



Michigan Department of Natural Resources – Procurement Services
P.O. Box 30028, Lansing, MI 48909
OR
525 W. Allegan, Lansing, MI 48933

NOTICE OF CONTRACT NO. 751B4300031
Between
STATE OF MICHIGAN
and

Required by authority of 1984 PA 431, as amended.

Name and Address of Contractor Michigan State University Office of Sponsored Programs 426 Auditorium Rd., Rm 2 301 Administration Building East Lansing, MI 48824-2601	Primary Contact Diane Cox	
	Email Coxd@osp.msu.edu	
	Telephone (517) 884-4243	Contractor #, Mail Code *****5984/283

State Contact	Division	Name	Telephone	Email
Project Manager	Wildlife Division	Stephen Beyer	(517)241-0533	BeyerS1@michigan.gov
Buyer	Finance and	Jana Harding-Bishop	(517)284-5938	HardingJ3@michigan.gov

Contract Summary			
Description (Provide a basic but comprehensive description of services) Data collection and analysis to generate localized deer abundance estimates and recommended future protocols.			
Initial Term 4 yrs – 5 months	Effective Date May 1, 2014	Initial Expiration Date September 30, 2018	Available Options 1 – 1 year
Payment Terms Net 45	F.O.B. N/A	Shipped N/A	Shipped From N/A
Minimum Delivery Requirements N/A	Alternate Payment Options <input type="checkbox"/> P-Card <input type="checkbox"/> Direct Voucher		Available to MiDeal Participants <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
ESTIMATED CONTRACT VALUE AT TIME OF EXECUTION: \$249,917.00			



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ESTIMATED CONTRACT VALUE AT TIME OF EXECUTION: \$249,917.00			

THIS IS NOT AN ORDER: This Contract Agreement is awarded based on Wildlife’s Call for Project RFP with a due date of May 11, 2012. Orders for delivery will be issued directly by the Michigan Department of Natural Resources through the issuance of a Purchase Order Form.

FOR THE CONTRACTOR:

Michigan State University

 Firm Name
 On-file in DNR Procurement

 Authorized Agent Signature
 Diane Cox, Senior Contract and Grant Administrator

 Authorized Agent (Print or Type)
 4/17/14

 Date

FOR THE STATE:

On-file in DNR Procurement

 Signature
 Sharon Walenga-Maynard, Procurement Services Manager

 Name/Title
 DNR Finance and Operations/Procurement

 Division/Section
 4/18/14

 Date

STATE OF MICHIGAN TERMS AND CONDITIONS

I-A PURPOSE

This contract consists of the State of Michigan's (State) terms and conditions and the work statement (Appendix A). This contract constitutes the complete and exclusive agreement and understanding of the parties as it relates to this transaction. This contract supersedes all proposals, or other prior agreements, and all other communications between the parties relating to this transaction. If there is a conflict between the State's terms and conditions and the Contractor's Proposal, the State's terms and conditions shall take precedence.

The purpose of this contract is to obtain the services of the Department of Fisheries and Wildlife at Michigan State University to conduct research titled: Local-scale assessment and monitoring of deer populations following a major mortality event (MSU Project # 133189) in collaboration with Wildlife Division the Michigan Department of Natural Resources (DNR). Project completion date is September 30, 2018.

I-B ISSUING OFFICE/CONTRACT ADMINISTRATOR

This contract is issued by the State of Michigan, Department of Natural Resources, Financial Services (FS) for Wildlife Division (WLD).

FS is the only office authorized to change, modify, amend, alter, clarify, etc., the prices, specifications, terms, and conditions of this contract. All requests for changes, modifications, amendments, etc. must be addressed to:

Jana Harding-Bishop
DNR, FS
3rd Floor, Constitution Hall
P.O. Box 30028
Lansing, MI 48909
(517) 284-5938

I-C CONTRACT STAFFING

Upon receipt of the properly executed contract agreement, it is anticipated that the person named below or any other person so designated be authorized to oversee the contract on a day-to-day basis during the term of the contract. However, oversight of this contract implies no authority to change, modify, clarify, amend, or otherwise alter the prices, terms, conditions, and specifications of this contract.

The DNR Project Manager is:

Stephen Beyer
Department of Natural Resources
Wildlife Division
P.O. Box 30444
Lansing, MI 48909
Telephone: (517) 243-5179
Fax: (517) 373-6705
Email: beyers1@michigan.gov

The MSU Principal Investigator (MSU-PI) for this project is listed below. This person is responsible for the administration and research of the project. The MSU-PI does not have the authority to change, modify, clarify, amend, or otherwise alter the prices, terms, conditions, and specifications of the contract as that authority is retained by MSU - Office of Sponsored Programs.

