



**COUNTY OF BOONE, MISSOURI**

**REQUEST FOR STATEMENT OF QUALIFICATIONS (RSQ)**

For an

**ENVIRONMENTAL ANALYSIS STUDY:**

**HINKSON CREEK AQUATIC MACROINVERTEBRATE DATA MINING PROJECT**

**RSQ # 05-17APR19**

**Statement of Qualification Submittal Deadline:  
2:00 P.M. CST on April 17, 2019**

*Insertion Date Paper #1: March 1, 2019  
COLUMBIA MISSOURIAN*

*Insertion Date Paper #2: March 6, 2019  
COLUMBIA DAILY TRIBUNE*

Boone County Purchasing  
613 E. Ash Street, Room 109  
Columbia, Missouri, 65201

Liz Palazzolo, CPPO, C.P.M. – Senior Buyer  
Phone: (573) 886-4392  
Fax: (573) 886-4390  
Email: [lpalazzolo@boonecountymo.org](mailto:lpalazzolo@boonecountymo.org)



## **NOTICE OF REQUEST FOR STATEMENT OF QUALIFICATIONS**

### **For the HINKSON CREEK AQUATIC MACROINVERTEBRATE DATA MINING PROJECT**

#### **1. Introduction and Background:**

- 1.1 The Boone County Purchasing Department is accepting sealed Request for a Statement of Qualifications responses on behalf of the Boone County Resource Management Department. All references to this Request for a Statement of Qualifications (RSQ) should refer to the following:

**RSQ #: 05-17APR19 – Hinkson Creek Aquatic  
Macroinvertebrate Data Mining Project**

- 1.2 Organization: This document, referred to as a Request for a Statement of Qualifications (RSQ), is divided into the following parts:

- 1) Introduction and Background
- 2) Scope of Work
- 3) Response Submission Information
- 4) Vendor Statement of Qualifications Response Page(s)
- 5) Certification Regarding Debarment
- 6) Certification Regarding Lobbying
- 7) Work Authorization Certification
- 8) “No Response” Form
- 9) Boone County Standard Terms and Conditions

#### 1.3 Submission Instructions:

- 1.3.1 Delivery of Responses: Sealed responses will be received at the Boone County Purchasing office until the response submission deadline indicated.

- 1.3.2 Response Deadline: All responses must be **delivered before 2:00 P.M.** Central Time on **Wednesday, April 17, 2019** to:

Boone County Purchasing Department  
Liz Palazzolo, Senior Buyer  
613 E. Ash Street, Room 109  
Columbia, Missouri 65201-4460

- 1.3.3 The County will not accept any responses received after 2:00 P.M.  
Late responses may be returned unopened if the vendor requests within ten (10) business days after RSQ opening. All returns will be made at the vendor's expense.
- 1.4 Sealed Responses Required: Statement of Qualifications responses must be submitted in a sealed envelope identified with the RSQ number and date of closing. List the RSQ number on the outside of the box or envelope and note "Response to RSQ# 05-17APR19 enclosed." No fax or electronic transmitted proposals will be accepted.
- 1.5 If the offeror chooses not to submit a response, please return the enclosed *No Response Page* and note the reason.
- 1.6 Request for a Statement of Qualifications are available in the Purchasing Department and requests for copies may be made by phone (573) 886-4392; fax (573) 886-4390 or e-mail: [lpalazzolo@boonecountymo.org](mailto:lpalazzolo@boonecountymo.org).
- 1.7 Responses to this RSQ will be posted at <http://www.showmeboone.com/purchasing/bids>.
- 1.8 Background:
- 1.8.1 Study site: The macroinvertebrate data to be analyzed during this project were collected from Hinkson Creek, located in Boone County, Missouri. Hinkson Creek Watershed is a mixed-land-use watershed with rural (primarily agricultural) and urban (through the City of Columbia) reaches. In 1998, the Missouri Department of Natural Resources (MDNR) placed Hinkson Creek on the Clean Water Act Section 303(d) list of impaired waters for failure to fully support aquatic life. The source of the impairment was listed as "urban nonpoint lagoon runoff." Both water body identification numbers for Hinkson Creek (MO\_1007 and MO\_1008) were included in the listing. The cause of impairment to macroinvertebrate communities was listed as "unspecified" pollutants (USEPA 2011). Subsequent bioassessment studies, water quality analyses and follow-up studies were unable to determine a specific cause of impairment (MDNR 2003, 2006, and others).
- 1.8.2 Macroinvertebrate sampling protocol (language taken directly from reference MDNR 2006): The biological assessment monitoring was conducted according to the MDNR Semi-Quantitative Macroinvertebrate Stream Bioassessment Project Procedure (SMSBPP: MDNR 2003)<sup>1</sup>. In summary, macroinvertebrates were collected using a multi-habitat sampling method. The sampling was conducted in a stream reach approximately twenty times the average width of the stream and

---

<sup>1</sup> The SMSBPP was revised in 2012 and undergoes review every three years per MDNR policy. The most recent project procedure is available at <https://dnr.mo.gov/env/esp/SOP/Semi-quantMacroStreamBioassessmentProjectProcedure.pdf>

encompassed two riffle sequences or two meander sequences. Hinkson Creek is considered a “riffle / pool” predominant stream and, therefore, macroinvertebrate samples were collected from three predominant habitats: flowing water over coarse substrate (e.g., riffle); non-flowing water over depositional substrate (e.g., pool); and root-mat substrate. Each macroinvertebrate sample was a composite of six subsamples within each habitat. The sampling periods occurred during periods of stable base flow before peak aquatic insect emergence times. In general, macroinvertebrate sampling occurs in the spring from mid-March through mid-April and in the fall from mid-September through mid-October.

1.8.3 Biological assessment methods (language based on MDNR (2006) but with updated biological criteria tables for both MDNR sample seasons): Macroinvertebrate identifications were made to the lowest possible taxonomic level (usually genus or species) and according to MDNR-FSS-209 *Taxonomic levels for Macroinvertebrate Identifications* (MDNR 2005b)<sup>2</sup>. The macroinvertebrates from each habitat were evaluated using the following metrics:

- a) Taxa Richness (TR):  
Reflects the health of the community through a measurement of the number of taxa present. In general, the total number of taxa increases with improving water quality, habitat diversity, and habitat suitability. Taxa Richness is calculated by counting all taxa from the subsampling effort.
- b) Ephemeroptera/Plecoptera/Trichoptera Taxa (EPT Taxa):  
Is the total number of distinct taxa within the orders Ephemeroptera, Plecoptera, and Trichoptera. This value summarizes taxa richness within the insect taxonomic orders that are generally considered to be pollution sensitive. The EPT Taxa index generally increases with higher water quality.
- c) Biotic Index (BI):  
Developed as a means to detect organic pollution. Tolerance values for each taxon range from 1 to 10, with higher values indicating increased tolerance.
- d) Shannon Diversity Index (SDI):  
Is a measure of community composition that takes into account both richness and evenness. It assumed that a more diverse community is a more healthy community. Diversity increases as the number of taxa increases and as the distribution of individuals among those taxa is more evenly distributed.

