Form No. DTMB-3521 (Rev. 10/2015)
AUTHORITY: Act 431 of 1984
COMPLETION: Required
PENALTY: Contract change will not be executed unless form is filed

STATE OF MICHIGAN

DEPARTMENT OF NATURAL RESOURCES

PROCUREMENT

525 W. ALLEGAN STREET
LANSING, MI 48933

CHANGE NOTICE NO. **01**
to
CONTRACT NO. **751B4300037**
between
THE STATE OF MICHIGAN
and

NAME & ADDRESS OF CONTRACTOR	PRIMARY CONTACT	EMAIL
Michigan Technological University	Kim Codere	kmcodere@mtu.edu
Sponsored Programs Office, 3rd Floor Lakeshore Center, 1400 Townsend Drive	PHONE	CONTRACTOR'S TAX ID NO. (LAST FOUR DIGITS ONLY)
Houghton, MI 49931-1295	906-487-2226	5955/001

STATE CONTACTS	AGENCY	NAME	PHONE	EMAIL
PROGRAM MANAGER	Wildlife	Stephen Beyer	517-241-0533	Beyers1@michigan.gov
CONTRACT ADMINISTRATOR	DNR Procurement Services	Lisa VanOstran	517-284-5975	vanostranl@michigan.gov

CONTRACT SUMMARY			
DESCRIPTION: Analytical support refining wolf survival estimates in the Upper Peninsula and addressing Action Items in Michigan's Wolf Management Plan.			
INITIAL EFFECTIVE DATE	INITIAL EXPIRATION DATE	INITIAL AVAILABLE OPTIONS	EXPIRATION DATE BEFORE CHANGE(S) NOTED BELOW
06/01/2014	09/30/2016	1 – 1 year option	09/30/2016
PAYMENT TERMS		DELIVERY TIMEFRAME	
Net 45 days		N/A	
ALTERNATE PAYMENT OPTIONS			EXTENDED PURCHASING
☐ P-card ☐ Direct Voucher (DV) ☐ Other			☐ Yes ☒ No
MINIMUM DELIVERY REQUIREMENTS			

DESCRIPTION OF CHANGE NOTICE				
EXERCISE OPTION?	LENGTH OF OPTION	EXERCISE EXTENSION?	LENGTH OF EXTENSION	REVISED EXP. DATE
☒	1 year	☐		09/30/2017
CURRENT VALUE		VALUE OF CHANGE NOTICE	ESTIMATED AGGREGATE CONTRACT VALUE	
$135,333.00		$0.00	$135,333.00	
DESCRIPTION: Exercise option year and extend contract to 9/30/2017.				

FOR THE CONTRACTOR:

Michigan Technological University

Company Name

Kim Codere

Authorized Agent Signature

Kim Codere, Manager, Grants & Contracts

Authorized Agent (Print or Type)

8/11/16

Date

FOR THE STATE:

Laura L. Hyorkes

Signature

Laura Gyorkes - procurement mgr.

Name & Title

Dept. of Natural Resources

Agency

8/12/16

Date

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. 751B4300037
Between
STATE OF MICHIGAN
and
Required by authority of 1984 PA 431, as amended.

Name and Address of Contractor	**Primary Contact**	
Michigan Technology University **Sponsored Programs Office** **3rd Floor Lakeshore Center** **1400 Townsend Drive** **Houghton, MI 49931-1295**	**Email** **kmcodere@mtu-edu**	
	Telephone **(906) 487-2226**	**Contractor #, Mail Code** *******5955/001**

State Contact	Division	Name	Telephone	Email
Project Administrator	Wildlife	Stephen Beyer	(517)241-0533	Beyers1@michigan.gov
Buyer	Finance and Operations	Jana Harding-Bishop	(517)284-5938	HardingJ3@michigan.gov

Contract Summary			
Description (Provide a basic but comprehensive description of services) Analytical support refining wolf survival estimates in the Upper Peninsula and addressing Action Items in Michigan's Wolf Management Plan.			
Initial Term 2 years – 4 months	Effective Date June 1, 2014	Initial Expiration Date September 30, 2016	Available Options 1 – 1 year option
Payment Terms Net 45	F.O.B. N/A	Shipped N/A	Shipped From N/A
Minimum Delivery Requirements N/A		Alternate Payment Options ☐ P-Card ☐ Direct Voucher (DV)	Available to MiDeal Participants ☐ Yes ☒ No
ESTIMATED CONTRACT VALUE AT TIME OF EXECUTION: $135,333.00			

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

CONTRACT NO. 751B4300037

Between

STATE OF MICHIGAN

and

Required by authority of 1984 PA 431, as amended.

