



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

Solicitation

NUMBER
DNR214057

PAGE
1

ADDRESS CORRESPONDENCE TO ATTENTION OF
DEAN WINGERD
304-558-0468

*709061309 02 304-293-2941
WVU DIVISION OF FORESTRY
PO BOX 6125

MORGANTOWN WV 26506-6125

DIVISION OF NATURAL RESOURCES
PROCUREMENT OFFICE

324 4TH AVENUE
SOUTH CHARLESTON, WV
25303-1228 304-558-3397

DATE PRINTED
03/18/2014
BID OPENING DATE:
03/27/2014

BID OPENING TIME 1:30PM

LINE	QUANTITY	UOP	CAT NO	ITEM NUMBER	UNIT PRICE	AMOUNT
ADDENDUM NO. 1						
ADDENDUM IS ISSUED:						
1. TO PROVIDE RESPONSES TO VENDOR QUESTIONS REGARDING THE ABOVE SOLICITATION. QUESTION AND ANSWER PAGES ARE ATTACHED.						
2. TO PROVIDE ADDENDUM ACKNOWLEDGMENT. THIS DOCUMENT SHOULD BE SIGNED AND RETURNED WITH YOUR BID. FAILURE TO SIGN AND RETURN MAY RESULT IN THE DISQUALIFICATION OF YOUR BID.						
***** END OF ADDENDUM NO.1 *****						
03/26/14 12:45:46PM West Virginia Purchasing Division						
Fax (304) 558-3970						
SIGNATURE				TELEPHONE		DATE
TITLE		FIRM		ADDRESS CHANGES TO BE NOTED ABOVE		

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

SOLICITATION NUMBER: DNR214057
Addendum Number: 1

The purpose of this addendum is to modify the solicitation identified as ("Solicitation") to reflect the change(s) identified and described below.

Applicable Addendum Category:

- ☐ Modify bid opening date and time
- ☐ Modify specifications of product or service being sought
- ☒ Attachment of vendor questions and responses
- ☐ Attachment of pre-bid sign-in sheet
- ☐ Correction of error
- ☐ Other

Description of Modification to Solicitation:

1. To provide copy of vendor questions and responses.
2. To provide Addendum Acknowledgment form.

Additional Documentation: Documentation related to this Addendum (if any) has been included herewith as Attachment A and is specifically incorporated herein by reference.

Terms and Conditions:

1. All provisions of the Solicitation and other addenda not modified herein shall remain in full force and effect.
2. Vendor should acknowledge receipt of all addenda issued for this Solicitation by completing an Addendum Acknowledgment, a copy of which is included herewith. Failure to acknowledge addenda may result in bid disqualification. The addendum acknowledgement should be submitted with the bid to expedite document processing.

0003

ATTACHMENT A

Technical Questions**DNR214057**

- Q. 1. The request asks for a geneticist from the particular University to be part of the study. I am wondering if that geneticist needs to be from Virginia Tech (for example if VT submitted a proposal) or whether we could use a geneticist from the University of Idaho who specializes in conservation genetics? In our case, we have now had an excellent relationship with the University of Idaho's Laboratory for Ecological and Conservation Genetics, where our students get trained in PCR techniques from low quality/quantity DNA (i.e. from scats and hair). We work with a professor at Idaho who is on the Graduate Students committees. Dr. Waits from Idaho would be willing to provide a letter to this effect.
- A. 1. Section 3.2 of DNR214057 dealing with Vendor Qualifications is modified so that the Ph.D. person serving on the committee with a genetics specialty may be from outside of the respective Vendor's university. The specialist may be a faculty member at a different university or work outside of academia. The Vendor must still provide documentation that the genetics specialist is willing to serve on the students' committees (i.e., a letter directly to the vendor, and turned in with the bid, that the specialist is willing to serve on the committees).
- Q. 2. Under 4.1.7.1 of the above referenced solicitation it indicates the DNR will be collecting samples per recommendations of the student and major advisor. Do you have any idea on the number of persons or the amount of time each district has available for the project (which influences the number of samples and hence this cost)?
- A. 2. It is anticipated that the DNR will have 2-3 field personnel in each of the 5 ecological regions that will be able to collect hair samples per the Ph.D. student's study design. We would anticipate approximately 75-100 hair snares in each region but need additional advice from the winning Vendor on study design and sample size. Specific methodology, collection dates and sample size will be worked out with the winning Vendor. This study will be the major field research project for the Game Management Unit of the DNR during the next 4 years. Therefore, the Agency is committed to working with the Vendor and using any resources to ensure the project is completed on time and at a high quality.

ADDENDUM ACKNOWLEDGEMENT FORM
SOLICITATION NO.: DNR214057

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

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

Addendum Numbers Received:

(Check the box next to each addendum received)

<input checked="" type="checkbox"/> Addendum No. 1	<input type="checkbox"/> Addendum No. 6
<input type="checkbox"/> Addendum No. 2	<input type="checkbox"/> Addendum No. 7
<input type="checkbox"/> Addendum No. 3	<input type="checkbox"/> Addendum No. 8
<input type="checkbox"/> Addendum No. 4	<input type="checkbox"/> Addendum No. 9
<input type="checkbox"/> Addendum No. 5	<input type="checkbox"/> Addendum No. 10

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

WVU Research Corporation

Company



Authorized Signature

3/26/14

Date

NOTE: This addendum acknowledgement should be submitted with the bid to expedite document processing.
Revised 6/8/2012



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

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DEAN WINGERD 304-558-0468

*709061309 02 304-293-2941

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PO BOX 6125

MORGANTOWN WV 26506-6125

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DIVISION OF NATURAL RESOURCES
PROCUREMENT OFFICE

324 4TH AVENUE
SOUTH CHARLESTON, WV
25303-1228 304-558-3397

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T
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DATE PRINTED
02/25/2014

BID OPENING DATE: 03/27/2014

BID OPENING TIME 1:30PM

BID OPENING DATE: 03/27/2011						
LINE	QUANTITY	UOP	CAT NO.	ITEM NUMBER	UNIT PRICE	AMOUNT
THE WEST VIRGINIA PURCHASING DIVISION FOR THE AGENCY, WV DIVISION OF NATURAL RESOURCES, IS SOLICITING BIDS TO PROVIDE AN M.S. AND PH.D. STUDENT(S) TO CONDUCT AND PUBLISH A MAJOR BOBCAT POPULATION PROJECT IN WEST VIRGINIA, PER THE ATTACHED SPECIFICATIONS.						
ATTACHMENTS INCLUDE:						
1. INSTRUCTIONS TO VENDORS SUBMITTING BIDS.						
2. GENERAL TERMS AND CONDITIONS.						
3. DNR214057 SPECIFICATIONS.						
4. CERTIFICATION AND SIGNATURE PAGE.						
5. PURCHASING AFFIDAVIT.						
6. RESIDENT VENDOR PREFERENCE (RVP) FORM.						
03/24/14 09:54:44AM West Virginia Purchasing Division						
0001	1	LS		956-70		
M.S. AND PH.D. STUDENTS FOR BOBCAT POPULATION STUDY						
***** THIS IS THE END OF RFQ DNR214057 ***** TOTAL:						

SIGNATURE

Margaret Buckland

TELEPHONE 304-293-3998

DATE

3/19/14

Interim Director

FEIN 556000842

ADDRESS CHANGES TO BE NOTED ABOVE

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

INSTRUCTIONS TO VENDORS SUBMITTING BIDS

1. **REVIEW DOCUMENTS THOROUGHLY:** The attached documents contain a solicitation for bids. Please read these instructions and all documents attached in their entirety. These instructions provide critical information about requirements that if overlooked could lead to disqualification of a Vendor's bid. All bids must be submitted in accordance with the provisions contained in these instructions and the Solicitation. Failure to do so may result in disqualification of Vendor's bid.
2. **MANDATORY TERMS:** The Solicitation may contain mandatory provisions identified by the use of the words "must," "will," and "shall." Failure to comply with a mandatory term in the Solicitation will result in bid disqualification.
3. **PREBID MEETING:** The item identified below shall apply to this Solicitation.



A pre-bid meeting will not be held prior to bid opening.



A NON-MANDATORY PRE-BID meeting will be held at the following place and time:



A MANDATORY PRE-BID meeting will be held at the following place and time:

All Vendors submitting a bid must attend the mandatory pre-bid meeting. Failure to attend the mandatory pre-bid meeting shall result in disqualification of the Vendor's bid. No one person attending the pre-bid meeting may represent more than one Vendor.

An attendance sheet provided at the pre-bid meeting shall serve as the official document verifying attendance. The State will not accept any other form of proof or documentation to verify attendance. Any person attending the pre-bid meeting on behalf of a Vendor must list on the attendance sheet his or her name and the name of the Vendor he or she is representing. Additionally, the person attending the pre-bid meeting should include the Vendor's E-Mail address, phone number, and Fax number on the attendance sheet. It is the Vendor's responsibility to locate the attendance sheet and provide the required information. Failure to complete the attendance sheet as required may result in disqualification of Vendor's bid.

All Vendors should arrive prior to the starting time for the pre-bid. Vendors who arrive after the starting time but prior to the end of the pre-bid will be permitted to sign in, but are charged with knowing all matters discussed at the pre-bid.

Questions submitted at least five business days prior to a scheduled pre-bid will be discussed at the pre-bid meeting if possible. Any discussions or answers to questions at the pre-bid meeting are preliminary in nature and are non-binding. Official and binding answers to questions will be published in a written addendum to the Solicitation prior to bid opening.

4. **VENDOR QUESTION DEADLINE:** Vendors may submit questions relating to this Solicitation to the Purchasing Division. Questions must be submitted in writing. All questions must be submitted on or before the date listed below and to the address listed below in order to be considered. A written response will be published in a Solicitation addendum if a response is possible and appropriate. Non-written discussions, conversations, or questions and answers regarding this Solicitation are preliminary in nature and are non-binding.

Question Submission Deadline: March 14, 2014 at 5:00pm

Submit Questions to: Dean Wingerd

2019 Washington Street, East
Charleston, WV 25305

Fax: 304-558-4115

Email: Dean.C.Wingerd@wv.gov

5. **VERBAL COMMUNICATION:** Any verbal communication between the Vendor and any State personnel is not binding, including that made at the mandatory pre-bid conference. Only information issued in writing and added to the Solicitation by an official written addendum by the Purchasing Division is binding.
6. **BID SUBMISSION:** All bids must be signed and delivered by the Vendor to the Purchasing Division at the address listed below on or before the date and time of the bid opening. Any bid received by the Purchasing Division staff is considered to be in the possession of the Purchasing Division and will not be returned for any reason. The Purchasing Division will not accept bids, modification of bids, or addendum acknowledgment forms via e-mail. Acceptable delivery methods include hand delivery, delivery by courier, or facsimile. The bid delivery address is:

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

The bid should contain the information listed below on the face of the envelope or the bid may not be considered:

SEALED BID

BUYER: _____
 SOLICITATION NO.: _____
 BID OPENING DATE: _____
 BID OPENING TIME: _____
 FAX NUMBER: _____

In the event that Vendor is responding to a request for proposal, the Vendor shall submit one original technical and one original cost proposal plus _____ convenience copies of each to the Purchasing Division at the address shown above. Additionally, the Vendor should identify the bid type as either a technical or cost proposal on the face of each bid envelope submitted in response to a request for proposal as follows:

BID TYPE: ☐ Technical
☐ Cost

7. **BID OPENING:** Bids submitted in response to this Solicitation will be opened at the location identified below on the date and time listed below. Delivery of a bid after the bid opening date and time will result in bid disqualification. For purposes of this Solicitation, a bid is considered delivered when time stamped by the official Purchasing Division time clock.

Bid Opening Date and Time: March 27, 2014 at 1:30pm

Bid Opening Location: Department of Administration, Purchasing Division
 2019 Washington Street East
 Charleston, WV 25305-0130

8. **ADDENDUM ACKNOWLEDGEMENT:** Changes or revisions to this Solicitation will be made by an official written addendum issued by the Purchasing Division. Vendor should acknowledge receipt of all addenda issued with this Solicitation by completing an Addendum Acknowledgment Form, a copy of which is included herewith. Failure to acknowledge addenda may result in bid disqualification. The addendum acknowledgement should be submitted with the bid to expedite document processing.
9. **BID FORMATTING:** Vendor should type or electronically enter the information onto its bid to prevent errors in the evaluation. Failure to type or electronically enter the information may result in bid disqualification.

GENERAL TERMS AND CONDITIONS:

1. **CONTRACTUAL AGREEMENT:** Issuance of a Purchase Order signed by the Purchasing Division Director, or his designee, and approved as to form by the Attorney General's office constitutes acceptance of this Contract made by and between the State of West Virginia and the Vendor. Vendor's signature on its bid signifies Vendor's agreement to be bound by and accept the terms and conditions contained in this Contract.
2. **DEFINITIONS:** As used in this Solicitation/Contract, the following terms shall have the meanings attributed to them below. Additional definitions may be found in the specifications included with this Solicitation/Contract.
 - 2.1 **"Agency" or "Agencies"** means the agency, board, commission, or other entity of the State of West Virginia that is identified on the first page of the Solicitation or any other public entity seeking to procure goods or services under this Contract.
 - 2.2 **"Contract"** means the binding agreement that is entered into between the State and the Vendor to provide the goods and services requested in the Solicitation.
 - 2.3 **"Director"** means the Director of the West Virginia Department of Administration, Purchasing Division.
 - 2.4 **"Purchasing Division"** means the West Virginia Department of Administration, Purchasing Division.
 - 2.5 **"Purchase Order"** means the document signed by the Agency and the Purchasing Division, and approved as to form by the Attorney General, that identifies the Vendor as the successful bidder and Contract holder.
 - 2.6 **"Solicitation"** means the official solicitation published by the Purchasing Division and identified by number on the first page thereof.
 - 2.7 **"State"** means the State of West Virginia and/or any of its agencies, commissions, boards, etc. as context requires.
 - 2.8 **"Vendor" or "Vendors"** means any entity submitting a bid in response to the Solicitation, the entity that has been selected as the lowest responsible bidder, or the entity that has been awarded the Contract as context requires.

3. **CONTRACT TERM; RENEWAL; EXTENSION:** The term of this Contract shall be determined in accordance with the category that has been identified as applicable to this Contract below:



Term Contract

Initial Contract Term: This Contract becomes effective on Upon Award

and extends for a period of One (1) year(s).

Renewal Term: This Contract may be renewed upon the mutual written consent of the Agency, and the Vendor, with approval of the Purchasing Division and the Attorney General's office (Attorney General approval is as to form only). Any request for renewal must be submitted to the Purchasing Division Director thirty (30) days prior to the expiration date of the initial contract term or appropriate renewal term. A Contract renewal shall be in accordance with the terms and conditions of the original contract. Renewal of this Contract is limited to Three (3) successive one (1) year periods. Automatic renewal of this Contract is prohibited. Notwithstanding the foregoing, Purchasing Division approval is not required on agency delegated or exempt purchases. Attorney General approval may be required for vendor terms and conditions.

Reasonable Time Extension: At the sole discretion of the Purchasing Division Director, and with approval from the Attorney General's office (Attorney General approval is as to form only), this Contract may be extended for a reasonable time after the initial Contract term or after any renewal term as may be necessary to obtain a new contract or renew this Contract. Any reasonable time extension shall not exceed twelve (12) months. Vendor may avoid a reasonable time extension by providing the Purchasing Division Director with written notice of Vendor's desire to terminate this Contract 30 days prior to the expiration of the then current term. During any reasonable time extension period, the Vendor may terminate this Contract for any reason upon giving the Purchasing Division Director 30 days written notice. Automatic extension of this Contract is prohibited. Notwithstanding the foregoing, Purchasing Division approval is not required on agency delegated or exempt purchases, but Attorney General approval may be required.

Release Order Limitations: In the event that this contract permits release orders, a release order may only be issued during the time this Contract is in effect. Any release order issued within one year of the expiration of this Contract shall be effective for one year from the date the release order is issued. No release order may be extended beyond one year after this Contract has expired.



Fixed Period Contract: This Contract becomes effective upon Vendor's receipt of the notice to proceed and must be completed within _____ days.

☐ **One Time Purchase:** The term of this Contract shall run from the issuance of the Purchase Order until all of the goods contracted for have been delivered, but in no event shall this Contract extend for more than one fiscal year.

☐ **Other:** See attached.