---

<sup>2</sup> The *Taxonomic Levels for Macroinvertebrate Identifications* Standard Operating Procedure is updated every three years per MDNR policy to reflect changes in taxonomy and new taxa records for the State of Missouri. The most recent 2016 version can be found at <https://dnr.mo.gov/env/esp/SOP/MDNR-ESP-209.pdf>.

1.8.4 The above four metrics were aggregated into a single value presented as the Stream Condition Index (SCI). The SCI is calculated according to SMSBPP (MDNR 2003c) for each season and year and is based upon data collected from reference streams with the same EDU as the study stream. The SCI scores were divided into three categories. Study reaches that scored from 16-20 were considered fully biologically supporting, scores from 10-14 were considered partially biologically supporting, and scores of 4-9 were considered non-biologically supporting of aquatic life.

1.8.5 The study stream was then evaluated by calculating the metrics, scoring them using the scale determined in the SCI, and totaling the scores into a single value. The study stream is then ranked for aquatic life sustainability using the following criteria for Warm Water Reference Streams in the Ozark/Moreau/Loutre Ecological Drainage Unit:

**Table 1. Spring Biological Criteria Threshold Values for the Ozark/Moreau/Loutre Ecological Drainage Unit**

	Score =5	Score =3	Score =1
TR	>71	71-35	<35
EPT Taxa	>17	17-9	<9
BI	<6.4	6.4-8.2	>8.2
SDI	>2.80	2.80-1.40	<1.40

**Table 2. Fall Biological Criteria Threshold Values for the Ozark/Moreau/Loutre Ecological Drainage Unit**

	Score =5	Score =3	Score =1
TR	>73	73-37	<37
EPT Taxa	>15	15-7	<7
BI	<6.8	6.8-8.4	>8.4
SDI	>3.18	3.18-1.59	<1.59

## 2. Scope of Work

- 2.1 General Requirements: The contractor shall assist the Hinkson Creek Collaborative Adaptive Management process (CAM) in the computation and interpretation of aquatic macroinvertebrate community-level indicators using the existing Missouri Department of Natural Resources (MDNR) data sets available for stream sites in the Hinkson Creek watershed (2001-2017). The data may be found on the MDNR website: [https://dnr.mo.gov/mocwis\\_public/wqa/waterbodySearch.do](https://dnr.mo.gov/mocwis_public/wqa/waterbodySearch.do), water body IDs 1007.00 and 1008.00, Hinkson Cr., Boone County.
- 2.2 The objective of these analyses and interpretation shall be to diagnose stressors causing aquatic life impairment in Hinkson Creek. Indicator metric values (**see Attachment One**) will be calculated and analyzed to compare stream sites and summarize trends over time.
- 2.3 All analysis and reporting shall be completed and submitted in final written form to the Boone County Resource Management Department no later than within one (1) year of the contract award date. The contract award date shall be determined after the pre-qualification process and after the County's acceptance of project pricing. Project pricing shall be negotiated between the pre-qualified vendor and the County subsequent to pre-qualification.
- 2.4 The contractor shall understand and agree that all data collected as part of the study shall adhere to the data management plan prepared by the County, signed by the contractor, and incorporated into the contract. The contractor shall understand and agree that all data and analysis shall be considered public information.
- 2.5 The contractor must provide numerical values for macroinvertebrate community metrics and synthesis of diagnostic indicators to aid in the evaluation of causes for aquatic life impairment, as specified below:
- 2.6 Specific Task Requirements:
- 2.6.1 The contractor shall provide the following services to include but not necessarily be limited to:
- 1) Calculation of numerical values for indicator metrics at all stream sites (11 sites total, see **Attachment One**) and for all time periods for the raw macroinvertebrate community data that are currently available.
    - a. Classify macroinvertebrate taxa and assign pollution tolerance values as needed for calculation of indicator metrics, including organic nutrient enrichment, deposited sediment, hydrologic stressors, trait states, and any other tolerance values available in the literature.
  - 2) Determination of indicator macroinvertebrate species and site comparisons based on taxonomic presence/absence.
    - a. Analyses of existing spreadsheets using appropriate software for determining presence / absence of individual macroinvertebrate

- taxa among sites and between site categories (rural v. urban, Hinkson v. reference sites, etc.).
- b. Compare presence / absence of indicator species among Hinkson Creek sites, between Hinkson and other reference sites, and trends over time.
- 3) Interpretation of resulting macroinvertebrate indicator data as follows:
    - a. Summary statistics, including statistical comparisons among sites and groups of sites (urban v. rural, Hinkson v. reference, etc.), while using appropriate scaling and data transformations where necessary
    - b. Correlation analysis between indicator metric values and environmental variables that are available for the sites from previous work (water quality parameters, habitat quality scores, hydrological variables such as flow metrics, etc.)
    - c. Analysis of trends in indicator metric values over time for individual sites, groups of sites (rural v. urban, Hinkson v. reference)
    - d. Analysis of site differences and trends for stressor-specific metrics, such as those for deposited sediment tolerance, hydrologic alteration, nutrient loading, etc.
    - e. Analyses to determine “best” indicator metrics for stressor identification and assemblage of multi-metric indices for diagnosing causes for aquatic life impairment in Hinkson Creek
  - 4) Develop assessment tools to aid the CAM process in further monitoring and evaluation of aquatic life in Hinkson Creek, as well as to provide materials for outreach and education, including but not limited to the following:
    - a. Develop a database that includes quick public access to metric values, results of statistical comparisons, and evidence of stressor identification and aquatic life diagnosis
    - b. Identify aquatic life thresholds and risks for specific stressors where appropriate
    - c. Recommend specific management alternatives for enhancing, maintaining, and preserving the integrity of aquatic macroinvertebrate communities in Hinkson Creek

## 2.7 Project Work Product and Deliverables:

2.7.1 As a result of the contractor’s analysis, the contractor shall provide at minimum each of the following work products to the County:

- 1) A schedule of project milestones at the outset of the project;
- 2) Monthly progress/project status meetings in person or remotely, via Skype or alternative remote methods. The contractor may report progress more frequently than monthly as needed;
- 3) Development of a database (see paragraph 2.6.1(4)(a) above) immediately after the metrics have been run. Data shall be made available in

accordance with the prescribed data management plan. The database shall be made available to the public via a link to the [www.helpthehinkson.org](http://www.helpthehinkson.org) website;

- 4) Provision of an interim presentation to the CAM Stakeholder Committee, Action Team, and Science Team via a single presentation on-site in Columbia, Missouri;
- 5) Finalization of the database and interpretation thereof;
- 6) Final report/presentation to the CAM Stakeholder Committee, Action Team, and Science Team via a single presentation on-site in Columbia, Missouri.

**References:**

- MDNR (Missouri Department of Natural Resources). 2003. Semi-Quantitative Macroinvertebrate Stream Bioassessment, effective date August 11, 2003. \*
- MDNR. 2005b. MDNR-WQMS-209. Taxonomic Levels for Macroinvertebrate Identifications. Missouri Department of Natural Resources. Jefferson City, Missouri. \*
- MDNR. 2006. Phase III Hinkson Creek Stream Study. Columbia, Missouri. Boone County. Missouri Department of Natural Resources.
- USEPA (United States Environmental Protection Agency). 2011. EPA Region 7 Total Maximum Daily Load, Hinkson Creek (MO\_1007\_and\_1008), Boone County, Missouri.

