

## II. COMPANY PROFILE

Tetra Tech, Inc. (NASDAQ: TTEK) is a leading provider of specialized management consulting and technical services in three principal business areas: resource management, infrastructure and communications. Our management consulting services are complemented by our technical services, including research and development, applied science, engineering and architectural design, construction management, and operations and maintenance. We provide these services to a diverse base of public and private sector clients. Founded in 1966, we have over 14,000 employees located in more than 330 offices worldwide.

### **III. EEO RESPONSIBILITIES [41 CFR 60-2.17 (a)]**

In most instances, department managers and supervisors will be responsible for the selection of individuals to fill approved vacancies. However, the selection process requires that managers and supervisors be aware of and take into consideration the EEO Policy and AAP goals. Tetra Tech's EEO Policy and AAP will be implemented and administered as outlined below.

#### **A. EEO Officer**

Dan Batrack, CEO and COO, has assigned the overall responsibility for Equal Employment Opportunity and Affirmative Action Program compliance to Richard Lemmon, Vice President, who is the Equal Employment Opportunity Officer for Tetra Tech. As EEO Officer, Richard Lemmon is specifically responsible for the implementation and monitoring of the EEO Policy and the Affirmative Action Program. Richard Lemmon's duties and responsibilities include as a minimum, but are not limited to the following:

1. Ensuring that an Affirmative Action Program is adopted and effectively implemented each year, developing policy statements, internal and external communication techniques.
2. Designating or assisting in the selection of a facility EEO Coordinator.
3. Assisting in the identification of focus areas, suggesting corrective action, and the establishment of goals and objectives.
4. Designing and implementing audit and reporting systems that will measure progress to goals and objectives.
5. Conducting meetings with managers, supervisors, and employees to ensure that Tetra Tech's EEO Policy and AAP objectives are understood and good-faith efforts are being made to achieve results.
6. Reviewing Tetra Tech's AAP progress toward goals and objectives with senior management.
7. Ensuring that the work performance of management employees is evaluated, in part, on the basis of their affirmative action efforts and results.
8. Providing guidance to managers and supervisors to prevent racial, ethnic, religious and sexual harassment of employees.
9. Serving as a liaison between Tetra Tech and minority/female organizations.
10. Keep management informed of developments in EEO/AA laws and requirements.

#### **B. EEO Coordinator**

Janet Brunner, Sr. Human Resources Manager, is the Equal Employment Opportunity Coordinator for the AAP year. Janet Brunner, will be responsible for assisting the EEO Officer, as requested, in the performance of any of the duties stated above, developing or obtaining assistance in developing, implementing, and monitoring of the AAP. The EEO Coordinator has been given the full support of senior management and is assured the necessary support to execute all AAP responsibilities.

The EEO Coordinator's responsibilities include, but are not limited to the following:

1. Having an updated AAP in place at the beginning of each plan year.
2. Assisting management in the identification of focus areas and the development of corrective action steps.
3. Submitting an AAP Progress Report to Human Resources and to appropriate facility management which details progress towards AAP goals and includes the applicant flow, new hire, transfer, promotion and termination logs.
4. Serving as liaison between employees and management at this facility.
5. Serving as liaison between this facility and organizations concerned with employment opportunities for minorities and females.

6. Ensuring that minority and female employees are encouraged and afforded a meaningful opportunity to participate in all present and future educational, training, recreational and social activities sponsored by Tetra Tech, and that all facilities, such as lockers and restrooms, are comparable for both sexes.
7. Reviewing all technical forms (i.e., application forms and posters) for compliance with federal regulations.
8. Monitoring the effectiveness of the EEO Policy, the AAP, training programs, and hiring and promotional patterns to determine if minorities and females are given a full opportunity for employment and advancement.

#### C. Human Resources Department

As the Equal Employment Opportunity Coordinator for this facility, Janet Brunner has been given the authority and responsibility for implementing and monitoring the EEO and AAP programs for this facility. Janet Brunner Sr. Human Resources Manager will be assisted by and receive primary staff support from individuals assigned to the Human Resources Department. The Human Resources Department, will assume the day-to-day responsibility for the EEO and AAP programs. The responsibilities of the Human Resources Department include, but are not limited to the following:

1. Developing policy statements, Affirmative Action Programs, and internal and external communication techniques.
2. Assisting management in the identification of focus areas and arriving at appropriate solutions.
3. Designing and implementing audit and reporting systems that will:
  - a. Measure the effectiveness of Tetra Tech's EEO and affirmative action programs.
  - b. Indicate the need for remedial action.
  - c. Determine the degree to which Tetra Tech's goals and objectives have been attained.
4. Serving as liaison or assisting facility management in meetings between Tetra Tech and enforcement agencies.
5. Serving as liaison or assisting local and facility management in meetings between Tetra Tech and organizations concerned with employment opportunities for minorities and females.
6. Keeping management informed of the latest developments and requirements pertaining to EEO and affirmative action.
7. Assisting in the development of reports to management on the status of Tetra Tech's EEO Policy and Affirmative Action Program.
8. Assisting any present or future field facilities in preparing and implementing effective Affirmative Action Plans through the issuance of guidelines and appropriate training.
9. Coordinating and participating in compliance reviews by the Office of Federal Contract Compliance Programs, as appropriate.
10. Investigating all formal charges of discrimination at Tetra Tech's facilities, in addition to participating with this facility's senior management representative in conciliation negotiations with government agencies, as necessary.

## **IV. IDENTIFICATION OF POTENTIAL FOCUS AREAS**

### **[41 CFR 60-2.17 (b)]**

#### **A. WORKFORCE**

The workforce is evaluated by department and job group to determine if minorities and women are fully utilized. An analysis is performed by department to ensure that minority and female representation is at an acceptable range as compared to the workforce.

#### **B. PERSONNEL ACTIVITY**

Personnel activity including applicant flow, hires, terminations, and promotions are analyzed to determine if there are any problem areas. All employees are treated equally and have an opportunity to advance. Efforts are made to identify qualified minority, females, disabled and veteran employees for promotion. The criteria for both transfers and promotions are based objectively on skills, qualifications, experience, education and the employee's work record, as appropriate. Transfer and promotion practices currently in effect do not hamper the upward mobility of qualified female and minority employees.

#### **C. COMPENSATION**

Compensation analyses are performed to ensure that there are no gender or ethnic pay disparities. An analysis is performed on each job title comparing minorities to non-minorities and women to men. If any inequalities exist, a thorough analysis is conducted to correct or explain the difference. This analysis may include a review of the employees' length of service, years of experience, performance evaluations, prior related experience, education, special expertise, or the department or unit where the employees work.

#### **D. SELECTION**

The following selection procedures are followed:

1. Job descriptions list the minimum requirements for a particular job and are accurate in relating to actual job functions.
2. No written employment tests are currently being used.
3. The application and interview process has been reviewed and found to be free of bias and does not work to the disadvantage of minority or female applicants.
4. All job applications are retained in the active file for a minimum of at least two years.
5. A detailed record of all data relevant to recruitment and other personnel decisions which involved Affirmative Action candidates or employees is kept by the EEO Coordinator.
6. When an accommodation is made to hire an individual with a disability, a description of the accommodation is recorded in the personnel file.
7. All recruitment sources are notified annually of the EEO policy and Tetra Tech's desire to hire women and members of minority groups.

