effort to prepare a report to Congress on the National Urban Runoff Program, CDM performed an independent analysis of the cost-effectiveness of various national-level stormwater pollution abatement programs for urban areas. The techniques used to perform the work relied heavily on interviews and field visits conducted with stormwater-related practitioners, government entities and interest group representatives in 10 urban areas nationwide. A data set was developed from these case studies, and certain categories of benefits were identified and appropriate BMPs hypothesized on a regionalized receiving water basis. The 320 urban areas defined by USEPA with census data were used to develop cost-effectiveness results based on the regional BMPs assumed to be employed for the various water uses involved. Coincident with the cost-effectiveness review of BMPs, CDM studied the alternative institutional and financial mechanisms that can be used in connection with urban stormwater control.

Development of Screening Procedure for Relative Impacts of Point and Nonpoint Sources for WLAs

For USEPA, CDM developed a two-level screening procedure to determine when nonpoint pollution source loadings should be explicitly addressed as part of WLA studies during TMDL development. Level 1 screening involves an evaluation of nonpoint source and point source loadings and simplified assessments of receiving

Project Experience and References

Section One

water quality impacts. Level 2 provides an evaluation of the relative impacts of nonpoint source and point source pollution loadings on beneficial use impairment within a water body. In those instances in which nonpoint source loadings should be considered, the procedures are designed to evaluate whether tradeoffs between nonpoint source controls and point source controls merit further detailed study.

The screening procedures are designed to be applied with existing information, i.e., there is no need to conduct special studies. The procedures rely on a series of worksheets that present the appropriate equations, default values and references to data sources. Case studies that illustrate various aspects of the screening procedure are also presented.

Technical Assistance for Implementation of Revised Water Quality Standard Review and Revision Process

CDM provided technical assistance to the USEPA's Criteria and Standards Division for the implementation of the revised water quality standards review and revision process for the protection of aquatic life and the protection of aquatic life in the nation's waters as part of the TMDL process. This work involved the development of site-specific water quality criteria to reflect the effect of a specific receiving water on pollutant toxicity and a water body survey and assessment that provided an organized framework within which to define the existing and potential beneficial uses of a body of water.

In partnership with USEPA and various states, a number of demonstration studies were conducted to test proposed guidelines and obtain state comments. As part of these pilot studies, CDM also provided technical assistance for recalculating state toxin criteria for 21 chemicals based on resident species and family data in the national toxicity database by investigating concentration versus time-of-exposure toxicity responses of aquatic life for ammonia, cadmium, copper, and DO and by developing several sections of the technical support manual. The manual provides guidance in the conduct of water body surveys for the attainment of uses, examines the associations in the toxicity databases for marine and freshwater organisms, assesses the need for water quality criteria for sediment, reviews lead and cadmium toxicity in the marine environment, and assists in the development of a DO criterion implementation document.

Urban Runoff Water Model Review Study

CDM conducted a model review study for USEPA's Municipal Environmental Research Laboratory. Initially, the study involved a literature review to assess the state-of-the-art of urban water mathematical modeling since 1967. Particular urban water phenomena or subsystems addressed included rainfall, runoff and snowmelt; urban watersheds; water supply and water distribution systems; water use, waste collection and conveyance; waste treatment; receiving waters; and water reuse. In addition, model development work, uses and problems were also reviewed. Future

Project Experience and References

Section One

urban water models were suggested based on the state-of-the-art review and the demonstrated need for ability to treat certain existing planning and design problems. As a result of the study, a phased implementation program for model development was suggested for the Storm and Combined Sewer Section of USEPA.

Rouge River National Wet Weather Demonstration Project, Wayne County, Michigan

The Rouge River – part of a 436-square-mile watershed – was plagued by CSOs and poor stormwater quality for decades. An urban river outside of Detroit, the Rouge has undergone major improvements over the past nine years thanks to the Rouge River National Wet Weather Demonstration Project. The project, intended to restore and protect water quality, control CSOs and other nonpoint sources of pollution, and implement watershed management practices, began in 1992. Supported in part by USEPA grants, the project has included pollution control facilities and has established design criteria and BMPs to restore the river's degraded habitats.

Project Dates: 1990s

Client Contact: Ms. Kelly Cave, P.E.
Wayne County Dept. of Environment, 415
Clifford St., Detroit, MI 48226, (313) 224-
8282

Contract/Actual Bid Amount: \$54
Million

Accidents/Injuries: None

CDM managed a team of 25 subcontractors, integrating their program support in the Rouge River program office. For the program, CDM has:

- Coordinated stakeholder interface to develop interagency agreements between Wayne County and 14 local municipalities and operating agencies, plus two agreements with state agencies.
- Managed the project's interaction with federal and state agencies, including the Michigan Department of Natural Resources, MDEQ, Southeast Michigan Council of Governments, USEPA Large Lakes Research Station and the USGS.
- Managed an innovative grant program to assist local communities in demonstrating technologies for stormwater management and nonpoint source pollution control.
- Analyzed current and potential institutional and financial arrangements for wet weather pollution control.
- Integrated 75 improvement projects worth \$300 million performed by the local operating agencies. The



CDM's work on the Rouge River Wet Weather Demonstration Project has improved water quality and community relations throughout the watersheds.

Project Experience and References

Section One

improvements have included 10 major CSO detention basins totaling 56 million gallons, sewer separation projects in six communities, 50 community projects for stormwater control, and numerous efforts to remediate other nonpoint sources.

- Managed community outreach and public involvement programs, including public meetings; presentations to local officials and community leaders; establishment of technical advisory groups; and a student education program involving 100 area schools.

Project Experience and References

Section One

Surface Water and Sediment Quality Assessment, Kalamazoo, Michigan

Project Dates: 1990s

Client Contact: Mr. Paul Bucholtz
Remediation and Redevelopment
Division, Superfund Section, Michigan
Department of Natural Resources and
Environment, Constitution Hall, 3rd Floor
South, 525 W. Allegan St., Lansing, MI
48933, 517-373-8174

Contract/Actual Bid Amount:
\$7.4 million

Accidents/Injuries: None

MDEQ contracted CDM to conduct endangerment assessments for the Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund site in Kalamazoo. The site was placed on the NPL in August 1990 because there was evidence that the sediments, soils, water column, and biota within the site were contaminated with polychlorinated biphenyls (PCBs) and were preventing the river from meeting its designated uses.

The purpose of the investigations was to develop appropriate PCB levels in surface water and sediment that would protect the designated uses of the river and derive clean-up levels for future remediation. The scope of the investigation included:

- Preparation of project plans and procurement of a laboratory subcontractor
- Oversight of hydrogeological investigations at four operable units, sediment and biota sampling along the Kalamazoo River and its tributaries, data validation and report preparation
- Documentation of site activities in field logbooks, photographs, and weekly summary reports

CDM conducted two endangerment (ecological and human health) assessments for this site. For the ecological risk assessment, CDM quantitatively evaluated the effects of historical PCB contamination on existing aquatic uses in the Kalamazoo River and Portage Creek. Ecological risk-based cleanup levels were developed for the Kalamazoo River. CDM worked closely with the staff from USEPA Region V and MDEQ to develop realistic cleanup levels that would protect designated uses. MDEQ's goal is to restore the cold water fishery that historically existed in the Kalamazoo River and protect wildlife that uses the river corridor.