*\* The versions of these two documents have changed over the course of the sampling period (2001 – 2017) but the substance of the procedures has not changed substantially during that time.*



### 3. Response Submission Information:

- 3.1 Interested firms/individuals should submit an original, sealed response that includes three (3) printed copies, and an electronic copy on a removable storage stick or similar media to:

Liz Palazzolo  
Senior Buyer  
613 East Ash, Room 109  
Columbia, Missouri, 65201

**Due Date:** Responses are due in the Boone County Purchasing Department by **2:00 P.M. CST, on Wednesday April 17, 2019.**

- 3.1.2 The County has provided Response Pages as part of the RSQ. The vendor is advised to provide at minimal the information requested on the Response Pages. The vendor may choose to present the same information in a different format, however the vendor is responsible for ensuring that all relevant information is presented that allows the County Selection Team to fully evaluate and assess the vendor's qualifications to perform the Hinkson Creek Aquatic Macroinvertebrate Study.
- 3.2 Selection Procedure:
- 3.2.1 The Statement of Qualifications will be reviewed by a Selection Committee comprised of, but not limited to, Boone County Resource Management personnel. As part of the review process, the Selection Committee may request an interview with the selected vendor. Interviews may be conducted by phone, Skype or similar technology, or in person. The County will schedule interviews and coordinate such time with selected vendors. Any travel/lodging costs associated with a requested in-person interview will be borne by the vendor. The County will select the vendor best suited to perform the study.
- 3.2.2 Boone County recognizes the cost associated with developing a Statement of Qualifications and encourages brevity and conciseness in the vendor's response.
- 3.2.3 Pricing must NOT be submitted at this time. The County will request pricing after the pre-qualification process.
- 3.3 Statement of Qualifications: The vendor should respond with a "Statement of Qualification" that should include a description of key personnel who will be assigned to work on the County's project, the expertise of assigned personnel highlighting relevant experience, a description of at least two projects completed of similar scope; qualifications of key team members that would be directly involved with the project; and any supporting information that would further convey the respondent's qualifications for this project assignment. In addition, the State of Qualifications should include the following:

- 3.3.1 Business Information – Basic biographical information about the firm, including firm name and former firm names, address, date established, statement of business organization, names of all owners, principles, partners, and professional employees. This section should also detail the firm’s proximity to and familiarity with the project area.
  - 3.3.2 Staff Information – Resumes of each professional on the project team, including a description of experience, technical competence, and areas of expertise. The description should also include the number of ancillary staff with job descriptions or titles and relevant experience available for assignment. This section should detail the capacity and specialized experience of the firm to perform the work required within the time limits established and a discussion of how the County would benefit from your firm being selected to complete the work. This section should also name a designated project engineer/contact person for this project.
  - 3.3.3 Registration and Licensing – Evidence of professional registration and licensing with the State of Missouri and, in the case of business entities which must be registered with the Secretary of State, current copies of registration and statements of good standing.
  - 3.3.4 Work History – A listing of all government agencies for which work was performed within the preceding two years and nature of services. In the event the vendor has not performed professional services for governmental entities, then the vendor should provide a listing of institutional or business clients for whom work has been performed in the preceding two years. If the references are unavailable, then the vendor should provide a detailed explanation of why references are not available. A separate list of references should also be included.
  - 3.3.5 Insurance – Evidence of insurance coverages and amounts carried by the vendor.
  - 3.3.6 Project Listing – A listing of completed and pending projects in which the vendor was or is the primary provider of professional services or manager of the project.
  - 3.3.7 Subcontractors – A listing of any subcontractors the vendor intends to use to perform and work described herein, include relevant descriptions of the subcontractor’s expertise appropriate to work they will perform.
  - 3.3.8 Quality Controls – A description of internal quality control and assurance procedures used to verify accuracy and reliability of work product.
  - 3.3.9 Approach to Completing the Scope of Work with Proposed Schedule – A description of the vendor’s approach to completing the Scope of Work including project start and finish times, and identification of project milestones and deliverables.
- 3.4 While a contract will result from the pre-qualification process, and the pricing discussions that will be subsequent to pre-qualification, any firm wishing to submit a Statement of Qualification should take into consideration the following requirements that

will be included in a resulting contract, and that the following is not exhaustive of additional general contracting terms and requirements:

3.4.1 Business Compliance: The vendor must be in compliance with the laws regarding conducting business in the State of Missouri. The vendor will have to certify that the vendor and any proposed subcontractors either are presently in compliance with such laws or shall be in compliance with such laws prior to any resulting contract award. The vendor shall provide documentation of compliance upon request by the Purchasing Department. The compliance to conduct business in the state shall include but may not be limited to:

- Registration of business name (if applicable) with the Secretary of State at <http://sos.mo.gov/business/startBusiness.asp>
- Certificate of authority to transact business/certificate of good standing (if applicable)
- Taxes (e.g., city/county/state/federal)
- State and local certifications (e.g., professions/occupations/activities)
- Licenses and permits (e.g., city/county license, sales permits)
- Insurance (e.g., worker's compensation/unemployment compensation)

3.4.2 Employment of Unauthorized Aliens Prohibited:

- (a) The contractor shall comply with Missouri State Statute section 285.530 in that they shall not knowingly employ, hire for employment, or continue to employ an unauthorized alien to perform work within the state of Missouri.
- (b) As a condition for the award of the contract, the contractor shall, by sworn affidavit and provision of documentation, affirm its enrollment and participation in a federal work authorization program with respect to the employees working in connection with the contracted services. The contractor shall also sign an affidavit affirming that it does not knowingly employ any person who is an unauthorized alien in connection with the contracted services. The contractor will be required to **return a copy of the Memorandum of Understanding** following completion of enrollment. This will provide the County the proof of enrollment.
- (c) The contractor shall require each subcontractor to affirmatively state in its contract with the contractor that the subcontractor shall not knowingly employ, hire for employment or continue to employ an unauthorized alien to perform work within the state of Missouri. The contractor shall also require each subcontractor to provide the contractor with a sworn affidavit

under the penalty of perjury attesting to the fact that the subcontractor's employees are lawfully present in the United States.

