



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

Request for Quotation

RFO NUMBER
DEP13876

PAGE
1

ADDRESS CORRESPONDENCE TO ATTENTION OF
CHUCK BOWMAN
304-558-2157

VENDOR

*414125026 208-882-2588
 ECOANALYSTS INC
~~105 EAST 2ND STREET SUITE 1~~
 1420 South Blaine ST, Suite 14
 MOSCOW ID 83843

SHIP TO

ENVIRONMENTAL PROTECTION
 DEPARTMENT OF
 OFFICE OF WATER RESOURCES
 601 57TH STREET SE
 CHARLESTON, WV
 25304 304-926-0499

DATE PRINTED	TERMS OF SALE	SHIP VIA	FOB	FREIGHT TERMS
07/31/2008				

BID OPENING DATE: **08/28/2008** BID OPENING TIME **01:30PM**

LINE	QUANTITY	UOP	CAT NO	ITEM NUMBER	UNIT PRICE	AMOUNT
0001	1	JB		493-09	\$422.50	
				<p>WATER, WASTE WATER AND SOIL SAMPLE ANALYSIS</p> <p>OPEN END CONTRACT</p> <p>THE WEST VIRGINIA PURCHASING DIVISION, FOR THE AGENCY, THE WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION, IS SOLICITING BIDS TO PROVIDE FOR THE PROCESSING AND IDENTIFICATION OF PERIPHYTON SAMPLES FOR THE DIVISION OF WATER AND WASTE MANAGEMENT, WATERSHED ASSESSMENT BRANCH, PER THE ATTACHED SPECIFICATIONS, TERMS, CONDITIONS AND BID REQUIREMENTS.</p> <p>PLEASE NOTE THERE ARE MANDATORY BID SUBMISSION REQUIREMENTS LISTED UNDER "QUALIFICATIONS" IN THE ATTACHED SPECIFICATIONS. THE QUALIFICATION CRITERIA LISTED IS MANDATORY AND MUST ACCOMPANY THE BID SUBMITTAL IN ORDER FOR THE BID TO BE CONSIDERED FOR AWARD. FAILURE TO INCLUDE THIS INFORMATION WILL RESULT IN DISQUALIFICATION OF THE VENDOR'S BID.</p> <p>EXHIBIT 3</p> <p>LIFE OF CONTRACT: THIS CONTRACT BECOMES EFFECTIVE UPON THE 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</p>		

RECEIVED
08 AUG 27 AM 9:51
 PURCHASING DIVISION
 STATE OF WV

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE	TELEPHONE	DATE
	(208) 882-2588	8-26-08
TITLE	FEIN	ADDRESS CHANGES TO BE NOTED ABOVE
	820476170	

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. All quotations are governed by the *West Virginia Code* and the *Legislative Rules* of the Purchasing Division.
4. Prior to any award, the apparent successful vendor must be properly registered with the Purchasing Division and have paid the required \$125.00 registration fee.
5. All services performed or goods delivered under State Purchase Orders/Contracts are to be continued for the term of the Purchase Order/Contract, 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.
6. Payment may only be made after the delivery and acceptance of goods or services.
7. Interest may be paid for late payment in accordance with the *West Virginia Code*.
8. Vendor preference will be granted upon written request in accordance with the *West Virginia Code*.
9. The State of West Virginia is exempt from federal and state taxes and will not pay or reimburse such taxes.
10. The Director of Purchasing may cancel any Purchase Order/Contract upon 30 days written notice to the seller.
11. The laws of the State of West Virginia and the *Legislative Rules* of the Purchasing Division shall govern all rights and duties under the Contract, including without limitation the validity of this Purchase Order/Contract.
12. Any reference to automatic renewal is hereby deleted. The Contract may be renewed only upon mutual written agreement of the parties.
13. **BANKRUPTCY:** In the event the vendor/contractor files for bankruptcy protection, this Contract may be deemed null and void, and terminated without further order.
14. **HIPAA Business Associate Addendum:** The West Virginia State Government HIPAA Business Associate Addendum (BAA), approved by the Attorney General, and available online at the Purchasing Division's web site (<http://www.state.wv.us/admin/purchase/vrc/hipaa.htm>) is hereby made part of the agreement. Provided that, the Agency meets the definition of a Covered Entity (45 CFR §160.103) and will be disclosing Protected Health Information (45 CFR §160.103) to the vendor.
15. **West Virginia Alcohol & Drug-Free Workplace Act:** If this Contract constitutes a public improvement construction contract as set forth in Article 1D, Chapter 21 of the West Virginia Code ("The West Virginia Alcohol and Drug-Free Workplace Act"), then the following language shall hereby become part of this Contract: "The contractor and its subcontractors shall implement and maintain a written drug-free workplace policy in compliance with the West Virginia Alcohol and Drug-Free Workplace Act, as set forth in Article 1D, Chapter 21 of the West Virginia Code. The contractor and its subcontractors shall provide a sworn statement in writing, under the penalties of perjury, that they maintain a valid drug-free work place policy in compliance with the West Virginia Alcohol and Drug-Free Workplace Act. It is understood and agreed that this Contract shall be cancelled by the awarding authority if the Contractor: 1) Fails to implement its drug-free workplace policy; 2) Fails to provide information regarding implementation of the contractor's drug-free workplace policy at the request of the public authority; or 3) Provides to the public authority false information regarding the contractor's drug-free workplace policy."

INSTRUCTIONS TO BIDDERS

1. Use the quotation forms provided by the Purchasing Division.
2. **SPECIFICATIONS:** 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. Complete all sections of the quotation form.
4. Unit prices shall prevail in cases of discrepancy.
5. All quotations are considered F.O.B. destination unless alternate shipping terms are clearly identified in the quotation.
6. **BID SUBMISSION:** 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



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<p>WRITTEN NOTICE.</p> <p>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.</p> <p>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) 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 SERVICE 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>						

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE 	TELEPHONE 1208) 882-2588	DATE 8-26-08
TITLE CFO	FEIN 820476170	ADDRESS CHANGES TO BE NOTED ABOVE

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<p>ORDERING PROCEDURE: SPENDING UNIT(S) SHALL ISSUE A WRITTEN STATE CONTRACT ORDER (FORM NUMBER WV-39) TO THE VENDOR FOR COMMODITIES COVERED BY THIS CONTRACT. THE ORIGINAL COPY OF THE WV-39 SHALL BE MAILED TO THE VENDOR AS AUTHORIZATION FOR SHIPMENT, A SECOND COPY MAILED TO THE PURCHASING DIVISION, AND A THIRD COPY RETAINED BY THE SPENDING UNIT.</p> <p>BANKRUPTCY: IN THE EVENT THE VENDOR/CONTRACTOR FILES FOR BANKRUPTCY PROTECTION, THIS CONTRACT IS AUTOMATICALLY NULL AND VOID, AND IS TERMINATED 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 AGREEMENTS OR MAINTENANCE AGREEMENTS, INCLUDING ANY ELECTRONIC MEDIUM SUCH AS CD-ROM.</p> <p>REV. 04/11/2001</p> <p>EXHIBIT 10</p> <p>REQUISITION NO.:</p> <p>ADDENDUM ACKNOWLEDGEMENT</p> <p>I HEREBY ACKNOWLEDGE RECEIPT OF THE FOLLOWING CHECKED ADDENDUM(S) AND HAVE MADE THE NECESSARY REVISIONS TO MY PROPOSAL, PLANS AND/OR SPECIFICATION, ETC.</p> <p>ADDENDUM NO.'S: N/A</p>						

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SIGNATURE 	TELEPHONE 208 882-2588	DATE 8-26-08
TITLE CEO	FEIN 820476170	ADDRESS CHANGES TO BE NOTED ABOVE

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	NO. 1					
	NO. 2					
	NO. 3					
	NO. 4					
	NO. 5					
<p>I UNDERSTAND THAT FAILURE TO CONFIRM THE RECEIPT OF THE ADDENDUM(S) MAY BE CAUSE FOR REJECTION OF BIDS.</p> <p style="text-align: center;">VENDOR PREFERENCE CERTIFICATE</p> <p>CERTIFICATION AND APPLICATION* IS HEREBY MADE FOR PREFERENCE IN ACCORDANCE WITH WEST VIRGINIA CODE, 5A-3-37 (DOES NOT APPLY TO CONSTRUCTION CONTRACTS).</p> <p>A. APPLICATION IS MADE FOR 2.5% PREFERENCE FOR THE REASON CHECKED:</p> <p>() BIDDER IS AN INDIVIDUAL RESIDENT VENDOR AND HAS RESIDED CONTINUOUSLY IN WEST VIRGINIA FOR FOUR (4) YEARS IMMEDIATELY PRECEDING THE DATE OF THIS CERTIFICATION; OR</p> <p>() BIDDER IS A PARTNERSHIP, ASSOCIATION OR CORPORATION RESIDENT VENDOR AND HAS MAINTAINED ITS HEAD-QUARTERS OR PRINCIPAL PLACE OF BUSINESS CONTINUOUSLY IN WEST VIRGINIA FOR FOUR (4) YEARS IMMEDIATELY PRECEDING THE DATE OF THIS CERTIFICATION; OR 80% OF THE OWNERSHIP INTEREST OF BIDDER IS HELD BY ANOTHER INDIVIDUAL, PARTNERSHIP, ASSOCIATION OR CORPORATION RESIDENT VENDOR WHO HAS MAINTAINED ITS HEADQUARTERS OR PRINCIPAL PLACE</p>						