In support of the ecological risk assessment, extensive field sampling of local aquatic and terrestrial biota was conducted. Sampled aquatic organisms included game fish, rough fish, forage fish and common snapping turtles. Terrestrial organisms sampled included earthworms, white-footed mice, muskrat and mink. Tissues from these sampled species were analyzed for contaminant body burdens, especially whole-body PCB concentrations.

Project Experience and References

Section One

Project Dates: 1990s

Client Contact: Mr. Brian Marengo,
Philadelphia Water Dept., ARAMark
Tower, 5th Floor, 1101 Market St.,
Philadelphia, PA 19107-2994, (215) 685-
6300

Contract/Actual Bid Amount \$6.67
million

Accidents/Injuries: None

Office of the Watersheds Support Activities, Philadelphia, Pennsylvania

CDM assisted the City of Philadelphia Water Department's Office of Watersheds in implementing several strategic programs, including a comprehensive CSO NPDES permit compliance program, a municipal stormwater NPDES permit program, and a comprehensive watershed assessment, evaluation and TMDL program for Cobbs and Darby Creeks Basin and the Tacony-Frankford Creeks Basin. PWD operates a sewage and stormwater collection, conveyance and treatment system serving the city and

all or parts of 11 surrounding communities in the fourth largest urban area in the United States.

CDM assisted the city in:

- Developing an inventory of the hydraulic and physical characteristics of its watersheds and sewer systems
- Characterizing the hydrology and hydraulics of the tributary watersheds and sewersheds and hydraulic operation of the sewer collection and transmission system
- Documenting the implementation of nine minimum controls intended to ameliorate the potential impacts of CSO discharges
- Developing a long-term control plan for abatement of CSO impacts on area streams, including reviews of designated and actual uses and receiving water criteria and standards
- Developing and implementing the strategy for TMDL assessments and watershed management and TMDL implementation plans on two major watersheds
- Implementing the requirements of the city's stormwater discharge NPDES permit
- Investigating, analyzing and assessing the water quality, biology and fluvial geomorphology of all of the city's tributary watersheds

The initial stages of the compliance program focused on collecting the technical, environmental, institutional and economic data and performing the analyses to respond to regulatory requirements and to develop sound water quality control plans that are defensible, cost-effective and implementable. Additional work tasks included implementation assistance for nine minimum controls, the long-term CSO control plan, and a watershed approach for management of watersheds receiving CSO and stormwater discharges.

**WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION
TMDL VENDOR QUALIFICATION QUESTIONNAIRE Attachment A**

<p>PROJECT NAME Professional Engineering Services to Provide Total Maximum Daily Loads for the Impaired Streams in the West Fork River Watershed CDM Inc.</p>	<p>DATE (DAY, MONTH, YEAR) August 25, 2011</p>	<p>FEIN 04-247 3650</p>
<p>1. FIRM NAME CDM Inc.</p>	<p>2. HOME OFFICE BUSINESS ADDRESS 2740 Smallman St., Suite 100 Pittsburgh, PA 15222</p>	<p>3. FORMER FIRM NAME NA</p>
<p>4. HOME OFFICE TELEPHONE 412-201-5500</p>	<p>5. ESTABLISHED (YEAR) 1947</p>	<p>6. TYPE OWNERSHIP Corporation</p>
<p>7. PRIMARY TMDL DEVELOPMENT OFFICE: ADDRESS/ TELEPHONE/ PERSON IN CHARGE/ NO.OF TMDL DEVELOPMENT PERSONNEL IN OFFICE 2740 Smallman St., Suite 100 Pittsburgh, PA 15222 Matthew R. Sickles, P.E., Vice President Regional experts: 40 TMDL Experts National experts: 200 TMDL Experts</p>		
<p>8. NAMES OF PRINCIPAL OFFICERS OR MEMBERS OF FIRM Richard Fox, Chairman and CEO John Manning, President and Chief Operating Officer Paul Brown, Executive Vice President Paul Camell, Executive Vice President</p>		
<p>8a. NAME, TITLE, & TELEPHONE NUMBER - OTHER PRINCIPALS Matthew Sickles, Vice President, 412-201-5500 Jason Venier, Associate, 412-201-5500 Christopher Calpin, Senior Vice President, 513-583-9800 Randy Rogers, Senior Vice President, 312-346-5000</p>		

9. PERSONNEL BY DISCIPLINE

68	CONTRACT ADMINISTRATOR (S)	80	WATERSHED ANALYST (S)	—	OTHER (LIST BELOW)
67	PROGRAM MANAGER (S)	26	SOILS SPECIALIST (S)	—	
975	PROJECT MANAGER (S)	500	TECHNICAL EXPERT (S)	—	
150	QA/QC MANAGER (S)	50	TECHNICAL WRITER (S)	—	
125	BIOLOGICAL ANALYST (S)	5	OUTREACH SPECIALIST (S)		
60	MODEL DEVELOPER (S)	25	SENIOR WATER RESOURCE ENGINEER (S)		
			3,947 TOTAL PERSONNEL		

10. DO YOU NEED ADDITIONAL EMPLOYEES TO FULFILL THE REQUIREMENTS OF THIS CONTRACT? YES X NO

11. OUTSIDE KEY CONSULTANTS/SUB-CONSULTANTS ANTICIPATED TO BE USED. Attach "TMDL Vendor Qualification Questionnaire".

<p>NAME AND ADDRESS: Wilbur Smith Associates Geary Plaza, Suite 210 700 Washington Street, East Charleston, WV 25301</p>	<p>SPECIALTY: Surveying, Field Work</p>	<p>WORKED WITH BEFORE X Yes No</p>
<p>NAME AND ADDRESS:</p>	<p>SPECIALTY:</p>	<p>WORKED WITH BEFORE Yes No</p>
<p>NAME AND ADDRESS:</p>	<p>SPECIALTY:</p>	<p>WORKED WITH BEFORE Yes No</p>
<p>NAME AND ADDRESS:</p>	<p>SPECIALTY:</p>	<p>WORKED WITH BEFORE Yes No</p>
<p>NAME AND ADDRESS:</p>	<p>SPECIALTY:</p>	<p>WORKED WITH BEFORE Yes No</p>
<p>NAME AND ADDRESS:</p>	<p>SPECIALTY:</p>	<p>WORKED WITH BEFORE Yes No</p>
<p>NAME AND ADDRESS:</p>	<p>SPECIALTY:</p>	<p>WORKED WITH BEFORE Yes No</p>
<p>NAME AND ADDRESS:</p>	<p>SPECIALTY:</p>	<p>WORKED WITH BEFORE Yes No</p>

12. A. Is your firm's personnel experienced in development of TMDLs for total recoverable metal? YES

A1. Description and Number of Projects: 17

- Ballona Creek TMDL Implementation Plans for Metals, Bacteria and Toxicity, Los Angeles, CA
- Total Maximum Daily Load Development (15 projects), Illinois
- South Platte Urban Watershed TMDL Study, Denver, CO

A2. Provide an example TMDL for total recoverable metals.