4. **NOTICE TO PROCEED:** Vendor shall begin performance of this Contract immediately upon receiving notice to proceed unless otherwise instructed by the Agency. Unless otherwise specified, the fullyexecuted Purchase Order will be considered notice to proceed

5. **QUANTITIES:** The quantities required under this Contract shall be determined in accordance with the category that has been identified as applicable to this Contract below.

☐ **Open End Contract:** Quantities listed in this Solicitation are approximations only, based on estimates supplied by the Agency. 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.

☐ **Service:** The scope of the service to be provided will be more clearly defined in the specifications included herewith.

☒ **Combined Service and Goods:** The scope of the service and deliverable goods to be provided will be more clearly defined in the specifications included herewith.

☐ **One Time Purchase:** This Contract is for the purchase of a set quantity of goods that are identified in the specifications included herewith. Once those items have been delivered, no additional goods may be procured under this Contract without an appropriate change order approved by the Vendor, Agency, Purchasing Division, and Attorney General's office.

6. **PRICING:** The pricing set forth herein is firm for the life of the Contract, unless specified elsewhere within this Solicitation/Contract by the State. A Vendor's inclusion of price adjustment provisions in its bid, without an express authorization from the State in the Solicitation to do so, may result in bid disqualification.

7. **EMERGENCY PURCHASES:** The Purchasing Division Director may authorize the Agency to purchase goods or services in the open market that Vendor would otherwise provide under this Contract if those goods or services are for immediate or expedited delivery in an emergency. Emergencies shall include, but are not limited to, delays in transportation or an unanticipated increase in the volume of work. An emergency purchase in the open market, approved by the Purchasing Division Director, shall not constitute of breach of this Contract and shall not entitle the Vendor to any form of compensation or damages. This provision does not excuse the State from fulfilling its obligations under a One Time Purchase contract.

8. **REQUIRED DOCUMENTS:** All of the items checked below must be provided to the Purchasing Division by the Vendor as specified below.

- ☐ **BID BOND:** All Vendors shall furnish a bid bond in the amount of five percent (5%) of the total amount of the bid protecting the State of West Virginia. The bid bond must be submitted with the bid.
- ☐ **PERFORMANCE BOND:** The apparent successful Vendor shall provide a performance bond in the amount of . The performance bond must be issued and received by the Purchasing Division prior to Contract award. On construction contracts, the performance bond must be 100% of the Contract value.
- ☐ **LABOR/MATERIAL PAYMENT BOND:** The apparent successful Vendor shall provide a labor/material payment bond in the amount of 100% of the Contract value. The labor/material payment bond must be issued and delivered to the Purchasing Division prior to Contract award.

In lieu of the Bid Bond, Performance Bond, and Labor/Material Payment Bond, the Vendor may provide certified checks, cashier's checks, or irrevocable letters of credit. Any certified check, cashier's check, or irrevocable letter of credit provided in lieu of a bond must be of the same amount and delivered on the same schedule as the bond it replaces. A letter of credit submitted in lieu of a performance and labor/material payment bond will only be allowed for projects under \$100,000. Personal or business checks are not acceptable.

- ☐ **MAINTENANCE BOND:** The apparent successful Vendor shall provide a two (2) year maintenance bond covering the roofing system. The maintenance bond must be issued and delivered to the Purchasing Division prior to Contract award.
- ☒ **WORKERS' COMPENSATION INSURANCE:** The apparent successful Vendor shall have appropriate workers' compensation insurance and shall provide proof thereof upon request.
- ☐ **INSURANCE:** The apparent successful Vendor shall furnish proof of the following insurance prior to Contract award and shall list the state as a certificate holder:

- ☐ **Commercial General Liability Insurance:**
or more.
- ☐ **Builders Risk Insurance:** builders risk – all risk insurance in an amount equal to 100% of the amount of the Contract.
- ☐
- ☐
- ☐
- ☐
- ☐

The apparent successful Vendor shall also furnish proof of any additional insurance requirements contained in the specifications prior to Contract award regardless of whether or not that insurance requirement is listed above.

- ☐ **LICENSE(S) / CERTIFICATIONS / PERMITS:** In addition to anything required under the Section entitled Licensing, of the General Terms and Conditions, the apparent successful Vendor shall furnish proof of the following licenses, certifications, and/or permits prior to Contract award, in a form acceptable to the Purchasing Division.

☐
☐
☐
☐

The apparent successful Vendor shall also furnish proof of any additional licenses or certifications contained in the specifications prior to Contract award regardless of whether or not that requirement is listed above.

9. **LITIGATION BOND:** The Director reserves the right to require any Vendor that files a protest of an award to submit a litigation bond in the amount equal to one percent of the lowest bid submitted or \$5,000, whichever is greater. The entire amount of the bond shall be forfeited if the hearing officer determines that the protest was filed for frivolous or improper purpose, including but not limited to, the purpose of harassing, causing unnecessary delay, or needless expense for the Agency. All litigation bonds shall be made payable to the Purchasing Division. In lieu of a bond, the protester may submit a cashier's check or certified check payable to the Purchasing Division. Cashier's or certified checks will be deposited with and held by the State Treasurer's office. If it is determined that the protest has not been filed for frivolous or improper purpose, the bond or deposit shall be returned in its entirety.
10. **ALTERNATES:** Any model, brand, or specification listed herein establishes the acceptable level of quality only and is not intended to reflect a preference for, or in any way favor, a particular brand or vendor. Vendors may bid alternates to a listed model or brand provided that the alternate is at least equal to the model or brand and complies with the required specifications. The equality of any alternate being bid shall be determined by the State at its sole discretion. Any Vendor bidding an alternate model or brand should clearly identify the alternate items in its bid and should include manufacturer's specifications, industry literature, and/or any other relevant documentation demonstrating the equality of the alternate items. Failure to provide information for alternate items may be grounds for rejection of a Vendor's bid.
11. **EXCEPTIONS AND CLARIFICATIONS:** The Solicitation contains the specifications that shall form the basis of a contractual agreement. Vendor shall clearly mark any exceptions, clarifications, or

other proposed modifications in its bid. Exceptions to, clarifications of, or modifications of a requirement or term and condition of the Solicitation may result in bid disqualification.

12. LIQUIDATED DAMAGES: Vendor shall pay liquidated damages in the amount
for

This clause shall in no way be considered exclusive and shall not limit the State or Agency's right to pursue any other available remedy.

13. ACCEPTANCE/REJECTION: The State may accept or reject any bid in whole, or in part. Vendor's signature on its bid signifies acceptance of the terms and conditions contained in the Solicitation and Vendor agrees to be bound by the terms of the Contract, as reflected in the Purchase Order, upon receipt.

14. REGISTRATION: Prior to Contract award, the apparent successful Vendor must be properly registered with the West Virginia Purchasing Division and must have paid the \$125 fee if applicable.

15. COMMUNICATION LIMITATIONS: In accordance with West Virginia Code of State Rules §148-1-6.6, communication with the State of West Virginia or any of its employees regarding this Solicitation during the solicitation, bid, evaluation or award periods, except through the Purchasing Division, is strictly prohibited without prior Purchasing Division approval. Purchasing Division approval for such communication is implied for all agency delegated and exempt purchases.

16. FUNDING: This Contract shall continue for the term stated herein, contingent upon funds being appropriated by the Legislature or otherwise being made available. In the event funds are not appropriated or otherwise made available, this Contract becomes void and of no effect beginning on July 1 of the fiscal year for which funding has not been appropriated or otherwise made available.

17. PAYMENT: Payment in advance is prohibited under this Contract. Payment may only be made after the delivery and acceptance of goods or services. The Vendor shall submit invoices, in arrears, to the Agency at the address on the face of the purchase order labeled "Invoice To."

18. UNIT PRICE: Unit prices shall prevail in cases of a discrepancy in the Vendor's bid.

19. DELIVERY: All quotations are considered freight on board destination ("F.O.B. destination") unless alternate shipping terms are clearly identified in the bid. Vendor's listing of shipping terms that contradict the shipping terms expressly required by this Solicitation may result in bid disqualification.

20. INTEREST: Interest attributable to late payment will only be permitted if authorized by the West Virginia Code. Presently, there is no provision in the law for interest on late payments.

21. PREFERENCE: Vendor Preference may only be granted upon written request and only in accordance with the West Virginia Code § 5A-3-37 and the West Virginia Code of State Rules. A Resident Vendor Certification form has been attached hereto to allow Vendor to apply for the preference. Vendor's

failure to submit the Resident Vendor Certification form with its bid will result in denial of Vendor Preference. Vendor Preference does not apply to construction projects.

- 22. SMALL, WOMEN-OWNED, OR MINORITY-OWNED BUSINESSES:** For any solicitations publicly advertised for bid on or after July 1, 2012, in accordance with West Virginia Code §5A-3-37(a)(7) and W. Va. CSR § 148-22-9, any non-resident vendor certified as a small, women-owned, or minority-owned business under W. Va. CSR § 148-22-9 shall be provided the same preference made available to any resident vendor. Any non-resident small, women-owned, or minority-owned business must identify itself as such in writing, must submit that writing to the Purchasing Division with its bid, and must be properly certified under W. Va. CSR § 148-22-9 prior to submission of its bid to receive the preferences made available to resident vendors. Preference for a non-resident small, women-owned, or minority-owned business shall be applied in accordance with W. Va. CSR § 148-22-9.
- 23. TAXES:** The Vendor shall pay any applicable sales, use, personal property or any other taxes arising out of this Contract and the transactions contemplated thereby. The State of West Virginia is exempt from federal and state taxes and will not pay or reimburse such taxes.
- 24. CANCELLATION:** The Purchasing Division Director reserves the right to cancel this Contract immediately upon written notice to the vendor if the materials or workmanship supplied do not conform to the specifications contained in the Contract. The Purchasing Division Director may cancel any purchase or Contract upon 30 days written notice to the Vendor in accordance with West Virginia Code of State Rules § 148-1-7.16.2.
- 25. WAIVER OF MINOR IRREGULARITIES:** The Director reserves the right to waive minor irregularities in bids or specifications in accordance with West Virginia Code of State Rules § 148-1-4.6.
- 26. TIME:** Time is of the essence with regard to all matters of time and performance in this Contract.
- 27. APPLICABLE LAW:** This Contract is governed by and interpreted under West Virginia law without giving effect to its choice of law principles. Any information provided in specification manuals, or any other source, verbal or written, which contradicts or violates the West Virginia Constitution, West Virginia Code or West Virginia Code of State Rules is void and of no effect.
- 28. COMPLIANCE:** Vendor shall comply with all applicable federal, state, and local laws, regulations and ordinances. By submitting a bid, Vendors acknowledge that they have reviewed, understand, and will comply with all applicable law.
- 29. PREVAILING WAGE:** On any contract for the construction of a public improvement, Vendor and any subcontractors utilized by Vendor shall pay a rate or rates of wages which shall not be less than the fair minimum rate or rates of wages (prevailing wage), as established by the West Virginia Division of Labor under West Virginia Code §§ 21-5A-1 et seq. and available at <http://www.sos.wv.gov/administrative-law/wagerates/Pages/default.aspx>. Vendor shall be responsible for ensuring compliance with prevailing wage requirements and determining when prevailing wage

requirements are applicable. The required contract provisions contained in West Virginia Code of State Rules § 42-7-3 are specifically incorporated herein by reference.

30. **ARBITRATION:** Any references made to arbitration contained in this Contract, Vendor's bid, or in any American Institute of Architects documents pertaining to this Contract are hereby deleted, void, and of no effect.
31. **MODIFICATIONS:** This writing is the parties' final expression of intent. Notwithstanding anything contained in this Contract to the contrary, no modification of this Contract shall be binding without mutual written consent of the Agency, and the Vendor, with approval of the Purchasing Division and the Attorney General's office (Attorney General approval is as to form only). **No Change shall be implemented by the Vendor until such time as the Vendor receives an approved written change order from the Purchasing Division.**
32. **WAIVER:** The failure of either party to insist upon a strict performance of any of the terms or provision of this Contract, or to exercise any option, right, or remedy herein contained, shall not be construed as a waiver or a relinquishment for the future of such term, provision, option, right, or remedy, but the same shall continue in full force and effect. Any waiver must be expressly stated in writing and signed by the waiving party.
33. **SUBSEQUENT FORMS:** The terms and conditions contained in this Contract shall supersede any and all subsequent terms and conditions which may appear on any form documents submitted by Vendor to the Agency or Purchasing Division such as price lists, order forms, invoices, sales agreements, or maintenance agreements, and includes internet websites or other electronic documents. Acceptance or use of Vendor's forms does not constitute acceptance of the terms and conditions contained thereon.
34. **ASSIGNMENT:** Neither this Contract nor any monies due, or to become due hereunder, may be assigned by the Vendor without the express written consent of the Agency, the Purchasing Division, the Attorney General's office (as to form only), and any other government agency or office that may be required to approve such assignments. Notwithstanding the foregoing, Purchasing Division approval may or may not be required on certain agency delegated or exempt purchases.
35. **WARRANTY:** The Vendor expressly warrants that the goods and/or services covered by this Contract will: (a) conform to the specifications, drawings, samples, or other description furnished or specified by the Agency; (b) be merchantable and fit for the purpose intended; and (c) be free from defect in material and workmanship.
36. **STATE EMPLOYEES:** State employees are not permitted to utilize this Contract for personal use and the Vendor is prohibited from permitting or facilitating the same.
37. **BANKRUPTCY:** In the event the Vendor files for bankruptcy protection, the State of West Virginia may deem this Contract null and void, and terminate this Contract without notice.

38. [RESERVED]

39. CONFIDENTIALITY: The Vendor agrees that it will not disclose to anyone, directly or indirectly, any such personally identifiable information or other confidential information gained from the Agency, unless the individual who is the subject of the information consents to the disclosure in writing or the disclosure is made pursuant to the Agency's policies, procedures, and rules. Vendor further agrees to comply with the Confidentiality Policies and Information Security Accountability Requirements, set forth in <http://www.state.wv.us/admin/purchase/privacy/default.html>.

40. DISCLOSURE: Vendor's response to the Solicitation and the resulting Contract are considered public documents and will be disclosed to the public in accordance with the laws, rules, and policies governing the West Virginia Purchasing Division. Those laws include, but are not limited to, the Freedom of Information Act found in West Virginia Code § 29B-1-1 et seq.

If a Vendor considers any part of its bid to be exempt from public disclosure, Vendor must so indicate by specifically identifying the exempt information, identifying the exemption that applies, providing a detailed justification for the exemption, segregating the exempt information from the general bid information, and submitting the exempt information as part of its bid but in a segregated and clearly identifiable format. Failure to comply with the foregoing requirements will result in public disclosure of the Vendor's bid without further notice. A Vendor's act of marking all or nearly all of its bid as exempt is not sufficient to avoid disclosure and WILL NOT BE HONORED. Vendor's act of marking a bid or any part thereof as "confidential" or "proprietary" is not sufficient to avoid disclosure and WILL NOT BE HONORED. In addition, a legend or other statement indicating that all or substantially all of the bid is exempt from disclosure is not sufficient to avoid disclosure and WILL NOT BE HONORED. Vendor will be required to defend any claimed exemption for nondisclosure in the event of an administrative or judicial challenge to the State's nondisclosure. Vendor must indemnify the State for any costs incurred related to any exemptions claimed by Vendor. Any questions regarding the applicability of the various public records laws should be addressed to your own legal counsel prior to bid submission.

41. LICENSING: In accordance with West Virginia Code of State Rules §148-1-6.1.7, Vendor 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 agency or political subdivision. Upon request, the Vendor must provide all necessary releases to obtain information to enable the Purchasing Division Director or the Agency to verify that the Vendor is licensed and in good standing with the above entities.

42. ANTITRUST: In submitting a bid to, signing a contract with, or accepting a Purchase Order from any agency of the State of West Virginia, the Vendor agrees to 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 Vendor.

- 43. VENDOR CERTIFICATIONS:** By signing its bid or entering into this Contract, Vendor certifies (1) that its bid was made without prior understanding, agreement, or connection with any corporation, firm, limited liability company, partnership, person or entity submitting a bid for the same material, supplies, equipment or services; (2) that its bid is in all respects fair and without collusion or fraud; (3) that this Contract is accepted or entered into without any prior understanding, agreement, or connection to any other entity that could be considered a violation of law; and (4) that it has reviewed this RFQ in its entirety, understands the requirements, terms and conditions, and other information contained herein. Vendor's signature on its bid also affirms that neither it nor its representatives have any interest, nor shall acquire any interest, direct or indirect, which would compromise the performance of its services hereunder. Any such interests shall be promptly presented in detail to the Agency.

