ORIGINAL

MapTech, Inc.

Natural Resource Solutions

through *Science* and *Engineering*

A Proposal to:

The State of West Virginia

Purchasing Division
2019 Washington Street East
Charleston, WV 25305-0130

TMDL Development for Monongahela & Hughes River Watershed

Solicitation No.
CEOI 0313 DEP1600000009

MapTech, Inc.
Phillip W. McClellan, President
3154 State Street; Blacksburg, VA 24060
Phone: 540.961.7864 | **Fax:** 540.961.6392
pmcclellan@maptech-inc.com | www.maptech-inc.com

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Bid Clerk (Beth Collins, Buyer, (304) 558-2157) October 2, 2015
Department of Administration
Purchasing Division
2019 Washington Street East
Charleston, WV 25305-0130

RE: Solicitation No.: CEOI 0313 DEP1600000009; TMDL Development Contract: Hydrologic Group D (Monongahela R. & Hughes R. Watersheds

Dear Review Committee,

MapTech is pleased to submit the attached response to the solicitation. MapTech has a history of conducting TMDL projects for a variety of customers including several states in the eastern US. We are proud of the fact that, of more than 200 TMDL products, none have been contested in court, and all our TMDLs have been approved by EPA.

MapTech's success in the TMDL field has in large part been due to our objective application of science and engineering to the process. An excellent example is our first TMDL which was performed in the Blackwater watershed in Virginia. Prior to this work, EPA's contractor for Virginia's first TMDL – Muddy Creek – minimized wildlife as a bacteria source, identified the agricultural community as the default source and thereby established the standard practice. Contrarily, we reasoned that wildlife probably made significant contributions to in-stream bacteria violations and should be included in modeling and allocating TMDLs. Through Bacteria Source Tracking tests in our laboratory, we confirmed wildlife as the major contributor to the violations in Black Creek. To ensure scientific accuracy, our method of incorporating wildlife has become the routine in all bacteria TMDLs.

A second example of the importance of science and engineering in the TMDL process is our project on AML-impaired waters in Black Creek for the Virginia Department of Mines, Minerals and Energy (DMME). Again, MapTech took an innovative approach and developed a biometric model to simulate the biological scores used to assess the stream. This was in response to the numerous pollutants being delivered to the stream. This approach was challenged by EPA's TMDL contractor. Nevertheless, the TMDL as developed by MapTech, was approved and garnered appraise from EPA and Virginia DMME staff. More importantly, it laid the groundwork for testing the health of the stream as has been demonstrated in subsequent years of implementation.

As a final thought, MapTech has proven its approach to developing TMDLs with all being accepted by EPA. Furthermore, none of our TMDLs have resulted in litigation. That is not to say there have not been contentious debates. With the Blackwater, EPA at first resisted including wildlife. Nor was the mining industry initially supportive of our Callaghan and Straight Creek TMDLs that identified TDS as a stressor for the aquatic community. But, in both instances, the validity of the TMDLs and our methodologies were accepted. The mining industry went on to develop implementation plans for the two TMDLs and subsequently hired MapTech to develop a TMDL for the State.

If you have any questions, please feel free to call me.

Sincerely,

Phillip W. McClellan, MapTech, Inc.

Contents

1. Introduction

MapTech, Inc. is pleased to submit this proposal to provide the technical services required to support the West Virginia Department of Environmental Protection (WVDEP) for the project titled "TMDL Development Contract: Hydrologic Group D (Monongahela River and Hughes River Watersheds" (Solicitation No. CEOI 0313 DEP1600000009). Selecting MapTech will ensure WVDEP the successful completion of this project through MapTech's superior technical approach, exceptional staffing, highly relevant past performance, and commitment to delivering quality services and products on-time and on-budget.

MapTech is a Virginia-certified small business environmental firm headquartered in Blacksburg, VA with a presence in China. The staff includes a diverse and dedicated group of engineers and scientists led by former research faculty with significant experience in watershed assessment research. MapTech specializes in the collection, analysis and interpretation of environmental data to understand cause-effect relationships in watershed systems. Core programs include: Watershed Studies including TMDLs, Dam Safety Engineering, Stream and Wetland Restoration, Information Technology, Diagnostic Analysis & Field Services, and Monitoring Networks.

The firm has completed or is nearing completion of more than 250 TMDL projects. A wide range of modeling and interpretative tools, and a wet laboratory support the activities. Technical strengths for this purpose include water quality analysis, hydrology, monitoring and modeling, Geographic Information Systems (GIS), soil and water conservation, permitting and compliance, remote data networks and instrumentation, scientific research, and public outreach and education.

In the next four sections we provide information to substantiate that MapTech meets or exceeds the four Evaluation Criteria (A through D).

2. Criterion A: Organization [evaluation item A]

Company resources include types of environmental services performed, time in business, in-house capabilities, resources and equipment available to the project, location of primary office, and full and part-time employees able to participate in the project. Each of these is addressed here and, in part in other required submissions.

Types of Environmental Services Performed

The environmental services performed by MapTech within the last five years include:

- Watershed Studies (BMP design and development, NPS pollution studies, TMDLs and Implementation Plans, Research)
- Dam Safety Engineering (Dam renovation design, Inundation modeling & mapping, Emergency Action Planning
- Stream and Wetland Projects (Design and Construction, Wetland Delineation, 401/404 permit activities)
- Information Technology (GIS, Web applications, Web-hosting of data)
- Diagnostic Analysis & Field Services (Taxonomy of macro benthos, vegetation, and phytoplankton; Fluorometry; Bacteria Source Tracking; and Field Monitoring of hydrology, water quality, and biota)
- Monitoring Networks (Design and Maintenance of weather, stream flow and precipitation instruments, Software and Hardware engineering)
- Public Outreach and Education.

Time in Business

MapTech has been in business for 23 years under the same name.

In-House Capabilities

As with all of our TMDLs, the work will be done exclusively in-house because we have the manpower, resources and facilities.

Resources and Equipment

In **Section 7: Consultant Qualification Questionnaire**, MapTech lists its software and equipment available to complete the project. In addition, we have a Diagnostic Laboratory which supports TMDLs and other work including: Macro Benthic Taxonomy (Family-Certified), Phytoplankton Taxonomy, Bacterial Source Tracking, Fluorometric Identification of organic pollutants, and Wetland Delineation. We also design/build/install a range of instrumentation for Weather Stations, and rain and stream flow gauging.

Location of Primary Office

Our TMDL headquarters in Blacksburg, VA is 2.3 hours driving distance from Charleston and the project area by good roads (138 miles). This compares favorably to our average daily driving distance of 3 hours to current projects in Virginia, excluding our current Pennsylvania and Missouri contracts. On a typical weekday we have three vehicles on the road to projects.

Full and Part-Time Employee Participants

The core full-time staff assigned to this project will include 6: Phillip McClellan E.I.T., Dr. Jim Kern P.E., Megan Maggard E.I.T., Dr. Mike Scanlan, and Jeremy Bradley. Assistance will be drawn periodically from 3 others: Chris Harrell, Alex Depew, and Rod Bodkin.

3. Criterion B: Resources [evaluation item B]

In this section we expand on our hardware, software, licenses, databases, models/programs, contacts and other resources available to accomplish the project.

Hardware, Software, Licenses, Databases

In **Part 14** of **Section 7: Consultant Qualification Questionnaire**, MapTech listed its hardware and software available to complete the project. This includes computers, printers, and software for word processing, spreadsheeting, document production and databasing.

Models/Programs

Among the modeling and programming software listed in **Part 14** of **Section 7**, the elements that will be of most use in this project include:

- GWLF (particularly for modeling sediments)
- MINTEQ2 (for modeling metals and other discrete contaminants)
- HSPF (for modeling hydrology, meteorology and bacteria)
- MapTech's Biometric Model Framework® (for identifying stressors and allocation analysis for the benthic community)
- Statistical Software (JMP, R, STATISTICA, and SAS for analyzing water quality and relationships to Aquatic Life impairments)
- ESRI ArcView and ArcGIS (for spatial analysis particularly of land use, habitat, and load allocation), and
- RUSLE/USLE Based Annual Loading of sediment.

Contacts

MapTech maintains excellent relations with the Regional EPA Office and Headquarters. We also have fruitful contacts with the branches of government in several states including the Soil and Water Conservation Service, the Department of Mines, Minerals and Energy, the Division of Game and Inland Fisheries, the Department of Conservation and Recreation, and the Department of Environmental Quality. We expect the same level of comradeship to develop with equivalent West Virginia Departments we will be dealing with.

We are located adjacent to Virginia Polytechnic and State University. Because two of our principals worked there and have maintained good contacts, VPI&SU is both a reference for engineering and water resource information, and a source of high quality part-time assistants for our projects.

Other Resources

We have a Diagnostic Laboratory which supports TMDL and other work including: Macro Benthic Taxonomy (Family-Certified), Phytoplankton Taxonomy, Bacterial Source Tracking, Fluorometric Identification of organic pollutants, and Wetland Delineation. We also design, build, and install a range of instrumentation for Weather Stations, and rain and stream flow gauging.

4. Criterion C: Personnel [evaluation item C]

Staffing

MapTech offers WVDEP a pool of technical and subject matter experts, highly-experienced technical and program staff, and recognized watershed champions that together will successfully promote the overall goals of the State's technical program and who will successfully plan and implement the technical assistance for the project. The key personnel are available and committed to supporting this program and will be ably supported by technical and program staff. President Phillip McClellan (Project Liaison) will be responsible for managing all tasks and deliverables according to the project schedule and budget. He will be the primary client contact and ultimately accountable for the quality of services and deliverables of MapTech. Dr. James Kern, P.E. (Project Manager, Project Engineer) will be responsible for the technical direction and oversight in the project. Dr. Michael Scanlan (Environmental Scientist) will be responsible for data collection and statistical analysis, technical presentations and technical document preparation. Megan Maggard, E.I.T. (Staff Engineer/Modeler) will be responsible for developing, calibrating and verifying the HSPF and GWLF models. Jeremy Bradley (GIS Specialist Sr.) will provide ArcGIS products including land use and hydrology shape files, and a variety of map products.

Biographies of these principals are presented next and additional biographical details are found in **Part 13** of **Section 7: Consultant Qualification Questionnaire**.