Ballona Creek TMDL Implementation Plans for Metals, Bacteria and Toxicity, Los Angeles, California

To assist the City of Los Angeles in achieving its long-term water quality compliance objectives, CDM is developing three TMDL implementation plans for the Ballona Creek watershed. The TMDLs implementation plans address:

- Metals (Copper, Lead, Zinc, Selenium) during dry and wet weather conditions along the freshwater portions of Ballona Creek,
- Bacteria (total coliform, fecal coliform, enterococcus, e-coli) along Ballona Creek and the Del Ray Lagoon within the Ballona Creek estuary,
- Toxicity (attributed to metals and organic compounds) in the Ballona Creek Estuary.

The Ballona Creek Metals TMDL was issued in January 2006 when the USEPA approved the load allocations adopted by the state Regional Water Quality Control Board (RWQCB). CDM is assisting the city to meet TMDL numeric targets based on the California Toxics Rule for total recoverable metals for three reaches along the mainstem of Ballona Creek and Sepulveda Channel.

The Ballona Creek Bacteria TMDL was issued in April 2007. CDM is developing the Implementation Plan to meet numeric targets (density/100 mL) and allowable number of exceedance days for fecal coliform and e.coli for reaches with designated beneficial uses including REC-1 (contact recreation) and REC-2 for dry and wet weather conditions.

The Ballona Creek Estuary Toxics TMDL was issued in January 2006. CDM is developing TMDLs implementation plans using sediment as a surrogate for the metals and organic compounds which are associated with suspended solids.

CDM's services include: baseline watershed characterization, assessment of the range of implementation options and potential strategies, development of BMP performance standards, identification of watershed collaboration opportunities (stakeholder outreach), preparation of the draft and final BMP alternative plan, and a quantitative evaluation (e.g., predictions of the expected progress that the Implementation Plan will achieve towards meeting compliance targets).

CDM is coordinating with City of Los Angeles Prop "O" Water Quality Projects in the Ballona Creek watershed and the City of Los Angeles Water Quality Compliance Master Plan for Urban Runoff (prepared by CDM).

A3. Provide a detailed description of the methodology to develop a total recoverable metals TMDL as per EOI.

CDM will use the following methodology / tasks in developing a total recoverable metals TMDL:

- Data Development, Compilation, and Formatting - make use of WVDEP provided data and other collected data such as rainfall, etc. Gain WVDEP approval on data used.
 - Subwatershed Delineation - scale to one impaired stream per watershed
 - NPDES Permit Locations / Pollutant Source Identification - correctly identify locations for modeling
 - Model Selection - use of LSPC/MDAS or equivalent WVDEP approvable method
 - Model Development - model compliance with water quality criteria under a range of flow conditions, including exposure duration and exceedences frequency components and the other requirements in the EOI
 - Hydrology Calibration - calibrate low and high flow years to in-stream flow measurements to within acceptable limits to WVDEP
 - Water Quality Calibration - calibrate to water quality data provided by WVDEP for low flow, mean flow, and storm peaks
 - Biological Stressor Identification - weight of evidence / best professional judgment approach
 - Allocation Scenario Development - collaborate with WVDEP and test a range of stakeholder acceptable allocation methods, include margin of safety
 - TMDL Report Development - meet Federal requirements for TMDL approval (40 CFR 130)
 - Public Meeting Participation - first meeting would include TMDL concepts, goals, model selection / calibration, and general allocation strategies, second meeting would include presenting an overview of the substantive items during development and draft TMDL results for comment
- Response to USEPA and Public Comments / Technology Transfer and Training

B. Is your firm experienced in development of TMDLs for pH/dissolved metals?

B1. Description and Number of Projects: 32

- Total Maximum Daily Load Development, Illinois

B2. Provide an example TMDL for pH/dissolved metals.

Total Maximum Daily Load Development, State of Illinois

The federal Clean Water Act (CWA) requires states to compile and review water quality data and assess compliance with standards every two years. The purpose is to identify water bodies that are not supporting designated uses. After the official list of impaired waters is compiled, each state is required to prioritize the list and to develop Total Maximum Daily Loads (TMDLs) for each identified water body segment. TMDLs are water body and pollutant specific and ultimately determine the total amount of a pollutant (in a pounds per day load) that a water body can receive while still meeting the instream water quality standard. The final TMDL allocates loads among the identified point and nonpoint sources within a watershed as well as provides an implementation and management plan which affords communities with recommendations to achieve the TMDL goals. Implementation activities can include NPDES permit limits for municipal and industrial dischargers and/or the installation of best management practices to reduce nonpoint source contributions.

The Illinois Environmental Protection Agency (IEPA) has a three step process for developing TMDLs. The stages are:

- Stage 1 - Watershed Characterization, Data Analysis, Methodology Selection
- Stage 2 - Data Collection (optional)
- Stage 3 - Model Calibration, TMDL Scenarios, and Implementation Plan

Previous TMDL development has been completed through the gathering of historic water quality and flow data as well as watershed data such as land use, cropping practices, soil information, etc. Data collection has been necessary within eleven watersheds in order to amass adequate data to support modeling and establish TMDLs. A large-scale sampling program was executed within a limited schedule during the summer of 2006 in order to meet Illinois EPA's accelerated schedule.

USEPA has approved TMDLs that CDM has established for 23 stream segments and 12 lakes within 14 watersheds for the following pollutants:

- Nutrients - nitrogen, phosphorus, nitrates
- Dissolved Oxygen
- Bacteria - fecal coliform
- Metals - manganese, copper, silver, mercury, boron
- Siltation
- Habitat alterations

The nuances and unique issues related to each watershed, based on different data availability, land uses, impairments, receiving water uses, etc., require that the approach be tailored to each application for each watershed. Establishing a link between pollutant loads and resulting water quality is one of the most important components of developing a TMDL. CDM's process for evaluating each watershed includes:

- Setting endpoints for the TMDLs
- Verifying impairments within the watersheds
- Source assessment based on EPA's BASINS model as the framework for data collection, watershed delineation, and loading prediction based on land use
- Establishing linkages for receiving water between sources and endpoints through modeling
- Determining a margin of safety and considering seasonal variations
- Developing implementation plans

Throughout the entire process, CDM participates in public meetings to explain the TMDL process, technical information on modeling, allocation strategies, and implementation planning. In June 2007, CDM was awarded another contract to perform TMDL work in eight separate watersheds throughout Illinois for 34 stream segments and 10 lakes. The contract is valued at \$2.6 million. This work will include the same Stage 1 -3 tasks and will continue for the next five years.

B3. Provide a detailed description of the methodology to develop a pH/dissolved metals TMDL as per EOI.