The individual signing this bid on behalf of Vendor certifies that he or she is authorized by the Vendor to execute this bid or any documents related thereto on Vendor's behalf; that he or she is authorized to bind the Vendor in a contractual relationship; and that, to the best of his or her knowledge, the Vendor has properly registered with any State agency that may require registration.

- 44. PURCHASING CARD ACCEPTANCE:** The State of West Virginia currently utilizes a Purchasing Card program, administered under contract by a banking institution, to process payment for goods and services. The Vendor must accept the State of West Virginia's Purchasing Card for payment of all orders under this Contract unless the box below is checked.

☐ Vendor is not required to accept the State of West Virginia's Purchasing Card as payment for all goods and services.

- 45. VENDOR RELATIONSHIP:** The relationship of the Vendor to the State shall be that of an independent contractor and no principal-agent relationship or employer-employee relationship is contemplated or created by this Contract. The Vendor as an independent contractor is solely liable for the acts and omissions of its employees and agents. Vendor shall be responsible for selecting, supervising, and compensating any and all individuals employed pursuant to the terms of this Solicitation and resulting contract. Neither the Vendor, nor any employees or subcontractors of the Vendor, shall be deemed to be employees of the State for any purpose whatsoever. Vendor shall be exclusively responsible for payment of employees and contractors for all wages and salaries, taxes, withholding payments, penalties, fees, fringe benefits, professional liability insurance premiums, contributions to insurance and pension, or other deferred compensation plans, including but not limited to, Workers' Compensation and Social Security obligations, licensing fees, *etc.* and the filing of all necessary documents, forms and returns pertinent to all of the foregoing. Vendor shall hold harmless the State, and shall provide the State and Agency with a defense against any and all claims including, but not limited to, the foregoing payments, withholdings, contributions, taxes, Social Security taxes, and employer income tax returns.

- 46. INDEMNIFICATION:** The Vendor agrees to indemnify, defend, and hold harmless the State and the Agency, their officers, and employees from and against: (1) Any claims or losses for services rendered

by any subcontractor, person, or firm performing or supplying services, materials, or supplies in connection with the performance of the Contract; (2) Any claims or losses resulting to any person or entity injured or damaged by the Vendor, its officers, employees, or subcontractors by the publication, translation, reproduction, delivery, performance, use, or disposition of any data used under the Contract in a manner not authorized by the Contract, or by Federal or State statutes or regulations; and (3) Any failure of the Vendor, its officers, employees, or subcontractors to observe State and Federal laws including, but not limited to, labor and wage and hour laws.

- 47. PURCHASING AFFIDAVIT:** In accordance with West Virginia Code § 5A-3-10a, all Vendors are required to sign, notarize, and submit the Purchasing Affidavit stating that neither the Vendor nor a related party owe a debt to the State in excess of \$1,000. The affidavit must be submitted prior to award, but should be submitted with the Vendor's bid. A copy of the Purchasing Affidavit is included herewith.
- 48. ADDITIONAL AGENCY AND LOCAL GOVERNMENT USE:** This Contract may be utilized by and extends to other agencies, spending units, and political subdivisions of the State of West Virginia; county, municipal, and other local government bodies; and school districts ("Other Government Entities"). This Contract shall be extended to the aforementioned Other Government Entities on the same prices, terms, and conditions as those offered and agreed to in this Contract. If the Vendor does not wish to extend the prices, terms, and conditions of its bid and subsequent contract to the Other Government Entities, the Vendor must clearly indicate such refusal in its bid. A refusal to extend this Contract to the Other Government Entities shall not impact or influence the award of this Contract in any manner.
- 49. CONFLICT OF INTEREST:** Vendor, its officers or members or employees, shall not presently have or acquire any interest, direct or indirect, which would conflict with or compromise the performance of its obligations hereunder. Vendor shall periodically inquire of its officers, members and employees to ensure that a conflict of interest does not arise. Any conflict of interest discovered shall be promptly presented in detail to the Agency.
- 50. REPORTS:** Vendor shall provide the Agency and/or the Purchasing Division with the following reports identified by a checked box below:
- ☒ Such reports as the Agency and/or the Purchasing Division may request. Requested reports may include, but are not limited to, quantities purchased, agencies utilizing the contract, total contract expenditures by agency, etc.
 - ☐ Quarterly reports detailing the total quantity of purchases in units and dollars, along with a listing of purchases by agency. Quarterly reports should be delivered to the Purchasing Division via email at purchasing.requisitions@wv.gov.
- 51. BACKGROUND CHECK:** In accordance with W. Va. Code § 15-2D-3, the Director of the Division of Protective Services shall require any service provider whose employees are regularly employed on the grounds or in the buildings of the Capitol complex or who have access to sensitive or critical information

to submit to a fingerprint-based state and federal background inquiry through the state repository. The service provider is responsible for any costs associated with the fingerprint-based state and federal background inquiry.

After the contract for such services has been approved, but before any such employees are permitted to be on the grounds or in the buildings of the Capitol complex or have access to sensitive or critical information, the service provider shall submit a list of all persons who will be physically present and working at the Capitol complex to the Director of the Division of Protective Services for purposes of verifying compliance with this provision.

The State reserves the right to prohibit a service provider's employees from accessing sensitive or critical information or to be present at the Capitol complex based upon results addressed from a criminal background check.

Service providers should contact the West Virginia Division of Protective Services by phone at (304)558-9911 for more information.

52. PREFERENCE FOR USE OF DOMESTIC STEEL PRODUCTS: Except when authorized by the Director of the Purchasing Division pursuant to W. Va. Code § 5A-3-56, no contractor may use or supply steel products for a State Contract Project other than those steel products made in the United States. A contractor who uses steel products in violation of this section may be subject to civil penalties pursuant to W. Va. Code § 5A-3-56. As used in this section:

- a. "State Contract Project" means any erection or construction of, or any addition to, alteration of or other improvement to any building or structure, including, but not limited to, roads or highways, or the installation of any heating or cooling or ventilating plants or other equipment, or the supply of and materials for such projects, pursuant to a contract with the State of West Virginia for which bids were solicited on or after June 6, 2001.
- b. "Steel Products" means products rolled, formed, shaped, drawn, extruded, forged, cast, fabricated or otherwise similarly processed, or processed by a combination of two or more or such operations, from steel made by the open hearth, basic oxygen, electric furnace, Bessemer or other steel making process.

The Purchasing Division Director may, in writing, authorize the use of foreign steel products if:

- a. The cost for each contract item used does not exceed one tenth of one percent (.1%) of the total contract cost or two thousand five hundred dollars (\$2,500.00), whichever is greater. For the purposes of this section, the cost is the value of the steel product as delivered to the project; or
- b. The Director of the Purchasing Division determines that specified steel materials are not produced in the United States in sufficient quantity or otherwise are not reasonably available to meet contract requirements.

53. PREFERENCE FOR USE OF DOMESTIC ALUMINUM, GLASS, AND STEEL: In Accordance with W. Va. Code § 5-19-1 et seq., and W. Va. CSR § 148-10-1 et seq., for every contract or subcontract, subject to the limitations contained herein, for the construction, reconstruction, alteration, repair, improvement or maintenance of public works or for the purchase of any item of machinery or equipment to be used at sites of public works, only domestic aluminum, glass or steel products shall be supplied unless the spending officer determines, in writing, after the receipt of offers or bids, (1) that the cost of domestic aluminum, glass or steel products is unreasonable or inconsistent with the public interest of the State of West Virginia, (2) that domestic aluminum, glass or steel products are not produced in sufficient quantities to meet the contract requirements, or (3) the available domestic aluminum, glass, or steel do not meet the contract specifications. This provision only applies to public works contracts awarded in an amount more than fifty thousand dollars (\$50,000) or public works contracts that require more than ten thousand pounds of steel products.

The cost of domestic aluminum, glass, or steel products may be unreasonable if the cost is more than twenty percent (20%) of the bid or offered price for foreign made aluminum, glass, or steel products. If the domestic aluminum, glass or steel products to be supplied or produced in a "substantial labor surplus area", as defined by the United States Department of Labor, the cost of domestic aluminum, glass, or steel products may be unreasonable if the cost is more than thirty percent (30%) of the bid or offered price for foreign made aluminum, glass, or steel products.

This preference shall be applied to an item of machinery or equipment, as indicated above, when the item is a single unit of equipment or machinery manufactured primarily of aluminum, glass or steel, is part of a public works contract and has the sole purpose or of being a permanent part of a single public works project. This provision does not apply to equipment or machinery purchased by a spending unit for use by that spending unit and not as part of a single public works project.

All bids and offers including domestic aluminum, glass or steel products that exceed bid or offer prices including foreign aluminum, glass or steel products after application of the preferences provided in this provision may be reduced to a price equal to or lower than the lowest bid or offer price for foreign aluminum, glass or steel products plus the applicable preference. If the reduced bid or offer prices are made in writing and supersede the prior bid or offer prices, all bids or offers, including the reduced bid or offer prices, will be reevaluated in accordance with this rule.

REQUEST FOR QUOTATION
DNR214057 – Bobcat reporting

SPECIFICATIONS

1. **PURPOSE AND SCOPE:** The West Virginia Purchasing Division is soliciting bids on behalf of the West Virginia Division of Natural Resources, hereinafter referred to as DNR, to establish a contract for reporting, analyzing, writing, and publishing scientific results of a major study detailing demographic parameters, parasites, population estimates in different regions, and evaluating the population models of West Virginia bobcats.

Bobcat biological data has not been updated since the late 1970s. With increasing pelt prices and concomitant prices, the validity of the DNR's population model needs to be examined if the state is to continue to manage bobcats with any confidence. Further complicating population density estimates and usefulness of abundance indices are changing habitats in the form of maturing forests and the documented unreliability of sex data as provided by hunters and trappers at game checking stations.

The DNR's current model, using outdated data, suggests that West Virginia may be at the upper limit of allowable harvest for bobcats (21%). However, West Virginia has experienced no reduction in harvest in spite of higher pelt prices. From 2010–2013 the DNR has received numerous requests to increase the season bag limit for bobcats. Since this is a CITES listed species and a top tier predator, the DNR is exercising extreme caution before entertaining thoughts of proposing liberalized harvest regulations. Therefore, the DNR wishes to contract with a university to fund a Ph.D. and M.S. student in wildlife management to undertake a large-scale project to examine the population dynamics and modeling of West Virginia's bobcat population.

2. **DEFINITIONS:** The terms listed below shall have the meanings assigned to them below. Additional definitions can be found in section 2 of the General Terms and Conditions.

2.1 **"Contract Services"** means reporting, analyzing, writing, and publishing scientific results of a major study detailing demographic parameters, parasites, population estimates in different regions, and evaluating population models of West Virginia bobcats.

2.2 **"Pricing Page"** means the pages upon which Vendor should list its proposed price for the Contract Services. The Pricing Page is either included on the last page of this RFQ or attached hereto as Exhibit A.

2.3 **"RFQ"** means the official request for quotation published by the Purchasing Division and identified as DNR214057.

2.4 **"CITES"** means Convention on International Trade in Endangered Species.

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2.5 “Ph.D. Student” means a Doctor of Philosophy in Wildlife Management student.

2.6 “M.S. Student” means a Master of Science in Wildlife Management student.

2.7 “PCR” means Polymerase Chain Reaction.

3. QUALIFICATIONS: Vendor shall have the following minimum qualifications:

3.1. Offer a M.S. and Ph.D. major in wildlife management, wildlife biology or wildlife ecology from an accredited university. Documentation will be done by supplying a list of majors within a respective unit of the accredited university.

3.2. Have at least one faculty member within their college or university who has a Ph.D. specialty in genetics and is willing to serve on the student’s committee. If the principal investigator is not the faculty with a specialty in genetics, a letter on University letterhead stating their willingness to serve on the committee will serve as documentation.

3.3. Summaries of, and references from at least 5 studies dealing with population dynamics, natural barriers, game animals in the eastern United States, genetic flow or microsatellite loci published in peer reviewed scientific journals by the principal or co-principal investigator. Bidders shall provide the publication name, the date on which the study was published, the name of the study (as published), and the abstract (i.e., scientific citation plus abstract). A full version of each study must be available for review at request of the Agency at no cost (bidders’ including full copies or reprints of each study with the bid is acceptable). Bidders should use Attachment B, Study References Sheet, to provide this information or reprints.

3.4. Summaries of and references from at least 2 papers dealing with furbearers published in peer reviewed scientific journals. Bidders shall provide the publication name, the date on which the study was published, the name of the study (as published), and the abstract (i.e., scientific citation plus abstract). A full version of each study must be available for review at request of the Agency at no cost (bidders’ including full copies or reprints of each study with the bid is acceptable). Bidders should use Attachment C, Study References Sheet, to provide this information or reprints.

4. MANDATORY REQUIREMENTS:

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4.1 Mandatory Contract Services Requirements and Deliverables: Contract Services must meet or exceed the mandatory requirements listed below.

4.1.1 The M.S. student must obtain and process bobcat carcasses from trappers and hunters throughout West Virginia.

4.1.1.1 The winning vendor must offer a carcass reward to hunters and trappers of at least \$20.00 per animal and must be included in the annual lump sum on the pricing page. The winning vendor must budget for a minimum of 600 collected carcasses. A minimum of 300 carcasses should be budgeted for year 1 and 2, respectively.

4.1.1.2 The winning vendor will conduct mailings to 1,400 known hunters and trappers to increase awareness of the project. The price for mailings must be included in the annual lump sum on the pricing page. A minimum of 500 should be budgeted in years 1 and 2 with 400 in year 3, respectively.

4.1.2 The M.S. student must obtain age structure of harvested bobcats and compare results among West Virginia's five (5) ecological regions.

4.1.2.1 The winning vendor will be responsible for pulling and having age data extracted from all available teeth and must be included in the annual lump sum on the pricing page. A minimum of 600 teeth will be considered for age determination. A minimum of 300 should be budgeted for year 1 and 2, respectively.

4.1.3 The M.S. student must evaluate productivity of bobcats and compare results among West Virginia's five (5) ecological regions.

4.1.3.1 The M.S. student will dissect all available reproductive tracts and use appropriate age data to determine reproductive rates of bobcats in West Virginia.

4.1.4 The M.S. student will conduct and/or facilitate studies on food habits, parasites, diseases, morphometric measurements and physiological condition of bobcats.

4.1.4.1 Feline Panleukopenia PCR testing will be tested on all bobcat carcasses to determine prevalence in West Virginia.

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- 4.1.4.1 The winning vendor must include the Feline Panleukopenia PCR testing in the annual lump sum on the pricing page. A minimum of 600 bobcats must be tested. A minimum of 300 should be budgeted for year 1 and 2, respectively.
- 4.1.5 An overall view of morphometric measurements and physiological condition will be done and results compared among West Virginia's five (5) ecological regions.
- 4.1.6 Either the M.S. student or an honor's undergraduate student will use all available carcasses to assess food habits during the hunting and trapping seasons in West Virginia.
- 4.1.7 The Ph.D. student must coordinate statewide hair snare sampling protocol and design for bobcats.
 - 4.1.7.1 The student will design a sampling protocol that will be used by DNR personnel to collect hair samples across West Virginia's five (5) ecological regions. The DNR will be responsible for running and collecting samples per the student and major advisor's recommendations.
 - 4.1.7.2 The DNR will supply the respective hair samples to the Ph.D. student for analysis.
- 4.1.8 The Ph.D. student will collect genetic data to use for population estimation and to identify potential migration barriers in the landscape.
 - 4.1.8.1 The winning vendor will be responsible for analyzing all genetic samples collected during the sampling period. Price for genetic analysis must be included in each annual cost on the pricing page.
- 4.1.9 The Ph.D. student will estimate and compare the relative abundance of bobcats among West Virginia's five (5) ecological regions.
 - 4.1.9.1 Using data collected through hair sampling and occurrence rates, the student will compare abundance estimates in West Virginia.

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DNR214057 – Bobcat reporting

4.1.10 Ph.D. student will conduct an in-depth study in West Virginia's north central ecological region to determine if population estimates can be refined.

4.1.11 Ph.D. student will refine or verify the DNR's current bobcat population model to evaluate and determine its validity and use in conjunction with harvest data to evaluate potential changes in bag limits or season structure.

4.1.12 Because most universities require Ph.D. students to design and conduct their own research, the student will also be encouraged to develop and test additional hypotheses pertaining to bobcats using either population or genetic data. However, the student's first priority will be to complete the major objectives as listed above.

4.1.12.1 All additional costs for the original research must be included in the amount on the pricing page.

4.2 Publication of results

4.2.1 Either or both of the DNR Furbearer Project Leader or the Supervisor of Game Management Services will be a co-author on all publications or presentations.