Dr. David Williams
Department of Fisheries and Wildlife
Michigan State University
9A Natural Resources Bldg.
East Lansing, MI 48824
Telephone: (517) 432-0804
Email: dmwill@msu.edu

Partners: Dr. William Porter
Department of Fisheries and Wildlife
Michigan State University
9A Natural Resources Bldg.
East Lansing, MI 48824
Telephone: (517) 432-0874
[Email: porterw@msu.edu](mailto:porterw@msu.edu)

Dr. Brent Rudolph
Department of Natural Resources
Wildlife Division
8562 East Stoll Road
East Lansing, MI 48823
Telephone: (517) 641-4903
Fax: (517) 641-6022
Email: rudolphb@michigan.gov

I-D PROGRAM OF WORK

Specific program objectives and deliverables are detailed in the attached statement of work (**ATTACHMENT A**).

I-E DELIVERABLES

The MSU PI is responsible for providing annual progress reports, and a final report to the DNR contract administrator in written and electronic format by the specified dates(s). A template for these reports will be provided by the DNR contract administrator and submitted reports must use the template or contain all information requested on the template. The reports shall be mailed and transmitted electronically to the DNR contract administrator listed in I-C. Deliverables:

- 1) Annual estimates of deer abundance and assessment trends in local deer abundance for each study site.
- 2) Assessment of the feasibility of using trained volunteers from the local community to assist with monitoring deer abundance plan.
- 3) Detailed written methodology for establishing survey transects, working with volunteers to collect data, and conducting analyses to derive local abundance estimates.
- 4) Executive summary of project results. The executive summary will provide MDNR personnel with a review of the project, referenced to theses, publications, and reports.
- 5) As requested by MDNR, presentations of project results to MDNR personnel, project cooperators, and stakeholder groups.
- 6) Present results to Stakeholder Groups and the Natural Resources Commission (NRC)

Annual Progress Report	September 30, 2014
Annual Progress Report	September 30, 2015
Annual Progress Report	September 30, 2016
Annual Progress Report	September 30, 2017

Final payment will be withheld until final report is submitted. Electronic data files and mapping products will be shared in electronic format with the DNR contract administrator.

I-F PROJECT CONTROL AND REPORTS

The Contractor will carry out this project under the direction and control of the DNR, Wildlife Division.

The DNR contract manager will meet as needed with the PI for the purpose of reviewing progress and providing necessary guidance in solving problems that arise.

The PI will submit deliverables as listed in Section I-E above, and identify any problems, real or anticipated, which should be brought to the attention of the DNR contract manager to insure that the contract remains on schedule and will be completed as scheduled.

I-G PRICE PROPOSAL

This is a **fixed price contract**, and Contractor may invoice at the end of each fiscal quarter (December 31, March 31, June 30, and September 30) for 25% of the annual DNR contribution to the study (the contract cost). Contractor's fiscal contribution to this study (34%) is the waiver of normal overhead charges per the Agreement between MSU and DNR, executed September 5, 2013.

I-H MODIFICATIONS OF CONTRACT

This contract may be modified if any changes proposed by either party are requested in writing and mutually agreed to by the official representative of the Contractor shown in this contract and the DNR contract administrator. This request is not valid until it is signed by all parties, a Contract Change Notice is issued by the Issuing Office, and a Purchase Order is issued by the DNR.

I-I NO WAIVER OF DEFAULT

The failure of a party to insist upon strict adherence to any term of this contract shall not be considered a waiver or deprive the party of the right thereafter to insist upon strict adherence to that term, or any other term, of this contract.

I-J SEVERABILITY

Each provision of this contract shall be deemed severable from all other provisions, and if one or more of the provisions shall be declared invalid, the remaining provisions of this contract shall remain in full force and effect.

I-K HEADINGS

Captions and headings used in this contract are for information and organization purposes. Captions and headings, including inaccurate references, do not, in any way, define or limit the requirements or terms and conditions of this contract.

I-L RELATIONSHIP OF THE PARTIES

The relationship between the State and the Contractor is that of client and independent contractor. No agent, employee, or servant of the Contractor or any of its subcontractors shall be or shall be deemed an employee, agent, or servant of the State for any reason.

I-M COST LIABILITY

The State of Michigan assumes no responsibility or liability for costs incurred by the Contractor prior to the signing this contract. Total liability of the State is limited to the terms and conditions of this contract.

