

**To:** Scott Foss[sfoss@blm.gov]  
**From:** Alexander, Mara  
**Sent:** 2017-03-03T09:19:32-05:00  
**Importance:** Normal  
**Subject:** National Conservation Lands Scientific Studies Support Proposal Review  
**Received:** 2017-03-03T09:21:03-05:00

[12326432 Scientific Studies Support Program Evaluation WO Individual Scoring Worksheet.docx](#)  
[12328912 Scientific Studies Support Program Evaluation WO Individual Scoring Worksheet.docx](#)  
[12327996 Scientific Studies Support Program Evaluation WO Individual Scoring Worksheet.docx](#)  
[12328145 Scientific Studies Support Program Evaluation WO Individual Scoring Worksheet.docx](#)  
[12321940 Scientific Studies Support Program Evaluation WO Individual Scoring Worksheet.docx](#)  
[12328840 Scientific Studies Support Program Evaluation WO Individual Scoring Worksheet.docx](#)  
[12338846 Scientific Studies Support Program Evaluation WO Individual Scoring Worksheet.docx](#)  
[12325125 Scientific Studies Support Program Evaluation WO Individual Scoring Worksheet.docx](#)  
[GRANT12325125- NV University of Nevada, Las Vegas.zip](#)  
[GRANT12328846- NV Desert Research Institute.zip](#)  
[GRANT12321940- UT Natural History Museum, Universtiy of Utah.zip](#)  
[GRANT12328145- UT University of Southern California.zip](#)  
[GRANT12328840- CO Museums of Western Colorado.zip](#)  
[GRANT12327996- CO Colorado Mesa University.zip](#)  
[GRANT12326432 MT University of Washington.zip](#)  
[GRANT12328912- AZ Desert Botanical Garden.zip](#)  
[WO FA Instructions and Example Evaluation Rating Factors.docx](#)  
[NLCS FOA 2017 Amend #1.docx](#)

Hi Scott-

Thank you very much for helping with the review process for the Scientific Studies Support Program! Attached are the complete files for eight proposals, the corresponding evaluation scoring worksheets, instructions and example evaluation rating factors, as well as the original funding opportunity announcement in case you find it helpful in the review process. I inserted the state ranking scores in the scoring sheet you do not need to add anything else to this line. Please don't hesitate to come to me with any questions you may have.

In order to make final decisions and get the funding out to states in time, I would like to have your evaluations (the completed scoring worksheets) back to me by **COB Monday, March 27th**.

Thank you!

Mara

Mara Alexander, Ph.D.  
Science Coordinator  
National Conservation Lands  
Bureau of Land Management  
20 M Street SE Washington, DC 20003  
[malexander@blm.gov](mailto:malexander@blm.gov)  
desk: 202-912-7096  
cell: 202-738-2522

Application for Federal Assistance SF-424		
<div> <div> * 1. Type of Submission:  <input type="checkbox"/> Preapplication  <input checked="" type="checkbox"/> Application  <input type="checkbox"/> Changed/Corrected Application </div> <div> * 2. Type of Application:  <input type="checkbox"/> New  <input checked="" type="checkbox"/> Continuation  <input type="checkbox"/> Revision </div> <div> * If Revision, select appropriate letter(s):  <input type="text"/>  * Other (Specify):  <input type="text"/> </div> </div>		
* 3. Date Received: 02/01/2017		4. Applicant Identifier: <input type="text"/>
5a. Federal Entity Identifier: <input type="text"/>		5b. Federal Award Identifier: L16AC00402
<b>State Use Only:</b>		
6. Date Received by State: <input type="text"/>		7. State Application Identifier: <input type="text"/>
<b>8. APPLICANT INFORMATION:</b>		
* a. Legal Name: University of Washington		
* b. Employer/Taxpayer Identification Number (EIN/TIN): 91 6001537		* c. Organizational DUNS: 6057994690000
<b>d. Address:</b>		
* Street1: 4333 Brooklyn Ave NE Street2: Box 359472 * City: Seattle County/Parish: <input type="text"/> * State: WA: Washington Province: <input type="text"/> * Country: USA: UNITED STATES * Zip / Postal Code: 98195 9472		
<b>e. Organizational Unit:</b>		
Department Name: Office of Sponsored Programs		Division Name: Office of Research
<b>f. Name and contact information of person to be contacted on matters involving this application:</b>		
Prefix: <input type="text"/> * First Name: Carol Middle Name: <input type="text"/> * Last Name: Rhodes Suffix: <input type="text"/> Title: OSP Director Organizational Affiliation: <input type="text"/> * Telephone Number: (206) 543 4043 Fax Number: <input type="text"/> * Email: afe@uw.edu		

<b>Application for Federal Assistance SF-424</b>		
<b>* 9. Type of Applicant 1: Select Applicant Type:</b> <input type="text" value="H: Public/State Controlled Institution of Higher Education"/> <b>Type of Applicant 2: Select Applicant Type:</b> <input type="text"/> <b>Type of Applicant 3: Select Applicant Type:</b> <input type="text"/> <b>* Other (specify):</b> <input type="text"/>		
<b>* 10. Name of Federal Agency:</b> <input type="text" value="Bureau of Land Management"/>		
<b>11. Catalog of Federal Domestic Assistance Number:</b> <input type="text" value="15.231"/> <b>CFDA Title:</b> <input type="text" value="Fish, Wildlife and Plant Conservation Resource Management"/>		
<b>* 12. Funding Opportunity Number:</b> <input type="text" value="L17AS00001"/> <b>* Title:</b> <input type="text" value="BLM FY2017 Bureau wide National Conservation Lands Scientific Studies Support Program"/>		
<b>13. Competition Identification Number:</b> <input type="text"/> <b>Title:</b> <input type="text"/>		
<b>14. Areas Affected by Project (Cities, Counties, States, etc.):</b> <div><input type="text"/><input type="button" value="Add Attachment"/><input type="button" value="Delete Attachment"/><input type="button" value="View Attachment"/></div>		
<b>* 15. Descriptive Title of Applicant's Project:</b> <input type="text" value="BLM FY2017 Bureau wide National Conservation Lands Scientific Studies Support Program Hell Creek Project"/>		
Attach supporting documents as specified in agency instructions. <div><input type="button" value="Add Attachments"/><input type="button" value="Delete Attachments"/><input type="button" value="View Attachments"/></div>		

<b>Application for Federal Assistance SF-424</b>	
<b>16. Congressional Districts Of:</b>	
* a. Applicant: <input type="text" value="WA 007"/>	* b. Program/Project: <input type="text" value="MT 019"/>
Attach an additional list of Program/Project Congressional Districts if needed.	
<input type="text"/>	<input type="button" value="Add Attachment"/> <input type="button" value="Delete Attachment"/> <input type="button" value="View Attachment"/>
<b>17. Proposed Project:</b>	
* a. Start Date: <input type="text" value="04/01/2017"/>	* b. End Date: <input type="text" value="03/31/2022"/>
<b>18. Estimated Funding (\$):</b>	
* a. Federal	<input type="text" value="24,993.64"/>
* b. Applicant	<input type="text" value="0.00"/>
* c. State	<input type="text" value="0.00"/>
* d. Local	<input type="text" value="0.00"/>
* e. Other	<input type="text" value="0.00"/>
* f. Program Income	<input type="text" value="0.00"/>
* g. TOTAL	<input type="text" value="24,993.64"/>
<b>* 19. Is Application Subject to Review By State Under Executive Order 12372 Process?</b>	
<input type="checkbox"/> a. This application was made available to the State under the Executive Order 12372 Process for review on <input type="text"/> .	
<input type="checkbox"/> b. Program is subject to E.O. 12372 but has not been selected by the State for review.	
<input checked="" type="checkbox"/> c. Program is not covered by E.O. 12372.	
<b>* 20. Is the Applicant Delinquent On Any Federal Debt? (If "Yes," provide explanation in attachment.)</b>	
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
If "Yes", provide explanation and attach	
<input type="text"/>	<input type="button" value="Add Attachment"/> <input type="button" value="Delete Attachment"/> <input type="button" value="View Attachment"/>
<b>21. *By signing this application, I certify (1) to the statements contained in the list of certifications** and (2) that the statements herein are true, complete and accurate to the best of my knowledge. I also provide the required assurances** and agree to comply with any resulting terms if I accept an award. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties. (U.S. Code, Title 218, Section 1001)</b>	
<input checked="" type="checkbox"/> ** I AGREE	
** The list of certifications and assurances, or an internet site where you may obtain this list, is contained in the announcement or agency specific instructions.	
<b>Authorized Representative:</b>	
Prefix: <input type="text"/>	* First Name: <input type="text" value="Carol"/>
Middle Name: <input type="text"/>	
* Last Name: <input type="text" value="Rhodes"/>	
Suffix: <input type="text"/>	
* Title: <input type="text" value="OSP Director"/>	
* Telephone Number: <input type="text" value="(206) 543 4043"/>	Fax Number: <input type="text"/>
* Email: <input type="text" value="osp@uw.edu"/>	
* Signature of Authorized Representative: <input type="text" value="Autumn Eck"/>	* Date Signed: <input type="text" value="02/01/2017"/>

DOI-2020-12 01318



**BUDGET**

The MWC will provide matching contributions through the salary of the PI, Field Assistant, and undergraduate interns, volunteer time in excavating, preparing, conserving, and curating fossil specimens, and the supplies and materials needed for fieldwork (inventory and excavation) and preparation.

**PI summer salary** – The Principal Investigator (PI) Gay from MWC will dedicate at least one month during 2017 and two during 2018 of his working time toward achieving the goals outlined herein.

**Field Assistant salary** – The field assistant will spend at least three months directing fieldwork during the summer of 2017 and 2018. This allows completion of the goals set forth in the proposal.

• PI summer salary + 40% fringe benefits	\$7,680
• Field assistant salary + 40% fringe benefits	\$4,608
<b>Total Salaries</b>	<b>\$12,288</b>

• excavation supplies	\$1,500
• mapping supplies	\$500
• camping supplies	\$1,500
• vehicle fuel	\$1,600
• food	\$2,000
• collections cabinets and curation supplies	\$1,600
<b>Total Fieldwork and Supplies Costs</b>	<b>\$8,700</b>

<b>SUBTOTAL</b>	<b>\$23,028</b>
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Total Direct Costs:	<b>\$20,988</b>
Total Indirect Costs (8.8%):	<b>\$ 3,883</b>
Total Costs (this budget):	<b>\$24,871</b>

**Matching Contributions from MWC**

*PI Salary:* The MWC contribution of salary + fringe benefits for 3 months of summer salary of the Principal Investigator is worth \$1,920.

*Field Assistant Salary:* The match of salary + fringe benefits for 3 months of the Field Manager's salary is worth \$3,192.

*Undergraduate Internships:* Two undergraduate interns from regional institutions will spend at least 8 weeks working on the project. These interns will be funded by the MWC, and represent a total of \$5,000 in matching funds (\$2,500/intern).

*Volunteer Time:* MWC and UFOP paleontology volunteers will spend at least 2,000 hours of work time in the field and lab dedicated to the proposed project. Calculated at an hourly rate of \$23.00 including benefits for the private sector, these volunteer hours are worth \$46,000 as matching funds.

*Field Supplies:* The MWC has the majority of the needed major equipment and supplies for conducting successful paleontological inventory and excavation. Equipment already owned by the MWC, including vehicles, would cost at least \$80,000 to purchase.

*Preparation Supplies:* All fossil specimens collected require proper preparation (removal of surrounding rock matrix) and conservation in the lab prior to accession into collections and long-term curation. The MWC has a large and well-equipped, and staffed paleontology preparation lab suitable for this task. Preparation requires specialized equipment and supplies, including picks, brushes, pneumatic tools, glues, stabilizers, etc. These equipment/supplies are worth \$5,900 as matching resources.

**Matching Contributions from other sources**

*Field Assistant Salary:* A grant through Canyonlands Natural History Association has allowed one week of field assistant work in the field and benefits, valued at \$950.

*Field vehicle fuel:* A grant through Canyonlands Natural History Association has already allocated an additional \$150 of fuel expenses.

*Field supplies:* A grant through Canyonlands Natural History Association has already allocated an additional \$1,450 for expendable field supplies including camp food.

Based on our work in association with CNHA we anticipate increased support from them for the 2018 field season to the tune of approximately \$4,900.

## Project Narrative File(s)

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\* Mandatory Project Narrative File Filename: 1235 Gay 2017 BLM NLCS Bears Ears Proposal.docx

Add Mandatory Project Narrative File

Delete Mandatory Project Narrative File

View Mandatory Project Narrative File

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To add more Project Narrative File attachments, please use the attachment buttons below.

Add Optional Project Narrative File

Delete Optional Project Narrative File

View Optional Project Narrative File

## Key Contacts Form

**\* Applicant Organization Name:**

Natural History Museum of Utah, University of Utah

Enter the individual's role on the project (e.g., project manager, fiscal contact).

**\* Contact 1 Project Role:** Principal Investigator

Prefix:

**\* First Name:** RANDALL

Middle Name: B

**\* Last Name:** IRMIS

Suffix:

Title: Curator and Associate Professor

Organizational Affiliation:

Natural History Museum of Utah, University of Utah

**\* Street1:** 301 Wakara Way

Street2:

**\* City:** SALT LAKE CITY

County: SALT LAKE

**\* State:** UT: Utah

Province:

**\* Country:** USA: UNITED STATES**\* Zip / Postal Code:** 84108 1214**\* Telephone Number:** 8015850561

Fax:

**\* Email:** irmis@umnh.utah.edu

## Key Contacts Form

**\* Applicant Organization Name:**

Natural History Museum of Utah, University of Utah

Enter the individual's role on the project (e.g., project manager, fiscal contact).

**\* Contact 2 Project Role:** Financial contact

Prefix:

MR

**\* First Name:** ANTHONY

Middle Name: DAVID

**\* Last Name:** MILLET

Suffix:

Title: Administrative Manager

Organizational Affiliation:

University of Utah

**\* Street1:** 301 WAKARA

Street2:

**\* City:** SALT LAKE CITY

County:

SALT LAKE

**\* State:**

UT: Utah

Province:

**\* Country:**

USA: UNITED STATES

**\* Zip / Postal Code:** 84108 1214**\* Telephone Number:** 801/581 6927

Fax:

**\* Email:** tmillet@umnh.utah.edu

## Budget Narrative File(s)

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\* Mandatory Budget Narrative Filename:

[Add Mandatory Budget Narrative](#)

[Delete Mandatory Budget Narrative](#)

[View Mandatory Budget Narrative](#)

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To add more Budget Narrative attachments, please use the attachment buttons below.

[Add Optional Budget Narrative](#)

[Delete Optional Budget Narrative](#)

[View Optional Budget Narrative](#)

[Attachment B]

**BUREAU OF LAND MANAGEMENT**  
Financial Assistance (Cooperative Agreements)



## BUDGET DETAIL

(Suggested Format)

**Instructions:** Using the estimated amounts listed on your SF 424A Budget Information form, use this worksheet to provide details of those estimated costs. In the Narrative Boxes, explain the purpose of each cost and provide sufficient detail so costs may be analyzed for reasonableness.

Agreement or Funding Opportunity No.: L17AS00001 Date: 1/30/2017

Organization Name: Colorado Mesa University

Project Title: Structural and Geological Mapping and Assessment of the Dominguez Escalante National Conservaion Area (D E NCA)

A) PERSONNEL COSTS (SF-424A Object Class Category 6a.)					Personnel Justification
Estimated costs of salaries/wages, not including fringe benefits, paid to Recipient employees working directly on this agreement. Indicate Key Personnel with an asterisk (*), provide more detail in the Narrative Box if needed.					
Name & Title or Position Title	Salary or Wage	Months or Hours	Matching Funds (if applicable)	BLM Funds	
Undergraduate Students academic year	\$12/hr	132 hrs		\$1,584	
Undergraduate Students summer	\$12/hr	160 hrs		\$1,920	
A) TOTAL PERSONNEL COSTS:					
(SF 424A Object Class Category 6a. Personnel)			\$	\$ \$3,504	
<u>Budget justification of costs:</u>  Undergraduate students will be walking contacts with GPS units, measuring structural features and working in ArcGIS to compile the data from the field.					

## Budget Detail

Page 2

**B) FRINGE BENEFIT COSTS** (SF-424A Object Class Category 6b.)

Estimated costs of fringe benefits (e.g. health insurance, vacation, FICA, etc.) paid to Recipient employees working on this agreement. List employees/positions below, and their fringe benefit rates as a percentage (%) of their salaries. List what are considered fringe benefits in the Narrative Box.

Name & Title/Position	Salary/Wage Base (BLM Amounts budgeted in Section A above)	Fringe Benefit Rate (%)	Matching Funds (if applicable)	BLM Funds
Undergraduate students summer	\$1,920	1.45%		\$28.00
<b>B) TOTAL FRINGE BENEFIT COSTS:</b> (SF 424A Object Class Category 6b. Fringe Benefits)			\$	\$ 28.00

Budget Justification of Costs:

Fringe benefits are budgeted at actual costs in accordance with CMU's federal rate agreement. Benefits for undergraduate students include Medicare only at 1.45% of their summer wages.



## Budget Detail

Page 3

<b>C) TRAVEL COSTS (SF-424A Object Class Category 6c.)</b>						
<b>SUB TOTAL, LODGING &amp; PER DIEM</b> The cost of lodging & meals while traveling for agreement activities. Give details and purpose of the travel in the Narrative Box. Current Federal rates may be found online at: <a href="http://www.gsa.gov/portal/category/21287">http://www.gsa.gov/portal/category/21287</a> .						
<b>Proposed Travel (Lodging &amp; Per Diem)</b>		<b>No. of People</b>	<b>No. of Days</b>	<b>Cost Per Person Per Day</b>	<b>Matching Funds (if applicable)</b>	<b>BLM Funds</b>
<b>To:</b>						
<b>From:</b>						
<b>To:</b>						
<b>From:</b>						
<b>SUB TOTAL, MILEAGE REIMBURSEMENT</b> The cost of reimbursement for estimated mileage traveled in recipient vehicles for agreement activities. Give details and the purpose of the travel in the Narrative Box. Current Federal mileage reimbursement rates may be found online at: <a href="http://www.GSA.gov">www.GSA.gov</a> . <b>NOTE:</b> Mileage reimbursement rates include all vehicle costs, i.e. fuel, insurance, maintenance, etc.						
<b>Proposed Travel (Mileage Reimbursement)</b>		<b>No. of Miles</b>	<b>No. of Trips</b>	<b>Cost Per Mile</b>	<b>Matching Funds (if applicable)</b>	<b>BLM Funds</b>
<b>To:</b>	D E NCA	100	40	.49		\$1,960
<b>From:</b>	Grand Junction, CO					
<b>To:</b>						
<b>From:</b>						
<b>SUB TOTAL, OTHER TRAVEL COSTS</b> The costs of airfare, bus fare, car rental, etc., required for agreement activities. Explain the details and the purpose of the costs in the Narrative Box.						
<b>Proposed Other (Travel Reimbursement)</b>		<b>Type</b>	<b>Cost</b>	<b>No.</b>	<b>Matching Funds (if applicable)</b>	<b>BLM Funds</b>
<b>To:</b>						
<b>From:</b>						
<b>To:</b>						
<b>From:</b>						
<b>C) TOTAL TRAVEL COSTS:</b>					<b>\$</b>	<b>\$1,960</b>
(SF 424A Object Class Category 6c. Travel)						
<u>Budget justification of costs::</u>						
Remote area of study requires travel of roughly 100 miles round trip to get to field area. Slightly less than half of these miles are on dirt roads or 4-wheel drive tracks.						

## Budget Detail

Page 4

**D) EQUIPMENT COSTS** (SF-424A Object Class Category 6d. Equipment)

The cost of equipment purchased for use on this agreement. Equipment is defined as items with a useful life of more than one (1) year and a cost of \$5,000+ per unit. If your organization has a written policy for purchasing equipment, please submit a copy with your application. Explain the need and purpose of the equipment in the Narrative Box below.

Equipment	Quantity	Cost per Unit	Matching Funds (if applicable)	BLM Funds
<b>D) TOTAL EQUIPMENT COSTS:</b> (SF 424A Object Class Category 6d. Equipment)			<b>\$</b>	<b>\$ 0</b>

Budget justification of costs:

**E) SUPPLY COSTS** (SF-424A Object Class Category 6e. Supplies)

Estimated costs of materials and supplies used directly on this agreement, e.g. safety glasses, work gloves, office supplies, etc. If your organization has a written policy for purchasing supplies, please submit a copy with your application. Explain the purpose of the costs in the Narrative Box below.

Item	Quantity	Cost per Unit	Matching Funds (if applicable)	BLM Funds
Silva Compass	4	40		\$160
Long wave UV Flashlight	2	35		\$70
Sample containers (25 pieces each)	2	35		\$70
Rock sampling hammers	4	40		\$160
Field Notebooks and other misc field supplies	4	25		\$100
<b>E) SUPPLY COST TOTAL:</b> (SF 424A Object Class Category 6e. Supplies)			<b>\$</b>	<b>\$ 560</b>

Budget justification of costs:

UV lights will be used to find outcrops of fluorite which is associated with structural elements within the D-E NCA. Sample containers will be necessary to store samples after preliminary processing for shipment to laboratory. Rock hammers will be used to remove samples for analysis. Field notebooks will be utilized to record data in remote areas. Compasses will be used to take measurements of structural and stratigraphic features for accuracy.

**F) CONTRACTUAL COSTS** (SF-424A Object Class Category 6f. Contractual)

Estimated costs of contracted/sub contracted services and sub grant/recipient awards. If your organization has a written contracting policy, please submit a copy with your application. Provide contractor names, if available, and explain the details and purposes of the costs in the Narrative Box below. **NOTE:** Calculation of your Indirect Costs may be affected by contracted and/or pass through expenses. See Section J) INDIRECT COSTS, for more information.

Contractor Name, Type, etc.	Cost	Matching Funds (if applicable)	BLM Funds
Field Consultants (2 at \$5000 each)	\$10,000		\$10,000
<b>F) CONTRACTUAL COST TOTAL:</b> (SF 424A Object Class Category 6f. Contractual)		\$	\$ 10,000

Budget justification of costs:

Due to the magnitude of the proposed project and the time constraints placed upon students and faculty of CMU funds are being requested for 2 field consultants. These field consultants are CMU graduates of the geology program and considered to be experts in their field. Consultants will oversee field work as well as act as field guides for CMU students and faculty. Additionally, these consultants will spend time collecting GPS points on geologic contacts, sampling, conducting inventory of mining sites, collecting structural data and overseeing lab work and preparation of samples for shipment to ACT Labs.

Due to the remote location of the field sites access to some areas will be accomplished using 4x4 vehicles and ATVs or, when inaccessible by vehicle, on foot. Overnight camping will be necessary in some hard to access regions. All associated costs will be covered by the consultants.

**G) CONSTRUCTION COSTS** (SF-424A Object Class Category 6g. Construction)

The estimated costs of construction. "Construction" is the intent to construct, alter, or repair (including dredging, excavating, and painting) buildings, structures, or other real property FAR Part 2 Definitions. Explain the details and purpose of the costs in the Narrative Box below.