Name and Address of Contractor	Primary Contact	
Michigan Technology University Sponsored Programs Office 3rd Floor Lakeshore Center 1400 Townsend Drive Houghton, MI 49931-1295	Kim Codere	
	Email kmcodere@mtu-edu	
	Telephone (906) 487-2226	Contractor #, Mail Code *****5955/001

State Contact	Division	Name	Telephone	Email
Project Administrator	Wildlife	Stephen Beyer	(517)241-0533	Beyers1@michigan.gov
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Payment Terms Net 45	F.O.B. N/A	Shipped N/A	Shipped From N/A
Minimum Delivery Requirements N/A		Alternate Payment Options ☐ P-Card ☐ Direct Voucher (DV)	Available to MiDeal Participants ☐ Yes ☒ No
ESTIMATED CONTRACT VALUE AT TIME OF EXECUTION: $135,333.00			

THIS IS NOT AN ORDER: This Contract Agreement is awarded based on Wildlife Divisions Call for Projects Request for Proposal with a due date of April 1, 1013. 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 Technological University
Firm Name

On-file in DNR Procurement
Authorized Agent Signature

Kim Codere, Manager, Grants & Contracts
Authorized Agent (Print or Type)

6/23/14
Date

FOR THE STATE:

On-file in DNR Procurement
Signature

Joe Frick, Assistant Chief
Name/Title

DNR Finance and Operations/Procurement
Division/Section

6/24/14
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: **Survival, mortality, and dispersal of wolves in Michigan** in collaboration with Wildlife Division the Michigan Department of Natural Resources (DNR). Project completion date is September 30, 2016.

I-B ISSUING OFFICE/CONTRACT ADMINISTRATOR

This contract is issued by the State of Michigan, Department of Natural Resources, Finance and Operations Division (FOD) for Wildlife Division (WLD).

FOD 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, FOD
3rd Floor, Constitution Hall
P.O. Box 30028
Lansing, MI 48909
(517) 284-5938
Email: HardingJ3@michigan.gov

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.

DNR Project Administrator:

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

DNR Project Manager:

Dr. Dean Beyer
Department of Natural Resources
Wildlife Division
1990 US 41 South
Marquette, MI 49855
Telephone: (906) 227-1627
Fax: (906) 227-1621
Email: beyerd@michigan.gov

The MTU Principal Investigator (MTU-PI) for this project is listed below. This person is responsible for the administration and research of the project. The MTU-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 MTU - Sponsored Programs Office.

Dr. Joseph Bump
School of Forest Resources and Environmental Science
Michigan Technological University
Noblet Buildling 172.
Houghton, MI 49931
Telephone: (906) 487-1093
Email: jkbump@mtu.edu

I-D PROGRAM OF WORK

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

I-E DELIVERABLES

The MTU 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. All compiled files of raw data and databases created from these data.
2. Estimates of wolf survival, and cause-specific mortality and dispersal rates in Michigan's Upper Peninsula.
3. Results of survival and Anderson-Gill (AG) hazard models, and a detailed written methodology for these models.
4. Final report and executive summary of project results. The executive summary will provide MDNR personnel with a review of the project, referenced to theses, publications, and reports and provide management recommendations.
5. As requested by MDNR, Microsoft power-point presentations of project results to MDNR personnel, project cooperators, and stakeholder groups.
6. As requested by MDNR, present results to Stakeholder Groups and the Natural Resources Commission (NRC)

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

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.

For fiscal year 2104, the Contractor may bill 50% of contract costs on June 30th and the remaining 50% on September 30th.