I-N CONTRACTOR RESPONSIBILITIES

The Contractor is responsible for the performance of all of its obligations under this contract, whether the obligations are performed by the Contractor or a subcontractor. The State reserves the right to approve any subcontractor hired to perform the Contractor's obligations under this contract, and the right to require the Contractor to replace any subcontractor deemed unacceptable by the State. The Contractor is exclusively responsible for adherence by subcontractors to all provisions of this contract. Further, the State will consider the Contractor to be the sole point of contact with regard to contractual matters, including but not limited to payment of any and all costs resulting from the contract.

I-O INFORMATION RELEASE / OWNERSHIP

News Releases

News releases pertaining to this Contract or the services, study, data, or project to which it relates will not be made without prior written State approval, which will not be unduly withheld.

Publication

The Contractor will not use, release, or publish any analyses, findings, results, or techniques developed under this agreement, or any information derived therefrom until such analyses, findings, or techniques have been reported to the State in the manner prescribed by this agreement and have become public domain. These analyses, findings or techniques will be considered in the public domain when: 1) they are submitted to the State and receive positive action, 2) they are formally accepted by the State, or 3) forty-five (45) days elapse after submission to the State, whichever of the three may occur first. No material may be published that is exempt from disclosure under Public Act No. 442 of 1976, known as the "Freedom of Information Act," without express permission from the State. The Contractor will provide the State, for its review, copies of all presentations or articles being submitted for publication at least thirty (30) days in advance. Review of materials will be handled expeditiously and approval will not be unduly withheld. Co-authorship on any presentations at professional meetings and publications resulting from this project will be agreed upon by the Co-PIs.

Acknowledgement of State Participation/Support

All publications or oral presentations concerning the analyses, findings, results, or techniques developed under this contract will contain an acknowledgement, of the State's participation and support unless the State requests in writing that their participation and support not be acknowledged. Furthermore, Contractor may not receive fees for any article in excess of the cost of preparation of published article and excluding the cost of the research and compilation that was compensated under the contract.

Ownership of Samples/Equipment

At the end of the project period, the DNR will retain ownership of any supplies/equipment purchased with funding under this contract and for the purposes of the project which are not

consumed while completing the project. The supplies/equipment must be returned to the State upon the request of the DNR Project Manager.

I-P DISCLOSURE

All information in this contract is subject to the provisions of the Freedom of Information Act, 1976 Public Act No. 442, as amended, MCL 15.231, et seq.

I-Q ACCOUNTING RECORDS

The Contractor will be required to maintain project records pertaining to Appendix A 'Work Statement' for three (3) years from the expiration date of this contract, which access shall be made available to the State upon reasonable notice to Contractor.

I-R AUDIT OF CONTRACT COMPLIANCE

The Contractor agrees that the State may, upon 24-hour notice, perform an audit at Contractor's location(s) to determine if the Contractor is complying with the requirements of this contract. The Contractor agrees to cooperate with the State during the audit and produce all records and documentation that verifies compliance with the requirements of this contract.

I-S SAFETY AND ACCIDENT PREVENTION

In performing work under this contract on State premises, the Contractor shall conform to any specific safety requirements contained in this contract or as required by law or regulation. The Contractor shall take any additional precautions as the State may reasonably require for safety and accident prevention purposes. Any violation of such safety requirements, rules, laws, or regulations shall be a material breach of this contract and shall be grounds for cancellation of this contract in accordance with the Cancellation provisions contained herein.

I-T TAXES

Employment Taxes

Contractors are expected to collect and pay all applicable federal, state, and local employment taxes.

Sales and Use Taxes Contractors are required to be registered to remit sales and use taxes on taxable sales of tangible personal property or services delivered into the State.

I-U GENERAL INDEMNIFICATION

Each party to this contract must seek its own legal representative and bear its own costs; including judgments, in any litigation that may arise from performance specific to each party's responsibilities. It is specifically understood and agreed that neither party will indemnify the other party in such litigation.

I-V INSURANCE REQUIREMENTS

The Contractor shall purchase and maintain such insurance as will protect them from claims set forth below which may arise out of, or result from, the Contractor's operations under the Contract (Purchase Order), whether such operations be by themselves or by any Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

NOTE: CONTRACTOR MAY SUBMIT EVIDENCE OF SELF-INSURANCE AND/OR AMENDMENT OF EXISTING LIABILITY COVERAGE IN FULFILLMENT OF ABOVE PROVISIONS, IF THE STATE ACCEPTS THE EVIDENCE OR AMENDED LIABILITY COVERAGE AS PROVIDING COMPARABLE PROTECTION OF THE STATE'S INTEREST.

The Contractor is required to provide proof of the minimum levels of insurance coverage as indicated below. The purpose of this coverage shall be to protect the State from claims which may arise out of, or result from, the Contractor's performance of services under the terms of this Contract, whether such services are performed by the Contractor, or by any subcontractor, or by anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable.