Contractor: Name/Type/Organization/Etc.	Cost	Matching Funds (if applicable)	BLM Funds
<b>G) CONSTRUCTION COST TOTAL:</b> (SF 424A Object Class Category 6g. Construction)		\$	\$ 0

Budget justification of costs:

## Budget Detail

Page 6

**H) OTHER COSTS** (SF-424A Object Class Category 6h. Other)

Estimated costs which don't fit any other Object Class Category, e.g. duplicating and printing costs, postage and freight, rental of equipment, etc. Explain the details and purpose of the costs in the Narrative Box below.

Item	Cost	Matching Funds (if applicable)	BLM Funds
Printing	225		\$225
10 Radiometric samples (\$200 each)	2000		\$2,000
30 whole rock samples (\$90 each)	2700		\$2,700
15 Thin section preparations (\$15 each)	225		\$225
Shipping of samples to laboratory	75		\$75
<b>H) OTHER COSTS TOTAL:</b> (SF 424A Object Class Category 6h. Other)		\$	\$ 5,225

*Budget justification of costs:*

Thirty mineralogical samples will be analyzed using whole rock lithogeochemistry at ACT Lab using Inductively Coupled Plasma –Mass Spectrometry Instrument to determine major and minor elemental composition. Twelve samples will be picked for either Krypton-Krypton, Strontium-Rubidium, and/or Neodymium-Samarium dating to determine an absolute age of mineralization in the faults at ACT Labs. Thin sections will be prepared from mineralogical samples to analyze mineral assemblage and survey for fluid inclusions. Samples will need to be shipped to ACT Labs for geochemical testing.

**I) TOTAL DIRECT COSTS** (SF-424A Object Class Category 6i. Sum of 6a.-6h.)

The total of all direct costs applicable to this project.

Total Direct Costs	Matching Funds (if applicable)	BLM Funds
<b>I) TOTAL DIRECT COSTS:</b> (SF 424A Object Class Category 6i. Total, Sum of 6a. 6h.)	\$	\$ 21,277

**J) INDIRECT COSTS** (SF-424A Object Class Category 6j. Indirect Charges)

Indirect costs are expenses which cannot be readily identified and charged to a particular project or agreement, e.g. building rent, utilities, office supplies, etc. Such costs are charged to the project as a percentage of the Direct Costs (items A through H above) and this percentage is called the Indirect Cost Rate. If your organization has a Negotiated Indirect Cost Rate Agreement (NICRA) please submit a copy of the agreement with your application. If your organization has no NICRA, the BLM may allow a "de minimis" indirect cost rate of up to 10% of your Modified Total Direct Costs (MTDC), which are your Direct Costs excluding sub grant and sub contract costs in excess of \$25,000. See 2 CFR 200.68 Modified Total Direct Cost (MTDC) and 2 CFR 200.414(f) Indirect (F&A) Costs for more information.

If your organization is a Cooperative Ecosystems Studies Unit (CESU) partner, your indirect cost rate will be 17.5% of your NICRA determined indirect cost base.

Use the Narrative Box below to explain how you calculated your indirect cost base and resulting indirect costs.

Indirect Cost Rate to be used on this Grant (%):	17.5%		
Indirect Cost Base for this Grant:	\$ 21,277		
Total Indirect Costs	Matching Funds (if applicable)	BLM Funds	
<b>J) TOTAL INDIRECT COSTS:</b> (SF 424A Object Class Category 6j. Indirect Charges)	\$	\$ 3,723	

Budget justification of costs:

As a member of the Colorado Plateau Ecosystems Studies Unit, Colorado Mesa University is charging the CPESU indirect cost rate of 17.5% TDC. Colorado Mesa University's federal rate agreement is included as part of this budget justification.

**K) TOTALS** (SF-424A Object Class Category 6k. TOTALS)

The sum total of all Direct and Indirect Costs (Sum of 6i. & 6j.) applicable to this agreement.

Total Project Costs	Matching Funds (if applicable)	BLM Funds
<b>K) TOTAL COSTS:</b> (SF 424A Object Class Category 6k. TOTALS)	\$	\$ 25,000

I certify that to the best of my knowledge the costs detailed above are correct and complete and for the purposes set forth in the associated application for Federal Assistance.

Verner C. Johnson Professor of Geology  
Name & Title of Person Completing Budget and GIS Coordinator

## COLLEGES AND UNIVERSITIES RATE AGREEMENT

EIN: DATE: 07/29/2015  
 ORGANIZATION: FILING REF.: The preceding  
 Colorado Mesa University agreement was dated  
 FRMLY: Mesa State College 05/18/2012  
 1100 North Avenue  
 Grand Junction, CO 81501-3122

The rates approved in this agreement are for use on grants, contracts and other agreements with the Federal Government, subject to the conditions in Section III.

## SECTION I: Facilities And Administrative Cost Rates

RATE TYPES: FIXED FINAL PROV. (PROVISIONAL) PRED. (PREDETERMINED)

EFFECTIVE PERIOD

<u>TYPE</u>	<u>FROM</u>	<u>TO</u>	<u>RATE(%)</u>	<u>LOCATION</u>	<u>APPLICABLE TO</u>
PRED.	07/01/2016	06/30/2020	35.00	On-Campus	All Programs
PRED.	07/01/2016	06/30/2020	6.40	Off-Campus	All Programs
PROV.	07/01/2020	06/30/2021	35.00	On-campus	All Programs
PROV.	07/01/2020	06/30/2021	6.40	Off-campus	All Programs

\*BASE

Modified total direct costs, consisting of all direct salaries and wages, applicable fringe benefits, materials and supplies, services, travel and up to the first \$25,000 of each subaward (regardless of the period of performance of the subawards under the award). Modified total direct costs shall exclude equipment, capital expenditures, charges for patient care, rental costs, tuition remission, scholarships and fellowships, participant support costs and the portion of each subaward in excess of \$25,000. Other items may only be excluded when necessary to avoid a serious inequity in the distribution of indirect costs, and with the approval of the cognizant agency for indirect costs.

ORGANIZATION: Colorado Mesa University FRMLY: Mesa State College  
AGREEMENT DATE: 7/29/2015

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SECTION II: SPECIAL REMARKS

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TREATMENT OF FRINGE BENEFITS:

The fringe benefits are specifically identified to each employee and are charged individually as direct costs. The directly claimed fringe benefits are listed below.

TREATMENT OF PAID ABSENCES

Vacation, holiday, sick leave pay and other paid absences are included in salaries and wages and are claimed on grants, contracts and other agreements as part of the normal cost for salaries and wages. Separate claims are not made for the cost of these paid absences.

OFF-CAMPUS DEFINITION: For all activities performed in facilities not owned by the institution and to which rent is directly allocated to the project(s) the off-campus rate will apply. Grants or contracts will not be subject to more than one F&A cost rate. If more than 50% of a project is performed off-campus, the off-campus rate will apply to the entire project.

DEFINITION OF EQUIPMENT

Equipment is defined as tangible nonexpendable personal property having a useful life of more than one year and an acquisition cost of \$5,000 or more per unit.

The following fringe benefits are treated as direct costs:

WORKERS COMPENSATION, HEALTH/DENTAL/LIFE INSURANCE, MEDICARE, LONG-TERM DISABILITY, AND RETIREMENT PLANS.

The four year extension of the indirect cost rate was granted in accordance with 2 CFR 200.414(g).

NEXT PROPOSAL DUE DATE

A proposal based on actual costs for fiscal year ending 06/30/19 will be due no later than 12/31/19.



ORGANIZATION: Colorado Mesa University FRMLY: Mesa State College

AGREEMENT DATE: 7/29/2015

SECTION III: GENERALA. LIMITATIONS:

The rates in this Agreement are subject to any statutory or administrative limitations and apply to a given grant, contract or other agreement only to the extent that funds are available. Acceptance of the rates is subject to the following conditions: (1) Only costs incurred by the organization were included in its facilities and administrative cost pools as finally accepted; such costs are legal obligations of the organization and are allowable under the governing cost principles; (2) The same costs that have been treated as facilities and administrative costs are not claimed as direct costs; (3) Similar types of costs have been accorded consistent accounting treatment; and (4) The information provided by the organization which was used to establish the rates is not later found to be materially incomplete or inaccurate by the Federal Government. In such situations the rate(s) would be subject to renegotiation at the discretion of the Federal Government.

B. ACCOUNTING CHANGES:

This Agreement is based on the accounting system purported by the organization to be in effect during the Agreement period. Changes to the method of accounting for costs which affect the amount of reimbursement resulting from the use of this Agreement require prior approval of the authorized representative of the cognizant agency. Such changes include, but are not limited to, changes in the charging of a particular type of cost from facilities and administrative to direct. Failure to obtain approval may result in cost disallowances.

C. FIXED RATES:

If a fixed rate is in this Agreement, it is based on an estimate of the costs for the period covered by the rate. When the actual costs for this period are determined, an adjustment will be made to a rate of a future year(s) to compensate for the difference between the costs used to establish the fixed rate and actual costs.

D. USE BY OTHER FEDERAL AGENCIES:

The rates in this Agreement were approved in accordance with the authority in Title 2 of the Code of Federal Regulations, Part 200 (2 CFR 200), and should be applied to grants, contracts and other agreements covered by 2 CFR 200, subject to any limitations in A above. The organization may provide copies of the Agreement to other Federal Agencies to give them early notification of the Agreement.

E. OTHER:

If any Federal contract, grant or other agreement is reimbursing facilities and administrative costs by a means other than the approved rate(s) in this Agreement, the organization should (1) credit such costs to the affected programs, and (2) apply the approved rate(s) to the appropriate base to identify the proper amount of facilities and administrative costs allocable to these programs.

BY THE INSTITUTION:

Colorado Mesa University FRMLY: Mesa State College

(INSTITUTION)

(SIGNATURE)

(NAME)

(TITLE)

(DATE)

ON BEHALF OF THE FEDERAL GOVERNMENT:

DEPARTMENT OF HEALTH AND HUMAN SERVICES

(AGENCY)

Arif M. Karim - A

Digitally signed by Arif M. Karim - A  
DN: cn=Arif M. Karim - A, o=U.S. Government, ou=HHS, ou=PTC, ou=Frpts  
rs=Arif M. Karim - A, c=US, email=arif.m.karim@hhs.gov

(SIGNATURE)

Arif Karim

(NAME)

Director, Cost Allocation Services

(TITLE)

7/29/2015

(DATE) 1011

HHS REPRESENTATIVE:

Stanley Huynh

Telephone:

(415) 437-7820



CERTIFICATION REGARDING LOBBYING

Certification for Contracts Grants Loans and Cooperative Agreements

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

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

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

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts subgrants and contracts under grants loans and cooperative agreements) and that all subrecipients shall certify and disclose accordingly This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352 title 31 U S Code Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10 000 and not more than \$100 000 for each such failure

Statement for Loan Guarantees and Loan Insurance

The undersigned states to the best of his or her knowledge and belief that

If any funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency a Member of Congress an officer or employee of Congress or an employee of a Member of Congress in connection with this commitment providing for the United States to insure or guarantee a loan the undersigned shall complete and submit Standard Form-LLL "Disclosure of Lobbying Activities " in accordance with its instructions Submission of this statement is a prerequisite for making or entering into this transaction imposed by section 1352 title 31 U S Code Any person who fails to file the required statement shall be subject to a civil penalty of not less than \$10 000 and not more than \$100 000 for each such failure

* APPL CANT'S ORGAN ZAT ON			
Colorado Mesa University			
* PR NTED NAME AND T TLE OF AUTHOR ZED REPRESENTAT VE			
Prefix	* First Name	Middle Name	
	Tim		
* Last Name	Suffix		
Foster			
* Title			
President			
* S GNATURE		* DATE	
Tim Foster		02/02/2017	

Manifest for Grant Application # GRANT12327996

Grant Application XML file (total 1):

1. GrantApplication.xml. (size 17468 bytes)

Forms Included in Zip File (total 7):

1. Form GG LobbyingForm V1.1.pdf (size 23351 bytes)
2. Form ProjectNarrativeAttachments 1 2 V1.2.pdf (size 21582 bytes)
3. Form SF424 2 1 V2.1.pdf (size 30078 bytes)
4. Form BudgetNarrativeAttachments 1 2 V1.2.pdf (size 22560 bytes)
5. Form SF424A V1.0.pdf (size 28963 bytes)
6. Form Key Contacts V1.0.pdf (size 26632 bytes)
7. Form SF424B V1.1.pdf (size 28434 bytes)

Attachments Included in Zip File (total 2):

1. ProjectNarrativeAttachments 1 2 ProjectNarrativeAttachments 1 2 Attachments 1235 Johnson D E NCA.pdf application/pdf (size 1254720 bytes)
2. BudgetNarrativeAttachments 1 2 BudgetNarrativeAttachments 1 2 Attachments 1234 Johnson Budget Detail.pdf application/pdf (size 435487 bytes)

[Hatchett NLCS 2017]

**BUREAU OF LAND MANAGEMENT**  
Financial Assistance (Cooperative Agreements)



Person Submitting Proposal: Benjamin J. Hatchett, Ph.D. Date: 2/2/2016

Organization Name: Desert Research Institute

\*\*Agreement or Announcement No.: L17AS00001

\*\* Agreement or Announcement BLM FY2017 Bureau-wide National Conservation Lands  
Title: Scientific Studies Support Program

Estimated Period of Performance: April 1, 2017-March 31, 2018

BLM POC:  
Proposed Project Location: Black Rock National Conservation Area

This work will occur on: ☒ Public Lands ☐ Both Public & Private Lands

**OUR MISSION:** To develop an improved understanding of the atmospheric processes responsible for driving climate variability in dryland environments and combining hydrologic modeling with field geomorphology work to establish baseline estimates of precipitation and temperature regimes associated with climate extremes (e.g., droughts and pluvials). By linking the atmospheric drivers with hydrologic responses, information pertinent to management decision support and restoration efforts for water limited regions can be extracted. These findings can also be used to place dryland landscapes into broader geological and paleoclimatic contexts and address questions such as: “how responsive are particular landscapes or watersheds to extreme and persistent drought or extended wet (pluvial) periods?”, “what types of weather patterns produce substantial or extreme precipitation, and when do these events occur?”, and “how can restoration efforts be best implemented to ensure a resilient landscape?”

**OBJECTIVES:**

Our study focuses on the Black Rock National Conservation Area (NCA) in northwestern Nevada and has the following primary objectives:

1. Establishing an understanding of the primary atmospheric drivers (namely winter season storm tracks, atmospheric rivers, spring season closed lows, and summer convective storms) of hydroclimate variability in this region spanning 1895-2017.
2. Development of a calibrated, semi-distributed watershed water balance and lake evaporation model of High Rock Lake.
3. Creation of a paleoshoreline reconstruction of High Rock Lake to better establish its timing of formation and various lake levels that will serve as modeling targets for hydrologic modeling efforts.
4. Apply the watershed-lake model to estimate precipitation and temperature multipliers associated with High Rock Lake paleoshoreline data.

This project will support the research theme “Research Syntheses” by uniquely blending hydrologic modeling, paleoclimate data collection, and atmospheric modeling in order to develop a clear understanding of the types of storms that drive cool and warm season precipitation anomalies in the Black Rock NCA. These techniques will also support the exploration of how sensitive the shoreline elevation of High Rock Lake is to varying durations and magnitudes of dry and wet periods. These findings can be used to support best management practices or strategies designed to minimize negative impacts during droughts and maximize restoration efforts during wet periods, which will also support the research theme “Other Management Driven Research”. The termination of the recent 2012-2016 drought provides an example of how our findings could be applied to the issue of how the High Rock Lake and Fly Canyon water resources may have changed. Understanding these changes could be used to evaluate drought impacts on sensitive habitat and species such as mule deer, sage grouse, and migratory birds such as the

[Hatchett NLCS 2017]

snowy plover. Although above average precipitation has been observed during water years 2016 and 2017 (through January), our research will investigate rises in High Rock Lake and changes in Fly Canyon streamflow which can be used to identify which regions of drought-impacted habitat might recover at faster rates and which regions may require altered management (such as grazing allotment reductions or enhancements) in order to facilitate recovery. By identifying the regions over the Pacific Ocean where storm track activity and moisture transport are best correlated to precipitation in the Black Rock NCA, potential changes in these regions and their impacts on the Black Rock NCA can be incorporated into climate change adaptation management strategies. Lastly, by evaluating the historical weather and climate patterns in the Black Rock NCA using high resolution model output and coarser-resolution reanalysis products, our research can provide useful information in predicting favorable fire weather regimes such as high wind events, extreme heating events, and dry lightning outbreaks that influence fire danger in this area. This information can be used to enhance fire fighting resource allocation to protect infrastructure and sensitive habitat and wilderness area. It can also be used to help the Black Rock NCA's science plan to understand potential future impacts to the desert dace habitat in Fly Canyon, provide information for grazing permit renewals, and help evaluate the vegetative responses to climate extremes such as persistent droughts or occasional wet years.

#### RESEARCH THEME AND TECHNICAL APPROACH:

- ☒ *Research Identified in Unit Science Plans (for National Monuments, National Conservation Areas, and Similar Designations)*
  - ☐ *Effectiveness Research*
  - ☐ *Standardized Inventory and Monitoring*
- ☒ *Research Syntheses*
  - ☐ *Citizen Science*
- ☒ *Other Management-Driven Research*
  - ☐ *All themes and goals apply*

#### RESEARCH BACKGROUND

A fundamental question of paleoclimate research asks: "How different were past climates from the climate of today?" In the Great Basin of North America, geologic evidence of shorelines formed by terminal lakes record changes in the climatic moisture budget and indicate periods of time where water availability was different relative to today. Other geologic paleoproxy evidence derived from sedimentary deposits, such as ash layers and submerged terrestrial plants can also be used to reconstruct and interpret regional climate changes in the context of hypothesized ocean and atmospheric circulations. It is necessary to apply models of these systems to ensure that our interpretations are robust and physically plausible. We propose to use atmospheric reanalysis products, climate observations, atmospheric models, geologic fieldwork, and the development of a coupled water balance and lake-evaporation model of the High Rock Lake watershed in the Black Rock National Conservation Area (NCA). In doing so, we hope to:

- 1) develop an improved understanding of the primary drivers of weather and climate variability in the Black Rock NCA,
- 2) test the sensitivity of the High Rock Lake system to these drivers, and
- 3) better constrain when High Rock Lake formed in time.

The outcomes of this research can be used to inform management decisions during times of climate extremes such as extended drought or pluvial (wet) periods. Suggestions for enhancing management of issues regarding habitat restoration efforts, grazing allotments and ways to improve the resiliency and sustainability of natural resources in the High Rock Wilderness and greater Black Rock NCA for continued benefits to recreational and ecosystem function will be provided by this work.

The Great Basin is the largest dryland region in North America and is characterized by its internally draining watersheds that create terminal lakes. The extent of terminal lakes directly reflects the climatic water balance between losses from evapotranspiration and inflow provided by direct on-lake precipitation, watershed runoff, and groundwater discharge (Mifflin and Wheat 1979; Allendar et al. 2009). The largest terminal lake systems during the Late Pleistocene (11,700-30,000 cal yr BP) were

[Hatchett NLCS 2017]

Lakes Lahontan and Bonneville, which received inflow from multiple perennial rivers originating in the Sierra Nevada and Wasatch ranges and integrated multiple basins during their highstands (Reheis et al. 2014). Today, the few remaining perennial terminal lakes exist along the most precipitation-rich mountains although upstream diversion for consumptive use has caused many of these lakes to fall or become desiccated (Adams 2007). These remaining lakes are important for Great Basin ecosystem function as they harbor endemic fish species, provide important stopping points for native and migratory birds along the Pacific Flyway, and support riparian and wetland areas along their shoreline. During extremely wet years or following extended wet periods, these lakes may overtop their rims and provide streamflow to ephemeral creeks, such as Fly Canyon, resulting in downstream riparian areas being provided with important water resources for habitat maintenance and colonization. Many of these dryland lakes will only fill following extreme precipitation events and/or after very wet winters (Enzel et al. 1989) and they rapidly succumb to large evaporative demands during the hot and dry warm season. This implies that water resources for habitat restoration and vegetation demands are short-lived and that these lakes represent highly sensitive indicators of climatic change (Mifflin and Wheat 1979; Reheis et al. 2014).

Furthermore, the sedimentary deposits from terminal lakes provide valuable archives of continental Quaternary paleoclimate records (Quade and Broecker 2009). As the surface elevations of these lakes rise and fall, a variety of landforms are produced at and below the lake surface. These landforms provide geological constraints on past lake elevation and transient behavior. Well-dated ash layers in outcrops provide age-constraints for lake level interpretations (e.g. Stine 1990) and other subaerial exposures such as dessication cracks (Adams 2007) and submerged terrestrial plants (Stine 1990; 1994) can be also be used to infer lake level changes. No known data exists for the High Rock Lake shorelines, and one component of the proposed project will attempt to find datable organic (i.e., carbon-based) material from which a lake level reconstruction can be developed for the highest shoreline and any intermediate exposed shorelines. Support for six radiocarbon samples to be measured is included in the budget. A survey of the near-shore area will be performed to identify any submerged datable material that may provide information on past drought episodes.

The relatively cool and dry climate of the northern Great Basin means that paleoproxy indicators such as sedimentary cores, tree rings, and human occupation sites tend to be well-preserved and can be used with direct evidence of shoreline elevations to reconstruct climatic conditions. For example, relative abundances of vegetation types derived from pollen counts in sedimentary cores taken from meadows and lakes suggest responses to mesic versus xeric conditions (Wigand 1987; Mensing et al. 2013). Pack rat middens record information on vegetation abundance and ecotonal shifts (Louderbeck and Rhode 2009) and their solubility in water allows them to provide maximum lake-level constraints (Thompson et al. 1986; Bacon et al. 2006). This project will place information produced from the High Rock Lake shoreline reconstruction in context with other Great Basin archives of past climate.

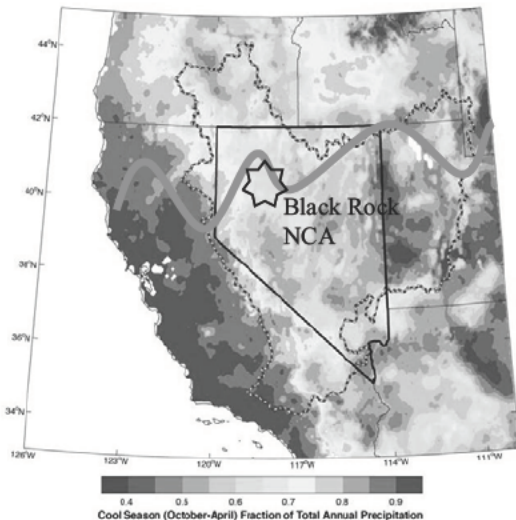
What then, drives major changes in Great Basin climate? Antevs (1938) was the first to hypothesize that the Great Basin water balance, and hence terminal lake levels, are indicators of latitudinal displacement of the winter season jet stream and storm track produced by the presence of continental ice sheets (Kutzbach and Wright 1985). Although proxy records do not support a zonally symmetric shift in the storm track during the Late Pleistocene (Lyle et al. 2012), millennial-scale changes in the patterns of moisture delivery to the Great Basin were caused by orbital forcing (Lachniet et al. 2014); ice sheet topography (Oster et al. 2015) and changes in the Earth's thermal equator (Broecker and Putnam 2013). At decadal to interannual timescales, precipitation variability in the Great Basin is governed by tropical-extratropical sea surface temperature (SST) anomalies and their associated atmospheric teleconnections such as the Northern Annular Mode and the Pacific North America pattern (Wallace and Gutzler 1981). The El Niño Southern Oscillation (ENSO; Neelin et al. 1998) represents the leading mode of global SST variance and has a quasi-periodic return interval (3-7 years). ENSO is also a leading mode of precipitation variability in the western United States with a characteristic north-south precipitation dipole pattern centered near 40° N (Dettinger et al. 1998; Wise 2010).