## E. OTHER AREAS OF FOCUS

### Facility & Company Sponsored Activities

Facility and Company sponsored activities are all administered on a non-discriminatory basis.

### Public Transportation

Public transportation is available to this facility from surrounding metropolitan areas. Schedules are such that employees can use such transportation both before and after working hours.

### Housing

Integrated housing is available to all employees in the area surrounding this facility. Both privately owned homes and commercial rental units are within the immediate area and within commuting distance.

### Physical Facilities

This location does not maintain, provide or permit any segregated facilities

### Seniority

Formal seniority lines or lists are not maintained. Whenever seniority is used or considered (i.e. vacation accrual, benefit accrual), sex is not a consideration.

### Training Programs

While some limited training is provided, employees are encouraged to pursue additional education and training through external sources. On occasion, employees are provided an opportunity or are scheduled to attend relevant in-house or external seminars and training. All training, whether internal or external, is encouraged by Tetra Tech in a non-discriminatory manner.

### Technical Phases of Compliance

1. All appropriate bulletin boards are posted with applicable equal employment opportunity literature and regulations.
2. All subcontractors are notified of their obligations under Executive Order No. 11246 as amended, as well as, Revised Order No. 4.
3. Purchase order forms advise vendors and subcontractors that Tetra Tech is a government contractor and of their obligation to practice EEO and affirmative action.

## **V. ACTION ORIENTED PROGRAMS**

### **[41 CFR 60-2.17 (c)]**

All personnel involved in recruiting, selection, discipline and related processes will receive instruction on an on going basis, regarding Tetra Tech's affirmative action objectives, equal employment opportunity laws, regulations, court decisions, and appropriate job-related management practices.

#### **A. Job Descriptions, Specifications and Requirements**

Job descriptions list the minimum requirements for a particular job and are accurate in relating to actual job functions. Tetra Tech will continue to review and revise, when appropriate, employee position titles, qualifications, job specifications and wage/salary rates to assure that they do not have qualifications or other requirements that would tend to screen out or disproportionately or adversely impact upon minorities or females.

Tetra Tech has delegated to its department managers the final decision on hiring, as stated in the section on EEO responsibilities. Yearly reviews will continue to be performed to ensure the elimination of any impediment to full implementation of the EEO Policy and the AAP. The Human Resources Department staff will monitor the attitudes of department management for any adverse attitudes toward EEO and affirmative action, and watch for abnormal rates of rejection for minorities and females.

The Human Resources Staff will be assigned to:

1. Conduct an analysis of position requirements and/or descriptions to ensure that they accurately reflect position functions and are consistent for the same position from one department to another.
2. Evaluate new or modified worker specifications for each job classification by department, using job performance criteria. Specifications will be consistent for the same job classification in all locations and free from bias with regard to race, color, age, religion, sex, and national origin. If any requirements screen out a disproportionate number of minorities or females, these requirements will be carefully evaluated with respect to their relationship to actual job performance and business necessity.
3. Make available approved position descriptions, whether such descriptions have been formalized in writing or not, and worker specifications to all members of management involved in the recruiting, screening, selection and disciplinary processes; and, distribute appropriate copies to recruitment sources.

#### **B. Recruitment Practices**

To enhance the likelihood of recruiting minority and female employees, Tetra Tech will contact appropriate State agencies and solicit names from management of appropriate minority and female groups, associations and institutions which can refer qualified applicants for positions in job groups which have an underutilization of minorities or females. Additionally, each qualified applicant is identified by: name, ethnicity, gender, veteran and disabled status, positions applied for, recruitment source, referral source, and final disposition.

The Human Resources staff will be assigned to ensure the following types of recruitment activities:

1. Include the phrase "Equal Employment Opportunity" (EEO) and/or "Affirmative Action" employer (EEO/AA) in all printed employment advertisements.
2. Place appropriate job opportunities in minority and female publications or minority and female Internet web sites.
3. Disseminate information on job opportunities and Tetra Tech's affirmative action objectives to organizations representing minorities and females, and employment development agencies.
4. Actively encourage minority and female employees to refer applicants.
5. Send minority and female employees to participate in "Career Days," Job Fairs and related activities in their communities, when appropriate.
6. Recruit, when appropriate, at secondary schools, junior colleges and colleges with predominantly minority or female enrollments.
7. Ensure that referral agencies that are used, if any, are referring minorities and females in a nondiscriminatory manner.

### **C. Internal Postings**

Current job openings are posted internally in conspicuous areas throughout the facilities where employees congregate. Job postings are updated as positions become available or are filled. This formal "job posting" procedure is utilized to make employees aware of vacancies, and as a means of promoting job opportunity and mobility of current employees through interdepartmental transfers. The method of posting assures fair and equal treatment of all covered employees consistent with affirmative action policies. Evaluation of employees from transfer or promotion is based solely on knowledge, skills, experience, and ability to perform the duties as required by the job.

### **D. Selection Practices**

To assure that no discriminatory practices have entered the selection system, the Human Resources Department will monitor the selection decisions for all job titles in underutilized job groups. As an example, if a vacancy exists in an area identified as being underutilized, it will be the selecting manager's or supervisor's responsibility to provide the Human Resources Department with reasons why qualified minority and female applicants were considered but not selected.

The Human Resources Staff will continue to ensure that the Tetra Tech's selection process is job related. These responsibilities will include:

1. A review of Tetra Tech's job application and other pre-employment forms to ensure that inquiries are job related.
2. Periodic evaluation of the selection policy to ensure that it is free from bias and does not hinder Tetra Tech's ability to attain its affirmative action goals.
3. Periodically evaluate practices to ensure that they are job related and necessary.
4. Train personnel interviewers on proper interview techniques, appropriate inquiries, documentation and Tetra Tech's affirmative action objectives.

## **E. Promotional and Training Practices**

Staff will continue to take the following types of action to prepare minorities and females for promotion, and to assist employees in advancing to jobs offering a higher level of responsibility, greater degree of challenge and further opportunity for advancement:

1. When an underutilization exists, advise managers and supervisors of approved vacancies, with the intention of identifying potential minority and female candidates.
2. Make available career counseling to assist employees in identifying promotional opportunities, training and educational programs to enhance promotability and opportunities for job rotation or transfer.
3. When appropriate, offer remedial education, skills training, and work-study programs to assist employees in meeting performance standards and preparing for employment or advancement.
4. Administer an employee performance evaluation program, which is designed to assist employees in meeting performance standards, in a non-discriminatory manner.
5. Evaluate requirements for promotion on job-related criteria and ensure that minorities and females are not required to possess higher qualifications than those of others.
6. When an underutilization exists, require supervisory personnel to explain promotion selection decisions when qualified minority or female employees are among the candidates rejected for advancement opportunities.

## **F. Management and Disciplinary Practices**

In order to increase and/or maintain the representation of minority and female employees throughout the work force, all department heads will be held accountable for monitoring and evaluating their hiring, promotions, transfer and termination practices.

Supervisors and department heads will be responsible for identifying and helping to develop promotion and transfer opportunities for minority and female employees in their departments whenever and wherever an underutilization is identified. In addition, current eligible employees, as well as applicants, will be informed and encouraged to participate in training and educational assistance programs that may be available at or through Tetra Tech, and in the community.