4.3 Assignment of committee

4.3.1 Either or both of the DNR Furbearer Project Leader or the Supervisor of Game Management Services will be a member of the student's committee and invited to all committee meetings.

4.4 Annual Reports

4.4.1 Annual reports are due on August 1 of each year to the Supervisor of Game Management Services and Furbearer Project Leader via e-mail in either Word or PDF format and will detail completion percentage of said task that were to be completed during the respective year.

4.5 Performance Schedule

4.5.1 August 2014 Students begin classes.

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- 4.5.2 August – November 2014 Sampling design.
- 4.5.3 December 2014 Students have first committee meetings and selects committees.
- 4.5.4 December 1, 2014 report detailing sampling design and protocols due to DNR. Report will be submitted to Supervisor of Game Management Services and Furbearer Project Leader via e-mail in either Word or PDF format and will detail completion percentage of said task.
- 4.5.5 November 2014 – February 2015 Carcass collection.
 - 4.5.5.1 The M.S. student will be responsible for coordinating and collecting bobcat carcasses. Summary report of progress will be included in annual report.
- 4.5.6 March 2015 – July 2015 Collect hair snare samples.
 - 4.5.6.1 Ph.D. student will be responsible for organizing sampling collection and analysis. Summary report of progress will be included in annual report.
- 4.5.7 May 2015 – August 2017 Conduct genetic analyses.
 - 4.5.7.1 Ph.D. student will conduct genetic analyses and include updates with annual report.
- 4.5.8 November 2015 – February 2016 Carcass collection.
 - 4.5.8.1 The M.S. student will be responsible for coordinating and collecting bobcat carcasses. Summary report of progress will be included in annual report.
- 4.5.9 March 2016 – July 2016 Collect hair snare samples.
 - 4.5.9.1 Ph.D. student will be responsible for organizing sampling collection and analysis. Summary report of progress will be included in annual report.
- 4.5.10 August 2017 M.S. student completes all respective contract services.

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4.5.10.1 A final report is due to the DNR on September 1, 2017.

4.5.11 July 2018 Ph.D. student completes all respective contract services.

4.5.11.1 A final report is due to DNR by July 31, 2018.

5. CONTRACT AWARD:

5.1 Contract Award: The Contract is intended to provide Agency with a purchase price for the Contract Services. The Contract shall be awarded to the Vendor that provides the Contract Services meeting the required specifications for the lowest overall total cost (Combine All Years), as shown on the Pricing Page. The initial contract shall be awarded for the Year One(1) Total only, effective the first year of the Contract, with Years Two (2) , Three (3) and Four (4) added by subsequent annual renewal change orders.

5.2 Pricing Page: Vendor should complete the Pricing Page by filling in the Annual Cost for each item listed, this Annual Cost shall include all costs related to the project including salaries, fringe benefits, travel, supplies and any other incidentals required. Vendor should complete the Pricing Page in full as failure to complete the Pricing Page in its entirety may result in Vendor's bid being disqualified.

Notwithstanding the foregoing, the Purchasing Division may correct errors as it deems appropriate. Vendor should enter the information into the Pricing Page to prevent errors in the evaluation.

6. **PERFORMANCE:** Vendor and Agency shall agree upon the schedule listed in Section 4.5 for performance of Contract Services and Contract Services Deliverables. In the event that this Contract is designated as an open-end contract, Vendor shall perform in accordance with the release orders that may be issued against this Contract.
7. **PAYMENT:** Agency shall pay, for all Contract Services performed and accepted under this Contract. Vendor shall accept payment in accordance with the payment procedures of the State of West Virginia. Vendor shall bill Agency monthly for costs accrued during that pay period.
8. **TRAVEL:** Vendor shall be responsible for all mileage and travel costs, including travel time, associated with performance of this Contract. Any anticipated mileage or travel costs may be included in the flat fee or hourly rate listed on Vendor's bid, but such costs will not be paid by the Agency separately.

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9. FACILITIES ACCESS: Performance of Contract Services may require access cards and/or keys to gain entrance to Agency's facilities. In the event that access cards and/or keys are required:

- 9.1. Vendor must identify principal service personnel which will be issued access cards and/or keys to perform service.
- 9.2. Vendor will be responsible for controlling cards and keys and will pay replacement fee, if the cards or keys become lost or stolen.
- 9.3. Vendor shall notify Agency immediately of any lost, stolen, or missing card or key.
- 9.4. Anyone performing under this Contract will be subject to Agency's security protocol and procedures.
- 9.5. Vendor shall inform all staff of Agency's security protocol and procedures.

10. VENDOR DEFAULT:

10.1. The following shall be considered a vendor default under this Contract.

- 10.1.1. Failure to perform Contract Services in accordance with the requirements contained herein.
- 10.1.2. Failure to comply with other specifications and requirements contained herein.
- 10.1.3. Failure to comply with any laws, rules, and ordinances applicable to the Contract Services provided under this Contract.
- 10.1.4. Failure to remedy deficient performance upon request.

10.2. The following remedies shall be available to Agency upon default.

- 10.2.1. Cancellation of the Contract.
- 10.2.2. Cancellation of one or more release orders issued under this Contract.
- 10.2.3. Any other remedies available in law or equity.

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11. MISCELLANEOUS:

11.1. Contract Manager: During its performance of this Contract, Vendor must designate and maintain a primary contract manager responsible for overseeing Vendor's responsibilities under this Contract. The Contract manager must be available during normal business hours to address any customer service or other issues related to this Contract. Vendor should list its Contract manager and his or her contact information below. The Contract manager for this project will be the academic advisor of the M.S. and Ph.D. Students.

Contract Manager: James Anderson
Telephone Number: 304-293-3825
Fax Number: 304-293-2441
Email Address: Jim.Anderson@mail.wvu.edu

Pricing Sheet
DNR214057 Bobcat Project

YEAR ONE (1)	YEAR TWO (2)	YEAR THREE (3)	YEAR FOUR (4)
Annual Cost	Annual Cost	Annual Cost	Annual Cost
\$ 83,097	\$83,862	\$61,129	\$40,512

TOTAL COST	\$268,600
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CERTIFICATION AND SIGNATURE PAGE

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

West Virginia University

(Company)

Mary Jane Buckland

(Authorized Signature)

Mary Jane Buckland, Interim Director

(Representative Name, Title)

304-293-3998

304-293-7435

(Phone Number)

(Fax Number)

(Date)

3/19/14

RFQ No. DNR214057STATE OF WEST VIRGINIA
Purchasing Division**PURCHASING AFFIDAVIT**

MANDATE: Under W. Va. Code §5A-3-10a, 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: (1) the debt owed is an amount greater than one thousand dollars in the aggregate; or (2) the debtor is in employer default.

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

DEFINITIONS:

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

"Employer default" means having an outstanding balance or liability to the old fund or to the uninsured employers' fund or being in policy default, as defined in W. Va. Code § 23-2c-2, failure to maintain mandatory workers' compensation coverage, or failure to fully meet its obligations as a workers' compensation self-insured employer. An employer is not in employer default if it has entered into a repayment agreement with the Insurance Commissioner and remains in compliance with the obligations under the repayment agreement.

"Related party" means a party, whether an individual, corporation, partnership, association, limited liability company or any other form or business association or other entity whatsoever, related to any vendor by blood, marriage, ownership or contract through which the party has a relationship of ownership or other interest with the vendor so that the party will actually or by effect receive or control a portion of the benefit, profit or other consideration from performance of a vendor contract with the party receiving an amount that meets or exceeds five percent of the total contract amount.

AFFIRMATION: By signing this form, the vendor's authorized signer affirms and acknowledges under penalty of law for false swearing (W. Va. Code §61-5-3) that neither vendor nor any related party owe a debt as defined above and that neither vendor nor any related party are in employer default as defined above, unless the debt or employer default is permitted under the exception above.

WITNESS THE FOLLOWING SIGNATURE:Vendor's Name: West Virginia UniversityAuthorized Signature: Mary Jane Buckland Date: 3/19/14State of West VirginiaCounty of Monongalia, to-wit:Taken, subscribed, and sworn to before me this 19 day of MARCH, 2014.My Commission expires September 27, 2022**AFFIX SEAL HERE**

Official Seal
Notary Public, State Of West Virginia
Molly A Superfeskyy
625 Southern Avenue
Morgantown WV 26501
My commission expires September 27, 2022

NOTARY PUBLIC

Purchasing Affidavit (Revised 07/01/2012)

State of West Virginia

VENDOR PREFERENCE CERTIFICATE

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

1. Application is made for 2.5% resident vendor preference for the reason checked:

____ Bidder is an individual resident vendor and has resided continuously in West Virginia for four (4) years immediately preceding the date of this certification; or,

____ Bidder is a partnership, association or corporation resident vendor and has maintained its headquarters or principal place of business continuously in West Virginia for four (4) years immediately preceding the date of this certification; or 80% of the ownership interest of Bidder is held by another individual, partnership, association or corporation resident vendor who has maintained its headquarters or principal place of business continuously in West Virginia for four (4) years immediately preceding the date of this certification; or,

____ Bidder is a nonresident vendor which has an affiliate or subsidiary which employs a minimum of one hundred state residents and which has maintained its headquarters or principal place of business within West Virginia continuously for the four (4) years immediately preceding the date of this certification; or,

2. Application is made for 2.5% resident vendor preference for the reason checked:

____ Bidder is a resident vendor who certifies that, during the life of the contract, on average at least 75% of the employees working on the project being bid are residents of West Virginia who have resided in the state continuously for the two years immediately preceding submission of this bid; or,

3. Application is made for 2.5% resident vendor preference for the reason checked:

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

4. Application is made for 5% resident vendor preference for the reason checked:

____ Bidder meets either the requirement of both subdivisions (1) and (2) or subdivision (1) and (3) as stated above; or,

5. Application is made for 3.5% resident vendor preference who is a veteran for the reason checked:

____ Bidder is an individual resident vendor who is a veteran of the United States armed forces, the reserves or the National Guard and has resided in West Virginia continuously for the four years immediately preceding the date on which the bid is submitted; or,

6. Application is made for 3.5% resident vendor preference who is a veteran for the reason checked:

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

7. Application is made for preference as a non-resident small, women- and minority-owned business, in accordance with *West Virginia Code* §5A-3-59 and *West Virginia Code of State Rules*.

____ Bidder has been or expects to be approved prior to contract award by the Purchasing Division as a certified small, women- and minority-owned business.

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

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

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

Bidder: West Virginia University

Bidder: _____

Date: 3/19/14

Signed: Mary Jane Buckland

Title: Interim Director



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

Solicitation

NUMBER

DNR214057

PAGE

1

ADDRESS CORRESPONDENCE TO ATTENTION OF

DEAN WINGERD
304-558-0468

RFQ COPY

TYPE NAME/ADDRESS HERE

WVU Division of Forestry
PO Box 6125
Morgantown WV 26505-6125

V
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DIVISION OF NATURAL RESOURCES
PROCUREMENT OFFICE

324 4TH AVENUE
SOUTH CHARLESTON, WV
25303-1228 304-558-3397

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DATE PRINTED

03/18/2014

BID OPENING DATE:

03/27/2014

BID OPENING TIME 1:30PM

LINE	QUANTITY	UOP	CAT. NO.	ITEM NUMBER	UNIT PRICE	AMOUNT
<p>ADDENDUM NO. 1</p> <p>ADDENDUM IS ISSUED:</p> <p>1. TO PROVIDE RESPONSES TO VENDOR QUESTIONS REGARDING THE ABOVE SOLICITATION. QUESTION AND ANSWER PAGES ARE ATTACHED.</p> <p>2. TO PROVIDE ADDENDUM ACKNOWLEDGMENT. THIS DOCUMENT SHOULD BE SIGNED AND RETURNED WITH YOUR BID. FAILURE TO SIGN AND RETURN MAY RESULT IN THE DISQUALIFICATION OF YOUR BID.</p> <p>***** END OF ADDENDUM NO.1 *****</p>						
SIGNATURE <i>Mary Anne Buckland</i>				TELEPHONE 304-293-3998	DATE 3/19/14	
TITLE Interim Director		FEIN 556000842		ADDRESS CHANGES TO BE NOTED ABOVE		

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

SOLICITATION NUMBER: DNR214057**Addendum Number: 1**

The purpose of this addendum is to modify the solicitation identified as ("Solicitation") to reflect the change(s) identified and described below.

Applicable Addendum Category:

- ☐ Modify bid opening date and time
- ☐ Modify specifications of product or service being sought
- ☒ Attachment of vendor questions and responses
- ☐ Attachment of pre-bid sign-in sheet
- ☐ Correction of error
- ☐ Other

Description of Modification to Solicitation:

1. To provide copy of vendor questions and responses.
2. To provide Addendum Acknowledgment form.

Additional Documentation: Documentation related to this Addendum (if any) has been included herewith as Attachment A and is specifically incorporated herein by reference.

Terms and Conditions:

1. All provisions of the Solicitation and other addenda not modified herein shall remain in full force and effect.
2. Vendor should acknowledge receipt of all addenda issued for this Solicitation by completing an Addendum Acknowledgment, a copy of which is included herewith. Failure to acknowledge addenda may result in bid disqualification. The addendum acknowledgement should be submitted with the bid to expedite document processing.

ATTACHMENT A

Technical Questions

DNR214057

- Q. 1. The request asks for a geneticist from the particular University to be part of the study. I am wondering if that geneticist needs to be from Virginia Tech (for example if VT submitted a proposal) or whether we could use a geneticist from the University of Idaho who specializes in conservation genetics? In our case, we have now had an excellent relationship with the University of Idaho's Laboratory for Ecological and Conservation Genetics, where our students get trained in PCR techniques from low quality/quantity DNA (i.e. from scats and hair). We work with a professor at Idaho who is on the Graduate Students committees. Dr. Waits from Idaho would be willing to provide a letter to this effect.
- A. 1. Section 3.2 of DNR214057 dealing with Vendor Qualifications is modified so that the Ph.D. person serving on the committee with a genetics specialty may be from outside of the respective Vendor's university. The specialist may be a faculty member at a different university or work outside of academia. The Vendor must still provide documentation that the genetics specialist is willing to serve on the students' committees (i.e., a letter directly to the vendor, and turned in with the bid, that the specialist is willing to serve on the committees).
- Q. 2. Under 4.1.7.1 of the above referenced solicitation it indicates the DNR will be collecting samples per recommendations of the student and major advisor. Do you have any idea on the number of persons or the amount of time each district has available for the project (which influences the number of samples and hence this cost)?
- A. 2. It is anticipated that the DNR will have 2-3 field personnel in each of the 5 ecological regions that will be able to collect hair samples per the Ph.D. student's study design. We would anticipate approximately 75-100 hair snares in each region but need additional advice from the winning Vendor on study design and sample size. Specific methodology, collection dates and sample size will be worked out with the winning Vendor. This study will be the major field research project for the Game Management Unit of the DNR during the next 4 years. Therefore, the Agency is committed to working with the Vendor and using any resources to ensure the project is completed on time and at a high quality.

ADDENDUM ACKNOWLEDGEMENT FORM
SOLICITATION NO.: DNR214057

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

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

Addendum Numbers Received:

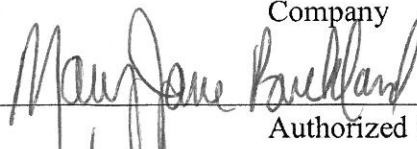
(Check the box next to each addendum received)

<input checked="" type="checkbox"/> Addendum No. 1	<input type="checkbox"/> Addendum No. 6
<input type="checkbox"/> Addendum No. 2	<input type="checkbox"/> Addendum No. 7
<input type="checkbox"/> Addendum No. 3	<input type="checkbox"/> Addendum No. 8
<input type="checkbox"/> Addendum No. 4	<input type="checkbox"/> Addendum No. 9
<input type="checkbox"/> Addendum No. 5	<input type="checkbox"/> Addendum No. 10

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

West Virginia University

Company


3/19/14

Authorized Signature

Date

NOTE: This addendum acknowledgment should be submitted with the bid to expedite document processing.
Revised 6/8/2012



400 Quarrier Street Charleston, WV 25301-2010

BrickStreet Mutual Insurance Company
A Mutual Company

**Workers Compensation and Employers
Liability Insurance Policy**

Policy Number	Policy Period	
	From	To
WCB1019700	07/01/2013	07/01/2014
	(12:01 AM at the insured location)	

Information Page		Renewal/Rewrite of Policy Number	
		NEW	
1. Named Insured and Address		Agency Information	
West Virginia University One Waterfront Place Morgantown, WV 26506		2013 Wells Fargo Insurance Services of West Virginia Inc. Wells Fargo Morgantown WV 1075 Van Voorhis Road Ste 200 Morgantown, WV 26505-3587	
Carrier No.	FEIN	Risk ID	Entity Type
15762	55-6000842	470150890	Government Agency

Additional Workplaces not shown above:
Refer to Schedule of Locations Endorsement WC 99 06 02 (07-09)

2. The Policy Period is from 07/01/2013 to 07/01/2014 12:01am Standard Time at the insured's mailing address.
3. A. Workers Compensation Insurance: Part One of the policy applies to the Workers Compensation Law of the states listed here: WV

B. Employers Liability Insurance: Part Two of the policy applies to work in each state listed in Item 3.A. The limits of our liability under part Two are:

Bodily Injury by Accident:	\$100,000.00	Each Accident
Bodily Injury by Disease:	\$500,000.00	Policy Limit
Bodily Injury by Disease:	\$100,000.00	Each Employee

C. Other States Insurance: Part Three of the policy applies to the states, if any, listed here: All states and U.S. territories except North Dakota, Ohio, Washington, Wyoming, Puerto Rico, and the U.S. Virgin Islands, and states designated in Item 3.A. of the Information Page.

