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June 22, 2011

Chuck Bowman
Department of Environmental Protection
Division of Water and Waste Mgmt.
601 57th Street SE
Charleston, WV 25304

**RE: Benthic Macroinvertebrate Sample Processing and
Identification Proposal (RFQ - DEP15456)
Charleston, West Virginia
Via: UPS**

Mr. Bowman,

This letter and attachments will serve as our response to the recent request for quotations to provide all instrumentation necessary to identify benthic macroinvertebrate samples for the West Virginia Department of Environmental Protection (DEP). Environmental Services & Consulting, Inc. (ES&C) is a woman-owned small business with an extensive aquatic macroinvertebrate experience. We have been in business since 1999, and currently have full-time NABS-certified taxonomists and laboratory personnel available to work your project.

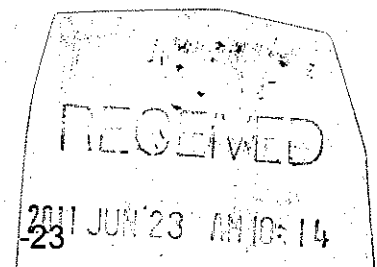
Attached to this letter, please find the quotation forms provided by the Purchasing Division, ES&C's statement of Qualifications (listing key personnel who will be working on this project), and associated resumes and certifications. Additional information about our company and services can also be found on our website, at www.es-and-c.com.

Qualifications and Related Experience

Our goal is provide exceptional services focusing on aquatic macroinvertebrate studies and taxonomy for our local, regional, national, and international clients. Our employees have over 30 years combined professional and academic experience in macroinvertebrate studies. We currently have the capacity to handle multiple large-scale macroinvertebrate processing and identification projects (>200 samples per year). In the past 12 years of processing benthic aquatic organisms, our NABS-certified taxonomists have processed over 6,000 samples and have identified over 1,880,000 individual organisms. Please see the attached SOQ for our qualifications.

Sample Pickup and Delivery

ES&C's current location in western Virginia will allow for pickup and return delivery of samples by ES&C personnel at no additional cost to DEP.



Removal of Organisms from Stream Debris

ES&C maintains a staff of five trained and experienced macroinvertebrate sorting technicians. We have over 1,300 square feet of office and laboratory space dedicated primarily to aquatic macroinvertebrate sample processing and identification, complete with all necessary equipment and instrumentation for sorting samples according to West Virginia DEP Watershed Assessment Branch – Procedures for Processing Benthic Macroinvertebrate Samples protocols.

Genus Level Identification and Electronic Submittal of Results

ES&C routinely processes genus-level identification samples. Additionally, we have developed a proprietary Laboratory Information System (LIMS) to track all samples from receipt to return, to allow direct data entry, to calculate over 100 comparative metrics and indices, and to provide results in any format (hard copy, spreadsheet, or database file) desired by our clients.

Legal Representation

Should legal testimony be requested, ES&C personnel will testify to the validity of our laboratory analysis in the following areas:

1. Time of notification by the DEP / DWWWM of sample shipment, and by whom,
2. Condition of sample,
3. ES&C sample preservation,
4. Dates and analysis, and by whom,
5. Chain of Custody procedures within our laboratory,
6. Methods used, and
7. Results of analysis.

However, we cannot testify regarding data interpretation by others.

Quality Assurance

ES&C currently maintains a stringent Quality Assurance / Quality Control (QA/QC) program for all aspects of processing. Ten percent of all samples are re-sorted by a second qualified sorter, for a minimum 90% sorting efficiency (ideally 95% or better). Additionally, the QC officer randomly spot-checks individual grids/trays from samples in process to ensure standards are maintained. ES&C has adopted the same QA/QC protocols used in the 2004 EPA Eastern Wadeable Streams Project. Following identification of samples by the primary NABS-certified taxonomist, ten percent of all samples are then re-identified by a second qualified NABS-certified taxonomist. The results are compared in order to determine numerical differences, straight taxonomic differences, and hierarchical taxonomic differences. Where straight taxonomic differences exist, the initial taxonomist is notified of the possible error and given a chance to review the specific taxa in question. When taxonomic errors are irresolvable in house, an outside expert may be called upon to provide a third opinion.

June 22, 2011

Schedule

We have the personnel and capacity to meet the desired goals under a contract within the specified deadlines.

- Samples submitted by April 1 are due August 31
- Samples submitted by August 31 are due Dec. 1
- Samples submitted by December 31 are due Feb. 28
- Results of smaller, site specific projects will be available within one month of sample receipt or within a mutually agreed upon time period.

Pricing

Please find pricing listed on the DEP15456 Request for Quotation / Bid Sheet, attached at the end of this document. Pricing for sample processing includes all in house supplies (e.g., slides and mounting media for midgets, etc.), processing time, and internal QC of approximately 10% of all samples.

Conclusion

ES&C agrees with all of the Terms and Conditions outlined in the RFQ, and has the capability to perform all of the contract specifications for processing and identification of benthic macroinvertebrate samples.

The information provided in this response reflects the information requested. ES&C is a leading taxonomic laboratory, and we will be happy to provide additional information regarding our qualifications, if requested.

If you have any questions, or would like further information about our company and abilities, please contact me at 540-552-0144 or slynde@es-and-c.com. Thank you for your interest in our company. We hope to hear from you soon.

Sincerely,
ENVIRONMENTAL SERVICES & CONSULTING, INC.


Stuart Lynde
Principal Scientist

Attachments:

1. Quotation Forms
2. Statement of Qualifications
3. Resumes / Certifications of Key Personnel



State of West Virginia
Department of Administration
Purchasing Division
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

Request for Quotation

RFQ NUMBER

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25304 304-926-0499

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FIELD TESTING SERVICES						
THE WEST VIRGINIA PURCHASING DIVISION, FOR THE WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION, IS SOLICITING BIDS FROM QUALIFIED VENDORS FOR A CONTRACT TO PROVIDE PROCESSING AND IDENTIFICATION OF BENTHIC MACROINVERTEBRATE SAMPLES COLLECTED FROM WEST VIRGINIA WATERS, PER THE FOLLOWING SPECIFICATIONS, BID REQUIREMENTS, TERMS & CONDITIONS, AND THE ATTACHED BID SCHEDULE.						
EXHIBIT 3						
LIFE OF CONTRACT: THIS CONTRACT BECOMES EFFECTIVE UPON AWARD AND EXTENDS FOR A PERIOD OF ONE (1) YEAR OR UNTIL SUCH "REASONABLE TIME" THEREAFTER AS IS NECESSARY TO OBTAIN A NEW CONTRACT OR RENEW THE ORIGINAL CONTRACT. THE "REASONABLE TIME" PERIOD SHALL NOT EXCEED TWELVE (12) MONTHS. DURING THIS "REASONABLE TIME" THE VENDOR MAY TERMINATE THIS CONTRACT FOR ANY REASON UPON GIVING THE DIRECTOR OF PURCHASING 30 DAYS WRITTEN NOTICE.						
UNLESS SPECIFIC PROVISIONS ARE STIPULATED ELSEWHERE IN THIS CONTRACT DOCUMENT, THE TERMS, CONDITIONS AND PRICING SET HEREIN ARE FIRM FOR THE LIFE OF THE CONTRACT.						
RENEWAL: THIS CONTRACT MAY BE RENEWED UPON THE MUTUAL WRITTEN CONSENT OF THE SPENDING UNIT AND VENDOR, SUBMITTED TO THE DIRECTOR OF PURCHASING THIRTY (30)						
SEE REVERSE SIDE FOR TERMS AND CONDITIONS						
SIGNATURE		TELEPHONE		DATE		
		540-552-0144		June 22, 2011		
TITLE		FEIN		ADDRESS CHANGES TO BE NOTED ABOVE		
Principal Scientist		27-4612987				

WHEN RESPONDING TO RFQ, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'

GENERAL TERMS & CONDITIONS REQUEST FOR QUOTATION (RFQ) AND REQUEST FOR PROPOSAL (RFP)

1. Awards will be made in the best interest of the State of West Virginia.
2. The State may accept or reject in part, or in whole, any bid.
3. Prior to any award, the apparent successful vendor must be properly registered with the Purchasing Division and have paid the required \$125 fee.
4. All services performed or goods delivered under State Purchase Order/Contracts are to be continued for the term of the Purchase Order/Contracts, contingent upon funds being appropriated by the Legislature or otherwise being made available. In the event funds are not appropriated or otherwise available for these services or goods this Purchase Order/Contract becomes void and of no effect after June 30.
5. Payment may only be made after the delivery and acceptance of goods or services.
6. Interest may be paid for late payment in accordance with the *West Virginia Code*.
7. Vendor preference will be granted upon written request in accordance with the *West Virginia Code*.
8. The State of West Virginia is exempt from federal and state taxes and will not pay or reimburse such taxes.
9. The Director of Purchasing may cancel any Purchase Order/Contract upon 30 days written notice to the seller.
10. The laws of the State of West Virginia and the *Legislative Rules* of the Purchasing Division shall govern the purchasing process.
11. Any reference to automatic renewal is hereby deleted. The Contract may be renewed only upon mutual written agreement of the parties.
12. **BANKRUPTCY:** In the event the vendor/contractor files for bankruptcy protection, the State may deem this contract null and void, and terminate such contract without further order.
13. **HIPAA BUSINESS ASSOCIATE ADDENDUM:** The West Virginia State Government HIPAA Business Associate Addendum (BAA), approved by the Attorney General, is available online at www.state.wv.us/admin/purchase/vrc/hipaa.htm and is hereby made part of the agreement. Provided that the Agency meets the definition of a Cover Entity (45 CFR §160.103) and will be disclosing Protected Health Information (45 CFR §160.103) to the vendor.
14. **CONFIDENTIALITY:** The vendor agrees that he or she will not disclose to anyone, directly or indirectly, any such personally identifiable information or other confidential information gained from the agency, unless the individual who is the subject of the information consents to the disclosure in writing or the disclosure is made pursuant to the agency's policies, procedures, and rules. Vendor further agrees to comply with the Confidentiality Policies and Information Security Accountability Requirements, set forth in <http://www.state.wv.us/admin/purchase/privacy/noticeConfidentiality.pdf>.
15. **LICENSING:** Vendors must be licensed and in good standing in accordance with any and all state and local laws and requirements by any state or local agency of West Virginia, including, but not limited to, the West Virginia Secretary of State's Office, the West Virginia Tax Department, and the West Virginia Insurance Commission. The vendor must provide all necessary releases to obtain information to enable the director or spending unit to verify that the vendor is licensed and in good standing with the above entities.
16. **ANTITRUST:** In submitting a bid to any agency for the State of West Virginia, the bidder offers and agrees that if the bid is accepted the bidder will convey, sell, assign or transfer to the State of West Virginia all rights, title and interest in and to all causes of action it may now or hereafter acquire under the antitrust laws of the United States and the State of West Virginia for price fixing and/or unreasonable restraints of trade relating to the particular commodities or services purchased or acquired by the State of West Virginia. Such assignment shall be made and become effective at the time the purchasing agency tenders the initial payment to the bidder.

I certify that this bid is made without prior understanding, agreement, or connection with any corporation, firm, limited liability company, partnership, or person or entity submitting a bid for the same material, supplies, equipment or services and is in all respects fair and without collusion or Fraud. I further certify that I am authorized to sign the certification on behalf of the bidder or this bid.