The Contractor waives all rights against the State of Michigan, its departments, divisions, agencies, offices, commissions, officers, employees, and agents for recovery of damages to the extent these damages are covered by the insurance policies the Contractor is required to maintain pursuant to this contract, unless such damages are the result of the negligence or omission of the State of Michigan.

The insurance shall be written for not less than any minimum coverage herein specified or required by law, whichever is greater.

BEFORE THE CONTRACT IS SIGNED BY BOTH PARTIES OR BEFORE THE PURCHASE ORDER IS ISSUED BY THE STATE, THE CONTRACTOR MUST FURNISH TO THE DNR, FS, CERTIFICATE(S) OF INSURANCE VERIFYING INSURANCE COVERAGE. THE CERTIFICATE MUST BE ON THE STANDARD "ACCORD" FORM. THE CONTRACT OR PURCHASE ORDER NUMBER MUST BE SHOWN ON THE CERTIFICATE OF INSURANCE TO ASSURE CORRECT FILING. All such Certificate(s) shall contain a provision indicating that coverage afforded under the policies WILL NOT BE CANCELLED OR MATERIALLY CHANGED without prior written notice having been given to the DNR, FS. Such NOTICE must include the CONTRACT NUMBER affected.

The Contractor is required to provide the type and amount of insurance checked () below:

- 1. Commercial General Liability with the following minimum coverage:
\$2,000,000 General Aggregate Limit other than Products/Completed Operations
\$2,000,000 Products/Completed Operations Aggregate Limit
\$1,000,000 Personal & Advertising Injury Limit
\$1,000,000 Each Occurrence Limit
\$500,000 Fire Damage Limit (any one fire)
- 2. If a motor vehicle is used to provide services or products under this Contract, the Contractor must have vehicle liability insurance for bodily injury and property damage as required by law.
- 3. Worker's disability compensation, disability benefit or other similar employee benefit act with minimum statutory limits. NOTE: (1) If coverage is provided by a State fund or if Contractor has qualified as a self-insurer, separate certification must be furnished that coverage is in the state fund or that Contractor has approval to be a self-insurer; (2) Any citing of a policy of insurance must include a listing of the States where that policy's coverage is applicable; and (3) Any policy of insurance must contain a provision or endorsement providing that the insurers' rights of subrogation are waived. This provision shall not be applicable where prohibited or limited by the laws of the jurisdiction in which the work is to be performed.

- ☑ 4. Employers liability insurance with the following minimum limits:
 - \$100,000 each accident
 - \$100,000 each employee by disease
 - \$500,000 aggregate disease

I-W NOTICE AND RIGHT TO CURE

In the event of a curable breach by the Contractor, the State shall provide the Contractor written notice of the breach and a time period to cure said breach described in the notice. This section requiring notice and an opportunity to cure shall not be applicable in the event of successive or repeated breaches of the same nature or if the State determines in its sole discretion that the breach poses a serious and imminent threat to the health or safety of any person or the imminent loss, damage or destruction of any real or tangible personal property.

I-X CANCELLATION

The State may cancel this contract without further liability or penalty to the State, its departments, divisions, agencies, offices, commissions, officers, agents, and employees for any of the following reasons:

1. **Material Breach by the Contractor.** In the event that the Contractor breaches any of its material duties or obligations under this contract, which are either not capable of or subject to being cured, or are not cured within the time period specified in the written notice of breach provided by the State, or pose a serious and imminent threat to the health and safety of any person, or the imminent loss, damage or destruction of any real or tangible personal property, the State may, having provided written notice of cancellation to the Contractor, cancel this contract in whole or in part, for cause, as of the date specified in the notice of cancellation.

In the event the State chooses to partially cancel this contract for cause charges payable under this contract will be equitably adjusted to reflect those services that are cancelled. In the event this contract is cancelled for cause pursuant to this section, and it is therefore determined, for any reason, that the Contractor was not in breach of contract pursuant to the provisions of this section, that cancellation for cause shall be deemed to have been a cancellation for convenience, effective as of the same date, and the rights and obligations of the parties shall be limited to that otherwise provided in this contract for a cancellation for convenience.