Biographical Briefs

James Kern, Ph.D., P.E. (Project Manager). Dr. Kern will be responsible for the technical direction and oversight of the project. He will interact with state contacts, oversee the technical efforts, and participate in technology development and transfer. Dr. Kern is MapTech's Chief Operations Officer and Water Resources Engineer. He has had oversight responsibilities for all MapTech operations since 2004. He has a professional focus in hydrologic/water quality assessment including modeling of land management practices on surface water. With a Ph.D. in Biological Systems Engineering from VPI&SU, he was a research associate in Biological Systems Engineering Department from 1992 to 1998. At MapTech he has been the lead scientist/engineer in over 70 TMDL development projects and over 40 TMDL IP development projects. He has extensive experience in modeling, statistical analysis, instrumentation, GIS, and information systems. He has broad and deep knowledge and insight in watershed studies, hydrologic/water quality model development, and water quality/quantity monitoring. He has had extensive watershed stakeholder involvement and interaction with the USEPA, State Agencies, and local and county agencies through TMDL development, Implementation Plan oversight and guidance, and related activities. He will lead the development of the models, stressor screening, workgroup meetings, and the overall development for TMDL planning.

Phillip M. McClellan, E.I.T. (Water Resources Engineer, Project Liaison). Mr. McClellan will guide the project ensuring that all necessary resources are made available in a timely manner. He was a co-principal investigator with Dr. Vernon Shanholtz in the development of VirGIS, the first state-wide GIS systems developed to prioritize watersheds for BMD implementation. He has 33 years experience in environmental monitoring networks, watershed studies, watershed assessment, data analysis, and instrumentation. This experience includes evaluation of the impact of non-point source pollution on surface and ground water and the design, installation and management of extensive hydrologic/water quality/climatic monitoring networks throughout Virginia and the Midwest. He has been a principal investigator on monitoring projects designed to assess ground water impacts of agricultural nonpoint source pollution, as well as GIS studies to assess the impact of fertilizer handling facilities on well water. He has worked with the Yangtze (Changjiang) River Water Commission, Wuhan China since 2002 developing an Integrated NonPoint Source Management and Decision Support System (INPSMDSS) on the Yangtze River basin. Under his guidance, MapTech has completed or is nearing completion of over 150 TMDLs, and TMDL IPs addressing hundreds of impaired segments and multiple pollutants. He led the development of the first comprehensive TMDL IPs in Virginia. His background in instrumentation and water quality monitoring led to a long-term contract to support the Department of Emergency Managements early flood-warning program. He has contract experience with agencies and water quality issues in Midwestern U.S. states, as well as Arkansas, California Georgia, Maryland, Michigan, North Carolina, Pennsylvania, and Virginia. For this project his role will be to provide practical guidance TMDL development. He will also insure that the necessary firm resources are made available to execute contracts in a timely and cost-effective manner.

Dr. Mike Scanlan, Ph.D., M.S. (Environmental Scientist). Dr. Scanlan of MapTech will be responsible for preparing project reports and deliverables, as well as stressor evaluation, data collection, metrics, methods, and technical training. He is an environmental scientist with extensive experience in water quality data assessment and analysis, regulations, monitoring, pollution prevention, permitting, inspections, and water quality analysis. He has 26 years of practical experience in water assessment, permitting, compliance, and grant management. He was a university professor of ecology, and had twenty-two years of program and management experience with the Virginia Department of Environmental Quality (DEQ). Water program skills include 305(b)/303(d) list and report preparation, water quality monitoring program development and oversight, Virginia-wide probabilistic monitoring and analysis, and permits and compliance.

Megan Maggard (, E.I.T. (Staff Engineer/Modeler). Ms. Maggard will model the sources in the watershed and calibrate and verify the water quality and hydrologic model for the projects. She has an M.S. in Biological Systems Engineering with a concentration in Land and Water Resources. She has extensive and recent experience with models in support of MapTech's TMDL projects. Ms. Maggard has over eleven years of professional experience in soil and water conservation and watershed management with two years at the Project Manager level including: watershed modeling, TMDL development, TMDL Implementation Plan development, non-point source assessment, and evaluation of agricultural tillage practices. She has experience with using the GLEAMs, HSPF, and GWLF models to evaluate Best Management Practices/alternatives for non-point source pollution control. She is also trained in environmentally sensitive and sustainable engineering design procedures for the restoration and protection of streams and rivers (Rosgen and NRCS). She has been the Project Manager for eight TMDL development projects and three TMDL IP development projects.

Jeremy Bradley (Geographic Information Specialist). Mr. Bradley will compile and process candidate data for the TMDL, and participate in identifying reference watersheds and indices for stressors. He graduated from VPI&SU in Geography, Geospatial and Environmental Analysis, and is currently enrolled in the Masters of Geospatial Technology Program at VPI&SU. He has had over 7 years experience in GIS work. He is an expert in ArcView software, database, and GIS programming and serves as MapTech's key GIS technician for developing environmental and project databases. He is an expert user of AutoCAD, ArcGIS, Photoshop, IDRISI, Dreamweaver and GIS software development and database management. He is also fluent in PHP, HTML, OpenLayers, and other web development software; Visual Basic, CSS, and Avenue. For this project he will participate primarily in the development of GIS products supporting TMDL development.

5. Criterion D: Project Management [evaluation item D]

From the client perspective, comfort with a project's management is developed through satisfying meetings, reports and communication. But, the glue binding these activities together are the project goals.

Meeting, Reporting, and Communication

MapTech recognizes that planning, communication, and reporting are essential for sustaining superior project performance and timely delivery of quality products and services given constraints of scope, budget, and schedule. We will continuously strive to further improve our services and products throughout the period of performance. The following list summarizes MapTech's Project Management.

- MapTech has a flat management structure conducive to quick communication that also enables project personnel to acquire additional skills making them more versatile and technically proficient.
- Project Managers take full responsibility for their projects and ensure that clients are kept informed and satisfied.
- On a fixed schedule the PM originates client progress calls to review the project's pace, accomplishments and technical issues. A memo report is subsequently delivered to the client summarizing the call's topics and decisions.
- Project Managers meet with MapTech Administration every few days to provide updates and obtain necessary resources.
- Project Managers schedule regular meetings with clients for update purposes.
- Project Team members meet regularly to discuss progress, needs, plan work for the next period, and negotiate problems.
- Project Managers perform QA checks on the data, and review and approve all products.

MapTech has a strong track record of success in managing both large and small contracts and meeting client deadlines and is committed to achieving WVDEP's timetable for this project. To meet the timetable and accomplish the project objectives, in this project MapTech makes the following serious commitments:

- Attend in project kickoff activities with WVDEP intended to identify contacts, responsibilities, timelines, deliverables, conference calls, and reports. Watershed tours should be incorporated.
- Actively participate in semi-monthly working calls with WVDEP to discuss work progress and plan the next stages of work.
- Include a Project Quality Assurance element in the working call to ensure emerging problems and other issues are addressed.
- Provide monthly technical / financial progress reports to WVDEP to document work accomplishments, issues and resolutions.
- Send the PM or his alternate (Environmental Scientist) to facilitate meetings over complex issues at WVDEP's offices in Charleston, WV.
- Continuously strive to improve our services to WVDEP for the duration of the project.

Goal Setting

MapTech will help the State identify and establish specific goals for the TMDL project. The goals should reflect the intentions/concerns of the State and provide enough specificity to make the assessment useful for practical implementation. In large part, WVDEP has detailed the expected elements of the TMDLs in the RFP under "SECTION THREE: PROJECT SPECIFICATIONS". Based on the final goals, appropriate geographic/hydrologic units of assessment will be selected. These assessment units will be based on water body type, size of the drainage area, activities impacting water quality, and/or cultural issues within the watersheds. These critical issues must be established in order to identify key parties that should be involved, data availability, and desired outputs from the process. Relevant to this is MapTech's monthly financial/technical progress report to WVDEP. This report will include QA activities supporting implementation of the project, problems encountered, and corrective actions taken.

6. Project Technical Experience [Related Experience, Oral Pres. 5.1]

MapTech recognizes that TMDLs are public documents that are necessary precursors for solving the water quality problems in the subject watersheds. Consequently, they need to be an authoritative and accurate description of conditions with the data and modeling to support the proposed solutions. MapTech has a history of developing TMDLs which were USEPA-approved. Sub contractor MapTech has recently worked with both states and USEPA to review and resolve TMDLs of other contractors where the draft had employed questionable methods or generated contested results. MapTech has a reputation of being requested by the Virginia DEQ to advise others how to negotiate complex TMDLs.

MapTech has conducted TMDL studies in Virginia, Arkansas, Tennessee, and Georgia across three EPA Regions (3, 4, 6), and multi-jurisdictional projects. Subject pollutants range from toxic to conventional, in habitats spanning mountain streams and shellfish-supporting estuaries. Modeling expertise includes deep and broad expertise in HSPF and GWLF as well as versions of QUAL, PRISM, WASP and other software.

The following projects are presented to demonstrate MapTech's experience in providing each of the services required by West Virginia in developing TMDLs for the Monongahela and Hughes River Watersheds. The listed TMDL projects have all have been approved by USEPA. They have also met at a minimum the eight TMDL elements including: implement applicable WQS, LAs and WLAs, background pollutant contributions, critical

conditions, seasonal variations, margin of safety, reasonable assurance, and public participation. MapTech's ability to support the current project follows.

Experience 1: AML and Resource Extraction TMDLs

The following selected examples of AML and active resource extraction TMDLs provide specific evidence that MapTech has successfully developed TMDLs equivalent to those necessary for the Monongahela and Hughes River watersheds.

In addition to the projects presented below, The TMDLs prepared for Dumps Cr. and Black Cr. employed a multiple regression analysis of the response of the macro benthic community to in-stream constituents (potential stressors) and developed indicator bio-metrics for the RBP II score used to determine the health of aquatic communities. The potential stressors modeled included Fe, Mn, TDS, TSS, pH, SO4, acidity, alkalinity, temperature, and specific conductivity.

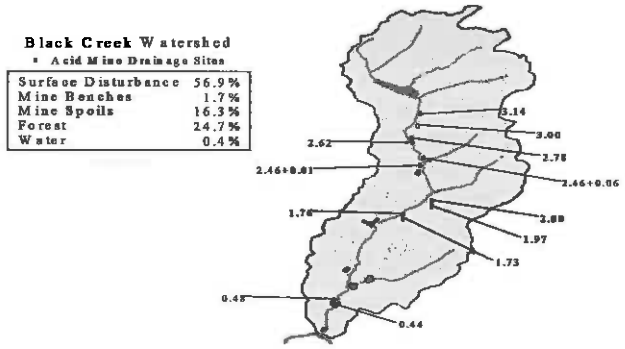
Also, in 2014, MapTech developed a pH TMDL for an impairment in Ashville Bridge Creek, VA. Because MapTech demonstrated the impairment was related to naturally low buffering capacity of the watershed soils and atmospheric deposition, the pH TMDL was not submitted to EPA until the State of Virginia could develop a uniform approach to pH TMDLs.