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 l976, 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

Any samples provided by the DNR for use under this contract will remain the sole property of the DNR and must be returned upon the request of the DNR Project Manager

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 2014-2016

TITLE: Survival, mortality, and dispersal of wolves in Michigan

NEEDS: On January 27, 2012, the U.S. Fish and Wildlife Service (USFWS) removed gray wolves (*Canis lupus*) in the Great Lakes region from the federal list of threatened and endangered species, transferring management authority to the States. Regional wolf populations exceed recovery criteria and there is stakeholder interest in managing wolf abundance to reduce wolf-human conflicts and/or allowing a harvest to manage conflicts or provide recreational opportunities. However, proposals for a public wolf harvest in Michigan are controversial. Because the USFWS removed wolves from the list of federally endangered species only a short time ago, some stakeholders are concerned that any harvest of wolves might cause populations to decline, resulting in reinstatement of federal protection wolves. Decision-makers will request predictions on the effect of various harvest scenarios on Michigan's wolf population. Biologists can use a population modeling approach to develop these predictions. However, population modeling requires inputs of wolf population vital rates. Important inputs needed include estimates of survival rate, mortality factors, and dispersal dynamics. Biologists commonly estimate these rates and factors by monitoring the fates of radio-collared individuals. In Michigan, over 350 wolves were radio-collared and monitored from 1992-2010. These data are more than adequate for developing estimates of survival rate, determining mortality factors, and estimating dispersal. Although preliminary analyses of these data are available, the management need warrants analyses that are more detailed. In addition, biologists need to understand causes of mortality and dispersal dynamics in order to consider their relative effects and determine which factors management might be able to manipulate to cause desired changes in wolf populations.

Survival & Mortality

Survival rates for wolves have historically been lowest where human influence is high. Annual estimates have ranged from 0.55-0.85 for wolves >1 year old in generally unexploited populations (Fuller et al. 2003, Adams et al. 2008, Benhamou and Cornelis 2010). However, studies have shown lower (0.34-0.54) survival estimates for wolves subject to significant annual take (Person and Russell 2008). Hence, reliable survival estimates prior to an annual harvest are essential to the establishment of a baseline rate. While human-caused mortality has been shown to influence adult survival and hence population growth (Person and Russell 2008, Creel and Rotella 2010, Gude et al. 2012), wolves apparently can sustain some rate of human take (e.g., <30 % human-caused mortality does not appear to influence growth rates; Fuller et al. 2003, Adams et al. 2008, Smith et al. 2010, Gude et al. 2012). Nonetheless, adult survival is a key vital rate in population growth estimates and it should be monitored closely (Smith et al. 2010). We anticipate cause-specific mortality effects on survival such as proximity to humans (or road density, as a proxy for conflict), method of capture, and vaccination status of the sampled population. Reliable survival models with valid covariates can provide valuable information to state agencies, especially models constructed in the absence of recreational harvest. Valid estimates of vital rates are important to the understanding of population trends, particularly in a region where state management agencies are implementing wolf harvests and source-sink population dynamics can occur among states.

Dispersal

Dispersal is an important mechanism for wolves. Wolves disperse in order to find new mates, establish new populations, and expand their range, among other factors (Fuller et al. 2003). Dispersal rates often depend on a number of factors such as prey availability and breeding pack survival. In the Great Lakes region, age was an important determinant of dispersal and dispersal rates for yearlings have ranged from 38-78% (Treves et al. 2009). Due to habitat fragmentation, human tolerance, and the absence of pack benefits, dispersers may be more vulnerable to natural and human-caused factors that increase the chances of mortality and human-wolf conflict (Fuller et al. 2003). Understanding dispersal processes within a wolf population is key to providing management recommendations, particularly because these processes can be

dependent on many other factors such as pack productivity, habitat fragmentation, prey abundance, and surrounding populations (Fuller et al. 2003, Treves et al. 2009). Dispersal may also influence an individual's probability of survival (Boyd and Pletscher 1999, Blanco and Cortes 2007, Smith et al. 2010). From a management perspective, it is important to consider the potential drivers of individual dispersal from a pack, and the likely consequences individual survivorship. For example, a unique situation currently exists in the western Great Lakes where, during the wolf hunt season, a dispersing individual might become more or less vulnerable to being killed depending on whether it was moving into or out of a state that permits wolf hunting (i.e. Michigan vs. Minnesota or Wisconsin). Given the circumstances, these effects can influence local or regional populations positively or negatively. Consequently, an understanding of the nature and magnitude of dispersal effects is an important piece of information for wolf population management.