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<p>FAILED TO CONTINUE TO MEET THE REQUIREMENTS FOR SUCH PREFERENCE, THE SECRETARY MAY ORDER THE DIRECTOR OF PURCHASING TO: (A) RESCIND THE CONTRACT OR PURCHASE ORDER ISSUED; OR (B) ASSESS A PENALTY AGAINST SUCH BIDDER IN AN AMOUNT NOT TO EXCEED 5% OF THE BID AMOUNT AND THAT SUCH PENALTY WILL BE PAID TO THE CONTRACTING AGENCY OR DEDUCTED FROM ANY UNPAID BALANCE ON THE CONTRACT OR PURCHASE ORDER.</p> <p>BY SUBMISSION OF THIS CERTIFICATE, BIDDER AGREES TO DISCLOSE ANY REASONABLY REQUESTED INFORMATION TO THE PURCHASING DIVISION AND AUTHORIZES THE DEPARTMENT OF TAX AND REVENUE TO DISCLOSE TO THE DIRECTOR OF PURCHASING APPROPRIATE INFORMATION VERIFYING THAT BIDDER HAS PAID THE REQUIRED BUSINESS TAXES, PROVIDED THAT SUCH INFORMATION DOES NOT CONTAIN THE AMOUNTS OF TAXES PAID NOR ANY OTHER INFORMATION DEEMED BY THE TAX COMMISSIONER TO BE CONFIDENTIAL.</p> <p>UNDER PENALTY OF LAW FOR FALSE SWEARING (WEST VIRGINIA CODE 61-5-3), BIDDER HEREBY CERTIFIES THAT THIS CERTIFICATE IS TRUE AND ACCURATE IN ALL RESPECTS; AND THAT IF A CONTRACT IS ISSUED TO BIDDER AND IF ANYTHING CONTAINED WITHIN THIS CERTIFICATE CHANGES DURING THE TERM OF THE CONTRACT, BIDDER WILL NOTIFY THE PURCHASING DIVISION IN WRITING IMMEDIATELY.</p> <p>BIDDER: <u>EcoAnalysts, Inc.</u></p> <p>DATE: <u>8-26-08</u></p> <p>SIGNED: <u>[Signature]</u></p>						

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE <u>[Signature]</u>	TELEPHONE <u>(208) 882-2588</u>	DATE <u>8-26-08</u>
TITLE <u>CEO</u>	FEIN <u>820476170</u>	ADDRESS CHANGES TO BE NOTED ABOVE

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<p>PLEASE PROVIDE A FAX NUMBER IN CASE IT IS NECESSARY TO CONTACT YOU REGARDING YOUR BID:</p> <p>----- (208) 883-4288 -----</p> <p>CONTACT PERSON (PLEASE PRINT CLEARLY):</p> <p>----- Noël Jensen -----</p>						
<p>***** THIS IS THE END OF RFQ DEP13876 ***** TOTAL: _____</p>						

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CONTRACT SPECIFICATIONS FOR PERIPHYTON SAMPLE PROCESSING AND IDENTIFICATION

AREA OF WORK / BID AWARD

The West Virginia Department of Environmental Protection, Division of Water and Waste Management (DWWM) is seeking bids for the processing and identification of diatoms and soft algae from periphyton samples collected from streams of West Virginia. Personnel from DWWM's Watershed Assessment Section will collect and preserve the samples. There are typically between 250 and 350 samples collected each year that would need processed and identified. As of 6/2008, we have a backlog of around 425 samples, of which, approximately 300 would be shipped upon finalization of contract.

Bids should be submitted by vendors in connection with the costs associated with processing (including cleaning and preparation of slides for diatoms) and identification of diatoms and soft algae from the periphyton samples.

QUALIFICATIONS

The 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 studies, and provides water quality information to the citizens of West Virginia and other government agencies. Legal action based upon identification results is possible. Therefore, the vendor(s) selected must have a quality control program in place and meet the following qualifications:

1. Degreed biologist on staff **who performs the actual identifications**. Must have at least 2 years experience in the identification of algae samples. (Identification of organisms by non-professional personnel is strictly forbidden)
2. Capable of attending and providing expert testimony in legal proceedings, upon request.
3. Experience demonstrating ability to process and identify up to 30 samples per month.

In order to verify the vendor meets the above criteria, the vendor must submit a description of how the project will be managed by the contractor, a summary of experience with sorting and identification of periphyton, a description of how the samples will be processed and identified, and a description of vendor's internal QA/QC procedures.

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 contractor's responsibility, are divided into four (4) major steps:

- STEP 1 - Collection of sample from specified office.
- STEP 2 - Conduct specified analysis on samples in a timely and professional manner.
- STEP 3 - Establishment of continuing program to ensure the reliability of data (Quality Assurance/Quality Control).
- STEP 4 - Legal Testimony

Step 1 - Collection of Samples from Specified Office

Collection of periphyton samples shall be conducted by DWWM personnel. Each sample will be a 100 ml graduated container (or similar) with periphyton scraped from 5 rocks mixed with rinse water and preserved with formalin. These will generally be total samples. There will be some split for QA purposes. The vendor will be notified of sample shipment. Costs of sample shipment to the vendor will be borne by the DWWM. Costs to return identified slides and results to the DWWM will be the sole responsibility of the successful bidder(s). The vendor shall be responsible for preservation of the sample and the internal chain of custody from the time the vendor obtains the sample until the time the analysis is accepted by the Division. The vendor shall also maintain records of the results of identification for a minimum of three (3) years.

Step 2 - Conduct Specified Analysis on Samples

Processing and Identification of Periphyton Samples shall be carried out according to the vendor's procedures as defined in response to this request.

Results of identifications shall be submitted to DWWM at a rate of at least 30 samples per month, starting 30 days from the receipt of samples or at an alternate rate that is determined acceptable by DWWM.

Analysis of samples is not deemed completed until the data has been submitted to and accepted by the DWWM. Should the 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.

Step 3 - Quality Control

Quality control procedures should be well defined and strictly adhered to in all aspects of processing, storage, and identification. Quality control procedures must be submitted as part of this bidding process. Any cost for internal QA/QC procedures should be incorporated into the cost / sample bid.

PRIME VENDOR RESPONSIBILITIES

A vendor, who is awarded a contract, when performing work under the terms and conditions of this contract, is solely responsible for the satisfactory completion of the work. The prime vendor shall be responsible for ensuring that any subcontractors have all the necessary permits, certifications, experience and insurance to perform the work. 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 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 DWWM.

DEP reserves the right to award the contract to the two (2) lowest vendors. The second vendor would receive approximately 10% of the samples and act as a QA/QC.

SPECIFICATIONS FOR PERIPHYTON PROCESSING AND IDENTIFICATION

“Soft” (Non-Diatom) Algae – Relative Abundance and Taxa Richness

Homogenize the sample with a blender. Pipette a subsample into a Palmer counting cell. Permanent mounting techniques can be utilized if preferred. Dilute samples if cells overlap too much for counting. Identify and count 300 algal non-diatom units to the lowest taxonomic level (which should be genus and perhaps species level) at a magnification of at least 400X (higher levels of magnification are permissible). Cell units, of 10 μm length, should be counted instead of individual cells for filamentous species (or measure average cells per filament based on average cell length per filament). Individual cells of colonial species should be counted when appropriate. Count live and dead (those with no cell content) diatoms separately, recording only the number of each observed in order to determine live: dead diatom ratio (identification will be done on the cleaned samples). Record numbers of non-diatom algal units on the non-diatom bench sheet that should be similar to the example provided in Appendix A of EPA's *Rapid Bioassessment Protocols for Use in Wadeable Streams and Rivers 1999* (Barbour et. al.) http://www.epa.gov/owow/monitoring/rbp/app_a.html. All undigested samples shall be archived and returned to the WVDEP at the cessation of the contract or upon request.

Calculate Biovolume / Biomass

Biomass should be calculated for the most abundant taxa ($> 10\%$ of sample) at minimum, it is fine to include measurements for all taxa. A minimum of 15 measurements (length and width) should be taken for these species. The average measurements are used to calculate the biovolume, which is then converted to biomass, assuming a specific gravity of 1. The biomass of each species is calculated based on the abundance of that species and adjusted for original sample volume.

Diatoms

Clear diatom frustules of organic and intercellular material using either 'Nitric Acid Oxidation' or 'Hydrogen Peroxide / Potassium Dichromate Oxidation'. Prepare slides and identify diatoms at 1000X to the lowest possible taxonomic level, preferably to the species or variety level, using current taxonomic references. Record all taxa encountered on the diatom bench sheet creating a species list prior to enumeration. Scan the slide until several minutes pass without producing any new taxa. For QA/QC reasons, the Contractor shall mark the beginning and end of each transect on each diatom slide using a diamond scribe, and note the length. All slides, split samples and the

digested slurry shall be archived and returned to the WVDEP at the cessation of the contract or upon request. For quantitative data, count a minimum of 600 valves recording taxa and number counted on the diatom bench sheet.

Taxonomic Resolution

Using modern literature, the contractor shall identify soft algae to genus and, if possible species, and the diatoms to the lowest possible level, which should be species and perhaps variety/subspecies. Diatoms shall be counted if they have intact frustules in the field of view. We seek a standardized level of taxonomy across all samples; at the same time we recognize that for some taxa, this goal is not reasonably achievable. These circumstances shall be noted in a comments portion of the data files.