2. **Cancellation for Convenience by the State.** The State may cancel this contract for its convenience, in whole or part, if the State determines that such a cancellation is in the State's best interest. Reasons for such cancellation shall be left to the sole discretion of the State and may include, but not necessarily be limited to (a) the State no longer needs the services or products specified in this contract, (b) relocation of office, program changes, changes in laws, rules, or regulations make performance of the services under this contract no longer practical or feasible, and (c) unacceptable prices for additional services requested by the State. The State may cancel this contract for its convenience, in whole or in part, by giving the Contractor written notice 30 days prior to the date of cancellation. If the State chooses to cancel this contract in part, the charges payable under this contract shall be equitably adjusted to reflect those services that are cancelled.
3. **Non-Appropriation.** The State may cancel this contract in the event that funds to enable the State to effect continued payment under this contract are not appropriated or otherwise made available. The Contractor acknowledges that, if this contract extends for several fiscal years, continuation of this contract is subject to annual appropriation or availability of funds for this contract. If funds are not appropriated or otherwise made available, the State shall have the right to cancel this contract at the end of the last period

for which funds have been appropriated or otherwise made available by giving written notice of cancellation to the Contractor. The State shall give the Contractor written notice of such non-appropriation or unavailability within 30 days after it receives notice of such non-appropriation or unavailability.

4. **Criminal Conviction.** In the event the Contractor, an officer of the Contractor, or an owner of a 25% or greater share of the Contractor, is convicted of a criminal offense incident to the application for or performance of a State, public or private contract or subcontract; or convicted of a criminal offense including but not limited to any of the following: embezzlement, theft, forgery, bribery, falsification or destruction of records, receiving stolen property, attempting to influence a public employee to breach the ethical conduct standards for State of Michigan employees; convicted under State or federal antitrust statutes; or convicted of any other criminal offense which in the sole discretion of the State, reflects upon the contractor's business integrity, the State may cancel this contract.
5. **Approvals Rescinded.** In the event any final administrative or judicial decision or adjudication disapproves a previously approved request for purchase of personal services pursuant to Article 11, Section 5 of the Michigan Constitution of 1963, and Chapter 7 of the Civil Service Rules, the State may cancel this contract. Notwithstanding any other provision of this contract to the contrary, the State Personnel Director is authorized to disapprove contractual disbursements for personal services if the Director determines that disbursements under this contract violate Article 11, Section 5 of the Michigan Constitution or violate applicable Civil Service rules or regulations. Cancellation may be in whole or in part and may be immediate as of the date of the written notice to the Contractor or may be effective as of the date stated in such written notice.

I-Y ASSIGNMENT

The Contractor shall not have the right to assign this contract or to assign or delegate any of its duties or obligations under this contract to any other party (whether by operation of law or otherwise), without the prior written consent of the State. Any purported assignment in violation of this section shall be null and void. Further, the Contractor may not assign the right to receive money due under this contract without the prior written consent of DNR Financial Services.

I-Z DELEGATION

The Contractor shall not delegate any duties or obligations under this contract to a subcontractor other than a subcontractor named in the bid unless DNR Financial Services has given written consent to the delegation.

I-AA NON-DISCRIMINATION CLAUSE

In the performance of any contract or purchase order resulting herefrom, the Contractor agrees not to discriminate against any employee or applicant for employment, with respect to their hire, tenure, terms, conditions or privileges of employment, or any matter directly or indirectly related to employment, because of race, color, religion, national origin, ancestry, age, sex, height, weight, marital status, physical or mental disability unrelated to the individual's ability to perform the duties of the particular job or position. The Contractor further agrees that every subcontract entered into for the performance of any contract or purchase order resulting herefrom will contain a provision requiring non-discrimination in employment, as herein specified, binding upon each subcontractor. This covenant is required pursuant to the Elliot Larsen Civil Rights Act, 1976 Public Act 453, as amended, MCL 37.2101, et seq, and the Persons with Disabilities Civil Rights Act, 1976 Public Act 220, as amended, MCL 37.1101, et seq, and any breach thereof may be regarded as a material breach of the contract or purchase order.

I-BB UNFAIR LABOR PRACTICES

Pursuant to 1980 Public Act 278, as amended, MCL 423.231, et seq, the State shall not award a contract or subcontract to an employer whose name appears in the current register of employers failing to correct an unfair labor practice compiled pursuant to Section 2 of the Act. This information is compiled by the United States National Labor Relations Board.

A Contractor of the State, in relation to the contract, shall not enter into a contract with a subcontractor, manufacturer, or supplier whose name appears in this register. Pursuant to Section 4 of 1980 Public Act 278, MCL 423.324, the State may void any contract if, subsequent to award of the contract, the name of the Contractor as an employer, or the name of the subcontractor, manufacturer or supplier of the Contractor appears in the register.

I-CC SURVIVOR

Any provisions of this contract that impose continuing obligations on the parties shall survive the expiration or cancellation of this contract for any reason.