OBJECTIVES:

Our goal is to provide managers with data necessary to more effectively manage the wolf population in the UP. To do this we will take advantage of extensive long-term wolf data sets collected by MDNR to estimate wolf survival and dispersal rates. Specifically, we will:

Objective 1. *Estimate annual survival rates for Michigan's collared wolves and identify factors that influence wolf survival.*

Objective 2. *Comparatively examine survival and cause-specific mortality rates for dispersing wolves.*

To address wolf management needs and meet these goals, we will use fifteen years of radio telemetry data gathered by Michigan Department of Natural Resources. These data will allow us to investigate wolf survival and mortality rates over time, and consequences and patterns of dispersal.

The first objective involves:

- Estimating monthly and annual survival rates of radio-collared wolves over fifteen years of monitoring; testing for seasonal and long term effects.
- Relating survival rates to trapping methods and vaccination status.
- Spatially quantifying individual and pack home ranges and relate survival rates to road densities and other landscape attributes within home ranges.

The second objective involves:

- Identifying collared wolves that dispersed from their packs; testing for effects associated with season, age, and sex.
- Testing for differences between survival rates of dispersers versus non-dispersers.
- Investigating causes of mortality for dispersers.

EXPECTED RESULTS AND BENEFITS:

This work will provide important information for the successful management of wolves in Michigan and contribute to understanding regional wolf population dynamics. Proximate and long-term benefits of the project include, but are not limited to, the following components:

- Estimates of vital rates for wolves in Michigan can be compared to other estimates historically, regionally, and across the U.S. These numbers will provide much-needed information on the

successful management of the Michigan population and Great Lakes meta-population. Estimates of survival rates can be used in population dynamics models to help predict changes in wolf numbers corresponding to potential harvest scenarios in Michigan.

- Knowledge of how key underlying factors influence survival can inform Michigan wolf management actions. For example, if incidentally trapped wolves exhibit low survival rates, education and awareness programs can target trappers and help them to address this problem.

- Understanding how survival rates vary across Upper Michigan will allow for the potential identification of high mortality areas. Subsequently, areas where conflicts are most likely to occur can be specifically targeted for mitigation efforts via awareness, education, and non-lethal preventative measures (Gehring et al. 2010, VerCauteren et al. 2012).

- A better understanding of dispersal mechanisms occurring in Michigan's wolf population will allow state agencies such as Michigan and Wisconsin to anticipate immigration and emigration between associated populations and associated, potential conflicts.

- Knowledge of dispersal rates between states may inform the question of additive versus compensatory human-caused mortality in wolf populations, allowing better-informed management. For example, many studies have focused on population growth by tracking growth and mortality rates within a defined population (Fuller et al. 2003). However, it has been difficult to quantify the extent to which immigration from outside populations compensates for higher mortality rates (Blanco and Cortes 2007), which is important for regional management.

This information relates directly to several wolf management goals, strategies, and actions outlined in MDNR's Wolf Management Plan (MDNR 2008):

<u>Goals</u>

5.1 Maintain a viable population.

5.2 Facilitate wolf-related benefits.

5.3 Minimize wolf-related conflicts.

5.4 Conduct science-based and socially acceptable management.

<u>Strategies and Actions</u>

6.2.3 Investigate biological and social factors relevant to wolf management.

Action item 1. Determine wolf population responses to selected management options.

6.2.4 Coordinate with partners to support a wolf research program

Action item 1. Expand and maintain cooperative relationships with agencies, organizations, and institutions interested in investigating biological, ecological, and social questions regarding wolves and their management.

6.6.1 Monitor the health of wolves in Michigan

Action item 3. Conduct necropsies and analyses of dead wolves and biological samples.

6.12.1 Develop and implement a policy regarding public wolf harvest for the purpose of reducing wolf-related conflicts.

Action item 2. Evaluate the potential impacts of licensed hunters and trappers on local levels of wolf-related conflicts and the local and regional wolf population.