QA/QC analysis

The Contractor shall provide the prepared diatom slides to the WVDEP in groups of approximately 30 samples, which shall include samples that are completely identified, enumerated, error-checked, data entered and verified, and shall be provided to the WVDEP with database output in electronic format. WVDEP will provide a database for this purpose. WVDEP will conduct a QA check on at least three of the first 30 samples. Sixty percent (60%) community similarity (PCS) is the lower limit in order for the Contractor to be paid for all services related to that batch of 30 samples. The Contractor shall continue to process and identify samples while the WVDEP is conducting the QA/QC analyses, unless informed otherwise. Should PCS during QA/QC be found to be between 60% - 100%, the Contractor's analysis results will be accepted and the contractor shall continue to process and identify samples in groups of 30, returning identified organisms and data sheets for each such group upon completion, until all samples have been processed. If at any point WVDEP determines that PCS is below 60%, the WVDEP will inform the Contractor in writing that the batch is not acceptable. The batch will be shipped back to the Contractor at the Contractor's expense for a second opportunity to meet the 60% PCS level within 15 days of receiving the batch. The Contractor shall expeditiously ship all counted algal samples and data sheets (bench sheets in electronic or paper format) from the returned batch to the WVDEP. If the Contractor's PCS level is greater than or equal to 60%, the Contractor shall be informed that the batch is accepted and may continue to process and identify samples with 10% of all samples undergoing QA/QC as previously noted. If the Contractor's PCS remains under 60%, or is again found to be below 60% at any time during the remainder of the contract period,

the WVDEP reserves the right to either ask the Contractor to proceed with trying to reach the 60% PCS level or terminate the contract for default.

Reporting

All taxa, counts, and biomass information should be entered into the database that WVDEP will provide. In addition, the lab will provide copies of all bench sheets generated (either paper or electronic) which includes all site information, including stream name, stream code, stream mile (if provided), date collected, collector's name, taxonomist's name, and date identified. If vendor typically calculates metrics, provide bids both with and without these calculations.

STATE OF WEST VIRGINIA
Purchasing Division**PURCHASING AFFIDAVIT****VENDOR OWING A DEBT TO THE STATE:**

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

PUBLIC IMPROVEMENT CONTRACTS & DRUG-FREE WORKPLACE ACT:

West Virginia Code §21-1D-5 provides that: Any solicitation for a public improvement construction contract shall require each vendor that submits a bid for the work to submit at the same time an affidavit that the vendor has a written plan for a drug-free workplace policy in compliance with Article 1D, Chapter 21 of the West Virginia Code. A public improvement construction contract may not be awarded to a vendor who does not have a written plan for a drug-free workplace policy in compliance with Article 1D, Chapter 21 of the West Virginia Code and who has not submitted that plan to the appropriate contracting authority in timely fashion. For a vendor who is a subcontractor, compliance with Section 5, Article 1D, Chapter 21 of the West Virginia Code may take place before their work on the public improvement is begun.

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 materials, 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.


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, West Virginia Insurance Commission, or any other state agencies or political subdivision. Furthermore, 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.

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. Vendors should visit www.state.wv.us/admin/purchase/privacy for the Notice of Agency Confidentiality Policies.

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

Vendor's Name: EcoAnalysts, Inc.Authorized Signature: Date: 8-26-08

Processing and Identification of Periphyton Samples

RFQ number: DEP13876

Bid opening date: Aug 28, 2008 1:30 pm Eastern

Prepared for:

West Virginia Department of Environmental Protection

Prepared by

EcoAnalysts Inc.



On the Frontier of Ecological Monitoring

1420 S. Blaine St, Suite 14

Moscow, ID 83843

(208) 882-2588 Ph

(208) 883-4288 Fx



Moscow, ID • Bozeman, MT • Davis, CA • Joplin, MO • Selinsgrove, PA • Ontario, Canada



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Executive Summary

EcoAnalysts submits this proposal to provide processing and identification of diatoms and soft algae from stream periphyton samples for The West Virginia Department of Environmental Protection (WVDEP), Division of Water and Waste Management. Our taxonomists have extensive experience providing identification and enumeration of both soft-bodied algae and diatoms. EcoAnalysts has provided similar processing for many clients and are therefore thoroughly familiar with the methods and protocols. Our highly qualified and experienced taxonomists would provide a combination of talent, capacity, and value to provide the services necessary to serve on this project.

Our Company

EcoAnalysts began in 1992 when three young aquatic biologists recognized a demand for biological monitoring services in the water quality field. They began providing consulting services on a part-time basis as they finished their degrees at the University of Idaho. As word about them rapidly spread, so did the demand for their services. In 1995, they officially incorporated as a privately-owned Idaho business. EcoAnalysts has been in operation for over 13 years now and we are a nationally recognized leader in the field of biological monitoring and consulting services. Our experienced sorters, taxonomists, and senior consulting scientists comprise an expert team who provides our clients with superior biological monitoring services.

Our company core services are: 1) aquatic and terrestrial invertebrates, periphyton, phyto- and zooplankton, larval fish, and fish stomach sample identification; 2) aquatic ecology research, surveys, monitoring and consulting; 3) endangered invertebrate species surveys; and 4) invasive invertebrate species surveys and management plans.

We have completed more than 1,000 projects, and identified over 35,000 macroinvertebrate, plankton, and periphyton samples from around the United States and from Australia, Brazil, Mexico, Canada, Peru and the Republic of Suriname. From our humble beginnings, EcoAnalysts has become one of the largest taxonomic laboratories in the country, with the capacity to process 5,000+ macroinvertebrate samples annually.

EcoAnalysts' consulting services include, but are not limited to: educational workshops, technical trainings and presentations, study design, field sampling, data analysis and interpretation, and reporting. Our ecologists produce statistically and ecologically defensible study designs, which are particularly important in determining site-specific biological impacts. Our rigorous quality control (QC) procedures, and the accompanying documentation we provide, give our clients confidence in knowing their dataset is of the highest quality and can withstand peer or legal scrutiny. We have a track record of 94% of our business coming from repeat clients and projects. This is the best testament to our ability to provide sound data over time and shows our commitment to do the same.



Understanding the Scope of Work

There is no step in this project that we are unfamiliar with, and in fact, we have extensive experience with the entire process. Every step, from sample shipping/receiving, handling, login, to identification, data entry/delivery, project management, and quality assurance, is well-documented and will be conducted in an efficient manner.

In general, we understand our scope of work to include:

- Identification to genus/species of 300 natural units for soft algae
- Calculation of biomass for, at minimum, the most abundant taxa
- Slide preparation, enumeration, and identification of 600 diatom valves
- Turnaround time of 30 samples per month
- Data entry into the database provided by WVDEP

Management Plan

EcoAnalysts is committed to meeting the needs of our clients and we have evolved an organizational structure comprised of experienced professionals to best serve those needs. This structure assures that projects are completed on time and on budget.

Contract Manager

We believe in a hands-on approach to customer satisfaction at every level of the company, from the top, down. Our contract manager is Gary Lester, CEO of EcoAnalysts, Inc., and he takes a vested interest in the success of every project.

Project Coordinator

Shanda McGraw is our Project Coordinator and the primary operational point of contact for our clients. She is responsible for communicating with your staff to ensure all relevant information is relayed to our professionals. Once the samples have arrived, Ms. McGraw meticulously reconciles each sample against data provided by the client. She then logs them into our database and assigns tracking numbers to each sample, according to the specifications of the project. Information entered into the database is then tied to all future activities, with the unique assigned identifier used in each step of the process key to all future data entry. Throughout the project, Ms. McGraw receives updates from the taxonomists and provides status reports to the client. In this project, Ms. McGraw would oversee the progress of sample processing each month to ensure the goal of 30 samples a month is met. Ms. McGraw also provides any necessary reporting for the duration of the project and coordinates data delivery.



Standard Operating Procedure

There are several steps involved in the successful completion of a taxonomy project at our laboratory. This section of our proposal presents in detail the key technical steps associated with each project.

Log In for Periphyton Samples

The purpose of this process is to log samples into our laboratory and document their condition when they arrive. The following procedure is used to accomplish this purpose:

- Our receiving person opens up shipping containers and removes chain of custody forms included by the field crew.
- All sample containers are inspected for damage or leakage. Sample information is checked against custody forms and any discrepancies are noted.
- Discrepancies, if they occur, are reported to the client in order to clarify and correct any errors.
- Samples are logged into our database and assigned a unique sample tracking number.
- Sample jars are labeled with the unique sample identifier and placed on a shelf until processing begins.

Periphyton Laboratory SOP

Sample Preparation

A sample is removed from storage and the lab technician fills out a sample data sheet with the following information: sample identification number, pertinent location and replicate information, sample date, habitat type, area sampled and volume if available. If sample volume is not available, a volume measuring procedure is followed. This information is later transferred into an electronic database.

Subsampling for soft-bodied algae and diatom components

This procedure describes EcoAnalysts' SOP for sample splitting in preparation for identification and enumeration of soft-bodied algae and diatom components.

- The sample is vigorously shaken to evenly disperse the periphyton within the sample.
- Subsamples are taken from the middle of the sample and placed into labeled vials which have the unique sample ID # with the suffixes –soft and –diatom.
- The volume of the subsample is recorded both on the vials and on the lab sheet for both the soft body algae and the diatom subsamples.
- The original sample is returned to the shipping container it was sent in and set aside for shipping after the project is finished.