The Human Resources Staff will continue to take the following actions to assist supervisors in meeting their Affirmative Action Program responsibilities:

1. Develop and periodically review forms and management practices such as interviews, employee evaluations, counseling, training and discipline.
2. Offer training to management regarding Tetra Tech's Affirmative Action Program objectives and job-related personnel practices.
3. Monitor disciplinary action to ensure that minorities and females are not being disciplined in disproportionate numbers.



## **G. Benefits and Rules**

Tetra Tech regularly analyzes the wage and benefits program to ensure that no discriminatory practices exist. Wage schedules are not related to or based on the gender or race of employees, but are based on established market labor rates for each classification or specialty.

The Human Resources Staff will be assigned to take the following actions to ensure that Tetra Tech's facilities are desegregated and its benefits programs and rules are nondiscriminatory:

1. Review Tetra Tech's employee benefits plans, coverage and administration procedures to ensure that they do not inadvertently discriminate illegally because of race, color, religion, sex, national origin or age.
2. Review Tetra Tech's work rules to ensure that they do not inadvertently discriminate illegally because of race, color, religion, sex, national origin or age.

## **H. Management Training**

Tetra Tech, Inc. is committed to providing educational training to all the management to ensure that personnel actions and all employment decisions are made in a manner which will further the principle of equal employment opportunity. Tetra Tech, Inc. is committed to assuring that our supervisors and employees are familiar with proper procedures, policies, and practices on affirmative action and harassment training.

## VI. INTERNAL AUDIT AND REPORTING SYSTEM [41 CFR 60-2.17 (d)]

A major component of the Affirmative Action Plan is an assessment of the effectiveness of efforts undertaken to achieve goals and objectives. This assessment requires complex record-keeping systems for collecting information about applicants and about the numerous personnel transactions affecting Tetra Tech employees. To meet this goal, an audit and reporting system has been designed which:

1. Assists in measuring the effectiveness of the EEO Policy and the Affirmative Action Program.
2. Indicates those areas where remedial action is needed.
3. Determines the degree to which location goals and objectives have been achieved.
4. Monitors the number of qualified applicants, new hires, promotions, transfers and terminations by race and sex.

This information provides the basis for analyzing personnel transactions for a one-year period and for an annual update of the Affirmative Action Plan. The update includes the predetermination of annual placement goals as well as an assessment of the previous year's annual placement goals and progress made.

**Applicant Information.** Information about gender and ethnicity of each applicant is collected and maintained for affirmative action reporting purposes. Applicants who wish to benefit under the Affirmative Action Program for Individuals with Disabilities, Special Disabled Veterans or Veterans of the Vietnam era are also invited to self-identify their status after an offer of employment has been made and before employment begins. This information is requested on a voluntary basis and is used only for affirmative action purposes. Information regarding the disposition of each application for each opening is also maintained.

**Employee Information.** Information is collected and maintained for the following personnel transactions: placements (new hires, promotions, and transfers); merit increases; separations (resignation, death, retirement, and medical); involuntary separations (layoffs and dismissals), and training programs. The information is compiled by job group, by gender and by ethnicity.

This system, which was outlined in the preceding section, Action Oriented Programs, will be used by the facility EEO Coordinator in developing progress reports to management, which will indicate progress toward AAP goals and objectives. Department management will indicate any current or foreseeable EEO and AAP focus areas, and outline corrective action suggestions.

Janet Brunner, Sr. Human Resources Manager, is responsible for discussing any problems related to the implementation of the EEO Policy and this AAP with appropriate management representatives. Discussions will focus on rejection ratios, the underutilization of minorities and females, charges of discrimination or allegations of harassment. There will be yearly audits of the selection and placement process, paying particular attention to hiring, promotion, transfer and termination patterns. A report on the status of this facility's Affirmative Action Program will be prepared, and remedial steps will be taken which are necessary to provide for the effective implementation of the program.

## **VII. WORKFORCE ANALYSIS [41 CFR 60-2.11]**

### **Workforce Analysis**

In accordance with Federal Affirmative Action Regulations, a work force analysis of employees by department is developed. The analysis consists of a count of employees in each job title in the unit; job titles are ranked from the lowest to highest salary range including supervisors. For each job title the following is provided: the salary range; the total number of incumbents; the total number of male and female incumbents and total number of male and female incumbents by the ethnic categories of American Indian, Asian, Black, Hispanic and Caucasian.

The data is analyzed by reviewing each department and comparing the percent of minorities and women in the department to the percentages in the workforce. If any problem areas exist, programs are developed to correct those areas. These programs are described in the "Action Oriented Programs." section.

## **VIII. JOB GROUP ANALYSIS**

### **[41 CFR 60-2.12 AND 60-2.13]**

Job groups are the basic units for developing availability proportions, conducting the utilization analysis, and analyzing personnel transactions. In accordance with Federal affirmative action regulations, the different job titles held by Tetra Tech employees have been combined to form the job groups listed in the AAP reports section.

### **Methodology**

Federal affirmative action regulations specify that job groups have similar content, wage rates, and opportunities. Accordingly, in developing the job groups, the following guidelines were taken into consideration:

- The contents of the jobs included in a job group should be similar in job responsibilities, requisite skills, and wage rates.
- The opportunities for advancement should be similar for all jobs in a job group.
- A given job group should not include job classifications with clearly different utilization patterns. For example, job classifications predominantly filled with males should not be combined in the same job group with job classifications predominantly filled with females.
- Job groups, in general, should be composed of a minimum of ten employees to allow meaningful utilization analysis and the establishment of goals. In some cases, job groups of less than ten employees may be necessary because of unique job content, requirements, location, and skills.
- Job groups should illuminate, rather than mask, focus areas.
- Feeder jobs for jobs included in a job group should be similar.
- Jobs in a job group should have the same labor market.

In accordance with Federal Affirmative Action Regulations, a job group analysis of employees by job group categories with similar content, wage rates and opportunity for advancement is developed. The analysis consists of a count of employees in each job title with similar functions ranked from the lowest to highest salary range including supervisors. For each job group category the following is provided: the salary range; the total number of incumbents; the total number of male and female incumbents and total number of male and female incumbents by the ethnic categories of American Indian, Asian, Black, Hispanic and Caucasian

## IX. FEEDER GROUP ANALYSIS

Below is a table demonstrating the lines of progression and providing an analysis of the job groups by their feeder groups.

Job Group	Feeder Group
1A	1B
1B	2A,2D
2A	3A
2D	5A
3A	No Feeder
5A	5B
5B	No Feeder

## **X. AVAILABILITY ANALYSIS**

### **[41 CFR 60-2.14]**

In accordance with Federal affirmative action regulations, Tetra Tech, Inc. has conducted an availability analysis of the employment of females and ethnic minorities by job group. To perform this availability analysis based on the guidelines outlined in the OFCCP's Federal Contract Compliance Manual and in pertinent parts of 41 CFR, Chapter 60, proportions of available females and ethnic minorities for each job group are developed.

Availability is defined as the percentage of minorities and women among those persons who are eligible currently or will be eligible during the term of the affirmative action program.

As specified in federal affirmative action regulations, two factors are considered in determining the availability proportions of females and ethnic minorities for each job group. These two factors are set forth below. In determining whether minorities and females are underutilized, Tetra Tech has considered the following data: \*

1. The availability of minorities/females having requisite skills in an area from which the location can reasonably recruit.
2. The availability of promotable and transferable minority/female employees within the facility during the AAP year.