INSTRUCTIONS TO BIDDERS

1. Use the quotation forms provided by the Purchasing Division. Complete all sections of the quotation form.
2. Items offered must be in compliance with the specifications. Any deviation from the specifications must be clearly indicated by the bidder. Alternates offered by the bidder as **EQUAL** to the specifications must be clearly defined. A bidder offering an alternate should attach complete specifications and literature to the bid. The Purchasing Division may waive minor deviations to specifications.
3. Unit prices shall prevail in case of discrepancy. All quotations are considered F.O.B. destination unless alternate shipping terms are clearly identified in the quotation.
4. All quotations must be delivered by the bidder to the office listed below prior to the date and time of the bid opening. Failure of the bidder to deliver the quotations on time will result in bid disqualifications: Department of Administration, Purchasing Division, 2019 Washington Street East, P.O. Box 50130, Charleston, WV 25305-0130
5. Communication during the solicitation, bid, evaluation or award periods, except through the Purchasing Division, is strictly prohibited (W.Va. C.S.R. §148-1-6.6).



State of West Virginia
Department of Administration
Purchasing Division
2019 Washington Street East
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Request for Quotation

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<p>DAYS PRIOR TO THE EXPIRATION DATE. SUCH RENEWAL SHALL BE IN ACCORDANCE WITH THE TERMS AND CONDITIONS OF THE ORIGINAL CONTRACT AND SHALL BE LIMITED TO TWO (2) ONE (1) YEAR PERIODS.</p> <p>CANCELLATION: THE DIRECTOR OF PURCHASING RESERVES THE RIGHT TO CANCEL THIS CONTRACT IMMEDIATELY UPON WRITTEN NOTICE TO THE VENDOR IF THE COMMODITIES AND/OR SERVICES SUPPLIED ARE OF AN INFERIOR QUALITY OR DO NOT CONFORM TO THE SPECIFICATIONS OF THE BID AND CONTRACT HEREIN.</p> <p>OPEN MARKET CLAUSE: THE DIRECTOR OF PURCHASING MAY AUTHORIZE A SPENDING UNIT TO PURCHASE ON THE OPEN MARKET, WITHOUT THE FILING OF A REQUISITION OR COST ESTIMATE, ITEMS SPECIFIED ON THIS CONTRACT FOR IMMEDIATE DELIVERY IN EMERGENCIES DUE TO UNFORESEEN CAUSES (INCLUDING BUT NOT LIMITED TO DELAYS IN TRANSPORTATION OR AN UNANTICIPATED INCREASE IN THE VOLUME OF WORK.)</p> <p>QUANTITIES: QUANTITIES LISTED IN THE REQUISITION ARE APPROXIMATIONS ONLY, BASED ON ESTIMATES SUPPLIED BY THE STATE SPENDING UNIT. IT IS UNDERSTOOD AND AGREED THAT THE CONTRACT SHALL COVER THE QUANTITIES ACTUALLY ORDERED FOR DELIVERY DURING THE TERM OF THE CONTRACT, WHETHER MORE OR LESS THAN THE QUANTITIES SHOWN.</p> <p>BANKRUPTCY: IN THE EVENT THE VENDOR/CONTRACTOR FILES FOR BANKRUPTCY PROTECTION, THE STATE MAY DEEM THE CONTRACT NULL AND VOID, AND TERMINATE SUCH CONTRACT WITHOUT FURTHER ORDER.</p> <p>THE TERMS AND CONDITIONS CONTAINED IN THIS CONTRACT SHALL SUPERSEDE ANY AND ALL SUBSEQUENT TERMS AND CONDITIONS WHICH MAY APPEAR ON ANY ATTACHED PRINTED DOCUMENTS SUCH AS PRICE LISTS, ORDER FORMS, SALES</p>						
SEE REVERSE SIDE FOR TERMS AND CONDITIONS						
SIGNATURE <i>Quat Alane</i>			TELEPHONE 540-552-0144		DATE June 22, 2011	
TITLE Principle Scientist		FEIN 27-4612987		ADDRESS CHANGES TO BE NOTED ABOVE		

WHEN RESPONDING TO REQ. INSERT NAME AND ADDRESS IN SPACE ABOVE LABELLED 'VENDOR'



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<p>AGREEMENTS OR MAINTENANCE AGREEMENTS, INCLUDING ANY ELECTRONIC MEDIUM SUCH AS CD-ROM.</p> <p>REV. 05/26/2009</p> <p>NOTICE</p> <p>A SIGNED BID MUST BE SUBMITTED TO:</p> <p>DEPARTMENT OF ADMINISTRATION PURCHASING DIVISION BUILDING 15 2019 WASHINGTON STREET, EAST CHARLESTON, WV 25305-0130</p> <p>THE BID SHOULD CONTAIN THIS INFORMATION ON THE FACE OF THE ENVELOPE OR THE BID MAY NOT BE CONSIDERED:</p> <p>SEALED BID</p> <p>BUYER: CB-23</p> <p>RFQ. NO.: DEP15456</p> <p>BID OPENING DATE: 06/23/2011</p> <p>BID OPENING TIME: 1:30 PM</p> <p>PLEASE PROVIDE A FAX NUMBER IN CASE IT IS NECESSARY TO CONTACT YOU REGARDING YOUR BID:</p> <p>540-552-1528</p> <p>CONTACT PERSON (PLEASE PRINT CLEARLY):</p> <p>Stuart R. Lynde</p>						
SEE REVERSE SIDE FOR TERMS AND CONDITIONS						
SIGNATURE <i>Stuart R. Lynde</i>			TELEPHONE 540-552-0144		DATE June 22, 2011	
TITLE Principle Scientist		FEIN 27-4612987		ADDRESS CHANGES TO BE NOTED ABOVE		

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DEP15456

BENTHIC MACROINVERTEBRATE SAMPLE PROCESSING AND/OR IDENTIFICATION

AREA OF WORK/BID AWARD

The West Virginia Department of Environmental Protection, Division of Water and Waste Management is seeking bids for the processing and identification of benthic macroinvertebrate samples collected from West Virginia waters. Benthic macroinvertebrates will be collected primarily from riffle/run habitats of flowing waters using rectangular frame kick nets. DWWM's Watershed Assessment Branch (WAB) performs the majority of the macroinvertebrate sampling. WAB collects an average of around 500 benthic macroinvertebrate samples annually.

Bids should be submitted by vendors in connection with the following:

- Sample pick-up and delivery
- Removal of organisms from stream debris – sorting the samples
- Identification of the sample to the genus level and electronic submission of results
- Legal representation (\$/hour)

Resumes of taxonomists including proof of North American Benthological Society (NABS) taxonomic certifications shall be included in the bid package or upon request prior to award.

QUALIFICATIONS/REQUIREMENTS

The West Virginia Department of Environmental Protection's (DEP) Division of Water and Waste Management (DWWM) conducts inspections of permitted and non-permitted facilities, investigates complaints, monitors ambient quality of surface water, groundwater and sediments, performs special studies, and provides water quality information to the citizens of West Virginia and other government agencies.

Legal action based upon benthic macroinvertebrate identification results is possible. Therefore, the vendor selected shall have a quality control program in place and shall meet the following qualifications:

1. Must have degreed biologists on staff performing the benthic macroinvertebrate identifications. NABS certification for genus level EPT (eastern) and genus level chironomidae (eastern) is required to perform the identifications. Identification of organisms by non-professional personnel or those without NABS certification is strictly forbidden. Biologists performing the identifications must be dedicated taxonomists; that is, the majority of their work on a daily basis involves the identification of benthic macroinvertebrates.
2. Must be capable of attending and providing expert testimony in legal proceedings, upon

request.

3. Minimum of 5 years of experience with sorting / identifying benthic macroinvertebrates.
4. Completed results must be delivered to DEP/DWWM according to the following schedule:
 - Samples submitted by April 1 are due August 31;
 - Samples submitted by August 31 are due Dec. 1;
 - Samples submitted by December 31 are due Feb. 28;
 - Results of smaller, site-specific projects must be available within one month of sample receipt or within some other negotiated time period.

Submissions shall include the following for each sample:

- a) benthic macroinvertebrate identifications reported in MS Excel or Access (WAB will provide a data template);
 - b) copies of bench sheets completed during identifications;
 - c) all organisms identified (except reference taxa specimens, which will be returned when the contract or project is complete);
 - d) all QA/QC information associated with sorting and identification of the samples.
5. Must be able to complete large-scale macroinvertebrate processing and identification projects (e.g., projects with >200 samples per year). Must have a minimum of 5 years of experience dealing with large-scale macroinvertebrate processing and identification projects (e.g., projects with >200 samples per year).

SCOPE

In administering and enforcing most of the pollution control laws of the state, the importance of quality control cannot be overstated. Quality control measures must be strictly adhered to in all phases of sample collection, preservation, transportation, and analysis. The quality control and analytical processes, as they relate to the vendor's responsibility, are divided into five (5) major steps:

- Step 1** - Receipt of sample at specified location – generally WAB office in Charleston, WV.
- Step 2** - Sorting of samples in a timely and professional manner.
- Step 3** - Identification of samples in a timely and professional manner.
- Step 4** - Establishment of continuing program to ensure the reliability of data (Quality Assurance/Quality Control).
- Step 5** - Legal Testimony

Step 1 - Receipt of Samples

Benthic macroinvertebrate samples will be collected by DEP/DWWM personnel. Due to the size of the sample containers (1 gallon jar) and the total number of samples collected annually (approx. 500), DEP/DWWM will not ship samples to the contractor using commercial transport such as UPS or Federal Express. Therefore, the vendor shall provide sample pick-up and delivery services. Generally, samples will be housed at DEP/DWWM's office in Charleston, WV. DEP/DWWM will bear the cost of sample transport, however, and the vendor shall include sample transport costs as part of the bid package. Typically, there are four to five sample pick-ups per year.

DEP/DWWM will provide Chain-of-Custody forms when samples are received by the vendor. The vendor shall be responsible for maintaining preservation of the samples and the internal chain of custody from the time the vendor obtains the samples until the results of benthic macroinvertebrate identifications are accepted by the DEP/DWWM. The vendor shall also maintain records of the results of identifications for a minimum of five (5) years.

Step 2 - Requirements for Sorting Benthic Macroinvertebrate Samples

Introduction

1. Benthic macroinvertebrate samples shall be sorted/processed in accordance with the procedures outlined below: "WVDEP Watershed Assessment Branch - Standard Operating Procedures for Processing Benthic Macroinvertebrate Samples". This procedure must be reviewed and understood fully before submitting bids.
2. For the majority of the samples, sorting requires removing a sub-sample consisting of 200 (+/- 20%) benthic macroinvertebrate organisms from the entire sample. Any vertebrates (salamanders, fish) encountered during subsampling should be retained with the sample, but not identified. Specimens should be stored in archival quality containers that will prevent loss of preservative through evaporation: glass vials with leak-proof screw caps, polypropylene jars with screw caps, etc.
3. Occasionally, the entire sample will need to be sorted and identified (i.e., artificial substrate samples and special surveys). DEP/DWWM will notify the vendor of these special cases and realizes that these samples may require significantly more time to process and identify than 200-organism subsamples. Therefore, vendors are asked to bid on whole-sample sorting separately.
4. Vendor will be responsible for examining sorting efficiency for 5% of all submitted samples for QA/QC purposes and reporting the information with each data submission.
5. Sorting macroinvertebrates from benthic survey samples (a procedure often referred to as "bug sorting") is an extremely important step in the biological research performed by the Department of Environmental Protection. The quality of the work performed by the "sorter" influences the quality of subsequent processes, such as identification and data analysis. A competent "sorter" must be able to recognize the morphological diversity of aquatic organisms, as well as the various methods these organisms may use to hide themselves from predators. The outcome of the final study may be affected, even if only a few organisms are

overlooked during the sorting process.

The processes described below were derived with some modifications from: Barbour, M. T. et al. "Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates and Fish", Second Ed., EPA 841-B-99-002. These protocols may be downloaded from the Internet at <http://www.epa.gov/owow/wtr1/monitoring/rbp/download.html>.

Definitions

MACROINVERTEBRATES - Animals that are large enough to be seen with the naked eye and do not have a backbone.