Finally, MapTech has developed metal/ionic strength TMDLs for Peak Cr. in Pulaski Co., VA (Zn-, Cu-, Pb-sediment), for Lewis Cr. in Augusta Co., VA (Pb-sediment). MapTech is also currently under contract to develop TMDLs in several watersheds in Missouri for several metals and sediment.

Project Example 1

Project Title	Client	Period of Performance	Contractor Role
Black Creek TMDL for Mn, Fe, SO4, TSS, Alkalinity and Conductivity	VDMME Joey O'Quinn, P.O. Drawer 900, Big Stone Gap, VA 224219, joey.o'quinn@dmme.virginia.gov, (276) 523-8151	4/2001 – 3/2002	Prime

With the development of this Black Creek TMDL, MapTech produced the **first resource-extraction TMDL in the State of Virginia**. Black Creek and its tributaries in Wise County was listed on the Virginia 1998 Section 303(d) list as impaired with regard to the general standard (benthic) based on a study conducted by faculty Dr. Donald Cherry, Department of Biology, Virginia Tech. The watershed is just under 4 square miles in size and comparable to the average TMDL watershed.



Abandoned surface mines, deep-mine drainage, and ongoing coal mining heavily impact Black Creek. A key component of the Black Creek TMDL was the development of in-stream water-quality endpoints for TMDL allocation, within the framework of the Rapid Bio-assessment Protocol (RBP) used in Virginia for assessing the health of the benthic macroinvertebrate community. Multiple regression theory was used to develop relationships between specific metrics of benthic health and the stressors impacting it. An extensive assessment of water quality and benthic survey data previously collected in the region (Southwest Virginia and Eastern Kentucky) was conducted to determine important water quality parameters and the mathematical relationship between these parameters and benthic health as measured by the RBP. The relationships were incorporated into a bio-assessment model that was used to produce a continuous RBP score for the impaired waters. All of this work was supported by extensive research into the literature on AMD impacts on watersheds and the aquatic life effects of the mining-generated parameters that were central in the TMDL.

The models used to simulate hydrology/water quality and to determine source allocation scenarios were USGS HSPF with support systems ANNIE, IOWDM, and WDMUtil. Modeled aquatic life stressors included total and dissolved iron, total and dissolved manganese, total dissolved solids, total suspended solids, pH, sulfate, acidity, alkalinity, temperature, and specific conductivity. The bio-assessment model was used with the simulated values for the water quality stressors to calculate the RBP scores for existing conditions. An RBP calculator was developed and used to determine allocation scenarios expected to achieve water quality goals.

Project Example 2

Project Title	Client	Period of Performance	Contractor Role
Phase II TMDLs for Levisa Fork, Bull Cr., Powell R. & S. Fork Pound R.	VDMME in coordination with VDEQ & USEPA Joey O'Quinn, P.O. Drawer 900, Big Stone Gap, VA 224219, joey.o'quinn@dmme.virginia.gov, (276) 523-8151; Craig Lott, P.O. Box 1105, Richmond, VA 23218, craig.lott@deq.virginia.gov	01/2011 – 06/2014	Prime

The Levisa Fork and the Powell River "Phase I" TMDLs were drafted by MapTech. The Bull Cr. and Pound R. "Phase I" TMDLs were originally

prepared by another contractor. Serious concerns were raised about some of these TMDLs by mining companies and other stakeholders regarding the sufficiency of the available data to determine pollution load reductions and the adequacy of the predictive tools. As a result, the VDMME, VDEQ and USEPA adopted a "Phased" approach, in accordance with USEPA guidance, to researching the issues and resolving stakeholder concerns for all the TMDLs.

MapTech was retained to complete "Phase II" of these TMDLs because it was intimately familiar with three of the systems having developed the phased TMDLs for Powell and Levisa Fork, and having incorporated Bull Creek into the Levisa Fork TMDL. MapTech had also reviewed the modeling approach of the contractor for the South Fork and North Fork Pound River TMDL. Although another contractor conducted the initial TMDLs on the latter two systems, MapTech's monitoring-based modeling approach, and understanding of the DMME's permitting process, was critical for winning the contract. MapTech successfully completed "Phase II" of the TMDL reports for all the listed stream segments. MapTech's original TMDLs for Levisa Fork and the Powell River remained unchanged and were approved by USEPA. Meanwhile, the TMDLs for Bull Cr. and the Pound R. watersheds required significant revisions to the models and underlying assumptions in order to be approved and adopted.

Virginia DEQ, under direction from USEPA, required that contractors change their approach to reporting permitted loads in resource extraction TMDLs. The approach developed by MapTech addresses VDEQ's needs, and maintains compatibility with VDMME's approach in applying the TMDLs in the permitting process. The approach is contained in MapTech's White Paper: Calculation of Existing and Allocated Sediment Loads for Permitted Discharges in Coalfield TMDLs. This document outlines our approach to calculating existing and allocated sediment loads. The document details issues regarding model design, calibration and allocation of sediment loads for permitted discharges in coalfield TMDLs. It in large part is responsible for the successful completion of these "Phased" TMDLs.

Project Example 3

Project Title	Client	Period of Performance	Contractor Role
Callahan and Straight Creek Resource Extraction TMDLs for TDS, Sediment & Bacteria	VDMME and VPI&SU Joey O'Quinn, P.O. Drawer 900, Big Stone Gap, VA 224219, joey.o'quinn@dmme.virginia.gov, (276) 523-8151; Craig Lott, craig.lott@deq.virginia.gov, (804) 698-4240.	04/2004 – 05/2005	Prime

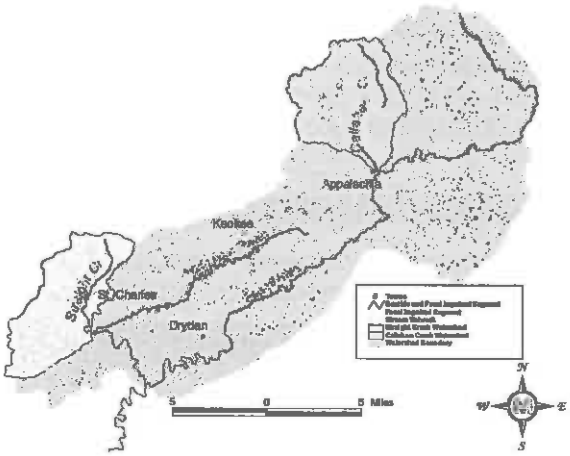
MapTech developed four TMDLs (two bacterial, and two benthic) for two of the impaired segments of the Powell River, Callahan Creek and Straight Creek. Callahan Creek, located in Wise County, VA and Straight Creek, located in Lee County, VA are tributaries to the Powell River and are part of the Upper Tennessee River Basin. In the Powell River watershed, Callahan Creek was initially placed on the Virginia 1998 Section 303(d) TMDL Priority List for violations of the General Standard (benthic) and was later added for violations of the bacteria standard. Fecal coliform bacteria were consistently elevated above the 400-cfu/100 ml standard. Consequently, the stream did not support primary contact recreation (e.g., swimming, wading, and fishing).

The USEPA encouraged Virginia to develop a water quality standard for E. coli bacteria to replace the fecal coliform standard. This new standard specified that the number of E. coli bacteria shall not exceed a maximum of 235-cfu /100 ml. In addition, if data is available, the geometric mean of two or more observations taken in a calendar month should not exceed 126-cfu/100 ml. Meanwhile, the General Standard is implemented by VADEQ through application of the modified Rapid Bioassessment Protocol II (RBPII). Using the modified RBPII, the health of the benthic macro-invertebrate community is typically assessed through measurement of 8 biometrics that evaluate overall health. By this methodology, Callahan Creek was rated as moderately impaired. Straight Creek was initially listed on the Virginia 1994 TMDL Report for violations of the bacteria standard and the Virginia 1996 List for violations of the General Standard (benthic). This stream also does not support the primary contact recreation use (e.g., swimming, wading, and fishing). The modified RBPII method results rated Straight Creek as moderately impaired. During development of the fecal bacteria TMDL, the in-stream E. coli target was a geometric mean not exceeding 126-cfu/100 ml and a single sample maximum of 235-cfu/100 ml.

TMDLs must be developed for a specific pollutant(s). The potential benthic stressors are: sediment, toxics, low dissolved oxygen, nutrients, pH, metals, conductivity, temperature and organic matter. The results of the stressor analysis for the benthic impairment in Callahan Creek and Straight Creek were divided into three categories: Non-Stressor, Possible Stressor, and Most Probable Stressor. The results indicated that for both Callahan Creek and Straight Creek, sediment and total dissolved solids (TDS) are the Most Probable Stressors and, therefore, were used to develop the benthic TMDLs.

Sediment is delivered to Callahan Creek and Straight Creek through a natural and continual process that is often accelerated by human activity. Sources contributing to the TDS impairments include both nonpoint contributions and point sources. Nonpoint sources in the Callahan Creek watershed and Straight Creek watershed are abandoned mine land (AML) (e.g., mine spoils, benches, and disturbed areas), straight pipes, and land currently being mined. In the Callahan Creek watershed there are 84 permitted discharges including 78 sedimentation basin outlets, 3 VPDES, and 3 deep mine discharges. There are 50 permitted discharges in the Straight Creek watershed; one VPDES and 49 sedimentation basin outlets.

To address the bacteria TMDL, reducing the human bacteria loading from straight pipes and failing septic systems should be a primary implementation focus because of the health implications. This component could be implemented through education on septic tank pump-outs as well as a septic system installation/repair program. Livestock exclusion from streams has been shown to be very effective in lowering bacteria concentrations in streams, both by reducing the direct cattle deposits and by providing additional riparian buffers. Reduced trampling and soil shear on streambanks by livestock has been shown to reduce bank erosion.