- 3.4.3 Coordination: The contractor shall fully coordinate all contract activities with those activities of the County. As the work of the contractor progresses, advice and information on matters covered by the contract shall be made available by the contractor to the County throughout the effective period of the contract.
- 3.4.4 Property of the County: The contractor shall agree and understand that all documents, data, reports, supplies, equipment, and accomplishments prepared, furnished, or completed by the contractor pursuant to the terms of the contract shall become the property of the County. Upon expiration, termination, or cancellation of the contract, said items shall become the property of the County, which shall include all rights and interests for present and future use or sale as deemed appropriate by the County.
- 3.4.5 Confidentiality: The contractor shall agree and understand that all discussions with the contractor and all information gained by the contractor as a result of the contractor's performance under the contract shall be confidential and that no reports, documentation, or material prepared as required by the contract shall be released to the public without the prior written consent of the County.
- 3.4.6 Boone County's Standard Terms and Conditions shall be incorporated into the contract and shall take precedence over the vendor's terms and conditions, if any.
- 3.4.7 **Insurance Requirements:** The contractor shall not commence work under the contract until the contractor has obtained all insurance required under this paragraph and the Certificate of Insurance has been approved by the County, nor shall the contractor allow any subcontractor to commence work on their subcontract until all similar insurance required of subcontractor has been so obtained and approved. All policies shall be in amounts, form and companies satisfactory to the County which must carry an A-6 or better rating as listed in the A.M. Best or equivalent rating guide. Insurance limits indicated below may be lowered at the discretion of the County.
- a. **Employers Liability and Workers Compensation Insurance -** The contractor shall take out and maintain during the life of the contract, **Employers Liability and Workers Compensation Insurance** for all of its employees employed at the site of work, and in case any work is sublet, the contractor shall require the subcontractor similarly to provide Workers Compensation Insurance for all of the latter's employees unless such employees are covered by the protection afforded by the contractor. Workers Compensation coverage shall meet Missouri statutory limits. Employers Liability limits shall be \$500,000.00 each employee, \$500,000.00 each accident, and \$500,000.00 policy limit. In case any class of employees engaged in hazardous work under the contract at the

site of the work is not protected under the Workers Compensation Statute, the contractor shall provide and shall cause each subcontractor to provide Employers Liability Insurance for the protection of their employees not otherwise protected.

- b. **Commercial General Liability Insurance** - The contractor shall take out and maintain during the life of the contract, such commercial general liability insurance as shall protect it and any subcontractor performing work covered by the contract, from claims for damages for personal & advertising injury, bodily injury including accidental death, as well as from claims for property damages, which may arise from operations under the contract, whether such operations be by themselves or for any subcontractor or by anyone directly or indirectly employed by them. The amounts of insurance shall be not less than \$2,000,000.00 combined single limit for any one occurrence covering both bodily injury and property damage, including accidental death. If the contract involves any underground/digging operations, the general liability certificate shall include X, C, and U (Explosion, Collapse, and Underground) coverage. If providing Commercial General Liability Insurance, then the Proof of Coverage of Insurance shall also be included.
  
- c. The contractor may satisfy the minimum liability limits required for Commercial General Liability or Business Auto Liability under an Umbrella or Excess Liability policy. There is no minimum per occurrence limit of liability under the umbrella or Excess Liability; however, the Annual Aggregate limit shall not be less than the highest "Each Occurrence" limit for either Commercial General Liability or Business Auto Liability. **The contractor shall include the County as an Additional Insured on the umbrella or Excess Liability, unless the Certificate of Insurance states that the Umbrella or Excess Liability provides coverage on a "Follow-Form" basis.**
  
- d. **Business Automobile Liability** – The contractor shall maintain during the life of the contract, automobile liability insurance in the amount of not less than \$2,000,000.00 combined single limit for any one occurrence, covering both bodily injury, including accidental death, and property damage, to protect themselves from any and all claims arising from the use of the contractor's own automobiles, teams and trucks; hired automobiles, teams and trucks; non-owned and both on and off the site of work.
  
- e. **Subcontractors:** The contractor shall cause each subcontractor to purchase and maintain insurance of the types and amounts specified herein. Limits of such coverage may be reduced only upon written agreement of County. The contractor shall provide to the County copies

of certificates of insurance evidencing coverage for each subcontractor. Subcontractors' commercial general liability and business automobile liability insurance shall name the County as an Additional Insured and have the Waiver of Subrogation endorsements added.

- f. **Proof of Carriage of Insurance** - The contractor shall furnish the County with Certificate(s) of Insurance which name the County as an additional insured in an amount as required in the contract. The Certificate of Insurance shall provide that there will be no cancellation, non-renewal or reduction of coverage without thirty (30) calendar days prior written notice to the County. In addition, such insurance shall be on an occurrence basis and shall remain in effect until such time as the County has made final acceptance of the services provided.
  
- g. **Indemnity Agreement:** To the fullest extent permitted by law, the contractor shall indemnify, hold harmless and defend the County, its directors, officers, agents, and employees from and against all claims, damages, losses and expenses (including but not limited to attorney's fees) arising by reason of any act or failure to act, negligent or otherwise, of the contractor, of any subcontractor (meaning anyone, including but not limited to consultants having a contract with contractor or a subcontract for part of the services), of anyone directly or indirectly employed by contractor or by any subcontractor, or of anyone for whose acts the contractor or its subcontractor may be liable, in connection with providing these services. This provision does not, however, require the contractor to indemnify, hold harmless, or defend the County of Boone from its own negligence.
  
- h. Nothing in these requirements shall be construed as a waiver of any governmental immunity of the County, its officials nor any of its employees in the course of their official duties.
  
- i. Failure to maintain the required insurance in force may be cause for contract termination. In the event the Agency/Service fails to maintain and keep in force the required insurance or to obtain coverage from its subcontractors, the County shall have the right to cancel and terminate the contract without notice.

**Certificate Holder address:**

County of Boone, Missouri  
C/O Purchasing Department  
613 E. Ash Street  
Columbia, MO 65201

- 3.4.8 **Assignment, Transfer, Etc.:** The contractor must be prohibited from assigning, transferring, conveying, subletting, or otherwise disposing of this agreement or its rights, title or interest therein, or its power to execute such agreement to any other person, company or corporation without the prior consent and approval in writing by the County.
- 3.4.9 **Contract Period:** The initial contract period shall run **Date of Award through One Year.**
- 3.4.10 **Cancellation Agreement:** The County reserves the right to cancel the contract without cause by giving not less than thirty (30) calendar days prior notice to the contractor in writing of the intention to cancel, or with cause, if at any time the contractor fails to fulfill or abide by any of the terms or conditions specified. Failure of the contractor to comply with any of the provisions of the contract may be considered a material breach of contract and must be cause for immediate termination of the contract at the discretion of Boone County. Boone County may allow the contractor reasonable opportunity to cure material breach, but is not required to do so.
- 3.4.11 **Fiscal Non-Funding Clause:** In the event sufficient budgeted funds are not available for a new fiscal period, the County must notify the provider of such occurrence and the contract must terminate on the last day of the current fiscal period without penalty or expense to the County.
- 3.4.12 **Pricing:** The contract will be awarded on a firm, fixed price basis for the entirety of the initial/original contract period once contract pricing has been negotiated between the vendor and the County.