I-DD PERFORMANCE REVIEWS

DNR may review with the contractor their performance under the contract. Performance reviews shall be conducted quarterly, semi-annually or annually depending on contractor's past performance with the State. Performance reviews shall include, but are not limited to, quality of service being delivered and provided, timeliness, percentage of completion, accuracy of billings, customer service, completion, and submission of required paperwork, and other requirements of the contract.

Upon a finding of poor performance, which has been documented by DNR Financial Services, the Contractor shall be given an opportunity to respond and take corrective action. If corrective action is not taken in a reasonable amount of time as determined by DNR Financial Services, the contract may be canceled for default.

I-EE ELECTRONIC PAYMENT AVAILABILITY

Electronic transfer of funds is available to State contractors. Contractor is required to register with the State electronically at <http://www.cpexpress.state.mi.us>. Public Act 533 of 2004 requires all payments made by the State of Michigan be transitioned to Electronic Funds Transfers (EFT).

I-FF RENEWALS

This contract may be renewed by a written and mutually executed agreement of the parties, in accordance with Section I-I above, not less than 30 days before its expiration. The contract may be renewed for up to one (1) one (1) year period.

I-GG COMPLIANCE WITH LAWS

The Contractor represents to the best of its knowledge and belief that, in performing the services called for by this Contract, it will not violate any applicable law, rule, or regulation, or any intellectual rights of any third party; including but not limited to, any United States patent, trademark, copyright, or trade secret.

I-HH Legal Effect

Contractor must show acceptance of the Contract by signing the Contract and returning it to the Contract Administrator. The Contractor must not proceed with the performance of the work to be done under the Contract, including the purchase of necessary materials, until both parties have signed the Contract to show acceptance of its terms, and the Contractor receives a Contract release/purchase order that authorizes and defines specific performance requirements.

ATTACHMENT A – STATEMENT OF WORK
FY 2014-2018

TITLE: Local-scale assessment and monitoring of deer populations following a major mortality event

NEED: Monitoring efforts to support decision making for deer management typically occur at county or regional scales. Numerous factors that influence deer management (e.g., hunting access or intensity, land use and cover, predation rates) vary at a much finer scale, but uniformly monitoring such conditions and associated population responses is not generally feasible or necessary. However, events that significantly impact populations or generate substantial public concern periodically create a need to assess deer abundance or population dynamics at a finer scale. This scale mismatch may disrupt an agency's ability to effectively manage social and ecological process and require organizations to evaluate new monitoring frameworks (Cumming et al. 2006). In particular, the Michigan Surveillance and Response Plan for Chronic Wasting Disease (CWD) requires localized deer abundance estimates to be generated following any documented outbreak of CWD. Furthermore, an increased frequency of outbreaks of Epizootic Hemorrhagic Disease (EHD) in Michigan is attracting substantial concern among deer hunters and other wildlife enthusiasts in affected areas. A particularly significant EHD outbreak in 2012 created considerable public alarm but may provide a unique and timely opportunity to assess new monitoring frameworks capable of addressing this management dilemma.

EHD is an acute, infectious, viral disease that is often fatal in Michigan. It was first identified as a viral disease in 1955 following investigations into the death of several hundred white-tailed deer in both New Jersey and Michigan (Shope et al. 1960). Since the initial 1955 outbreak, additional die-offs in Michigan attributed to EHD occurred in 1974, 2006, 2008, 2009, 2010, 2011, 2012, and 2013. Most die-offs occurred in isolated areas and resulted in estimates of no more than a few thousand deer dying. However, in 2012 EHD was confirmed in 30 counties and mortalities were reported in 21 other counties where confirmatory laboratory testing of samples was not able to be conducted. In total, EHD was the suspected cause of death in nearly 15,000 reported deer mortalities. To date, these outbreaks do not appear to have had an effect on regional populations. Because of its high mortality rate in Michigan, however, EHD outbreaks are likely producing highly contrasting localized deer abundance. Hunters and other wildlife enthusiasts in affected areas may observe reduced densities of deer for years to come, and these occurrences may influence stakeholder satisfaction. With the greater frequency of EHD outbreaks, such stakeholder experiences are becoming increasingly common.

OBJECTIVES:

1. Estimate current local abundance of white-tailed deer in proximity to areas of a major mortality event (EHD outbreak).
2. Estimate the time required for local deer populations to recover from a major mortality event.
3. Identify a similar area not recently affected by a recent mortality event to replicate monitoring efforts at a similar scale where deer abundance is expected to be representative of regional pre-outbreak conditions.
4. Evaluate the feasibility of using trained volunteers from the local community into a 5-year deer-abundance monitoring plan.

5. Provide recommendations to aid future local population assessment methods, management decisions, and broader public communications regarding the local-scale response of deer populations to die-off events.