To address the TDS and sediment TMDLs, it is anticipated that AML reclamation and the correction of straight pipes will be initial targets of implementation. One way to accelerate reclamation of AML is through remining. The Virginia Department of Mines, Minerals and Energy's (DMME) Division of Mined Land Reclamation (DMLR), The Nature Conservancy, Virginia Tech/Powell River Project, and U. S. Office of Surface Mining combined resources to develop proposals for incentives that will promote economically viable, environmentally beneficial remining operations that reclaim AML sites.

Experience 2: Biological Stressor Identification and Stressors

The Aquatic Life TMDLs in the Monongahela and Hughes River watersheds will necessitate a thorough evaluation and accurate identification of the stressors in order to support the load allocations. MapTech modeled its initial stressor approach around EPA's threshold protocol which involves a statistical analysis of potential stressors in the water column. However, MapTech has developed a more dependable approach in its advanced aquatic life TMDLs which involves a multiple regression examination of the relationship between specific metrics of benthic health and the stressors impacting it. It is helpful for this purpose that MapTech has generated an extensive assessment of water quality and benthic survey data collected in southwest Virginia and eastern Kentucky that identifies the mathematical relationship between water quality parameters and macro benthic health as measured by RBP scores. These relationships will help provide a continuous RBP score for project impaired waters that can be used in allocating the TMDLs. The following is an example MapTech project in which stressor review and identification was conducted. Aquatic Life TMDL projects listed in the other Experience categories also provide evidence that MapTech has this experience.

Project Example 1

Project Title:	Client:	Period of Performance:	Contractor Role:
TMDLs for Sediment and Bacteria in the Back Creek Watershed	VDEQ and New River-Highlands RC&DC: Craig Lott, P.O. Box 1105, Richmond, VA 23218, craig.lott@deq.virginia.gov, (804) 698-4240; Gary Boring, 325 E. Main St Suite E-2, Wytheville, VA 24382, gboringnrhrcd@centurylink.net, (276) 227-0535	2006 - 2008	Prime

The Back Creek watershed did not meet the Recreational Use Standard due to fecal coliform bacteria, and the Aquatic Life Standard (benthic) for initially unknown reasons. Consequently, MapTech developed the TMDL for the Back Creek watershed (New River Basin) located in Pulaski, Virginia. Historical data were compiled and analyzed with statistical techniques to describe flow patterns, seasonal and long-term trends, and critical flow periods. A comprehensive assessment of all fecal coliform sources and their delivery mechanisms was performed. A water quality-sampling program was implemented to utilize Bacterial Source Tracking (BST) to identify source types, to determine the relative percentage contribution of each source type, and to determine the spatial and temporal distribution of sources for all impairments. These results were used to improve stakeholder confidence in the TMDL process, to refine the calibration of the water quality component of HSPF, and to improve the allocation of loads among sources. BST samples of fecal coliform and *E. coli* were analyzed in MapTech's Environmental Diagnostic Laboratory. The benthic-impaired segment involved a comprehensive evaluation of potential stressors to the benthic community resulting in the determination that sediment is the Most Probable Stressor.

The USGS HSPF water quality model was selected as the modeling framework for fecal coliform to simulate existing conditions and perform bactera TMDL allocations. In establishing the existing and allocation conditions, seasonal variations in hydrology, climatic conditions, and watershed activities were explicitly accounted for in the model. Due to the lack of continuous streamflow data for Back Creek, the paired watershed approach, with additional refinement using instantaneous flow measurements was used to calibrate the HSPF model. Through this approach, the HSPF model is calibrated using data from Upper Tinker Creek, a hydrologically similar watershed where continuous stream flow is available.

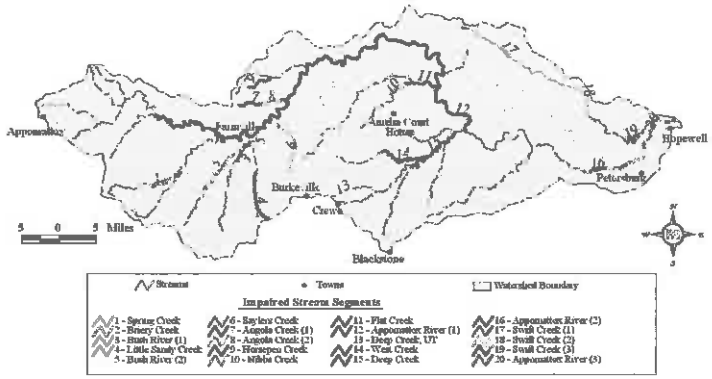
There are no in-stream criteria for sediment in Virginia so that a reference watershed approach was used to define allowable TMDL loading rates. This approach paired Toms Creek watershed which is supportive of its designated use(s) with the impaired watershed. The TMDL sediment load was defined as the modeled sediment load for existing conditions from the non-impaired Toms Creek watershed, area-adjusted to the Back Creek watershed, and in-stream loading due to stream bed and bank erosion with runoff. The Generalized Watershed Loading Function (GWLF) model was used for comparative modeling for both Back Creek and Toms Creek.

Experience 3: Interpretation of Narrative Criteria TMDLs

MapTech has successfully completed numerous TMDLs impaired by pollutants requiring an interpretation of narrative criteria. Because the target watersheds will involve this interpretation, MapTech's experience in this regard is crucial. The following are two examples.

Project Example 1

Project Title:	Client:	Period of Performance:	Contractor Role:
Aquatic Life TMDLs for the Appomattox River Watershed	VDEQ Craig Lott, P.O. Box 1105, Richmond, VA 23218 craig.lott@deq.virginia.gov, (804) 698-4240	12/2002 - 2004	Prime

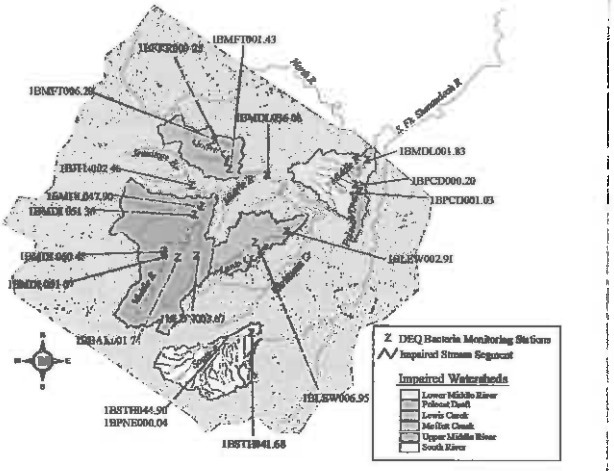


The Appomattox River watershed contains approximately one million acres and drains to the James River near Hopewell, Virginia. This project represented the first basin-wide TMDL approach in Virginia. The drainage basin includes twenty two (22) segments impaired due to elevated fecal coliform concentrations, two (2) reservoirs with low levels of dissolved oxygen (DO), one segment impaired because it did not meet the state's aquatic life (benthic community) criteria and nine (9) steam segments with low dissolved oxygen levels. Flow in the lower segment from the confluence of the Appomattox River with the James River upstream to Lake Chesdin is affected by tidal fluctuations. TMDLs were developed for all benthic and fecal coliform impairments. A comprehensive assessment was conducted on fecal coliform impairments to determine point and non-point sources, source pathways to stream, and source loads impacting stream bacteria levels. The benthic-impaired segment involved a comprehensive evaluation of potential stressors to the benthic community to determine the factors impacting the Aquatic Life Use narrative standard. For the segments and lakes with depressed DO, a source assessment was conducted to determine potential factors impacting stream and/or lake DO. Protocols where developed to determine if depressed lake DO was likely due to natural or anthropogenic causes. Guidelines were provided a basis for determining if a TMDL should be initiated. Similar guidelines were developed for free flowing streams.

The watershed model HSPF was used to model hydrology/water quality for non-tidal stream segments. WASP was used to model bacteria levels in the stream segment influenced by tidal fluctuations. Watershed model HSPF was used to determine point and non-point source loads. In general, the process involved model parameterization, hydrology calibration/validation, water quality calibration/validation, sensitivity analysis, determining existing conditions (*i.e.* determine the TMDL), and allocation of loads exceeding the stream assimilative capacity to different bacteria sources. The activity involved extensive interaction with watershed stakeholders through public meetings and meetings with various stakeholder groups. The project involved interaction with state agencies, and county and local government jurisdictions. Bacterial Source Tracking was used to identify the source of bacteria as either from human, wildlife, livestock, or pet. The model scenario developed for the TMDL included a 100% reduction in loads from sewer overflows and uncontrolled residential discharges (straight pipes), a 90-100% reduction in direct in-stream loads from livestock, a 50-60% reduction in land-based loads from urban and agricultural sources, and a 0% reduction in all wildlife loads.

Project Example 2

Project Title:	Client:	Period of Performance:	Contractor Role:
TMDL for Benthic and Bacteria Impairments in the Middle and South River Watersheds	VDCR Bill Keeling, 600 E. Main St., Richmond, VA 23219 william.keeling@dcr.virginia.gov, (804) 786-6124	2009 - 2011	Prime



The Middle and South River watersheds are tributaries to the South Fork of the Shenandoah River watershed. The watershed contains six impaired stream segments (six fecal coliform and four benthic TMDLs). A comprehensive stressor evaluation was conducted to determine the failure of the benthic impairments to meet the Aquatic Life Use narrative standard. It was found that additional monitoring was necessary to discriminate between legacy pollutants and current pollutant sources, to determine toxicity of metals and organics, and to establish a better database of pollutant loads and/or concentrations for stressor identification, and to better support TMDL development.

The watershed model HSPF was used to model hydrology/water quality for fecal coliform impaired segments. In general, the process involved comprehensive assessment of bacteria sources, determination of source pathways to the stream, the calculation of loads for each pathway, hydrologic/water quality model parameterization, hydrology calibration/validation, water quality calibration/validation, sensitivity analysis, determining existing conditions (*i.e.* determine the TMDL), allocation of loads exceeding the stream assimilative capacity to different bacteria sources and writing a draft and final TMDL report. The study involved integrating modeling for source allocations based on a TMDL developed for Christians Creek following the old state standard for fecal coliform, and TMDLs developed for this study based on the new standard for *E-coli*.

Sediment loads for benthic-impaired watersheds were modeled using a reference watershed approach. With this approach, the sediment load from a non-impaired reference watershed with similar physiographic, soils, land use and geomorphic conditions as the impaired watershed is assumed as the end-point or target load (*i.e.* a pseudo sediment standard) for TMDL development. Watershed model GWLF was used to simulate stream sediment loads from the impaired watershed and its reference watershed. GWLF is a continuous simulation spatially lumped model that operates on a daily time step for water balance calculations and monthly calculations for sediment and nutrients from daily water balance. The model simulates runoff based on the Soil Conservation Service's Curve Number method; erosion is calculated from a modification of the Universal Soil Loss Equation (USLE); and sediment estimates are calculated by applying a delivery ratio based on a function of watershed area.