In the western Great Basin, either strong phase of ENSO can produce a wet year though persistent La Niña episodes are thought to accompany extended dry periods (Herweijer et al. 2007) particularly if warm Atlantic SSTs exist (McCabe et al. 2008). Lower-frequency (decadal-multidecadal) modes of climate variability such as the Pacific Decadal Oscillation (Mantua et al. 1997) and the closely related Interdecadal Pacific Oscillation (Meehl and Hu 2006) have ENSO-like attributes in spatial patterns of SST variability and also influence Great Basin precipitation patterns (Wise 2010). However, unlike

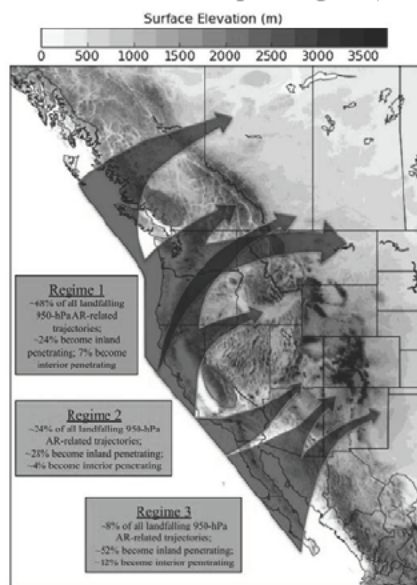
[Hatchett NLCS 2017]

ENSO, these modes likely represent the sums of interacting climate dynamical processes rather than a single physical mode. The Black Rock NCA and High Rock Lake are perfectly positioned along the center of this dipole region to address questions regarding drivers of wet and dry years during varying phases of ENSO throughout the historical period and into the future.

Recently, there has been renewed interest in the paleoclimate community (e.g., Kirby et al. 2012)



*Figure 1: Fraction of total annual precipitation received during the cool season (October-April) throughout the southwestern United States and Great Basin (dashed outline). Created using monthly precipitation (1981-2010 normals) at 6 km horizontal resolution estimated by Livneh et al. (2013). The green line is the boundary between the ENSO dipole region (Wise 2010).*



*Figure 2: Preferential corridors of inland moisture transport from Rutz et al. (2015). The Black Rock NCA intersects the southern branch of Regime 2.*

regarding the role of infrequent, high magnitude cool season precipitation events associated with atmospheric rivers or elongated regions of enhanced moisture transport that accompany extratropical cyclones (Ralph et al. 2004; Rutz et al. 2014). Along the western margin of the Great Basin in the Sierra Nevada, atmospheric rivers account for 10% of precipitation days but 30-50% of total cool season precipitation (Backes et al. 2014; Hatchett et al. 2016). In the western Great Basin, over 70% of total annual precipitation occurs during the cool season (Figure 1) due to extratropical cyclone passage, so the role of atmospheric rivers in Great Basin hydroclimate cannot be ignored. In contrast, while atmospheric rivers do impact the eastern and southern Great Basin (Rutz et al. 2014), there is an increased importance of warm season precipitation associated with the North American Monsoon (30-60% of total annual precipitation; Figure 1; Johnson et al. 2007). The Black Rock NCA is located in the region receiving approximately 65% of its annual precipitation during the cool season. A portion of this precipitation likely results from atmospheric rivers and other winter storms as well as spring season closed lows (Oakley and Redmond 2014). This

proposal will specifically address the relative roles of these mechanisms (atmospheric rivers, moderate winter storms, spring closed lows, and warm season convection) in driving observed variations in climate using the daily gridded precipitation estimates from the 6 km Livneh product (Livneh et al. 2013) and atmospheric reanalysis products from the 20<sup>th</sup> Century Reanalysis (Compo et al. 2011) for the period spanning 1911-2017.

The Black Rock NCA is located along a preferential corridor for inland atmospheric river penetration due to the lower upstream topography of the northern Sierra Nevada and southern Cascades (Figure 2; Rutz et al. 2015). This implies that atmospheric rivers likely play a significant role in the observed precipitation variability and lake levels of High Rock Lake. To examine the dynamics of atmospheric rivers and spring season closed low pressure circulations in more detail, we will utilize high resolution (3 km) simulations from the Weather Research and Forecast Model (Skamarock et al. 2008). We will select two case studies each of atmospheric river events and closed low events that produced extreme and/or sustained precipitation and perform simulations of these events at a resolution (3 km) that allows for model convection to be explicitly resolved. One case study will focus on the extreme January 7-8 2017 precipitation event (49 mm rainfall observed

at Gerlach, NV). The results from this component of the proposed work will improve understanding of

[Hatchett NLCS 2017]

how moisture is transported through the lower elevation upstream topography and how extreme precipitation is created that may lead to enhanced groundwater recharge, streamflow generation in intermittent streams, vegetative responses such as subsequent green up, and erosion. It will also address the open question of how closed low circulations entrain moisture during their development over the Great Basin.

On a more fundamental level, we propose to repeat the evaluation of the importance of storm tracks and moisture transport on precipitation variability performed by Hatchett et al. (2017) for the Walker Lake Basin (Figure 3), but expanding this work to include the spring and summer months. While storm tracks are often considered to be the most important driver of precipitation variability (Oster et al. 2015), Hatchett et al. (2017) showed that moisture transport explains a higher fraction of precipitation variance (0.78 versus 0.54) during the winter months, primarily due to the role of atmospheric rivers (Hatchett et al. 2016). Under equally stormy conditions (as inferred by sea level pressure variance; Chang et al. 2015), moisture-limited atmospheric conditions will be less effective in producing precipitation compared to conditions characterized by a moisture surplus such as in an atmospheric river event. By replicating this work for the Black Rock NCA, not only will the primary regions of winter and spring season moisture transport and storm track activity be identified (and their relative roles quantified), but these areas of greatest correlation can be then used to evaluate the types of changes in large scale circulation projected by global climate models under estimated future climates (e.g., Chang et al. 2015). This information can be used to identify likelihoods of changes in future precipitation regimes and used to inform long-term management strategies at the Black Rock NCA relating to climate change adaptation planning for grazing allotments, recreational opportunities, and restoration efforts.

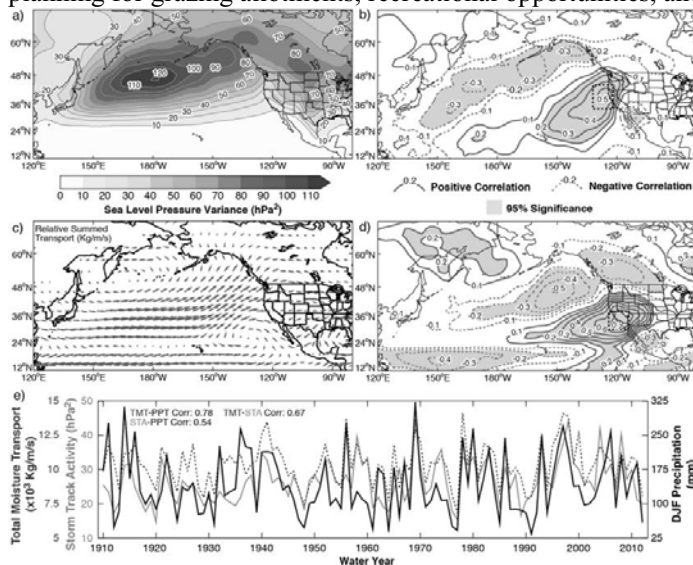


Figure 3: Results from Hatchett et al. (2017) showing 20<sup>th</sup> Century Reanalysis output for: a) winter season (Dec-Feb) storm track activity and b) correlation of Walker Lake basin precipitation to storm track activity. c) as in a) but for moisture transport. d) as in b) but for moisture transport. e) Time series of moisture transport and storm track activity (left y-axis) and Walker Lake basin winter precipitation (right y-axis).

relationships are re-calculated from the lake rating curve. A schematic is provided showing the components of both the watershed model (Figure 4a) and the lake evaporation model (Figure 4b).

The development of a simple water balance and lake evaporation model of the High Rock Lake watershed along with the establishment of timing of high and low lake levels will allow an unprecedented perspective to evaluate climate variability in the Black Rock NCA. The coupled hydrologic model can be used to test the sensitivity of the lake to changes in historical storm tracks or moisture transport as has been recently performed in the Walker Lake basin by Hatchett et al. (2017). In the Walker Lake basin,

The final primary component of our proposed project will be the creation of a monthly semi-distributed water balance and lake evaporation model of the High Rock Lake watershed system, similar to the model that has been developed for the Walker Lake basin (Hatchett et al. 2015; Hatchett et al. 2016; Hatchett et al. 2017) and Jakes Lake Basin (Barth et al. 2016). The watershed hydrologic model will be discretized into 800 m horizontal resolution cells and use a monthly time step. The model has the capability to simulate key watershed processes including the partitioning of frozen and liquid precipitation, building and melting of a snowpack, evapotranspiration, soil moisture storage, and runoff generation. The lake evaporation model is coupled to the watershed model such that watershed-derived runoff is routed into the lake volume and evaporative losses (as a function of lake area) are subtracted from the lake volume. Once the volume change from runoff minus evaporation has been estimated, the area and volume

[Hatchett NLCS 2017]

Hatchett et al. (2017) found that lowstands during the extreme and persistent megadroughts of the Medieval Climate Anomaly (MCA; 900-1300 A.D.) could be achieved by bottom 10<sup>th</sup> percentile storm

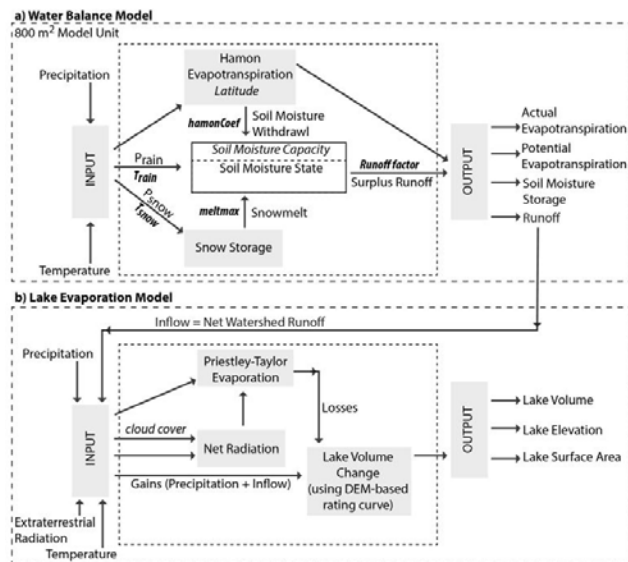


Figure 4: Schematic of the hydrologic processes represented by the a) watershed water balance and b) lake evaporation models to be used for the High Rock Lake watershed system.

tracks and moisture transport, which are comparable in precipitation magnitudes to those experienced during the recent 2012-2016 California-Nevada drought but lacking the multidecadal-centurial persistence of the MCA megadroughts (Hatchett et al. 2015). Building such a model of High Rock Lake will inform the Black Rock NCA managers and scientific researchers about the sensitivity of the lake to not only atmospheric drivers, but also to the timescales at which it responds to climate drivers. Hatchett et al. (2015) found that Walker Lake requires 100-200 years of drought to fall to megadrought lowstands but can rise rapidly in 20-50 years. The development of a basic shoreline reconstruction will provide modeling targets for the wettest period(s) in High Rock Lake's history and potentially provide information about its drier periods (if datable material can be recovered). These modeling targets will then serve as upper and lower bounds to estimate combinations of precipitation and

temperature that can yield the given shoreline elevations. More importantly, however, the combination of the shoreline reconstruction and the model-derived climate estimates can be used to place the timing of oscillations in High Rock Lake into context with the many other paleoproxy datasets in the Great Basin and western United States. We hypothesize that if High Rock Lake was formed after the fall of Lake Lahontan (16 cal yr. bp.), the highstands of High Rock Lake that appear in satellite imagery likely were formed during the Younger Dryas (11,300-13,000 cal. yr. bp.) and Late Holocene (~3,700 cal. yr. bp.), when other highstands of western Great Basin lakes were identified by Stine (1990) and Adams (2007).

To achieve these goals, we will blend our unique set of capabilities (atmospheric and hydrologic modeling, data analysis, and field data collection of geomorphic lake level indicators) to produce a comprehensive evaluation of the primary drivers of hydroclimate variability in the High Rock Lake watershed at climate (i.e., seasonal) and weather (i.e., event-based) timescales. We will work first on evaluating the primary large scale drivers of weather and climate and then perform simulations of extreme events. The hydrologic model will be developed continuously throughout the early portion of the project with a goal of completion at the end of the field collection of shoreline data. The second portion of our project will evaluate the atmospheric model simulations and use our developed knowledge on large scale drivers to perform hydrologic model experiments. We will conclude our project with a publication on our findings, a management report to support decision making by the Black Rock NCA Field Office, and a presentation at the Great Basin Climate Forum. Our findings will be applicable to informing management decisions pertaining to weather and climate extremes within the larger Black Rock NCA as well as other NCAs located in midlatitude dryland regions (e.g., Red Rock Canyon NCA, Red Cliffs NCA, and Morley Nelson Snake River Birds of Prey NCA). This is due to the repeatability of our study methodology and the availability of climate and atmospheric data for these other NCAs.

The collective results of the proposed research will serve to provide a comprehensive foundation of knowledge regarding the atmospheric drivers of hydroclimate variability at weather and climate timescales as well as assist in estimating the sensitivity of High Rock Lake to past pluvial and drought periods. Beyond serving to inform natural resource management decision making and assisting to establish foundational information that can be used for climate change adaptation planning by the Black Rock NCA Field Office, this project will enhance existing knowledge regarding atmospheric processes that drive climate variability along the inflection point of the western North American ENSO dipole region (Wise 2010). Little direct shoreline data currently exists in lake basins located in the central



[Hatchett NLCS 2017]

northern Great Basin, and this project will attempt to fill this data gap by producing a simple lake level reconstruction. Collection and publication of this data will improve Late Pleistocene and Holocene paleoclimate reconstructions for western North America by supplementing existing sedimentary cores and other proxy information. We will collaborate with Dr. Mark Hall of the Black Rock NCA to interpret our findings in context of the pollen reconstructions that he has recently been working with in the region (e.g., Hall 2016).

<b>TASKS AND DELIVERABLES (in <i>italics</i>)</b>	<b>Start Date</b>	<b>Completion Date</b>
1. Evaluate historical climate information in context of storm tracks, moisture transport, and extreme events	April 1, 2017	June 30, 2017
2. <i>High Rock Lake fieldwork (mapping and collection of datable material for shoreline reconstruction; 3 days during period)</i>	June 1, 2017	November 30, 2017
3. <i>Develop and calibrate hydrologic model of High Rock Lake</i>	July 1, 2017	August 31, 2017
4. Perform WRF simulations of extreme precipitation events in Black Rock NCA (a winter, spring, summer event)	July 1, 2017	October 31, 2017
5. Perform hydrologic model experiments for climate sensitivity of High Rock Lake to varying winter/summer regimes	September 1, 2017	November 30, 2017
6. Evaluate WRF simulations for case studies of extreme precipitation events	October 1, 2017	December 31, 2017
7. <i>Produce manuscript on drivers of hydroclimate variability in the Black Rock NCA</i>	December 1, 2017	March 31, 2018
8. <i>Write management report</i>	January 1, 2018	February 28, 2018
9. <i>Write final report</i>	March 1, 2018	March 31, 2018
10. <i>Presentation of results at Great Basin Climate Forum (typically held in April)</i>	January 1, 2018	April 31, 2018

#### **PUBLIC BENEFIT:**

Our research will improve the capabilities of the Black Rock NCA Field Office to most effectively manage the High Rock Lake Wilderness during climate extremes which will benefit the public by ensuring a robust, sustainable, and resilient recreational and natural environment. Habitat restoration efforts that support the goal of creating a more robust and enjoyable environment will also be supported by our results, as they can be used to inform managers on the ideal timing and location for restoration work under given weather and climate scenarios. Our findings regarding the drivers of climate variability in the Black Rock NCA will support public education and outreach via communication through the Black Rock NCA website or in literature hosted on site such as a “Point of Interest” kiosk. By informing the public on the relative roles of phenomena such as atmospheric rivers, spring season closed lows, summer thunderstorms in producing the environment of the Black Rock NCA, they will gain an enhanced appreciation of the local landscape leading to an improved experience in the NCA.

#### **QUALIFICATIONS, PAST PERFORMANCE, ACTIVE BLM COOPERATIVE AGREEMENT:**

As our team consists of a hydrologic modeler (Co-PI Garner), an atmospheric modeler (Co-PI Smith), and a paleoclimatologist (PI Hatchett), we are uniquely posed and well-qualified to perform the proposed interdisciplinary research project.

[Hatchett NLCS 2017]

**Benjamin J. Hatchett**

Dr. Benjamin J. Hatchett is a National Science Foundation-supported Postdoctoral Fellow under award number ATM-1419267, August 2016-present. His skills include paleoclimatology, numerical hydrologic and atmospheric modeling, big data analysis, geological fieldwork, and graphical communication. His work is focused on midlatitude dryland and alpine environments. He was a NASA EPSCoR Nevada Space Grant Graduate Fellowship recipient for January 2014-December 2014 and his graduate work was also supported by the National Fish and Wildlife Foundation and the National Science Foundation. Here he focused on hydrologic modeling and climate dynamics in a snow dominated terminal lake watershed. This work resulted in three journal publications (plus one in revision, one in review, and two in preparation) and 12 presentations (six invited). He received an American Avalanche Association Graduate Research Grant as PI spanning September 2015-May 2016. This project involved the evaluation of snow levels and atmospheric river conditions on California avalanche hazard, peak midwinter streamflow events, and western United States avalanche fatalities. It has resulted in two articles submitted to peer-reviewed journals (one in review, one in revision) and four presentations (two invited). He is currently involved in a climate extremes project sponsored by the Department of Interior that is focused on changing snow levels and snow droughts in the northern Sierra Nevada, an extreme precipitation project in the Atacama Desert, and a paleoclimate dynamics project in the terminal Lake Chewaucan basin led by Dr. Adam Hudson (USGS).

**Craig Smith**

Dr. Craig Smith's PhD dissertation at Oregon State University was funded by NSF (ATM-0527790). This research resulted in significant insights into the effect of diurnal surface heating on downslope windstorms. The PI used a combination of observations and Large Eddy Simulation and mesoscale (WRF) modeling to create a simple framework for identifying effects of boundary layer stability on internal gravity wave (IGW) breaking and transcritical barotropic wave phenomena in the lee of relatively small (~1 km height) mountain ridges. Dr. Craig Smith has also been funded by NSF to study the extreme heating events known as Sundowners that occur near Santa Barbara, CA (ATM-#1419267). This work has been conveyed at stakeholder and scientific conferences and has resulted into new insight in to the dynamics and predictability of Sundowners. Seven conference and invited talks funded by NSF (ATM-1419267). Seven conference and invited talks funded by NSF (ATM-0527790).

**Christopher Garner**

Christopher Garner, M.S. is a research hydrologist at the Desert Research Institute (DRI). With over 15 years of experience in academia and research, he is an expert in the field of hydrologic science having developed and applied hydrologic models to investigate a variety of research questions using tools and solutions from the fields of surface water hydrology, groundwater hydrology, and water resources engineering. For example, he has developed and applied physically-based distributed watershed models to forecast streamflow in the Truckee, Carson, and Walker River Basins using the Precipitation Runoff Modeling System (PRMS). More recently he has specialized in the development and application of computational Spatial Decision Support Systems (SDSSs) for management, evaluation, and analysis of complex hydrologic and agricultural systems. He successfully developed and applied a SDSS in the Walker River Basin to evaluate the possible outcomes of water right acquisitions by the National Fish and Wildlife Foundation (NFWF). In addition to his expertise with hydrologic modeling and SDSSs, he has extensive expertise developing and applying custom MATLAB models of watershed scale processes to simulate the impact of climate on water resources in arid and semi-arid environments using paleoclimate information, global climate model estimates, and historic ground-based information.

**BLM ACTIVE COOPERATIVE AGREEMENTS**

The PI and Co-PIs have no BLM Active Cooperative Agreements at this time. The Desert Research Institute currently has three Active Cooperative Agreements under the master agreement L13AC00262.

[Hatchett NLCS 2017]

**Benjamin J. Hatchett****benjamin.hatchett@dri.edu****Professional Preparation**

University of Nevada	Geography	B.S.	2008
University of Nevada	Atmospheric Sciences	M.S.	2012
University of Nevada	Geography	Ph.D.	2016

**Appointments**

2016 – Present	Desert Research Institute-Postdoctoral Fellow/Advisor Craig M. Smith
2016 – Present	Sierra Nevada College-Adjunct Faculty
2013 – 2016	University of Nevada-Graduate Research Assistant/Advisor: Douglas. P. Boyle
2011– Present	Lake Tahoe Community College-Adjunct Faculty
2009 – 2013	Desert Research Institute-Graduate Research Assistant/Advisor: Darko R. Koracin

**Publications in Past Three Years**

2017. **Hatchett, B.**, N.S. Oakley, B. Daudert, D.J. McEvoy. Recent abrupt rise in northern Sierra Nevada snow levels. *Nature Climate Change*, in review.
2017. **Hatchett, B.** D.P. Boyle, C.B. Garner, S.D. Bassett, M.L. Kaplan, and A.E. Putnam. The response of a Great Basin terminal lake to winter North Pacific atmospheric circulations. *Geological Society of America Special Papers*, in revision.
2017. **Hatchett, B.**, S. Burak, J.J. Rutz, N.S. Oakley, E.H. Bair, and M.L. Kaplan. Avalanche fatalities during atmospheric river events in the western United States. *Journal of Hydrometeorology*, in revision.
2017. **Hatchett, B.**, and McEvoy, D. The value of examining the hydrometeorological origins of snow droughts. *Bulletin of the American Meteorological Society*, in prep.
2017. **Hatchett, B.** Renaissance drought termination at Eagle Lake, California, *Quaternary Science Reviews*, in prep.
2017. **Hatchett, B.**, C.B. Garner, C.M. Smith, and M.L. Kaplan. Observed snow levels during peak winter streamflow events in the northern Sierra Nevada. *Journal of Hydrometeorology*, in prep.
2016. **Hatchett, B.**, D.P. Boyle, C.B. Garner, M.L. Kaplan, A.E. Putnam, and S.D. Bassett. Magnitude and frequency of wet years under a megadrought climate in the western Great Basin, USA. *Quaternary Science Reviews*, In press. doi:10.1016/j.quatscirev.2016.09.017.
2016. Barth, C., D.P. Boyle, **B. Hatchett**, S.D. Bassett, C.B. Garner, and K.D. Adams. Late Pleistocene climate inferences from a water balance model of Jakes Valley, NV. *Journal of Paleolimnology*, **568**(2), 109-122. doi: 10.1007/s10933-016-9897-z.
2016. **Hatchett, B.**, D. Koracin, J.F. Mejia, and D.P. Boyle. Assimilating urban heat island effects into climate projections. *Journal of Arid Environments*, **128**, 59-64, doi:10.1016/j.jaridenv.2016.01.007.
2015. **Hatchett, B.**, D.P. Boyle, A.E. Putnam, and S.D. Bassett. Placing the 2012-2015 California-Nevada drought into a paleoclimatic context: Insights from Walker Lake, California-Nevada, USA. *Geophysical Research Letters*, **42**, doi:10.1002/2015GL065841.