Data sources for external availability factors for our computations have been acquired from the U.S. Census Bureau.

\* The charts used for the computation of availability percentages are in the AAP reports section.

## **XI. UTILIZATION ANALYSIS [41 CFR 60-2.15]**

In determining whether areas of underutilization exist and what steps might be taken to correct the deficiencies, an analysis was performed in accordance with Order No. 4. This utilization analysis considered the results of the Availability Analysis conducted in this plan. By using this data and by applying the measure of reasonableness, we have determined that some underutilization of minorities and/or females exists. The utilization analysis is in the AAP reports section. The results of the utilization analysis are the basis for establishing the goals described in this document.

## **XII. GOALS**

### **[41 CFR 60-2.16 AND 60-2.17(B)]**

At the beginning of a reporting period, annual goals are established for females and ethnic minority categories in job groups where underutilization is identified and is equal to or exceeds one person or more. For the 2014 Tetra Tech Affirmative Action Plan these goals are expressed as annual placement rates equal to availability proportions based upon 2010 census data. The goal is met if the actual placement rate is equal to or exceeds the availability rate.

Annual goal attainment for those instances where underutilization was identified at the beginning of the reporting period is assessed at the end of a reporting period by taking into account the applicable annual placement rates and actual experience of employee promotions, transfers, and hires. The assessment is made on the basis of comparing the placement rate by gender or ethnic minority category in the job group to the applicable availability proportion.

The 2014 goals are based on our workforce numbers staying the same. Primarily, openings will result from normal attrition and, in some cases, the vacancies may not be filled. These goals reflect current business conditions and are subject to change as these conditions change.

Our long range goal is to overcome underutilization in all job categories and to employ percentages of minorities and women at least equal to the percentages of qualified minorities and women within the available labor force.

Tetra Tech, Inc. will continue to develop and maintain programs that facilitate the attainment of the goals that have been set to increase the utilization of minorities or females. The following program will be implemented for job groups identified as underutilized:

When an underutilization is identified for a specific job group, Janet Brunner, Sr. Human Resources Manager, will make an annual review of the employee selection process, to ensure that any practices or policies which could result in a disproportional number of minorities and/or females being rejected for employment are kept out of the selection process.





## APPENDIX B » KEY STAFF RESUMES

### STEVE EVANS

**Years of Experience:** 13

**Education:** M.A., Education, Georgetown College, 2004; B.S., Biology, University of Kentucky, 2001

**Professional Memberships and Associations:** Kentucky Academy of Science; Association of Southeastern Biologists; Southern Appalachian Botanical Society; Botanical Society of America

#### **Professional Experience/Areas of Expertise**

Steve Evans is an environmental scientist / biologist for Third Rock. He has proven himself invaluable to our staff through his versatility and ability to tailor his biology expertise and capabilities to a variety of applications. Coming from a strong laboratory background where quality assurance is key, Steve has taken that attention to detail and knowledge and applied it to a broad range of environmental consulting projects. With experience including watershed planning, water quality analysis, forest invasive control and restoration, plant species and community identification, and statistical analysis, he is well suited to compile and analyze data, and project long-term strategies for watershed planning.

#### **Municipal Stormwater Program Consulting**

Steve has worked extensively as part of a team of consultants to provide technical expertise to Lexington-Fayette Urban County Government (LFUCG) for implementation of their municipal stormwater program and compliance with Consent Decree/ MS4 permit requirements. Steve has specialized technical experience using statistical and other science-based methodologies to understand large amounts of watershed-scale water quality data and reach valuable conclusions that can guide stormwater program management and resource remediation. Specifically, Steve has analyzed current and historic data from LFUCG's stormwater monitoring program for each of Lexington's seven watersheds in order to determine overall stream health and water quality trends in these streams. Steve was lead author of a comprehensive evaluation of LFUCG's stormwater monitoring program data from 1999 to 2013.

Steve authored and implemented a report template to define the content and format of "watershed assessment reports" for LFUCG. He further authored or reviewed watershed assessments for six of the seven major watersheds. These assessments identify and delineate the content of a document that will fully characterize the background information available on a watershed, including identification of potential stakeholders, gathering all technical data, determining existing watershed management activities, performing an analysis of the watershed health based on monitoring data, and identifying any water quality data gaps or collection needs.

Additionally, Steve has developed and will implement an extensive Water Quality Program Training Module that includes basic information about LFUCG's Stormwater program, protocols for educating LFUCG's employees on monitoring procedures, safety protocols, sample handling and preservation, and record keeping that should be used when sampling LFUCG's streams.

#### **Watershed Planning**

Because Steve has comprehensive experience at field sampling and design planning, laboratory analysis, data analysis, and community coordination, he is uniquely qualified to produce watershed analysis and planning documents. Steve has worked with nonprofit organizations, municipal, state, and federal agencies to produce watershed plans, such as for the Hanging Fork and Clarks Run watersheds in Boyle and Lincoln Counties, KY and the Wolf Run Watershed for Lexington-Fayette Urban County Government, in Fayette County, KY. He is currently managing the production of a watershed plan for Chestnut Creek in Marshall County, Kentucky. These public documents compile all available water planning documents, monitoring data, and landuse information in order to identify impairments and protect healthy waterways. They also provide coordinate and scheduling of implementation plans and funding to ensure watershed goals are met. As the lead author of the Kentucky Statewide Assessment of Forest Resources and Strategy, he was also able to aid in the



establishment of strategies to protect, enhance, and restore both resources.

### **Water Quality Monitoring**

Steve conducts and designs aquatic biological assessments consisting of field water quality testing using various water quality meters, field collection of surface water samples, and habitat assessment. His intimate knowledge of sample collection and preservation techniques ensures efficient sampling strategies. For stormwater sampling in association with the EPA Consent Decree for the Lexington-Fayette Urban County Government (LFUCG), Steve advised the project team on sampling parameters, coordinated sampling logistics, collected grab and composite samples as well as flow measurements during multiple dry, wet weather, and storm events from the municipal waste facilities, major watersheds, and the urban expansion area. Recently, he authored an update to Lexington's SWQMP's Water Quality and Biological Sampling Plan to incorporate updated sampling methodology and quality practices

As part of several Cumulative Impact Assessments for HUC-8 watersheds in Eastern Kentucky recently prepared for use in litigation, Steve prepared a Quality Assurance Project Plan to use in quality training for multiple consulting groups, authored water quality assessment of the Upper Levisa watershed with analysis of historic data from 1930s to the present, review of multiple statistical analyses of the relationship between macroinvertebrate samples, stream health, and environmental variables.

### **Bacterial Source Tracking**

In response to an increasing need to identify the sources of fecal contamination in watersheds, Steve has extended the scope of Third Rock's environmental services to include microbial source tracking consulting and bacteriological analysis. Microbial source tracking methodologies go beyond the enumeration of pathogen water quality indicators and indicate the host source of the pathogen input. This information is crucial for watershed coordinators to effectively plan remediation activities or to provide due diligence for TMDL studies. In the Dix River Watershed, Steve directed remediation from cattle to humans due to

source tracking analyses correctly identifying the primary source of fecal pollution in the rural watershed. He has developed procedures to enable Third Rock to perform testing for analysis of Total Coliforms by Standard Method 9222B, Fecal Coliforms by 9222D, and *E. coli* by EPA method 1603. He joined the University of Kentucky in conducting a microbial source tracking analysis of the West Hickman Watershed in Lexington, KY. Steve has presented to numerous audiences on the applications and limitations of microbial source tracking.