BENTHIC ORGANISMS (or BENTHOS) - Living organisms that reside on the bottom of streams, rivers, or lakes. Benthos may be vertebrates, invertebrates, or plants.

REFERENCE COLLECTION - A reference collection is a set of specimens, each representing some taxonomic level and not necessarily limited to a specific project. For the purposes of DEP/DWWM's studies, a reference collection does not have to be limited to a particular watershed. Reference collections should have expert confirmation of each taxon. These collections are used to verify identifications of subsequent samples.

VOUCHER COLLECTION - The voucher collection consists of the actual specimens collected during the project. Following identification and enumeration, all specimens collected for this project should be maintained in a voucher collection. This collection will be returned to the DEP/DWWM.

Materials for Sorting

1. Sample Jar - Contains the unprocessed sample, which consists of benthic organisms and stream debris.
2. Sample Vial - for storage of processed sample. This container may be a plastic/glass vial or a larger plastic bottle. Most samples will fit into a 10 ml or 4-6 dram vial, however, large organisms such as crayfish and snails, will require larger vials/bottles.
3. Sorting tray - a homemade plastic or Plexiglas tray used to evenly distribute the sieved sample and for randomly selecting the sub-sample. The internal dimensions of the tray shall be 10 inches x 40 inches - divided into 100 2 inch x 2 inch grids.
4. White foam board or other schematic 10 inches x 40 inches - marked with 100 2 inch x 2 inch grids for placing sorting tray on to demark grids and randomly select them for sorting.
5. White Flat-bottom Pans - used for picking specimens removed from 100 grid sorting tray.
6. Denatured Alcohol - preservative used in unprocessed and processed samples.

7. Sieve - #30 sieves (595 um) are used to separate alcohol and fine debris from the sample prior to sorting.
8. Labels – Archival paper is used to internally identify the contents of the sample vials/bottles (i.e., the sorted sample) and self-adhesive labels are used to externally identify (if necessary) the sample vials/bottles. External labels may be omitted for samples stored in transparent glass containers, as long as the internal label is clearly visible.
9. Clear Tape - Used on label as additional external adhesive.
10. Pencil - used to label sample bottle.
11. Small container/vial used for short term, intermediate storage of the sample during the sorting process.
12. Forceps - Fine tipped forceps are used to remove the organisms from the debris.
13. 10X Illuminated Magnifier - an optical aid to illuminate and magnify the sample during the sorting process. Alternatively, magnifying visors and a desk lamp can be used.
14. Squirt bottle - filled with alcohol, used to rinse organisms into sample vial.
15. Plexiglas - used to cover sample partially sorted overnight to prevent evaporation.

Procedures for Sorting

1. Select the sample to be sorted. If a sample is in two or more jars, the contents of the jars must be combined before sorting is initiated. Samples requiring more than one jar will be labeled as “1 of 2” and “2 of 2”.
2. Select a vial that will hold the organisms after sorting is completed. Usually a 10 mL or 4-6 dram vial is adequate for a 200-organisms subsample. Additional vials/bottles may be needed if the sample contains large organisms.
3. Prepare an *internal* label out of archival paper for the sample using permanent, alcohol-proof, archival ink (e.g., pigma ink; regular ink will run if alcohol is spilled on the label) or a pencil. The label must include the following information:

Stream Name

Station Number (AN-code)

Random Number (if provided)

Lab Sample ID# (Lab's internal id to link electronic results to final database)

Sample Date

County

Initials of Sample Collector

Initials of Sample Processor

of grids sorted (the numbers must be kept separate if several iterations of sorting are necessary; see below)

of organisms sorted for final sample

If any of this information is missing from the original sample jar label, notify the DEP/DWWM biologists so that the error can be corrected.

External labels may be omitted for samples stored in transparent glass containers, as long as the internal label is clearly visible. External label should contain the same information as required above. Place the external label on the bottle and apply clear tape over it for additional adhesion to the vial/bottle surface.

4. Prepare the sample for sorting. This step is performed in a sink and should be done under a fume hood or in a well ventilated area.
 - a. Under a fume hood, open sample jar and pour contents into a #30 sieve (595 micron).
 - b. Rinse sample jar into sieve and examine jar to make sure all detritus and organisms have been removed.
 - c. Rinse the contents of the sieve in tap water to remove remaining alcohol and to rinse out fine sand and sediment.
 - d. Carefully rinse any large detritus (i.e. leaves) or stones, making sure that all organisms on these items are returned to the sieve. Discard large leaves and gravel, or other large materials after rinsing.
 - e. Place the 10 inch x 40 inch - 100 grid sorting tray on top of 100 grid foam board/ schematic with grids and numbers plainly visible through the plexiglas bottom. After cleaning is complete, pour the entire contents of the sieve into the gridded sorting tray. Add a small quantity of water and gently swirl or stir the sample materials until the contents are evenly distributed in the tray. *Even distribution is extremely important in this step.* If debris is clumped, the organisms will not be distributed evenly and the final subsample may not accurately represent the full sample. If the sample was divided into more than one jar (labeled as "1 of 2" and "2 of 2"), the jars are to be combined at this point. Only when the sample is evenly distributed throughout the gridded sorting tray is it ready for sub-sampling and sorting.
 - f. Using a random number generator, select the first grid to be sorted. Using the same concept as a "cookie cutter", isolate the organisms within the chosen grid and scoop the contents of the grid place into a white enamel pan. Be careful not to damage any organisms during this step. Organisms with their head inside the grid are to be included within the grid. If you can't tell which end is the head, then the organism belongs in the grid that contains the largest portion of the body. A minimum of 4 grids must be sorted in order to ensure that a representative sub-sample has been obtained from the sorting tray.

- g. Fill a small container or vial with 75% alcohol for temporary storage of sub-sampled organisms. A properly labeled vial for final storage can be used at this point as well.
- h. Using fine-tipped forceps and 10X illuminated magnifier or magni-visor (sorter should use magnification of at least 2x), remove all macroinvertebrates from the subsample and transfer to the alcohol filled sample container/vial. Keep a running tally of the number of organisms that have been sorted. If there are a significant number of invertebrates that appear to be terrestrial, include them in the sample, but do not include them in the 200-organism count. The taxonomist will verify whether these organisms are truly terrestrial or semi-aquatic. Do not include empty clam or snail shells, or parts of organisms that are easily disconnected from the specimen (legs, gills, etc.).
- i. If leaves are present, be sure to examine both surfaces. Watch for unusual clumps of twigs, leaves, or sand, which may be protective cases for some organisms. If cases are found, both the case and the organism should be sorted. If the organism is in the case, the case and organism should be kept together. If an empty case is found, it should also be removed but not counted.
- j. If there is any doubt to the identity of an object (is it a seed or a bug?), it should be sorted, but not counted. A senior biologist should be notified if a large number of questionable objects are present.
- k. When all the organisms appear to have been removed from the pan, agitate the contents of the pan and examine again. Often the agitation will reorient an organism that was previously overlooked.
- l. Have a senior biologist inspect the pan after sorting has been completed. The biologist will point out any organisms that have been overlooked or misidentified as detritus. As the sorter becomes more proficient at his/her task, this step may be reduced in frequency. For the set quantity of QA samples, the number of organisms recovered by the senior biologist should be documented along with the initial number of organisms picked in order to calculate the percent sorting efficiency (see below).
- m. If 200 (+/- 20% which is 160 to 240) organisms have been picked from the initial 4 grids chosen, sub-sampling is complete. If fewer than 160 organisms have been picked, an additional grid is randomly chosen and sorted entirely even if 160 organisms have been picked while sorting the additional grid. (Note: Once a grid is started – it must be fully picked). This is repeated until at least 160 organisms are obtained or until the entire sample has been sorted. All attempts should be made (i.e., picking additional grids) to get as close to 200 organisms in the subsample. If more than 240 organisms are obtained from the initial 4 grids, then those individuals must be re-sampled down to the 200 (+/- 20%) goal. The remainder of the sample (i.e., the non-selected grids) may be discarded unless otherwise directed by DEP/DWWM.

- n. If using a temporary storage container/vial, pour contents of the sub-sample into the labeled bottle/vial. Make sure that all organisms in the bottle are fully submerged in the alcohol. If some remain on the vial sides, use the squirt bottle to rinse them into the alcohol.
- o. After a sample has been sorted, record the date and your initials in the sample log book. The total number of organisms picked and the number of grids sorted should also be documented for each sample on the vial label and on the bench sheet. If a re-subsampling is necessary (subsampling a subsample that exceeds 240 organisms), record the number of grids sorted for each iteration of the subsampling process separately. This last step is very important as these values are used to calculate organism density and to determine sample comparability.
- p. Sorting efficiency shall be evaluated for 5% of the samples. Recovery errors cannot exceed 10% (i.e., no more than 20 organisms can be missed by the sorter for a given sample) of the total sample (composite of remnants from each grid sorted). If the sorter does not meet this standard, the sorted sample remnants shall be re-checked until the recovery limits are attained. A record of all samples that were sorted, a list of quality control (QC) checks and documentation of any corrective action taken shall be maintained by the vendor to document the process. DEP/DWWM reserves the right to review QA/QC documentation upon request. All QA/QC associated with sorting and identification of each sample shall also be submitted with the results.

Step 3 - Requirements for Identification of Benthic Macroinvertebrates

Introduction

1. Benthic macroinvertebrate samples shall be identified in accordance with procedures outlined below: "WVDEP-DWWM Standard Operating Procedures for Identifying Macroinvertebrate Samples". This procedure must be reviewed and understood fully before submitting bids.
2. Vendor must have degreed biologists on staff performing the benthic macroinvertebrate identifications. NABS certification for genus level EPT (eastern) and genus level chironomidae (eastern) is required to perform the identifications. Identification of organisms by non-professional personnel or those without NABS certification is strictly forbidden. Biologists performing the identifications must be dedicated taxonomists; that is, the majority of their work on a daily basis involves the identification of benthic macroinvertebrates.
3. All aquatic insects (including Diptera), crustaceans, and molluscs, are to be identified to the genus-level of taxonomy. (NOTE: samples may include a significant number of chironomid larvae, which MUST be identified to genus). *Hydropsyche* individuals must be separated into *Hydropsyche* vs. *Ceratopsyche* according to Merritt, Cummins, and Berg (2008). Oligochaeta, Turbellaria, and Hirudinea are to be identified to family level. Macroinvertebrates that do not require family/genus level identification are Nemertea,

Nematoda, Hydroida, and Bryozoa. These organisms need only be identified to the taxonomic level (phylum, class, order, etc.) indicated in the previous sentence. However, it would be desirable to report lower taxonomic levels if these organisms are easily identified. Vertebrates and terrestrial organisms are not to be identified.

4. Taxonomists are permitted to use taxonomic identification keys other than those suggested in the operating procedures. However, all keys must be current and up-to-date. All results submitted to DEP/DWWM shall include a bibliography of publications used in identification of the specimens. Vendor will be responsible for identification and enumeration only; data analysis will not be required.
5. Results of identifications shall be submitted on the paper form(s) styles provided by DEP/DWWM and in electronic format (Microsoft Excel or Access compatible format; WVDEP will provide a data template for this purpose). All QA/QC associated with sorting and identification of each sample shall also be submitted with the results.
6. Identification of samples is not deemed completed until the data has been submitted to and accepted by the DEP/DWWM. Should the DEP/DWWM not provide notice of acceptance within four weeks of the date results were mailed by the vendor, the firm may consider the data to be acceptable by the Division.
7. The vendor shall be responsible for maintaining preservation of the samples. Vendor shall return all sample jars, voucher specimens, and reference collections to the DEP/DWWM in addition to the results of identification. Unused sample residues (i.e. detritus and unpicked portions) are to be properly disposed by the vendor unless otherwise directed on a small scale, project specific basis.
8. Vendor will be required to provide identification services only. No data analysis will be required. At the completion of the projects (or portions of the project) the vendor will submit the completed "WVDEP/ WAB BENTHIC MACROINVERTEBRATE LAB SHEET", voucher specimens, and identification results in Excel or Access format (WVDEP will provide an electronic data template with required fields). The voucher specimens are essentially all specimens in the 200 organism sub-sample that have not been included in the reference collection. Vendor may retain the DEP/DWWM reference specimens until the contract or project has been completed or upon request by DEP/DWWM. Specimens retained by the laboratory permanently must be first represented in the DEP/DWWM reference collection by individuals in good condition and documented on all paper and electronic forms.