Identification and Enumeration of Soft Algae

In this process EcoAnalysts counts and identifies soft algae to the lowest practical taxon, with a count of live/dead diatoms (i.e., soft algae counts).

Achieving desired cell density

- The sample is vigorously shaken to evenly disperse the periphyton within the sample.
- Exactly 0.1ml of the homogenized sample is placed on a slide (or a Palmer Maloney counting chamber) using a micropipette.
- Algae will be examined at 400X magnification using a light microscope to assess if periphyton is too dense or dilute for identification and enumeration. The original sample will be diluted or concentrated if necessary to achieve desirable cell density (approximately 15-20 counting units per field of view). If dilution or concentration is needed, the new volume and concentration ratio will be recorded on the data sheet.

Counting soft algae

- Soft algae are counted and identified to the lowest practical taxon using the strip method until at least 300 counting units are encountered. For colonial algae, each colony is counted as one algal unit per 10 by 10 micron area, or in the case of filaments, each 10 micron length is one algal unit, for purposes of tallying 300 counting units in a count. Diatoms will be enumerated as either 'live' or 'dead'.
- Counting and identification is made at 400X magnification using a Nikon light microscope and the latest taxonomical references. All identifications and counts are recorded on approved data sheets, as described previously.

Calculating cell density

To estimate algal cell density, we keep track of the volume of the sample counted in the following way:

- Record the strip length and width and then multiply the area by the depth.
- If applicable, the counted volume is then multiplied by the dilution or concentration factor.
- The total algal cell density is calculated as follows:
 - The total algal density (cells / substrate area)

$$= \{ [N / (V_{sc} * CR)] * V_T \} / A_S$$
- Where:
 - N = the total number of cells counted
 - V_{sc} = the volume of sample counted
 - CR = the concentration or dilution factor (if applicable, or CR = 1)
 - V_T = total sample volume
 - A_S = substrate area sampled
- Each taxon's density can also be calculated using the same formula except N will represent the number of counts for the individual taxa.

Determination of biovolume

- Biovolume will be determined for taxa constituting 5% or more of a sample count.
- The size of cells, colonies, or filaments (trichomes) will be fitted to the nearest geometric shape, appropriate measurements made with a calibrated ocular micrometer, and biovolumes will be calculated.
- Biovolume determinations will be made for at least 5 specimens. If these measurements are not in the range of previous measurements, an addition 15 specimens will be examined and measured from the batch of samples. No more than 5 specimens will be measured from a single sample.

Diatom Slide Preparation

The purpose of this process is to count and identify diatoms to the lowest practical taxon, usually to the species or variety level.

Digestion - Hydrogen Peroxide

- The diatom subsample split is digested under the hood.
- Hydrogen Peroxide is carefully added to the sample in a 1:2 sample-to-peroxide ratio and allowed to sit for 2 hours.
- A dash of Potassium dichromate is added to catalyze the reaction and the peroxide and sample mixture.
- De-ionized water is added to the digested sample to fill the 300 ml beaker. The sample is left overnight (or for at least 8 hours).
- Water is siphoned from the center of the water column (under the surface) to the 50 ml mark on the beaker.
- De-ionized water is added to top off the beaker and left for at least 8 hours so that diatom cells settle. Note: the rule is one hour per centimeter so the smallest diatoms can settle.
- After a loss of orange color is achieved, usually after 6-8 rinses, the digested diatom material is transferred to a clean vial and labeled with the unique sample ID # with the suffix – clean diatom.

Diatom Identification and Enumeration

- Diatoms are counted and identified to the lowest practical taxon using the strip method until at least 300 cells (600 valves) are encountered. Counting and identification is made at 1000X magnification using a Nikon light microscope and the latest taxonomical references
- All identifications and counts are recorded on approved data sheets.

Special Handling for low density of diatoms

- In some cases, the number of diatoms in a sample is very sparse. In these cases, additional procedures are required to either make a satisfactory slide for analysis or to determine that analysis of a sample is not practical.
- If a satisfactory slide could be made by increasing the concentration of cleaned diatom material by two to five times, this is done by using a micropipette to remove the required amount of water from the vial of material after it has been allowed to settle for at least eight hours. The concentration factor is then recorded.
- If a concentration of cleaned material greater than two to five times is required, then the original sample is re-subsampled. If it is still too dilute, the two vials of cleaned subsample materials are combined. EcoAnalysts records all steps and volumes along the way, including the final concentration factor.
- If, after following the steps above to concentrate the cleaned material, the density of diatoms still does not meet the criteria of 30 to 40 cells per field at 400 - 450x, then EcoAnalysts will proceed to make the densest slide possible. As a general guideline, if accurate identifications are possible, and at least 100 specimens could be counted within four hours, a determination will be made to analyze the slide. If the diatom taxonomist determines that the slide should not be counted, the Project Coordinator will be informed. Only under very special circumstances will the taxonomist be asked to take the extraordinary measure of counting a slide for more than four hours.



Vouchering

- Each microscope slide will be labeled with all information necessary for the identification of the sample, including water body name, site identification number, and sampling date.
- Samples will be placed into slide boxes in an orderly fashion and shipped to you upon completion of the project.
- A second set of slides will be vouchered in a diatom herbarium at the Philadelphia Academy of Natural Sciences, pending permission from the client.

Data Management and Reporting

- Data are entered into a custom-built taxonomy counting program which creates an electronic file for each project.
- Since the counting program automatically tallies the number of cells for each taxon, no handwritten bench sheets are required – this entirely eliminates the potential for transcription error. We can provide the electronic copies or print the electronic benchsheet on demand for WVDEP.
- Sample identifier information is entered, followed by the taxa and counts and notes.
- After all samples in the project are identified, the data are formatted in the output specified by the client, in this case a database provided by WVDEP.
- Any remaining sample materials will be returned.

Quality Assurance and Quality Control Methods

EcoAnalysts is dedicated to providing valid and scientifically defensible data. To that end, every step of the process has quality assurance practices built in. We break down our approach into two sections – Quality Assurance (QA) and Quality Control (QC) for periphyton – a description of each follow.

QA of Periphyton Identifications

This series of steps represents a proven method to help ensure the accuracy of our taxonomy.

- High quality digital images are taken of each taxon encountered in the project. This is one of the best voucher systems for permanently archiving soft algae specimens. These images include taxa names, photographer/taxonomist name, date, and project ID number.
- Diatom slides are archived in slide boxes with the project name.
- A minimum of 10% of all samples will be analyzed by an independent phycologist to ensure taxonomic accuracy and reproducibility of the processing and analysis methods.
- There will be a consensus of at least 90% of the common taxa in each sample.
- Both taxonomists meet via phone conference to discuss any discrepancies. In some cases it is necessary to re-examine the digital images and/or specimens to resolve discrepancies.
- The final data are adjusted according to the recommendations of both taxonomists.

Taxonomic QA Methods - Periphyton

- Soft-bodied algae and diatom proportional counts will be subject to the following criteria:
 - The common algae identified by both taxonomists should match.
 - Diatom taxa accounting for more than 10% relative abundance should be identified similarly by both taxonomists (synonyms are acceptable).
 - The percent community similarity index calculated from the two diatom counts should exceed 90%.
- If any of these criteria are not met, the sample will be re-analyzed and any discrepancies will be resolved.

A quality control report describing results and corrective steps taken (if necessary) will be provided concurrently with data delivery.



References

Here, we highlight a few relevant projects to demonstrate our familiarity and experience with periphyton processing, our adherence to clients' performance criteria, and our ability to handle large projects. We encourage you to contact our clients to discuss our ability to meet expectations with respect to the quality of services, cost control, timeliness of performance, and business relations.

US EPA – Department of Water

Contact: Ellen Tarquinio
USEPA
1200 Pennsylvania Ave (202) 566-2267
Washington DC 20460 Tarquinio.Ellen@epamail.epa.gov

Contract Period: 2007 - present

Project Description: EcoAnalysts is currently in the final data reconciliation stages of the National Lakes Survey Phytoplankton Community Analysis. For the National Lakes Survey, EcoAnalysts was contracted to provide complete analysis for Phytoplankton and Zooplankton samples collected from lakes across the US. We received 1296 phytoplankton samples, which we reconciled with EPA's online tracking system. Using tools designed in our lab to compare data from the samples to the data provided by the technical administrators of the project, we were able to find data entry and field discrepancies and rectify them with the project administrators before processing began. We provided weekly and monthly updates of the progress of the analysis and had a 100% completion rate, with no samples lost, destroyed, or mislabeled. We are one of the only taxonomic laboratories in the country to have a proven record of successfully managing projects on this scale.

New Mexico Environment Department Phytoplankton

Contact: Danny Davis
NMED
1190 St. Francis Dr. (505) 827-2819
Santa Fe, NM 87502 danny.davis@state.nm.us

Contract Period: 2006

Project Description: EcoAnalysts enumerated and identified 26 phytoplankton samples from New Mexico. Soft algae were counted to 300 natural units using the Sedgwick Rafter method. The soft algae were identified to genus.

South Dakota DENR

Water Resources Assistance Program
Aaron Larson
2050 West Main Street (605) 394-2229
Suite #1 (605) 394-5317 fax
Rapid City, SD 57702-2493 Aaron.Larson@state.sd.us

Contract Period: 2007

Description: EcoAnalysts identified soft body algae to genus (300 units) and diatoms to species (600 valves). Periphyton community and bioassessment metrics were calculated to determine biological condition at each site.