### **Statistical Analysis**

Steve is well versed in the application of non-parametric multivariate ordination techniques used in ecological assessments, including PCORD. He actively consulted Kentucky's Division of Water in the development of their COMPASS data reporting system. This system allows both laboratories and consulting firms to report data to the division using Microsoft Access templates. With experience in both the laboratory and consulting aspects of data management and the quality control thereof, Steve acted as a primary contact for the development of the COMPASS system and has led Third Rock to be the first commercial enterprise to submit results using this system.

### **Quality Assurance**

Steve has extensive experience in quality assurance and control and in the development of standard operating procedures and quality assurance plans. Prior to joining Third Rock Steve served as the Laboratory Director and Quality Assurance Manager at Microbac (formerly EnviroData Group) where he successfully developed a quality assurance manual and cause analysis procedures that were adopted at the Microbac corporate (national) level, and overhauled most of the EnviroData Group quality system. At Third Rock, Steve has developed multiple US EPA and Kentucky Division of Water approved Quality Assurance Project Plan's (QAPP) for grants as well as wastewater permits and served as the Quality Assurance Officer on the projects. The project QAPPs served as the central document to establish the quality standards and procedures to be utilized in the project and provided the organization for the successful completion of the projects.



## **GERRY FISTER, P.G.**

**Years of Experience:** 26

**Education:** B.S., Geology, University of Kentucky, 1987

**Professional Registrations and Licenses:**

Professional Geologist, Kentucky, #0527, 1993

**Professional Memberships and Associations:**

Kentucky Association of Professional Geologists;  
Geological Society of America

**Specialized Training:**

OSHA 8-hr Annual Haxwoper Refresher, Sharon McCreadie, Instructor, Association of Bay Area Governments, Annual

Geohazards in Transportation in the Appalachian Region, Kentucky Geological Survey, 2006

Sinkholes and the Engineering and Environmental Impacts of Karst, National Ground Water Association, 2003

Symposium on Geophysics and Environmental Problems, Environmental and Engineering Geophysical Society, 2000

**Professional Experience/Areas of Expertise**

Gerry Fister is the contract administrator and/or project manager for a variety of projects at Third Rock. He has a clear understanding of the staffing needs, technological applications, and complexities of the process for water quality projects. He serves as the primary point of contact with the firm owner and ensures that Third Rock staff has the support and resources available to produce high quality deliverables within the project schedule.

Gerry has an extensive understanding of the regulations governing environmental quality and permitting. With his knowledge of a wide range of regulatory programs, and a broad background in the application of environmental science make him a valuable asset to Third Rock's clients. His expertise in the application of environmental science enables our firm to meet client needs. Gerry spearheaded the effort at Third Rock to train all project administrators in ArcView® GIS. Using GIS technology, he has maximized project efficiency by being able to organize multiple sources of data

(such as geologic maps, topographic maps, aerial photographs, sampling points and results, etc.). Gerry has managed a wide range of project types including statewide environmental contracts for the Kentucky Transportation Cabinet (KYTC), Tennessee Department of Transportation, and the Kentucky Finance and Administration Cabinet. As part of his project management responsibilities for that contract, For the Kentucky Finance and Administration Cabinet, Gerry has managed projects at National Guard posts, state parks, state maintenance facilities, and other state facilities. .

**Hazardous Materials Assessment**

Gerry is our company's leading underground storage tank and hazardous materials specialist. He has over 20 years of experience with data-gathering techniques, federal and state environmental regulations, walkover inspections, windshield surveys, site mapping techniques, surface geology elements, and technical writing. His experience includes all aspects of the Phase I and II Environmental Site Assessment process including assessments for individual sites as well as multiple sites for such undertakings as linear transportation projects. He has served as principle investigator, inspecting site for presence of environmental hazards, including underground storage tanks and hazardous materials for dozens of site development projects throughout Kentucky, Ohio, and Tennessee. He is currently completing a Corrective Action Plan for the Southend Park site as part of the Newtown Pike Extension Project in Lexington, Kentucky.

He has completed arsenic investigations, landfill evaluations, soil and groundwater assessments, petroleum spill evaluations, and more. Recently, he was involved in the planning efforts regarding the existing I-75 (Brent Spence) bridge between Covington, Kentucky, and Cincinnati, Ohio, assessing the feasibility and constructability of several bridge replacement/rehabilitation options.

Gerry has combined his Phase I and II experience with an extensive understanding of regulations governing the NEPA process. He specifically has a detailed working knowledge of the transportation process as it relates to hazardous materials having working on a long list of projects throughout Kentucky, Ohio and Tennessee.



### Prior Professional Experience

Gerry held a staff geologist position with Fuller, Mossbarger, Scott, and May Civil Engineers from 1987 to 1988. His primary responsibility was directing drilling activities for a geotechnical investigation related to the expansion of the Winfield Locks and Dam on the Kanawha River in West Virginia. His duties included inspecting monitoring well installation, piezometer installation, continuous soil sampling, rock coring, and Shelby tube collection. This experience laid the foundation for the future application of subsurface investigation methods to the environmental field.

From 1988 through 2000, Gerry was a project manager for Commonwealth Technology, Inc. His responsibilities included managing a variety of projects requiring a detailed understanding of regulatory environmental programs under the Clean Water Act, Resource Conservation and Recovery Act, National Environmental Policy Act, Comprehensive Environmental Response Compensation and Liability Act, Toxic Substance Control Act, and state and local regulatory programs. In this capacity, he designed and directed more than 300 site investigations involving the sampling and characterization of all environmental media. Investigative techniques he used included applying conventional technologies and methods as well as conducting groundwater dye trace studies; seismic, magnetic, and soil vapor surveys; and other geotechnical methods. He completed over 700 Phase I Environmental Site Assessments (ESAs) for real estate transactions. In many cases, he completed both Phase II and Phase III ESAs defining the extent of the environmental liability and implementation of corrective action. Gerry directed client services for a number of Kentucky state agencies including the Kentucky Transportation Cabinet and the Finance and Administration Cabinet. KYTC services included the identification and clearance of a wide variety of environmental problems on acquired highway right-of-ways. The Finance and Administration services included similar services at state facilities such as state parks or National Guard posts.

### JOHN KOSCO, P.E., CPESC

**Education:** M.S., Civil / Water Resources Engineering, George Washington University, 1997; B.S., Agricultural Engineering, Pennsylvania State University, 1992

**Years of Experience:** Total: 22; With Tetra Tech: 13

**Key Areas of Experience:** Clean Water Act support; stormwater control; Phase I and Phase II program support

Mr. Kosco has 22 years of experience with stormwater and nonpoint source controls, having worked at U.S. Environmental Protection Agency (EPA) Headquarters for 9 years as an engineer and project manager and at Tetra Tech for 13 years. Mr. Kosco is a Senior Water Resources Engineer specializing in National Pollutant Discharge Elimination System (NPDES) stormwater permitting for EPA, state, and local clients. He has extensive experience conducting evaluations of municipal stormwater Phase I programs and developing stormwater permits and programs. While at EPA, he was one of the coauthors of the stormwater Phase II regulation published in December 1999 and provided most of the engineering and technical support for this rule.