CDM will use the following methodology / tasks in developing a pH / dissolved metal TMDL:

- Data Development, Compilation, and Formatting - make use of WDEP provided data and other collected data such as rainfall, etc. Gain WDEP approval on data used.
- Subwatershed Delineation - scale to one impaired stream per watershed
- NPDES Permit Locations / Pollutant Source Identification - correctly identify locations for modeling
- Model Selection - use of LSPC/MDAS or equivalent WDEP approvable method
- Model Development - model compliance with water quality criteria under a range of flow conditions, including exposure duration and exceedences frequency components and the other requirements in the EOI
- Hydrology Calibration - calibrate low and high flow years to in-stream flow measurements to within acceptable limits to WDEP
- Water Quality Calibration - calibrate to water quality data provided by WDEP for low flow, mean flow, and storm peaks
- Biological Stressor Identification - weight of evidence / best professional judgment approach
- Allocation Scenario Development - collaborate with WDEP and test a range of stakeholder acceptable allocation methods, include margin of safety
- TMDL Report Development - meet Federal requirements for TMDL approval (40 CFR 130)
- Public Meeting Participation - first meeting would include TMDL concepts, goals, model selection / calibration, and general allocation strategies, second meeting would include presenting an overview of the substantive items during development and draft TMDL results for comment
- Response to USEPA and Public Comments / Technology Transfer and Training

C. Is your firm experienced in development of TMDLs for fecal coliform bacteria? YES

C1. Description and Number of Projects: 18

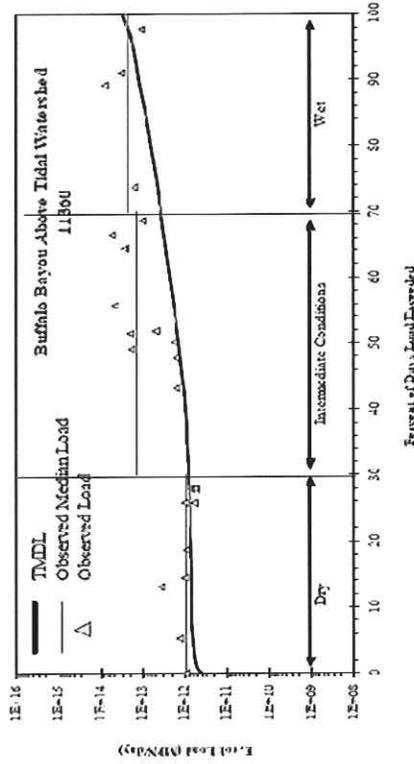
- TMDL Development, Indianapolis Department of Environmental Management, IN
- Ballona Creek TMDL Implementation Plans for Metals, Bacteria and Toxicity, Los Angeles, CA
- Total Maximum Daily Load Development, Illinois
- Middle Santa Ana River Bacteria TMDL Implementation, SAWPA, Santa Ana River Watershed, Southern California
- TMDL Plan-Bacteria, Michigan Department of Environmental Quality, Michigan
- Santa Monica Bay Beaches Wet Weather Bacteria TMDL Implementation Plan, Jurisdictions 2 and 3, Los Angeles, CA
- Santa Monica Bay Beaches TMDL Implementation Plan, Jurisdictions 5 and 6, Los Angeles, CA

C2. Provide an example for TMDL for bacteria.

Buffalo and Whiteoak Bayou TMDLs for Bacteria, Texas

CDM was contracted as a subconsultant to the University of Houston to assist with completing 18 bacteria TMDLs for Buffalo and Whiteoak Bayous, two of the most contaminated streams in Texas with regard to indicator bacteria. The study included wastewater treatment facilities (including effluent discharges and biosolids), sanitary sewer overflows, dry weather and wet weather discharges from the municipal separate storm sewer system (MS4), septic systems, resuspended sediment, as well as direct deposition from birds and wildlife. A detailed evaluation was undertaken to characterize each of the sources through detailed research, water quality monitoring of sources (wastewater facilities, sanitary sewer overflows, and dry weather discharges) and discussions with stakeholders who were involved throughout the TMDL project.

The TMDL study culminated in a unique load allocation methodology that investigated a total of three different approaches to determine the in-stream assimilation of bacteria from watershed loading: load duration curves (LDCs), the Hydrologic Simulation Program-Fortran (HSPF) and the Bacteria Loading Estimator Spreadsheet Tool (BLEST). The developed HSPF model was calibrated for the period from 1999 through 2003 and simulated all bacteria sources evaluated in the study. In addition, a steady state model, BLEST, was developed specifically for this study to evaluate in-stream loadings as well as present an assessment of bacteria loading at three different flow conditions: low flow, median flow and high flow. The loadings and required percent reductions from the three approaches were found to be comparable and were presented and were presented the TMDL documents. The TMDLs were approved by both TCEQ and US EPA in 2009.



CDM developed load duration curves, shown below, for the Buffalo and Whiteoak Bayou TMDL project. This methodology could be applied to the District's projects.

C3. Provide a detailed description of the methodology to develop a fecal coliform bacteria TMDL as per EOI.

CDM will use the following methodology / tasks in developing a fecal coliform bacteria TMDL:

- Data Development, Compilation, and Formatting - make use of WVDEP provided data and other collected data such as rainfall, etc. Gain WVDEP approval on data used.
- Subwatershed Delineation - scale to one impaired stream per watershed
- NPDES Permit Locations / Pollutant Source Identification - correctly identify locations for modeling
- Model Selection - use of a load duration curve, LSPC/MDAS model, or equivalent WVDEP approvable method
- Model Development - model compliance with water quality criteria under a range of flow conditions, including exposure duration and exceedences frequency components and the other requirements in the EOI
- Hydrology Calibration - calibrate low and high flow years to in-stream flow measurements to within acceptable limits to WVDEP
- Water Quality Calibration - calibrate to water quality data provided by WVDEP for low flow, mean flow, and storm peaks
- Biological Stressor Identification - weight of evidence / best professional judgment approach
- Allocation Scenario Development - collaborate with WVDEP and test a range of stakeholder acceptable allocation methods, include margin of safety
- TMDL Report Development - meet Federal requirements for TMDL approval (40 CFR 130)
- Public Meeting Participation - first meeting would include TMDL concepts, goals, model selection / calibration, and general allocation strategies, second meeting would include presenting an overview of the substantive items during development and draft TMDL results for comment
- Response to USEPA and Public Comments / Technology Transfer and Training

D. Is your firm experienced in biological stressor identification and TMDLs for biological impairments? YES

D1. Description and Number of Projects: 10

- Total Maximum Daily Load Development, Illinois
- Ballona Creek TMDL Implementation Plans for Metals, Bacteria and Toxicity, Los Angeles, CA
- Rock River Sediment and Phosphorus TMDL, USEPA and Wisconsin Department of Natural Resources, WI

D2. Provide an example TMDL for biological impairment.

TMDL for Phosphorus and Sediment in the Rock River Basin, Wisconsin

USEPA Region 5 and the WDNR are in the process of developing a TMDL analysis for phosphorus and sediment in the Rock River Basin. The TMDL will provide a quantitative analysis of the amount of phosphorus and sediment that the Rock River Basin waterbodies can receive from both point and nonpoint sources and still meet water quality standards. The TMDL is currently being revised to address public comments. CDM developed the technical approach, conducted the load allocation calculations, and assisted with preparing the project QAPP and TMDL documentation.

There are more than 40 waterbodies in the basin that are on the 303(d) list of impaired waters for phosphorus and/or sediment impairments. The basin contains numerous wastewater treatment plant dischargers, significant agricultural lands, and several municipalities, including the City of Madison.