Delaware Department of Natural Resources and Environmental Conservation

Ellen Dickey
Delaware DNREC
Division of Water Resources (302) 739-9942
89 Kings Hwy. (302) 739-3491 fax
Dover, DE 19901 Ellen.Dickey@state.de.us

Contract Period: 2005

Description: EcoAnalysts identified periphyton samples collected from coastal plains streams in Delaware. Soft body algae were identified to genus (300 units) and diatoms were identified to species (600 valves). Periphyton community and bioassessment metrics were calculated to determine biological condition at each site. Voucher slides were quality checked by the Philadelphia Academy of Natural Sciences and a complete set of reference slides were deposited at the herbarium there.

Arizona Department of Environmental Quality

Patti Spindler
Arizona DEQ
1110 W. Washington St. (602) 771-4543
Phoenix, AZ 85007 phs@azdeq.gov

Contract Period: 2003 - present

Project Description: EcoAnalysts has processed approximately 50 samples per year since 2003 for the Arizona DEQ. Samples are identified to the genus/species level. In addition, we evaluated the agency's synoptic reference collection from previous years work and brought the taxonomy up to current accepted standards. Several QC samples from previous contractors were also evaluated in order to determine taxonomic accuracy and whether or not changes could be made to historical data. In addition, EcoAnalysts is slated to provide periphyton taxonomy services for AZDEQ in 2008.



Key Management Personnel

Gary T. Lester, CEO, Principal, Aquatic Ecologist

Gary has worked in the field of aquatic ecology since 1987. His principal areas of expertise include bioassessment of surface waters using benthic macroinvertebrate communities. As CEO of EcoAnalysts, Gary's duties include communication our company vision to staff and clients, business development, leadership development, acquiring and overseeing contracts, stewarding client relationships and supervising management personnel.

An active member of the North American Benthological Society, Gary currently serves on the Taxonomic Certification Program Committee. This committee is charged with advancing the quality of taxonomic data nationally by developing a certification program for freshwater taxonomists. Gary co-authored a paper published in the Journal of the North American Benthological Society in December 2003 on determining the quality of taxonomic data.

Project Role

Mr. Lester will act as the Contract Manager on this project if awarded. This includes reviewing and clarifying any of the fine points of the contract as well as signing and authorizing the project. Once Mr. Lester has the completed and signed contract, he passes it on to our Project Coordinator, Shanda McGraw.

Education

- Graduate Studies (M.S., abd) Entomology University of Idaho (1994)
- B.S. Fisheries Resource Management University of Idaho (1992)
- A.A.S. Ecology and Environmental Technology Paul Smith's College (1989)

Professional Memberships

- American Fisheries Society
- Entomological Society of America
- North American Benthological Society (NABS)
- Northwest Environmental Business Council
- Environmental Business Association of New York

Certifications

- N.A.B.S. Certified Taxonomist – Chironomidae East
- N.A.B.S. Certified Taxonomist – Chironomidae West

Awards/Achievements

- 2007 Mid-Career Alumni Achievement Award, University of Idaho College of Natural Resources
- 1994 Student Presentation Award (2nd place) Idaho Academy of Science annual meeting, Pocatello, ID
- 1992 Most Outstanding Fisheries Senior University of Idaho

Selected Technical Training

- Gastropod Taxonomy Workshop. 2006. Sponsored by Northwest Biological Assessment Workgroup. Dr. Robert Dillon, instructor.
- Ephemeroptera Taxonomy Workshop. 2005. Sponsored by Northwest Biological Assessment Workgroup. Dr. Pat Randolph and Luke Jacobus, instructors. Arid Southwestern Stream Biocondition Gradient and Tiered Aquatic Life Uses. 2005. Sponsored by USEPA/Council of State Governments. Tempe, AZ.
- Western Tolerance Values Workshop. 2004. Sponsored by USEPA/Council of State Governments. Corvallis, OR.
- Plecoptera Taxonomic Workshop. 2004. Sponsored by Northwest Biological Assessment Workgroup. Dr. Ken Stewart, instructor.
- Crustacea Taxonomic Workshop. 2004. Sponsored by Northwest Biological Assessment Workgroup. D. Christopher Rogers, instructor.
- Aquatic Worms and Mollusks Taxonomic Workshop. 2002. Sponsored by Northwest Biological Assessment Workgroup. Steven Fend and Terrence Frest, instructors.

Publications

- Clark, W.H. and G.T. Lester. 2005. Range Extension and Ecological Information for *Orconectes virilis* (Hagen 1870) (Decapoda: Cambaridae) in Idaho, USA. *Western North American Naturalist* 65(2): 164-9
- Danehy, R.J., S.S. Chan, G.T. Lester, R.B. Langshaw, and T.R. Turner. 2007. Periphyton and macroinvertebrate assemblage structure in headwaters bordered by mature, thinned and clearcut Douglas-Fir stands. *Forest Science* 53(2): 294-307.
- Lester, G.T. and W.H. Clark. 2002. Occurrence of *Corophium spinicorne* Stimpson, 1857 (Amphipoda: Corophiidae) in Idaho, U.S.A. *Western North American Naturalist* 62(2): 230-233.
- Lester, G.T., B.J. Krestian and J.H. Epler. 2003. First Nearctic records of *Tempisquitoneura* (Diptera: Chironomidae: Orthocladiinae) from Arizona, USA. *Entomological News* 114(2): 117-119.
- Lester, G.T., W.P. McCafferty and M.R. Edmondson. 2002. New Mayfly (Ephemeroptera) records from Idaho. *Entomological News* 13(2): 131-136.
- Stribling, J.B., S.R. Moulton II and G.T. Lester. 2003. Determining the quality of taxonomic data. *Journal of the North American Benthological Society* 22(4): 621-631.
- Waltz, R.D., G.F. Edmunds, Jr. and G.T. Lester. 1998. New distributions for *Raptoheptagenia cruentata* and *Ametropus neavei* (Ephemeroptera: Heptageniidae, Ametropodidae). *Entomological News* 109(3): 213-214.



Shanda McGraw – Project Coordinator

Ms. McGraw has been an employee for EcoAnalysts, Inc. since May 2000. In October 2002 she was promoted from a Laboratory Technician to Sorting Laboratory Coordinator. In September 2005, she was promoted to Project Coordinator. As Project Coordinator, Shanda is responsible for all client interactions. She assembles all necessary project information and carries out project initialization. Shanda coordinates with the client for safe and expeditious transfer of custody of samples and is responsible for maintaining chain of custody records and logging all samples into Aegis, our dedicated laboratory information management system. Once the project is successfully set up and all samples are logged and accounted for, Shanda then monitors the progress of the project and provides feedback to our clients. She is ultimately responsible for managing client expectations and ensuring that projects are done in a timely and cost-effective manner. She is well-versed in MS Excel and Access, as well as other custom programs used for data delivery. Upon completion of analysis, Shanda is responsible for all client deliverables, including data delivery. She is also in charge of all hazardous materials shipping, receiving, and compliance as well as all international import and export compliance.

Education

- Idaho Secondary Teaching Certification (2000)
- B.S. Ed. Secondary Education-Mathematics & Chemistry University of Idaho (1999)

Technical Training

- Recurrent Hazmat Training – Shipping dangerous goods compliance by Ground and Air (7/26/2006)
- Hazmat Training – Shipping dangerous goods compliance (2004)



Taxonomist Resumés

Julia Kay Eichman – Taxonomist

Julia has over 30 years' experience identifying phytoplankton and periphyton from across the United States. Her phytoplankton experience began working with Dr. Cameron Christensen, Dr. John Dodd, and Dr. Charles Reimer, both as course work and field work in Iowa. Her principal areas of expertise include bioassessment of surface waters using soft-bodied algae, diatoms, water chemistry and geology. As a periphyton taxonomist for EcoAnalysts, Julia's duties include preparation of samples, identification and enumeration of soft-bodied algae, diatoms, data analysis, interpretation and report preparation.

Since joining EcoAnalysts, Julia has worked on projects such as the EPA National Lakes Survey, also with other projects across the country and Canada. Julia also continues work on preparing samples for deposition in various Diatom Herbariums, and presentation of taxa information gathered from the projects.

An active member of the North American Diatom Society and International Diatom Research, Julia maintains contact with experts in the field and keeps an updated library of changes and advancements in algae as water quality indicators. Julia has authored and co-authored presentations at both the national and international meetings.