Materials for Identification of Benthic Macroinvertebrates

1. Dissecting Microscope - for examination of gross features.
2. Compound Microscope - for examining minute features. Phase-contrast microscopes are preferable.
3. Fine-tipped forceps and probes - for manipulating specimens.

4. Petri dishes – or other container to hold specimens during identification.
5. Alcohol - 75% ethanol or isopropanol is used to preserve the samples and to prevent desiccation during identification.
6. Wash Bottle - used for alcohol storage.
7. Microscope Slides and glass cover slips - for examination of tiny specimens and/or body parts under a compound microscope. Slides and cover slips should be clean.
8. Mounting Medium – CMC-10 mounting medium or a similar permanent mounting medium is used to prepare permanent mounts of microscopic specimens.
9. Benthic Macroinvertebrate Lab Sheet - standard for recording results of identification and enumeration (Figure 1).
10. Taxonomic Keys for the Identification of Benthic Macroinvertebrates

Procedures for Mounting Chironomidae (and other small specimens)

The procedures that follow are summarized from Epler's *Identification Manual for the Larval Chironomidae (Diptera) of North and South Carolina*.

1. Label a clean glass slide. Label should include, at a minimum, the stream name, stream code, collection data and sample ID number.
2. Place 2-5 drops of CMC-10, or other permanent mounting medium, on the slide.
3. Place the specimens in the mounting medium, ventral side up, head pointing down ("south"). Tease out larger bubbles.
4. Gently lower coverslip over the mounting medium at an angle.
5. Use the cover slip to reposition larvae, if desired. Then gently press down the cover slip over the head capsules with pencil eraser to spread the mouthparts and over the anal end to spread the hind pro-legs.
6. Lay the slide on a flat surface and allow it to cure for 2-3 hours. If air bubbles form, fill them in with fresh medium and allow curing for 1-2 more hours. Then ring the slide with more medium or clear fingernail polish.
7. Add to the label the # of organisms on the slide and a general description of the type of organisms (e.g., Chironomidae, Oligochaeta, Acarina, etc.)

List of Taxonomic Keys

The primary taxonomic keys are listed below. The contractor may use other taxonomic keys for lower level identification; however, these references must be current and up-to-date. The contractor shall provide a list of references used in the identification of all specimens.

General Keys

Brigham, A.R., W.U. Brigham, and A. Gnilka (eds.). 1982. Aquatic Insects and Oligochaetes North and South Carolina. Midwest Aquatic Enterprises, Mahomet, IL.

Merritt, R.W., and K.W. Cummins (eds.). 1995. An Introduction to the Aquatic Insects of North America. 3rd edition. Kendall/Hunt Publishing Company, Dubuque, Iowa.

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<http://www.epa.gov/bioindicators/html/publications.html>

Smith, D.G. 2001. Pennak's Freshwater Invertebrates of the United States: Porifera to Crustacea. 4th edition. John Wiley & Sons, New York.

Thorp, J.H and A.P. Covich, Eds. 2001. Ecology and Classification of North American Freshwater Invertebrates. Second Edition. Academic Press.

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- Milligan, M.R. 1997. Identification Manual for the Aquatic Oligochaeta of Florida: Volume I- Freshwater Oligochaetes. Florida Department of Environmental Protection, Division of Water Facilities, Tallahassee, FL. Available on-line at: <http://publicfiles.dep.state.fl.us/dear/labs/biology/biokeys/oligofw.pdf>

Crustacea

- Hobbs, H.H., Jr. 1972. Biota of Freshwater Ecosystems, Identification Manual no. 9. Crayfishes (Astacidae) of North and Middle America. EPA-WPCRS No. 18050, ELD05/72. Supt. Doc. No. 5501-0399, United States Environmental Protection Agency, Washington, D.C. 173 pp. Available on-line at: <http://www.epa.gov/nscep/index.html>
- Holsinger, J.R. 1972. Biota of Freshwater Ecosystems, Identification Manual no. 5. Freshwater amphipod crustaceans (Gammaridae) of North America. WPCRS No. 18050, ELD04/72. Supt. Doc. No. 5501-0369, United States Environmental Protection Agency, Washington, D.C. 89 pp.
- Jezerinac, R.F., G.W. Stocker, and D.C. Tarter. 1995. The Crayfishes (Decapoda: Cambaridae) of West Virginia. Ohio Biological Survey Bulletin. New Series. Vol. 10, No.1.
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Pluchino, E.S. 1984. Guide to the Common Water Mite Genera of Florida. Florida Department of Environmental Regulation, Technical Series Vol. 7 No. 1. Orlando, Florida. Available on-line at: <http://publicfiles.dep.state.fl.us/dear/labs/biology/biokeys/mites.pdf>

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Parmalee, P.W. and A.E. Bogan. 1998. The Freshwater Mussels of Tennessee. University of Tennessee Press. Knoxville, Tennessee. 328 pp.

Step 4 - Quality Control

1. Vendor will be required to retain all voucher specimens and establish reference collections for this project. Voucher specimens are the actual specimens identified from the samples. A reference collection is defined as a set of biological specimens, representing each specific taxon observed in the samples submitted by DEP/DWWM. Reference collections are to be arranged/curated based on taxonomic and/or phylogenetic order. Any specimens removed from the voucher collection for purposes of building the reference collection must be documented on both the paper and electronic reporting forms. The reference taxa specimens should be delivered to DEP/DWWM at the end of the contract/project period, or upon request if desired earlier. A small subset of the reference taxa specimens may be retained by the vendor permanently for internal use if the retained specimens are already represented by an individual or set of individuals in good condition in the DEP/DWWM reference collection. The retention of specimens for any purpose must be fully documented on laboratory bench sheets.
2. Vendor shall compile genus-level reference and voucher collections to be submitted to DEP/DWWM at end of contract period or upon request for DEP/DWWM use.
3. With the exception of organisms approved to be used in the laboratories' internal reference collection, all specimens identified in the 200-organism subsamples are to be returned to DEP/DWWM. Slide mounted specimens should be labeled to indicate, at a minimum, DEP sample ID, lab number, count of organisms on slide, and general grouping of organisms (e.g., Chironomidae, Oligochaeta, etc.). All other specimens are to be stored in a single sample vial (additional vials may be used when large organisms, such as crayfish, are present).
4. Vendor shall evaluate sorting efficiency for 5 % of all samples. Recovery errors may not exceed 10% of the total sample. A record of all samples sorted, a list of quality control checks, and documentation of any corrective action taken shall be maintained by the vendor to document the process. This information shall be provided each time the taxonomic results are submitted to DEP/DWWM.
5. In addition, the vendor shall re-identify a minimum of 5 % of the samples. A taxonomist other than the original identifier shall perform this check. Errors are brought to the attention of the original taxonomist and subsequent identifications are subject to scrutiny until errors are resolved. A record of all samples re-identified; a list of quality control (QC) checks; and documentation of any corrective action taken shall be maintained by the vendor to document the process. All reports documenting QA/QC will be submitted to DEP/DWWM with all other completed results in the delivery group or upon request.
6. If any significant changes in taxonomy occur during the life of this contract, the vendor shall notify DEP/DWWM and provide supporting references. This process will allow our own records to remain current.

7. DEP/DWWM biologists and/or another contract laboratory will verify identifications for a minimum of 2.5% of the samples. Samples subjected to verification are selected randomly and will encompass checks on all taxonomists. The vendor will be advised upon analysis of the two identifications if significant¹ differences in identification are encountered. Cancellation of the contract will result if discrepancies continue.

Step 5 - Legal Testimony

The selected firm may be requested by the DEP/DWWM to testify concerning the validity of the laboratory sorting and identification process. The firm will only be required to testify to the following areas:

1. Time of notification by the DEP/DWWM of sample shipment and by whom.
2. Condition of sample.
3. How sample was preserved by the firm.
4. Dates of analysis and by whom.
5. Chain of Custody procedures within the laboratory.
6. Methods used.
7. Results of sorting, identification, and internal QA/QC processes.

At no time will the firm respond to questions concerning interpretation of results. The Division shall reimburse the firm for the costs of any such testimony.

SUBCONTRACTORS

The vendor who is awarded a contract, when performing work under the terms and conditions of this contract, are solely responsible for the satisfactory completion of the work. The prime vendor shall be responsible for ensuring that any subcontractor has all the necessary permits, certifications (including NABS certifications), experience and insurance to perform the work. All subcontractors must be approved by DEP/DWWM before subcontractor initiates work. The primary contractor shall supply resumes and/or other documents to prove sub-contractor's qualifications. DEP/DWWM will consider the prime vendor to be the sole point of contact with regard to authorized work under the contract; however, this provision does not prohibit the DEP/DWWM from directly contacting subcontractors.

CONFIDENTIALITY

The vendor agrees that any and all data, analyses, materials, reports or other information, oral or written, prepared by the vendor with respect to this requisition shall, except for information which has been publicly available, be treated as confidential and shall not be utilized, released, published, or disclosed, by the vendor at any time for any purpose whatsoever other than to provide consultation or other service to the DEP/DWWM.

¹ "Significant" differences will include, but will not be limited to, consistent misidentification of an organism(s) during QA/QC checks.

BID PREPARATION

The bidder shall include the information below with their bid. The contract award will be made to the qualified vendor with the lowest bid. We expect to collect approximately 500 samples per year, however there is no minimum number of samples that will be sent to the successful bidder.

Omission of any of the information listed below may result in disqualification.

- 1) Description of how the project will be managed by the contractor.
- 2) Summary of experience with sorting and identification of benthic macroinvertebrates. Must have minimum of 5 years of experience with sorting / identifying benthic macroinvertebrates.
- 3) Resumes of taxonomists and copies of NABS certifications shall be included in the bid package.
- 4) List of taxonomic references used in the identification of all specimens.
- 5) Description of vendor's internal QA/QC procedures, stating specifically how errors are tracked and resolved, which will insure the highest level of accuracy in both the sorting and identifying processes.
- 6) Specific description of product that will be returned to DEP/DWWM (i.e., reporting format, specimens, etc.)

DEP15456
BID SHEET

Item No.	Quantity	Description	Unit Price	Amount
A	500	Per sample un-sorted, identified to Genus level: 200-organism subsample	157 ⁰⁰	78,500
E	4	Per each "sample pick-up/delivery" not "per sample" (Assume 100 samples per pickup)	0	0
F	5 hr	Cost/hour for professional staff representation of data in legal/administrative setting	150 ⁰⁰	750

TOTAL = 79,250

Contractor: Environmental Services & Consulting, Inc.

Signature: Steve Rynk

Date: 6-22-2011

Quantities listed on the bid schedule are for bid evaluation purposes only and are not a guarantee of quantities to be ordered over the life of the contract. Actual quantities ordered may be more or less than those stated on this schedule.

RFQ No. _____

STATE OF WEST VIRGINIA
Purchasing Division

PURCHASING AFFIDAVIT

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

DEFINITIONS:

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

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

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

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

WITNESS THE FOLLOWING SIGNATURE

Vendor's Name: Environmental Services & Consulting, Inc.

Authorized Signature: [Signature] Date: 6-22-2011

State of Virginia

County of Montgomery, to-wit:

Taken, subscribed, and sworn to before me this 22nd day of June, 2011.