**Other relevant publications**

2012. Mejia, J., J. Huntington, **B. Hatchett**, D. Koracin, and R. G. Niswonger. Linking global climate models to an integrated hydrologic model using an individual station downscaling approach. *Journal of Contemporary Water Research and Education* **147**:17-27, doi: 10.1111/j.1936-704X.2012.03100.x.

**Synergistic Activities**

- STEM Outreach:** Two field trips for Bishop, Walker, Mono, and Pyramid Paiute Indian tribes (K-12) to desert terminal lakes with emphasis on extreme weather and climate of the Great Basin. Two 60-minute presentations to underprivileged youth in Reno, NV about careers in STEM fields. One 35-minute lecture to K-12 teacher training on utilizing paleoclimate data to teach climate change.

[Hatchett NLCS 2017]

2. **Public Outreach:** Nine public lectures on droughts, extreme climate changes, and avalanche hazards.
3. **Mentoring:** Mentored one undergraduate (Henry Meier, U. Maine) during one-month field season collecting 10-Be surface exposure samples from Last Glacial Maximum moraine belts in June Lake, CA.

### Research Areas of Interest

Dryland hydroclimatology, Paleoclimatology, Synoptic Meteorology, Dynamic Meteorology, Regional Climate Modeling, Mountain Meteorology, Climate Dynamics, Urban Environments, Hydrologic Modeling

### Recent (3-year) Collaborators

Aaron Putnam (U. Maine/Columbia U.), Guleed Ali (Columbia U.), Adam Hudson (USGS), Jonathan Rutz (NWS), Edward Bair (UC Santa Barbara/ERI), John Abatzoglou (U. Idaho), Darko Koracin (DRI), John Mejia (DRI), Craig Smith (DRI), Ramesh Vellore (Indian Institute of Tropical Meteorology), Jeffrey Tilley (U. North Georgia), Michael Kaplan (DRI), Rajan Chakrabarty (Washington U.), Alice Doughty (Dartmouth), Scott Bassett (U. Nevada, Reno), Doug Boyle (U. Nevada, Reno), Chris Garner (DRI).

### Undergraduate Courses Taught (Different Courses): 2

### Craig Smith

Assistant Research Professor, Desert Research Institute

#### a) Professional preparation

University of California at Los Angeles	Mechanical Engineering	BS	1999
Oregon State University	Atmospheric Sciences	MS	2003
Oregon State University	Atmospheric Sciences	PhD	2010

#### b) Appointments

2013 – present	Assistant Research Professor, Desert Research Institute
2013 – present	Faculty, Graduate program in Atmospheric Sciences, University of Nevada, Reno
2013 – 2015	Project Scientist, Vertum Partners, Los Angeles, CA
2012 – 2013	Postdoctoral Research Fellow, Desert Research Institute
2011 – 2012	Postdoctoral Research Fellow, Indiana University
2010 – 2011	Postdoctoral Research Fellow, Ecole Polytechnique Federale du Lausanne
2003 – 2010	Graduate Research and Teaching Assistant, Oregon State University

#### c) Five products related to the proposed project

- Smith, C. M.**, Realtime operational numerical weather prediction model for SE California. Available online at <http://www.dri.edu/forecast-ridgecrest>, 2015 – present.
- Smith, C. M.**, D. Koraćin, D., and K. Horvath, 2014. Day-ahead predictability of complex terrain flows for wind resource production: a case study of the Washoe Zephyr. *Weather and Forecasting*, **29**, 1343-1355.
- Barthelmie, R. J., P. Crippa, H. Wang, **C. M. Smith**, R. Krishnamurthy, R. Calhoun, D. Valyou, P. Marzocca, D. Matthiesen, G. Brown, S.C. Pryor, 2013. 3D wind and turbulence characteristics of the atmospheric boundary-layer. Accepted for publication in the *Bulletin of the American Meteorological Society*. In press, early online view available.
- Smith, C. M.**, R. J. Barthelmie, and S. C. Pryor, 2013. In-situ observations of the influence of a large onshore wind farm on near-surface temperature, turbulence intensity and wind speed profiles. *Environmental Research Letters*, **v. 8 (3)**, 034006.

[Hatchett NLCS 2017]

**Smith, C. M.** and F. Porte-Agel, 2014. An intercomparison of subgrid models for large eddy simulation of katabatic flows. *Quarterly Journal of the Royal Meteorological Society*. **v. 140 (681)**, 1294-1303.

#### **d) Five other significant products**

Koraćin, D., R. Belu, B. Canadillas, K. Horvath, R. Vellore, **C. M. Smith**, J. Jiang, T. McCord, 2013. A review of challenges in assessment and forecasting of wind resources: *Croatian Meteorological Journal*, **v. 47**, 13-33.

**Smith, C. M.** and E. D. Skillingstad, 2011. Effect of inversion height and surface heat flux on downslope windstorms, *Monthly Weather Review*, **v. 139**, p. 3750-3764.

**Smith, C. M.** and E. D. Skillingstad, 2009. Investigation of upstream boundary layer influence on mountain wave breaking and lee wave rotors using a large eddy simulation: *Journal of Atmospheric Sciences*, **v. 66**, p. 3147-3164.

**Smith, C. M.** and E. D. Skillingstad, 2005. Numerical simulation of katabatic flow with changing slope angle, *Monthly Weather Review*, **v. 133**, p. 3065-3080.

Barthelmie, R. J., **C. M. Smith**, M. Churchfield, P. Moriarty, K. S. Hansen, and J. Madsen, Complex wake merging in large offshore wind farms: A comparison of wind farm and CFD model approaches. *AWEA offshore*, October 2012.

#### **e) Synergistic activities**

- Member, American Meteorological Society Renewable Energy committee, 2015-2017
- Chair, Solar Forecasting session, *American Meteorological Society General meeting*. New Orleans, LA, 01/2016.
- Chair, Complex Terrain session, *Traversing new terrain in Meteorological modeling, air quality and dispersion*. UC Davis, 09/2013. Conference sponsored by the California Air Resources Board (CARB).
- **Reviewer for the following journals:**  
National Science Foundation (NSF), Atmospheric and Geosciences (2016), Bulletin of the American Meteorology Society (2011, 2013), Boundary Layer Meteorology (2011), Earth Interactions (2013), Environmental Research Letters (2013), Environmental Science and Technology (2014), Journal of Applied Science (2015, 2016), Journal of Applied Meteorology and Climatology (2010, 2014, 2015), Journal of Geophysical Research – Atmospheres (2014), Journal of Wind Energy (2012 x2), Monthly Weather Review (2015), Oxford Handbooks (2016)

#### **f) Recent Collaborators**

Rebecca Barthelmie (Cornell University), Radian Belu (Drexel University), Gareth Brown (Sgurr), Ron Calhoun (Arizona State University), Scott Capps (Atmospheric Data Solutions), Branko Grisogono (University of Croatia), Kristian Horvath (Croatian meteorological and hydrological survey), Mike Kaplan (Desert Research Institute), Darko Koracin (Desert Research Institute and University of Croatia), Raghu Krishnamurthy (Leosphere), Pierre Marzocca (Clarkson University), Dave Matthiesen (Case Western Reserve University), Fernando Porte-Agel (Ecole Polytechnique Federale du Lausanne), Sara Pryor (Cornell University), Levi Stanton (Sonoma Tech Instrumentation), Jeff Tilley (Desert Research Institute), John Hui Wang (Sgurr), Cameron Whiteman (Vertum Partners)

#### **g) Graduate and Postdoctoral Advisors**

Darko Koraćin	Desert Research Institute
Rebecca Barthelmie	Indiana University
Fernando Porte-Agel	Ecole Polytechnique Federale du Lausanne
Eric Skillingstad	Oregon State University

#### **h) Thesis and Postdoctoral Advising**

Ben Hatchett	Postdoctoral advisee, Desert Research Institute, 08/2016 to present
Ashok Pohkarel	PhD, University of Nevada Reno 04/2016

[Hatchett NLCS 2017]

Christopher B. Garner

Assistant Research Hydrologist  
The Desert Research Institute  
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Reno, NV 89512

Phone: (775) 673-7684  
Email: [cgarner@dri.edu](mailto:cgarner@dri.edu)

**EDUCATION**

M.S., Hydrology, University of Nevada, Reno, 2007  
B.S., Geological Sciences, University of Memphis, 2005

**PROFESSIONAL EXPERIENCE**

Nov 2016-Present	Assistant Research Hydrologist, The Desert Research Institute, Reno, Nevada
2012-Oct 2016	Project Manager, Hydrologic Research, University of Nevada, Reno
2011-2012	Programmer/Analyst, Hydrologic Models, University of Nevada, Reno
2008-2011	Assistant Research Hydrologist, The Desert Research Institute, Reno, Nevada
2007-2008	Staff Hydrologist, The Desert Research Institute, Reno, Nevada
2005-2007	Graduate Research Assistant, The Desert Research Institute, Reno, Nevada
2001-2005	Research Assistant, Ground Water Institute, University of Memphis, Tennessee

**TECHNICAL SKILLS**

- Experience with watershed modeling software such as PRMS and HEC-HMS
- Specialized knowledge in design and implementation of computational Spatial Decision Support Systems for water resources planning and management.
- Experience using water resources software such as MODSIM and RiverWare
- Experience with groundwater modeling (MODFLOW and GMS)
- Excellent MATLAB programming skills for customized models and analytics
- Excellent computer programming skills for water resources analysis using VB.NET, Visual Basic, Excel (VBA), MATLAB, SQL, and FORTRAN languages.
- Experience using Geographic Information Systems (ArcGIS).
- Experience using water resources software such as MODSIM and RiverWare
- Experience with groundwater modeling (MODFLOW)
- Experience in designing, programming and utilizing Database Systems (MS-Access)

**PEER-REVIEWED PUBLICATIONS**

- Hatchett, B.J., D.P. Boyle, **C.B. Garner**, S.D. Bassett, M.L. Kaplan, and A.E. Putnam, "Magnitude and frequency of wet years under a megadrought climate in the western Great Basin, USA," *Quaternary Science Reviews*. Accepted. doi:10.1016/j.quatscirev.2016.09.017.
- Putnam, A., Putnam, D., Andreu-Hayles, L., Cook, E., Palmer, J., Clark, E., Wang, C., Chen, F., Denton, G., Boyle, D., Bassett, S., Birkel, S., Martin, J., Hajdas, I., Southon, J., **Garner, C.**, Cheng, H., Broecker, W., Little Ice Age wetting of interior Asian deserts and the rise of the Mongol Empire", *Quaternary Science Reviews*, 2016.
- Barth, C., D.P. Boyle, B.J. Hatchett, S. Bassett, and **C. Garner**, "Late Pleistocene Climate Inferences from a Water-Balance Model of Jakes Valley, NV," *Journal of Paleolimnology*. 2016
- Boyle, D.P., **C. Garner**, J.S. Tilley, S. Bassett, A. Huggins, and C. Barth, "Application of hydrologic models to assess the effects of cloud seeding on agriculture in the Walker River Basin of Nevada," *Journal of Weather Modification*, Vol. 47, 42-57, 2015.
- Carroll, R.W.H., G. Pohl, D. McGraw, **C. Garner**, A. Knust, D.P. Boyle, T. Minor, S. Bassett, and K. Pohlmann, "Mason Valley Groundwater Model: Linking Surface Water and Groundwater in the Walker River Basin, Nevada," *Journal of the American Water Resources Association*, 2010, 46(3), 554-573.
- Hatchett, B.J., D.P. Boyle, **C.B. Garner**, M.L. Kaplan, S.D. Bassett, and A.E. Putnam, "The sensitivity of a western Great Basin terminal lake to winter Northeast Pacific storm track activity and moisture transport," *The Geological Society of America Special Papers*. In revision.

[Hatchett NLCS 2017]

Letter of Support from Mark E. Hall, Field Manager, Black Rock Field Office

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**From:** "Hall, Mark" <mehall@blm.gov>  
**Date:** Thursday, February 2, 2017 at 10:14 AM  
**To:** Benjamin Hatchett <Benjamin.Hatchett@dri.edu>  
**Subject:** Letter

To Whom It May Concern:

The Black Rock Field Office, which manages the Black Rock NCA, has reviewed Dr. Hatchett's proposal. Should this project get funded, we are in full support of it--we will insure any necessary permits and NEPA paperwork are completed in a timely fashion. This project will help us with management decisions.

Should you have any questions, please contact me at the number below.

Best, Mark Hall

Mark E. Hall, PhD  
A  
cting  
Field Manager  
Black Rock Field Office  
Winnemucca District Office  
775-623-1529.

## REFERENCES

- Adams, K.D. (2007), Late Holocene lake-level fluctuations and sedimentary environments at Walker Lake, Nevada, USA. *Geol. Soc. Am. Bull.*, **119**, 126-139.
- Allendar, K.K., J.L. Smith, and M.J. Johnson (2009), Evapotranspiration from the Lower Walker River Basin, west-central Nevada, waters 2005-07. USGS Scientific Investigations Report 2009-5079. Available at: [<http://pubs.usgs.gov/sir/2009/5079/pdf/sir20095079.pdf>]
- Antevs, E., (1938), Climatic Variations During the Last Glaciation in North America. *Bull. Am. Met. Soc.*, **19**, 172-176.
- Backes, T.M., M.L. Kaplan, R. Schumer, and J.F. Mejia (2015), A climatology of the vertical structure of water vapor transport to the Sierra Nevada in cool season atmospheric river precipitation events. *J. Hydrometeorol.* **16**(3), 1029-1047.
- Bacon, S. N., R.M. Burke, S.K. Pezzopane, and A.S. Jayko (2006), Last glacial maximum and Holocene lake levels of Owens Lake, eastern California, USA. *Quat. Sci. Rev.*, **25**(11), 1264-1282.
- Broecker, W.S., and A.E. Putnam (2013), Hydrologic impacts of past shifts of Earth's thermal equator offer insight into those to be produced by fossil fuel CO<sub>2</sub>, *Proc. Nat. Aca. Sci.*, **110**, 16710-16715.
- Chang, E.K.M., C. Zheng, P. Lanigan, A.M.W. Yau, and J.D. Neelin (2015), Significant modulation of variability and projected change in California winter precipitation by extratropical cyclone activity. *Geophys. Res. Lett.*, **42**, 5983-5991, doi:10.1002/2015GL064424.
- Compo, G.P. and coauthors (2011), The Twentieth Century reanalysis project. *Quat. J. Royal Meteorol. Soc.*, **137**, 1-28, doi:10.1002/qj.776.
- Dettinger, M.D., Cayan, D.R., Diaz, H.F., Meko, D.M., (1998), North-south precipitation patterns in western North America on interannual-to-decadal timescales. *J. Climate.*, **11**, 3095-3111.
- Enzel, Y., D.R. Cayan, R.Y. Anderson, and S.G. Wells, (1989), Atmospheric circulation during Holocene lake stands in the Mojave Desert: evidence of regional climate change. *Nature*, **341**, 44-47.
- Hatchett, B.J., D.P. Boyle, A.E. Putnam, and S.D. Bassett (2015), Placing the 2012-2015 California-Nevada drought into a paleoclimatic context: Insights from Walker Lake, California-Nevada, USA, *Geophys. Res. Lett.*, **42**, doi:10.1002/2015GL065841.
- Hatchett, B., D.P. Boyle, C.B. Garner, M.L. Kaplan, A.E. Putnam, and S.D. Bassett, (2016), Magnitude and frequency of wet years under a megadrought climate in the western Great Basin, USA. *Quat. Sci. Rev.*, In press. doi:10.1016/j.quatsci.2016.09.017.
- Hatchett, B., D.P. Boyle, C.B. Garner, M.L. Kaplan, A.E. Putnam, and S.D. Bassett, (2017), Sensitivity of of a Great Basin terminal lake system to changes in winter season North Pacific storm tracks and moisture transport. In revision for *Geol. Soc. Amer. Sp. Papers*.
- Herweijer, C., R. Seager, E.R. Cook, and J. Emile-Geay (2007), North American droughts of the last millennium from a gridded network of tree ring data. *J. Climate*, **20**, 1353-1376.
- Ibarra, D.E., A.E. Egger, K.L. Weaver, C.R. Harris, and K. Maher (2014), Rise and fall of late Pleistocene pluvial lakes in response to reduced evaporation and precipitation: Evidence from Lake Surprise, California. *Bull. Geol. Soc. Amer.*, B31014-1.
- Johnson, R.H., P. E. Ciesielski, B. D. McNoldy, P. J. Rogers, and R. K. Taft (2007), Multiscale variability of the flow during the North American Monsoon Experiment. *J. Climate*, **20**, 1628-1648.
- Kirby, M.E., Zimmerman, S.R.H., Patterson, W.P. and Rivera, J. J. 2012. A 9170-year record of decadal-to-multi-centennial scale pluvial episodes from the coastal Southwest United States: a role for atmospheric rivers? *Quat. Sci. Rev.*, **46**, 57-65.
- Kutzbach, J.E., and H.E. Wright, Jr., (1985), Simulation of the climate of 18,000 yr BP: results for the North American/North Atlantic/European Sector. *Quat. Sci. Rev.*, **4**, 147-187.
- Lachniet, M., R. Denniston, Y. Asmerom, and V. Polyak, 2014: Orbital control of western North America atmospheric circulation and climate over two glacial cycles: *Nature Comm.*, **5**, 3805.
- Livneh B., E.A. Rosenberg, C. Lin, B. Nijssen, V. Mishra, K.M. Andreadis, E.P. Maurer, and D.P. Lettenmaier (2013) A Long-Term Hydrologically Based Dataset of Land Surface Fluxes and States for the Conterminous United States: Update and Extensions. *J. Climate*, **26**, 9384-9392.



- Louderback, L.A., Rhode, D.E., (2009), 15,000 years of vegetation change in the Bonneville basin: the Blue Lake pollen record. *Quat. Sci. Rev.*, **28**, 308-326.
- Lyle, M., L. Heusser, C. Ravelo, M. Yamamoto, J. Barron, N. S. Diffenbaugh, T. Herbert, and D. Andreasen (2012), Out of the tropics: the Pacific, Great Basin Lakes, and Late Pleistocene water cycle in the western United States. *Science*, **337**, 1629-1633.
- Mantua, N., S. Hare, Y. Zhang, J. Wallace, and R. Francis, 1997: A Pacific Interdecadal Climate Oscillation with Impacts on Salmon Production. *Bull. Amer. Meteor. Soc.*, **78**, 1069–1079.
- McCabe, G.J., Betancourt, J.L., Gray, S.T., Palecki, M.A. and Hidalgo, H.G., 2008. Associations of multi-decadal sea-surface temperature variability with US drought. *Quat. Int.*, **188**, 31-40.
- Meehl, G.A., and A. Hu, 2006: Megadroughts in the Indian monsoon region and southwest North America and a mechanism for associated multidecadal Pacific sea surface temperature anomalies. *J. Climate*, **19**, 1605-1623, doi:10.1175/JCLI3675.1.
- Mensing, S., Sharpe, S., Tunno, I., Sada, D., Thomas, J., Starratt, S., Smith, J. (2013), The Late Holocene Dry Period: Multiproxy evidence for an extended drought between 2800 and 1850 cal yr BP across the central Great Basin, USA. *Quat. Sci. Rev.* **78**, 266-282.
- Mifflin, M.D., and M.M. Wheat, 1979: Pluvial lakes and estimate pluvial climates of Nevada. *Nevada Bureau of Mines and Geology*, Bulletin 94, Reno, NV.
- Neelin, J.D., D.S. Battisti, A. C. Hirst, F-F. Jin, Y. Wakata, T. Yamagata, and, S. Zebiak, (1998), ENSO theory. *J. Geophys. Res. Oceans*, **103**, 14,261-14,290.
- Oakley, N. and K. Redmond, (2014), A Climatology of 500-hPa Closed Lows in the Northeastern Pacific Ocean, 1948–2011. *J. Appl. Meteor. Climatol.*, **53**, 1578–1592.
- Oster, J., D.E. Ibarra, M.J. Winnick, and K. Maher, 2015: Steering of westerly storms over western North America at the Last Glacial Maximum. *Nat. Geosci.* **8**, 201-205, doi:10.1038/ngeo2365.
- Quade J., and W.S. Broecker, 2009: Dryland hydrology in a warmer world: lessons from the last glacial period. *Euro. Phys. J.*, **176**, 21-36.
- Ralph, F. M., P. J. Neiman, and G. A. Wick (2004), Satellite and CALJET aircraft observations of atmospheric rivers over the eastern North Pacific Ocean during the winter of 1997/98. *Mon. Wea. Rev.* **132**, 1721-1745.
- Reheis, M.C., K.D. Adams, C.G. Oviatt, and S.N. Bacon, 2014: Pluvial lakes in the Great Basin of the western United States-a view from the outcrop. *Quat. Sci. Rev.*, **97**, 33-57.
- Rutz, J.J., W.J. Steenburgh, and F.M. Ralph (2014), Climatological characteristics of atmospheric rivers and their inland penetration over the western United States. *Mon. Wea. Rev.*, **142**, 905-921.
- Rutz, J.J., W.J. Steenburgh, and F.M. Ralph (2015), The inland penetration of atmospheric rivers over western North America: A Lagrangian Analysis. *Mon. Wea. Rev.*, **143**, 1924–1944.
- Skamarock, W.C. and coauthors (2008), A description of the advanced research WRF version 3. NCAR Technical Note TN-475+STR, 125 pp.
- Stine, S., 1990: Late Holocene fluctuations of Mono Lake, eastern California. *Palaeogeog. Palaeoclim. Palaeoecol.*, **78**, 333-381.
- Stine, S. (1994), Extreme and persistent drought in California and Patagonia during mediaeval time, *Nature*, **369**, 546-549.
- Thompson, R.S., and K.H. Anderson (2003), Biomes of western North America at 18,000, 6000 and 0 14C yr BP reconstructed from pollen and packrat midden data. *J. Biogeography* **27**(3), 555-584.
- Wallace, J. and D. Gutzler, 1981: Teleconnections in the Geopotential Height Field during the Northern Hemisphere Winter. *Mon. Wea. Rev.*, **109**, 784–812.
- Wigand, P.E. (1987), Diamond Pond, Harney County, Oregon: vegetation history and water table in the eastern Oregon Desert. *Great Basin Naturalist*, **47**, 427–458.
- Wise, E.K. (2010), Spatiotemporal variability of the precipitation dipole transition zone in the western United States. *Geophys. Res. Lett.*, **37**, doi:10.1029/2009GL042193.