BENEFITS: The escalating spread of diseases that affect deer and other wildlife is an increasingly common focus of wildlife management efforts. The recent EHD die-offs of 2012 provide a unique and timely opportunity to quantify impacted deer population dynamics over time, engage local stakeholders, and inform management decisions or efforts to communicate about localized deer dynamics. Such efforts may improve understanding of how deer populations may be expected to recover following EHD mortality events of increased frequency, aid in meeting CWD response commitments, and improve the overall ability for the Michigan Department of Natural Resources to communicate with the public about localized dynamics that significantly affect their interactions with wildlife but occur at a scale not previously addressed.

Wildlife agencies in Michigan and elsewhere currently lack the data to project future disease dynamics or rate of recovery following mortality events. The proposed research seeks to improve current understanding of the impacts severe mortality events are likely to have on deer population recovery at a scale relevant to its localized effects. These findings may also provide benefits for informing future expectations of landowners and hunters within localized disease outbreak areas or improving stakeholder confidence in management decisions.

APPROACH:

We will use distance sampling to estimate abundance of white-tailed deer in each of several study zones delineated based on distances progressively further from the Maple River (2012 outbreak area). Distance sampling has been successfully used to evaluate white-tailed deer abundance in similar landscapes (LaRue et al. 2007) and has effectively documented changes in abundance over time for other deer species (Focardi et al. 2005). We will conduct road-based distance sampling surveys in each study zone (supplemented with on-foot observations if necessary), using deer-encounter rate to determine the appropriate length of each sampling transect. Transect routes (road segments) will be selected based on distance from the Maple River and representation of varying forest and agriculture land cover types. MSU conducted 12-15 surveys within each study zone during the summer of 2013 with an alternate funding source by using consistent observers under suitable conditions (e.g., avoiding precipitation and high winds). Observers will record the distance and angle of each detected deer from the vehicle, the number and activity of observed deer, as well as the occupied land cover type. We will use program DISTANCE 6.0, which evaluates detection probability as a function of detection distance and other covariates, to estimate deer abundance in each study zone (Thomas et al. 2010). Observers will include staff of the Department of Fisheries and Wildlife at Michigan State University, Michigan Department of Natural Resources employees, and volunteers associated with the Maple River area deer cooperatives. Refinements to study design and all analyses will be under the guidance of staff of the Department of Fisheries and Wildlife at Michigan State University, who will also provide training sessions to familiarize volunteers with proper use of measurement devices, observational techniques, and behavioral identification.

Monitoring at the outbreak site will continue under this contract annually for 4 years (through spring of 2018). A non-EHD outbreak site will be identified for full replication of observations and analyses starting in the spring of 2014 and continuing through the spring of 2018. Initial training of volunteers will be conducted by faculty in the Department of Fisheries and Wildlife at Michigan State University in collaboration with biologists of the Michigan Department of Natural Resources. Analyses of data collected during the first year will be conducted by faculty at Michigan State University. A graduate assistantship through the Department of Fisheries and Wildlife at Michigan State University will be used to coordinate volunteers, refine study design, manage data collection, and complete analyses.

Close collaboration with Michigan Department of Natural Resources staff will ensure study methods and final results will be appropriately structured to aid future management decisions and broader public communications regarding the impacts of EHD on deer populations in Michigan and other locations experiencing similar outbreaks.

STAFFING:

David Williams, Ph.D., Assistant Professor-Fixed Term, MSU Department of Fisheries and Wildlife, Quantitative Wildlife Laboratory: quantitative analysis of landscape-level ecological process, animal movement analyses, deer movement simulations/modeling, disease risk modeling, population modeling.

William Porter, Ph.D., Professor, Boone and Crockett Chair of Wildlife Conservation, MSU Department of Fisheries and Wildlife, leads the Quantitative Wildlife Laboratory: a group of graduate students and postdoctoral researchers dedicated to bringing cutting-edge analytical tools to understanding wildlife ecology and informing decisions about wildlife management.

Amy Dechen Quinn, Ph.D., Adjunct Asst. Professor-Fixed Term, MSU Department of Fisheries and Wildlife, Quantitative Wildlife Laboratory; now Assistant Professor of Wildlife Management at State University of New York - Cobleskill: deer behavior, spatial landscape ecology of deer, disease risk modeling, distance sampling.

Sonja Christensen, Ph.D. student, Quantitative Wildlife Laboratory: former Massachusetts deer and moose project leader, ungulate management, deer ecology and habitat use, public outreach.