D. This policy includes these endorsements and schedules: SEE ATTACHED SCHEDULE

4. The premium for this policy will be determined by our Manuals of Rules, Classifications, Rates and Rating Plans. All Information required below is subject to verification and change by audit.

SEE ATTACHED CLASSIFICATIONS OF OPERATIONS

Minimum Premium: \$500.00	Total Estimated Annual Premium:	\$488,285.00
	Premium Discount:	
	Expense Constant:	\$175.00
	Deposit Premium:	\$104,987.00

Issue Date: 06/28/2013
Issuing Office: Charleston, WV

WC 00 00 01 A (07-09)

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West Virginia University: Response to Request for Quotation DNR214057 (Bobcat Project)

PIs: James T. Anderson, Ph.D. and Amy B. Welsh, Ph.D.

Qualifications

West Virginia University offers a graduate program for MS and Ph.D. students in the Wildlife and Fisheries Resources Program.

The screenshot shows the West Virginia University website for the Davis College of Agriculture, Natural Resources and Design. The navigation bar includes links for Animal & Nutritional Sciences, Design & Merchandising, Forestry & Natural Resources, Plant & Soil Sciences, Resource Management, and Apply Now. The main header features the college name and a search bar. Below the header, a sidebar lists navigation options: Home, About Us, Undergraduate, Graduate, Faculty & Staff, Research, Alumni & Friends, and Give. The main content area is titled 'DOCTORAL PROGRAM AREAS' and lists various fields of study in a grid format. A left sidebar under 'GRADUATE STUDENTS' lists links for Current Graduate Students, Future Graduate Students, Davis Master's Programs, Davis Doctoral Programs, Funding and Assistantships, Student Organizations, Graduate Student Profiles, and Graduate Faculty.

DOCTORAL PROGRAM AREAS		
Agricultural & Extension Education	Food Science	Plant Pathology
Agricultural Biochemistry	Forest Resource Management	Recreation, Parks & Tourism Resources
Agronomy	Genetics & Developmental Biology	Reproductive Physiology
Animal Nutrition	Horticulture	Resource Management
Animal Physiology	Human & Community Development	Soil Science
Animal Production	Human Nutrition	Wildlife & Fisheries Resources
Applied & Environmental Microbiology	Natural Resource Economics	Wood Science & Technology
Entomology	Organic Agriculture	

The screenshot shows the West Virginia University website for the Davis College of Agriculture, Natural Resources and Design. The navigation bar includes links for Animal & Nutritional Sciences, Design & Merchandising, Forestry & Natural Resources, Plant & Soil Sciences, Resource Management, and Apply Now. The main header features the college name and a search bar. Below the header, a sidebar lists navigation options: Home, About Us, Undergraduate, Graduate, Faculty & Staff, Research, Alumni & Friends, and Give. The main content area is titled 'MASTER'S PROGRAM AREAS' and lists various fields of study in a grid format. A left sidebar under 'GRADUATE STUDENTS' lists links for Current Graduate Students, Future Graduate Students, Davis Master's Programs, Davis Doctoral Programs, Funding and Assistantships, Student Organizations, Graduate Student Profiles, and Graduate Faculty.

MASTER'S PROGRAM AREAS		
Agricultural & Extension Education	Design & Merchandising	Nutritional & Food Sciences
Agricultural & Resource Economics	Entomology	Plant Pathology
Agriculture, Forestry & Consumer Sciences	Forestry	Recreation, Parks & Tourism Resources
Agronomy	Genetics & Developmental Biology	Reproductive Physiology
Animal Physiology	Horticulture	Wildlife & Fisheries Resources
Applied & Environmental Microbiology	Landscape Architecture	

http://wildlife.wvu.edu/students/graduate_program

<http://grad.davis.wvu.edu/davis-doctoral-programs>

3.2 Dr. Amy Welsh is Co-PI on this project and specializes in conservation genetics.

http://forestry.wvu.edu/faculty_staff/amy_welsh

3.3 See attachment B.

- Anderson, J. T.**, A. K. Zadnik, P. B. Wood, and K. Bledsoe. 2013. Evaluation of habitat quality for selected wildlife species associated with island back channels. *Open Journal of Ecology* 3:301-310. doi:10.4236/oje.2013.34035
- Balcombe, C. K., **J. T. Anderson**, R. H. Fortney, and W. S. Kordek. 2005. Wildlife use of mitigation and reference wetlands in West Virginia. *Ecological Engineering* 25:85-99.
- Questel, J. M., M. G. Walsh, R. J. Smith, Jr., and **A. B. Welsh**. 2012. New data on mitochondrial diversity and origin of *Hemimysis anomala* in the Laurentian Great Lakes. *Journal of Great Lakes Research* 38:14-18.
- Rauch, S. E., **J. T. Anderson**, and A. B. Billings. 2011. Spring hunting season home range size of male wild turkeys in north central West Virginia. *Proceedings of the National Wild Turkey Symposium* 10:157-163.
- Tatu, K. S., **J. T. Anderson**, L. J. Hindman, and G. Seidel. 2007. Diurnal foraging activities of mute swans in Chesapeake Bay, Maryland. *Waterbirds* 30:121-128.
- Vance, J. A., N. B. Angus, and **J. T. Anderson**. 2013. Effects of bridge construction on songbirds and small mammals at Blennerhassett Island, Ohio River, USA. *Environmental Monitoring and Assessment* 185:7739-7748.
- Veselka, W. V., **J. T. Anderson**, and W. S. Kordek. 2010. Using dual classifications in the development of avian wetlands indices of biological integrity for wetlands in West Virginia, USA. *Environmental Monitoring and Assessment* 164:533-548.
- Ward, R. L., **J. T. Anderson**, and J. T. Petty. 2008. Effects of road crossings on stream and streamside salamanders. *Journal of Wildlife Management* 72:760-771.
- Weaver, H. W., **J. T. Anderson**, J. W. Edwards, T. L. Dotson. 2004. Nuisance black bear response to physical and auditory conditioning techniques in southern West Virginia. *Northeast Wildlife* 58:23-33.
- Welsh, A. B.**, T. Hill, H. Quinlan, C. Robinson, and B. May. 2012. Genetic assessment of lake sturgeon population structure in the Laurentian Great Lakes. *North American Journal of Fisheries Management* 28:572-591.
- Welsh, A. B.**, and B. May. 2006. Development and standardization of disomic microsatellite markers for lake sturgeon genetic studies. *Journal Applied Ichthyology* 22:337-344.
- Welsh, A. B.**, and D. T. McLeod. 2010. Detection of natural barriers to movement of lake sturgeon (*Acipenser fulvescens*) within the Namakan River, Ontario. *Canadian Journal of Zoology* 88:390-397.

Welsh, A.B., and K. I. Mohamed. 2011. Genetic diversity of *Striga hermonthica* populations in Ethiopia: Evaluating the role of geography and host specificity in shaping population structure. *International Journal of Plant Science* 172:773-782.

Zadnik, A. K. **J. T. Anderson**, P. Bohall Wood, and K. Bledsoe. 2009. Wildlife use of back channels associated with islands on the Ohio River. *Wetlands* 29:543-551.

3.4 See Attachment C.

Anderson, J. T., and J. L. Bonner. 2014. Modeling habitat suitability for beaver (*Castor canadensis*) using Geographic Information Systems. *International Proceedings of Chemical, Biological, and Environmental Engineering* 61:12-23.

Helon, D. A., C. P. Dwyer, M. D. Witt, J. W. Edwards, and **J. T. Anderson**. 2013. Summer movements and activity patterns of river otters in Northeastern Ohio, USA. *Proceedings of the International Academy of Ecology and Environmental Sciences* 3:181-190.

Helon, D. A., **J. T. Anderson**, and J. D. Osbourne. 2002. Comparison of interior versus roadside scent stations. *Game and Wildlife Science* 19:303-312.

Helon, D. A., **J. T. Anderson**, C. P. Dwyer, and J. W. Edwards. 2004. Summer home range size and habitat use by river otters in Ohio. *Proceedings IXth International Otter Colloquium* Volume 21A.

Vance, J. A., N. B. Angus, and **J. T. Anderson**. 2012. Riparian and riverine wildlife response to a newly created bridge crossing. *Natural Resources* 3:213-228.

11.1 Contract Manager

Contract Manager:	James T. Anderson
Telephone Number:	(304) 293-2825
Fax Number:	(304) 293-2441
Email Address:	<u>Jim.anderson@mail.wvu.edu</u>

Attachment B

Summaries of, and references from at least 5 studies dealing with population dynamics, natural barriers, game animals in the eastern United States, genetic flow or microsatellite loci published in peer reviewed scientific journals by the principal or co-principal investigator.

Evaluation of habitat quality for selected wildlife species associated with island back channels

James T. Anderson¹, Andrew K. Zadnik², Petra Bohall Wood³, Kerry Bledsoe⁴

¹Division of Forestry and Natural Resources and Environmental Research Center, West Virginia University, Morgantown, USA;
jim.anderson@mail.wvu.edu

²Wildlife and Fisheries Resources, Division of Forestry, West Virginia University, Morgantown, USA

³US Geological Survey West Virginia Cooperative Fish and Wildlife Research Unit, West Virginia University, Morgantown, USA

⁴West Virginia Division of Natural Resources, Wildlife Resources Section, Fairmont, USA

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ABSTRACT

The islands and associated back channels on the Ohio River, USA, are believed to provide critical habitat features for several wildlife species. However, few studies have quantitatively evaluated habitat quality in these areas. Our main objective was to evaluate the habitat quality of back and main channel areas for several species using habitat suitability index (HSI) models. To test the effectiveness of these models, we attempted to relate HSI scores and the variables measured for each model with measures of relative abundance for the model species. The mean belted kingfisher (*Ceryle alcyon*) HSI was greater on the main than back channel. However, the model failed to predict kingfisher abundance. The mean reproduction component of the great blue heron (*Ardea herodias*) HSI, total common muskrat (*Ondatra zibethicus*) HSI, winter cover component of the snapping turtle (*Chelydra serpentina*) HSI, and brood-rearing component of the wood duck (*Aix sponsa*) HSI were all greater on the back than main channel, and were positively related with the relative abundance of each species. We found that island back channels provide characteristics not found elsewhere on the Ohio River and warrant conservation as important riparian wildlife habitat. The effectiveness of using HSI models to predict species abundance on the river was mixed. Modifications to several of the models are needed to improve their use on the Ohio River and, likely, other large rivers.

Keywords: Habitat Suitability Index; Island Back

Channel; Model Validation; Ohio River; Riparian Wildlife

1. INTRODUCTION

Over the past 200 years, industrialization and navigational projects have dramatically altered the Ohio River, USA, essentially changing it from a free-flowing river to a series of connected lakes [1]. Many of the islands on the river have been completely eliminated or severely degraded due to these activities [2].

The islands and associated back channels (*i.e.*, areas between an island and mainland not receiving commercial barge traffic) on the Ohio River are generally believed to provide critical habitat features for several wildlife species. However, few studies have quantitatively evaluated the quality of these areas for wildlife [3, 4]. This information is important to assist federal and state resource managers in determining what types of activities are compatible with conserving these areas for wildlife.

A widely accepted method to assess the habitat quality of an area for particular species is the use of Habitat Suitability Index (HSI) models [5,6]. The United States Fish and Wildlife Service (USFWS) originally developed these models as part of the Habitat Evaluation Procedures [7,8]. The models are based on measurements of structural variables necessary for important life requisites of individual species. Each variable is scored from 0 - 1, and then entered into a formula to calculate a final HSI score, also 0 - 1. Higher final HSI scores indicate higher habitat quality for that species [8]. The relation between HSI scores and carrying capacity is assumed to be positively linear [8].

The need to evaluate HSI model performance is com-



Wildlife use of mitigation and reference wetlands in West Virginia

Collin K. Balcombe^{a,1}, James T. Anderson^{a,*}, Ronald H. Fortney^b, Walter S. Kordek^c

^a West Virginia University, Division of Forestry, PO Box 6125, Morgantown, WV 26506-6125, USA

^b West Virginia University, Department of Civil and Environmental Engineering, PO Box 6103, Morgantown, WV 26506-6103, USA

^c West Virginia Division of Natural Resources, PO Box 67, Ward Road Elkins, WV 26241, USA

Received 20 November 2004; received in revised form 24 February 2005; accepted 10 March 2005

Abstract

We evaluated avian and anuran communities in 11 mitigation and four reference wetlands throughout West Virginia, USA. Avian species richness ($P=0.711$), diversity ($P=0.314$), and abundance ($P=0.856$) (expressed as mean \pm S.E. per ha) were similar between mitigation (richness: 11.3 ± 0.40 ; diversity: 3.1 ± 0.53 ; abundance: 27.1 ± 2.2) and reference (richness: 11.2 ± 0.62 ; diversity: 2.8 ± 0.47 ; abundance: 28.5 ± 4.9) wetlands. Waterbird ($P=0.013$) and waterfowl ($P=0.013$) abundance were higher in mitigation (waterbird: 5.1 ± 1.5 ; waterfowl: 4.4 ± 1.4) than reference (waterbird: 0.44 ± 0.23 ; waterfowl: 0.24 ± 0.21) wetlands. Anuran (frogs and toads) species richness ($P=0.023$), Wisconsin index (WI) calling values ($P<0.001$), and abundance ($P<0.001$) (expressed as mean \pm S.E. per survey point) were higher in mitigation (richness: 2.01 ± 0.09 ; WI: 0.52 ± 0.03 ; abundance: 4.75 ± 0.66) than reference (richness: 1.47 ± 0.14 ; WI: 0.40 ± 0.17 ; abundance: 4.69 ± 1.18) wetlands. Evidence suggests that avian and anuran densities in mitigation wetlands are similar or in some cases higher than in natural (reference) wetlands.

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Keywords: Anurans; Mitigation; Mitigation wetland; Habitat use; Birds; Frogs; Wetland-dependent species; Mitigation success; West Virginia

1. Introduction

Wetlands are important ecosystems that provide valuable habitat for wildlife. The destruction of wet-

lands across the U.S., however, has undermined the survival of some fish, shellfish, furbearing mammals, waterfowl, and amphibians that rely exclusively on these areas for survival (Mitsch and Gosselink, 2000). The Clean Water Act of 1972 was the first major legislation that protected our nation's wetland resource base, but it was not until the "no net loss" policy of the late 1980s that the government actively sought to mitigate for these losses that have impacted wetland-dependent wildlife across the country.

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New data on mitochondrial diversity and origin of *Hemimysis anomala* in the Laurentian Great Lakes

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ABSTRACT

The most recent Ponto-Caspian species to invade the Laurentian Great Lakes is the crustacean *Hemimysis anomala*, first reported in 2006. A previous study described three haplotype groups (A, B, C) of *H. anomala* in native and invaded areas within Europe, but only one haplotype (A1) in a sample from Lake Michigan. Our study expands these results to additional populations in the Great Lakes basin, and evaluates relationships among North American and European populations. A 549-bp fragment of the mitochondrial cytochrome oxidase I (COI) gene was analyzed from populations of *H. anomala* in Lakes Ontario, Erie, Huron, and the St. Lawrence River. Two different haplotypes, A1 and B1, were observed in the sampled populations of *H. anomala* and in a previous analysis from *H. anomala* in Oneida Lake (New York). Our results, in contrast with a previous study, detect an additional haplotype in North America.