Application for Federal Assistance SF-424		
<b>* 1. Type of Submission:</b> <input type="checkbox"/> Preapplication <input checked="" type="checkbox"/> Application <input type="checkbox"/> Changed/Corrected Application		
<b>* 2. Type of Application:</b> <input type="checkbox"/> New <input checked="" type="checkbox"/> Continuation <input type="checkbox"/> Revision		
<b>* If Revision, select appropriate letter(s):</b> <input type="text"/> <b>* Other (Specify):</b> <input type="text"/>		
<b>* 3. Date Received:</b> 01/24/2017		<b>4. Applicant Identifier:</b> <input type="text"/>
<b>5a. Federal Entity Identifier:</b> <input type="text"/>		<b>5b. Federal Award Identifier:</b> L12AC20378
<b>State Use Only:</b>		
<b>6. Date Received by State:</b> <input type="text"/>		<b>7. State Application Identifier:</b> <input type="text"/>
<b>8. APPLICANT INFORMATION:</b>		
<b>* a. Legal Name:</b> Natural History Museum of Utah, University of Utah		
<b>* b. Employer/Taxpayer Identification Number (EIN/TIN):</b> 876000525		<b>* c. Organizational DUNS:</b> 009095365
<b>d. Address:</b>		
<b>* Street1:</b> 75 South 2000 East		
<b>Street2:</b> <input type="text"/>		
<b>* City:</b> Salt Lake City		
<b>County/Parish:</b> Salt Lake		
<b>* State:</b> UT: Utah		
<b>Province:</b> <input type="text"/>		
<b>* Country:</b> USA: UNITED STATES		
<b>* Zip / Postal Code:</b> 84112 8930		
<b>e. Organizational Unit:</b>		
<b>Department Name:</b> OFFICE OF SPONSORED PROJECTS		<b>Division Name:</b> VP FOR RESEARCH
<b>f. Name and contact information of person to be contacted on matters involving this application:</b>		
<b>Prefix:</b> <input type="text"/>		<b>* First Name:</b> WILLIAM
<b>Middle Name:</b> <input type="text"/>		
<b>* Last Name:</b> ERNEST		
<b>Suffix:</b> <input type="text"/>		
<b>Title:</b> Sponsored Proj Grant & Contrac		
<b>Organizational Affiliation:</b> University of Utah		
<b>* Telephone Number:</b> 801/581 4714		<b>Fax Number:</b> 801/581 3007
<b>* Email:</b> william.ernest@osp.utah.edu		

<b>Application for Federal Assistance SF-424</b>			
<b>* 9. Type of Applicant 1: Select Applicant Type:</b> <input type="text" value="H: Public/State Controlled Institution of Higher Education"/>			
Type of Applicant 2: Select Applicant Type: <input type="text"/>			
Type of Applicant 3: Select Applicant Type: <input type="text"/>			
<b>* Other (specify):</b> <input type="text"/>			
<b>* 10. Name of Federal Agency:</b> <input type="text" value="Bureau of Land Management"/>			
<b>11. Catalog of Federal Domestic Assistance Number:</b> <input type="text" value="15.231"/>			
CFDA Title: <input type="text" value="Fish, Wildlife and Plant Conservation Resource Management"/>			
<b>* 12. Funding Opportunity Number:</b> <input type="text" value="L17AS00001"/>			
<b>* Title:</b> <input type="text" value="BLM FY2017 Bureau wide National Conservation Lands Scientific Studies Support Program"/>			
<b>13. Competition Identification Number:</b> <input type="text"/>			
Title: <input type="text"/>			
<b>14. Areas Affected by Project (Cities, Counties, States, etc.):</b> <input type="text"/> <input type="button" value="Add Attachment"/> <input type="button" value="Delete Attachment"/> <input type="button" value="View Attachment"/>			
<b>* 15. Descriptive Title of Applicant's Project:</b> <input type="text" value="CRITICAL DINOSAUR FOSSIL RESOURCE PROTECTION, INVENTORY, AND SALVAGE: LATE CRETACEOUS FORMATIONS WITHIN GRAND STAIRCASE ESCALANTE NATIONAL MONUMENT"/>			
Attach supporting documents as specified in agency instructions. <input type="button" value="Add Attachments"/> <input type="button" value="Delete Attachments"/> <input type="button" value="View Attachments"/>			

<b>Application for Federal Assistance SF-424</b>	
<b>16. Congressional Districts Of:</b>	
* a. Applicant <input type="text" value="UT 002"/>	* b. Program/Project <input type="text" value="2, 3"/>
Attach an additional list of Program/Project Congressional Districts if needed.	
<input type="text"/>	<input type="button" value="Add Attachment"/> <input type="button" value="Delete Attachment"/> <input type="button" value="View Attachment"/>
<b>17. Proposed Project:</b>	
* a. Start Date: <input type="text" value="05/01/2017"/>	* b. End Date: <input type="text" value="04/30/2018"/>
<b>18. Estimated Funding (\$):</b>	
* a. Federal	<input type="text" value="20,739.00"/>
* b. Applicant	<input type="text" value="20,691.00"/>
* c. State	<input type="text" value="0.00"/>
* d. Local	<input type="text" value="0.00"/>
* e. Other	<input type="text" value="0.00"/>
* f. Program Income	<input type="text" value="0.00"/>
* g. TOTAL	<input type="text" value="41,430.00"/>
<b>* 19. Is Application Subject to Review By State Under Executive Order 12372 Process?</b>	
<input type="checkbox"/> a. This application was made available to the State under the Executive Order 12372 Process for review on <input type="text"/> .	
<input type="checkbox"/> b. Program is subject to E.O. 12372 but has not been selected by the State for review.	
<input checked="" type="checkbox"/> c. Program is not covered by E.O. 12372.	
<b>* 20. Is the Applicant Delinquent On Any Federal Debt? (If "Yes," provide explanation in attachment.)</b>	
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
If "Yes", provide explanation and attach	
<input type="text"/>	<input type="button" value="Add Attachment"/> <input type="button" value="Delete Attachment"/> <input type="button" value="View Attachment"/>
<b>21. *By signing this application, I certify (1) to the statements contained in the list of certifications** and (2) that the statements herein are true, complete and accurate to the best of my knowledge. I also provide the required assurances** and agree to comply with any resulting terms if I accept an award. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties. (U.S. Code, Title 218, Section 1001)</b>	
<input checked="" type="checkbox"/> ** I AGREE	
** The list of certifications and assurances, or an internet site where you may obtain this list, is contained in the announcement or agency specific instructions.	
<b>Authorized Representative:</b>	
Prefix: <input type="text"/>	* First Name: <input type="text" value="Brent"/>
Middle Name: <input type="text"/>	
* Last Name: <input type="text" value="Brown"/>	
Suffix: <input type="text"/>	
* Title: <input type="text" value="Director"/>	
* Telephone Number: <input type="text" value="801 581 6903"/>	Fax Number: <input type="text" value="801 585 5749"/>
* Email: <input type="text" value="ospawards@osp.utah.edu"/>	
* Signature of Authorized Representative: <input type="text" value="Brent Brown"/>	* Date Signed: <input type="text" value="01/24/2017"/>

DOI-2020-12 01354

## Project Narrative File(s)

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\* Mandatory Project Narrative File Filename:

[Add Mandatory Project Narrative File](#)

[Delete Mandatory Project Narrative File](#)

[View Mandatory Project Narrative File](#)

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To add more Project Narrative File attachments, please use the attachment buttons below.

[Add Optional Project Narrative File](#)

[Delete Optional Project Narrative File](#)

[View Optional Project Narrative File](#)

# INDIVIDUAL EVALUATION SCORING SHEET

Funding Opportunity Announcement No. L17AS00001

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

Grants.gov Project # and Applicant Legal Business Name: 12328840 Museum of Western ColoradoEvaluator: Scott Foss Title: Critical Evaluation of Paleo Resources of Triassic/Jurassic Transition in Bears Ears NM

Evaluation Factors	Ratings (see attached description or use your own method)
<b>State Ranking</b> <b>(b)(5) DPP</b>	
<b>Clear Objective</b> (Maximum score 15/100 Points) Notes:	
<b>Research Theme and Technical Approach</b> (Maximum score 25/100 Points) Notes:	
<b>Public Benefit</b> (Maximum score 20/100 Points) Notes:	
<b>Qualifications</b> (Maximum score 10/100 Points) Notes:	

UNITED STATES DEPARTMENT OF THE INTERIOR  
Bureau of Land Management

**FUNDING OPPORTUNITY ANNOUNCEMENT**  
for  
**Federal Financial Assistance**

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**FUNDING OPPORTUNITY TITLE:**

**BLM FY2017 Bureau-wide National Conservation Lands Scientific Studies Support Program**

**(Formerly known as National Landscape Conservation System Research Support Program)**

**FUNDING OPPORTUNITY NUMBER:**

**L17AS00001**

**ANNOUNCEMENT TYPE: AMENDMENT NO. 1 ~ Issued January 10, 2017**

**Modifications to this Funding Opportunity Announcement:**

- 1. Extends the deadline for submission of applications to Febuary 2, 2017, 11.59 p.m. Eastern Time**
- 2. Changes Science Program Lead**
- 3. Clarifies the Application Review Process**

**CFDA NUMBER & TITLES APPLICABLE TO THIS ANNOUNCEMENT:**

- 15.224 - Cultural Resource Management
- 15.225 - Recreation Resource Management
- 15.230 - Invasive & Noxious Plant Management
- 15.231 - Fish, Wildlife and Plant Conservation Resource Management
- 15.233 - Forests & Woodlands Resource Management (stewardship agreements)
- 15.237 - Rangeland Resource Management

**DEADLINE FOR SUBMISSION OF APPLICATIONS:**

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**CONTACT INFORMATION:**

**Brandon Riley, Grants Management Specialist**

Telephone: 202 912 7540, Email: [briley@blm.gov](mailto:briley@blm.gov)

**Mara Alexander, Science Program Lead**

Telephone: 202 912 7096, Email: [malexander@blm.gov](mailto:malexander@blm.gov)

**BLM**

**Bureau of Land Management—Financial Assistance**



BLM Funding Opportunity Announcement

No. L17AS00001

**Project Title:** BLM FY2017 Bureau wide National Conservation Lands Scientific  
Studies Support Program  
(Formerly known as National Landscape Conservation System Research Support Program)

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## **A. PROGRAM DESCRIPTION**

### **1. Authority**

This Bureau of Land Management (BLM) Federal Financial Assistance Funding Opportunity is being announced under the following legislative authorities:

**ENDANGERED SPECIES ACT, 16 USC 1535, PL 93-205, Section 6 as amended by PL 97-304. Section 1535.**

**FEDERAL LAND POLICY AND MANAGEMENT ACT OF 1976 (FLPMA), 43 USC §1737 (b), Public Law 94-579**

**FEDERAL NOXIOUS WEED ACT (Public Law 93-629, as amended) 7 USC §2814 Management of undesirable plants on Federal lands**

**FISH AND WILDLIFE CONSERVATION AND WATER RESOURCES DEVELOPMENTS COORDINATION ACT (FISH AND WILDLIFE COORDINATION ACT), Public Law 85-624 as amended, 16 U.S.C. §661 and §664**

**GOOD NEIGHBOR AUTHORITY (GNA), Consolidated Appropriations Act, 2014 PL 113-76 and the Agricultural Act of 2014 PL 113-79, 16 USC §2113a**

**HEALTHY FORESTS RESTORATION ACT OF 2005, 16 USC 6501, PL 108-148. Section 6501 NATIONAL TRAILS SYSTEM ACT, 16 USC 1246, PL 90-543, as amended by PL 95-625, 96-87, and 98-11. Section 1246**

**PUBLIC RANGELANDS IMPROVEMENT ACT OF 1978, 43 USC 1906, PL 95-514. Section 9. Section 1906**

**SIKES ACT, 16 USC 670h and 670j. PL 86-797, Title II, Sec. 202, as added PL 93-452, Sec 2; as amended PL 97-396, Sec 4. Sec 670h**

**TAKE PRIDE IN AMERICA ACT (TPIA), Public Law 101-628, as amended, 16 USC §4601, 4605**

**WATERSHED RESTORATION AND ENHANCEMENT AGREEMENTS (aka THE WYDEN AMENDMENT), 16 USC 1011 , PL 104-208, Section 124, as amended by PL 105-277, Section 136, as amended by PL 108-7, Section 135. Section 1011**

**WILD AND SCENIC RIVERS ACT, 16 USC 1281, PL 90-542, Section 1281**

Projects will be awarded under specific legislative authority that pertains to that particular project.

### **2. Description of Program and/or Project**

- a. Background: The BLM is unique in its mission of managing the public lands for multiple use and sustained yield of resources, including conservation. More than 30 million acres of BLM land is recognized for outstanding conservation

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values and designated for special management by Acts of Congress or Presidential Proclamations.

The BLM manages these special areas to maintain and enhance their conservation values with the goal to conserve, protect, and restore these important landscapes and their outstanding cultural, ecological, and scientific values. These areas range from broad Alaskan tundra to red rock deserts and from deep river canyons to rugged ocean coastlines and include some of America's finest natural and cultural treasures.

The National Conservation Lands include the following unit designations:

- National Monuments and National Conservation Areas;
- Wilderness/Wilderness Study Areas;
- National Wild and Scenic Rivers; and
- National Scenic and Historic Trails.

The National Conservation Lands financially supports scientific studies aimed at increasing our understanding of the resources present on BLM management lands and the effectiveness of BLM's resource management decisions. The program seeks to engage the external scientific community in conducting scientific studies on the National Conservation Lands that can benefit management of the public lands.

The following are examples of projects funded in Fiscal Year 2016:

- Inventorying and assessing of wetlands for their status and ecological condition within the National Trails Management in Wyoming
- Testing the use of remote sensing data to survey for prairie dog towns important to Black Footed Ferrets in the Rio Grande del Norte National Monument in New Mexico
- Using citizen science to inventory paleontology resources in BLM Wilderness Study Areas in Montana
- Ranid Frog recovery in Las Cienegas National Conservation Area in Arizona
- Fossil inventory and salvage in Grand Staircase-Escalante National Monument in Utah
- Investigating inter marsh movements of Amargosa vole populations to better manage this endangered species in the Amargosa Wild and Scenic River in California
- Inventory of coastal meadow pollinator habitats of the San Juan National Monument in Washington
- Assessing fungi inoculation of planted Big Sagebrush seedling success after wildfires in Birds of Prey NCA in Idaho

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- b. Objectives: BLM has Bureau-wide funding available in Fiscal Year 2017 to develop new partnerships and support existing partners with established cooperative agreements.

These projects will assist the BLM in gaining scientific understanding of National Conservation Lands' resources and landscapes and the benefits they provide the American public. They will also apply scientific understanding to management, education, and outreach. Please review the public benefit section for more information.

- c. Public Benefit:

**Natural, Scientific, and Cultural Benefits** - The National Conservation Lands protect a myriad of endangered species, diverse habitats and ecosystems, historic properties, and cultural resources. These designated lands help ensure that the Nation's extraordinary biodiversity and cultural heritage will be sustained for present and future generations to enjoy. As landscape pressures such as drought, climate change, and the loss of species habitat and migration corridors continue to be of concern, units of the National Conservation Lands offer opportunities for scientists to conduct important research and data collection. The National Conservation Lands contain over 30 percent of all special-status animal species found on BLM lands. These science projects will help the BLM better understand the National Conservation Lands' natural, scientific, and cultural resources, and the benefits they provide the American public by applying scientific understanding to management, education, and outreach.

**Recreation Benefits** - As wide-open spaces and opportunities for natural exploration continue to dwindle, the National Conservation Lands conserve over 30 million acres of rugged landscapes for the public to explore and enjoy, and hosts more than one-fourth of all recreation on BLM lands. These diverse lands provide opportunities for recreationists of all kinds, from white-water rafters and rock climbers to hunters and fishermen, hikers and skiers to boaters and off-highway vehicle riders. The BLM manages units that include over 2,700 recreation sites and 22 visitor centers, and serves approximately 14 million visitors annually. Because of the high rate of visitation, the communities surrounding the National Conservation Lands reap significant economic benefits through tourism services. These science projects will help the BLM better understand the National Conservation Lands' recreational resources, the benefits they provide the American public, and apply scientific understanding to management, education, and outreach.

### 3. Program Performance Goals and Deliverables:

BLM Funding Opportunity Announcement

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- a. National Conservation Lands program requires specific performance goals and outcomes to be accomplished. Proposals must identify how the project incorporates at least one of the following these goals/themes:
  - i. **Research Identified in Unit Science Plans (for National Monuments, National Conservation Areas, and Similar Designations):** BLM Manual Section 6220 calls for the development of science plans for applicable units of the National Conservation Lands. Projects identified in finalized unit science plans will be given priority over new proposals for that unit.
  - ii. **Effectiveness Research:** Research that empirically tests the effectiveness of management practices (e.g., evaluating past restoration efforts or best management practices for minimizing impacts).
  - iii. **Standardized Inventory and Monitoring:** Research that uses the principles presented in the BLM's Assessment, Inventory, and Monitoring Strategy to apply standardized, scientifically-defensible indicators and methods for inventorying and monitoring the resources, objects, and/or values for which National Conservation Lands were designated.
  - iv. **Research Syntheses:** Research that synthesizes a diverse array of scientific investigations or data from a new perspective in order to improve best management practices for a National Conservation Lands priority topic.
  - v. **Citizen Science:** Research that engages citizen scientists (volunteers) as assistants under agency supervision in data collection, compilation, or data analysis to improve BLM's management of the National Conservation Lands (e.g. bio-blitzes).
  - vi. **Other Management-Driven Research:** Research that provides information that can directly inform a pertinent and pressing management question.
- b. The project proposal must identify specific deliverables or outcomes to be accomplished (e.g. reports, peer-reviewed articles, GIS files, outreach tools, at a minimum, these must include:
  - i. Annual progress reports;
  - ii. A final report, suitable for distribution to BLM staff; and
  - iii. A manager's summary (less than one page report that helps inform managers' decisions).

## B. FEDERAL AWARD INFORMATION

1. **Award Instrument:** In accordance with the Legislative Authority, a cooperative agreement will be used and substantive Bureau of Land Management (BLM) involvement will consist of the following: The BLM Program Officer (PO) will collaborate with the recipient's Project Manager/Principal Investigator (RPM/PI) to manage all stages of project development, implementation, and evaluation. Responsibility for project management, control, and direction will be shared by the recipient and the BLM, however the BLM will have the right to intervene by

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modifying the project management plan if the project is not staying on schedule and/or technical issues arise.

2. **Anticipated number of awards to make under this announcement:** BLM anticipates making 20 awards in FY 2017 depending on availability of funding. If funding in the later part of the fiscal year becomes available there could be additional awards. BLM anticipates dispersing funding across states where BLM lands are located.
3. **Individual award amounts will be no more than \$25,000 per award and could fund subsequent fiscal years depending on approved appropriation.**
4. **Total funding expected (based on FY 2016 allocation) to be awarded through this announcement: \$397,000.**
5. **Anticipated Start Date:** April 1, 2017
6. **Anticipated Period of Performance:** Five (5) years maximum  
From: April 1, 2017  
To: March 31, 2022
7. **No Obligation to Award:** The BLM is under no obligation to award funds for these projects. Only BLM Grants Management Officers (GMO) may obligate funds for financial assistance.

## C. ELIGIBILITY INFORMATION

1. **Eligible Applicants**  
*Any* state, local government, Indian tribe, institution of higher education (IHE), or nonprofit organization.
2. **Cost Sharing or Matching**  
**(Endangered Species Act, 3:1 Matching)** – If project is awarded under the **Endangered Species Act, 16 USC 1535, PL 93-205, Section 6 as amended by PL 97-304. Section 1535**, refer to (d) Allocation of Funds (2)(i) the Federal share of such program costs shall not exceed 75% of the estimated program cost stated in agreement, 1:3 (Recipient:BLM) Match; and (ii) 10% whenever two or more States having a common interest in one or more endangered or threatened species.

Applicants may attribute some or all of their allowable indirect costs as voluntary committed cost-share/match, however recipients may only charge to the Federal award the indirect costs calculated against the allowable direct costs charged to the Federal award. Recipients may not charge to the Federal award indirect costs calculated against: 1) any portion of the recipient's direct costs which are proposed as voluntary committed cost-share/match; or 2) any portion of the direct costs charged to any other Federal or non-Federal partner.

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**3. Other Eligibility Restrictions**

This financial assistance opportunity is also open to all partners under any Cooperative Ecosystem Studies Unit (CESU) program. CESUs are partnerships that provide research, technical assistance, and education. If a cooperative agreement is awarded to a CESU partner under a formally negotiated Master CESU agreement, indirect costs are limited to a rate of no more than 17.5% of the indirect cost base recognized in the partner's Federal Agency-approved Negotiated Indirect Cost Rate Agreement (NICRA).

**D. APPLICATION REQUIREMENTS AND SUBMISSION INFORMATION****\*\*\*\*PRIOR TO SUBMITTING PROPOSAL\*\*\*\***

**\*\*\* RECIPIENT MUST CONTACT DESIGNATED NATIONAL CONSERVATION LANDS LEAD IN THE STATE WHERE THE PROJECT IS OCCURRING (REFER TO PAGE 23 ~ SECTION G OF THIS ANNOUNCEMENT) PRIOR TO SUBMITTING APPLICATION.**

**\*\*\* IDENTIFY IF YOUR PROPOSAL IS A CONTINUATION OF AN EXISTING BLM COOPERATIVE AGREEMENT AND PROVIDE CURRENT BLM AGREEMENT NUMBER ( i.e., L16AC00000). IDENTIFY FY 2017 WORK TO BE ACCOMPLISHED WITH NEW MILESTONES AND GOALS. FOLLOW ATTACHMENT A FOR SUBMITTING YOUR PROPOSED WORK.**

**1. Submission Dates and Times**

See announcement cover sheet for the deadline (date and time) for submission of applications. Applications must be received by the BLM prior to the posted deadline. Any application received after the deadline for submission may not be considered for award unless it can be determined the delay was caused by Federal government mishandling.

**2. Application Submission via [www.grants.gov](http://www.grants.gov)**

The Bureau of Land Management participates in the Grants.gov initiative which provides the Grant Community with a single website, [www.grants.gov](http://www.grants.gov), to search for and apply for all federal grant opportunities.