Brent Rudolph, Ph.D., Wildlife Research Specialist, MDNR: extensive knowledge of deer ecology and management specific to Michigan. Familiarity with both the physical landscape and stakeholder groups in the vicinity of the EHD outbreak site and other locations likely to serve as additional study area unaffected by EHD. Assisted in previous public communication efforts regarding EHD and coordinated other efforts to enlist stakeholder assistance in monitoring and research efforts.

RESOURCES:

Quantitative Wildlife Laboratory at Michigan State University

COORDINATION AND INTEGRATION:

Drs. David Williams, William Porter, and Amy Dechen Quinn (MSU) will have primary responsibility to ensure quality of analyses and project deliverables, with Sonja Christensen supervising data collection and generating analyses and reports for their review. Dr. Brent Rudolph will coordinate involvement by MDNR staff and assist with identifying a second study area apparently unaffected by recent EHD outbreaks and having similar characteristics to the outbreak site.

DELIVERABLES AND INFORMATION TRANSFER:

1. Annual estimates of deer abundance and assessment trends in local deer abundance for each study site.
2. Assessment of the feasibility of using trained volunteers from the local community to assist with monitoring deer abundance plan.
3. Detailed written methodology for establishing survey transects, working with volunteers to collect data, and conducting analyses to derive local abundance estimates.
4. Executive summary of project results. The executive summary will provide MDNR personnel with a review of the project, referenced to theses, publications, and reports.
5. As requested by MDNR, presentations of project results to MDNR personnel, project cooperators, and stakeholder groups.

6. Present results to stakeholder groups and the Natural Resources Commission (NRC)

Annual Progress Report	September 30, 2014
Annual Progress Report	September 30, 2015
Annual Progress Report	September 30, 2016
Annual Progress Report	September 30, 2017
Final Report and Executive Summary	September 30, 2018

LOCATION:

Southern Michigan: North Plains Township (Ionia County), Lyons Township (Ionia County), Lebanon Township (Clinton County), and area to be determined. Analyses will take place at the Quantitative Wildlife Laboratory at Michigan State University.

SCHEDULE:

- Job 1: Develop training and data collection protocols for distance sampling efforts using volunteers.
- Job 2: Work with MDNR staff to identify a second study area.
- Job 3: Collect distance sampling data with cooperation from public volunteers, MSU researchers, and MDNR employees.
- Job 4: Analyze distance sampling data and produce local estimates of white-tailed deer abundance.
- Job 5: Evaluate temporal trends in local deer abundance for each study site.
- Job 6: Final report to MDNR, communicate results and approach to MDNR staff and volunteer organizations

Fiscal Year	Planned Work	Cost
2014	Jobs 1 - 4	\$56,338
2015	Jobs 3 - 4	\$57,490
2016	Jobs 3 - 4	\$59,859
2017	Jobs 3 - 5	\$62,302
2018	Jobs 4 - 6	\$13,928

BUDGET:

Cost Categories	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	Totals
Salary and Benefits	51,938	53,740	55,609	57,552	12,928	231,767
Travel	2,250	2,250	2,750	2,750	1,000	11,000
Supplies	2,150	1,500	1,500	2,000	0	7,150
Equipment	0	0	0	0	0	0
Indirect Costs	30,141	30,757	32,025	33,332	7,451	133,704
Total Project Costs	86,479	88,247	91,884	95,634	21,379	383,621
Matching Funds	(30,141)	(30,757)	(32,025)	(33,332)	(7,451)	(133,704)
Total Request	56,338	57,990	59,859	62,302	13,928	249,917

LITERATURE CITED:

- Cumming, GS, DHM Cumming, and CL Redman. 2006. Scale mismatches in social-ecological systems: causes, consequences, and solutions. *Ecology and Society* 11(1): 14.
- Focardi, S, P Montanaro, R Isotti, F Ronchi, M Scacco, and R Calmanti. 2005. Distance sampling effectively monitored a declining population of Italian roe deer *Capreolus capreolus italicus*. *ORYX-LONDON*- 39(4): 421.
- LaRue, MA, CK Nielsen, and MD Grund. 2007. Using distance sampling to estimate densities of white-tailed deer in south-central Minnesota. *Prairie Naturalist*, 39, 57-68.
- Michigan Surveillance and Response Plan for Chronic Wasting Disease of Free-Ranging and Privately-Owned/Captive Cervids. 2002. Wildlife Division, Michigan Department of Natural Resources and Animal Industry Division, Michigan Department of Agriculture. 1-19.
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- Thomas, L, ST Buckland, EA Rexstad, JL Laake, S Strindberg, SL Hedley, JRB Bishop, TA Marques, and KP Burnham. 2010. Distance software: design and analysis of distance sampling surveys for estimating population size. *Journal of Applied Ecology* 47(1): 5-14.