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Introduction

Since the 1800s, one of the biggest threats to freshwater ecosystems has been the introduction of nonindigenous species (NIS) via human activity (Mills et al., 1993). The most recognized vector for NIS into the Laurentian Great Lakes is through discharged ballast water from transoceanic ships (Holeck et al., 2004). Ballast water can harbor planktonic organisms capable of tolerating salinity changes associated with ballast water exchange, which has contributed to the more than 170 NIS established in the Laurentian Great Lakes (Grigorovich et al., 2003; Roman, 2006; Ellis and MacIsaac, 2009). Over 75% of the NIS recorded in the Great Lakes are endemic to the Ponto-Caspian region (Black, Caspian and Azov Seas; Ricciardi and MacIsaac, 2000). Some of the most widely recognized Ponto-Caspian invaders are the molluscs *Dreissena polymorpha* (Hebert et al., 1989) and *D. bugensis* (May and Marsden, 1992), fish such as round goby (*Neogobius melanostomus*; Jude et al., 1991) and ruffe

(*Gymnocephalus cernuus*; Stepien et al., 1998), the cladoceran *Cercopagis pengoi* (MacIsaac et al., 1999; Ojaveer et al., 2001; Panov et al., 2007), and the amphipod *Echinogammarus ischnus* (Witt et al., 1997). Understanding the pathways by which an organism enters a new environment, and where that organism originated from, can aid in strengthening current regulations to prevent future invasions.

The most recent Ponto-Caspian species to invade the Laurentian Great Lakes is the crustacean *Hemimysis anomala* G. O. Sars, 1907. *H. anomala* is native to coastal areas and river deltas in the Black Sea, Sea of Azov, and northern and eastern Caspian Sea (Wittmann, 2007). In the 1960s *H. anomala* was intentionally introduced into the Kaunas reservoir in Lithuania to improve fish stocks (Ketelaars et al., 1999). This introduced population is the likely source of the species' spread to the Baltic Sea with subsequent expansion to the Rhine Delta. A second possible invasion route originated from the Danube Delta, spreading along the Danube River down to the Rhine Delta, where intermixing between the various lineages has occurred (Audzijonyte et al., 2008). During the 1990s and 2000s the species spread throughout western Europe. In 1992 it was discovered in Finnish coastal waters of the Baltic Sea, Sweden in 1995, Poland in 2002, and the UK in 2004 (Salemaa and Hietalahti, 1993; Holdich et al., 2006; Audzijonyte et al., 2008). Additional populations were documented in inland waterways of Germany in 1998 and the Czech Republic during 2003 (Audzijonyte et al., 2008).

In North America, evidence to date indicates widespread invasion and ongoing colonization within the Great Lakes basin. The first North American records of *H. anomala* came from Lakes Michigan and Ontario in 2006 (Pothoven et al., 2007; Walsh et al., 2010). Subsequent

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SPRING HUNTING SEASON HOME RANGE SIZE OF MALE WILD TURKEYS IN NORTH CENTRAL WEST VIRGINIA

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Abstract: Hunting male eastern wild turkeys (*Meleagris gallopavo silvestris*) is a popular spring sport in West Virginia, although recent estimates suggest the wild turkey population may be declining. Wild turkey population estimates from West Virginia and many other states frequently are based on spring gobbler harvest. Our objective was to determine home range sizes of adult and juvenile male wild turkeys during the spring hunting season and to explore the relationship between home range size and population estimates. These data and relationships could establish baseline data for comparison with future population changes. We trapped and monitored 19 male wild turkeys in north central West Virginia from 2006 to 2007. We monitored movements immediately before and during the spring gobbler hunting season. We estimated the 95% probability contour fixed kernel home range size of adult (2 and ≥ 3 yr olds) and juvenile males. Adult males had a larger home range than juvenile birds. We found no difference in the home range size of the 2-yr age class and the ≥ 3 -yr age classes, although sample sizes were limited. We found no difference between years for adults. Home range size increased with estimated population size in a model that also contained age and year. We concluded that movement related to breeding behavior was a factor in adults having larger home ranges than juveniles. Our results can benefit resource managers by providing home range estimates and baseline information on the relationship between home range size and population estimates that will assist in making sound decisions in a dynamic ecological and sociological environment. Our results also provide behavior information on male wild turkey home range characteristics during the spring wild turkey hunting season for various media requests and to spring wild turkey hunters. We recommend additional research to better understand potential influences on male wild turkey home range size in West Virginia.

Proceedings of the National Wild Turkey Symposium 10:157–163

Key words: home range size, male eastern wild turkey, *Meleagris gallopavo silvestris*, spring hunting season, West Virginia.

Numerous studies have reported male eastern wild turkey (*Meleagris gallopavo silvestris*), hereafter, male wild turkey or gobbler, home range size (Kelley et al. 1988, Godwin et al. 1995, Miller et al. 1997), but few have estimated home range size associated with spring gobbler hunting season. Male wild turkey home range size estimates, directly before and during the spring gobbler season, are lacking in West Virginia.

Wild turkey population trends, habitat use characteristics, mortality factors, and harvest management, for example, are important variables in developing a sound

wild turkey management program. Spring gobbler harvest frequently is used as an index to population size. It is important to understand these variables and their relationships to population size to make effective resource management decisions, and home range size is fundamental information needed for making these decisions. Wild turkey populations stabilized and may be declining in West Virginia (West Virginia Division of Natural Resources 2010). Baseline information, such as home range size,

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Diurnal Foraging Activities of Mute Swans in Chesapeake Bay, Maryland

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Abstract.—We determined diurnal time-activity budgets of Mute Swans (*Cygnus olor*) at Chesapeake Bay, Maryland, USA with the principal aim of determining intensity of their feeding activity. Although Mute Swan herbivory is believed to contribute to declines in submerged aquatic vegetation (SAV) in the Bay, there is a lack of comprehensive quantitative data indicating the magnitude of feeding activity by Mute Swans. We collected time-activity budgets from May through August 2003 (N = 50 10-minute observation periods) and from March through August 2004 (N = 818). Mute Swans spent more time feeding (38.4%) than in non-foraging activities, including swimming (21.8%), resting (18.4%), self-maintenance (18.6%), agonistic activity (1.7%), and disturbance-induced activities (1.2%). Feeding intensity was not influenced by seasons (spring and summer). Mute Swans foraged more actively during the morning than they did midday. Mute Swans in flocks (\geq three individuals) spent more time feeding than those in pairs and birds in larger flocks spent more time feeding than those in smaller flocks. Moreover, a recent enclosure study on the Chesapeake Bay indicated that grazing by Mute Swan flocks caused a higher SAV decline than grazing by paired Mute Swans. It is likely that individuals in flocks (especially large ones) pose a greater risk to the SAV in the Bay as compared to those in pairs. Thus, management authorities should seriously consider controlling Mute Swan flocks (especially large ones) in the Bay in addition to pairs. Received 4 December 2005, accepted 29 July 2006.

Key words.—Chesapeake Bay, *Cygnus olor*, exotic species, feeding, focal sample, Mute Swans, SAV, time-activity budget.

Waterbirds 30(1): 121-128, 2007

Mute Swans (*Cygnus olor*) are exotic in the United States and have been prominent in the Atlantic Flyway since 1960 (Atlantic Flyway Council 2003). They have undergone phenomenal population growth along the Atlantic coast, especially in Maryland portions of the Chesapeake Bay (Ciaranca *et al.* 1997; Maryland Department of Natural Resources [DNR] 2001; Hindman and Harvey 2004; Perry *et al.* 2004; Petrie 2004), where numbers increased from five birds in 1962 to about 4,000 in 1999 (Hindman and Harvey 2004). The problem of a dramatic population rise of Mute Swans is aggravated by their predominantly herbivorous diet that mainly consists of submerged aquatic vegetation (SAV), their large appetites, a lack of field feeding, and their year round stay in the Chesapeake Bay leading to SAV consumption even during the flowering/growing season during summer (Allin 1981; Ciaranca *et al.* 1997; Maryland Department of Natural Resources 2001; Perry *et al.* 2004; Petrie 2004).

Determining the amount of time spent foraging is one of the basic requirements for assessing the impact of Mute Swan pairs and flocks on SAV. Though comprehensive quantitative data evaluating feeding intensity of Mute Swans in the Chesapeake Bay are lacking, such data can be obtained by collecting time-activity budgets (Rave and Baldassarre 1989; Baldassarre and Bolen 1994). Moreover, time-activity budgets also can be used to determine consistency and predominance of feeding activity through different seasons and times of day. Though it is useful to have information on activity patterns of Mute Swans, there is relatively little information published on this subject (Holm 2002). Hitherto, time-and-activity budgeting has not been carried out for Mute Swans inhabiting the Chesapeake Bay. Data on time budgets for Mute Swans are, in fact, unavailable for the entire United States, except for Connecticut during winter (Ciaranca *et al.* 1997).

Effects of bridge construction on songbirds and small mammals at Blennerhassett Island, Ohio River, USA

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Abstract Construction of man-made objects such as roads and bridges may have impacts on wildlife depending on species or location. We investigated songbirds and small mammals along the Ohio River, WV, USA at a new bridge both before and after construction and at a bridge crossing that was present throughout the study. Comparisons were made at each site over three time periods (1985–1987 [Phase I] and 1998–2000 [Phase II] [pre-construction], 2007–2009 [Phase III] [post-construction]) and at three distances (0, 100, 300 m) from the bridge or proposed bridge location. Overall, 70 songbirds and 10 small mammals were detected during the study. Cliff swallows (*Petrochelidon pyrrhonota*) and rock pigeons (*Columba livia*) showed high affinity for bridges ($P < 0.05$). Combined small mammal abundances increased between Phases I and II ($P < 0.05$), but

did not differ between Phases II and III ($P > 0.05$). Species richness and diversity for songbirds and small mammals did not differ before and after bridge construction ($P > 0.05$). We found that most species sampled did not respond to the bridge crossing, and believe that the bridge is not causing any measurable negative density impacts to the species we investigated. The new bridge does provide habitat for exotic rock pigeons that are adjusted to man-made structures for nesting.

Keywords Bridge · *Columba livia* · Island · *Peromyscus* · *Petrochelidon pyrrhonota* · West Virginia

Introduction

Highway bridge crossings can affect wildlife either positively, negatively, or not at all depending on species or location. There are limited published data on the ecological impacts of bridges on wildlife; however, more attention has been drawn to the positive effects of bridges upon wildlife. Cliff swallows (*Petrochelidon pyrrhonota*), barn swallows (*Hirundo rustica*), and peregrine falcons (*Falco peregrinus*) use bridges for nesting and perching (Bell et al. 1996; Cade and Bird 1990; Redmond and Murphy 2007; Tordoff and Redig 1988; Tumilson 2009). Other research shows that bridges provide roosting and resting habitat for bats (Bennett et al. 2008). Edge created by roads and bridges may provide habitat for songbirds

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Using dual classifications in the development of avian wetland indices of biological integrity for wetlands in West Virginia, USA

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Abstract Considerable resources are being used to develop and implement bioassessment methods for wetlands to ensure that “biological integrity” is maintained under the United States Clean Water Act. Previous research has demonstrated that avian composition is susceptible to human impairments at multiple spatial scales. Using a site-specific disturbance gradient, we built avian wetland indices of biological integrity (AW-IBI) specific to two wetland classification schemes, one based on vegetative structure and the other based on the wetland’s position in the landscape and sources of water. The resulting class-specific AW-IBI was comprised of one to four metrics that varied in their sensitivity to the disturbance gradient. Some of these metrics were specific to only one of the classification schemes, whereas others could discriminate varying levels of disturbance regardless of classification scheme. Overall, all of the derived biological indices specific to the vegetative

structure-based classes of wetlands had a significant relation with the disturbance gradient; however, the biological index derived for floodplain wetlands exhibited a more consistent response to a local disturbance gradient. We suspect that the consistency of this response is due to the inherent nature of the connectivity of available habitat in floodplain wetlands.

Keywords Birds · Disturbance · Index of biological integrity · Metrics · West Virginia · Wetlands

Introduction

Wetland function and biotic integrity can be compromised by anthropogenic influences in proximity to a wetland (Harris 1988; Winter 1988; Yuan and Norton 2004). Functions that wetlands provide occur on multiple spatial scales within a matrix of landscapes (Zedler 2003). Therefore, evaluating stressors that can influence wetlands should focus on using site-specific criteria that reveal patterns within the landscape context (Bedford and Preston 1988). The mobility of avian assemblages infers that birds would be ideal candidates for assessing wetland condition from a landscape perspective (Naugle et al. 2001). Because birds are conspicuous and charismatic, the results of avian bioassessments can be easily related to

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Effects of Road Crossings on Stream and Streamside Salamanders

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ABSTRACT Salamanders are important members of faunal communities in Appalachian Mountain (USA) streams, and the use of salamanders as bioindicators is increasing. Roads are a part of the modern landscape, but effects of roads on stream and streamside salamander diversity and abundance is not clear. We sampled streams in central West Virginia, USA, using quadrats placed along transects in the flowing channel, dry channel, and stream bank to assess salamander diversity, richness, and abundance during 2004. We used Akaike's Information Criterion for model selection at reach (i.e., above and below culverts) and stream scales. Salamander diversity and richness was affected by elevation, stream gradient, canopy cover, and the presence of roads. Overall, stream and riparian habitat quality was the most important factor affecting salamander richness. The presence of roads, stream gradient, and elevation received the most empirical support for predicting species' abundances. Roads benefited disturbance-tolerant species but negatively affected other species. Impacts of roads and culverts on habitat should be considered by federal and state transportation agencies and natural resources agencies during the planning process and addressed through mitigation efforts. Managers should install culverts that are as wide as the stream channel, at grade with the streambed, and dominated by rubble substrate to provide maximum benefit for salamanders. (JOURNAL OF WILDLIFE MANAGEMENT 72(3):760-771; 2008)

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KEY WORDS Appalachian seal salamanders, culverts, *Desmognathus monticola*, *Desmognathus ochrophaeus*, *Eurycea bislineata*, *Gyrinophilus porphyriticus*, mountain dusky salamanders, northern spring salamanders, northern two-lined salamanders, roads.

Roads are a part of human society and can have wide-ranging ecological effects on the landscape (Forman 2000, Forman and Deblinger 2000, Angermeier et al. 2004). Roads may serve as a source of pollution, direct wildlife mortality, and sedimentation (Swift 1986, Forman and Deblinger 2000, Forman et al. 2003). Roads also can restrict wildlife passage of terrestrial and aquatic salamanders causing habitat fragmentation and isolation of populations (DeMaynadier and Hunter 2000, Forman and Deblinger 2000, Jones et al. 2000, Marsh and Beckman 2004). Small, isolated populations are vulnerable to extinction from inbreeding depression, demographic changes, and environmental events (Lande 1993, Mills and Smouse 1994). Upstream and downstream movements by salamanders influence the age structure of populations and are a possible means of density-dependent regulation (Bruce 1986, Resetarits 1995, Lowe and Bolger 2002, Lowe 2003). However, other abiotic or biotic factors may be as, or more, important than roads and culvert crossings on salamander abundance (Smith and Grossman 2003, Russell et al. 2004). Therefore, it is important to know the relative effects of culverts and roads on salamander distribution.

Road planners and wildlife managers must work together to balance the needs of society with the needs of wildlife (Forman and Alexander 1998, Forman et al. 2003). Studies in the Appalachian Mountains (USA) have documented the effects of roads on stream sediment (Swift 1986, 1988; Hedrick et al. 2007), aquatic macroinvertebrates (Chisholm and Downs 1978, Hedrick et al. 2007), plants (Rentch et al. 2005), terrestrial salamanders (Marsh et al. 2005, Semlitsch et al. 2007), and other wildlife (Klaus and Buehler 2001,

McShea et al. 2003, Francl et al. 2004). However, research on aquatic biota in general and salamanders in particular in relation to roads and culvert passages in the Appalachians and elsewhere is limited (Chisholm and Downs 1978, Ward 2005, Wheeler et al. 2005). It is important to understand effects of road construction on aquatic and terrestrial life because many transportation agencies are under increasing pressure to mitigate for both terrestrial and aquatic life (N. Angus, West Virginia Division of Highways, personal communication).