- a. All applicants should register at [www.grants.gov](http://www.grants.gov) and all applications should be submitted electronically through [www.grants.gov](http://www.grants.gov) unless other arrangements are made and approved of in advance of the submission

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deadline. If you have any questions or problems with the registration or application submission process, contact the Grants.gov Help Desk at 1-800-518-4726, or go to <http://www.grants.gov/web/grants/support/technical-support/troubleshooting.html> for online help.

- b. Applications submitted through [www.grants.gov](http://www.grants.gov) are considered to be electronically signed applications.

**Important note on Grants.gov application attachment file names:**

Please do not assign application attachments file names longer than 20 characters, including spaces. Assigning file names longer than 20 characters will create issues in the automatic interface between Grants.gov and BLM's financial assistance management system.

**3. Intergovernmental Review**

Before submitting an application, U.S. state and local government applicants should visit the following website ([http://www.whitehouse.gov/omb/grants\\_spoc/](http://www.whitehouse.gov/omb/grants_spoc/)) to determine whether their application is subject to the state intergovernmental review process under Executive Order (E.O.) 12372 "Intergovernmental review of Federal Programs." E.O. 12372 was issued to foster the intergovernmental partnership and strengthen federalism by relying on state and local processes for the coordination and review of proposed Federal financial assistance and direct Federal development. The E.O. allows each state to designate an entity to perform this function. The official list of designated entities is posted on the website. Contact your state's designated entity for more information on the process the state requires to be followed when applying for assistance. States that do not have a designated entity listed on the website have chosen not to participate in the review process.

The period of performance for projects awarded under this program is one or more years. Project proposals must be designed and budgeted accordingly. For multi-year projects, budgets and project activities should be clearly articulated in phases/years and support for future phases/years will be contingent on project performance, satisfactory reporting and financial management, and availability of program funds. Past and present recipients of awards under this program are eligible, but must submit new proposals to compete for additional funding.

**4. Application Package**

This announcement includes all information, documents, and electronic addresses needed to submit an application through [www.grants.gov](http://www.grants.gov). Paper copies may be requested by contacting the individual(s) listed on the application coversheet.

Download the Application Package linked to this Funding Opportunity on Grants.gov to begin the application process. Downloading and saving the Application Package to

## BLM Funding Opportunity Announcement

No. L17AS00001

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your computer makes the required government-wide standard forms fillable and printable.

##### 5. DUNS Number and SAM Registration

Each applicant (unless the applicant is an individual or Federal awarding agency that is exempt from those requirements under 2 CFR § 25.110(b) or (c), or has an exception approved by the Federal awarding agency under 2 CFR § 25.110(d)) is required to:

- a. Provide a valid DUNS number (Dun & Bradstreet Universal Numbering System) on its application. DUNS numbers are nine-digit numbers established and assigned by Dun and Bradstreet, Inc. (D&B) to uniquely identify business entities. DUNS numbers may be obtained free of charge from Dun & Bradstreet, Inc., at: <http://fedgov.dnb.com/webform> or by calling them at (877) 930-5228.
- b. Be registered in SAM (System for Award Management, [www.SAM.gov](http://www.SAM.gov)) before submitting its application. SAM is the Official U.S. Government system that consolidated the capabilities of CCR/FedReg, ORCA, and EPLS. There is no fee to register at this site. Register in the System for Award Management (SAM) at: <http://www.sam.gov>.
- c. Continue to maintain an active SAM registration with current information at all times during which the applicant has an active Federal award or an application or plan under consideration by a Federal awarding agency.

##### 6. The Application Package

Applications must include all required Standard Forms (SF) shown below, a Proposal (Attachment A), a Budget Detail (Attachment B), and a copy the applicant's approved federal agency Negotiated Indirect Cost Rate Agreement (NICRA), if applicable. Non-governmental organizations that have not previously received award funds or have not had an active award within 3 (three) years must complete a Financial Assistance Evaluation Questionnaire. A copy of the questionnaire may be requested by contacting the Grants Management Officer(s) listed on the application coversheet.

##### **WHAT TO SUBMIT:**

Required Form Name and Number	✓
SF-424 Application for Federal Assistance **If a continuation of existing cooperative agreement with the BLM mark continuation in item 2 "Type of Application" and identify current agreement number in item 5b.	
SF-424A Budget Information - Non-Construction Programs	



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Required Form Name and Number	✓
SF-424B Assurances - Non-Construction Programs	
SF LLL Form: If applicable, Completed SF LLL Disclosure of Lobbying Activities form	
Project Proposal (Attachment A to this document)	
Budget Detail and Justification of Costs (Attachment B to this document)	
Federal Agency-approved Negotiated Indirect Cost Rate Agreement (NICRA), if applicable	
Conflict of Interest Statement, when applicable	
Financial Assistance Evaluation Questionnaire (if applicable)	

**\*\*Failure to provide complete information may cause delays, postponement, or rejection of the application.**

a. Project Proposal (Attachment A)

Attachment A is a suggested project proposal template and may be used when submitting your proposal. The proposal must be no longer than 15 pages, with a type-face no smaller than 11-point, and have at least one (1) inch margins on all sides. The 15 page limit includes all text, figures, references, and vitae, but does not include the Budget Detail (Attachment B).

All proposals are confidential.

b. Budget Detail (Attachment B)

- 1) Use the Budget Detail sample form (Attachment B) to present the breakdown of your estimated costs by category needed to accomplish project activities, along with your budget justification of all costs. Estimated costs should be described in sufficient detail so that they may be checked for allowable, allocable and reasonable. Include a description of any cost share (cash, in-kind, etc.) listed. Lump sum costs are not acceptable in any category, without a detail breakdown of how the costs would be accrued. **No profit or fees are allowable.**

- 2) Budget details should be broken down into the following categories:

**Personnel Costs.** List salaries or wages of employees working directly on your proposed project agreement. Indicate program manager and other key personnel by name and title. Other personnel may be indicated by title alone. For all positions, indicate salaries or

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wages and estimated hours or percent of time to be spent on the agreement.

**Fringe Benefit Costs.** The costs of fringe benefits of employees working directly on your project. Indicate rates/amounts, what costs are included in this category, and the basis of the rate computations. Federally approved rate agreements are acceptable for compliance with this item.

**Travel Costs.** The estimated costs for travel related to your project activities. Include the purpose of trip, destination, number of persons traveling, length of stay, and all travel costs including airfare, per diem, lodging, and miscellaneous travel-related expenses. For local travel, include mileage and rate of compensation. If applicable, indicate that the costs are per your organization's written travel policy. Current Federal per diem rates (the maximum allowances that federal employees are reimbursed for expenses incurred while on official travel) may be found at <http://www.gsa.gov/portal/content/104877>.

**Equipment Costs.** Equipment is defined as expendable tangible personal property having a useful life of more than one (1) year and an acquisition cost of more than \$5,000.00, or a value which reaches the capitalization threshold level established by the organization for financial statement purposes.

**Supply Costs.** The costs of consumable supplies and materials to be used for project activities. List each item and quantity individually.

**Contractual Costs.** Include estimated costs of proposed professional and technical consultants and contractors participating on the project. Identify all work that will be accomplished, including a breakdown of all tasks to be completed, and a detailed budget estimate of time, rates, supplies, and materials that will be required for each task. Any changes or additions will require a request for approval. Procurement procedures must comply with 2 CFR Parts 200.317 through 200.326.

**Construction Costs.** The cost of any construction directly related to the project activities.

**Other Costs.** The cost of items not listed above and which do not fit in any other category, such as the cost of duplicating and printing, equipment rental, postage, etc. No profit or fee will be allowed.

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**Total Direct Costs.** The sum of categories (a) through (h).

**Indirect Costs.** All applicants are hereby notified of the following:

- Recipients without an approved indirect cost rate are prohibited from charging indirect costs to a Federal award. Accepting the 10% *de minimus* rate as a condition of award is an approved rate.
- Failure to establish an approved rate during the award period renders all costs otherwise allocable as indirect costs unallowable under the award.
- Only the indirect costs calculated against the Federal portion of the total direct costs may be charged to the Federal award. Recipients may not charge to their BLM award any indirect costs calculated against the portion of total direct costs charged to themselves or charged to any other project partner, Federal and non-Federal alike.
- Recipients must have prior written approval from the BLM to transfer unallowable indirect costs to amounts budgeted for direct costs or to satisfy cost-sharing or matching requirements under the award.
- Recipients are prohibited from shifting unallowable indirect costs to another Federal award unless specifically authorized to do so by legislation.”
- Applicants who are individuals applying for funds separate from a business or non-profit organization he/she may operate are not eligible to charge indirect costs to their award. If you are an individual applying for funding, do not include any indirect costs in your proposed budget.

If indirect costs will be charged to the project, complete this section and show the proposed rate, cost base, and proposed amount for allowable indirect costs. It is not acceptable to simply incorporate indirect rates within other direct cost line items.

**Include a copy of any federally approved negotiated indirect cost rate agreement (NICRA).**

If your organization has never had a NICRA, the BLM Grants Management Officer (GMO) may allow an indirect cost rate of up to 10% of your base modified total direct costs (MTDC). MTDC includes all salaries and wages, fringe benefits, materials and supplies, services, travel, and subgrants and subcontracts up to the

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first \$25,000 of each. Include the computational basis for the indirect expense pool and corresponding allocation base for your rate.

**Negotiating an Indirect Cost Rate with the Department of the Interior:** Entities that do not have a NICRA must first have an open, active Federal award before they can submit an indirect cost rate proposal to their cognizant agency. The Federal awarding agency that provides the largest amount of direct funding to your organization is your cognizant agency, unless otherwise assigned by the White House Office of Management and Budget (OMB). If the Department of the Interior is your cognizant agency, your indirect cost rate will be negotiated by the Interior Business Center (IBC). For more information, contact the IBC at:

Indirect Cost Services  
Acquisition Services Directorate, Interior Business Center  
U.S. Department of the Interior  
2180 Harvard Street, Suite 430  
Sacramento, CA 95815  
Phone: 916-566-7111  
Email: [ics@ibc.doi.gov](mailto:ics@ibc.doi.gov)  
Internet address:

<https://www.doi.gov/ibc/services/finance/indirect-cost-services>

**Total Costs.** The total of both direct and indirect costs estimated to be expended on your project activities.

**Each budget category shall include a budget justification of costs and how they derived to those cost, i.e., travel regulations, personnel wage schedules, competition and market research for cost, etc.**

## **E. APPLICATION REVIEW INFORMATION**

### **Application Selection Process**

Applications eligible for merit review will be evaluated by a field review committee to review, rate, rank, and recommend applications for award using the below evaluation criteria. Evaluation teams are made up of two or more qualified personnel familiar with the program and who have been certified to have no conflict of interest with any persons or organizations applying for award. The final selection of applications will take place at the BLM Washington Office, National Conservation Lands Division.

The Government reserves the right to reject any and all proposals which do not meet the requirements of this funding opportunity announcement and which are determined to be outside the scope of the authority under which this announcement is posted.

Awards will be made to responsive, responsible applicants who submit proposals which conform to the funding opportunity announcement and are most advantageous to the Government considering the evaluation factors listed below.

The evaluation process will be comprised of the following four screening levels:

#### **1. First Level Screening --Basic Eligibility**

- a. Applications will be screened by the Grants Management Officer to ensure that applications meet basic eligibility requirements. Depending on the specifics of the opportunity, screening may include, but is not limited to, the following:
  - 1) Program and/or legislative authority requirements are met;
  - 2) Submission is timely;
  - 3) Complete and properly executed SF-424 application package documents (see D. APPLICATION AND SUBMISSION INFORMATION) are included;
- b. Applications must satisfy basic eligibility screening requirements to be considered for further review.

- 2. Second Level Merit Review Evaluation – Field Review. Each BLM State will have their own field committee based on expertise and professional qualification. The BLM State Offices will evaluate proposals only for their specific State. Eligible applications will be evaluated in an objective and unbiased manner with the following merit review criteria using a numerical scoring based on a 100 point maximum score. An overall consensus rating will be determined for each application and submitted to BLM Washington Office, National Conservation Lands Division.**

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- A. Project aligns with National Conservation Lands unit and BLM State office information needs (Maximum score of 60/100)
- B. BLM staff has the capacity to support project (Maximum score of 20/100)
- C. Past Performance (Maximum score of 10/100)
- D. Active Cooperative Agreement (Maximum score of 10/100)

**3. Third Level Review – BLM Washington Office, National Conservation Lands Division. The National Office will have a national committee with membership based expertise and professional qualification to review applications. Eligible applications will be evaluated in an objective and unbiased manner with the following merit review criteria using a numerical scoring based on a 100 point maximum score. An overall consensus rating will be determined for each application. The rankings and proposals will be submitted to the Assistant Director of the National Conservation Lands and Community Partnerships for funding determinations.**

- A. State Ranking (Maximum score 30/100 Points)
- B. Objective (Maximum score 15/100 Points)
- C. Research Theme and Technical Approach (Maximum score 25/100 Points)
- D. Public Benefit (Maximum score 20/100 Points)
- E. Qualifications (Maximum score 10/100 Points)
- F. Offered Cost Share or Match (Maximum score 0/100 Points – Tie breaker if needed)

**4. Fourth Level Review Pre-award Clearance and Approvals**

Following the described review process, BLM will also complete a business evaluation and determination of responsibility. During these evaluations the Grants Management Officer will evaluate variables such as:

- a. Risk Management. The BLM uses a risk-based approach to evaluate the risk posed by the supporting applicants' projects before it awards Federal funds.
  - 1) BLM is required to review information available through OMB-designated eligibility and/or financial integrity databases, such as the Federal

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Awardee Performance and Integrity Information System (FAPIS). The BLM considers factors such as:

- (a) Financial stability;
  - (b) Quality of management systems;
  - (c) History of performance managing Federal awards, timeliness of compliance with reporting requirements, conformance to the terms and conditions of previous Federal awards, etc.;
  - (d) Reports and findings from audits performed; and
  - (e) The applicant's ability to effectively implement statutory, regulatory, or other requirements imposed on non-Federal entities.
- 2) Budget review is based on the following:
- (a) Budget line items must be allowable, allocable, reasonable in price, and appropriate for the level of effort needed to accomplish the project
  - (b) Budget details and justification must provide adequate explanation of, and justification for, each estimated cost
  - (c) Requested equipment must be justified and necessary for completion of the project
  - (d) Cost Sharing/Matching funds must not come from Federal funds

If the results of all pre-award reviews and clearances are satisfactory, an award of funding will be made once the agreement is finalized. If the BLM determines that a Federal award will be made, special conditions that correspond to the degree of risk assessed may be applied to the Federal award

If the results of pre-award reviews and clearances are unsatisfactory, consideration of funding for the project may be withdrawn.

## **F. FEDERAL AWARD ADMINISTRATION INFORMATION**

### **1. Federal Award Notices**

- a. Any award made from this announcement will be based on the application submitted to, and as approved by, the Department of the Interior, Bureau of Land Management, and will be regulated by OMB's Uniform Guidance, 2 CFR Part 200 Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards.

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- b. Acceptance. Acceptance is defined as the start of work, drawing down of funds, or accepting the award via electronic means. Costs may not be incurred before the effective date listed on the award. Acceptance of a Federal Financial Assistance award from the Department of the Interior, Bureau of Land Management, carries with it the responsibility to be aware of, and comply with, the administrative and national policy requirements and terms and conditions of award.

## 2. Reporting

Periodic submission of Federal Financial reports (SF-425), Performance/Progress reports, and Youth Employment reports (if applicable) will be required under this financial assistance agreement. Submission of financial and performance/progress reports may be required either quarterly, semi-annually, or annually. Submission of youth employment reports (if applicable) is required quarterly.

## 3. Administrative and National Policy Requirements

- a. Office of Management and Budget Guidance for Grants and Agreements. By accepting additional Federal funding under the current Federal assistance, your organization agrees to abide by the applicable OMB Guidance for Grants and Agreement in the expenditure of Federal funds and performance under this program. OMB guidance is available at the following web site:  
<http://www.ecfr.gov/cgi-bin/text-idx?SID=954b81d94bf127c6de3c76a3c99d8d9f&tpl=/ecfrbrowse/Title02/2subttitleA.tpl>
- b. Administrative Requirements.
  - 1) 2 CFR Part 200 Subparts A through D - Uniform Administrative Requirements and Cost Principles.
  - 2) 2 CFR Part 200 Subpart F - Audit Requirements. Non-Federal entities that expend \$750,000.00, or more, in federal awards in a single year shall have a single or program-specific audit conducted for that year in accordance with the Single Audit Act Amendments of 1996 (31 U.S.C. 7501-7507) and revised OMB Circular A-133, available at:  
[http://www.whitehouse.gov/omb/circulars\\_default](http://www.whitehouse.gov/omb/circulars_default).
  - 3) Indirect Facilities and Administration (F&A) Costs.
    - (a) 2 CFR Part 200.414 - Indirect (F&A) Costs
    - (b) 2 CFR, Appendix III to Part 200 - Indirect (F&A) Costs Identification and Assignment, and Rate Determination for Institutions of Higher



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## Education (IHEs)

- (c) Appendix IV to Part 200 - Indirect (F&A) Costs Identification and Assignment, and Rate Determination for Nonprofit Organizations
- (d) Appendix V to Part 200 - State/Local Government-wide Central Service Cost Allocation Plans
  - (1) The provisions of 2 CFR 200.414(c) require Federal agencies to accept federally negotiated indirect cost rates. The BLM has applied the following policies, procedures and general decision-making criteria for deviations from negotiated Indirect Cost Rates for financial assistance programs and agreements.
  - (2) Distribution Basis. For all deviations to the Federal negotiated indirect cost rate, including statutory, regulatory, programmatic, and voluntary, the basis of direct costs against which the indirect cost rate is applied must be:
    - (i) The same base identified in the recipient's negotiated indirect cost rate agreement, if the recipient has a federally negotiated indirect cost rate agreement; or
    - (ii) The Modified Total Direct Cost (MTDC) base in cases where the recipient does not have a federally negotiated indirect cost rate agreement or, with prior approval of the Awarding Agency, when the recipient's federally negotiated indirect cost rate agreement base is only a subset of the MTDC (such as salaries and wages) and the use of the MTDC still results in an overall reduction in the total indirect cost recovered. MTDC is the base defined by 2 CFR 200.68, "Modified Total Direct Cost (MTDC)."
    - (iii) In cases where the recipient does not have a federally negotiated indirect cost rate agreement, under no circumstances will the Department use a modified rate based upon Total Direct Cost or other base not identified in the federally negotiated indirect cost rate agreement or defined within 2 CFR 200.68. The purpose of this restriction is to ensure that the reduced rate is applied against a base that does not include any potentially distorting items (such as pass-through funds, subcontracts in excess of \$25,000, and participant support costs) and is based on the requirements outlined in 2 CFR 200.68; 2

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CFR 200.414(f); 2 CFR 200 Appendix III, Section C.2.; 2 CFR 200 Appendix IV, Section B.3.f.; and Appendix VII, Section C.2.c.

- (3) Indirect Cost Rate Reductions Used as Cost-Share. Instances where the recipient elects to use a rate lower than the federally negotiated indirect cost rate, and uses the balance of the unrecovered indirect costs to meet a cost-share or matching requirement required by the program and/or statute, are not considered a deviation from 2 CFR 200.414(c) as the federally negotiated indirect cost rate is being applied under the agreement in order to meet the terms and conditions of the award.

c. Program Legislation and/or Regulations applicable to this announcement:

- i. Scientific integrity is vital to Department of the Interior (DOI) activities under which scientific research, data, summaries, syntheses, interpretations, presentations, and/or publications are developed and used. Failure to uphold the highest degree of scientific integrity will result not only in potentially flawed scientific results, interpretations, and applications but will damage DOI's reputation and ability to uphold the public's trust. All work performed must comply with the DOI Scientific Integrity Policy posted to <http://www.doi.gov>, or its equivalent as provided by their organization or State law. For more information go to URL: <https://www.doi.gov/scientificintegrity>.
- ii. Archaeological Resources Protection Act (16 USC 470aa-mm)
- iii. National Historic Preservation Act (54 USC 300101 et. seq.)
- iv. Paleontological Resources Preservation Act (16 USC 470aaa)
- v. BLM-Manual 6100 – National Landscape Conservation System Management
- v. BLM-Manual 6200 –National Monuments, National Conservation Areas, and Similar Designations
- iv. Proclamation or designating legislation for the area under study (if applicable)

#### 4. General Award Terms and Conditions

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- a. Code of Federal Regulations/Regulatory Requirements, as applicable (contact your program officer with any questions regarding the applicability of the following):
- 1) 2 CFR Part 25, Universal Identifier and System of Award Management
  - 2) 2 CFR Part 170, Reporting Subawards and Executive Compensation
  - 3) 2 CFR Part 175, Award Term for Trafficking in Persons
  - 4) 2 CFR Part 180 & 2 CFR Part 1400, Government-wide Debarment and Suspension (Non-procurement)
  - 5) 2 CFR Part 182 & 2 CFR Part 1401, Requirements for Drug-Free Workplace (Financial Assistance)
  - 6) 43 CFR 18, New Restrictions on Lobbying: Submission of an application also represents the applicant's certification of the statements in 43 CFR Part 18, Appendix A, Certification Regarding Lobbying.
  - 7) 41 USC §4712, Pilot Program for Enhancement of Recipient and Sub-recipient Employee Whistleblower Protection: This requirement applies to all awards issued after July 1, 2013 and shall be in effect until January 1, 2017.
  - 8) 41 USC §6306, Prohibition on Members of Congress Making Contracts with Federal Government: No member of or delegate to the United States Congress or Resident Commissioner shall be admitted to any share or part of this award, or to any benefit that may arise therefrom; this provision shall not be construed to extend to an award made to a corporation for the public's general benefit.
  - 9) Executive Order 13513, Federal Leadership on Reducing Text Messaging while Driving: Recipients are encouraged to adopt and enforce policies that ban text messaging while driving, including conducting initiatives of the type described in section 3(a) of the order.
  - 10) Executive Order 13043, Increase Seat Belt Use in the United States: Recipients of grants/cooperative agreements and/or sub-awards are encouraged to adopt and enforce on-the-job seat belt use policies and programs for their employees when operating company-owned, rented, or personally owned vehicles. These measures include, but are not limited to, conducting education, awareness, and other appropriate programs for their employees about the importance of wearing seat belts and the consequences of not wearing them.
  - 11) Executive Order 13658, Minimum Wage for Contractors, seeks to increase the efficiency and cost savings in the work performed by parties who contract with the Federal Government by increasing the hourly minimum wage paid by those contractors and any subcontractors. (see 79 CFR 9851).

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**12) Prohibition on Issuing Financial Assistance Awards to Entities that Require Certain Internal Confidentiality Agreements**

Section 743 of Division E, Title VII of the Consolidated and Further Continuing Resolution Appropriations Act of 2015 (Pub. L. 113-235) prohibits the use of funds appropriated or otherwise made available under that or any other Act for grants or cooperative agreements to an entity that requires employees or contractors of such entity seeking to report fraud, waste, or abuse to sign internal confidentiality agreements or statements prohibiting or otherwise restricting such employees or contractors from lawfully reporting such waste, fraud, or abuse to a designated investigative or law enforcement representative of a federal department or agency authorized to receive such information.