**4. VENDOR STATEMENT OF QUALIFICATIONS RESPONSE PAGE**

4.1 Company Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

Telephone: \_\_\_\_\_ Fax: \_\_\_\_\_

Federal Tax ID (or Social Security #): \_\_\_\_\_

Print Name: \_\_\_\_\_ Title: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

E-Mail Address: \_\_\_\_\_

4.2 **Company History:** The vendor should describe in the available space the company's background in performing aquatic macroinvertebrate studies, e.g., when the company was founded, how long the company has been serving the Missouri market, etc:

\_\_\_\_\_

\_\_\_\_\_

4.3 **Work History:** The vendor should provide a listing of government agencies, businesses, or other clients for which work was performed similar to the work envisioned for the Boone County Aquatic Macroinvertebrate Hinkson Creek study:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

The vendor should provide reference contact information below regarding provision of aquatic macroinvertebrate studies similar to the Boone County Hinkson Creek study below:

4.4 **Vendor's References:**



Company/Entity Name: \_\_\_\_\_

Contact Name: \_\_\_\_\_

Contact's Title: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_

Telephone Number and Area Code: \_\_\_\_\_

E-mail Address: \_\_\_\_\_

Description of Equipment/Services Furnished: \_\_\_\_\_

Availability of Reference: \_\_\_\_\_



Company/Entity Name: \_\_\_\_\_

Contact Name: \_\_\_\_\_

Contact's Title: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_

Telephone Number and Area Code: \_\_\_\_\_

E-mail Address: \_\_\_\_\_

Description of Equipment/Services Furnished: \_\_\_\_\_

Availability of Reference: \_\_\_\_\_

4.5 **Personnel Expertise:** The vendor should describe below the background, education, and relevant expertise of key personnel who will be assigned to the County's study:

**Personnel Expertise Summary**  
*(Also attach resumes for key personnel)*

Personnel	Background and Expertise of Personnel
1. _____ (Name)	_____
_____	_____
(Title)	_____
_____	
2. _____ (Name)	_____
_____	_____
(Title)	_____
_____	
3. _____ (Name)	_____
_____	_____
(Title)	_____
_____	
4. _____ (Name)	_____
_____	_____
(Title)	_____
_____	
5. _____ (Name)	_____
_____	_____
(Title)	_____
_____	

4.6 **Registration/Licensure/Certifications:** If not described above, the vendor should describe in the available space the relevant registration/licensure/certifications held by the company and the staff who will be performing the aquatic macroinvertebrate study currently have:

---

---

4.7 **Insurance:** The vendor should describe evidence of current insurance including coverage by category and amount:

---

---

4.8 **Project Listing:** The vendor should provide a listing of completed and pending projects in which the vendor acts/acted as the primary provider or manager of the study:

---

---

4.9 **Subcontractors, Their Roles and Their Qualifications:** The vendor should identify any and all subcontractors who may be working with the vendor to complete the Hinkson Creek Aquatic Macroinvertebrate study for Boone County, identify their role(s) in the study, and identify their qualifications to perform the work:

---

---

---

---

4.10 **Quality Controls:** The vendor should describe internal quality control and assurance procedures that will be employed to ensure accuracy and reliability in conducting the study:

---

---

**4.11 Approach to Performing Scope of Work and Schedule:** The vendor should describe the approach the vendor will take in conducting and completing the Hinkson Creek Macroinvertebrate Study as described herein, and include a schedule of milestone events with specific start and finish dates with delivery of finished work product to the County:

---

---

---

---

**Certification Regarding  
Debarment, Suspension, Ineligibility and Voluntary Exclusion  
Lower Tier Covered Transactions**

This certification is required by the regulations implementing Executive Order 12549, Debarment and Suspension, 29 CFR Part 98 Section 98.510, Participants' responsibilities. The regulations were published as Part VII of the May 26, 1988, Federal Register (pages 19160-19211).

(BEFORE COMPLETING CERTIFICATION, READ INSTRUCTIONS FOR  
CERTIFICATION)

- (1) The prospective recipient of Federal assistance funds certifies, by submission of this proposal, that neither it nor its principals are presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.
  
- (2) Where the prospective recipient of Federal assistance funds is unable to certify to any of the statements in this certification, such prospective participant must attach an explanation to this proposal.

---

Name and Title of Authorized Representative

---

Signature

---

Date

*(The vendor should complete and return with the response)*

## **CERTIFICATION REGARDING LOBBYING**

### *Certification for Contracts, Grants, Loans, and Cooperative Agreements*

The undersigned certifies, to the best of his or her knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loan, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

\_\_\_\_\_  
Vendor Signature

\_\_\_\_\_  
Date

## INSTRUCTIONS FOR COMPLIANCE WITH HOUSE BILL 1549

House Bill 1549 addresses the Department of Homeland Security's and the Social Security Administration's E-Verify Program (Employment Eligibility Verification Program) that requires the County to verify "lawful presence" of individuals when we contract for work/service; verify that contractor has programs to verify lawful presence of their employees when contracts exceed \$5,000; and a requirement for OSHA safety training for public works projects.

The County is required to obtain certification that the bidder awarded the attached contract participates in a federal work authorization program. To obtain additional information on the Department of Homeland Security's E-Verify program, go to:

[http://www.dhs.gov/xprevprot/programs/gc\\_1185221678150.shtm](http://www.dhs.gov/xprevprot/programs/gc_1185221678150.shtm)

Please complete and return form *Work Authorization Certification Pursuant to 285.530 RSMo* if the contract amount is in excess of \$5,000. Attach to this form the *E-Verify Memorandum of Understanding* that the vendor completed when enrolling. The link for that form is:  
<http://www.uscis.gov/files/nativedocuments/save-mou.pdf>

Additional information may be obtained from:

<http://www.uscis.gov/files/nativedocuments/MOU.pdf>

If the vendor is an Individual/Proprietorship, then the vendor must return the attached *Certification of Individual Bidder*. On that form, the vendor may do **one of the three options** listed. Be sure to attach any required information for those options as detailed on the *Certification of Individual Bidder*. If the vendor chooses option number two, then the vendor will also need to complete and return the attached form *Affidavit*.





**CERTIFICATION OF INDIVIDUAL BIDDER**

Pursuant to Section 208.009 RSMo, any person applying for or receiving any grant, contract, loan, retirement, welfare, health benefit, post-secondary education, scholarship, disability benefit, housing benefit or food assistance who is over 18 must verify their lawful presence in the United States. Please indicate compliance below. Note: A parent or guardian applying for a public benefit on behalf of a child who is citizen or permanent resident need not comply.

**Options**

- \_\_\_\_ 1. I have provided a copy of documents showing citizenship or lawful presence in the United States. (Such proof may be a Missouri driver’s license, U.S. passport, birth certificate, or immigration documents). Note: If the applicant is an alien, verification of lawful presence must occur prior to receiving a public benefit.
  
- \_\_\_\_ 2. I do not have the above documents, but provide an affidavit (*copy attached – see following page*) which may allow for temporary 90-day qualification.
  
- \_\_\_\_ 3. I have provided a completed application for a birth certificate pending in the State of \_\_\_\_\_. Qualification must terminate upon receipt of the birth certificate or determination that a birth certificate does not exist because I am not a United States citizen.

\_\_\_\_\_  
Applicant

\_\_\_\_\_  
Date

\_\_\_\_\_  
Printed Name

**AFFIDAVIT**  
**(Only Required for Certification of Individual Bidder (Option #2))**  
*- see previous page -*

State of Missouri                    )  
  )ss  
County of \_\_\_\_\_            )

I, the undersigned, being at least eighteen years of age, swear upon my oath that I am either a United States citizen or am classified by the United States government as being lawfully admitted for permanent residence.

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Social Security Number  
or Other Federal I.D. Number

\_\_\_\_\_  
Printed Name

On the date above written \_\_\_\_\_ appeared before me and swore that the facts contained in the foregoing affidavit are true according to his/her best knowledge, information and belief.