Education

- M.S. Botany University of Arkansas (1991)
- Certification in Secondary Education for Biology, Chemistry, Physics, General Science and Earth Science Missouri Southern State College (1983)
- B.A. Distributed Studies (Botany, Zoology, and Political Science) Iowa State University (1976)
- A.A. Life Sciences Iowa Central Community College (1974)

Selected Professional Memberships

- North American Diatom Society
- International Diatom Research Convention
- American Society of Microbiology
- North American Benthological Society (NABS)
- Sigma Xi Research Society
- National Science Teachers Association – Presenter
- National Association of Biology Teachers

Technical Training

- 1996 Stream Monitoring, Missouri Department of Conservation
- 1990 Stream Limnology, Dr. Arthur Brown
- 1989 Diatom Research, Dr. Charles Reimer
- 1989 Algal Cytology, Dr. Richard Meyer
- 1975 Aquatic Ecology, Dr. Richard Boberg
- 1975 Aquatic Invertebrates, Dr. David Fredricksen
- 1973 Freshwater Algae, Dr. John Dodd
- 1973 Diatom Ecology, Dr. Charles Reimer

Awards/Honor Societies

- 2005 George Washington Carver, Outstanding Science Teacher
- 2001 Earthworks for Improvement in Earth Science Education Award
- 1998 NSTA Physics Honors Recipient
- 1998 Tandy Honors Science Teacher
- 1998 Who's Who of American Teachers
- 1997 The Leadership Cadre-Master Teachers for Inquiry Science
- 1995 Teacher in Industry Award
- 1994 NSF Honors Chemistry, Recipient
- 1991 Sigma Xi Research Society
- 1990 Elkins EPA Award
- 1989 McBride Scholar
- 1975 Science and Humanities Scholar

Posters & Presentations

- Analyzing a modification of the swirl and decant method of collecting meiofauna from core samples. Garrett Tyler Clark¹, Arthur V. Brown¹, Andrea J. Radwell¹, and Julia K. Eichman². (1) Biological Sciences, University of Arkansas, Fayetteville, AR 72701, (2) EcoAnalysts, Moscow, ID 83843. Presentation, NABS 2007.
- Impact of treated sewage on meiofauna in headwater streams. Arthur V. Brown, Biological Sciences, University of Arkansas, SCEN 705, Fayetteville, AR 72701, Winston E. Duncan, The Education Department, The Valley, Anguilla, and Julia K. Eichman, EcoAnalysts, Moscow, ID 83843. 2007 NABS Poster
- *Didymosphenia geminata* and the periphyton community of the Kootenai River, Montana and Idaho.
- Expanding distribution and populations of *Didymosphenia geminata* ((Lyngbye) M. Schmidt 1899) with a discussion of co-occurring diatom taxa in the Kootenai River, USA.
- Impacts of a Small Dam Removal on Diatom Assemblages in the Neversink River, Delaware River Drainage, New York
- Relationship of Water Chemistry and Diatom Assemblages: Limnological Development of Brigg's Woods Lake (IAS)
- Diatoms as Water Quality Indicators: Part I & II (IAS)
- Diatoms Then and Now (IAS)
- Southern Iowa River Basin Study (IAS)
- The Association of Water Quality Parameter, Geological Substrate, and Periphyton Community (International Diatom Symposium)

Publications

- The Effects of Forest Management Practice on Soil Nutrient Status, University of Arkansas, Fayetteville, February 1991, 56 pp
- The Association of Water Quality Parameters, Geological Substrates and Periphyton Community Structure, Arkansas Water Resources Research Center, Fayetteville, Arkansas, June 1991, 173pp

Workshop

- Facilitation and Encouragement for the use of periphyton in bioassessments



Stephen D. Porter, Subcontractor, QA Taxonomist

Education

- Ph.D. (abd), Aquatic Biology, University of Louisville, Louisville, KY, 1985 to 1993 (major professor: R. Jan Stevenson)
- M.S. student, Biology, Humboldt State University, Arcata, CA, 1974 to 1975 (major professor: William C. Vinyard)
- B.A., Biology, Humboldt State University, Arcata, CA, 1972 to 1974
- West Valley College, Saratoga, CA, 1970 to 1972

Other Coursework

End date	Provider	Course Title	Hours
3-05-93	USFWS	Electrofishing Principles	32
6-05-92	USGS	UNIX, Frame, STATIT	20
4-03-92	USGS	Defensive Driving	4
2-21-92	USGS	Editing Hydrologic Reports	24
2-07-92	USGS	Environmental Processing Organic Chemicals	130
7-16-91	USGS	Hazard Communications	2
5-23-91	USGS	Sediment-Trace Element Chemistry	24
9-15-90	USGS	Technical Report Writing	16
6-15-87	COE	Reservoir WQ Statistical Design & Analysis	32
7-15-85	UNIV	Effective Oral Presentations	16
12-15-83	UNIV	Malacology – Freshwater Mussels	40
10-15-81	EPA	Identification of surface Algal Communities	40
8-30-80	EPA	Algal Assay Lab Procedures	35
6-15-80	EPA	WQ Indicative Organisms /Diatoms	32
9-30-79	EPA	WQ Indicative Organisms /Caddis Flies	32
10-15-78	EPA	WQ Indicative Organisms/Mayflies	24
8-30-78	EPA	Applied Ecology Seminar	32
10-30-76	EPA	Plankton/Periphyton MTHDS/Taxonomy	40

Work Experience

Research Associate – Aquatic Biology 1-22-07 to present
 Edwards Aquifer Research & Data Center, Texas State University

- Aquatic biologist for Edwards Aquifer Research & Data Center (part time, currently Wednesdays and Fridays). Participant on research grant from National Park Service, Southern Plains Network. Goal is to develop additional water-quality program with hydrology and geohydrology staff and to incorporate algae and macroinvertebrate community analysis into assessments of water quality and stream condition. (Supervisor: Glenn Longley)

Regional Biologist GS-1315-14 8-23-93 to 12-31-06
 U.S. Geological Survey, Central Region

- Regional biologist and discipline specialist (algae) for the NAWQA Program and the Central Region. Coordinated ecological sampling activities at NAWQA fixed and synoptic sites to ensure national consistency in application of NAWQA protocols; design, plan, and implemented regional and study-unit studies addressing ecological relations with water quality and stream condition; and participated in NAWQA national synthesis (Ecology, Nutrients), topical themes

(NEET, EUSE), and ecological trend-analysis activities. Instructor and/or coordinator of USGS ecological training courses and workshops. Represented the USGS in liaison, cooperative, and technical meetings with senior officials of Federal, State, and local agencies for the purpose of presenting the scope and results of the NAWQA program, coordinated and solicited technical and financial support for biological and water-quality research, and exchanging information on biological and water-quality issues. Provided expert technical guidance on ecological issues concerning algae and water-quality relations to the NAWQA Program, USGS and other Federal agencies, State and local water-resource agencies, and environmental consultants. Provided technical review and oversight for District proposals, projects, and reports, and participated in annual District program reviews, regional science meetings, and District-based training classes. Taught and applied principles of ecological data analysis and interpretation. Wrote and reviewed interpretative reports concerning ecological relations with water quality. (Supervisor: Gary Rowe)

Hydrologist GS-1315-13

10-7-91 to 8-22-93

U.S. Geological Survey, WRD Kentucky District

- Project chief for the Kentucky River basin NAWQA pilot project, QW Specialist and Environmental Studies Unit leader for the Kentucky District, and biological discipline (algae) specialist, instructor, and protocol author for the NAWQA program and WRD. Coordinated activities and defined surface-water quality assessment methodology, approaches, and goals for the Kentucky NAWQA project. Instructed and directed District personnel in statistical, interpretative, and technical report-development techniques to meet project objectives. Represented the USGS in liaison, cooperative, and technical meetings with senior officials of Federal, State, and local agencies for the purpose of presenting the scope and results of the NAWQA program, coordinating and soliciting technical and financial support for biological and water-quality research, exchanging information on biological and water-quality issues, and developing, promoting, and planning new cooperative projects for the Kentucky District. Author or co-author of 4 technical reports for the Kentucky NAWQA project; presented results at numerous local, regional, and national scientific and technical meetings, symposia, and conferences. Prepared comprehensive technical reports and responses under short time frames for use by USGS personnel and the GAO audit of the NAWQA program. Planned, directed, and conducted preliminary research concerning the use of freshwater mussels to assess long-term water-quality trends. Author of successful 1992 merit proposal to support this area of biological research. Served as biological and water-quality consultant by providing expert technical guidance to District and WRD personnel in designing and documenting projects and programs to study, interpret, and report on the quality of water resources and aquatic biological communities. Reviewed District project proposals and reports containing water-quality or biological objectives to assure technical accuracy. Reviewed and interpreted water-quality sampling and assessment procedures, WRD technical publications and directives, and the technical competence of District personnel in water-quality functions or activities. Developed and tested innovative algae sample-collection and analysis methods for national use in the NAWQA program. Author of 2 NAWQA biological protocol reports, and served as NTC instructor for "Concepts in Aquatic Ecology" course, as well as algae instructor for 4 NAWQA Training and Methods Shakedown (TAMS) courses held during 1992. Invited participant, speaker, or facilitator for USGS Large Rivers Workshop, Biology Task Group, and NAWQA biological meetings; represented



USGS-NAWQA biological and water-quality perspectives at meetings with USEPA-EMAP scientists and EMAP diatom-indicator workshops. Discussed and coordinated approaches to biological assessments of water-quality with scientists from State and Federal agencies, universities, research academies, and the private sector. (Supervisor: Lloyd Woosley)