Recipients must not require their employees or contractors seeking to report fraud, waste, or abuse to sign internal confidentiality agreements or statements prohibiting or otherwise restricting such employees or contractors from lawfully reporting such waste, fraud, or abuse to a designated investigative or law enforcement representative of a federal department or agency authorized to receive such information.

Recipients must notify their employees or contractors that existing internal confidentiality agreements covered by this condition are no longer in effect

**b. Funding.**

- 1) Awards shall be funded subject to availability of BLM funding. Initial funding does not guarantee additional funding in subsequent years.
- 2) Once the grant or cooperative agreement is signed by a BLM Grants Management Officer (GMO), funding is obligated and the recipient may incur approved costs beginning on the effective date of the award and as specified in their submitted and approved budget.

- c. Payment Mechanism.** Payment will be made by draw-down reimbursement through the Department of the Treasury, Automated Standard Application for Payment (ASAP) System. See following website:  
<http://www.fms.treas.gov/asap> Treasury Circular 1075 (31 CFR 205) requires that draw-downs to a recipient organization shall be limited to the minimum amounts needed and shall be timed to be in accordance with the actual, immediate cash requirements of the recipient organization in carrying out the purposes of the approved program or project. The timing and amount of cash advances shall be as close as is administratively feasible to the actual disbursements by the recipient organization for direct program or project costs and the proportionate share of any allowable indirect costs

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- d. **Conflicts of Interest.** The Recipient must establish safeguards to prohibit its employees and sub-recipients from using their positions for purposes that constitute or present the appearance of a personal or organizational conflict of interest. The Recipient is responsible for notifying the Grants Management Officer (GMO) in writing of any actual or potential conflicts of interest which may include, but are not limited to, direct or indirect financial interests, close personal relationships, positions of trust in outside organizations, consideration of future employment arrangements with a different organization, or decision-making affecting the award that would cause a reasonable person with knowledge of the relevant facts to question the impartiality of the recipient and/or recipient's employees and sub-recipients in the matter.

## **5. Special Award Terms and Conditions:**

- a. **Liability, Insurance, and Indemnification.** Depending on what the project risk assessment recipients may be required to agree to the following:
  - 1) **Liability.** The BLM assumes no liability for any actions or activities conducted under this agreement except to the extent that recourse or remedies are provided by Congress under the Federal Tort Claims Act, 28 USC 2671.
  - 2) **Insurance.** The recipient will be required to (1) obtain liability insurance or (2) demonstrate present financial resources in an amount determined sufficient by the Government to cover claims brought by third parties for death, bodily injury, property damage, or other loss resulting from one or more identified activities carried out in connection with this financial assistance agreement.
  - 3) **Insured.** The federal government shall be named as an additional insured under the recipient's insurance policy.
  - 4) **Indemnification.** The recipient hereby agrees:
    - (a) To indemnify the Federal Government, Bureau of Land Management (BLM), from any act or omission of the recipient, its officers, employees, or (members, participants, agents, representatives, as appropriate) (1) against third party claims for damages arising from one or more activities carried out in connection with this financial assistance agreement and (2) for damage or loss to government property resulting from such an activity, to the extent the laws of the State where the recipient is located permit. This obligation shall survive the termination of this agreement.

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- (b) To purchase public and employee liability insurance at its own expense from a responsible company or companies with a minimum limitation of one million dollars (\$1,000,000.00) per person for any one claim, and an aggregate limitation of three million dollars (\$3,000,000.00) for any number of claims arising from any one incident. The policies shall name the United States as an additional insured, shall specify that the insured shall have no right of subrogation against the United States for payments of any premiums or deductibles due thereunder, and shall specify that the insurance shall be assumed by, be for the account of, and be at the insured's sole risk. Prior to beginning the activities authorized herein, the recipient shall provide the BLM with confirmation of such insurance coverage. Each policy shall have a certificate evidencing the insurance coverage and identifying the assistance agreement number.
- (c) To pay the United States the full value for all damage to the lands or other property of the United States caused by the recipient, its officers, employees, or (members, participants, agents, representatives, agents as appropriate).
- (d) To provide workers' compensation protection to the recipient's officers, employees, and representatives.
- (e) To cooperate with the BLM in the investigation and defense of any claims that may be filed with the BLM arising out of the activities of the recipient, its agents, and employees.
- (f) In the event of damage to or destruction of the buildings and facilities assigned for the use of the recipient in whole or in part by any cause whatsoever, nothing herein contained shall be deemed to require the BLM to replace or repair the buildings or facilities. If the BLM determines in writing, after consultation with the recipient that damage to the buildings or portions thereof renders such buildings unsuitable for continued use by the recipient, the BLM shall assume sole control over such buildings or portions thereof. If the buildings or facilities rendered unsuitable for use are essential for conducting operations authorized under this agreement, then failure to substitute and assign other facilities acceptable to the recipient will constitute termination of this agreement by the BLM.
- (e) Flow-down. For the purposes of this clause, "Recipient" includes such sub-recipients, contractors, or subcontractors as, in the judgment of the recipient and subject to the Government's determination of sufficiency, have sufficient resources and/or

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maintain adequate and appropriate insurance to achieve the purposes of this clause.

- (f) Identified Activities. All activities carried out in connection with financial assistance arising from this funding opportunity announcement.
- b. Recipients must successfully complete an appropriate Defensive Driving Course before operating a Government-owned vehicle (GOV).
- c. Recipients must successfully complete appropriate safety and training requirements before operating Government-owned equipment, 4-wheel all-terrain vehicles (ATV) or other Government-furnished property (GFP).
- d. Recipient/Sub-recipient Personnel Security and Suitability Requirements.
  - 1) If performance of this grant/cooperative agreement requires recipient/sub-recipient personnel to have a Federal Government-issued personal identification card before being allowed unsupervised access to a DOI facility and/or information system, the Program Officer will be the sponsoring official, and will make the arrangements for personal identity verification and card issuance.
  - 2) At least two weeks before start of grant/cooperative agreement performance, the recipient will identify all recipient and sub-recipient personnel who will require physical and/or logical access for performance of work under this grant/cooperative agreement. The recipient and sub-recipient must make their personnel available at the place and time specified by the Program Officer in order to initiate screening and background investigations. The following forms, or their equivalent, may be used to initiate the credentialing process:
    - (a) OPM Standard Form 85 or 85P
    - (b) OF 306
    - (c) Fingerprint card (local procedures may require the fingerprinting to be done at a police station; in this case, any charges are to be borne by the recipient or sub-recipient, as applicable)
    - (d) Release to Obtain Credit Information
    - (e) PIV card application (web-based)
  - 3) Recipient and sub-recipient employees are required to give, and to authorize others to give, full, frank, and truthful answers to relevant and material questions needed to reach a suitability determination. Refusal or failure to furnish or authorize provision of information may constitute

grounds for denial or revocation of credentials. Government personnel may contact the recipient or sub-recipient personnel being screened or investigated in person, by telephone or in writing, and the recipient agrees to make them available for such contact.

- 4) Alternatively, if an individual has already been credentialed by another agency through OPM, and that credential has not yet expired, further clearance may not be necessary. Provide the sponsoring office with documentation that supports the individual's status.
- 5) During performance of the grant/cooperative agreement, the recipient will keep the Program Officer apprised of changes in personnel to ensure that performance is not delayed by compliance with credentialing processes. Cards that have been lost, damaged, or stolen must be reported to the Program Officer, Grants Management Officer, and Issuing Office within 24 hours. Replacement will be at the recipient's expense. If reissuance of expired credentials is needed, it will be coordinated through the Program Officer.
- 6) At the end of grant/cooperative agreement's performance, or when a recipient/sub-recipient employee is no longer working under this grant/cooperative agreement, the recipient will ensure that all identification cards are returned to the Program Officer. Before starting work under this agreement, a National Agency Check (NAC) will be conducted to verify the identity of the individual applying for clearance. Upon successful completion of the NAC process, an identification card will be issued and access granted.
- 7) Simultaneously, a NAC with Inquiries (NACI) will be initiated to determine the individual's suitability for the position. If the NACI adjudication is favorable, nothing more needs to be done. If the adjudication is unfavorable, the credentials will be revoked. In the event of a disagreement between the recipient and the Government concerning the suitability of an individual to perform work under this grant/cooperative agreement, DOI shall have the right of final determination.
- 8) This requirement must be incorporated into any sub-grants/cooperative agreements that require sub-recipient personnel to have unsupervised access to a Federally controlled facility for more than 180 calendar days or unsupervised access to a Federally controlled Level 3 or 4 information system.
- 9) Federal Information Systems Security Awareness Training. Before the recipient, or any of its employees or sub-recipients, are granted access to



## BLM Funding Opportunity Announcement

No. L17AS00001

**Project Title:** BLM FY2017 Bureau wide National Conservation Lands Scientific Studies Support Program

Page 27 of 36

(Formerly known as National Landscape Conservation System Research Support Program)

the BLM Federal computer system they must first successfully complete the U.S. Department of the Interior's (DOI) Federal Information Systems Security Awareness Online Course. This course was designed specifically for users of Federal computer systems. The course is a Web-based training product that explains the importance of Information Systems Security and takes approximately one hour to complete. This course is mandatory for all Department of the Interior employees, contractors, recipients, and all other users of DOI computer resources. Topics covered in the course include: threats and vulnerabilities, malicious code, user responsibilities, and new developments affecting Information Systems Security.

**G. FEDERAL AWARDING AGENCY CONTACTS:**

State	Contact Name	contact phone	email
<b>National</b>	Mara Alexander	(202) 912-7096	malexander@blm.gov
<b>Alaska</b>	Tom Bickauskas	(907) 271-3386	tbickaus@blm.gov
<b>Arizona</b>	Ken Mahoney	(602) 417-9238	kmahoney@blm.gov
<b>California</b>	Mark Conley	(916) 978-4641	mconley@blm.gov
<b>Colorado</b>	Chad Schneckenburger	(303) 239-3738	cschneckenburger@blm.gov
<b>Eastern States</b>	Peter De Witt	(561) 746-7680	pdewitt@blm.gov
<b>Idaho</b>	Robin Fehlau	(208) 373-3825	rfehlau@blm.gov
<b>Montana</b>	Jaime Tompkins	(406) 896-5038	jtompkins@blm.gov
<b>Nevada</b>	Barb Keleher	(775) 861-6628	bkeleher@blm.gov
<b>New Mexico</b>	McKinney Briske or Mara Alexander	(575) 525-4334 or (202) 912-7096	mbriske@blm.gov or malexander@blm.gov
<b>Oregon / Washington</b>	Jerry Magee	(503) 808-6086	gmagee@blm.gov
<b>Utah</b>	Allison Ginn	(801) 539-4053	aginn@blm.gov
<b>Wyoming</b>	Noelle Glines-Bovio	(307) 775-6035	nglinesbovio@blm.gov

**END****FUNDING OPPORTUNITY ANNOUNCEMENT**

[Attachment A]

**BUREAU OF LAND MANAGEMENT**  
Financial Assistance (Cooperative Agreements)



## ATTACHMENT A: PROJECT PROPOSAL (SUGGESTED FORMAT)

**Instructions:** A Project Proposal must be submitted with the Standard Form (SF) 424 Application for Federal Assistance for all BLM Assistance Agreements. Complete each section below. Use additional sheets as needed.  
\*\*If this is a continuation of existing BLM cooperative agreement, identify the current BLM agreement number and project title below.

Person Submitting Proposal: \_\_\_\_\_ Date: \_\_\_\_\_  
 Organization Name: \_\_\_\_\_  
 \*\*Agreement or Announcement No.: \_\_\_\_\_  
 \*\* Agreement or Announcement Title: \_\_\_\_\_  
 Estimated Period of Performance: \_\_\_\_\_  
 BLM POC: \_\_\_\_\_  
 Proposed Project Location: \_\_\_\_\_

This work will occur on: ☐ Public Lands ☐ Both Public & Private Lands

**YOUR MISSION:** (Describe your mission. Describe why this support is being requested.)

### OBJECTIVE:

1. Describe your objectives and how the objectives support one or more research themes listed in Section 3 A. Program Performance Goals of this announcement and identify the National Conservation Lands involved.

### RESEARCH THEME AND TECHNICAL APPROACH:

Please identify which themes apply to your projects (please check boxes that apply by placing cursor on in front of the box and clicking twice):

- ☐ *Research Identified in Unit Science Plans (for National Monuments, National Conservation Areas, and Similar Designations)*
- ☐ *Effectiveness Research*
- ☐ *Standardized Inventory and Monitoring*
- ☐ *Research Syntheses*
- ☐ *Citizen Science*
- ☐ *Other Management-Driven Research*
- ☐ *All themes and goals apply*

Proposals must:

1. Describe the techniques, processes, methodologies to be used.

[Attachment A]

2. Describe how data collection, analysis, and means of interpretation will be accomplished.
3. Describe how the proposed objectives will be achieved within the proposed period of performance (POP).
4. Describe significant goals or milestones and how they will be measured.
5. Describe tasks and relationships of partners, if applicable.
6. Describe how the proposed project improves management of the National Conservation Lands unit.
7. Explain whether the proposed projects applicable to management beyond the relevant National Conservation Lands unit.
8. Provides foundational knowledge or fills data gaps.
9. Credible methods and success metrics.
10. Realistic timetable & deliverables:

Milestone / Task / Activity	Start Date	Completion Date

**PUBLIC BENEFIT:**

(Describe how this project benefits the general public.)

**QUALIFICATIONS, PAST PERFORMANCE, ACTIVE BLM COOPERATIVE AGREEMENT:**

(List key personnel and their responsibilities. Describe similar successful projects completed in the past and any unique qualifications your organization may possess and describe all BLM Active Cooperative Agreements. )

[Attachment B]

**BUREAU OF LAND MANAGEMENT**  
Financial Assistance (Cooperative Agreements)



## ATTACHEMENT B: BUDGET DETAIL (SUGGESTED FORMAT)

**Instructions:** Using the estimated amounts listed on your SF 424A Budget Information form, use this worksheet to provide details of those estimated costs. In the Narrative Boxes, explain the purpose of each cost and provide sufficient detail so costs may be analyzed for reasonableness.

Agreement or Funding Opportunity No.: \_\_\_\_\_ Date: \_\_\_\_\_  
 Organization Name: \_\_\_\_\_  
 Project Title: \_\_\_\_\_

A) PERSONNEL COSTS (SF-424A Object Class Category 6a.)					
Estimated costs of salaries/wages, <u>not</u> including fringe benefits, paid to Recipient employees working directly on this agreement. Indicate Key Personnel with an asterisk (*), provide more detail in the Narrative Box if needed.					
Name & Title or Position Title	Salary or Wage	Months or Hours	Matching Funds (if applicable)	BLM Funds	Personnel Justification
<i>Example: James Smith, Executive Director</i>	<i>\$20,000.00/Mo.</i>	<i>3 Mos.</i>	<i>\$15,000.00</i>	<i>\$45,000.00</i>	
<b>A) TOTAL PERSONNEL COSTS:</b> (SF 424A Object Class Category 6a. Personnel)			<b>\$</b>	<b>\$</b>	
<u>Budget justification of costs:</u>					

**B) FRINGE BENEFIT COSTS (SF-424A Object Class Category 6b.)**

Estimated costs of fringe benefits (e.g. health insurance, vacation, FICA, etc.) paid to Recipient employees working on this agreement. List employees/positions below, and their fringe benefit rates as a percentage (%) of their salaries. List what are considered fringe benefits in the Narrative Box.

Name & Title/Position	Salary/Wage Base (BLM Amounts budgeted in Section A above)	Fringe Benefit Rate (%)	Matching Funds (if applicable)	BLM Funds
<i>Example: James Smith, Executive Director</i>	\$20,000.00	30%	\$0.00	\$6,000.00
<b>B) TOTAL FRINGE BENEFIT COSTS:</b> (SF 424A Object Class Category 6b. Fringe Benefits)			\$	\$
<u>Budget Justification of Costs:</u>				

<b>C) TRAVEL COSTS (SF-424A Object Class Category 6c.)</b>						
<b>SUB TOTAL, LODGING &amp; PER DIEM</b> The cost of lodging & meals while traveling for agreement activities. Give details and purpose of the travel in the Narrative Box. Current Federal rates may be found online at: <a href="http://www.gsa.gov/portal/category/21287">http://www.gsa.gov/portal/category/21287</a> .						
Proposed Travel (Lodging & Per Diem)		No. of People	No. of Days	Cost Per Person Per Day	Matching Funds (if applicable)	BLM Funds
To:						
From:						
To:						
From:						
To:						
From:						
To:	Example: Portland, OR	1	2	\$150.00/Day	\$100.00	\$200.00
From:	Eugene, OR					
<b>SUB TOTAL, MILEAGE REIMBURSEMENT</b> The cost of reimbursement for estimated mileage traveled in recipient vehicles for agreement activities. Give details and the purpose of the travel in the Narrative Box. Current Federal mileage reimbursement rates may be found online at: <a href="http://www.GSA.gov">www.GSA.gov</a> . <b>NOTE:</b> Mileage reimbursement rates include all vehicle costs, i.e. fuel, insurance, maintenance, etc.						
Proposed Travel (Mileage Reimbursement)		No. of Miles	No. of Trips	Cost Per Mile	Matching Funds (if applicable)	BLM Funds
To:						
From:						
To:						
From:						
To:						
From:						
To:	Example: Portland, OR	110 Miles	2	\$0.10/Mile	\$0.00	\$22.00
From:	Eugene, OR					
<b>SUB TOTAL, OTHER TRAVEL COSTS</b> The costs of airfare, bus fare, car rental, etc., required for agreement activities. Explain the details and the purpose of the costs in the Narrative Box.						
Proposed Other (Travel Reimbursement)		Type	Cost	No.	Matching Funds (if applicable)	BLM Funds
To:						
From:						
To:						
From:						
To:						
From:						
<b>C) TOTAL TRAVEL COSTS:</b>						
(SF 424A Object Class Category 6c. Travel)					\$	\$
<u>Budget justification of costs:</u>						

**D) EQUIPMENT COSTS** (SF-424A Object Class Category 6d. Equipment)

The cost of equipment purchased for use on this agreement. Equipment is defined as items with a useful life of more than one (1) year and a cost of \$5,000+ per unit. If your organization has a written policy for purchasing equipment, please submit a copy with your application. Explain the need and purpose of the equipment in the Narrative Box below.

Equipment	Quantity	Cost per Unit	Matching Funds (if applicable)	BLM Funds
<i>Example: John Deere Compact Tractor</i>	<i>1</i>	<i>\$17,500.00</i>	<i>\$7,500.00</i>	<i>\$10,000.00</i>
<b>D) TOTAL EQUIPMENT COSTS:</b> (SF 424A Object Class Category 6d. Equipment)			<b>\$</b>	<b>\$</b>

Budget justification of costs:

**E) SUPPLY COSTS** (SF-424A Object Class Category 6e. Supplies)

Estimated costs of materials and supplies used directly on this agreement, e.g. safety glasses, work gloves, office supplies, etc. If your organization has a written policy for purchasing supplies, please submit a copy with your application. Explain the purpose of the costs in the Narrative Box below.

Item	Quantity	Cost per Unit	Matching Funds (if applicable)	BLM Funds
<i>Example: Work Gloves, Leather</i>	<i>6</i>	<i>\$10.00/Pair</i>	<i>\$50.00</i>	<i>\$10.00</i>
<b>E) SUPPLY COST TOTAL:</b> (SF 424A Object Class Category 6e. Supplies)			<b>\$</b>	<b>\$</b>

Budget justification of costs:

**F) CONTRACTUAL COSTS** (SF-424A Object Class Category 6f. Contractual)

Estimated costs of contracted/sub contracted services and sub grant/recipient awards. If your organization has a written contracting policy, please submit a copy with your application. Provide contractor names, if available, and explain the details and purposes of the costs in the Narrative Box below. **NOTE:** Calculation of your Indirect Costs may be affected by contracted and/or pass through expenses. See Section J) INDIRECT COSTS, for more information.

Contractor Name, Type, etc.	Cost	Matching Funds (if applicable)	BLM Funds
<i>Example: Ace Delivery Service (Yearly Contract)</i>	\$2,500.00	\$0.00	\$2,500.00

**F) CONTRACTUAL COST TOTAL:**

(SF 424A Object Class Category 6f. Contractual)

\$

\$

Budget justification of costs:**G) CONSTRUCTION COSTS** (SF-424A Object Class Category 6g. Construction)

The estimated costs of construction. "Construction" is the intent to construct, alter, or repair (including dredging, excavating, and painting) buildings, structures, or other real property FAR Part 2 Definitions. Explain the details and purpose of the costs in the Narrative Box below.

Contractor: Name/Type/Organization/Etc.	Cost	Matching Funds (if applicable)	BLM Funds
<b>G) CONSTRUCTION COST TOTAL:</b>		\$	\$
(SF 424A Object Class Category 6g. Construction)			

Budget justification of costs:



**H) OTHER COSTS** (SF-424A Object Class Category 6h. Other)

Estimated costs which don't fit any other Object Class Category, e.g. duplicating and printing costs, postage and freight, rental of equipment, etc. Explain the details and purpose of the costs in the Narrative Box below.

Item	Cost	Matching Funds (if applicable)	BLM Funds
<i>Example: Ace Equipment Rental (Post-Hole Digger, 4 Days)</i>	<i>\$25/Day</i>	<i>\$0.00</i>	<i>\$100.00</i>

**H) OTHER COSTS TOTAL:**

(SF 424A Object Class Category 6h. Other)

\$

\$

Budget justification of costs:

**I) TOTAL DIRECT COSTS** (SF-424A Object Class Category 6i. Sum of 6a.-6h.)

The total of all direct costs applicable to this project.

Total Direct Costs	Matching Funds (if applicable)	BLM Funds
<b>I) TOTAL DIRECT COSTS:</b> (SF 424A Object Class Category 6i. Total, Sum of 6a. 6h.)	\$	\$

**J) INDIRECT COSTS** (SF-424A Object Class Category 6j. Indirect Charges)

Indirect costs are expenses which cannot be readily identified and charged to a particular project or agreement, e.g. building rent, utilities, office supplies, etc. Such costs are charged to the project as a percentage of the Direct Costs (items A through H above) and this percentage is called the Indirect Cost Rate. If your organization has a Negotiated Indirect Cost Rate Agreement (NICRA) please submit a copy of the agreement with your application. If your organization has no NICRA, the BLM may allow a "de minimis" indirect cost rate of up to 10% of your Modified Total Direct Costs (MTDC), which are your Direct Costs excluding sub grant and sub contract costs in excess of \$25,000. See **2 CFR 200.68 Modified Total Direct Cost (MTDC)** and **2 CFR 200.414(f) Indirect (F&A) Costs** for more information.

If your organization is a Cooperative Ecosystems Studies Unit (CESU) partner, your indirect cost rate will be 17.5% of your NICRA determined indirect cost base.

Use the Narrative Box below to explain how you calculated your indirect cost base and resulting indirect costs.