\_\_\_\_\_  
Notary Public

My Commission Expires:

**“NO RESPONSE” FORM**

**NOTE: THE VENDOR SHOULD COMPLETE AND RETURN THIS FORM ONLY IF THE VENDOR DOES NOT WANT TO SUBMIT A STATE OF QUALIFICATIONS**

If the vendor does not wish to respond to respond, but would like to remain on the Boone County vendor list **for this service/commodity**, please remove form and return to the Purchasing Department by mail, e-mail or fax.

**Bid: RSQ: 05-17APR19 – Request for Statement of Qualifications for Hinkson Creek Aquatic Macroinvertebrate Data Mining Project**

Business Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Telephone: \_\_\_\_\_

Contact: \_\_\_\_\_

Date: \_\_\_\_\_

Reason(s) for Not Submitting a Response :

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## **STANDARD TERMS AND CONDITIONS - BOONE COUNTY, MISSOURI**

1. Contractor shall comply with all applicable federal, state, and local laws and failure to do so, in County's sole discretion, shall give County the right to terminate this Contract.
2. Responses shall include all charges for packing, delivery, installation, etc., (unless otherwise specified) to the Boone County Department identified in the Request for Bid and/or Proposal.
3. The Boone County Commission has the right to accept or reject any part or parts of all bids, to waive technicalities, and to accept the offer the County Commission considers the most advantageous to the County. Boone County reserves the right to award this bid on an item-by-item basis, or an "all or none" basis, whichever is in the best interest of the County.
4. Bidders must use the bid forms provided for the purpose of submitting bids, must return the bid and bid sheets comprised in this bid, give the unit price, extended totals, and sign the bid. The Purchasing Director reserves the right, when only one bid has been received by the bid closing date, to delay the opening of bids to another date and time in order to revise specifications and/or establish further competition for the commodity or service required. The one (1) bid received will be retained unopened until the new Closing date, or at request of bidder, returned unopened for re-submittal at the new date and time of bid closing.
5. When products or materials of any particular producer or manufacturer are mentioned in our specifications, such products or materials are intended to be descriptive of type or quality and not restricted to those mentioned.
6. Do not include Federal Excise Tax or Sales and Use Taxes in bid process, as law exempts the County from them.
7. The delivery date shall be stated in definite terms, as it will be taken into consideration in

awarding the bid.

8. The County Commission reserves the right to cancel all or any part of orders if delivery is not made or work is not started as guaranteed. In case of delay, the Contractor must notify the Purchasing Department.
9. In case of default by the Contractor, the County of Boone will procure the articles or services from other sources and hold the Bidder responsible for any excess cost occasioned thereby.
10. Failure to deliver as guaranteed may disqualify Bidder from future bidding.
11. Prices must be as stated in units of quantity specified, and must be firm. Bids qualified by escalator clauses may not be considered unless specified in the bid specifications.
12. No bid transmitted by fax machine or e-mail will be accepted.
13. The County of Boone, Missouri expressly denies responsibility for, or ownership of any item purchased until same is delivered to the County and is accepted by the County.
14. The County reserves the right to award to one or multiple respondents. The County also reserves the right to not award any item or group of items if the services can be obtained from a state or other governmental entities contract under more favorable terms. The resulting contract will be considered “Non-Exclusive”. The County reserves the right to purchase from other vendors.
15. The County, from time to time, uses federal grant funds for the procurement of goods and services. Accordingly, the provider of goods and/or services shall comply with federal laws, rules and regulations applicable to the funds used by the County for said procurement, and contract clauses required by the federal government in such circumstances are incorporated herein by reference. These clauses can generally be found in the *Federal Transit Administration’s Best Practices Procurement Manual – Appendix A*. Any questions

regarding the applicability of federal clauses to a particular bid should be directed to the Purchasing Department prior to bid opening.

16. In the event of a discrepancy between a unit price and an extended line item price, the unit price shall govern.
17. Should an audit of Contractor's invoices during the term of the Agreement, and any renewals thereof, indicate that the County has remitted payment on invoices that constitute an over-charging to the County above the pricing terms agreed to herein, the Contractor shall issue a refund check to the County for any over-charges within 30-days of being notified of the same.
18. For all bid responses over \$25,000, if any manufactured goods or commodities proposed with bid/proposal response are manufactured or produced outside the United States, this MUST be noted on the Bid/Proposal Response Form or a Memo attached.
19. **For all titled vehicles and equipment the dealer must use the actual delivery date to the County on all transfer documents** including the Certificate of Origin (COO,) Manufacturer's Statement of Origin (MSO,) Bill of Sale (BOS,) and Application for Title.
20. **Equipment and serial and model numbers** - The contractor is strongly encouraged to include equipment serial and model numbers for all amounts invoiced to the County. If equipment serial and model numbers are not provided on the face of the invoice, such information may be required by the County before issuing payment.

*Revised 1/17/2018*

***End of Document***

**RSQ # 05-17APR19**  
**ENVIRONMENTAL ANALYSIS STUDY:**  
**HINKSON CREEK AQUATIC MACROINVERTEBRATE DATA MINING PROJECT**

**ATTACHMENT ONE**

**Table 1.** Initial list of macroinvertebrate metrics and/or indices that potentially could be examined for diagnosing causes for aquatic life impairment at stream sites in the Hinkson Creek watershed of central Missouri. References are given below.