Two pollutant loading models (SWAT and SLAMM) were used to generate data that was input into a customized database tool developed for calculating loading capacity and setting phosphorus and sediment load allocations. A STELLA application was then used to route the allocated loads through the basin and calculate resulting concentrations for comparison to water quality targets. Several meetings with stakeholders were held throughout the project and the project approach was refined based on stakeholder comments.

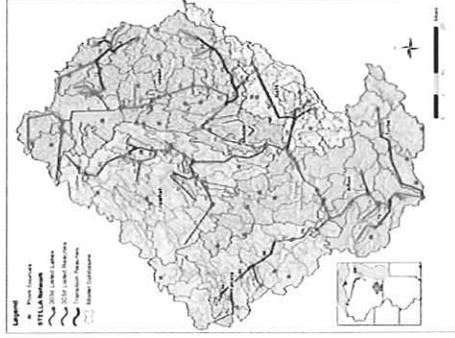
Unique aspects of the project include:

Practical Target Loads that Account for Flow Variation

Loading capacity calculations were conducted using monthly data from the pollutant loading models to account for changes due to seasonal variation in flows. The loading capacity was calculated as the load that will produce monthly target concentrations in a reach in approximately seven out of 10 years. This frequency was selected so that water quality targets are met under most flow conditions and the TMDL is not driven by extreme high or low flows.

Derivation of TSS Targets in the Absence of a Numerical Standard

Wisconsin has numeric standards for phosphorus and narrative criteria for sediment, as measured by total suspended solids (TSS). In the absence of a numeric standard for sediment concentrations, TSS loading capacities were developed for this TMDL based on relationships between TSS and total phosphorus (TP) loading. It is reasonable to expect that TMDL implementation actions that reduce TP to acceptable levels will also reduce TSS loads to an extent sufficient to achieve designated fish and other aquatic life uses. The TSS loading capacities for the TMDL were therefore calculated by determining the TSS load that is typically associated with the TP load that meets the phosphorus criteria.



Equitable Allocation of Loads: The calculated loading capacities for each reach were proportionally allocated according to the monthly baseline load contributions of the various pollutant sources. This allocation method assigns responsibility for attaining water quality targets in proportion to each source's current contribution to the excess load.

D3. Provide a detailed description of the methodology to develop a biological impairment TMDL as per EOI.

CDM will use the following methodology / tasks in developing a biological impairment TMDL:

- Data Development, Compilation, and Formatting - make use of WVDEP provided data and other collected data such as rainfall, etc. Gain WVDEP approval on data used.
- Subwatershed Delineation - scale to one impaired stream per watershed
- NPDES Permit Locations / Pollutant Source Identification - correctly identify locations for modeling
- Model Selection - use of LSPC/MDAS or equivalent WVDEP approvable method
- Model Development - model compliance with water quality criteria under a range of flow conditions, including exposure duration and exceedences frequency components and the other requirements in the EOI
- Hydrology Calibration - calibrate low and high flow years to in-stream flow measurements to within acceptable limits to WVDEP
- Water Quality Calibration - calibrate to water quality data provided by WVDEP for low flow, mean flow, and storm peaks
- Biological Stressor Identification - weight of evidence / best professional judgment approach
- Allocation Scenario Development - collaborate with WVDEP and test a range of stakeholder acceptable allocation methods, include margin of safety
- TMDL Report Development - meet Federal requirements for TMDL approval (40 CFR 130)
- Public Meeting Participation - first meeting would include TMDL concepts, goals, model selection / calibration, and general allocation strategies, second meeting would include presenting an overview of the substantive items during development and draft TMDL results for comment
- Response to USEPA and Public Comments / Technology Transfer and Training

E. Describe your firm's management plan that supports personnel and project activities within the organization and coordinates with the WVDEP to achieve timely TMDL development within budgetary constraints as per EOI.

CDM applies a management plan to each TMDL project that includes a Project Manager (PM) experienced in TMDL development, technical staff to perform tasks under the direction of the PM, a TMDL Lead Practitioner to guide the

overall approach and provide internal quality review of completed work, and a Client Service Manager to ensure that the work is being performed as scoped for the needs of WUDEP.

CDM's PM develops a detailed work breakdown structure to define tasks and budgets, and then receives a weekly task report to track progress on tasks from a schedule and budget perspective. Monthly progress reports are typically provided to the client with financial progress and invoices, and more frequently when needed or requested.

CDM's TMDL management plans typically include checkpoints for the following major milestones, when full agreement with WUDEP would be necessary before moving on to the next phase of the work:

- Quality Assurance Plan (QAPP) Development (if required)
- Acceptance of Available Data
- TMDL Approach Methods and Model Selection
- Allocation Methodology
- TMDL Results and Report
- Implementation Plan Development (if scoped)

F. Describe your firm's experience with the LSPC/MDAS or equivalent modeling system in TMDL development. Provide names and number of projects for which this type of modeling system was employed.

Description and Number of Projects: 20

- Water Quality Model Development (WARMF) for Hangman (Latah) Creek Watershed, Washington Department of Ecology, Washington and Idaho
- TMDLs (WQM, HSPF, WAM, WASP, BATHTUB and EFDC), Florida Department of Environmental Protection, FL
- HSPF Modeling, Lake Whatcom TMDL for total phosphorus and sediment, Washington DOE
- WARMF Model to assess Santa Margarita River's assimilative capacity for nutrients, CA

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES RESPONSIBLE FOR TMDL DEVELOPMENT PROJECTS (Insert additional copies as necessary)

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE:		With modeling system(s), e.g., LSPC, MDAS, etc
	In EPA-approved TMDL development	In TMDL-related projects	
Dunavant, Rebecca A. Senior Environmental Scientist	10	10	10
<p>Brief Explanation of Responsibilities</p> <ul style="list-style-type: none"> • Project Manager for the Illinois EPA contract since 2006 • Project Manager, TMDL Data Collection, IEPA • Project Manager, Oxbow TMDL Development, Mississippi Department of Environmental Quality • Led large-scale and innovative sampling programs to support TMDL Development in Illinois • Managed multiple field crews conducting stream gauging, grab sampling, and continuous monitoring for Illinois • Project manager for the DuPage River/Salt Creek sediment-oxygen demand (SOD) monitoring 			
<p>EDUCATION (Degree, Year, Specialization) M.S., Environmental Science and Engineering, Colorado School of Mines -- Golden (2003); B.A., Environmental Studies, University of Colorado -- Boulder (2000)</p>			
<p>MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS</p> <ul style="list-style-type: none"> • Water Quality Standards Academy, EPA • Colorado Water Quality Forum 			
<p>REGISTRATION (Type, Year, State)</p> <p>n/a</p>			