Hydrologist GS-1315-12

6-3-90 to 10-6-91

U.S. Geological Survey, WRD Kentucky District

- Participated in Kentucky River basin NAWQA pilot project. Compiled, reviewed, and statistically analyzed data for metals and other trace elements in bottom materials, suspended sediments, and dissolved constituents. Prepared interpretive technical report and assisted in the preparation of data report concerning the distribution of metals and other trace elements in streams of the Kentucky River basin. Developed District program for the identification and analysis of algae samples for the NAWQA program. Coordinated District algal-laboratory analyses of NAWQA periphyton samples from the Upper Illinois River basin and Yakima River basin NAWQA Ecological Surveys, and directed multivariate analyses of the correspondence of algal species with ancillary water-quality data. Authored protocols for NAWQA algae identification and enumeration, biovolume determination, and quality control procedures. Participated in NAWQA ecological field investigations in the Upper Illinois and Yakima River basins. Participated in the ad-hoc NAWQA Biology Group and worked closely with the USGS North Carolina Ecology Group (NCEG) concerning issues relative to aquatic ecology, biological protocols, and the development of biological retrospective reports for NAWQA study units. Developed merit proposals concerning (1) processes controlling the fate of agricultural chemicals in a wetland system, (2) the relevance of shell-layer and tissue accumulation processes in freshwater mussels for describing water-quality trends, and (3) the effects of land and water use on the toxicity of urban streams. Authored pre-proposal for Water, Energy, and Biogeochemical Budget (WEBB) program concerning Robinson Forest, which was one of the 13 candidate sites chosen for further consideration. Served as lead water-quality hydrologist, as well as a technical consultant in matters relating to aquatic ecology and statistics for colleagues in the Kentucky District, as well as other Districts of the USGS. Promoted interagency cooperation on water-quality and biological studies in the Kentucky River basin, and presented results from Kentucky River NAWQA pilot-project investigations at water-resources research symposia. Provided technical reviews of proposals and reports prepared by colleagues in the District, as well as those prepared by cooperators and other researchers in Kentucky. (Supervisor: Lloyd Woosley)

Aquatic Biologist

10-1-87 to 6-3-90

PORT/AQUA Environmental Services

- As an independent environmental consultant, designed and conducted environmental studies addressing water quality and aquatic biology in streams and lakes. Collected, identified, and analyzed algae, macroinvertebrates, and fish, and determined biological correspondence to water-quality constituents. Provided multivariate statistical analyses of biological and water-quality dynamics. Developed technical reports and environmental impact statements. Consulted with state and federal regulatory agencies on behalf of clients, and testified as an expert witness at public hearings and legal proceedings. Developed statistical sampling-designs and optimal water-withdrawal zones for public water utilities. Performed limnological investigations. Provided

identification and enumeration of phytoplankton and benthic algae for other environmental consulting firms and government agencies. Performed stream and wetland habitat evaluations in conjunction with riparian construction projects. Coordinated water-quality monitoring of the Ohio River for a major municipal sewer district. Co-authored the "Summary of biological investigations relating to surface-water quality in the Kentucky River basin," NAWQA pilot-project biological retrospective report, which was the first such report to be published by the USGS.

Limnologist GS-0401-09

9-1-86 to 10-1-87

U.S. Army Corps of Engineers, Water Management Section

- As chief limnologist for the Louisville District, coordinated biological and water-quality monitoring activities at 20 reservoir projects. Trained field sampling personnel in limnological and biological monitoring procedures. Developed statistical sampling-design and analysis procedures. Produced technical water-quality reports for inclusion in reservoir-management manuals, and provided technical reviews of other reports and proposals. Served as laboratory manager for the Corps of Engineers water-quality laboratory. Trained and coordinated the activities of 3 water-quality technicians in water chemistry procedures. Developed additional biological laboratory and field procedures, as well as quality control/quality assurance manuals. Developed and executed service contracts to environmental laboratories. Represented the Corps of Engineers in matters related to hazardous-materials contamination, ordinary high-water line surveys, corrosion studies, nuisance algal bloom/fish-kill investigations, and barge-traffic investigations on the Ohio River. Coordinated and participated in interagency Ohio River fish population-studies and produced video film detailing the purposes and results of these studies. (Supervisor: Pat Neichter)

Aquatic Biologist

8-1-76 to 9-1-86

Kentucky Natural Resources and Environmental Protection Cabinet, Division of Water

- Responsible for the collection of water-quality and biological data, as well as the identification of algae, macroinvertebrates, and fishes, in addition to the analysis and interpretation of biological and water-quality data. Authored or co-authored 25 technical reports concerning water quality, aquatic biology, and stream-use designation. Reviewed environmental impact statements. Coordinated the biological ambient water-quality monitoring program, and participated in intensive stream and lake investigations, and compliance monitoring of wastewater treatment plant effluents. Served as an expert in algae and macrophyte identification and analysis, and investigated nuisance algal and aquatic plant problems and taste-and-odor problems associated with raw water supplies. Assisted in the development of revised water-quality standards for the Commonwealth of Kentucky. Developed and instructed water quality and algae identification courses for water-treatment plant operators and certified environmental laboratories. Provided technical review in matters relating to water-quality and aquatic ecology and expert testimony in court cases. (Supervisor: Robert Logan)

Selected Technical Publications, Conference Proceedings, and Abstracts

Porter, S.D., Mueller, D.K., Spahr, N.E., Munn, M.D., and Dubrovsky, N.M., in revision, Algal-metric approaches for assessing trophic condition and organic enrichment in U.S. streams and rivers: Freshwater Biology.

- Porter, S.D., in revision, Algal Attributes: An autecological classification of algal taxa collected by the USGS National Water-Quality Assessment (NAWQA) Program: U.S. Geological Survey Data Series Report.
- Mize, S.V., Porter, S.D., and Demcheck, D.K., accepted, Influence of fipronil compounds and agricultural intensity on macroinvertebrate communities in streams of southwestern Louisiana, USA: *Environmental Pollution*, v. XX, p. x-y
- Hambrook-Berkman, J.A., and Porter, S.D., 2004, An overview of algal monitoring and research in the U.S. Geological Survey's National Water-Quality Assessment (NAWQA) Program: *Diatom*, v. 20, p. 13-22.
- Mau, D.P., Ziegler, A.C., Porter, S.D., and Pope, L.M., 2004, Surface-water-quality conditions and relation to taste-and-odor occurrences in the Lake Olathe watershed, Northeast Kansas, 2000–02: U.S. Geological Survey Scientific Investigations Report 2004-5047, 95 p.
- Demcheck, D.K., Tollet, R.W., Mize, S.V., Skrobialowski, S.C., Fendick, R.B., Swarzenski, C.M., and Porter, S.D., 2004, Water quality in the Acadian-Pontchartrain Drainages, Louisiana and Mississippi, 1999-2001: U.S. Geological Survey Circular 1232, 34 p.
- Peterson, D.A., Miller, K.A., Bartos, T.T., Clark, M.L., and Porter, S.D., 2003, Water quality in the Yellowstone River basin, Montana, Wyoming, and North Dakota, 1999-2001: U.S. Geological Survey Circular 1234, 34 p.
- Kalkhoff, S.J., Lee, K.E., Porter, S.D., Terrio, P.J., and Thurman, E.M., 2003, Herbicides and herbicide degradation products in upper Midwest agricultural streams during August base-flow conditions, *Journal of Environmental Quality*, v. 32, p. 1025-1035.
- Peterson, D.A., and Porter, S.D., 2002, Biological and chemical indicators of eutrophication in the Yellowstone River and major tributaries during August 2000: *Proceedings, 2002 National Monitoring Conference, National Water Quality Monitoring Council*, 14 p. <http://www.nwqmc.org>
- Porter, S.D., 2002, Structural and functional approaches to algal bioassessment: The importance of seston-periphyton relations with autogenic organic enrichment in productive streams and rivers: *Bulletin of the North American Benthological Society*, v. 19, no 1, p.166.
- Peterson, D.A., Porter, S.D., and Kinsey, S.M., 2001, Chemical and biological indicators of nutrient enrichment in the Yellowstone River basin, Montana and Wyoming, August 2000: Study design and preliminary results: U.S Geological Survey Water-Resources Investigations Report 01-4238, 6 p.
- Porter, S.D., 2001, Influence of natural factors on the quality of midwestern streams and rivers: U.S. Geological Survey Water-Resources Investigations Report 00-4288, 13p.
- Kalkhoff, S.J., Barnes, K.K., Becher, K.D., Savoca, M.E., Schnoebelen, D.J., Sadorf, E.M., Porter, S.D., and Sullivan, D.J., 2000, Water quality in the Eastern Iowa Basins, Iowa and Minnesota, 1996-98: U.S. Geological Survey Circular 1210, 37 p.
- Porter, S.D., 2000, Upper Midwest River Systems--Algal and nutrient conditions in streams and rivers in the upper Midwest region during seasonal low-flow conditions, In: *Nutrient Criteria Technical Guidance Manual, Rivers and Streams*: Washington, DC, U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, EPA-822-B-00-002, p. A-25 - A-42.
- Leland, H.V., and Porter, S.D., 2000, Distribution of benthic algae in the upper Illinois River basin in relation to geology and land use: *Freshwater Biology*, v. 44, p. 279-301.
- Cuffney, T.F., Meador, M.R., Porter, S.D., and Gurtz, M.E., 2000, Responses of physical, chemical, and biological indicators of water quality to a gradient of