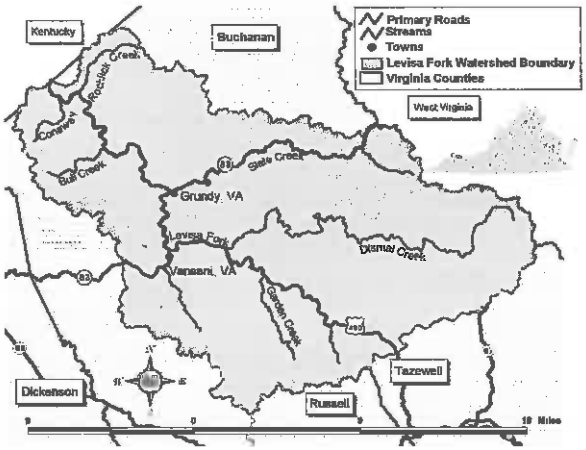
Experience 4: TMDLs for, and Loads from Sediment Impairments

While all of the following projects demonstrate MapTech's ability to handle sediment TMDLs, the first example was conducted in the coal fields of Virginia in watersheds with common AML landforms and so is more germane to the RFP. However, the remaining projects demonstrate MapTech's broad understanding and capability with respect to the questions that will be raised in the West Virginia Project.

Project Example 1

Project Title	Client	Period of Performance	Contractor Role
E. coli, Phased Benthic, and Phased Total PCB TMDL Development for Levisa Fork, Slate Creek, and Garden Creek	VDEQ and New River-Highlands RC&DC Craig Lott, P.O. Box 1105, Richmond, VA 23218, craig.lott@deq.virginia.gov, (804) 698-4240; Gary Boring, 325 E. Main St Suite E-2, Wytheville, VA 24382, gboringnrhrcd@centurylink.net, (276) 227-0536	05/2008 – 02/2011	Prime

MapTech developed TMDLs for the General Standard (benthic impairment due to sediment) in Slate Creek and several segments of Levisa Fork, for Recreational Use (E. coli), and for Fish Consumption Use (PCBs) in Garden Creek. In Levisa Fork and Slate Creek the stressor determined to be impacting aquatic live was sediment. The sediment endpoints were calculated from reference watersheds. The reference watersheds were Dry Fork for Levisa Fork, and Lick Creek for Slate Creek.



The model used was the *Visual Basic™* version of the Generalized Watershed Loading Functions (GWLF) model with modifications for use with ArcView (Evans et al., 2001). The target TMDL load for Slate Creek is the average annual load in metric tons per year (t/yr) from the area-adjusted Lick Creek watershed under existing conditions. To reach the TMDL target goal (1,770.63 t/yr), different scenarios were run with GWLF.

The target TMDL load for Levisa Fork is the average annual load in metric tons per year (t/yr) from the area-adjusted Dry Fork watershed under existing conditions. To reach the TMDL target load (17,547.48 t/yr), different scenarios were run using GWLF.

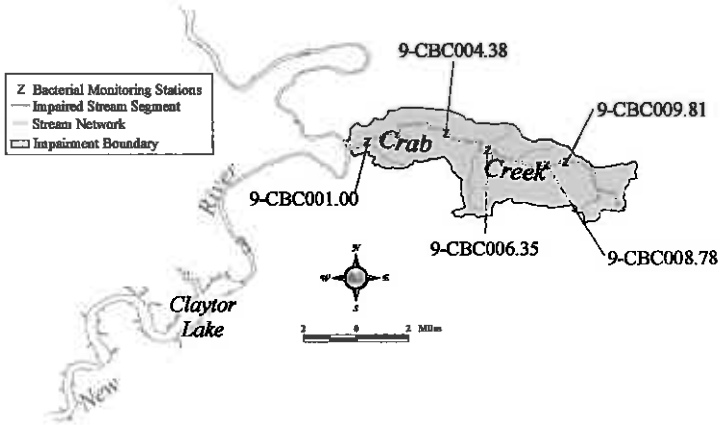
In Slate Creek, final reductions to sediment loads were: abandoned mine land (98%), disturbed forest (98%), residential (82%), pasture (83%), and an 85% reduction to streambank erosion. This scenario was chosen because it has similar reductions on different land uses with more emphasis on reducing stream bank erosion. In Levisa Fork, the selected scenario had similar reductions to sediment loads from row crop (72%), pasture (74%), residential (74%), developed land (71%), disturbed forest (74%), active gas wells (73%), abandoned mine land (AML, 74%), barren (74%), and a 74% reduction to streambank erosion.

Sediment plays a key role in the distribution of PCBs in the watershed and the PCB TMDL. Selected streambed sediments contain significant concentrations of PCBs from historical or current loadings or both. PCBs can be released to the water column by the re-suspension of streambed sediments, by the desorption of PCBs at the streambed-water column interface, and by the direct diffusion of PCBs from lower contaminated sediment layers.

Project Example 2

Project Title	Client	Period of Performance	Contractor Role
Sediment and Bacteria TMDLs in the New River Watershed – Including Crab Creek	VDEQ through New River-Highlands RC&DC: Craig Lott, P.O. Box 1105, Richmond, VA 23218, craig.lott@deq.virginia.gov, (804) 698-4240; Gary Boring, 325 E. Main St Suite E-2, Wytheville, VA 24382, gboringnrhrcd@centurylink.net, (276) 227-0536	200X - 2004	Prime

MapTech developed a general standard (benthic) and a fecal coliform TMDL for the Crab Creek watershed (New River Basin) in Montgomery County, Virginia because the watershed failed the Aquatic Life Use Standard and the Recreational Use Standard. Historical data were compiled and analyzed with statistical techniques to describe flow patterns, seasonal and long-term trends, and critical flow periods. A thorough assessment of all fecal coliform sources and their delivery mechanisms was performed. A water quality-sampling program was implemented to utilize Bacterial Source Tracking (BST) to identify source types, to determine the relative percentage contribution of each source type, and to determine the spatial and temporal distribution of sources for all impairments. These results were convincing evidence for stakeholders in the TMDL process, refined the calibration of the water quality component of HSPF, and improved the allocation of loads among sources. BST samples were analyzed for fecal coliform and *E. coli* in MapTech's Environmental Diagnostic Laboratory. Resolution of the Aquatic Life impairment involved a comprehensive evaluation of potential stressors to the benthic community. The results pointed to sediment as the Most Probable Stressor.



The USGS Hydrologic Simulation Program - Fortran (HSPF) water quality model was selected as the modeling framework for fecal coliform to simulate existing conditions and perform TMDL allocations. In establishing the existing and allocation conditions, seasonal variations in

hydrology, climatic conditions, and watershed activities were explicitly accounted for in the model. Due to the lack of continuous streamflow data for Crab Creek, the paired watershed approach, with additional refinement using instantaneous flow measurements, was used to calibrate the HSPF model. Through this approach, the HSPF model is calibrated using data from a hydrologically similar watershed, where continuous stream flow is available. The Upper Tinker Creek watershed was compared to the Crab Creek watershed and chosen as an appropriate watershed for a paired-watershed calibration

There are no existing in-stream criteria for sediment in Virginia; therefore, a reference watershed approach was used to define allowable TMDL loading rates in the Crab Creek watershed. This approach pairs two watersheds: one that is supportive of its designated use(s) and one whose streams are impaired. The Toms Creek watershed was selected as the TMDL reference for Crab Creek. The TMDL sediment load was defined as the modeled sediment load for existing conditions from the non-impaired Toms Creek watershed, area-adjusted to the Crab Creek watershed. In-stream erosion from stormwater as well as watershed impervious surface area and animal densities were factor inputs to the sediment model. The Generalized Watershed Loading Function (GWLF) model was used for comparative modeling for both Crab Creek and Toms Creek and to develop load reductions in the TMDL.

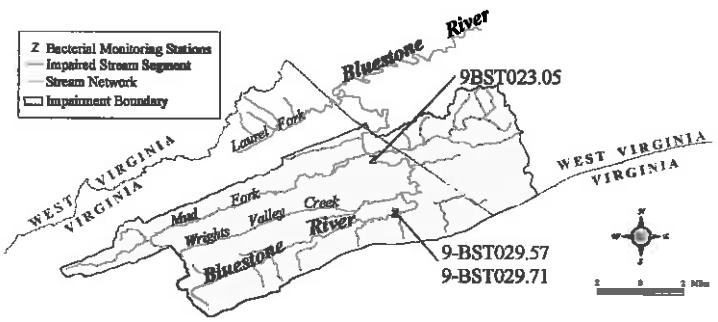
Project Example 3

Project Title	Client	Period of Performance	Contractor Role
Development of Sediment and Bacteria TMDLs for the Bluestone River Watershed	VDEQ through New River-Highlands RC&DC: Craig Lott, P.O. Box 1105, Richmond, VA 23218, craig.lott@deq.virginia.gov, (804) 698-4240; Gary Boring, 325 E. Main St Suite E-2, Wytheville, VA 24382, gboringnrhrcd@centurylink.net, (276) 227-0536	2004 - 2006	Prime

MapTech developed a fecal coliform and a general standard (benthic) TMDL for the Bluestone River watershed (New River Basin), located in Virginia's Tazewell County and West Virginia's Mercer County. Historical data were compiled and analyzed with statistical techniques to describe flow patterns, seasonal and long-term trends, and critical flow periods. A comprehensive assessment of all fecal coliform sources and their delivery mechanisms was performed. A water quality-sampling program was implemented to utilize Bacterial Source Tracking (BST) to identify source types, to determine the relative percentage contribution of each source type, and to determine the spatial and temporal distribution of sources for all impairments. Fecal coliform and *E. coli* were analyzed in MapTech's Environmental Diagnostic Laboratory via the BST protocol to determine the most probable source among livestock, humans, pets and wildlife. The benthic-impaired segment involved a comprehensive evaluation of potential stressors to the benthic community. The results indicated that sediment is the most probable stressor on the benthic community. Sediment arises, in this watershed, from urban runoff, construction activity and agricultural activity. Based on detailed analyses, sediment was the target pollutant used to address the benthic impairment in the Bluestone River.