Salamanders are an important component of biological diversity in the Appalachian Mountains (Hairston 1949, Spight 1967, Burton and Likens 1975a). However, concerns have risen about worldwide declines of salamanders and other amphibians (Blaustein 1994). Moreover, the ecological importance of salamanders, based on their biomass, energy flow and nutrient cycling, predatory effects on invertebrates, and as a source of energy for predators, has been well documented (Spight 1967; Burton and Likens 1975a, b; Wyman 1998; Petranksa and Murray 2001). To maintain fully functional stream and riparian ecosystems salamander populations must be retained (Semlitsch and Bodie 2003).

A number of factors, including stream gradient, sediment type, elevation, water quality, canopy cover, and predatory fish influence distribution and abundance of stream and streamside salamanders in the Appalachians and elsewhere. Stream gradient and associated channel substrate have been implicated in the distribution of salamanders from several regions of the United States (Murphy et al. 1981, Corn and Bury 1989, Barr and Babbitt 2002, Russell et al. 2004). For example, southern two-lined salamanders (*Eurycea cirrigera*), northern two-lined salamanders (*Eurycea bislineata*), north-

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NUISANCE BLACK BEAR RESPONSE TO PHYSICAL AND AUDITORY CONDITIONING TECHNIQUES IN SOUTHERN WEST VIRGINIA

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Abstract: Nuisance black bear (*Ursus americanus*) activity has increased in southern West Virginia due to rising bear populations coupled with the availability of human refuse. Wildlife managers are interested in understanding nuisance activity and developing possible management strategies to curb unwanted behavior. During 2003, 12 nuisance black bears were captured and fitted with radiocollars. Upon release, 6 black bears received a conditional regimen comprised of rubber buckshot to the flank and a succession of shell crackers. During the first 2 hours following release, all bears became sessile then remained stationary for at least 24 hours. Within 4 days bears began to move greater distances daily and all resumed nuisance activity within 2 weeks. The physical and auditory conditioning techniques we used did not appear to be an effective means of eliminating subsequent nuisance behavior. Controlling food availability may be the best way to limit nuisance behavior, but removing problem bears or changing their behavior will continue to be important because complete elimination of food attractants is unlikely and some bears already associate people with food. Thus, managers need to understand the limitations of physical and auditory conditioning techniques when developing effective nuisance bear management programs.

NORTHEAST WILDLIFE 58: 23-33 (2004)

Key words: aversive conditioning, black bear, nuisance, telemetry, *Ursus americanus*, West Virginia.

Black bear (*Ursus americanus*) populations have increased from historic lows and are currently expanding their range in Virginia, Pennsylvania, and West Virginia. From 1991–2000, black bear harvest levels in Virginia increased at an annual rate of 6.3%, from 500 to 900 animals, suggesting a relative increase

in population levels (Virginia Department of Game and Inland Fisheries 2002). In Pennsylvania, bear numbers have nearly tripled over the last 20 years (Ternent et al. 2001). In a 4-county area of southern West Virginia (Kanawha, Fayette, Raleigh, and Boone) minimum population estimates have increased from 182 black bears in 1989 to 699 black bears in 1998 (Weaver 2004). As a result of land fragmentation and increasing human development, black bears are venturing

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Genetic Assessment of Lake Sturgeon Population Structure in the Laurentian Great Lakes

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Abstract.—Many populations of lake sturgeon *Acipenser fulvescens* have decreased in size throughout the Great Lakes basin. To implement management strategies such as stocking, it is important to understand the genetic structure of lake sturgeon spawning populations. Lake sturgeon from 27 spawning locations (25 from the Great Lakes basin and 2 from the Hudson Bay drainage) were analyzed using 12 microsatellite loci. Population structure was detected at different spatial scales. At the largest scale, consistent genetic breaks were observed among three clusters of spawning populations: (1) Hudson Bay–northern Lake Superior, (2) southern Lake Superior, and (3) the rest of the Great Lakes. These clusters were identified using a Bayesian approach that does not define the populations a priori. Within each of the three clusters, sublevels of genetic structure were detected. These sublevel clusters accounted for 8.82% of the genetic variation ($P < 0.000$), while differences among populations within the clusters accounted for 3.72% of the genetic variation ($P < 0.000$). At the smallest scale, significant genetic differentiation was detected between most sampled locations through pairwise genetic differentiation index (F_{ST}) tests and pairwise contingency tests. Lake sturgeon showed greater genetic differentiation in Lake Superior than elsewhere, which could be due to the lake's bathymetry. The lower genetic resolution observed elsewhere in the Great Lakes could be due to more recent colonization events. The results can be used to delineate management units and to select appropriate donor populations for supplementation or reintroductions.

Lake sturgeon *Acipenser fulvescens* inhabit the Great Lakes basin, Hudson Bay drainage, and the Mississippi River system, and the Great Lakes represent approximately 25% of the species' range (Harkness and Dymond 1961). Lake sturgeon population abundances in each of the three major drainages are much reduced from historic levels (Hay-Chmielewski and Whelan 1997; Auer 1999a; Stewart and Watkinson 2004). Populations at many locations within the Great Lakes basin are estimated to be 1% of their historic sizes

(Hay-Chmielewski and Whelan 1997). Declines have been attributed to overfishing, habitat loss, and the hydrological changes and migration impediments caused by dams (Auer 1999a). Although some of these problems have been solved, many lake sturgeon populations have not experienced a substantial increase in size, resulting in concern for the long-term viability of this species in the basin. Lake sturgeon are listed as either endangered or threatened in 19 of the 20 states within the species' historic range in the United States (Auer 1999a; Aadland et al. 2005). Lack of population recovery at some locations may be due to lake sturgeon life history characteristics, such as late age of sexual maturity (14–20 years for females: Harkness and Dymond 1961), intermittent spawning (females spawn approximately every 6 years: Harkness and Dymond 1961), and limited recruitment resulting from low numbers of spawning fish (as seen in white sturgeon *A. transmontanus*: Anders et al. 2002).

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Development and standardization of disomic microsatellite markers for lake sturgeon genetic studies

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Summary

Lake sturgeon (*Acipenser fulvescens*) are of conservation concern in North America. To facilitate the recovery of this fish species, an understanding of their population genetic structure is necessary to develop and implement spatially and temporally appropriate management actions. Until recently, few genetic data using nuclear loci have been collected, primarily due to the paucity of suitable genetic markers because most microsatellite loci in lake sturgeon appeared to be tetrasomic. The authors identified nine microsatellite loci (from 254 examined) that were putative polymorphic disomic loci and tested their conformance to a disomic mode of inheritance using three lake sturgeon families. The objectives of the study were to: (i) confirm the disomic status of the nine loci through inheritance testing, and (ii) standardize the genetic markers among participating laboratories. At all nine loci, disomic inheritance were confirmed, and all nine loci segregated independently in the 26 of 36 loci pairs possible to test. One of the nine loci showed non-Mendelian segregation, possibly due to meiotic drive and/or selection. Three progeny had peak patterns inconsistent with disomy at one or more loci. The nine loci when combined with four microsatellite loci previously confirmed in other studies as disomic in lake sturgeon now yield a suite of 13 microsatellite markers. These 13 markers have been standardized among four other laboratories to facilitate building an inter-laboratory genetic database for lake sturgeon.

Introduction

Lake sturgeon (*Acipenser fulvescens*) historically ranged throughout the Great Lakes basin, Hudson Bay drainage, and Mississippi River of North America (Harkness and Dymond, 1961). Their numbers have been reduced by over-fishing, dams and other migration impediments and diminished habitat quality and/or loss (Auer, 1999). Lake sturgeon are now listed as either endangered, threatened, or of special concern in most states within their historic range, as an Appendix II species under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), and as a species of concern under the United States Endangered Species Act. As with many other sturgeon species, late sexual maturity and an intermittent spawning pattern (Harkness and Dymond, 1961) slow the ability of lake sturgeon to quickly rebound.

To facilitate the recovery of lake sturgeon, management efforts have focused on regulating or, in most cases, eliminating harvest (Welsh, 2004), providing fish passage over dams (Peake et al., 1997; Amaral et al., 2002), and

restoring spawning habitat (Bruch, 1999). Reintroduction of lake sturgeon to locations where they have been extirpated, as well as stocking to increase the abundance of existing stocks, has been implemented to a limited extent (Schram et al., 1999; Runstrom et al., 2002). Approaches employed in conservation genetics can help to prioritize populations for active management, to identify suitable donor and recipient populations for stocking, and to guide interjurisdictional coordination by delineating appropriate management units.

Microsatellite loci are useful genetic markers for intraspecific population genetic studies because they are codominant, biparentally inherited, putatively neutral, and have a relatively high mutation rate (Goldstein and Schlotterer, 1999). Evidence of duplicated microsatellite loci has been observed in many sturgeon species (e.g. Jenneckens et al., 2001; Rodzen and May, 2005; Shao et al., 2005), as well as other fish species (e.g. David et al., 2003). The lake sturgeon genome appears to be tetraploid-derived and in the early stages of the diploidization process, with a mix of tetrasomic and disomic microsatellite loci (e.g. Pyatskowitz et al., 2001; McQuown et al., 2002; Welsh et al., 2003). Duplicated loci can complicate population genetic analyses because of the difficulty in determining gene dosages and the assumption of diploidy is incorporated into many statistical tests.

In 1999, lake sturgeon geneticists and managers in the United States met to address priorities for the collection and analysis of genetic data that could be incorporated into management plans. Critical needs that were identified included the development of additional genetic markers and the standardization of those markers among the various laboratories (Lowie, 1999). To eliminate the inherent difficulties associated with tetrasomic loci, future lake sturgeon genetic marker development required identifying nuclear microsatellite loci that are disomic. Following selection of appropriate genetic markers, standardization of marker use and allelic designations was deemed critical for building a genetic database among the laboratories.

Building a North American genetic database of lake sturgeon is difficult because of differences among laboratories in analytic techniques and scoring procedures. Integration of genetic data collected at different laboratories will permit a more comprehensive understanding of lake sturgeon population structure. Many laboratories are using different genotyping platforms and apparent allele sizes can vary depending on electrophoretic conditions (Haberl and Tautz, 1999). Standardization of microsatellite loci also requires consistent allele scoring within and between laboratories. With the development of new microsatellite markers, the timing for such

Detection of natural barriers to movement of lake sturgeon (*Acipenser fulvescens*) within the Namakan River, Ontario

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Abstract: Many populations of lake sturgeon (*Acipenser fulvescens* Rafinesque, 1817) are below historic population sizes, and migration barriers have likely contributed to some of these population declines. Dams and natural barriers can potentially isolate populations along a single river and can have a strong effect on the ability of lake sturgeon to move upstream. Along the Namakan River in Ontario, Canada, a series of natural rapids could impede movement of lake sturgeon and fragment the sturgeon into several small populations. Movement patterns of lake sturgeon were assessed using genetics and acoustic telemetry. Samples were collected from five locations along the river, each one separated by a rapid or falls, and were analyzed at 12 microsatellite loci. No significant genetic differences were observed between the five segments, indicating that the groups of lake sturgeon are not isolated. There were no significant differences in genetic diversity between the five segments. Therefore, migration is likely occurring both upstream and downstream. The acoustic telemetry study also confirmed bidirectional movement of adult fish. The natural rapids and falls along the Namakan River do not appear to be a significant barrier to movement of lake sturgeon, and the lake sturgeon within this river represent a single population.

Résumé : Plusieurs populations d'esturgeons jaunes (*Acipenser fulvescens* Rafinesque, 1817) se retrouvent à des densités inférieures à celles du passé et il est vraisemblable que des barrières à la migration aient contribué au déclin de certaines de ces populations. Les barrages et les barrières naturelles peuvent potentiellement isoler les populations le long du cours d'une même rivière et affecter fortement la capacité des esturgeons jaunes à se déplacer vers l'amont. Le long de la rivière Namakan en Ontario, Canada, une série de rapides naturels pourrait entraver le déplacement des esturgeons jaunes et les séparer en plusieurs petites populations. Nous avons évalué les patrons de déplacement des esturgeons jaunes à l'aide de la génétique et de la télémétrie acoustique. Nous avons prélevé des esturgeons à cinq sites sur le cours de la rivière, chacun séparé par un rapide ou une chute, et procédé à une analyse génétique de 12 locus microsatellites. Il n'y a aucune différence génétique significative entre les cinq segments, ce qui indique que les groupes d'esturgeons jaunes ne sont pas isolés. Il n'y a pas non plus de différence significative de diversité génétique entre les cinq segments. Il se produit donc vraisemblablement de la migration tant vers l'amont que vers l'aval. La télémétrie acoustique confirme aussi les déplacements des poissons adultes dans les deux directions. Les rapides naturels et les chutes le long de la Namakan ne semblent pas constituer des barrières significatives aux déplacements des esturgeons jaunes qui forment donc une seule population dans cette rivière.

[Traduit par la Rédaction]

Introduction

The lake sturgeon (*Acipenser fulvescens* Rafinesque, 1817) has a wide range throughout North America, including the Great Lakes and St. Lawrence River, Lake Winnipeg, Hudson Bay, and the Mississippi River systems. Many populations throughout their range are reduced in size relative to historic population numbers mainly owing to overfishing and habitat modifications (Peterson et al. 2007). Although fishing

has been restricted in many jurisdictions, habitat changes, such as the construction and operation of dams, continue to have an effect on some populations of lake sturgeon. On the Ottawa River, greater abundance and faster growth of lake sturgeon were observed on reaches that were not impounded (Haxton and Findlay 2008). On the Mattagami River, hydroelectric operations appeared to have an effect on reproductive development of lake sturgeon (McKinley et al. 1998). Flow regimes on the Sturgeon River had an impact on spawning activity of sturgeon (Auer 1996a). In the Red River of the North basin, lake sturgeon have been extirpated owing to dams blocking access to historic spawning grounds (Aadland et al. 2005).

Studies on movements of lake sturgeon can provide additional information on the potential impacts of natural and artificial barriers. Current studies offer conflicting information, with some reporting large migration distances and others reporting minimal movement. In the Great Lakes, a range of adult migration distances from 32 to 225 km have been reported (reviewed in Auer 1996b). Movements of

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GENETIC DIVERSITY OF *STRIGA HERMONTHICA* POPULATIONS IN ETHIOPIA: EVALUATING THE ROLE OF GEOGRAPHY AND HOST SPECIFICITY IN SHAPING POPULATION STRUCTURE

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Striga hermonthica, a root hemiparasitic Orobanchaceae, severely constrains grain production in sub-Saharan Africa. Host specificity and geography may play important roles in shaping the population structure of *S. hermonthica*, with the Rift Valley potentially presenting a significant barrier to dispersal. Genetic diversity was assessed in 12 *S. hermonthica* populations from locations in Ethiopia. Of these, seven populations were parasitic on sorghum, two each on tef and maize, and one on finger millet. Genetic variation was detected using four amplified fragment length polymorphism (AFLP) primer combinations. After correcting for repeatability, 385 fragments were detected across all primer combinations. The percentage of polymorphic loci was relatively high, ranging from 53.2% to 76.4%. Expected heterozygosity ranged from 0.168 to 0.279. Genetic differentiation between populations was relatively high, and all populations were significantly different from each other. F_{ST} values ranged from 0.032 to 0.293 and averaged 0.146. Genetic differences between populations could not be attributed to host specificity. Instead, geography was the main determinant of population structure. There was a correlation between geographic and genetic distance. A significant portion of the genetic variance could be apportioned on either side of the Rift Valley (5%; $P = 0.001$). Also, a significant geographic barrier was identified in the southern portion of the sampled region.

Keywords: *Striga hermonthica*, genetic, AFLP, host specificity, geography, Ethiopia.

Introduction

Striga hermonthica (giant witchweed), a parasitic plant native to Ethiopia and Sudan (Musselman 1987), is known to cause substantial losses in cereal crop production across Africa and south Asia. Corn (*Zea mays* L.), sorghum (*Sorghum vulgare* Pers.), finger millet (*Eleusine coracana* [L.] Gaertn.), and tef (*Eragrostis tef* [Zucc.] Trotter) are among the staple foods threatened by giant witchweed. This parasitic plant currently affects up to 40% of Africa's crop production, and the annual crop yield losses in West African savannas alone account for \$7 billion, affecting more than 100 million people (Emechebe et al. 2004).