My Commission expires 10/31, 2011.

AFFIX SEAL HERE



NOTARY PUBLIC

[Signature]

SOQ

Environmental Services & Consulting, Inc.

Prepared by:
Environmental Services & Consulting, Inc.
Blacksburg, VA

Revised: June 22, 2011



P.O. Box 11437
Blacksburg, Virginia 24062

Telephone: 540-552-0144
Facsimile: 540-552-1528

A Woman-Owned Small Business

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1. INTRODUCTION

Environmental Services & Consulting (ES&C) is a woman-owned small business specializing in aquatic systems. We provide consulting services, laboratory testing, and field sampling to a wide spectrum of clients throughout the nation. From project design and implementation to the final report, ES&C is proud of its expertise and dedication to delivering a scientifically sound and defensible product to each and every client. ES&C has built a reputation for providing the highest quality products at competitive rates.

2. CORPORATE PROFILE

ES&C is a corporation established in the Commonwealth of Virginia in 1999, providing environmental consulting services to clients in Virginia and across the country. The company is an outgrowth from academia and is conveniently located near the campus of Virginia Tech in Blacksburg, Virginia, offering ES&C's staff opportunities to work in cooperation with the university's faculty and staff and the availability of the university's advanced technologies. ES&C maintains a strong relationship with the university. Once a single-person operation, ES&C currently employs seven salaried scientists and four part-time technicians.

ES&C started as a laboratory specializing in macroinvertebrate, planktonic, and algal taxonomy. Since its inception, it has grown to become one of the nation's leading taxonomic laboratories, processing thousands of samples for Federal, State, Municipal, Industrial and commercial clients. ES&C employees have worked on benthic samples from Coast to Coast.

ES&C is more than just a taxonomic laboratory. We provide our clients with a wide range of environmental consulting services including environmental permitting, stream and wetland enhancement and restoration, environmental site assessments, and a wide range of natural resources studies.

2.1. Company Information

ES&C is registered through the Central Contractors Registration (CCR) website. Additionally, Representations and Certifications are updated electronically and can be accessed through the ORCA website. The information provided below is provided for convenience only.

DUNS:	039267138
CAGE/NCAGE Code:	3GCW8
Legal Business Name:	ENVIRONMENTAL SERVICES & CONSULTING, INC.
TIN/EIN:	27-4612987
Company URL:	http://www.es-and-c.com
Phone:	540-552-0144
Fax:	540-552-1528
Toll Free Phone:	888-995-2782
Mailing Address::	ENVIRONMENTAL SERVICES & CONSULTING, INC. P.O. Box 11437 BLACKSBURG, VA 24062
Office Location (Shipping Address):	ENVIRONMENTAL SERVICES & CONSULTING, INC. 516 ROANOKE STREET CHRISTIANSBURG, VA 24073
Business Start Date:	11/17/1999
HUBZone Certified:	NO
Woman-Owned:	YES
Accept Credit Cards:	YES
Member/Manager:	Katherine S. Lynde

2.2. SIC/NAICS Codes

ES&C provides services under several codes including those listed below.

NIACS CODES (1997):

541620	Environmental Consulting Services Sanitation Consulting Services Site Remediation Consulting Services
541690	Biological Consulting Services Chemical Consulting Services Entomological Consulting Services
541380	Testing Laboratories
563910	Environmental Remedial Services
541710	Environmental Research and Development Laboratories
541370	Topographic Mapping Services Geographic Information System (GIS) base mapping services
541512	Computer Aided Design (CAD)
541511	Custom Computer Programming Services
541330	Engineering Services

SIC CODES (1987)

8748	Business Consulting Services
8999	Services, Environmental Consulting
8734	Testing Laboratories
4959	Sanitary Services (Remediation Services)
8713	Surveying Services
7389	Business Services
8711	Engineering Services
7371	Computer Programming Services
7373	Computer Integrated system Design

3. SERVICES

3.1. Regulatory Compliance

- Surface Water Permitting
- Discharge Monitoring Reports
- Pollution Abatement
- VWP (Water Protection)
- Joint Permit Application
- Water Withdrawal Permits
- VMRC Permits
- Department of Health Permits
- Compliance Issues
- NEPA
- Nutrient Management Plans
- Stormwater Pollution Prevention Plan (SWPPP)

3.2. Assessments and Inspections

- Transaction Screen
- Phase I Environmental Site Assessment
- Phase II Environmental Site Assessment
- Asbestos Inspection/Sampling
- Asbestos Management Plans
- Project Monitoring
- Toxic Mold Inspection/Sampling
- Mold Project Remediation Plans / Monitoring
- Indoor Air Quality
- Risk Assessments
- Site Characterization Studies
- Contamination Assessments
- Water Quality Impact Studies
- Stream Assessments
- Erosion and Sediment Control

3.3. Ecology and the Environment

- Benthics
- Aquatic Invertebrate Studies
- Aquatic Invertebrate Project Design
- Fish Studies
- Algae Studies
- Chlorophyll Analysis
- Mosquito Studies
- Total Maximum Daily Load (TMDL)
- Watershed Surveys
- Wildlife Surveys
- Stream Habitat Assessments

3.4. Compliance Monitoring

- Stormwater Monitoring
- Groundwater Monitoring
- Discharge Monitoring
- Total Maximum Daily Load (TMDL)
- "WET" Test

3.5. Soil and Groundwater

- Groundwater Management Plan
- Groundwater Monitoring
- Erosion and Sediment Control
- Soil Sampling
- Soil Contamination

3.6. Site Assessments

- Wetland Mitigation
- Wetland Delineation
- Wetland Restoration
- Stream Restoration
- Stream Mitigation
- Joint Permit Application

4. KEY PERSONNEL

4.1. Katherine S. Lynde

Katherine Lynde is the sole member and manager of Environmental Services & Consulting Inc. She acquired sole-ownership in the company on January 1, 2005 and serves in a leadership role working with other management to develop the company's vision and direction.

4.2. Stuart R. Lynde

Stuart R. Lynde is a Senior Project Manager at ES&C. He received his Bachelors degree from Lynchburg College in 1991 and went on to earn a Masters degree from Virginia Tech in 1994. His Masters degree focused on the effects of thermal discharges on leaf breakdown and macroinvertebrate communities as well as the development of a novel flow-through test for juvenile Asian clams (*Corbicula* sp.). He pursued his Doctoral degree until he formed ES&C in 1999. Mr. Lynde's doctoral research focused on the effects of cationic surfactants used as bio-fouling control agents on non-target organisms after the compounds were detoxified. While continuing to work on his degree, Mr. Lynde worked full-time for a Blacksburg consulting firm where he was a senior scientist managing the company's largest project in the coal fields of Virginia. Mr. Lynde is a Certified Virginia Nutrient Management planner and a Virginia Erosion Sediment and Control Combined Administrator. He is also on the faculty of Radford University.

Mr. Lynde has conducted research for clients on a variety of environmental issues. Some of these issues include the development of passive wetland systems for the treatment of leachate, evaluating the effects of wetland systems used for treating acid mine drainage, agricultural best management practices (BMPs), road construction, white phosphorous contamination, acid mine drainage, and a variety of industrial effluents on stream communities. He has extensive background in both sediment and aqueous phase toxicity testing using novel as well as EPA approved protocols. Some non-standard test approaches include various life stages (juvenile and glochidia) of native mussel species. His background in ecotoxicology led to the development of sediment and aqueous phase toxicity tests for juvenile Asian clams. He managed a watershed-scale ecological risk assessment resulting from an accidental discharge of coal-slurry into waters upstream of endangered species critical habitat, incorporating field biological and chemical monitoring; aqueous and sediment phase toxicity testing; and endangered species surrogate studies and product testing. Mr. Lynde has conducted numerous studies that served as the basis for TMDL development with the Virginia Department of Mines Minerals and Energy.

Mr. Lynde has been an invited presenter at scientific meetings, an invited lecturer in college courses, and has 18 published abstracts and presentations at national and

international scientific meetings. He has provided expert testimony in the areas of water quality, stream and habitat assessment in US Federal Court. He was the first student participant at a SETAC/USEPA sponsored Pellston Series Workshop, and received awards from SETAC and the Smith Mountain Lake Association.

Mr. Lynde's resume can be found in Appendix A.

4.3. Nicole L. Martin

Nicole is the database manager. She received a BS in Wildlife and Biology from Virginia Tech. She has experience in the identification of local plant and animal species, including native birds, reptiles, and mammals. She has worked with the red wolf release program and many endangered species protection programs. She has presented many wildlife related topics to the public through both personal and television appearances.

Ms. Martin is responsible for database maintenance, oversight of QA/QC procedures, and she oversees all sample sorting staff. Nicole has been with ES&C for over six years. During that time, she has improved the company's system for tracking and processing samples, has updated all the company's standard operating procedures, is integral in the on-going process of database management, and has become the company's most proficient sample sorter.

Mrs. Martin's resume can be found in Appendix A.

4.4. Benjamin L. Leatherland

Mr. Leatherland has over 12 years of experience in environmental science and natural resource management, with an additional two years of experience in urban/regional/municipal planning. He is currently responsible for project management, QA/QC review, technical report preparation, and fieldwork coordination. He is experienced in wetland delineation, watershed management and planning, stream restoration enhancement (natural channel design), Section 401/404 water quality permitting, sustainable development planning, habitat restoration and monitoring, wetland evaluation and restoration, lake management, stream surveying, urban/regional planning, NEPA/SEPA Environmental Assessment (EA) documentation, bioengineering stream bank stabilization, construction plan preparation, aquatic bioassessment, wildlife surveying, air pollution monitoring, protected species surveying, cultural/historic resource investigation, plan review, rezoning, surface water/groundwater monitoring, and public

speaking. Mr. Leatherland's M.S. degree research focused on watershed management and growth planning for the Lake Howell/Coddle Creek Reservoir water supply watershed.

Mr. Leatherland's resume can be found in Appendix A.

4.5. John R. Lauth, PHD, Taxonomist

Dr. Lauth received his BS and MS in biology from Bowling Green State University in 1976 and 1983 respectively. He received his PhD in Aquatic Ecotoxicology from Virginia Tech in 1991. His undergraduate and graduate training emphasized the identification and use of marine and freshwater invertebrates in toxicological assessment. He tenured a two year Post Doctoral at the University of Kentucky, supervising a biomonitoring project for Martin Marietta, Oak Ridge National Laboratories. This project compared the infaunal taxonomic evaluation of streams flowing through a large production facility to standard bioassays of water from corresponding sampling stations. During this period, he was involved in several other projects involving benthic surveys.

Dr. Lauth has over 15 years experience in aquatic ecotoxicology. He has received funding for over 20 freshwater and marine studies, involving taxonomic and bioassay evaluations. Projects have involved both government and the private sector.

Dr. Lauth's innovative Modular Mesocosm design is currently in use at the NOAA, Center for Coastal Environmental Health and Biomolecular Research at Charleston, SC. This mesocosm system simulates all major physical characteristics of a saltmarsh habitat freshwater intrusion and tidal flux to saltmarsh zonation. Validation of that design involved extensive taxonomic comparisons to field sites in South Carolina and Virginia. These comparisons included both infaunal and benthic macroscopic and microscopic organisms, demonstrating the ability to support the variety of species found in those natural systems. Unique sampling techniques have been developed for replicate sampling of infaunal taxa in mesocosms. All aspects of this project were coordinated under the supervision of Dr. Geoff Scott at the Center for Coastal Environmental Health and Biomolecular Research.

He has presented and published over 20 unique research papers, not including final reports to granting agencies.

Dr. Lauth has taught Zooplankton Ecology at Virginia Tech. This course had strong emphasis on the identification of freshwater and marine zooplankton and infaunal species. This focus was emphasized as a means of determining ecosystem health and diversity.