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES RESPONSIBLE FOR TMDL DEVELOPMENT PROJECTS

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE:		With modeling system(s), e.g., LSPC, MDAS, etc
	In EPA-approved TMDL development	In TMDL-related projects	
Bounds, P.E., D.WRE, Daniel G. Principal, Environmental Engineer	4	11	11
<p>Brief Explanation of Responsibilities</p> <ul style="list-style-type: none"> • Senior Advisor, TMDL Public Workshops, IEPA • Project Manager, Rock River Sediment and Phosphorus TMDL, WI • TMDL development for programs in Illinois, Wisconsin, California • Coordination with state and federal agencies 			
<p>EDUCATION (Degree, Year, Specialization) B.S., University of Illinois, Urbana-Champaign, Illinois, Civil Engineering (1993); M.B.A., Eastern Illinois University, Charleston Illinois Business Administration (2001)</p>			
<p>MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS</p> <ul style="list-style-type: none"> • Illinois Water Environment Association, Watershed Management Committee Chair and Vice President • Water Environment Federation • American Council of Engineering Companies • Alliance for the Great Lakes 			
<p>REGISTRATION (Type, Year, State)</p> <p>Professional Engineer, 2004, Illinois and California</p>			

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES RESPONSIBLE FOR TMDL DEVELOPMENT PROJECTS

NAME & TITLE (Last, First, Middle Int.)		YEARS OF EXPERIENCE: 25	
Wagner, P.E., D.WRE, Richard A. Principal, Water Resources Engineer	In EPA-approved TMDL development 6	In TMDL-related projects 6	With modeling system(s), e.g., LSPC, MDAS, etc 25
<p>Brief Explanation of Responsibilities</p> <ul style="list-style-type: none"> • Project Manager/Technical Reviewer, TMDL Modeling Study, Caloosahatchee River Watershed, Florida Department of Environmental Protection (FDEP) • Technical Reviewer/Water Quality Modeler, TMDL Modeling Study, Upper Kissimmee River Basin, FDEP • Project Engineer, TMDL Model Selection Memorandum, Kissimmee River Basin, FDEP • Project Manager/Water Quality Modeler, TMDL Modeling Study, Perdido Bay, FDEP • Project Manager/Water Quality Modeler, TMDL Modeling Study, Wekiva Lakes Watershed, FDEP <p>EDUCATION (Degree, Year, Specialization) M.S., Civil Engineering, University of Cincinnati (1983); B.S., Civil Engineering, Marquette University (1981)</p> <p>MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS</p> <p>REGISTRATION (Type, Year, State) Professional Engineer, 1989, Virginia and Florida</p>			

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES RESPONSIBLE FOR TMDL DEVELOPMENTS PROJECTS

NAME & TITLE (Last, First, Middle Int.)		YEARS OF EXPERIENCE: 25	
French, Ronald D. Vice President, Ecologist and Aquatic Biologist	In EPA-approved TMDL development 8	In TMDL-related projects 8	With modeling system(s), e.g., LSPC, MDAS, etc. 5
<p>Brief Explanation of Responsibilities</p> <ul style="list-style-type: none"> • Previous Officer-in-Charge, TMDL Development, Illinois EPA • Officer-in-Charge Illinois River (OK) Watershed Study • Project Manager, Peruque Creek Watershed Study, Lake Saint Louis, MO • Project Manager Chicago Area Waterways UAA Study • Project Manager, Biological Monitoring Activities, Rouge River National Wet Weather Demonstration Project, Wayne County, MI <p>EDUCATION (Degree, Year, Specialization) M.A., Biological Sciences, Western State College, Gunnison, Colorado (1985); B.S., Environmental and Systematic Biology, California Polytechnic State University (1980)</p> <p>MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS</p> <ul style="list-style-type: none"> • American Fisheries Society • North American Lake Management Society • Water Environment Federation • American Council of Engineering Companies of Illinois - IEPA Committee <p>REGISTRATION (Type, Year, State) n/a</p>			

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES RESPONSIBLE FOR TMDL DEVELOPMENT PROJECTS (Insert additional copies as necessary)

NAME & TITLE (Last, First, Middle Int.)		YEARS OF EXPERIENCE: 10	
In EPA-approved TMDL development 10	In TMDL-related projects 10	With modeling system(s), e.g., LSPC, MDAS, etc. 10	
Brief Explanation of Responsibilities <ul style="list-style-type: none"> • Technical Advisor, Illinois EPA Total Maximum Daily Load (TMDL) Studies • Modeling expertise includes BATHUB, QUAL2K, QUAL2E, WASP, HEC-Ras, HSPF • Experience includes stream ecology and ecosystem modeling, water quality and ecology field and laboratory research, and engineering software development. 			
EDUCATION (Degree, Year, Specialization) Ph. D. - Engineering Science, University of Auckland, New Zealand (2005); M. Phil. - Science and Technology, University of Waikato, Hamilton, New Zealand (1999); M.S. - Environmental and Water Resources Engineering, University of Colorado, Boulder, Colorado (1997); B.S. - Civil and Environmental Engineering, Duke University (1994)			
MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS			
None			

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES RESPONSIBLE FOR TMDL DEVELOPMENTS PROJECTS

NAME & TITLE (Last, First, Middle Int.)		YEARS OF EXPERIENCE: 8	
In EPA-approved TMDL development 4.5	In TMDL-related projects 5	With modeling system(s), e.g., LSPC, MDAS, etc. 4	
Brief Explanation of Responsibilities <ul style="list-style-type: none"> • Project Scientist, TMDL Projects, IEPA • Data analysis and database management using a number of statistical and analytical software programs including MS Access and ArcGIS • Environmental modeling using load-duration curve assessments as well as software packages including QUAL2K and BATHUB • Extensive field sampling experience including development of a variety of sampling plans and protocols 			
EDUCATION (Degree, Year, Specialization) B.S. - Fisheries and Wildlife, University of Missouri-Columbia (2002)			
MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS			
<ul style="list-style-type: none"> • American Fisheries Society • North American Benthological Society 			

REGISTRATION (Type, Year, State)	
n/a	

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES RESPONSIBLE FOR TMDL DEVELOPMENT PROJECTS (Insert additional copies as necessary)

NAME & TITLE (Last, First, Middle Int.)		YEARS OF EXPERIENCE: 6	
In EPA-approved TMDL development	In TMDL-related projects	In EPA-approved TMDL development	In TMDL-related projects
0	0	0	0
<p>Mehrotra, Ph.D., Anna S. Environmental Engineer</p> <p>With modeling system(s), e.g., LSPC, MDAS, etc. 5</p>			
<p>Brief Explanation of Responsibilities</p> <ul style="list-style-type: none"> Project Engineer, Wet Weather Treatment Alternatives Analysis, Pittsburgh, PA Project Engineer, Process Alternatives Analysis, Knoxville, TN Project Engineer, Process Alternatives Analysis, Dahlgren, VA 			
<p>EDUCATION (Degree, Year, Specialization) Ph.D. - Environmental Engineering, UC Berkeley (2003); M.S. - Environmental Engineering, Stanford University (1995); B.S. - Mathematics/Applied Science, UCLA (1993)</p>			
<p>MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS</p> <ul style="list-style-type: none"> Water Environment Federation 			
<p>REGISTRATION (Type, Year, State) Engineer-in-Training, 2003, California Professional Engineer, Ohio (pending)</p>			