6.12.2 Develop and implement a policy regarding public wolf harvest for reasons other than managing wolf-related conflicts.

Action item 1. Evaluate the potential biological effects of a public wolf harvest specifically for recreational or utilitarian purposes.

This information also relates directly to Goal 1, Objective 1.1, and strategy 1.1.6 of MDNR Wildlife Division's strategic plan.

APPROACH:

The overall analytical approach is to use known fate models to track wolf survival rates over time and relate survival and mortality to covariates of interest such as age, sex, vaccinations at capture, capture methods, habitat type occupied, and dispersal patterns.

Survival Models

We will assess survival rates of radio-collared wolves in Michigan using Program MARK (White and Burnham 1999) and the associated Remark (Laake and Rextad 2012). We will compile a database of radio telemetry locations for Michigan wolves based on data gathered by MDNR. We will use this database to recode records of wolf locations into an encounter history data structure that can be utilized by Program MARK (White and Burnham 1999). For each year of monitoring, new individuals that were trapped, collared, and added to the sampled population will be accounted for using a staggered entry data design. We will estimate monthly survival by encounter history analysis and whether or not the individual was located during the given month. Monthly encounters are coded as the following over the study time period: 01 – animal survived; 11 – animal died; 00 – animal not located during time interval.

We will estimate sampled population survival rates using known-fate models in MARK. The Kaplan-Meier (KM) survival function (Kaplan and Meier 1958) will be used to estimate the probability of survival for a cohort from one encounter period to the next. This function is described by the following,

$$\hat{S}_t = \prod_{i=1}^{t} \left(\frac{n_i - d_i}{n_i} \right)$$

where *di* is the number dying over the *i*th interval, and *ni* is the number alive at the start of the sampling interval and whose fate is known at the end of the interval (not censored). We will use the KM estimator to generate monthly and annual survival rates and we will test for differences between seasons, years, and sexes using general linear models.

Using the data from the telemetry records, variables will be included to indicate whether or not a wolf was either a) trapped by a researcher, or b) trapped incidentally by a recreational trapper. Another set of variables will indicate whether a wolf received or did not receive a vaccination at the time of capture (e.g., 1 = vaccinated, 0 = no vaccination). To incorporate dispersal into the model, we will generate movement vectors between locations for each individual using movement models in the Geospatial Modeling Environment (Beyer 2012). We will identify individuals that dispersed from the pack home range (i.e. territory, 95th percent kernel density isopleths) for a prolonged period of time (> 1 encounter period, or 1 month). We will categorize individuals that left and returned as opposed to those that did not return (Smith et al. 2010), and these categories will be used as potential explanatory variables in models.

Following these analyses, we will develop a set of candidate survival models that will include combinations of at least, but not limited to, the following variables: sex; age; researcher-caught/trapper caught;

vaccinated/non-vaccinated; resident/disperser; forest type/habitat occupied. We will run models using the KM estimator for survival in Program MARK. Survival will be related to known indicator variables and we will quantify support for each model using Akaike's Information Criterion (AIC) (Burnham and Anderson 2002) and associated ΔAIC values (difference between model and top-ranked model). We will estimate coefficients using Maximum Likelihood in Program MARK and averaged using Akaike weights and model averaging procedures (Burnham and Anderson 2002).

Mortality and Dispersal

Radio telemetry systems employ a mortality signal when an animal has become inactive for a period of time, allowing investigation of the cause of mortality. In most cases, causes of mortality are known for these individuals. We will query known mortalities from the sampled wolf population and compile a list of causes and counts for each cause, for example: natural causes (or unknown)*;* known disease*;* illegally killed*;* legally killed (removed due to known depredations, threat to pets or livestock)*;* interspecific conflict*;* other accident (e.g., roadkill). These data can be used to inform Anderson-Gill (AG) hazard models which are well-suited for telemetry-based survival analysis and hazard risk modeling (Johnson et al. 2004, Smith et al. 2010). We can then estimate survival and mortality risk with AG models, using a similar model averaging approach as the survival analysis in Program MARK. We will estimate annual and overall rates of dispersal using the covariance structure associated with wolf telemetry locations that occur over space and time (Schneeberger and Jansen 2006). We will investigate differences between dispersers and non-dispersers as well as various effects of dispersal distance, final location, and likelihood of human-caused mortality on survival (described previously).