The giant witchweed can adapt very quickly to different hosts and environments. Dawoud and Sauerborn (1994) showed that *S. hermonthica* can attain up to 50% germination under moisture regimes described as the permanent wilting point for its host, illustrating the potentially serious consequences this parasite can have in arid regions. Additionally, witchweed can tolerate wide ranges of day/night temperatures (25°/15°C–40°/30°C; Patterson et al. 1982), making it a successful parasite throughout its range. These characteristics render *S. hermonthica* a serious pest to cereal production, especially in the Sahel region (Senegal to Ethiopia), where it has developed two host-specific strains. The first is specific to millet, occurring in the drier and more northerly region of

the Sahel, and the second attacks sorghum and is found farther south, in wetter regions (Musselman and Hepper 1986). In addition, this species has spread in Africa south to Angola and north to the Delta in Egypt, extending its range outside the continent to Yemen and Saudi Arabia (Mohamed et al. 2001).

The ability of *S. hermonthica* to withstand a wide range of climatic conditions (Patterson et al. 1982; Dawoud and Sauerborn 1994) and parasitize different hosts (Ali et al. 2009) qualifies it to be considered among the most widely distributed known witchweeds with real invasive potential threatening cereal production worldwide (Mohamed et al. 2006). Therefore, it is difficult to develop universally resistant host crops, and crop breeding efforts toward obtaining resistant cultivars may need to take the view that *Striga* species are diverse at the intraspecific level. Instead, it may be better to focus efforts on controlling witchweed itself, particularly its spread. Host specificity and geography could potentially influence the spread of *S. hermonthica*. If host specificity and geography are significant evolutionary forces for witchweed, the population structure of the species should reflect genetic differences based on host or geographic barriers.

Limited studies on witchweed genetic diversity have been conducted, especially considering its wide range (Mohamed et al. 2007). *Striga hermonthica* is an obligate outbreeder (Safa et al. 1984), and its hybridization with *Striga aspera* has caused some taxonomic confusion (Aigbokhan et al. 2000). Allozyme electrophoresis of nine loci in two populations of *S. hermonthica* (pearl millet-adapted and sorghum-adapted populations) collected from Burkina Faso and one

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WILDLIFE USE OF BACK CHANNELS ASSOCIATED WITH ISLANDS ON THE OHIO RIVER

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Abstract: The back channels of islands on the Ohio River are assumed to provide habitat critical for several wildlife species. However, quantitative information on the wildlife value of back channels is needed by natural resource managers for the conservation of these forested islands and embayments in the face of increasing shoreline development and recreational boating. We compared the relative abundance of waterbirds, turtles, anurans, and riparian furbearing mammals during 2001 and 2002 in back and main channels of the Ohio River in West Virginia. Wood ducks (*Aix sponsa*), snapping turtles (*Chelydra serpentina*), beavers (*Castor canadensis*), and muskrats (*Ondatra zibethicus*) were more abundant in back than main channels. Spring peepers (*Pseudacris crucifer*) and American toads (*Bufo americanus*) occurred more frequently on back than main channels. These results provide quantitative evidence that back channels are important for several wildlife species. The narrowness of the back channels, the protection they provide from the main current of the river, and their ability to support vegetated shorelines and woody debris, are characteristics that appear to benefit these species. As a conservation measure for important riparian wildlife habitat, we suggest limiting building of piers and development of the shoreline in back channel areas.

Key Words: *Anas platyrhynchos*, anurans, beaver, *Branta canadensis*, Canada geese, *Castor canadensis*, mallards, turtles, waterbirds

INTRODUCTION

The Ohio River has been dramatically altered over the past 200 years from industrial and navigational projects (Tolin and Schettig 1983). These activities essentially changed the river from a free-flowing system to a series of connected lakes (Frost and Mitsch 1989), likely negatively affecting wildlife species (Bodie 2001) and eliminating or severely degrading many islands within the river (Tolin and Schettig 1983, U. S. Army Corps of Engineers 2000).

Remaining islands and associated back channels (i.e., the area between an island and mainland not used for commercial barge traffic) generally are regarded as critical habitat for several wildlife species (Tolin and Schettig 1983, Sacilotto and Anderson 2005). However, few studies have measured wildlife use of back-channel areas (Zeto et al. 1987, Thorp 1992,

Millard 1993, Sacilotto and Anderson 2005). Currently, many islands and some mainland tracts are protected from development as part of the Ohio River Islands National Wildlife Refuge (ORINWR). However, most back channels and adjacent mainland shorelines remain under pressure to be developed (U.S. Fish and Wildlife Service [USFWS] 2000). Riparian zones in riverine systems contain valuable wildlife communities (Gregory et al. 1991), but specific information on wildlife use of back channels is needed by resource managers for conserving these areas.

We sampled back and main channels, and island and mainland shorelines, associated with islands in the Ohio River and quantified relative abundance of waterbirds, turtles, anurans, beavers (*Castor canadensis*), and muskrats (*Ondatra zibethicus*). We hypothesized that back channels would have greater abundance of wildlife compared to main channels.

Attachment C.

Summaries of and references from at least 2 papers dealing with furbearers published in peer reviewed scientific journals.

Modeling Habitat Suitability for Beaver (*Castor canadensis*) Using Geographic Information Systems

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Abstract. Beaver (*Castor canadensis*) alter ecosystems and affect vegetative growth patterns in streams and wetlands throughout most of North America. We produced a habitat suitability model and map using a geographic information system, incorporating multiple layers important to beaver use. The map was applied to the Canaan Valley area of West Virginia, USA. Model results were compared to the published habitat suitability index (HSI) for North American beaver. Validation was performed by comparing active beaver locations to randomly selected locations in the study area. Our mean model value for active sites was significantly greater than that of random points. Our model values were higher than those of the HSI model, which lacks validation. We believe this type of model is a viable alternative to intensive surveys, with the ability to classify beaver habitat suitability over a large landscape. We show the usefulness of this type of modeling in identifying areas where beaver activity may be important to rare plant conservation decisions. Local information concerning food preferences and habitat use, which vary regionally, should be incorporated into this model when available. This model is presented as a tool for land and wildlife management where beaver populations are a concern and also as a possible template for developing similar models for other species.

Keywords: Canaan Valley, *Castor canadensis*, GIS, Habitat Suitability, Model, Plant Conservation, Wildlife

1. Introduction

Geographic information systems (GIS) have been used to create predictive habitat maps for management of some species of concern [1]. These mapping efforts can be particularly effective when habitat requirements of the target species are well known [2]. Modeling using a GIS-based approach is becoming more frequent and accurate as digital datasets improve. Beaver (*Castor canadensis*) habitat use and quality have been evaluated throughout North America using various techniques and measures [3]-[5].

The ecosystem alterations created by beaver can have significant impacts on streams and wetlands across much of North America. The dam-building activities of these large rodents alter forest succession by flooding areas [6], [7], leading to changes in sediment retention, invertebrate communities, vegetative composition, and stream morphology [8]-[10]. Herbivory by beavers also can have a dramatic effect on successional trends along streams [6], [7].

While historical beaver activities were a natural influence on a relatively unaltered landscape, they are now a potential hindrance to typical successional patterns in our altered landscape [11]. Fortney and Rentch [12] named beaver activities as one potential factor in the reduction of some rare plant communities in West Virginia. They cite beaver activity as a primary cause of a >40% loss in developing coniferous forests. Naiman et al. [7] indicate the potential for beaver-induced community types, such as fens and wet meadows, to be enduring stages of succession instead of temporary patches. Although beaver impoundments in New York, USA have been described as short term habitats [10], some ponds in West Virginia, USA have persisted since 1945 [13]. Naiman et al. [9] suggest that beaver alterations may affect the local landscape for centuries and that these changes are widespread across the distribution of the species. Although often managed to reduce interference with human activities, beavers are an important natural ecological presence, with multiple behaviors affecting the floristic communities that share their habitat.

Article

Summer movements and activity patterns of river otters in Northeastern Ohio, USA

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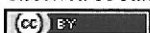
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Abstract

It is important to understand river otter (*Lontra canadensis*) movement and activity patterns for successful management and reintroduction plans. As part of a river otter study conducted in the Killbuck Watershed, the largest wetland complex in Ohio, USA outside of the Lake Erie marshes, 11 river otters were radio-tagged and monitored for movements and activity patterns. Twenty-seven 24-hour monitoring surveys were conducted during summer months (June–July) of 2002 and 2003. The mean movement distance of female river otters (\bar{x} = 1.8 km, SE = 0.23) was less ($P = 0.0012$) than the mean movement distance of male river otters (\bar{x} = 5.2 km, SE = 0.73). River otters were more active than inactive from 2201–0400 hrs (71% active), followed by 0401–1000 hrs (68% active), and 1601–2200 hrs (45% active); they were more inactive than active from 1001–1600 hrs (14% active). These results show that river otters can move long distances and it is important to manage not only wetland systems but riparian corridors that aid in dispersal of river otters to other wetland complexes and watersheds.

Keywords activity patterns; Killbuck Watershed; *Lontra canadensis*; movements; river otter; wetlands.

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1 Introduction

River otters are important furbearers and indicators of riparian health in North America (Melquist and Hornocker, 1983; Bowyer et al., 2003). Historically, river otters survived throughout northern Alaska, from eastern Newfoundland to the Aleutian Islands, and south to Florida and Texas, and were absent only in the treeless arctic and the arid southwestern states (Chapman and Feldhamer, 1982; Melquist and Hornocker, 1983; Melquist and Dronkert, 1987; Stone and Sheean-Stone, 1992). A combination of factors such as human infringement, habitat destruction, and unregulated trapping during the early 1900s reduced river otters from much of their historic range (Melquist and Hornocker, 1983; Melquist and Dronkert, 1987). Due to the high

COMPARISON OF INTERIOR VERSUS ROADSIDE SCENT STATION PLACEMENT TO DETERMINE CARNIVOROUS MAMMAL PRESENCE

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KEY WORDS: Carnivorous mammal, *Mammalia*, scent station, interior, roadside, species community, West Virginia, USA.

ABSTRACT

Carnivorous mammals are important components of ecosystems and often need to be monitored for management purposes. Most monitoring relies on scent stations placed near roads. However, carnivorous mammal assemblages and visitation rates may be different between interior sites and roadside sites. The objective of this study was to compare carnivorous mammal visitation rates between roadside (within 5 m of the road) plots and interior (≥ 100 m of the road) plots to determine the most efficient and effective use of scent station surveys to determine carnivorous mammal presence. Scent stations (roadside $n = 26$, and interior $n = 26$) were monitored five times in August-September-October 2000 and June-July 2001 on the Camp Dawson Army Training Site in north-central West Virginia, USA. Tracks of nine species of carnivores were found on the scent stations. Raccoon, *Procyon lotor*, Virginia opossum, *Didelphis virginiana*, and American black bear, *Ursus americanus*, were most common. Overall, scent station visitation rates were less at roadsides (23%) than interior areas (34%) for all predators combined ($G = 3.24$; $p = 0.06$) and for American black bears ($G = 3.02$; $p = 0.082$). Weasel, *Mustela* spp., and feral cats, *Felis catus*, were found only in interior sites, whereas domestic dog, *Canis familiaris*, was found only along roads. To obtain an accurate description of the entire carnivorous mammal community using the scent station sampling method both roadside and interior scent stations should be monitored.

SUMMER HOME RANGE SIZE AND HABITAT USE BY RIVER OTTERS IN OHIO

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ABSTRACT: Reintroduced river otters (*Lontra canadensis*) are an important component of Ohio's biological diversity, and are a key indicator of wetland and watershed health and quality. However, few data are available on their home range sizes and habitat use. We monitored river otters using radio-telemetry in the Killbuck Watershed, in northeastern Ohio, during 2002 and 2003 to determine home range and habitat use. Overall, mean home range size was 802.4 ha (range = 84.5–3,376.3, SE = 448.2) for female river otters and 1,101.7 ha (range = 713.8–1,502.6, SE = 102.2) for male river otters. Home range size of female and male river otters did not differ in 2002 ($P = 0.763$), but males had larger home range size than females during 2003 ($P = 0.001$). Based on compositional analysis, habitat use differed in proportion to availability of the 5 habitat types available in the study area (marsh, wet meadow, riparian/floodplain, open water, and flooded upland) ($P < 0.0001$). Overall, river otters used marsh habitat with a diverse association of floating aquatics and emergent vegetation in greater proportion than was available. Knowledge and understanding of river otter habitat use and home range size in Ohio will help managers identify habitats suitable for river otters in the Midwestern United States.

Key words: Habitat use, home range, Killbuck Watershed, *Lontra canadensis*, radio-telemetry, river otter.

River otters (*Lontra canadensis*) are a native Ohio furbearer and are also an important indicator of riparian health. At one time, river otters were established throughout most of the major drainages in North America (Hall 1981, Schwartz and Schwartz 1995, Whitaker and Hamilton 1998). Prior to the 1900s, river otters occurred in northern Alaska and from eastern Newfoundland to the Aleutian Islands, extending into the southern states of Florida and Texas, but remained absent from arid portions of the southwestern states (Chapman and Feldhamer 1982, Stone and Sheean-Stone 1992). Unregulated trapping, water pollution, and destruction of habitat caused serious declines in river otter populations throughout large portions of the species' former range (Berg 1982, Stone and Sheean-Stone 1992).

Implementation of reintroduction programs in many portions of the United States has facilitated reestablishment of river otters. Several states have conducted studies and surveys to determine post-release survival and movements of river otters. However, there is a lack of long-term studies or any systematic effort to determine the status of reintroduced river otter populations. Since the release program ended in Ohio in 1989, monitoring the distribution

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Riparian and Riverine Wildlife Response to a Newly Created Bridge Crossing

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ABSTRACT

Construction of man-made objects such as roads and bridges can influence wildlife presence and abundance. We investigated waterbirds, songbirds, anurans, turtles, small mammals, and furbearers along the Ohio River, WV, at a new bridge crossing, a 45-year old bridge, and 1 or 2 islands with no bridge and at 3 distances from the bridge or center point at each site (0 m, 100 m, and 300 m). We sampled 19 waterbird, 60 songbird, 7 anuran, 5 turtle, 9 small mammal, and 4 furbearer species. Great blue heron (*Ardea herodias*) abundances were greater at the site with no bridge. Songbird composition differed among sites and between transects under and away from the bridge with higher abundances or association of rock pigeon (*Columba livia*) and cliff swallow (*Petrochelidon pyrrhonota*) under the bridges and lower abundances of Carolina wren (*Thryothorus ludovicianus*) and common yellowthroat (*Geothlypis trichas*) under the bridges. Total small mammal abundance, diversity, and richness were lower under the new bridge compared to other sites and distances. We conclude that overall the new bridge is causing minimal relative abundance impacts to wildlife. However, great blue heron abundance may be altered due to noise and activity from the presence of the bridge and minor short-term impacts to some songbirds and small mammals directly under the bridge in the form of habitat conversion, fragmentation, and loss due to removal of vegetation is apparent.

Keywords: Great Blue Heron; Road Effects; Small Mammals; Songbirds; Waterbirds

1. Introduction

Humans today are affecting natural ecosystems at extraordinary rates through conversion of land and resource consumption [1], alteration of habitat and species composition [2], disruption of hydrological processes [3], and modification of energy flow and nutrient cycles [4]. Since the 1940s, the human population of the United States has become increasingly urbanized [5]. Urbanization dramatically alters landscapes through habitat fragmentation and increased human presence. Urbanization and the construction of roads and bridges can alter wildlife habitat, and is cited as the second most frequent cause of species endangerment, behind agriculture, in the United States [6]. Construction of these man-made objects may have temporary or permanent effects on wildlife and vegetation. Historically, relatively few published studies have evaluated these effects. Recently, more attention has been directed toward the effects of bridges and roads upon wildlife and vegetation [7,8].

Bridges can potentially affect mammals, birds, amphibians, and reptiles either positively, negatively, or have no

effect depending on species or location. Bridges have positive effects on wildlife by providing habitat for nesting, roosting, and resting as well as providing corridors for movement. Cliff swallows (*Petrochelidon pyrrhonota*) and barn swallows (*Hirundo rustica*) are species that use bridges for nesting and perching [9,10]. Additionally, peregrine falcons (*Falco peregrinus*) have been well documented as using bridges and skyscrapers for nesting sites and hunting perches [11]. Other research shows that bridges provide roosting and resting habitat for bats [12]. Edge created by roads and bridges may provide habitat for certain songbirds and increase their population [13].

There is a lack of published literature on the ecological impacts of bridges on wildlife. However, the presence of a bridge may have direct negative impacts on wildlife similar to those of highway impacts which have been studied in much greater detail. Some of these negative impacts include: increased mortality from vehicle collisions [14,15], noise [16], barrier effects [17,8], and attraction of undesirable or non-native species [18]. Bridges and highways also can impact the landscape causing habitat fragmentation [19], habitat loss [20], and habitat alteration [21] which in turn are negative for some wild-

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