The USGS Hydrologic Simulation Program - Fortran water quality model was selected as the modeling framework to simulate existing conditions and perform TMDL allocations. In establishing the existing and allocation conditions, seasonal variations in hydrology, climatic conditions, and watershed activities were explicitly accounted for in the model. In general, the process involved model parameterization, hydrology calibration/validation, water quality calibration/validation, sensitivity analysis, determining existing conditions (*i.e.*, determine the TMDL), and allocation of loads exceeding the stream assimilative capacity to different bacteria sources.

There are no in-stream criteria for sediment in Virginia; therefore, a reference watershed approach was used to define allowable TMDL loading rates in the Bluestone River watershed. In this approach a watershed supportive of its designated use and one whose streams are impaired are paired. The Dry River watershed was selected as the TMDL reference for Bluestone River watershed. The TMDL sediment load was defined as the modeled sediment load for existing conditions from the non-impaired Dry River watershed, area-adjusted to the Bluestone River watershed. In addition, based on Evans et al. (2003) and the Virginia Tech BSE Department, an "a factor" was developed as input to modeling of sediment to estimate stream bank erosion due to stormwater runoff. Thus the Generalized Watershed Loading Function (GWLF) model was used for comparative modeling for both Bluestone River and Dry River. GWLF is a continuous simulation spatially lumped model that operates on a daily time step for water balance calculations and monthly calculations for sediment and nutrients from daily water balance. The model simulates runoff based on the Soil Conservation Service's Curve Number method; erosion is calculated from a modification of the Universal Soil Loss Equation (USLE); and sediment estimates are calculated by applying a delivery ratio based on a function of watershed area.



Experience 5: Familiarity with TMDL Formats and Methods

MapTech has conducted TMDL studies in Virginia, Arkansas, Tennessee, and Georgia, across three EPA Regions (3, 4, 6), and in multi-jurisdictional projects. Subject pollutants range from toxic to conventional, in habitats spanning mountain streams and shellfish-supporting estuaries. Modeling expertise includes deep and broad expertise in HSPF and GWLF as well as versions of QUAL, PRISM, WASP and other software. The following project serves as a recent example of MapTech's ability to apply the appropriate methods, and to comply with the proper formats acceptable to stakeholders, States and the EPA.

Project Example 1

Project Title:	Client:	Period of Performance:	Contractor Role:
Benthic TMDL Development in the Upper Chickahominy River, VA	VDEQ: Craig Lott, P.O. Box 1105, Richmond, VA 23218, craig.lott@deq.virginia.gov, (804) 698-4240	2012 - 2013	Prime

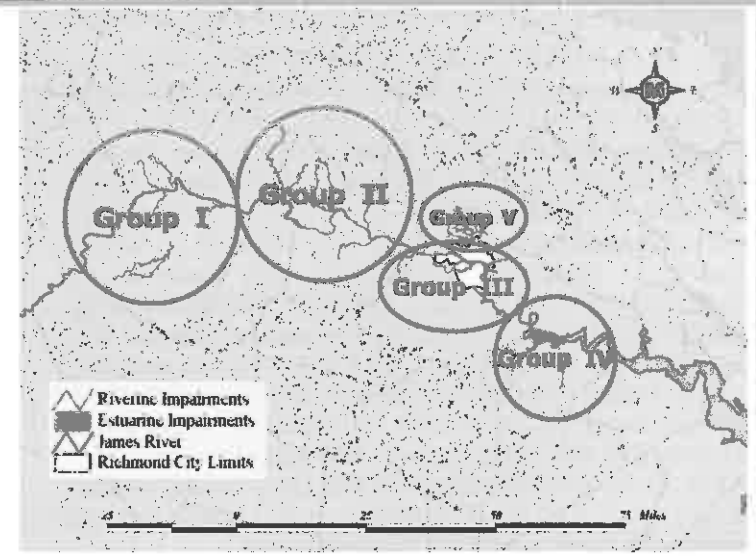
MapTech has completed the development of a general standard (benthic) TMDL for the Upper Chickahominy watershed (James River Basin), located in Hanover and Henrico Counties, Virginia. Historical data were compiled and analyzed with statistical techniques to describe flow patterns, seasonal and long-term trends, and critical flow periods. The general standard is a narrative standard, which protects aquatic life. Development of the general standard TMDL involved a comprehensive evaluation of potential stressors to the benthic community. The results indicated that sediment is the Most Probable Stressor. There are no existing in-stream criteria for sediment in Virginia; therefore, a reference watershed approach was used to define allowable TMDL loading rates in the Upper Chickahominy River watershed. This approach pairs two watersheds: one that is supportive of its designated use(s) and one whose streams are impaired. The Butterwood Creek watershed was selected as the TMDL reference for the Upper Chickahominy River watershed. The TMDL sediment load was defined as the modeled sediment load for existing conditions from the non-impaired Butterwood Creek watershed, area-adjusted to the Upper Chickahominy River watershed. The Generalized Watershed Loading Function (GWLF) model was used for comparative modeling for both Upper Chickahominy River and Butterwood Creek. The dominant land use in the Upper Chickahominy River watershed is residential. An important component of the allocation was reduction of stream bank erosion caused by high flow from impervious areas.

Experience 6: Complicated TMDLs (especially MS4s, CSOs)

MapTech has abundant experience with making public presentations and interacting with contentious stakeholders. The following project is an example involving the communication of complex water quality assessments and program reports to stakeholders with management decisions.

Project Example 1

Project Title:	Client:	Period of Performance:	Contractor Role:
TMDL Development for the James River and Tributaries near Richmond (Albemarle to Charles City Co.)	VDEQ: Craig Lott, P.O. Box 1105, Richmond, VA 23218, craig.lott@deq.virginia.gov, (804) 698-4240	02/2006 – 04/2010	Prime



In 2010, MapTech, Inc. completed a major Total Maximum Daily Load (TMDL) study of the Middle and Lower James River which flows through the City of Richmond to the Chesapeake Bay. The study area was multijurisdictional including portions of Chesterfield, Powhatan, Goochland, and Henrico Counties. It encompassed 37 impaired segments and **necessitated 37 TMDLs** (image shows TMDL Groups I-V). A number of the TMDL watersheds were the same scale as the Indian Creek watershed in Pennsylvania.

Portions of the freshwater Middle James and the tidal Lower James River were first listed for violations of the bacteria standard in 1996. Nonpoint sources of the bacteria included wildlife, grazing livestock, land application of manure and biosolids, urban/residential runoff, failed and malfunctioning septic systems, illicit cross-connections of residential wastes to the storm water collection system, leaking sewer lines, straight pipes, and non-permitted sewer overflows. Permitted sources included waste treatment facilities, domestic systems, Combined Sewer Overflows (CSOs), and Municipal Separate Storm Sewer Systems (MS4s). MS4 areas included portions of the City of Richmond, Henrico County, Chesterfield County and Virginia Department of Transportation drainages. Although all TMDLs generated through this project were thoroughly supported by the kind of literature search and data gathering expected in the Indian Creek Watershed, additional research was required on water quality factors and impacts of

CSOs and MS4s.

These TMDLs, described in the previous section, included a major Total Maximum Daily Load (TMDL) study of the Middle and Lower James River which flows through the City of Richmond to the Chesapeake Bay. The study area was complex by its multijurisdictional nature for it included portions of Chesterfield, Powhatan, Goochland, and Henrico Counties which are large urban areas that include Richmond, Virginia, with an involved citizenry. The water quality was complicated because the project encompassed 37 impaired segments necessitating 37 TMDLs (Groups I-V). The non-point bacterial sources covered a broad range from wildlife, grazing livestock, land application of manure and biosolids, urban/residential runoff, failed and malfunctioning septic systems, illicit cross-connections of residential wastes to the storm water collection system, leaking sewer lines, straight pipes, and non-permitted sewer overflows. Permitted sources were also highly varied including waste treatment facilities, domestic systems, Combined Sewer Overflows (CSOs), and Municipal Separate Storm Sewer Systems (MS4s). MS4 areas included portions of the City of Richmond, Henrico County, Chesterfield County and Virginia Department of Transportation drainages. Finally, the project required the employment of three hydrologic models to develop the TMDLs. HSPF simulated hydrology and bacterial loads in riverine segments for inputs to CE-QUAL-W2. CE-QUAL-W2 simulated the tidal James River segment flow and time-varying point and non point sources of bacteria. Finally, SWMM modeling was performed to mimic flows and bacterial loads from CSOs in the City of Richmond and thereby the inputs to the HSPF and CE-QUAL-W2 models. RIVPLUM6 was also used as necessary.

7. Consultant Qualification Questionnaire

WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION
AML CONSULTANT QUALIFICATION QUESTIONNAIRE Attachment "B"

PROJECT NAME	DATE (DAY, MONTH, YEAR)	FEIN
TMDL Development Hydrologic Group D, Monongahela R. & Hughes R. watersheds	02 October 2015	54-1717149

1. FIRM NAME	2. HOME OFFICE BUSINESS ADDRESS	3. FORMER FIRM NAME
MapTech, Inc.	3154 State St., Blacksburg, VA 24060	(same)

4. HOME OFFICE TELEPHONE	5. ESTABLISHED (YEAR)	6. TYPE OWNERSHIP	6a. WV REGISTERED DBE (Disadvantaged Business Enterprise)
(540) 961-7864 ext. 401	1992	X Individual Corporation Partnership Joint-Venture	YES X NO

7. PRIMARY AML DESIGN OFFICE: ADDRESS/ TELEPHONE/ PERSON IN CHARGE/ NO. AML DESIGN PERSONNEL EACH OFFICE
3154 State St , Blacksburg, VA / (540) 961-7864 / Phillip McClellan / 3

8. NAMES OF PRINCIPAL OFFICERS OR MEMBERS OF FIRM	8a. NAME, TITLE, & TELEPHONE NUMBER - OTHER PRINCIPALS
Phillip W. McClellan CEO (540) 961-7864 ext 401 James D. Kern, Ph.D., P.E., COO (540) 961-7864 ext 404	Christine Harrell CFO (540) 961-7864 ext 402

9. PERSONNEL BY DISCIPLINE

1 ADMINISTRATIVE	1 ECOLOGISTS	1 STAFF ENGINEERS	1 SOFTWARE ENGINEER	
— ARCHITECTS	— ECONOMISTS	— LANDSCAPE ARCHITECTS	2 ELECTRONICS SPECIALISTS	
1 **BIOLOGIST**	— ELECTRICAL ENGINEERS	— MECHANICAL ENGINEERS	— STRUCTURAL ENGINEERS	
— **CADD OPERATORS**	1 ENVIRONMENTALISTS	— **MINING ENGINEERS**	— **SURVEYORS**	
— CHEMICAL ENGINEERS	— ESTIMATORS	1 PHOTOGRAMMETRISTS	— TRAFFIC ENGINEERS	
— **CIVIL ENGINEERS**	— **GEOLOGISTS**	1 PLANNERS: URBAN/REGIONAL	— OTHER	
— CONSTRUCTION INSPECTORS	— HISTORIANS	— SANITARY ENGINEERS	2 AGRICULTURAL ENGINEERS	
— DESIGNERS	— HYDROLOGISTS	— SOILS ENGINEERS	1 GIS/CADD SPECIALIST	
— DRAFTSMEN		— SPECIFICATION WRITERS	12 TOTAL PERSONNELL	

TOTAL NUMBER OF WV REGISTERED PROFESSIONAL ENGINEERS IN PRIMARY OFFICE: 0*
***RPEs other than Civil and Mining must provide supporting documentation that qualifies them to supervise and perform this type of work.**

*... Our engineers have overseen and conducted more than 200 TMDL projects among multiple States completed and approved by USEPA. This includes multiple TMDLs for resource extraction (mining) for the Virginia Department of Mines, Minerals and Energy.