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES RESPONSIBLE FOR TMDL DEVELOPMENTS PROJECTS

NAME & TITLE (Last, First, Middle Int.)		YEARS OF EXPERIENCE: 14	
In EPA-approved TMDL development	In TMDL-related projects	In EPA-approved TMDL development	In TMDL-related projects
10	12	10	12
<p>Locke, P.G., Adam L. Data Visualization Specialist/ Hydrogeologist</p> <p>With modeling system(s), e.g., LSPC, MDAS, etc. 2</p>			
<p>Brief Explanation of Responsibilities</p> <ul style="list-style-type: none"> Staff Geologist, U.S. Geological Survey, Pittsburgh, Pennsylvania GIS Specialist, U.S. Dept. of Energy, Piketon, Ohio Project Lead/Supervisor, U.S. Navy, Atlantic Division CLEAN II Program, Multiple Locations Information solutions experience includes data management, data visualization, GIS production, Web development, and Web-GIS development 			
<p>EDUCATION (Degree, Year, Specialization) B.S. - Geosciences, Hydrogeology, The Pennsylvania State University (1996)</p>			
<p>MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS</p> <ul style="list-style-type: none"> Society of American Military Engineers - Sustaining Young Member, Philadelphia Post American Institute of Professional Geologists National Groundwater Association 			
<p>REGISTRATION (Type, Year, State) n/a</p>			

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES RESPONSIBLE FOR TMDL DEVELOPMENT PROJECTS (Insert additional copies as necessary)

NAME & TITLE (Last, First, Middle Int.) DePra, P.E., BCÉE, Daniel J. Senior Environmental Engineer		YEARS OF EXPERIENCE: 17	
In EPA-approved TMDL development 0	In TMDL-related projects 1	With modeling system(s), e.g., LSPC, MDAS, etc 0	
Brief Explanation of Responsibilities <ul style="list-style-type: none"> • Project Manager for the West Virginia Comprehensive Water Planning Study, WV • 15 years of project management experience including scheduling, scope development, financial evaluation and tracking, contracts, and subcontractor management 			
EDUCATION (Degree, Year, Specialization) M.S. - Civil Engineering, University of Pittsburgh (2004); B.S. - Mechanical Engineering, University of Pittsburgh (1993); B.S. - Chemistry, University of Pittsburgh (1993)			
MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS <ul style="list-style-type: none"> • American Academy of Environmental Engineers • Engineers Society of Western Pennsylvania 			

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES RESPONSIBLE FOR TMDL DEVELOPMENTS PROJECTS

NAME & TITLE (Last, First, Middle Int.) Sickles, P.E., Matthew R. Vice President, Environmental and Civil Engineer		YEARS OF EXPERIENCE: 20	
In EPA-approved TMDL development 0	In TMDL-related projects 1	With modeling system(s), e.g., LSPC, MDAS, etc... 0	
Brief Explanation of Responsibilities <ul style="list-style-type: none"> • Officer-in-Charge and Office Leader for CDM's Pittsburgh office, responsible for delivering necessary resources to clients to fully meet project needs. • Officer-in-Charge for NPDES project for Pittsburgh International Airport. During this project, CDM assisted with NPDES permit negotiations. Although the primary emphasis is deicing, some of their outfalls are subject to acid mine drainage TMDL so we are advising in accordance with the TMDL. 			
EDUCATION (Degree, Year, Specialization) B.S. - Environmental Engineering, The Pennsylvania State University (1989)			
MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS <ul style="list-style-type: none"> • American Academy of Environmental Engineers • Engineer's Society of Western Pennsylvania • Water Environment Foundation • Pennsylvania Water Environment Association • Southwestern Pennsylvania Engineering Outreach 			

REGISTRATION (Type, Year, State)
Professional Engineer, 2005, Pennsylvania

15. CURRENT PROJECTS/ACTIVITIES IN WHICH YOUR FIRM IS PRESENTLY INVOLVED
NOTE: CDM provides professional services for hundreds of projects. Listed below are the firm's current TMDL assignments.

PROJECT NAME, TYPE AND LOCATION	NAME AND ADDRESS OF OWNER	NATURE OF YOUR FIRM'S RESPONSIBILITY	ESTIMATED PROJECT COST	PERCENT COMPLETE
Total Maximum Daily Load Development, Milwaukee Metropolitan Sewer District (multiple locations)	260 West Seeboth Street Milwaukee, WI 53204-1446	Project management, TMDL development for bacteria, phosphorus, and sediment	\$911,000	5%
Total Maximum Daily Load Development, Illinois (multiple locations)	Jenny Clark, Project Manager, Illinois EPA, 1021 North Grand Ave. East, Springfield, IL 62794 (217) 782-3362	Project management, TMDL development	\$340,000 to date	95%
Rock River Sediment and Phosphorus TMDL, USEPA and Wisconsin Department of Natural Resources, Wisconsin	Jean Chruscicki, USEPA Region 5, Ralph Metcalfe Federal Building 77 West Jackson Blvd. Chicago, IL 60604 (312) 353-1435	TMDL development, including water quality analysis using SWAT, STELLA	\$210,000	90%
TMDL Development, USEPA, Montana (multiple projects)	Julie DalSoglio, Water Quality Program Manager U.S. EPA Region VIII, Federal Office Building 10 West 15th Street, Suite 3200 Helena, Montana 59626 (406) 457-5025	Technical support for completing Phase I TMDL assessments	\$1,500,000	75%
Development of Methods for Linking Land Use Activities and BMPs to Tributary Nutrient Loading, USEPA, Lake Whatcom, Washington	Steve Hood Washington Department of Ecology 1204 Railroad Avenue, Suite 200 Bellingham, WA 98225 (360) 715-5211	Development of methodology for linking land use and BMPs to tributary nutrient loadings from watersheds flowing into Lake Whatcom	\$38,000	75%
Total Maximum Daily Load Support, Florida Department of Environmental Protection, Florida (multiple projects)	Eric Livingston, FDEP, Bureau of Watershed Management 2600 Blair Stone Road (MS #3510) Tallahassee, FL 32399 (850) 245-8430	TMDL protocol development, TMDL support	\$1,742,000 to date	75%

<p>TMDL Support, Middle Santa Ana River Bacteria TMDL, California</p>	<p>Santa Ana Watershed Project Authority 11615 Sterling Avenue Riverside CA 92503 (951) 354-4220</p>	<p>TMDL, Best Management Plan Implementation (Watershed compliance monitoring/Urban source evaluation studies/Dry Weather Implementation Plan Development)</p>	<p>\$515,000</p>	<p>Ongoing</p>
<p>TMDL Compliance for Ballona Creek Watershed, Los Angeles, California</p>	<p>City of Los Angeles Bureau of Sanitation Watershed Protection Division 1149 S. Broadway Los Angeles, CA 90015 (323) 342-1501</p>	<p>Developed TMDL implementation plans to address metals (Copper, Lead, Zinc, Selenium), bacteria (total coliform, fecal coliform, enterococcus, e-coli), and toxicity (attributed to metals and organic compounds)</p>	<p>\$985,000</p>	<p>95%</p>
<p>Nutrients TMDL for Machado Lake Ecosystem Rehabilitation/Wilming ton Drain Multi-use Project, Los Angeles, California</p>	<p>Alfred Mata City of Los Angeles Department of Public Works Bureau of Engineering 1149 S. Broadway Suite 620 Los Angeles, CA 90015 (213) 847-0346</p>	<p>TMDL, BMP, water quality analysis and management plan, lake water quality model, regulatory compliance, flood control, sediment/dredging</p>	<p>\$4,000,000</p>	<p>95%</p>
<p>TOTAL NUMBER OF PROJECTS: 30 TMDL projects</p>		<p>TOTAL ESTIMATED PROJECT COSTS: \$9 million</p>		