### EXPERIENCE

**EPA Stormwater Rule Support (EPA OWM/WPD) –** Served as project manager and lead technical support for U.S. EPA's stormwater rulemaking effort. Led a team that developed technical analysis on impacts to small streams and benefits of reduced detention basins. Managed support for six onsite public listening sessions and a four-hour webcast, including facilitating two of the sessions. Managed a team to organize and summarize over 200 public comments received in response to a Federal Register Notice. The comments were organized by topic and uploaded into an online database. Led the development of a 40-page document that summarized all comments.

**EPA Green Infrastructure Technical Assistance (EPA OWM/WPD) –** For EPA Office of Water, co-leading a team of Tetra Tech staff to provide technical assistance on green infrastructure to municipal governments. Providing oversight on approximately 20 projects that include conceptual designs,



technical guidance development, code and ordinance reviews, and benefits assessments.

**MS4 Permit Improvement Guide (EPA OWM/WPD)**

– Project manager and lead technical author of EPA’s MS4 Permit Improvement Guide which provides clear and consistent on how permit writers should develop MS4 permits. The guide contains examples of permit conditions and supporting rationale that could be used in fact sheets that accompany NPDES permits. Reviewed existing MS4 permit requirements and developed example permit language that was measurable and clear. Worked closely with EPA to address State and EPA comments on the guide.

**MS4 Program Evaluation Guide (EPA OWM/WPD) –**

Primary author of EPA’s MS4 Program Evaluation Guide, which is EPA’s guide on how NPDES permitting authorities should conduct audits and inspections of MS4 programs. Developed a series of questions and checklists for inspectors to use during audits. Conducted training of EPA and state staff on how to conduct an effective MS4 program evaluation.

**Municipal Stormwater Post-Construction Guide (EPA OWM/WPD) –**

Managed and served as co-author of the guidance document *Managing Stormwater in Your Community: A Guide for Building an Effective Post-Construction Program*. This guide, developed jointly with the Center for Watershed Protection and published as a CWP document, provides information on the various program components municipalities should address to develop a post-construction program. Mr. Kosco was lead author for several chapters and managed a diverse group of staff in developing the guide.

**EPA Industrial SWPPP Guide (EPA OWM/WPD) –**

Served as primary author of EPA’s Developing Your Stormwater Pollution Prevention Plan: A Guide for Industrial Operators. Drafted all text for the 40 page guide, including SWPPP tips and “what to include in your SWPPP” sections. Developed a SWPPP template and MSGP documentation template to assist industrial operators in developing and implementing a SWPPP that complies with the guide.

**EPA Construction SWPPP Guide (EPA OWM/WPD) –**

Served as primary author of EPA’s *Developing Your*

*Stormwater Pollution Prevention Plan: A Guide for Construction Sites*. Developed the outline and wrote the majority of the text in the guide. Drafted a series of steps to help simplify the SWPPP development process for construction operators. This included identifying key principles for selecting appropriate erosion and sediment controls, pollution prevention controls, and post-construction controls. Also developed a SWPPP template for construction operators to use in writing SWPPPs, and created a sample inspection report.

**EPA Stormwater Webcasts (EPA OWM/WPD) –**

Served as the moderator and occasional subject matter expert for at least 25 of EPA’s stormwater webcasts. Supported EPA by identifying stormwater webcast topics and speakers, reviewing presentations, screening questions during the webcast, and preparing the materials for posting on EPA’s website. About 29 webcasts were held, with an average of 1,500 people participating in each live webcast. Served as an expert speaker for a webcast on municipal stormwater compliance in March 2007.

**Stormwater Phase I MS4 Evaluations (EPA R9) –**

As manager of a project to assess the compliance of numerous stormwater Phase I permit programs in California, Nevada, Hawaii, and Arizona, leads a team of inspectors who conduct both a programmatic review of the MS4s stormwater-related programs and an in-field verification of how selected elements of the program are actually implemented. Over 45 programs have been reviewed, consisting of over 110 permittees. A final report on each MS4 evaluation is developed for each state to assist the state in targeting its effort to the major problem areas in each MS4.

**Alaska DEC Storm Water Guide (ADEC) –**

Primary author of two chapters of the *Alaska Storm Water Guide* – Chapter 4 on Temporary Storm Water Controls and Chapter 5 on Permanent Storm Water Controls. This included drafting BMP principles, identifying BMPs and adapting their design criteria to adjust to the unique climates in Alaska.

**Stormwater Training for the State of California (CA SWRCB) –**

Managed a project to develop three 2-day training courses for state water quality staff in California. These courses, focusing on how to review stormwater management plans, how to conduct an



on-site MS4 evaluation, and how to write an MS4 permit, were held in the first half of 2004. Served as primary author of the training materials and lead instructor. In addition, developed an MS4 Audit Guide as a reference for the course on MS4 evaluations.

**Stormwater Permit Development for the State of Hawaii (Hawaii DOH)** – Developed draft permit language for the Hawaii Department of Transportation MS4 permit and the City/County of Honolulu MS4 permit. These permits were drafted after conducting on-site evaluations of each program with permit conditions included to address deficiencies identified during the evaluation.

**Arizona DEQ Stormwater Training (ADEQ)** – Developed and was the lead instructor for a 3-day stormwater training course for state staff in Arizona. The training covered all aspects of the stormwater program, including construction, industrial and municipal sources. In addition, the training addressed regulatory requirements, drafting permits, and inspection/compliance techniques. The training wrapped up with mock inspections of a construction site and an industrial facility.

**Minnesota Construction Site Guidance (MPCA)** – Managed a project to develop an inspection guide and compliance assistance information for small construction operators in Minnesota. The inspection guide provides specific information on how to conduct a stormwater inspection for local construction inspectors. The compliance assistance information for small construction operators steps small construction operators through the process of complying with the State's general construction permit and developing a stormwater pollution prevention plan.

**Stormwater Design Manual (Pulaski County, AR)** – For Pulaski County, Arkansas, served as primary author of the Stormwater Management and Drainage Manual for the Lake Maumelle Drainage Basin which provides guidance on site planning and stormwater practice design criteria necessary for meeting specified surface runoff loading rate criteria. Worked closely with County staff and other stakeholders in development of the manual. Developed both erosion and sediment control requirements and BMPs, along with standards for 10 typical stormwater management BMPs. Also drafted

an Erosion and Sediment Control Field Guide based largely on material in the manual.