4.6. Gerald T. Shepard

Mr. Shepard is the lead taxonomist and lab manager heading ES&C's benthic studies team. Jerry brings to ES&C over 11 years of scholastic and professional experience working with aquatic invertebrate taxonomy, biomonitoring principles, and stream studies. He earned a BS in Ecology and Aquatic Biology from the University of Wisconsin-Superior, and went on to earn a MS in Water Resources Science and Aquatic Ecology from the University of Wisconsin-Stevens Point. His graduate thesis project involved comparing new variations of the Hilsenhoff Biotic Index, utilizing species level taxonomy with samples collected monthly for a full year from riffle and snag habitats. Prior to joining ES&C, Jerry was a key taxonomist with the Great Lakes Environmental Center in Traverse City Michigan, working on the EPA's Wadeable Streams Assessment project. Under this position, he participated in the identification of over 250 macroinvertebrate samples that had been collected throughout the eastern half of the U.S. including Florida, Alabama, Louisiana, Georgia, Virginia, West Virginia, North Carolina, Pennsylvania, New England and New York.

Gerald Shepard's resume can be found in Appendix A.

4.7. Asa Spiller

Asa Spiller is a staff scientist and secondary taxonomist for ES&C. Mr. Spiller earned his B.S. in Environmental Science from Virginia Tech in May of 2008. While a student, Mr. Spiller took a keen interest in aquatic macroinvertebrate systematics. Since joining ES&C in May 2007, Mr. Spiller has become a proficient taxonomist with a high QC rating. Outside of ES&C, he extends his expertise in macroinvertebrate taxonomy by volunteering as a program assistant with the Save Our Streams organization at Virginia Tech.

Mr. Spiller's resume can be found in Appendix A.

5. FACILITY DESCRIPTION

ES&C maintains approximately 1,300 sq ft of space used primarily for processing taxonomic samples. We maintain five workstations used solely for sorting and preparation of samples under a variety of methodologies. Each station has access to at least 10-x magnifications for use in helping to sort macroinvertebrates from debris.

We maintain up to 3 workstations where sample identification takes place with the latest keys. Scopes include stereo dissecting microscopes with magnification of up to 80-x, stereo compound microscopes with magnification up to 1000-x and phase contrast microscopy with magnification up to 1000-x. Additionally, ES&C has the added capability of a universal camera mount and a digital camera that can be attached to any of our microscopes.

ES&C has five computer workstations connected to our internal LAN, and a Windows server, which maintains all the data. The server runs a RAID Array of multiple drives, which allows for recovery of data should we experience a hard drive failure of one of the drives. Data is backed up from the server to another secure machine. Access to all shared drives and files are password secured with access controlled through Microsoft Active Directory. All these machines are protected from internet traffic via a Unix-based firewall. Mail and Web services are handled on separate Unix based machines maintained external to our LAN. All machines run updated virus protection and all internet traffic is scanned at the server for viruses and spam, before delivery.

5.1. Laboratory Information Management System

ES&C has developed a proprietary Laboratory Information Management System (LIMS) dedicated specifically for taxonomic information. Developed on the access platform, this system tracks all samples and subsamples, from time of receipt to final reporting. For each sample, all taxa are stored with their associated phylogenetic information as well as key descriptors including condition, life stage, uniqueness, and quantity. Additionally, if provided by the client, our system can handle many of the habitat and site specific collection parameters used to make assessments including the most commonly used EPA's RBP habitat assessment protocols.

The ES&C LIMS also calculates "on-the-fly" over 100 biological metrics and indices associated with commonly monitored biological data. Some of these metrics

include the most common diversity, structural and functional used in assessments today. Because the functions are programmed into the system, they are calculated the same way sample after sample, reducing many of the errors associated with spreadsheet calculations many other companies use.

ES&C's LIMS incorporates the best characteristics of both analytical laboratory LIMS with a unique biological laboratory system that is second to none in the industry.

5.2. Environmental Sampling Capacity

5.2.1. Taxonomy

For its clients, ES&C routinely provides taxonomic expertise in support of biological assessments. ES&C processes between 50-250 benthic, plankton, and periphyton samples monthly. We have provided these services to a wide range of public/tribal sector clients, including the U.S. Fish and Wildlife Service (Western Region), the Virginia Department of Mines Minerals and Energy, Virginia Department of Environmental Quality, West Virginia Department of Environmental Protection, the Shawnee Nation, and the County of Amherst, Virginia. Our private sector clients include consulting/engineering firms, industrial facilities, mining operations, citizen monitoring groups, and individuals.

Our taxonomists collectively hold level II certifications (genus level) from the North American Benthological Society for Eastern General Arthropods, Eastern EPT (Ephemeroptera, Plecoptera and Trichoptera) Taxa, Eastern Chironomidae, and Western EPT Taxa. ES&C's head taxonomist was trained in species level taxonomy, for most orders of insecta to comply with Wisconsin Department of Natural Resources standards on his graduate thesis project. Examples of some of the genera taken to species include *Isoperla* (*dicala*, *frisoni*, *signata* and *slossonae*), *Taeniopteryx* (*burksi* and *nivalis*), *Ephemerella* (*dorothea*, *subvaria*, *invaria*, *rotunda*), *Brachycentrus* (*americanus* and *numerosus*), *Ceratopsyche* (*bronta*, *morose bifida*, *slossonae*, *sparna* and *vexa*), *Cryptochironomus digitatus*, *Polypedilum* (*convictum*, *fallax*, *illinoense*), and *Caecidotea racovitzai*. On questionable identifications, ES&C has connections with many invertebrate experts who are able to assist with species verifications.

ES&C personnel have collectively processed thousands of benthic samples from a wide array of habitat types. These include both lentic and lotic systems, and from

natural, damaged, and constructed systems. ES&C employees are actively pursuing additional certifications through NABS. Most ES&C personnel working in the benthics program have, at a minimum, undergraduate degrees and most taxonomists have either advanced benthic training, or advanced graduate degrees.

5.2.2. Water Chemistry

At present, ES&C maintains the capability to test for Chlorophyll, Dry weight and Ash Free Dry Weight, Coliform Bacteria, Heterotrophic Bacteria, pH, Hardness, Alkalinity, Conductivity, Dissolved Oxygen, Nitrate and Nitrite in water samples using methodologies provided by either Standard Methods for the Examination of Water and Waste Water, or the US EPA. For Analytes which ES&C is not currently set up to handle in-house by the approved methodologies (metals, gas range organics, etc), ES&C maintains agreements with a number of independent certified laboratories.

For drinking water analysis, all standard operating procedures are based on methodologies approved by the State of Virginia. In 2007, ES&C technicians began assessing drinking water samples for private home owners and real estate transactions. Additionally, ES&C technicians have been analyzing seston and periphyton samples for chlorophyll and ash free dry mass for various projects in Virginia, West Virginia and Texas since the spring of 2008.

5.3. Equipment Availability

Environmental Services & Consulting maintains a full compliment of biomonitoring supplies, allowing the company to conduct biomonitoring operations whenever necessary. In addition to basic biomonitoring field and lab supplies, ES&C's equipment includes, but is not limited to, the following:

- An explosion-proof room for storage of preservative filled samples
- Six dissecting microscopes
- Four compound microscopes
- Global positioning units
- Portable DO, pH, Temperature, and Conductivity meters
- YSI 556 Multimeter (currently set up for DO, pH, Temperature, and Conductivity)
- YSI Pro Plus multimeter (currently set up for DO, pH, Temperature and Conductivity).
- Extensive library of taxonomic identification keys (current list will be provided upon request)
- Gelman filtration funnels and filter pump.
- Drying oven

- Muffle furnace
- VWR 2010 digital incubator
- Boekel digital incubator
- Thermo Scientific Aquamate VIS Water Analysis Spectrophotometer
- Cadmium column (for analysis of nitrate and nitrite in drinking water)
- Auto refilling titration burettes
- VWR Clinical Centrifuge
- VWR Micro Centrifuge
- ISCO Autosampler with raingauge and bubbler attachments
- Various nets and sieves

6. REPRESENTATIVE CLIENT LIST

ES&C has provided environmental consulting services to a wide range of Federal, State, Municipal, Industrial and Commercial Clients. Below is a partial Client listing:

6.1. Federal and Tribal

- United States Fish and Wildlife Service
- United States Federal Emergency Management Agency
- United States Department of Homeland Security
- Eastern Shawnee Tribe of Oklahoma
- The Sac and Fox Nation
- Miami Tribe of Oklahoma
- Environment Canada

6.2. State, Municipal, University and Local Government

- Amherst County, Virginia
- Augusta County, Virginia
- James Madison University
- Montgomery County Maryland Department of Environmental Protection
- New River Community College
- Oklahoma Water Resources Board
- Radford University

- Southwest Virginia Community College
- Town of Appomattox, Virginia
- Town of Round Hill, Virginia
- Town of Scottsburg, Virginia
- Virginia Department of Environmental Quality
- Virginia Department of Forestry
- Virginia Department of Game and Inland Fisheries
- Virginia Department of Mines, Minerals, and Energy
- West Virginia Department of Environmental Protection

6.3. Commercial, Industrial, Engineering, and Developer

6.3.1. Industrial

- Blue Stone Block, Roanoke, VA
- Boxley Aggregates, Inc, Lynchburg, VA
- Tetra, Blacksburg, VA
- Hardy Road Trailer Court, Vinton, VA
- Lakewood Trailer Court, Halifax, VA

6.3.2. Developers

- Boone Homes Inc.
- Fralin & Waldron Developers & Builders Inc.
- Radford Homes Inc.
- Strauss Construction Inc.

6.3.3. Engineering Firms

- Branch Highways, Roanoke Virginia
- Gay & Neel, Christiansburg, Virginia
- Hurt & Proffitt, Lynchburg, Virginia

- KCI Technologies, Hunt Valley, Maryland
- Lumsden Associates, Roanoke, Virginia
- MapTech, Blacksburg, Virginia
- Potesta & Associates, Charleston, West Virginia
- Terradon, Charleston, West Virginia
- Spectrum Designs, Roanoke, Virginia

7. REPRESENTATIVE PROJECTS

ES&C has provided a wide range of environmental consulting services for federal and state agencies, municipalities, and educational institutions since its formation in 1999. A small group of those projects follow.

7.1. Environment Canada

Environment Canada is the Canadian equivalent of the U.S. Environmental Protection Agency (USEPA), and selected ES&C to process and identify aquatic macroinvertebrates from approximately 357 samples in 2010 and an additional 90 samples in 2011. These samples were collected from a wide variety of freshwater habitats, and were processed according to CABIN protocols. These projects were completed on time and within budget, and included voucher collection preparation.

7.2. Nutrient Management Plans – Numerous State Agencies

Nutrient Management Plans (NMP) are used to indicate how primary nutrients, are to be controlled on farm fields and other land for crop production in order to protect groundwater and surface water from unnecessary nutrient enrichment. The plan includes operating procedures based on crop yield, existing nutrient levels in the soil, organic residuals, optimum timing and placement of nutrients, environmental resource protection, and agronomic practices such as liming, tilling, and crop rotation.

On or before July 1, 2006, all state agencies, state colleges and universities, and other state governmental entities that own land upon which fertilizer, manure, sewage sludge or other compounds containing nitrogen or phosphorous are applied to support agricultural, turf, plant growth, or other uses were required to develop and implement a nutrient management plan for such land.

ES&C was selected to prepare the Nutrient Management Plan for numerous state agencies including James Madison University, New River Community College and Southwest Virginia Community College.

7.3. Virginia Department of Mines Minerals and Energy

ES&C has provided stream assessments and taxonomic support for numerous streams in support of TMDL development for Southwest Virginia streams, including the Black Creek watershed, Middle Creek Watershed, Dumps Creek Watershed and Callahan Creek watershed. These projects included collection of all samples as well as data analysis and interpretation.