Metric (Attribute)	Abbreviation	Metric Category	Citation(s)
Chironomidae richness	Chir <sub>rich</sub>	Richness	Hayslip 1993, Barbour et al. 1996
Diptera richness	Dipt <sub>rich</sub>	Richness	DeShon 1995
Ephemeroptera richness	Eph <sub>rich</sub>	Richness	Barbour et al. 1999
Ephemeroptera+Plecoptera+Trichoptera richness	EPT <sub>rich</sub>	Richness	Klemm et al. 1990
Plecoptera richness	Plec <sub>rich</sub>	Richness	Barbour et al. 1999
Total taxa richness	TT <sub>rich</sub>	Richness	Barbour et al. 1999
Trichoptera richness	Tri <sub>rich</sub>	Richness	Barbour et al. 1999
Clinger +Climber richness	ClgCli <sub>rich</sub>	Richness	*
% Chironomidae	Chir <sub>cp</sub>	<sup>b</sup> Composition / %	Lenat 1983, Barbour et al. 1994
% Corbicula	Corb <sub>cp</sub>	<sup>b</sup> Composition / %	Kerans & Karr 1994
% Diptera	Dipt <sub>cp</sub>	<sup>b</sup> Composition / %	Barbour et al. 1996
% Ephemeroptera	Eph <sub>cp</sub>	<sup>b</sup> Composition / %	Schloesser et al. 1991
% Ephemeroptera+Plecoptera	EP <sub>cp</sub>	<sup>b</sup> Composition / %	Poulton et al. 2007
% Ephemeroptera+Plecoptera+Trichoptera	EPT <sub>cp</sub>	<sup>b</sup> Composition / %	Barbour et al. 1999
% Hydropsychidae Trichoptera	HydT <sub>cp</sub>	<sup>b</sup> Composition / %	Camargo 1992
% Other Diptera+non-insects <sup>a</sup>	ODNI <sub>cp</sub>	<sup>b</sup> Composition / %	DeShon 1995
% Oligochaeta	Oligo <sub>cp</sub>	<sup>b</sup> Composition / %	Lenat 1993, Kerans & Karr 1994
% Plecoptera	Plec <sub>cp</sub>	<sup>b</sup> Composition / %	Barbour et al. 1994
% Tanytarsini midges	Tany <sub>cp</sub>	<sup>b</sup> Composition / %	DeShon 1995
% Trichoptera	Tri <sub>cp</sub>	<sup>b</sup> Composition / %	DeShon 1995
% Clingers+Climbers	ClgCli <sub>cp</sub>	Functional / habitat	Barbour et al. 1999
% Filterers	Filt <sub>fn</sub>	Functional / habitat	Hayslip 1993
% Predators	Pred <sub>fn</sub>	Functional / habitat	Kerans & Karr 1994
% Scrapers	Sc <sub>fn</sub>	Functional / habitat	Barbour et al. 1999
% Shredders	Sh <sub>fn</sub>	Functional / habitat	Barbour et al. 1992
% Intolerant taxa (MOBI tolerance ≤ 4.0)	IntMOBI <sub>tol</sub>	Tolerance	DeShon 1995, Huggins & Moffett 1988
Missouri Biotic Index	MOBI <sub>tol</sub>	Tolerance	MDNR 2001
Macroinvertebrate Biotic Index	MBI <sub>tol</sub>	Tolerance	Davenport & Kelly 1983
Deposited Sediment Tolerance Index	DSTI <sub>tol</sub>	Tolerance	Zweig and Rabeni 2001
Index of Hydrologic Alteration	IHA <sub>tol</sub>	Tolerance	Mazor et al. 2018
% Dominant taxon	DT1 <sub>dd</sub>	Dominance / Diversity	Shackleford 1988
% of 2 dominant taxa	DT2 <sub>dd</sub>	Dominance / Diversity	*
% of 5 dominant taxa	DT5 <sub>dd</sub>	Dominance / Diversity	*
Shannon Diversity Index	SDI <sub>dd</sub>	Dominance / Diversity	Washington 1984
EPT / Chironomidae ratio	EPTC <sub>ratio</sub>	Ratio	Ferrington 1987
Scraper / Filtering collector ratio	ScFc <sub>ratio</sub>	Ratio	Plafkin et al. 1989
% Fast Seasonal Development	Dev1 <sub>traits</sub>	<sup>b</sup> Trait states	Poff et al. 2006, Vieira et al. 2006
% Slow Seasonal Development	Dev2 <sub>traits</sub>	<sup>b</sup> Trait states	Poff et al. 2006, Vieira et al. 2006
% Ability to Exit as Adults	Exit2 <sub>traits</sub>	<sup>b</sup> Trait states	Poff et al. 2006, Vieira et al. 2006
% Rare Drift Occurrence	Drift1 <sub>traits</sub>	<sup>b</sup> Trait states	Poff et al. 2006, Vieira et al. 2006
% Abundant Drift Occurrence	Drift3 <sub>traits</sub>	<sup>b</sup> Trait states	Poff et al. 2006, Vieira et al. 2006
% No Swimming Ability	Swim1 <sub>traits</sub>	<sup>b</sup> Trait states	Poff et al. 2006, Vieira et al. 2006
% Weak Swimming Ability	Swim3 <sub>traits</sub>	<sup>b</sup> Trait states	Poff et al. 2006, Vieira et al. 2006
% Streamlined Body Shape	Shpe1 <sub>traits</sub>	<sup>b</sup> Trait states	Poff et al. 2006, Vieira et al. 2006
% Sprawlers	Habit3 <sub>traits</sub>	<sup>b</sup> Trait states	Poff et al. 2006, Vieira et al. 2006

<sup>a</sup>Excludes Chironomidae, <sup>b</sup>Percent (%) relative abundance, \* = Variation or modification of a commonly used metric



## Literature Cited

- Barbour, M.T., Bowman, M.L., and White, J.S., 1994, Evaluation of the biological condition of streams in the middle rockies – Central Ecoregion: Prepared for Wyoming Department of Environmental Quality, 36 p.
- Barbour, M.T., Gerritsen, J., Snyder, B.D., and Stribling, J.B., 1999, Rapid bioassessment protocols for use in streams and wadeable rivers--periphyton, benthic macroinvertebrates, and fish (2d ed.): U.S. Environmental Protection Agency Report, EPA 841/B-99/002, 18 p.
- Barbour, M.T., Plafkin, J.L., Bradley, B.P., Graves, C.G., and Wisseman, R.W., 1992, Evaluation of EPA's rapid bioassessment benthic metrics--metric redundancy and variability among reference stream sites: *Environmental Toxicology and Chemistry*, v. 11, p. 437-449.
- Barbour, M.T., Stribling, J.B., and Karr, J.R., 1995, Multimetric approach for establishing biocriteria and measuring biological condition, *in* Davis, W.S., and Simon, T.P., eds., *Biological assessment and criteria--tools for water resource planning and decision making*: Boca Raton, Florida, Lewis Publication, chap. 6, p. 63-77.
- Barbour, M.T., J. Gerritsen, G.E. Griffeth, R. Frydenborg, E. McCarron, J.S. White, and M.L. Bastain. 1996. A framework for biocriteria for Florida streams using benthic macroinvertebrates. *J. N. Amer. Benthol. Soc.* 15(2): 185-211
- Camargo, J.A., 1992, Macroinvertebrate responses along the recovery gradient of a regulated river (Spain) receiving an industrial effluent: *Archives of Environmental Contamination and Toxicology*, v. 23, p. 324-334.
- Davenport, T.E., and Kelly, M.H., 1983, Water resource data and preliminary trend analysis for the Highland Silver Lake Monitoring and Evaluation Project, Madison County, IL, phase II: Springfield, Illinois Environmental Protection Agency, Report No. IEPA/WPC/83-013, variously paged.
- DeShon, J.E., 1995, Development and application of the Invertebrate Community Index (ICI), *in* Davis, W.S., and Simon, T.P., eds., *Biological assessment and criteria--tools for water resource planning and decision making*: Boca Raton, Florida., Lewis Publishers, p. 217-243.
- Ferrington, L.C., 1987, Collection and identification of floating exuviae of Chironomidae for use in studies of surface water quality: Kansas City, Kansas, U.S. Environmental Protection Agency, Region VII, SOP No. FW130A, 39 p.
- Fore, L.S., Karr, J.R., and Conquest, L.L., 1994, Statistical properties of an index of biological integrity used to evaluate water resources: *Canada Journal of Fish Aquatic Science*, v. 51, p. 1077-1087.
- Hayslip, G.A., 1993, EPA Region 10 in-stream biological monitoring handbook (for wadeable streams in the Pacific Northwest): Seattle, Washington, U.S. Environmental Protection Agency, Region 10, Environmental Services Division, EPA-910-9-92-013, variously paged.
- Kerans, B.L., and J.R. Karr, 1994, A benthic index of biotic integrity (B-IBI) for rivers of the Tennessee Valley: *Ecology Applications*, v. 4, no. 4, p. 768-785.
- Klemm, D.J., Lewis, P.A., Fulk, F., and Lazorchak, J.M., 1990, Macroinvertebrate field and laboratory methods for evaluating the biological integrity of surface waters: U.S. Environmental Protection Agency, Environmental Monitoring Series, USEPA-ORD, EPA/600/4-90/030, 256 p.