10. HAS THIS JOINT-VENTURE WORKED TOGETHER BEFORE? ☐ YES ☐ NO N/A

11. OUTSIDE KEY CONSULTANTS/SUB-CONSULTANTS ANTICIPATED TO BE USED. Attach "AML Consultant Qualification Questionnaire".		
NAME AND ADDRESS: None	SPECIALTY:	WORKED WITH BEFORE ____ Yes No
NAME AND ADDRESS:	SPECIALTY:	WORKED WITH BEFORE ____ Yes No
NAME AND ADDRESS:	SPECIALTY:	WORKED WITH BEFORE ____ Yes No
NAME AND ADDRESS:	SPECIALTY:	WORKED WITH BEFORE ____ Yes No
NAME AND ADDRESS:	SPECIALTY:	WORKED WITH BEFORE ____ Yes No
NAME AND ADDRESS:	SPECIALTY:	WORKED WITH BEFORE ____ Yes No
NAME AND ADDRESS:	SPECIALTY:	WORKED WITH BEFORE ____ Yes No
NAME AND ADDRESS:	SPECIALTY:	WORKED WITH BEFORE ____ Yes No
NAME AND ADDRESS:	SPECIALTY:	WORKED WITH BEFORE ____ Yes No

12. A. Is your firm's personnel experienced in Abandoned Mine Lands Remediation/Mine Reclamation Engineering?

X YES Description and Number of Projects: Landslide, Stream Restoration on AML (2 projects); and TMDLs for active Mine/AML mine lands (~ 12 projects)

NO

B. Is your firm experienced in Soil Analysis?

X YES Description and Number of Projects: Soil Analysis for Wetlands (3 projects)

NO

C. Is your firm experienced in hydrology and hydraulics?

X YES Description and Number of Projects: Evaluated and Modeled the hydrology for more than 200 TMDL watersheds.

NO

D. Does your firm produce its own Aerial Photography and Develop Contour Mapping?

X YES Description and Number of Projects: No photography; Contour mapping for individual projects (3 projects)

NO

E. Is your firm experienced in domestic waterline design? (Include any experience your firm has in evaluation of aquifer degradation as a result of mining.)

YES Description and Number of Projects:

X NO

F. Is your firm experienced in Acid Mine Drainage Evaluation and Abatement Design?

X YES Description and Number of Projects: Research project involving Best Management Practices in AML (1 project for Office of Surface Mines)

NO

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES RESPONSIBLE FOR AML PROJECT DESIGN (Furnish complete data but keep to essentials)

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Kern, James D., Ph.D., P.E.	5	10	0

Brief Explanation of Responsibilities

Design and conduct research projects to 1) monitor AML stream chemistry & flow, 2) interpret source of chemistry from surface or groundwater, 3) develop and evaluate Best Management Practices to ameliorate water quality impacts from active extraction and AML landforms, and 4) statistical analyses.

Design and oversee multiple TMDL projects and Implementation Plans for stream impairments due to active or historical resource extraction;

Design and oversee construction of landslide stabilization and stream restorations.

EDUCATION (Degree, Year, Specialization)

Ph.D., 1997, Biological Systems Engineering; M.S., 1994, Agricultural Engineering; B.S., 1991, Agricultural Engineering;

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
yes	P.E., 2009, Virginia

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES RESPONSIBLE FOR AML PROJECT DESIGN (Furnish complete data but keep to essentials)

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
McClellan, Phillip W.	5	10	0

Brief Explanation of Responsibilities

Project management and oversight of projects to 1) monitor AML stream chemistry & flow, 2) interpret source of chemistry from surface or groundwater, 3) develop and evaluate Best Management Practices to ameliorate water quality impacts from active resource extraction and AML landforms.

Oversee and participate in design of multiple TMDL projects and Implementation Plans for stream impairments due to active or historical resource extraction;

Oversee and participate in design of construction of landslide stabilization and stream restorations.

EDUCATION (Degree, Year, Specialization)

M.S. (abt), 1983, Agricultural Engineering
B.S., 1979, Agricultural Engineering

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
yes	E.I.T., 1979. Virginia

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES **RESPONSIBLE FOR AML PROJECT DESIGN** (Furnish complete data but keep to essentials)			
NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Scanlan, Michael J., Ph.D., M.S.	3	5	0
Brief Explanation of Responsibilities Technical writer, environmental science, data assessment and statistical analysis of stream chemistry and flow, for TMDL projects involving AML landforms. Project manager for Pounding Mill Branch Drainage Landslide; also prepared design drawings and construction specifications. Project manager for Big Prater Stream Restoration; also conducted Wetlands Delineation (soils), and prepared construction specifications.			
EDUCATION (Degree, Year, Specialization) Ph.D., 1976, Ecology; M.S., 1971, Botany			
MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS Virginia Botanical Association		REGISTRATION (Type, Year, State)	

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES **RESPONSIBLE FOR AML PROJECT DESIGN** (Furnish complete data but keep to essentials)			
NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Brief Explanation of Responsibilities			
EDUCATION (Degree, Year, Specialization)			
MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS		REGISTRATION (Type, Year, State)	

14. PROVIDE A LIST OF SOFTWARE AND EQUIPMENT AVAILABLE IN THE PRIMARY OFFICE WHICH WILL BE USED TO COMPLETE AML DESIGN SERVICES	
High-performance PCs, Windows OS	
Modern servers, Linux OS	
Workstations networked to office network	
High speed internet service & email	
Digitizer & large format color plotter	
Total Station and various surveying equipment	
Word processing:	Microsoft Word, Publisher, OpenOffice for Windows & Linux
Spreadsheeting:	Microsoft Excel, Corel Quattro Pro, OpenOffice Calc
Web/Internet Development:	Dreamweaver, Internet Information Server, SMTP Server, Windows Media Server, LAMP Stack: Linux, Apachie, MySQL, and PhP
Internet:	Mozilla Firefox, Microsoft Internet Explorer
Statistics:	MINITAB, SAS, JMP, R, MathCad
Database management:	Access, SQL Server, MySQL, Dbase, DOS
Programming Languages & utilities:	FORTRAN, DOS, FORTRAN Powerstation, Visual Basic, Visual C++
GIS and CAD:	ESRI ArcGIS, ArcView GIS, TGR2shp, Spatial Analysis Tools, PC-VirGIS, HALO Viewer, BASINS, IntelliCAD, TurboCAD
Graphics:	Photoshop, Adobe PhotoDeluxe, Pagemeker, Adobe Pro, Acrobat, Catalog, Distiller, Quick Draw 3D Viewer, IPhoto Express, PowerPoint, OpenOffice Impress, Corel Presentation
Modeling Software used in MapTech Watershed/Water Quality Studies:	
	HSPF (all versions) & support models PEST, ANNIE, IOWDM
	ANSWERS2000, SWMM, MDAS, LSPC, BASINS/NPSM
	GWLF (DOS and ArcView interface)
	CE-QUAL-W2, WASP, DYNHYD, PRZM, MINTEQ2
	Biometric Model Framework (identifying stressors and allocation analysis for benthic community)
	FLUX, PROFILE, BATHTUB, PSRM-QUAL, EUTROMOD
	GLEAMS, RUSLE, USLE, SCS Runoff Curve Number, RUSLE/USLE Based Annual Load - sediment & nutrients
	TR-55, EFDC, FESHM, KINERSO, WARMF, AGNPS
	Mass Balance Models
	HEC-RAS
	Statistical Models (logistic regression, multi-regression, etc.)