- agricultural land use in the Yakima River basin, Washington: Environmental Monitoring and Assessment, v. 64, p. 259-270.
- Nelson, S.M., Porter, S.D., and Deacon, J., 2000, Use of a transplanted aquatic moss (*Hygrohypnum ochraceum*) as a trace element biomonitor in the Southern Rocky Mountain ecoregion—A regional synthesis: U.S. Department of the Interior, Bureau of Reclamation, Technical Service Center, Denver, CO, Technical Memorandum No. 8220-00-5, 24 p.
- Sorenson, S.K., Porter, S.D., Akers, K.K.B., Harris, M.A., Kalkhoff, S.J., Lee, K.E., Roberts, L.R., and Terrio, P.J., 1999, Water quality and habitat conditions in upper Midwest streams relative to riparian vegetation and soil characteristics, August 1997: Study design, methods, and data: U.S. Geological Survey Open-File Report 99-202, 53 p.
- Porter, S.D., 1999, Algae and their role in the U.S. Geological Survey National Water Quality Assessment Program, In: Hoch, P.C., ed., Proceedings of the XVI International Botanical Congress, St. Louis, MO, 1-7 August 1999, p. 60.
- Porter, S.D., and Harris, M.A., 1999, Algal-nutrient relations with agricultural practices, natural factors, and benthic macroinvertebrate indicators of biological integrity in Midwestern streams and rivers: Abstract + handout presented at USGS National Water Quality conference, Orange County, CA, December 1-2, 1999.
- Porter, S.D., Harris, M.A., and Sorenson, S.K., 1999, Effects of soils, riparian zones, hydrology, and land use on nutrients, herbicides, and biological relations in midwestern agricultural streams: Bulletin of the North American Benthological Society, v. 16, no. 1, p. 160. (Also presented at Mississippi River Research Consortium, 31st Annual Meeting, LaCrosse, WI)
- East, J.W., Paul, E.M., and Porter, S.D., 1998, Nutrient loading and selected water-quality and biological characteristics of Dickinson Bayou near Houston, Texas, 1995-97: U.S. Geological Survey Water-Resources Investigations Report 98-4012, 68 p.
- Porter, S.D., and Nelson, S.M., 1998, Bioaccumulation of metals by transplanted mosses in relation to water and sediment chemistry, macroinvertebrate community structure, and mining in the Southern Rockies ecoregion: Proceedings of the Western U.S. Mining-Impacted Watersheds joint conference on remediation and ecological risk assessment technologies, Denver, CO, October 27-29, 1998, p. 19-20.
- Porter, S.D., and Nelson, S.M., 1997, Comparison of metal concentrations accumulated by transplanted aquatic mosses in the Southern Rockies ecoregion--A regional synthesis: Bulletin of the North American Benthological Society, v. 14, no. 1, p. 70.
- Roberts, L.R., Lee, K.E., Harris, M.A., and Porter, S.D., 1997, Persistence of selected organochlorine compounds in fish tissue in the upper Mississippi River hydrologic system: Bulletin of the North American Benthological Society, v. 14, no. 1, p. 186.
- Cuffney, T.F., Meador, M.R., Porter, S.D., and Gurtz, M.E., 1997, Distribution of fish, benthic invertebrate, and algal communities in relation to physical and chemical conditions, Yakima River basin, Washington, 1990: U.S. Geological Survey Water-Resource Investigations Report 96-4280, 94 p.
- Carter, L.F., and Porter, S.D., 1997, Trace-element accumulation by *Hygrohypnum ochraceum* in the Upper Rio Grande Basin, Colorado and New Mexico, USA, Environmental Toxicology and Chemistry, v. 16, no. 12, p. 2521-2528.
- Porter, S.D., and Nelson, S.M., 1996, Uptake and elimination of metals by transplanted aquatic mosses: Bulletin of the North American Benthological Society, v. 13, no. 1, p. 152.

- Williamson, J.E., Goldstein, R.M., and Porter, S.D., 1996, Selected trace metals in water, sediment, plants, and fish in Rapid Creek, Rapid City, South Dakota, 1993-94: U.S. Geological Survey Water-Resources Investigations Report 96-4276, 30 p.
- Porter, S.D., White, K.D., and Clark, J.R., 1995, Water-quality assessment of the Kentucky River basin, Kentucky: Distribution of metals and other trace elements in sediment and water, 1987-90: U.S. Geological Survey Water-Resources Investigations Report 94-4134, 184 p.
- Haag, K.H., and Porter, S.D., 1995, Water-quality assessment of the Kentucky River basin, Kentucky: Nutrients, sediments, and pesticides in streams, 1987-90: U.S. Geological Survey Water-Resources Investigations Report 94-4227, 135 p.
- Haag, K.H., Garcia, R., Jarrett, G.L., and Porter, S.D., 1995, Water-quality assessment of the Kentucky River basin, Kentucky: Results of investigations of surface-water quality, 1987-90: U.S. Geological Survey Water-Resources Investigations Report 95-4163, 70 p.
- Carter, L.F., Porter, S.D., and Nelson, S.M., 1995, Metal accumulation by transplanted aquatic mosses in response to land-use practices in the Upper Rio Grande basin, Colorado and New Mexico: Bulletin of the North American Benthological Society, v. 12, no. 1, p. 159.
- Porter, S.D., 1994, Report of algae workgroup. In: Report of the interagency biological methods workshop, Gurtz, M.E. and Muir, T.A., eds.: U.S. Geological Survey Open-File Report 94-490, 85 p.
- Porter, S.D., 1994, Benthic algal community relations with water chemistry and land use: Examples from the Illinois, Yakima, and Kentucky River basins: Bulletin of the North American Benthological Society, v. 11, no. 1, p. 168.
- Porter, S.D., 1994, Guidance, procedures, and specifications for processing of algal samples by contract laboratories: U.S. Geological Survey Open-File Report (manuscript--for procurement purposes), 94 p.
- Porter, S.D., Cuffney, T.F., Gurtz, M.E., and Meador, M.R., 1993, Methods for collecting algal samples as part of the National Water-Quality Assessment Program: U.S. Geological Survey Open-File Report 93-409, 39 p.
- Ryder, J.L., Sanzalone, R.F., and Porter, S.D., 1993, Surface-water-quality assessment of the Kentucky River basin in Kentucky--Chemical analyses of major, minor, and trace elements in fine-grained sediments: U.S. Geological Survey Open-File Report 93-326, 89 p.
- Leland, H.V., and Porter, S.D., 1993, Geographic patterns in composition and structure of periphyton communities of the Yakima River basin, Central Washington: Bulletin of the North American Benthological Society, v. 10, no. 1, p. 136.
- Porter, S.D., 1992, Relation of metal concentrations in annual shell-layers of freshwater mussels with long-term water-quality trends in the Kentucky River: Bulletin of the North American Benthological Society, v. 9, no. 1, p. 115.
- Bradfield, A.D., and Porter, S.D., 1990, Summary of biological investigations relating to surface-water quality in the Kentucky River basin, Kentucky: U.S. Geological Survey Water-Resources Investigations Report 90-4051, 63 p.
- Porter, S.D., 1988, Succession of aquatic insect trophic guilds in a third order intermittent stream. (presented at North American Benthological Society Annual Meeting, 1988; presented at Kentucky Academy of Sciences Annual Meeting, 1988).
- Nuckols, J.R., Hubbs, S., Lewthart, C., Olup, B.J., Porter, S.D., Smith, J., and Spencer, H., 1988, Environmental Impact Study: Potential impacts of surface mining in the Cannon Creek Lake watershed, Bell County, Kentucky. Prepared for Keep Cannon Creek Clean, Inc., Pineville, KY. 197 p.

- Porter, S.D., 1988, Assessment of aquatic resources in the Coal Branch/Cane Creek/Little Sandy River basin. Technical Report. Prepared for GROWL, Inc., Clifford Duvall. Greenup, KY. 45 p.
- Porter, S.D., 1988, Stream system habitat evaluation. East Fork Little Sandy River: Ashland Mall project area. Boyd County, Kentucky. Technical Report. Prepared for James F. Robinson and Associates, Ashland, KY. 39 p.
- Porter, S.D., 1987, The influence of drainage basin physiography on diatom assemblages associated with coarse stream-sediments (epipsammon), *Bulletin of the North American Benthological Society*, v. 4, no. 1, p. 74.
- Holdren, G.C., Porter, S.D., and Mayfield, J.D., 1987, The effects of grass carp on water quality in McNeely Lake. Technical Report submitted to Kentucky Department of Fish and Wildlife Resources, Frankfort, KY.
- Porter, S.D., 1986, Epipsammic diatom assemblages in Kentucky streams. (presented at Kentucky Academy of Sciences Annual Meeting, 1986).
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- Porter, S.D., 1984, Algal variability in Kentucky stream systems. (presented at North American Benthological Society Annual Meeting, 1985).
- Porter, S.D., 1984, Diatoms as water quality indicators in Kentucky: Halophilic species. (presented at Kentucky Academy of Sciences Annual Meeting, 1984).
- Logan, R.W., Beck, G.V., Call, S.M., Houpp, R.E., Mills, M.R., Porter, S.D., Roth, C.A., Schneider, C.C., Walker, D.W., and Westerman, A.G., 1983-1986, Biological and water quality investigation for stream use designation. Technical Reports 1-22. Kentucky Division of Environmental Services & Kentucky Division of Water, Biological Branch. Frankfort, KY.
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- Porter, S.D., 1982, Phytoplankton dynamics and community structure in McNeely Lake (Jefferson County, KY). Kentucky Division of Water technical report: Frankfort, KY (also presented at Kentucky Academy of Sciences, Annual Meeting, 1982).
- Porter, S.D., 1981, The effects of metal toxicity on benthic algal communities in the East Fork Clarks River (Calloway County, KY). Kentucky Division of Water Quality technical report: Frankfort, KY (also presented at Kentucky Academy of Sciences, Annual Meeting, 1981).
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