7.4. Amherst County Landfill

The Closed Amherst County Landfill was leaking leachate into surrounding streams. The leachate was significantly impairing the aquatic life in the receiving system, and the county was failing to meet permit limits for whole effluent toxicity. ES&C was selected to complete the TIE/TRE where the previous consultant failed. ES&C verified the mode of toxicity, and developed a cost effective, phased passive treatment option to eliminate toxicity. A passive system was required because of the rural location and lack of power to the site. The treatment options designed included the use of wetland cells to polish the final effluent. Since the implementation of ES&C's design, the county has not seen any toxicity in their effluent and the receiving system is recovering.

7.5. US Fish and Wildlife Service (FWS) – Sacramento River

Between 1999 and 2001, the FWS collected 75 1-m² quantitative benthic macroinvertebrate samples from the Sacramento River Watershed, CA. The samples were collected in support of the Central Valley Project Improvement Act (P.L. 102-575) which requires doubling the natural production of anadromous fish stocks. ES&C provided taxonomic support as well as biomass for these samples with abundance values as high as 16 thousand individuals per square meter.

7.6. EPA 2004 Eastern Wadeable Stream Assessment

Prior to joining ES&C, the lead taxonomist worked for the Great Lakes Environmental Center out of Traverse City, MI on this project. In cooperation with Tetra Tech Inc, he participated in most aspects of the project including receiving samples, data

entry, QC and training of sorting personnel, and in the identification of 250+ invertebrate samples collected from throughout the Eastern U.S.

7.7. Montgomery County, MD

The Montgomery County Maryland Department of Environmental Quality collects benthic macroinvertebrate samples from local streams and rivers annually as part of their water quality assessment program. These samples are preserved in the field, and a minimum of 100 organisms is sub sampled for identification. ES&C has been contracted to identify the 2006-2008 samples to the lowest practical taxon (typically genus level), with chironomidae (midge flies) and oligochaeta (segmented worms) separated and identified to the subfamily or tribe level. Additionally ES&C is handling data entry and the addition of specimens not currently in the Montgomery County reference collection.

7.8. Black Diamond Ranch

The Black Diamond Ranch is the largest residential development project in the history of Craig County, Virginia. The Black Diamond Ranch will occupy 1,680 acres of land in Maggie, Virginia and will contain 103 individual lots. ES&C was contracted to perform all environmental work associated with this project including stream and wetland delineations, water permitting, and compensatory mitigation. This project was a unique and exciting challenge for Environmental Services and Consulting due to the sheer size of the project, the time constraints involved, as well as various environmental challenges. Environmental Services and Consulting mapped over ten miles of stream and more than 20 wetlands over a 10 day span. Environmental challenges included working with site designers, engineers, and regulatory officials in order to navigate through sensitive issues such as the presence of the federally endangered James Spiny mussel and state threatened Atlantic Pigtoe, road crossings of wild trout waters, and time of year restrictions concerning construction activities. Environmental Services and Consulting has successfully crossed many hurdles over the course of this project and is currently awaiting final approval from the many state and federal agencies involved.

7.9. Martin County Coal

On October 11, 2000, a release of 250 million gallons of coal slurry into Coldwater and Wolf Creeks in Martin County, Kentucky devastated about 100 miles of streams and rivers. Potesta & Associates is one of the engineering firms conducting risk evaluation and clean-up of the system. ES&C was contracted to provide the taxonomic expertise necessary to make the critical evaluations on recovery. In addition to providing taxonomic expertise, ES&C has produced and maintains the reference collection, and provided insight into multiple other issues associated with this project.

7.10. Federally Ordered Lagoon Closure

In 2006, EPA and the State ordered the closure of a sewage lagoon in Bedford County, VA for discharging without a NPDES permit. This high profile case was put under significant scrutiny as a result of the litigation. ES&C was contracted to prepare the closure plan and oversee the closure of lagoon. Approximately 265,000 gallons of water and sludge were pumped from the lagoon and the remaining solids were stabilized in place. Several times during the closure process local regulators inspected the facility with only positive comment. ES&C provided final closure of the lagoon in October 2006, below estimated agency costs.

7.11. Potesta and Associates

Beginning in spring of 2008 to the present, ES&C has been contracted by Potesta and Associates to analyze seston and periphyton samples for Chlorophyll a, Ash Free Dry Mass, and Selenium content. Four to five replicate samples for each analyte, from up to thirty stations are collected from various mining related projects throughout the state of West Virginia, and delivered to ES&C personnel on a bi-weekly basis. Chlorophyll samples are filtered onto Whatman GFF filters within 24 hours of collection, and later processed using SM 10200-H. Ash Free Dry Mass samples are filtered onto pre-ashed and pre-weighed filters before being analyzed according to SM 10300-C.5. Lastly, Selenium samples are filtered onto Teflon filters which are then preserved with a nitric acid solution. These are sent to an outside laboratory for analysis via EPA method 6020.

7.12. Accutest Gulf Coast

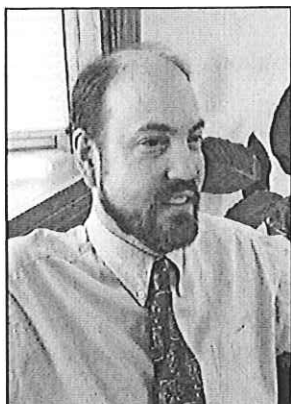
In 2007, ES&C was contracted to identify soft and diatom algae, and run Chlorophyll analysis on phytoplankton samples collected by Accutest Gulf Coast from 3 stations in Southern Texas. The samples were collected from 3 sites within a freshwater stream. Samples were shipped over-night to ES&C in cold storage. Algal samples were preserved with a gluteraldehyde solution immediately upon receipt, and kept in cold storage until they could be identified. Chlorophyll samples were filtered onto GFF filters, frozen, and shipped on ice to an independent laboratory for analysis.

APPENDIX A

ES&C EMPLOYEE RESUMES AND CERTIFICATIONS

STUART R. LYNDE

President



PROJECT ASSIGNMENT

Project Management

EDUCATION

Ph.D. candidate in Biology, Virginia Tech, Blacksburg, Virginia. 1994 to 1999.

M.S. in Zoology (Aquatic Ecotoxicology), Virginia Tech, Blacksburg, Virginia. 1994.

Thesis title: Techniques for Evaluating Power Plant Discharges Using In-situ Leaf Breakdown and Flow-through Sediment Bioassays.

B.S. in Biological Science, Lynchburg College, Lynchburg VA, 1991

CERTIFICATIONS

Virginia Erosion and Sediment Control Combined Administrator, #519, Expires November, 2008

Applied Fluvial Geomorphology, Level I, October, 2004

Virginia Certified Nutrient Management Planner, #486, Expires October, 2006

40-h HAZWOPER training, Expires April, 2005

RELATED EXPERIENCE

Mr. Lynde has conducted research for clients on a variety of environmental issues. Some of these issues include the development of passive wetland systems for the treatment of leachate, evaluating the effects of wetland systems used for treating acid mine drainage, agricultural best management practices (BMPs), road construction, white phosphorous contamination, acid mine drainage, and a variety of industrial effluents on stream communities. He has extensive background in both sediment and aqueous phase toxicity testing using novel as well as EPA approved protocols. Some non-standard test approaches include various life stages (juvenile and glochidia) of native mussel species. His background in ecotoxicology led to the development of sediment and aqueous phase toxicity tests for juvenile Asian clams. He managed a watershed-scale ecological risk assessment resulting from an accidental discharge of coal-slurry into waters upstream of endangered species critical habitat, incorporating field biological and chemical monitoring; aqueous and sediment phase toxicity testing; endangered species surrogate studies and product testing.

Impact Assessments



PROFESSIONAL AFFILIATIONS

American Society for Testing and Materials
North American Benthological Society
Roanoke Regional Homebuilders Association
Virginia Academy of Science
Virginia Association of Wetland Professionals
Virginia Mining Association
Water Environment Federation



NICOLE L. MARTIN

QA/QC, Data Entry Specialist



PROJECT ASSIGNMENT

Laboratory Management

EDUCATION

B.S. in Wildlife Science and Biology, Virginia Tech, Blacksburg, Virginia. 1999.

RELATED EXPERIENCE

Nicole Martin is the database manager for ES&C, and is responsible for database maintenance all QA/QC procedures and overseeing sample sorting staff. She has worked for ES&C for five years, during which she has improved the company's system for tracking and processing samples, has updated all the company's standard operating procedures, is integral in the on-going process of database management, and has become the company's most proficient sample sorter. She received her bachelor's degrees in both wildlife sciences and biology from Virginia Polytechnical Institute in 1999. Nicole has focused her career on both local ecosystems as well as local and exotic species. She has experience in field identification of many local species of flora and fauna. She has also provided species identification services to the public for native birds, reptiles and mammals in all life stages. Nicole Martin is also familiar with modern and traditional wildlife management practices. She has participated in an ongoing study of white-footed mouse distribution through various habitat types and a salamander species distribution study using capture and release methods. She has worked with the red wolf release program and many endangered species protection programs. Nicole Martin has studied many wildlife issues and has presented these issues to the public through both personal presentation and television appearances.

PROFESSIONAL AFFILIATIONS

American Society for Testing and Materials

North American Benthological Society

Roanoke Regional Homebuilders Association

Virginia Academy of Science

Virginia Association of Wetland Professionals

Virginia Mining Association

Water Environment Federation



JOHN R. LAUTH, PHD

Taxonomist

PROJECT ASSIGNMENT

Taxonomy/Sample Prep

EDUCATION

Virginia Polytechnic Institute and State University, Ph.D. in Zoology, December, 1990.

Dissertation Title: Incorporation of single species, short term chronic toxicity test methodology into a multi-level community based toxicity test.

Bowling Green State University, MS in Biological Science, 1983

Thesis Title: The effects of chrysotile asbestos on a planktonic alga (*Cryptomonas erosa* var *Reflexa* Marsson).

University of Miami Field Station at Pigeon Key, Summer Session, 1975

Gulf Coast Research Laboratory, Summer Session, 1975

Bowling Green State University, BS in Biological Science, 1976

RELATED EXPERIENCE

Dr. Lauth received his Bachelors and Masters of Science in biology from Bowling Green State University in 1976 and 1983 respectively. He received his PhD in Aquatic Ecotoxicology from Virginia Tech in 1991. His undergraduate and graduate training emphasized the identification and use of marine and freshwater invertebrates, zooplankton, periphyton, and phytoplankton in toxicological assessment. He tenured a two year Post Doctoral at the University of Kentucky, supervising a biomonitoring project for Martin Marietta, Oak Ridge National Laboratories. This project compared the infaunal taxonomic evaluation of streams flowing through a large production facility to standard bioassays of water from corresponding sampling stations. During this period, he was involved in several other projects involving benthic surveys.

Dr. Lauth has over 15 years experience in aquatic ecotoxicology. He received funding for over 20 freshwater and marine studies, involving taxonomic and bioassay evaluations utilizing zooplankton, phytoplankton, periphyton, benthic organisms, etc. Projects have involved both government and the private sector clients.



Dr. Lauth's innovative Modular Mesocosm design is currently in use at the NOAA, Center for Coastal Environmental Health and Biomolecular Research at Charleston, SC. This mesocosm system simulates all major physical characteristics of a saltmarsh habitat freshwater intrusion and tidal flux to saltmarsh zonation. Validation of that design involved extensive taxonomic comparisons to field sites in South Carolina and Virginia. These comparisons included both infaunal and benthic macroscopic and microscopic organisms, demonstrating the ability to support the variety of species found in those natural systems. Unique sampling techniques have been developed for replicate sampling of infaunal taxa in mesocosms. All aspects of this project were coordinated under the supervision of Dr. Geoff Scott at the Center for Coastal Environmental Health and Biomolecular Research.