## **BERT REMLEY**

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**Years of Experience:** 20

**Education:** M.S., Biology, Morehead State University, 1997; B.A., Anthropology, University of Kentucky, 1991

**Professional Memberships and Associations:** Society for Freshwater Science; American Fisheries Society - Kentucky Chapter; Carolina Area Benthologists; Freshwater Mollusk Conservation Society

### **Specialized Training**

Macroinvertebrate Sampling in the Eastern Kentucky Coalfields Training, Kentucky Division of Water, 2012

Ecological Training, Timothy M. Hill, Instructor, Ohio Department of Transportation, 2011

Wetland Delineator Certification Program, 2009

River Morphology & Applications Course, Dr. Dave Rosgen, Instructor, 2009

Benthic Macroinvertebrate Assessment – Sample Collection, Identification, and Data Evaluation, Ohio Environmental Protection Agency, (QDC #00837) 2003

Developing a Biological Assessment, US Fish & Wildlife Service, 2007

Applied Fluvial Geomorphology Course, Dave Rosgen, Instructor, Pilot View Resource Conservation & Development, 2007

Soil Erosion & Sediment Control, Danny Jasper, P.E., Kentucky Society of Professional Engineers, 2007

Eastern and Western Kentucky Headwater Stream Functional Assessment Protocol, Louisville District, United States Army Corps of Engineers, 2006

Advanced Midge Identification, Association of Mid-Atlantic Biologists Workshop, 2006

Stream Restoration in the Southeast: Accomplishments and Opportunities, North Carolina Stream Restoration Institute, 2006



Floodplains, Riparian Zones, and Buffer Strips: Key Components to Aquatic Life Use Attainment and Self-Sustaining Stream Systems, Soil and Water Conservation Society, 2006

Taxonomy and Identification of Darters, Association of Mid-Atlantic Aquatic Biologists Workshop, 2005

Canaan Valley Institute, Association of Mid-Atlantic Aquatic Biologists Workshops, 2005

Larval Fish Identification, Ed Hartowicz, Instructor, Third Rock Continuing Education, 2004

Laboratory QA/QC for Benthic Macroinvertebrate Sample Processing and Taxonomic Identifications, Mid-Atlantic Water Pollution Biology Workshop, Mid-Atlantic Environmental Protection Agency, 2003

Asteraceae Identification, Ron Jones, Instructor, Eastern Kentucky University, 2002

Water Beetle Taxonomy & Identification, John H. Epler, Ph.D., Instructor, Duke Power Environmental Center, 2002

Aquatic Insect Collection Protocols Workshop for Stream Mitigation & Restoration, Dave Penrose, Instructor, North Carolina Department of Environment & Natural Resources, 2001

Oligochaetes Identification, Carolina Benthological Workshop, 2001

Crayfish Workshop, Carolina Benthological Workshop, 2001

Aquatic Entomology, Eastern Kentucky University, 2000

Biology and Identification of Southeastern Mayflies, Stoneflies, and Caddisflies, Clemson University, 2000

#### **Professional Experience/Areas of Expertise**

Bert Remley has been sampling streams in Fayette County each year since 1998. He is Third Rock's senior aquatic biologist and is the Quality Control/Quality Assurance Officer for Third Rock's aquatic biology laboratory. In addition to macroinvertebrate taxonomy, Bert also conducts stream sampling for aquatic macroinvertebrates, fish, plankton, and freshwater mussels. He is experienced in the identification and ecology of

aquatic macroinvertebrates and fish of the region, conducting surveys in Kentucky, Ohio, Indiana, Illinois, Tennessee, West Virginia, Virginia, South Carolina, and North Carolina. Bert has also conducted hundreds of biological assessment for threatened and endangered species in Kentucky and Tennessee including numerous bat, fish, and mussel species. As a PADI certified open water diver and part of Third Rock's dive team, he has led numerous mussel surveys.

#### **Fish**

Bert has surveyed streams, rivers, and lakes for fish in Kentucky, Virginia, Tennessee, Ohio, and Illinois. He has employed several different sampling techniques including backpack electroshocking, boat mounted electroshocking, seining, and gill netting. Bert participated in surveying the fish communities of Pools 9 and 10 of the Kentucky River and their respective tributaries. Bert was lead biologist of a fish inventory of Cumberland Gap National Historical Park. All streams within the park that contained fish were surveyed, including Davis Branch, which contains the federally threatened blackside dace (*Chrosomus cumberlandensis*). In addition to this survey, Bert has conducted blackside dace surveys in several streams in southeastern Kentucky for coalmine permits and utility crossings. During a 2013 fish survey, Bert captured and identified blackside dace in a tributary to the Kentucky River in Perry County, KY. This was the first documented occurrence of blackside dace in the Kentucky River drainage and was verified by USFWS and KDFWR personnel. Bert has also surveyed for and collected the federally endangered relict darter (*Etheostoma chienense*) within the Bayou du Chien watershed. He has conducted numerous fish surveys in streams throughout the state for KPDES permits and biological assessments.

#### **Macroinvertebrates**

Bert has collected thousands of samples from the southeast and midwest employing several different sampling protocols. He has been certified by the Society for Freshwater Science to identify eastern midges (Chironomidae), mayflies (Ephemeroptera), stoneflies (Plecoptera), and caddisflies (Trichoptera) and general arthropods to genus level. He is also a certified Level 3 Qualified Data Collector by the Ohio EPA to collect, identify, and calculate



macroinvertebrate community metrics in Ohio. Similarly, he is certified to collect benthic macroinvertebrates for 401 certification projects in North Carolina. Bert has collected macroinvertebrate samples for the United States Army Corps of Engineers (USACE) Louisville District, Louisville Metropolitan Sewer District, and Lexington Fayette Urban County Government. Bert has also collected and identified macroinvertebrate samples in Tennessee following Tennessee Department of Environment and Conservation protocols.

Bert is the QA/QC officer for Third Rock's macroinvertebrate lab. He is responsible for calculating macroinvertebrate bioassessment indices, assisting taxonomist with their identifications, managing samples within the laboratory, reviewing and reporting data. Bert has personally identified over 2,000 samples from 10 different states within the southeast, midwest, and pacific northwest. Recent clients Bert has performed macroinvertebrate identifications for include the North East Ohio Regional Sewer District, West Virginia Department for Environmental Protection (WVDEP), USACE Louisville District, Mississippi Department of Environmental Quality (MSDEQ), ORSANCO (Ohio), Louisville Metropolitan Sewer District (MSD), Sevier Stormwater Group, Tennessee Department of Environment and Conservation, United States Environmental Protection Agency, and numerous private clients.

### **Water Quality Monitoring**

Bert's thesis in graduate school dealt with the effects of water quality and fish production. His thesis involved weekly collections of water samples and physiochemical data. He performed all laboratory analysis of the water samples, identification of zooplankton and phytoplankton samples, and analyzed the data. Bert has performed bi-annual water quality sampling and evaluation on reservoirs and streams for Lexington Fayette Urban County Government since 1998. Additionally, Bert collected vast numbers of water chemistry samples and physiochemical data from Pools 9 and 10 of the Kentucky River and their tributaries. He also routinely collects water quality samples for KYTC and coal mining projects. Bert also assists with the maintenance and calibration of Third Rock's water

quality instruments. Bert has also completed hundreds of habitat assessments on streams in the Southeast and Midwest following Rapid Bioassessment Protocols.

### **Prior Professional Experience**

From August 1992 to May 1993, Bert worked as a Wildlife Aide for the Kentucky Department of Fish and Wildlife Resources. He assisted the Upland Game Coordinator with the Ruffed Grouse restoration project and was also a member of the mobile deer trapping crew. During the summer of 1994, Bert served as a research assistant for doctoral students at Archbold Biological Station Lake Placid, Florida. From August 1998 until March 2000 Bert worked as a biologist within the biomonitoring division of Envirodata Group, LLC. He conducted acute and chronic toxicity tests using both freshwater and marine vertebrate and invertebrate species. He performed microscopic identifications of phytoplankton, zebra mussel veligers, and unidentified particulate samples. Bert conducted macroinvertebrate sample processing.