- Lenat, D.L., 1993, A biotic index for the southeastern United States--derivation and list of tolerance values, with criteria for assigning water-quality ratings—1993: *Journal of the North American Benthological Society*, v. 12, p. 279-290.
- Mazor, D.R., J. T. May, A. Sengupta, K.S. McCune, B.P. Bledsoe, E.D. Stein. 2018. Tools for managing hydrologic alteration on a regional scale: Setting targets to protect stream health. *Freshwater Biology*. 2018;1–18.
- Missouri Department of Natural Resources, 2001b, Biological criteria for Wadeable perennial streams of Missouri: Jefferson City, Missouri, Air & Land Protection Division, Environmental Services Program, 22 p.
- Plafkin, J.L., Barbour, M.T., Porter, K.D., Gross, S.K., and Hughes, R.M., 1989, Rapid bioassessment protocols for use in streams and rivers--benthic macroinvertebrates and fish: Washington, D.C., U.S. Environmental Protection Agency, Office of Water Regulations and Standards, EPA 440-4-89-001, variously paged.
- Poff, N.L., J.D. Olden, N.K.M. Vieira, D.S. Finn, M.P. Simmons, and B.C. Kondratieff. 2006. Functional trait niches on North American lotic insects: trait-based ecological applications in light of phylogenetic relationships. *J. N. Am. Benthol. Soc.* 25(4): 730-755
- Poulton, B.C., Rasmussen, T.J., and Lee, C.J. 2007. Assessment of biological conditions at selected stream sites in Johnson County, Kansas and Cass and Jackson Counties, Missouri, 2003 and 2004. USGS Scientific Investigations Report 2007-5108. 68 pp.
- Schloesser, D.W., Edsall, T.A., Manny, B.A., and Nichols, S.J., 1991, Distribution of *Hexagenia* nymphs and visible oil in sediments of the upper Great Lakes connecting channels: *Hydrobiologia*, v. 219, p. 345-352.
- Shackelford, B., 1988, Rapid bioassessments of lotic macroinvertebrate communities--biocriteria development: Little Rock, Arkansas, Arkansas Department of Pollution Control and Ecology, 44 p.
- Vieira, N.K.M., N.L. Poff, D.M. Carlisle, S.R. Moulton II, M.L. Koski, and B.C. Kondratieff. 2006. A database of lotic invertebrate traits for North America. U.S. Geological Survey, Data Series Report 187, 15pp.
- Washington, H.G., 1984, Diversity, biotic and similarity indices--a review with special reference to aquatic systems: *Water Resources*, v. 18, no. 6, p. 653-694.
- Zweig, L. D., and C. F. Rabeni. 2001. Biomonitoring for deposited sediment using benthic invertebrates: a test on 4 Missouri streams. *J. N. Am. Benthol. Soc.*, 20(4):643–657



Highway 63

Watershed Boundary

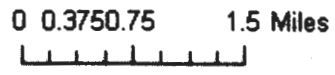
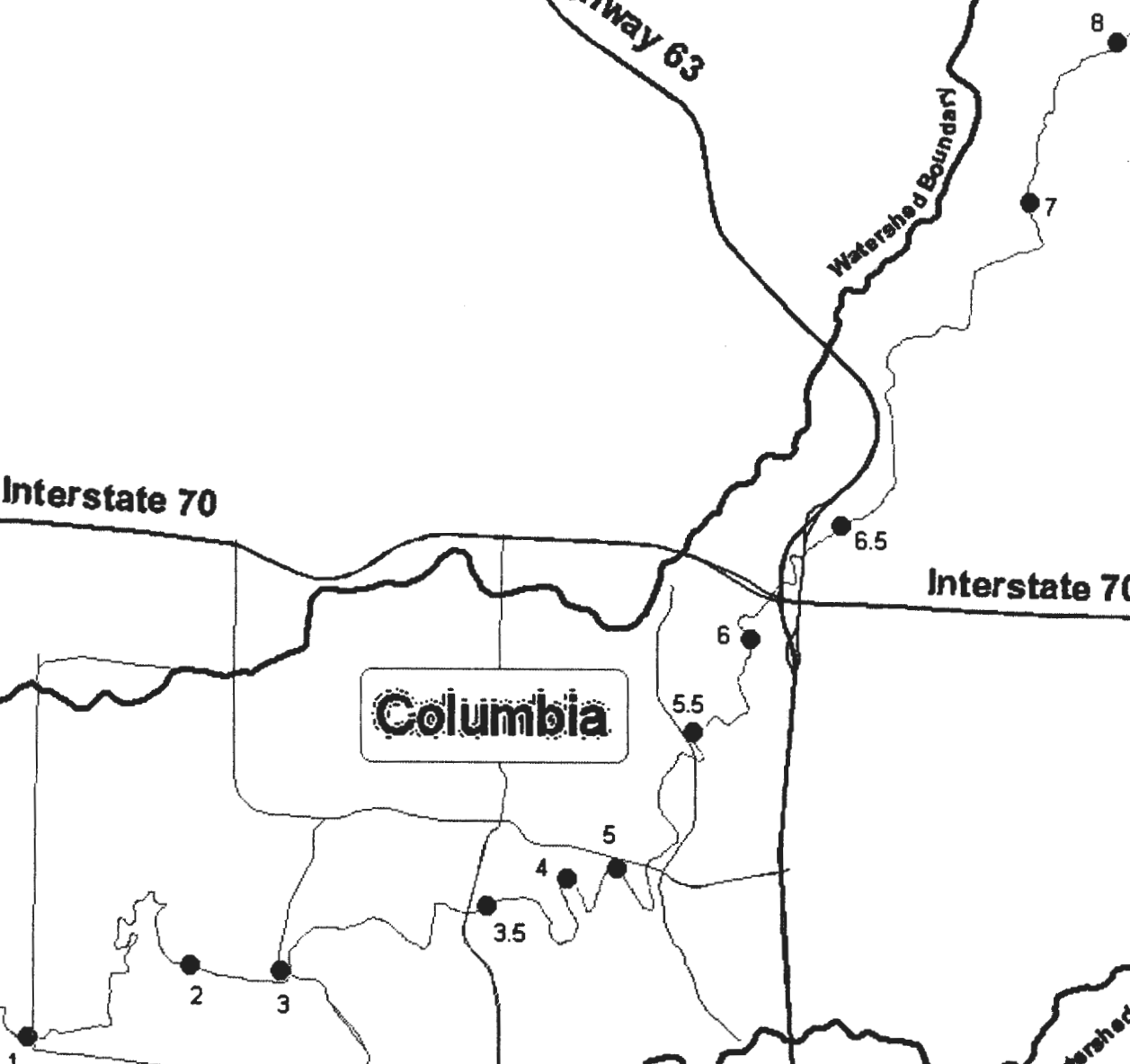
Interstate 70

Interstate 70

Columbia

Watershed Boundary

Highway 63





Perche  
Creek

Hinkson  
Creek

Columbia

Missouri  
River

Bonne  
Femme  
Creek