15. CURRENT ACTIVITIES ON WHICH YOUR FIRM IS THE DESIGNATED ENGINEER OF RECORD

PROJECT NAME, TYPE AND LOCATION	NAME AND ADDRESS OF OWNER	NATURE OF YOUR FIRM'S RESPONSIBILITY	ESTIMATED CONSTRUCTION COST	PERCENT COMPLETE
* Rainbow Forest Lake Dam Renovation, * Dam upgrade, * Botetourt Co., Virginia	Rainbow Forest Recreation Assn., 142 Hunters Trail, Troutville, VA 24175	Design of renovation, Construction bid advert. & review, and Construction oversight	$ 700,000	90%
* Pounding Mill Br. Drainage II Engineering, * Landslide stabilization, * Buchanan Co., Virginia	* VA Department of Mines, Minerals & Energy / AML * 3405 Mountain Empire Road, big Stone Gap, VA 24219	Design a solution to an unstable slope resulting from AML activities.	$ 40,080	90%
* Wolf Cr. TMDL * TMDL development plan * Giles, Bland, Tazewell Co., Virginia	* VA Department of Environmental Quality * 629 East Main St., Richmond, VA 23219	Develop TMDL-I.P. for 11 bacterial-impaired waters, conduct stakeholder meetings, provide tech. expertise & report.	$ 50,000	95%
* Clinch River TMDL-IPs in Tenn./Big Sandy R. Basin * TMDL Implementation Plan *Tazewell Co., Virginia	* VA Department of Environmental Quality * 629 East Main St., Richmond, VA 23219	Develop TMDL-I.P. for 11 bacterial-impaired waters, conduct stakeholder meetings, provide tech. expertise & report.	$ 45,000	5%
* Dam Inundation Study & Emergency Action Plan * Water resource engineering * Tazewell Co., Virginia	* Town of Tazewell * 201 N. Central Avenue, Tazewell, VA 24651	Conduct hydrologic analysis & modeling for High Hazard Dam develop EAP, and conduct training exercises.	$ 70,000	15%

TOTAL NUMBER OF PROJECTS:

TOTAL ESTIMATED CONSTRUCTION COSTS: $ 905,080

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 CONSTRUCTION COST	
				ENTIRE PROJECT	YOUR FIRMS RESPONSIBILITY
* Sediment Load Allocations in Indian Creek, PA * Sediment TMDL/Aq.Life * Southern PA	Redo TMDL that was rejected by EPA; technical expertise, modeling, stressor analysis, final report.	* US EPA * Washington, DC	June 2016	$ 52,000	$ 38,000
* Continuous Monitoring Data Sharing Strategy * Technical development * US-wide	Subject Expert in researching & develop internet strategy for collecting & providing data to users.	* US EPA * Washington, DC	October 2015	$ 70,000	$ 34,000

17. COMPLETED WORK WITHIN LAST 5 YEARS ON WHICH YOUR FIRM WAS THE DESIGNATED ENGINEER OF RECORD				
PROJECT NAME, TYPE AND LOCATION	NAME AND ADDRESS OF OWNER	ESTIMATED CONSTRUCTION COST	YEAR	CONSTRUCTED (YES OR NO)
* Mud Lick Br. of Big Prater Cr. Stream Restoration * Stream restoration * Buchanan Co., Virginia	* VA Department of Mines, Minerals & Energy / AML * 3405 Mountain Empire Road, big Stone Gap, VA 24219	$ 220,000	2012	YES
* Izard Streambank Stabilization & Restoration * Stream restoration *Floyd Co., Virginia	* Frank Izard * Floyd Co., VA	$ 15,000	2012	YES
* Kohl Stream Restoration * Stream restoration * Floyd Co., Virginia	* New River Highlands RC&D *325 E. Main St. Suite E-2 Wytheville, VA 24382	$ 12,000	2012	YES
* Crooked Cr. Channel Restoration * Natural stream design & construc. * Carroll Co., Virginia	* New River Highlands RC&D *325 E. Main St. Suite E-2 Wytheville, VA 24382	$ 50,000	2010	YES
* Powell R. TMDL * TMDL Project * Tazewell Co., VA	* New River Highlands RC&D *325 E. Main St. Suite E-2 Wytheville, VA 24382	$ 45,000	2011	YES (=> completed)
* Phased TMDLs for Levisa Fk, Bull Cr., Powell R. & S.Fk. Pound River * TMDLs * Southwestern Virginia	* Virginia DEQ * P.O. Box 1009, Richmond, VA23240	$ 115,000	2010	YES (=> completed)
* Benthic TMDL in the Upper Chickahominy R., VA * Aquatic Life TMDL for sediment * Hanover & Henrico Co., Virginia	* Virginia DEQ * P.O. Box 1009, Richmond, VA23240	$ 60,000	2013	YES (=> completed)
TMDL for the James R. & Tribs. * Multiple TMDLs for mult. pollutants * Central Virginia	* Virginia DEQ * P.O. Box 1009, Richmond, VA23240	$ 250,000	2010	YES (=> completed)

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 OWNER	ESTIMATED CONSTRUCTION COST OF YOUR FIRM'S PORTION	YEAR	CONSTRUCTED (YES OR NO)	FIRM ASSOCIATED WITH

19. Use this space to provide any additional information or description of resources supporting your firm's qualifications to perform work for the West Virginia Abandoned Mine Lands Program.

20. The foregoing is a statement of facts.

Signature: Phillip W. McClellan Title: President Date: October 2, 2015

Printed Name: Phillip W. McClellan

8. Vendor Preference

Rev 04/14

State of West Virginia

VENDOR PREFERENCE CERTIFICATE

Certification and application* is hereby made for Preference in accordance with ***West Virginia Code***, §5A-3-37. (Does not apply to construction contracts). ***West Virginia Code***, §5A-3-37, provides an opportunity for qualifying vendors to request (at the time of bid) preference for their residency status. Such preference is an evaluation method only and will be applied only to the cost bid in accordance with the ***West Virginia Code***. This certificate for application is to be used to request such preference. The Purchasing Division will make the determination of the Vendor Preference, if applicable.

1. **Application is made for 2.5% vendor preference for the reason checked:**
___ Bidder is an individual resident vendor and has resided continuously in West Virginia for four (4) years immediately preceding the date of this certification; **or,**
___ Bidder is a partnership, association or corporation resident vendor and has maintained its headquarters or principal place of business continuously in West Virginia for four (4) years immediately preceding the date of this certification; or 80% of the ownership interest of Bidder is held by another individual, partnership, association or corporation resident vendor who has maintained its headquarters or principal place of business continuously in West Virginia for four (4) years immediately preceding the date of this certification; **or,**
___ Bidder is a nonresident vendor which has an affiliate or subsidiary which employs a minimum of one hundred state residents and which has maintained its headquarters or principal place of business within West Virginia continuously for the four (4) years immediately preceding the date of this certification; **or,**

2. **Application is made for 2.5% vendor preference for the reason checked:**
___ Bidder is a resident vendor who certifies that, during the life of the contract, on average at least 75% of the employees working on the project being bid are residents of West Virginia who have resided in the state continuously for the two years immediately preceding submission of this bid; **or,**

3. **Application is made for 2.5% vendor preference for the reason checked:**
___ Bidder is a nonresident vendor employing a minimum of one hundred state residents or is a nonresident vendor with an affiliate or subsidiary which maintains its headquarters or principal place of business within West Virginia employing a minimum of one hundred state residents who certifies that, during the life of the contract, on average at least 75% of the employees or Bidder's affiliate's or subsidiary's employees are residents of West Virginia who have resided in the state continuously for the two years immediately preceding submission of this bid; **or,**

4. **Application is made for 5% vendor preference for the reason checked:**
___ Bidder meets either the requirement of both subdivisions (1) and (2) or subdivision (1) and (3) as stated above; **or,**

5. **Application is made for 3.5% vendor preference who is a veteran for the reason checked:**
___ Bidder is an individual resident vendor who is a veteran of the United States armed forces, the reserves or the National Guard and has resided in West Virginia continuously for the four years immediately preceding the date on which the bid is submitted; **or,**

6. **Application is made for 3.5% vendor preference who is a veteran for the reason checked:**
___ Bidder is a resident vendor who is a veteran of the United States armed forces, the reserves or the National Guard, if, for purposes of producing or distributing the commodities or completing the project which is the subject of the vendor's bid and continuously over the entire term of the project, on average at least seventy-five percent of the vendor's employees are residents of West Virginia who have resided in the state continuously for the two immediately preceding years.

7. **Application is made for preference as a non-resident small, women- and minority-owned business, in accordance with *West Virginia Code* §5A-3-59 and *West Virginia Code of State Rules*.**
✓ Bidder has been or expects to be approved prior to contract award by the Purchasing Division as a certified small, women- and minority-owned business.

Bidder understands if the Secretary of Revenue determines that a Bidder receiving preference has failed to continue to meet the requirements for such preference, the Secretary may order the Director of Purchasing to: (a) reject the bid; or (b) assess a penalty against such Bidder in an amount not to exceed 5% of the bid amount and that such penalty will be paid to the contracting agency or deducted from any unpaid balance on the contract or purchase order.

By submission of this certificate, Bidder agrees to disclose any reasonably requested information to the Purchasing Division and authorizes the Department of Revenue to disclose to the Director of Purchasing appropriate information verifying that Bidder has paid the required business taxes, provided that such information does not contain the amounts of taxes paid nor any other information deemed by the Tax Commissioner to be confidential.

Under penalty of law for false swearing (West Virginia Code, §61-5-3), Bidder hereby certifies that this certificate is true and accurate in all respects; and that if a contract is issued to Bidder and if anything contained within this certificate changes during the term of the contract, Bidder will notify the Purchasing Division in writing immediately.

Bidder: MapTech, Inc. Signed: 

Date: October 2, 2015 Title: President

9. Addendum Acknowledgement Form

ADDENDUM ACKNOWLEDGEMENT FORM
SOLICITATION NO.:

Instructions: Please acknowledge receipt of all addenda issued with this solicitation by completing this addendum acknowledgment form. Check the box next to each addendum received and sign below. Failure to acknowledge addenda may result in bid disqualification.

Acknowledgment: I hereby acknowledge receipt of the following addenda and have made the necessary revisions to my proposal, plans and/or specification, etc.

Addendum Numbers Received:
(Check the box next to each addendum received)

[X]	Addendum No. 1	[ ]	Addendum No. 6
[X]	Addendum No. 2	[ ]	Addendum No. 7
[ ]	Addendum No. 3	[ ]	Addendum No. 8
[ ]	Addendum No. 4	[ ]	Addendum No. 9
[ ]	Addendum No. 5	[ ]	Addendum No. 10

I understand that failure to confirm the receipt of addenda may be cause for rejection of this bid. I further understand that any verbal representation made or assumed to be made during any oral discussion held between Vendor's representatives and any state personnel is not binding. Only the information issued in writing and added to the specifications by an official addendum is binding.

MapTech, Inc.
Company

Authorized Signature

October 2, 2015
Date

NOTE: This addendum acknowledgement should be submitted with the bid to expedite document processing.

Revised 08/01/2015

10. Certification and Signature Page

CERTIFICATIONAND SIGNATURE PAGE

By signing below, or submitting documentation through wvOASIS, I certify that I have reviewed this Solicitation in its entirety; understand the requirements, terms and conditions, and other information contained herein; that I am submitting this bid, offer or proposal for review and consideration; that I am authorized by the vendor to execute and submit this bid, offer, or proposal, or any documents related thereto on vendor's behalf; that I am authorized to bind the vendor in a contractual relationship; and that to the best of my knowledge, the vendor has properly registered with any State agency that may require registration.

MapTech, Inc.

(Company)

Phillip W. McClellan, President

(Authorized Signature) (Representative Name, Title)

(540) 961-7864 ext 401 / (540) 961-6392 / October 2, 2015

(Phone Number) (Fax Number) (Date)

Revised 08/01/2015

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