16. CURRENT ACTIVITIES ON WHICH YOUR FIRM IS SERVING AS A SUB-CONSULTANT TO OTHERS

PROJECT NAME, TYPE AND LOCATION	NATURE OF FIRMS RESPONSIBILITY	NAME AND ADDRESS OF OWNER	ESTIMATED COMPLETION DATE	ESTIMATED PROJECT COST	
				ENTIRE PROJECT	YOUR FIRM'S RESPONSIBILITY
Rock River Sediment and Phosphorus TMDL, Wisconsin	TMDL development, including water quality analysis using SWAT, STELLA	USEPA and Wisconsin Department of Natural Resources, Wisconsin 101 S. Webster Street PO Box 7921 Madison, WI 53707 (608) 266-2621	2011	\$300,000	\$210,000

17. COMPLETED WORK WITHIN LAST 5 YEARS IN WHICH YOUR FIRM WAS THE DESIGNATED FIRM OF RECORD

PROJECT NAME, TYPE AND LOCATION	NAME AND ADDRESS OF OWNER	ESTIMATED PROJECT COST	YEAR	EPA APPROVED?
Total Maximum Daily Load Development, Illinois	Illinois EPA, 1021 North Grand Avenue, East Springfield, IL 62794 (217) 782-3362	\$5,500,000	2012	Yes
Water Quality Model Development for Hangman (Latah) Creek Watershed, Washington Department of Ecology, Washington and Idaho	Joe Joy Washington Department of Ecology Environmental Assessment Program PO Box 47600 Olympia, WA 98504 (360) 407-6486	\$55,000	2009	Yes

18. COMPLETED WORK WITHIN LAST 5 YEARS ON WHICH YOUR FIRM HAS BEEN A SUB-CONSULTANT TO OTHER FIRMS (INDICATE PHASE OF WORK FOR WHICH YOUR FIRM WAS RESPONSIBLE)

PROJECT NAME, TYPE AND LOCATION	NAME AND ADDRESS OF PRIMARY FIRM	ESTIMATED PROJECT COST OF YOUR FIRM'S PORTION	YEAR	EPA APPROVED?	CLIENT NAME AND ADDRESS
Lower Fox River TMDL, Green Bay, Wisconsin	The Cadmus Group 301 N. Broom Street, Suite 201 Madison, WI 53703 (608) 250-1920	\$20,000	2008	Yes	USEPA Region V P.O. Box 1030 Keshena, WI 54135

19. Use this space to provide any additional information or description of resources supporting your firm's qualifications to perform work for the WVDEP's TMDL Program.

CDM has successfully implemented TMDLs in a variety of applications nationwide and understands the key components that must be addressed during the process. Our team brings superior technical, financial, and project management capabilities to the execution and coordination of the TMDL process including:

- Real-world TMDL successes in Illinois, Washington, California, Florida, Montana, and Pennsylvania, which includes TMDLs approved by both State and Federal agencies;
- Modeling expertise and capabilities in estimating mass loading contributions from both point and nonpoint sources;
- Watershed-wide data management capabilities and analysis;
- Watershed/river and lake prioritizing based on contaminants; and
- Proven skills in stakeholder- and community-consensus building.

CDM will perform all the planning, administrative, and other activities required for developing the TMDL as described in the Expression of Interest and as directed by West Virginia DEP's project managers. CDM has the experienced in-house engineers and scientists to complete this work, and those staff will be managed by Becky Dunavant, our assigned project manager.

Along with our local West Virginia subconsultant, Wilbur Smith Associates, the project team will work closely with the West Virginia DEP TMDL team in completing all assignments in the Monongahela watershed. The individual members of our team have been selected for their ability to bring leadership and technical solutions to this project. We will apply our intimate knowledge of the watersheds, stakeholders, and the West Virginia DEP to develop specific TMDL implementation plans that are innovative, cost effective, and practical.

20. The foregoing is a statement of facts.

Matthew R. Sickles

Signature: _____ Title: Vice President

Printed Name: Matthew R. Sickles, P.E.

Date: August 25, 2011

STATE OF WEST VIRGINIA
Purchasing Division

PURCHASING AFFIDAVIT

West Virginia Code §5A-3-10a states: No contract or renewal of any contract may be awarded by the state or any of its political subdivisions to any vendor or prospective vendor when the vendor or prospective vendor or a related party to the vendor or prospective vendor is a debtor and the debt owed is an amount greater than one thousand dollars in the aggregate.

DEFINITIONS:

"Debt" means any assessment, premium, penalty, fine, tax or other amount of money owed to the state or any of its political subdivisions because of a judgment, fine, permit violation, license assessment, defaulted workers' compensation premium, penalty or other assessment presently delinquent or due and required to be paid to the state or any of its political subdivisions, including any interest or additional penalties accrued thereon.

"Debtor" means any individual, corporation, partnership, association, limited liability company or any other form or business association owing a debt to the state or any of its political subdivisions. "Political subdivision" means any county commission; municipality; county board of education; any instrumentality established by a county or municipality; any separate corporation or instrumentality established by one or more counties or municipalities, as permitted by law; or any public body charged by law with the performance of a government function or whose jurisdiction is coextensive with one or more counties or municipalities. "Related party" means a party, whether an individual, corporation, partnership, association, limited liability company or any other form or business association or other entity whatsoever, related to any vendor by blood, marriage, ownership or contract through which the party has a relationship of ownership or other interest with the vendor so that the party will actually or by effect receive or control a portion of the benefit, profit or other consideration from performance of a vendor contract with the party receiving an amount that meets or exceeds five percent of the total contract amount.

EXCEPTION: The prohibition of this section does not apply where a vendor has contested any tax administered pursuant to chapter eleven of this code, workers' compensation premium, permit fee or environmental fee or assessment and the matter has not become final or where the vendor has entered into a payment plan or agreement and the vendor is not in default of any of the provisions of such plan or agreement.

Under penalty of law for false swearing (*West Virginia Code §61-5-3*), it is hereby certified that the vendor affirms and acknowledges the information in this affidavit and is in compliance with the requirements as stated.

WITNESS THE FOLLOWING SIGNATURE

Vendor's Name: Camp Dresser & McKee Inc.

Authorized Signature: *Matt R. [Signature]* Date: 8/25/11

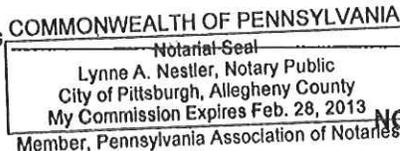
State of Pennsylvania

County of Allegheny, to-wit:

Taken, subscribed, and sworn to before me this 25th day of August, 2011.

My Commission expires COMMONWEALTH OF PENNSYLVANIA, 20 .

AFFIX SEAL HERE



NOTARY PUBLIC *Lynne A. Nestler*