## JENNIFER SHELBY, P.E., CPESC

### Years of Experience: 15

**Education:** Ph.D. Candidate, Biological Engineering, North Carolina State University; M.S., Biological Engineering, North Carolina State University, 2002; B.S., Biosystems and Agricultural Engineering, University of Kentucky, 1998

### Professional Registrations and Licenses:

Professional Engineer, Kentucky, #25763;  
Professional Engineer, Tennessee, #112264;  
Professional Engineer, Illinois, #62.063125; Certified Professional in Erosion and Sediment Control (CPESC), #4006, 2007

**Professional Memberships and Honors:** Kentucky Society of Professional Engineers; American Society of Agricultural and Biological Engineers; Kentucky Leadership PE Class of 2008–2009

### Specialized Training

Stream Restoration Design Training, Canadian Rivers Institute, University of New Brunswick, Dr. Robert Newberry, 2014

Levels I-IV of Rosgen Training (River Restoration and Natural Channel Design, River Assessment and Monitoring, River Morphology and Applications, Applied Fluvial Geomorphology), Wildland Hydrology, Dr. Dave Rosgen, 2007-2008

RIVERmorph Stream Restoration Software Training, RIVERmorph, LLC/ Wildland Hydrology, 2008

FLOWSED/POWERSED Sediment Transport Modeling Training. RIVERmorph, LLC/ Wildland Hydrology, 2008

Stream Restoration, Dr. Greg Jennings, P.E., North Carolina State University, 2003

Stream Restoration in the Southeast: Innovations for Ecology, NCSU Stream Restoration Program, Wilmington, NC, 2012

Stream Restoration in the Southeast: Advancing the Science and Practice, NCSU Stream Restoration Program, Asheville, NC, 2008

Stream Restoration in the Southeast: Accomplishments and Opportunities, NCSU Stream Restoration Institute, Charlotte, NC, 2006

Watershed-Based Planning Workshop, Kentucky Waterways Alliance, 2006

Stream Ecosystem Restoration Training, River Institute, Ohio, 2006

### Professional Experience/Areas of Expertise

Jennifer has dedicated her career to the enhancement of environmental quality, including nonpoint source pollution and stormwater management, watershed-scale assessment of hydrology and water-quality, green stormwater infrastructure planning and design, environmental permitting, and stream and wetland restoration. Having worked in Kentucky, Tennessee, and North Carolina, she is experienced with developing and implementing watershed-scale monitoring schemes and assessing the data produced, as well as designing and constructing large-scale stream and wetland restorations. Her role as a water resources engineer also includes management of environmental projects.

### Municipal Stormwater Program Consulting

Jennifer has worked extensively as part of a team of consultants to provide technical expertise to Lexington-Fayette Urban County Government (LFUCG) for implementation of their municipal stormwater program and compliance with Consent Decree / MS4 permit requirements. Jennifer has specialized experience assimilating vast amounts of varied water quality data and presenting it to technical and non-technical audiences. She has used appropriate statistical and graphical analyses to extract valuable conclusions from LFUCG's stormwater monitoring program data for each of Lexington's seven watersheds. Jennifer authored and implemented a protocol that considers 13 indicators to determine the success of the LFUCG stormwater monitoring program, indicate if the conditions of the MS4 permit have been satisfied, and reveal whether current monitoring practices are sufficient to evaluate pollutant levels from stormwater runoff to the MS4.

### Watershed Assessment and Water Quality

Jennifer has worked both in Kentucky and North Carolina on watershed-scale monitoring projects. Jennifer was part of a team of Third Rock engineers, planners, and ecologists that prepared a Watershed



Plan for the highly urbanized Wolf Run watershed for Lexington-Fayette Urban County Government (LFUCG). This effort included extensive review of existing watershed data, planning a monitoring scheme to collect additional data, and ultimately analyzing the data to support the development of an action plan for remediation projects within the watershed. Jennifer lead efforts to assess stream hydrogeomorphic condition and rate of stream change as a way to characterize the effects of hydromodification within the Wolf Run watershed. Permanent cross-sections, longitudinal profiles, and substrate analysis were established at nine monitoring stations throughout the watershed and were used to evaluate how the stream is physically changing, particularly under the modified flow regime of this highly urbanized watershed.

Jennifer also had an integral role in planning and implementing watershed-scale monitoring schemes in the Corbin City Reservoir (Laurel River) and Herrington Lake (Dix River) watersheds in central Kentucky. These projects included field assessments and monitoring of streams across the entire watershed for physical and biological characteristics, flow, water quality (nutrients, pathogens, sediment), and water chemistry (pH, conductivity, temperature, dissolved oxygen). Following field data collection, extensive data analyses were performed to determine and rank water pollution sources and recommend solutions to protect and remediate valuable water resources. Following the monitoring of the Corbin City Reservoir watershed, Jennifer and colleagues authored a Watershed Plan based on EPA criteria for the Kentucky Division of Water. Jennifer also contributed to the production of a nutrient TMDL for Clarks Run and Hanging Fork, streams within a developed portion of the watershed. This included the use of the QUAL2K water quality model for predicting in-stream dissolved oxygen concentration given the pollutant loading and in-stream processes.

#### **Stormwater BMP Planning and Design**

Jennifer provided services related to BMP planning, evaluating stream restoration opportunities, and assessing feasibility of those opportunities for a proposed redevelopment of a formerly industrial and commercial area of downtown Lexington into an arts and entertainment district (Distillery

District). The project included developing BMPs and restoration activities to improve the quality of a degraded stream, Town Branch, running through the district.

Jennifer has experience in design and construction oversight for “green” stormwater best management practices, including bioretention areas, water quality swales, and stormwater wetlands. For example, Jennifer designed and oversaw construction and planting of an approximately 1-acre stormwater wetland using an EPA 319(h) grant for reducing nonpoint source pollution. The stormwater wetland, within Levi Jackson State Park, treats stormwater from an adjacent parking lot and roadway, provides an aesthetically pleasing buffer of native species for the adjacent Little Laurel River, and offers opportunities for community education.

#### **Stream Restoration**

Jennifer’s areas of expertise related to stream enhancement and restoration include: field stream geomorphology and stability assessments; natural channel design utilizing Rosgen and other methods; hydrologic and hydraulic modeling to support restoration design; modeling sediment transport to support restoration design; preparation of construction plans and supporting documents; preparation of sediment and erosion control plans; and preparation of federal, state, and local permit applications. Since 2006, Jennifer has performed stream restoration design on five projects for Kentucky Department of Fish and Wildlife Resources projects funded by the state fee in lieu of (FILO) program. These projects include stream geomorphological data collection, natural channel design, 401 and 404 permit application preparation, mitigation plan preparation for the USACE, construction oversight, and post-construction monitoring. Recently, Jennifer performed restoration design and construction oversight for over 7,000 feet of perennial and headwater stream in Boyd County, Kentucky. Currently, Jennifer is involved in the design of more than 16,000 feet of perennial and headwater stream in Casey County, Kentucky. She is also currently leading the design of nearly 30,000 feet of perennial and headwater stream within Lake Barkley State Resort Park in Trigg County, including stream reaches with the State Park Golf Course.