PUBLICATIONS

DeLorenzo, M.E., J. Lauth, P.L. Pennington, G.I. Scott and P.E. Ross. 1999. Atrazine effects on the microbial food web in tidal creek mesocosms. *Aquat. Toxicol.* 46: 241-251.

Dyer S D, Lauth J R, Morrall S W, Herzog R R, Cherry D S. 1997. Development of a Chronic Toxicity Structure Activity Relationship for Alkyl Sulfates. *Environmental Toxicology and Water Quality*.295-303

Dyer S D, Stanton D T, Lauth J R, Cherry D S. 1998. Acute and Chronic Structure Activity Relationships for Alcohol Ether Sulfates. *Environmental Toxicology & Chemistry*.

Dyer SD, Stanton DT, Lauth JR & Cherry DS. 2000. Structure-activity relationships for acute and chronic toxicity of alcohol ether sulfates. *Environmental Toxicology and Chemistry* 19: 608-616

Lauth, J.R., S.D. Dyer, S.E. Belanger, and D.S. Cherry. 1996. A novel flow-through method for toxicity assessments using *Ceriodaphnia dubia*. *Environmental Toxicology and Water Quality* 11:335-343

Lauth, J. R., G.I. Scott, D.S. Cherry and A.L. Buikema. 1996. A Modular Estuarine Mesocosm. *Environmental Toxicology and Chemistry* 15:630-637.

Lauth, J.R., D.S. Cherry and J. Cairns Jr. 1990. A single reconstituted water formulation for the culture and toxicity testing of algae, invertebrates and fish. *Environmental Auditor* 1:209-219.



PUBLISHED ABSTRACTS

Lauth, J. and K. Schurr. 1984. Entry of chrysotile asbestos fibers from water into the planktonic alga (*Cryptomonas erosa*). *Micron and Microscopica Acta* 15:113-114.

Lauth, J. and K. Schurr. 1983. Some effects of chrysotile asbestos on a planktonic algae (*Cryptomonas erosa*). *Micron* 14:93-94.

Lauth, J., S. Shepka and K. Schurr. 1983. Observations on the ultrastructure of *Aurelia aurita*, Scyphistoma. *Micron* 14:95-96.

Lauth, J. and B. Rosen. 1982. Observations on variations in the lateral antennae apertures of soft bodied and loricate pelagic rotifers. *Micron* 13:55-56.

PROFESSIONAL AFFILIATIONS

Society of Environmental Toxicology and Chemistry



GERALD T. SHEPARD

Senior Scientist



PROJECT ASSIGNMENT

Aquatic Entomologist / Head Taxonomist

Erosion and Sediment Inspector

EDUCATION

M.S. in Water Resources Ecology. University of Wisconsin – Stevens Point, 2002

B.S. in Ecology and Aquatic Biology. University of Wisconsin – Superior. 1997

CERTIFICATIONS

NABS Invertebrate Taxonomy Level II – Eastern Chironomidae – February 2006.

NABS Invertebrate Taxonomy Level II – Eastern EPT Taxa – June 2007

NABS Invertebrate Taxonomy Level II - Eastern General Arthropods - May 2009

NABS Invertebrate Taxonomy Level II - Western EPT Taxa - May 2009

Virginia Dept. of Conservation Erosion and Sediment Control Inspector – March 2006

PUBLICATIONS

G. T. Shepard and S. W. Szczytko. 2001. Comparison between Riffle and Snag Habitats in a Central Wisconsin Trout Stream Using Modified Biotic Indices. Poster Abstract, Bulletin of the North American Benthological Society, 18(1).

G.T. Shepard. 2002. Establishment of a True Biotic Index and Comparison between Riffle and Snag Habitats in Bearskin Creek, Oneida County Wisconsin, Using a Modified Biotic Index. M.S. Thesis. University of Wisconsin, Stevens Point.

G.T. Shepard, S.R. Lynde, and N.L. Martin. 2007. Does Failure in Sorting Really Affect the Data? Poster Abstract. Bulletin of the North American Benthological Society. 24 (1)

RELATED EXPERIENCE

Jerry brings to ES&C over 9 years of scholastic and professional experience working with aquatic invertebrate taxonomy, biomonitoring principles, and stream studies. He earned a BS in Ecology and Aquatic Biology from the University of Wisconsin-Superior, and went on to earn a

MS in Water Resources Ecology from the University of Wisconsin-Stevens Point. His graduate project involved comparing new variations of the Hilsenhoff Biotic Index, utilizing species level taxonomy with samples from riffle and snag habitats, collected monthly over the course of a year. He presented some of his preliminary results at the NABS 2001 meeting in Lacrosse, WI. During his studies Jerry also assisted undergraduate students by leading field trips and holding study sessions for the aquatic entomology course. He also worked in the Wisconsin Aquatic Entomology Laboratory sorting and identifying invertebrate samples for the Wisconsin Department of Natural Resources. Prior to joining ES&C Jerry was a key taxonomist with the Great Lakes Environmental Center in Traverse City Michigan, working on the EPA's Wadeable Streams Assessment project. Under this position, he helped to train sorting personnel and participated in the genus level identification of over 250 macroinvertebrate samples collected from throughout the eastern half of the U.S. including Florida, Alabama, Louisiana, Georgia, Virginia, West Virginia, North Carolina, Pennsylvania, New Jersey, and New York. Currently Jerry serves as ES&C's top invertebrate taxonomist and lab manager, with duties that include identification of samples, management of the company reference library, oversight of laboratory operations including sorting personnel and other taxonomists, oversight of benthic field operations, and researching threatened or endangered species habitat and locality info for development permitting applications. Jerry also serves as an erosion and sediment inspector, monitoring construction sites to ensure compliance with state sediment control minimum standards.

PROFESSIONAL AFFILIATIONS

American Society for Testing and Materials

North American Benthological Society

Roanoke Regional Homebuilders Association

Virginia Academy of Science

Virginia Association of Wetland Professionals

Virginia Mining Association

Water Environment Federation

Wisconsin Cooperative Fisheries Research Unit

TAXONOMIC Certification

This certificate is awarded to

GERALD T. SHEPARD

*in recognition of the successful completion for
Level 2 Group 3 Eastern Chironomidae*

NORTH AMERICAN BENTHOLOGICAL SOCIETY




Dr. Trevor Reynoldson

Feb 1st 2006
Date

TAXONOMIC CERTIFICATION


This certificate is awarded to

GERALD SHEPARD

in recognition of the successful completion for

LEVEL 2 GROUP 2 EASTERN EPHEMEROPTER, PLECOPTERA and TRICHOPTERA

NORTH AMERICAN BENTHOLOGICAL SOCIETY



Dr. Trefor Reynoldson

June 1, 2007
Date

TAXONOMIC CERTIFICATION

This certificate is awarded to

GERALD SHEPARD

In recognition of excellence for specimen identification to Genus

Eastern Arthropods

NORTH AMERICAN BENTHOLOGICAL SOCIETY



Dr. Murray Colbo

Date

June, 2009

TAXONOMIC CERTIFICATION


This certificate is awarded to

GERALD SHEPARD

In recognition of excellence for specimen identification to Genus

Western Ephemeroptera, Plecoptera & Trichoptera

NORTH AMERICAN BENTHOLOGICAL SOCIETY



Murray Colbo

Dr. Murray Colbo

Date

June, 2009

ASA SPILLER

Staff Scientist/Taxonomist

PROJECT ASSIGNMENT

Aquatic Invertebrate Taxonomist

EDUCATION

B.S. in Environmental Science from Virginia Tech, Blacksburg, Virginia. 2008.

CERTIFICATIONS

Save our Streams Volunteer Biomonitoring

NABS Level II Group 1 Eastern General Arthropods Certification

NABS Level II Group 2 Eastern EPT Certification

RELATED EXPERIENCE

Asa Spiller is a staff scientist at Environmental Services & Consulting. Asa brings 5 years of scholastic experience with work in aquatic and terrestrial biology with a focus on freshwater ecology and aquatic entomology. Asa's primary duties include taxonomic classification (to genus level), secondary quality control identification of aquatic invertebrates as well as field coordination and project management. His fieldwork experience includes aquatic macroinvertebrate sampling, stream surveying, stream rating using Virginia's Unified Stream Methodology, GPS surveys using a Trimble unit, as well as testing and monitoring of chemical and physical characteristics of both lakes and streams.

PROFESSIONAL AFFILIATIONS

Soil and Water Conservation Society

American Society for Testing and Materials

North American Benthological Society

Roanoke Regional Homebuilders Association

Virginia Academy of Science

Virginia Association of Wetland Professionals

Virginia Mining Association

Water Environment Federation



TAXONOMIC CERTIFICATION

This certificate is awarded to

ASA SPILLER

in recognition of excellence in specimen identifications to Genus for

Eastern Ephemeroptera, Plecoptera and Trichoptera

NORTH AMERICAN BENTHOLOGICAL SOCIETY



Dr. Trefor Reynoldson

October, 2008

Date

TAXONOMIC CERTIFICATION


This certificate is awarded to

ASA SPILLER

*In recognition of excellence for specimen identification to Genus
Eastern Other Arthropods*

NORTH AMERICAN BENTHOLOGICAL SOCIETY




Dr. Murray Colbo

Date

September, 2009

APPENDIX B
ES&C REFERENCE LIST

**Taxonomic References Possessed By or Available
to Environmental Services and Consulting**

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Balcer, M.D., N.L. Korda, and S.I. Dodson. 1986. Zooplankton of the Great Lakes: A Guide to the Identification and Ecology of the Common Crustacean Species. University of Wisconsin Press. 174 pp.

MACROINVERTEBRATES

GENERAL WORKS

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Thorp, J.H, and A.P. Covich. 1991. Ecology and Classification of North American Freshwater Invertebrates. Academic Press, Inc. 911 p *

OLIGOCHAETA

Kathman R.D. and R.O. Brinkhurst. 1998. Guide to the Freshwater Oligochaetes of North America. College Grove, TN: Aquatic Resources Center.

Klemm, D.J. (ed.) 1985. A guide to the Freshwater Annelida (Polychaeta, Naididae and Tubificid Oligochaeta, and Hirudinea) of North America. (in part)

Milligan, M. R. 1997. Identification Manual for the aquatic Oligochaeta of Florida. Vol. I. Freshwater oligochaetes. State of Florida Department of Environmental Protection Division of Water Facilities Tallahassee. 194 p.

Brinkhurst, R.O. 1986. Taxonomy of the Genus Tubificoides (Oligochaeta, Tubificidae): Species with Bifid Setae. Canadian Journal of Zoology. Vol. 64.

HIRUDINEA

Klemm, D.J. 1982. Leeches (Annelida: Hirudinea) of North American. USEPA Environmental Monitoring and Support Laboratory. EPA-600/3-82-025. 170 p. *

Klemm, D.J. 1995. Identification guide to the freshwater Leeches (Annelida: Hirudinae) of Florida and Other Southern States. State of Florida Department of Environmental Protection Division of Water Facilities Tallahassee. 88 p.

NEMATODES

Ferris, V.R., J.M Ferris, and J.P. Tjepkema. 1973. Genera of Freshwater Nematodes (Nematoda) of Eastern North America. USEPA. 905R73108

CRUSTACEA

General

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Amphipoda

Chapman, J.W. 1988. Invasions of the Northeast Pacific by Asian and Antlantic Gammaridean Amphipod Crustacians, Including a New Species of *Corophium*. *Journal of Crustacean Biology*. Vol 8, Issue 3. 364-382.

Holsinger, J.R. 1976. The freshwater amphipod crustaceans (Gammaridae) of North America. USEPA Water Pollution Control Research Series 18050 ELDO4/72. 89 p.

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Decapoda

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Isopoda

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MOLLUSCA

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