STAFFING:

Joseph Bump, Ph.D, Assisstant Professor, School Forest Resources & Environmental Science, Michigan Technological University is responsible for project coordination, advising the doctoral student, and co-responsible for data management, statistical analyses, and report and manuscript writing. Dr. Bump is a wildlife ecologist, with a focus on population biology, predator effects on ecosystem processes, stable isotope ecology, human-wildlife conflict, and aquatic-terrestrial links. Dr. Bump has been working for the past three years on wolf-human conflict issue in the upper Great Lakes Region and has an established working relationship with MI DNR, with Dr. Dean Beyer and Brian Roell as collaborators.

Shawn T. O'Neil, Doctoral Student, School Forest Resources & Environmental Science, Michigan Technological University would be co-responsible for data management, statistical analyses, and report and manuscript writing. Mr. O'Neil is a spatial analyst, with expertise in GIS and Remote Sensing; training in: Program MARK at CSU, Fort Collins, CO; GIS, Statistical Methods, Regression Analysis, Spatial Statistics, Research Methods, Time Series Analysis;
proficient using Python and R programming languages, ArcGIS, Microsoft Suite (including Access).

Dean E. Beyer, Jr, Ph.D., Wildlife Research Specialist, MDNR: extensive knowledge of wolf ecology specific to Michigan. Facilitated and participated in collection of all data sets germane to the proposed analyses. Co-responsible for project coordination, statistical analyses, and report and manuscript writing.

RESOURCES:

School of Forest Resources & Environmental Science, Michigan Technological University.

COORDINATION AND INTEGRATION:

Drs. Joseph Bump, MTU, will supervise the Ph.D. student and will have the primary responsibility for coordination and integration of data into databases, model development and analyses throughout the study. Dr. Dean Beyer, MDNR, will consult on database and model development, and dissemination of project results to press, MDNR, and stakeholders.

DELIVERABLES AND INFORMATION TRANSFER:

1. All compiled files of raw data and databases created from these data.
2. Estimates of wolf survival, and cause-specific mortality and dispersal rates in Michigan's Upper Peninsula.
3. Results of survival and Anderson-Gill (AG) hazard models, and a detailed written methodology for these models.
4. Final report and executive summary of project results. The executive summary will provide MDNR personnel with a review of the project, referenced to theses, publications, and reports and provide management recommendations.
5. As requested by MDNR, Microsoft power-point presentations of project results to MDNR personnel, project cooperators, and stakeholder groups.
6. As requested by MDNR, present results to Stakeholder Groups and the Natural Resources Commission (NRC)

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

LOCATION:

Analyses will take place at Michigan Technological University.

SCHEDULE:

Job 1: Work with MDNR to become familiar with existing data sets and identify statistical methods for study. Conduct detailed literature review.

Job 2: Construct encounter history and conduct survival analysis.

Job 3: Conduct mortality and dispersal analysis.

Job 4: Final report to MDNR, communicate results and approach to MDNR staff.

Fiscal Year	Planned Work	Cost
2014	Jobs 1 - 2	$51,220
2015	Jobs 3 - 4	$49,742
2016	Job 4	$34,371

BUDGET:

Cost Categories	FY 2014	FY 2015	FY 2016	Totals
Salary and Benefits	$29,485	$30,534	$15,017	$75,036
Tuition & fees	$16,235	$17,208	$17,354	$50,797
Travel	$1,500	$2,000	$2,000	$5,500
Supplies	$4,000	$0	$0	$4,000
Equipment	$0	$0	$0	$ 0
Indirect costs	$19,242	$17,894	$9,359	$46,495
Total Project Costs	**$70,462**	**$67,636**	**$43,730**	**$181,828**
Matching Funds	($19,242)	($17,894)	($9,359)	($46,495)
Total Request	**$51,220**	**$49,742**	**$34,371**	**$135,333**

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