Indirect Cost Rate to be used on this Grant (%):			
Indirect Cost Base for this Grant: \$			
<b>Total Indirect Costs</b>	<b>Matching Funds (if applicable)</b>	<b>BLM Funds</b>	
<b>J) TOTAL INDIRECT COSTS:</b> (SF 424A Object Class Category 6j. Indirect Charges)	\$	\$	
<u>Budget justification of costs:</u>			

**K) TOTALS** (SF-424A Object Class Category 6k. TOTALS)

The sum total of all Direct and Indirect Costs (Sum of 6i. & 6j.) applicable to this agreement.

<b>Total Project Costs</b>	<b>Matching Funds (if applicable)</b>	<b>BLM Funds</b>
<b>K) TOTAL COSTS:</b> (SF 424A Object Class Category 6k. TOTALS)	\$	\$

I certify that to the best of my knowledge the costs detailed above are correct and complete and for the purposes set forth in the associated application for Federal Assistance.

\_\_\_\_\_  
Name & Title of Person Completing Budget

Rev 4/2016

## Budget Narrative File(s)

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\* **Mandatory Budget Narrative Filename:**

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## Project Narrative File(s)

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\* Mandatory Project Narrative File Filename:

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# INDIVIDUAL EVALUATION SCORING SHEET

Funding Opportunity Announcement No. L17AS00001

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

Grants.gov Project # and Applicant Legal Business Name: 12328912 Desert Botanical GardenEvaluator: Scott Foss Title: Hydrogeologic Study of the Surface and Groundwater Supporting Water Rights Acquisition

Evaluation Factors	Ratings (see attached description or use your own method)
<b><u>State Ranking</u></b> <b>(b)(5) DPP</b>	
<b><u>Clear Objective</u></b> (Maximum score 15/100 Points) Notes:	
<b><u>Research Theme and Technical Approach</u></b> (Maximum score 25/100 Points) Notes:	
<b><u>Public Benefit</u></b> (Maximum score 20/100 Points) Notes:	
<b><u>Qualifications</u></b> (Maximum score 10/100 Points) Notes:	

## Key Contacts Form

**\* Applicant Organization Name:**

Museums of Western Colorado

Enter the individual's role on the project (e.g., project manager, fiscal contact).

**\* Contact 1 Project Role:** Principal Investigator

Prefix:

Mr.

**\* First Name:**

Robert

Middle Name:

**\* Last Name:**

Gay

Suffix:

Title:

Curator of Museum Education

Organizational Affiliation:

Museums of Western Colorado

**\* Street1:**

550 Jurassic Ct.

Street2:

**\* City:**

Fruita

County:

**\* State:**

CO: Colorado

Province:

**\* Country:**

USA: UNITED STATES

**\* Zip / Postal Code:**

81502

**\* Telephone Number:**

970 361 0285

Fax:

**\* Email:**

robertg@westcomuseum.org

## Key Contacts Form

**\* Applicant Organization Name:**

Museums of Western Colorado

Enter the individual's role on the project (e.g., project manager, fiscal contact).

**\* Contact 2 Project Role:** Field Assistant

Prefix:

**\* First Name:** Taormina

Middle Name:

**\* Last Name:** Lepore

Suffix:

Title:

Organizational Affiliation:

Raymond M. Alf Museum of Paleontology

**\* Street1:** 1175 Base Line Rd

Street2:

**\* City:** Claremont

County:

**\* State:** CA: California

Province:

**\* Country:** USA: UNITED STATES**\* Zip / Postal Code:** 91711**\* Telephone Number:** 909 624 2798

Fax:

**\* Email:** (b) (6) @gmail.com

## Key Contacts Form

**\* Applicant Organization Name:**

Museums of Western Colorado

Enter the individual's role on the project (e.g., project manager, fiscal contact).

**\* Contact 3 Project Role:** Preparation, curation, and exhibits

Prefix:

Dr.

**\* First Name:** Julia

Middle Name:

**\* Last Name:** McHugh

Suffix:

Title: Curator of Paleontology

Organizational Affiliation:

Museums of Western Colorado

**\* Street1:** 550 Jurassic Ct.

Street2:

**\* City:** Fruita

County:

**\* State:** CO: Colorado

Province:

**\* Country:** USA: UNITED STATES**\* Zip / Postal Code:** 81521**\* Telephone Number:** 970 858 7282

Fax:

**\* Email:** jmchugh@westcomuseum.org



## Key Contacts Form

**\* Applicant Organization Name:**

Museums of Western Colorado

Enter the individual's role on the project (e.g., project manager, fiscal contact).

**\* Contact 4 Project Role:** Field and lab intern

Prefix:

**\* First Name:** xavier

Middle Name:

**\* Last Name:** Jenkins

Suffix:

Title:

Organizational Affiliation:

Arizona State University

**\* Street1:** Palo Verde West, 430 E University Dr, Room 120

Street2:

**\* City:** Tempe

County:

**\* State:** AZ: Arizona

Province:

**\* Country:** USA: UNITED STATES**\* Zip / Postal Code:** 85281**\* Telephone Number:** 623 200 6667

Fax:

**\* Email:** (b) (6) @yahoo.com

CERTIFICATION REGARDING LOBBYING

Certification for Contracts Grants Loans and Cooperative Agreements

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

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

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

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts subgrants and contracts under grants loans and cooperative agreements) and that all subrecipients shall certify and disclose accordingly This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352 title 31 U S Code Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10 000 and not more than \$100 000 for each such failure

Statement for Loan Guarantees and Loan Insurance

The undersigned states to the best of his or her knowledge and belief that

If any funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency a Member of Congress an officer or employee of Congress or an employee of a Member of Congress in connection with this commitment providing for the United States to insure or guarantee a loan the undersigned shall complete and submit Standard Form-LLL "Disclosure of Lobbying Activities " in accordance with its instructions Submission of this statement is a prerequisite for making or entering into this transaction imposed by section 1352 title 31 U S Code Any person who fails to file the required statement shall be subject to a civil penalty of not less than \$10 000 and not more than \$100 000 for each such failure

* APPLICANT'S ORGANIZATION			
Board of Regents, NSHE, obo Desert Research Institute			
* PRINTED NAME AND TITLE OF AUTHORIZED REPRESENTATIVE			
Prefix	* First Name	Middle Name	
	Lycia		
* Last Name	Suffix		
Ronchetti			
* Title	Business Manager		
* SIGNATURE		* DATE	
Lycia Ronchetti		02/02/2017	

## Budget Narrative File(s)

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\* **Mandatory Budget Narrative Filename:**

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To add more Budget Narrative attachments, please use the attachment buttons below.

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# INDIVIDUAL EVALUATION SCORING SHEET

Funding Opportunity Announcement No. L17AS00001

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

Grants.gov Project # and Applicant Legal Business Name: 12328145 University of Southern CaliforniaEvaluator: Scott Foss Title: Inventory and Salvage of Pre-Dinosaur Fossil Vertebrates in the Carboniferous-Permian Cutler Group, Valley of the Gods and John's Canyon, SE Utah

Evaluation Factors	Ratings (see attached description or use your own method)
<b><u>State Ranking</u></b> <b>(b)(5) DPP</b>	
<b><u>Clear Objective</u></b> (Maximum score 15/100 Points) Notes:	
<b><u>Research Theme and Technical Approach</u></b> (Maximum score 25/100 Points) Notes:	
<b><u>Public Benefit</u></b> (Maximum score 20/100 Points) Notes:	
<b><u>Qualifications</u></b> (Maximum score 10/100 Points) Notes:	

**ASSURANCES - NON-CONSTRUCTION PROGRAMS**

Public reporting burden for this collection of information is estimated to average 15 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Office of Management and Budget, Paperwork Reduction Project (0348-0040), Washington, DC 20503.

**PLEASE DO NOT RETURN YOUR COMPLETED FORM TO THE OFFICE OF MANAGEMENT AND BUDGET. SEND IT TO THE ADDRESS PROVIDED BY THE SPONSORING AGENCY.**

**NOTE:** Certain of these assurances may not be applicable to your project or program. If you have questions, please contact the awarding agency. Further, certain Federal awarding agencies may require applicants to certify to additional assurances. If such is the case, you will be notified.

As the duly authorized representative of the applicant, I certify that the applicant:

1. Has the legal authority to apply for Federal assistance and the institutional, managerial and financial capability (including funds sufficient to pay the non-Federal share of project cost) to ensure proper planning, management and completion of the project described in this application.
2. Will give the awarding agency, the Comptroller General of the United States and, if appropriate, the State, through any authorized representative, access to and the right to examine all records, books, papers, or documents related to the award; and will establish a proper accounting system in accordance with generally accepted accounting standards or agency directives.
3. Will establish safeguards to prohibit employees from using their positions for a purpose that constitutes or presents the appearance of personal or organizational conflict of interest, or personal gain.
4. Will initiate and complete the work within the applicable time frame after receipt of approval of the awarding agency.
5. Will comply with the Intergovernmental Personnel Act of 1970 (42 U.S.C. §§4728-4763) relating to prescribed standards for merit systems for programs funded under one of the 19 statutes or regulations specified in Appendix A of OPM's Standards for a Merit System of Personnel Administration (5 C.F.R. 900, Subpart F).
6. Will comply with all Federal statutes relating to nondiscrimination. These include but are not limited to: (a) Title VI of the Civil Rights Act of 1964 (P.L. 88-352) which prohibits discrimination on the basis of race, color or national origin; (b) Title IX of the Education Amendments of 1972, as amended (20 U.S.C. §§1681-1683, and 1685-1686), which prohibits discrimination on the basis of sex; (c) Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. §794), which prohibits discrimination on the basis of handicaps; (d) the Age Discrimination Act of 1975, as amended (42 U.S.C. §§6101-6107), which prohibits discrimination on the basis of age; (e) the Drug Abuse Office and Treatment Act of 1972 (P.L. 92-255), as amended, relating to nondiscrimination on the basis of drug abuse; (f) the Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment and Rehabilitation Act of 1970 (P.L. 91-616), as amended, relating to nondiscrimination on the basis of alcohol abuse or alcoholism; (g) §§523 and 527 of the Public Health Service Act of 1912 (42 U.S.C. §§290 dd-3 and 290 ee-3), as amended, relating to confidentiality of alcohol and drug abuse patient records; (h) Title VIII of the Civil Rights Act of 1968 (42 U.S.C. §§3601 et seq.), as amended, relating to nondiscrimination in the sale, rental or financing of housing; (i) any other nondiscrimination provisions in the specific statute(s) under which application for Federal assistance is being made; and, (j) the requirements of any other nondiscrimination statute(s) which may apply to the application.
7. Will comply, or has already complied, with the requirements of Titles II and III of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (P.L. 91-646) which provide for fair and equitable treatment of persons displaced or whose property is acquired as a result of Federal or federally-assisted programs. These requirements apply to all interests in real property acquired for project purposes regardless of Federal participation in purchases.
8. Will comply, as applicable, with provisions of the Hatch Act (5 U.S.C. §§1501-1508 and 7324-7328) which limit the political activities of employees whose principal employment activities are funded in whole or in part with Federal funds.

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9. Will comply, as applicable, with the provisions of the Davis-Bacon Act (40 U.S.C. §§276a to 276a-7), the Copeland Act (40 U.S.C. §276c and 18 U.S.C. §874), and the Contract Work Hours and Safety Standards Act (40 U.S.C. §§327-333), regarding labor standards for federally-assisted construction subagreements.
10. Will comply, if applicable, with flood insurance purchase requirements of Section 102(a) of the Flood Disaster Protection Act of 1973 (P.L. 93-234) which requires recipients in a special flood hazard area to participate in the program and to purchase flood insurance if the total cost of insurable construction and acquisition is \$10,000 or more.
11. Will comply with environmental standards which may be prescribed pursuant to the following: (a) institution of environmental quality control measures under the National Environmental Policy Act of 1969 (P.L. 91-190) and Executive Order (EO) 11514; (b) notification of violating facilities pursuant to EO 11738; (c) protection of wetlands pursuant to EO 11990; (d) evaluation of flood hazards in floodplains in accordance with EO 11988; (e) assurance of project consistency with the approved State management program developed under the Coastal Zone Management Act of 1972 (16 U.S.C. §§1451 et seq.); (f) conformity of Federal actions to State (Clean Air) Implementation Plans under Section 176(c) of the Clean Air Act of 1955, as amended (42 U.S.C. §7401 et seq.); (g) protection of underground sources of drinking water under the Safe Drinking Water Act of 1974, as amended (P.L. 93-523); and, (h) protection of endangered species under the Endangered Species Act of 1973, as amended (P.L. 93-205).
12. Will comply with the Wild and Scenic Rivers Act of 1968 (16 U.S.C. §§1271 et seq.) related to protecting components or potential components of the national wild and scenic rivers system.
13. Will assist the awarding agency in assuring compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. §470), EO 11593 (identification and protection of historic properties), and the Archaeological and Historic Preservation Act of 1974 (16 U.S.C. §§469a-1 et seq.).
14. Will comply with P.L. 93-348 regarding the protection of human subjects involved in research, development, and related activities supported by this award of assistance.
15. Will comply with the Laboratory Animal Welfare Act of 1966 (P.L. 89-544, as amended, 7 U.S.C. §§2131 et seq.) pertaining to the care, handling, and treatment of warm blooded animals held for research, teaching, or other activities supported by this award of assistance.
16. Will comply with the Lead-Based Paint Poisoning Prevention Act (42 U.S.C. §§4801 et seq.) which prohibits the use of lead-based paint in construction or rehabilitation of residence structures.
17. Will cause to be performed the required financial and compliance audits in accordance with the Single Audit Act Amendments of 1996 and OMB Circular No. A-133, "Audits of States, Local Governments, and Non-Profit Organizations."
18. Will comply with all applicable requirements of all other Federal laws, executive orders, regulations, and policies governing this program.
19. Will comply with the requirements of Section 106(g) of the Trafficking Victims Protection Act (TVPA) of 2000, as amended (22 U.S.C. 7104) which prohibits grant award recipients or a sub-recipient from (1) Engaging in severe forms of trafficking in persons during the period of time that the award is in effect (2) Procuring a commercial sex act during the period of time that the award is in effect or (3) Using forced labor in the performance of the award or subawards under the award.

<b>SIGNATURE OF AUTHORIZED CERTIFYING OFFICIAL</b>	<b>TITLE</b>
Autumn Eck	OSP Director
<b>APPLICANT ORGANIZATION</b>	<b>DATE SUBMITTED</b>
University of Washington	02/01/2017

Standard Form 424B (Rev. 7-97) Back

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<b>Application for Federal Assistance SF-424</b>		
<b>* 1. Type of Submission:</b> <input type="checkbox"/> Preapplication <input checked="" type="checkbox"/> Application <input type="checkbox"/> Changed/Corrected Application	<b>* 2. Type of Application:</b> <input checked="" type="checkbox"/> New <input type="checkbox"/> Continuation <input type="checkbox"/> Revision	<b>* If Revision, select appropriate letter(s):</b> <input style="width: 100%;" type="text"/> <b>* Other (Specify):</b> <input style="width: 100%;" type="text"/>
<b>* 3. Date Received:</b> <input style="width: 100%;" type="text" value="02/02/2017"/>	<b>4. Applicant Identifier:</b> <input style="width: 100%;" type="text"/>	
<b>5a. Federal Entity Identifier:</b> <input style="width: 100%;" type="text"/>	<b>5b. Federal Award Identifier:</b> <input style="width: 100%;" type="text"/>	
<b>State Use Only:</b>		
<b>6. Date Received by State:</b> <input style="width: 100%;" type="text"/>	<b>7. State Application Identifier:</b> <input style="width: 100%;" type="text"/>	
<b>8. APPLICANT INFORMATION:</b>		
<b>* a. Legal Name:</b> <input style="width: 100%;" type="text" value="Colorado Mesa University"/>		
<b>* b. Employer/Taxpayer Identification Number (EIN/TIN):</b> <input style="width: 100%;" type="text" value="84 6001656"/>	<b>* c. Organizational DUNS:</b> <input style="width: 100%;" type="text" value="0757598370000"/>	
<b>d. Address:</b>		
<b>* Street1:</b> <input style="width: 100%;" type="text" value="1100 North Avenue"/> <b>Street2:</b> <input style="width: 100%;" type="text"/> <b>* City:</b> <input style="width: 100%;" type="text" value="Grand Junction"/> <b>County/Parish:</b> <input style="width: 100%;" type="text"/> <b>* State:</b> <input style="width: 100%;" type="text" value="CO: Colorado"/> <b>Province:</b> <input style="width: 100%;" type="text"/> <b>* Country:</b> <input style="width: 100%;" type="text" value="USA: UNITED STATES"/> <b>* Zip / Postal Code:</b> <input style="width: 100%;" type="text" value="81501 3122"/>		
<b>e. Organizational Unit:</b>		
<b>Department Name:</b> <input style="width: 100%;" type="text"/>	<b>Division Name:</b> <input style="width: 100%;" type="text"/>	
<b>f. Name and contact information of person to be contacted on matters involving this application:</b>		
<b>Prefix:</b> <input style="width: 100%;" type="text"/> <b>Middle Name:</b> <input style="width: 100%;" type="text"/> <b>* Last Name:</b> <input style="width: 100%;" type="text" value="Johnson"/> <b>Suffix:</b> <input style="width: 100%;" type="text"/>	<b>* First Name:</b> <input style="width: 100%;" type="text" value="Verner"/>  <b>Title:</b> <input style="width: 100%;" type="text"/>	
<b>Organizational Affiliation:</b> <input style="width: 100%;" type="text"/>		
<b>* Telephone Number:</b> <input style="width: 100%;" type="text" value="970 248 1672"/>	<b>Fax Number:</b> <input style="width: 100%;" type="text"/>	
<b>* Email:</b> <input style="width: 100%;" type="text" value="vjohnson@coloradomesa.edu"/>		



<b>Application for Federal Assistance SF-424</b>			
<b>* 9. Type of Applicant 1: Select Applicant Type:</b> <input type="text" value="H: Public/State Controlled Institution of Higher Education"/>			
Type of Applicant 2: Select Applicant Type: <input type="text"/>			
Type of Applicant 3: Select Applicant Type: <input type="text"/>			
<b>* Other (specify):</b> <input type="text"/>			
<b>* 10. Name of Federal Agency:</b> <input type="text" value="Bureau of Land Management"/>			
<b>11. Catalog of Federal Domestic Assistance Number:</b> <input type="text" value="15.231"/>			
CFDA Title: <input type="text" value="Fish, Wildlife and Plant Conservation Resource Management"/>			
<b>* 12. Funding Opportunity Number:</b> <input type="text" value="L17AS00001"/>			
<b>* Title:</b> <input type="text" value="BLM FY2017 Bureau wide National Conservation Lands Scientific Studies Support Program"/>			
<b>13. Competition Identification Number:</b> <input type="text"/>			
Title: <input type="text"/>			
<b>14. Areas Affected by Project (Cities, Counties, States, etc.):</b> <input type="text"/> <input type="button" value="Add Attachment"/> <input type="button" value="Delete Attachment"/> <input type="button" value="View Attachment"/>			
<b>* 15. Descriptive Title of Applicant's Project:</b> <input type="text" value="Structural and Geological Mapping and Assessment of the Dominguez Escalante National Conservation Area (D E NCA)"/>			
Attach supporting documents as specified in agency instructions. <input type="button" value="Add Attachments"/> <input type="button" value="Delete Attachments"/> <input type="button" value="View Attachments"/>			

Application for Federal Assistance SF-424	
<b>16. Congressional Districts Of:</b>	
* a. Applicant <input style="width: 80px;" type="text" value="CO 003"/>	* b. Program/Project <input style="width: 80px;" type="text" value="CO 003"/>
Attach an additional list of Program/Project Congressional Districts if needed. <div style="display: flex; align-items: center; gap: 10px;"> <input style="width: 300px; height: 20px;" type="text"/> <div> <input type="button" value="Add Attachment"/> <input type="button" value="Delete Attachment"/> <input type="button" value="View Attachment"/> </div> </div>	
<b>17. Proposed Project:</b>	
* a. Start Date: <input style="width: 80px;" type="text" value="05/01/2017"/>	* b. End Date: <input style="width: 80px;" type="text" value="08/31/2018"/>
<b>18. Estimated Funding (\$):</b>	
* a. Federal	<input style="width: 100px;" type="text" value="25,000.00"/>
* b. Applicant	<input style="width: 100px;" type="text" value="0.00"/>
* c. State	<input style="width: 100px;" type="text" value="0.00"/>
* d. Local	<input style="width: 100px;" type="text" value="0.00"/>
* e. Other	<input style="width: 100px;" type="text" value="0.00"/>
* f. Program Income	<input style="width: 100px;" type="text" value="0.00"/>
* g. TOTAL	<input style="width: 100px;" type="text" value="25,000.00"/>
<b>* 19. Is Application Subject to Review By State Under Executive Order 12372 Process?</b> <input type="checkbox"/> a. This application was made available to the State under the Executive Order 12372 Process for review on <input style="width: 100px;" type="text"/> . <input type="checkbox"/> b. Program is subject to E.O. 12372 but has not been selected by the State for review. <input checked="" type="checkbox"/> c. Program is not covered by E.O. 12372.	
<b>* 20. Is the Applicant Delinquent On Any Federal Debt? (If "Yes," provide explanation in attachment.)</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If "Yes", provide explanation and attach <div style="display: flex; align-items: center; gap: 10px;"> <input style="width: 300px; height: 20px;" type="text"/> <div> <input type="button" value="Add Attachment"/> <input type="button" value="Delete Attachment"/> <input type="button" value="View Attachment"/> </div> </div>	
<b>21. *By signing this application, I certify (1) to the statements contained in the list of certifications** and (2) that the statements herein are true, complete and accurate to the best of my knowledge. I also provide the required assurances** and agree to comply with any resulting terms if I accept an award. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties. (U.S. Code, Title 218, Section 1001)</b> <input checked="" type="checkbox"/> ** I AGREE <small>** The list of certifications and assurances, or an internet site where you may obtain this list, is contained in the announcement or agency specific instructions.</small>	
<b>Authorized Representative:</b>	
Prefix: <input style="width: 100px;" type="text"/>	* First Name: <input style="width: 200px;" type="text" value="Tim"/>
Middle Name: <input style="width: 300px;" type="text"/>	
* Last Name: <input style="width: 500px;" type="text" value="Foster"/>	
Suffix: <input style="width: 100px;" type="text"/>	
* Title: <input style="width: 400px;" type="text" value="President"/>	
* Telephone Number: <input style="width: 200px;" type="text" value="970 248 1424"/>	Fax Number: <input style="width: 200px;" type="text"/>
* Email: <input style="width: 600px;" type="text" value="aor@coloradomesa.edu"/>	
* Signature of Authorized Representative: <input style="width: 200px;" type="text" value="Tim Foster"/>	* Date Signed: <input style="width: 150px;" type="text" value="02/02/2017"/>

## Budget Narrative File(s)

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\* Mandatory Budget Narrative Filename: 1234 Gay 2017 BLM NLCS Bears Ears Budget Narrativ

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CERTIFICATION REGARDING LOBBYING

Certification for Contracts Grants Loans and Cooperative Agreements

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

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

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

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts subgrants and contracts under grants loans and cooperative agreements) and that all subrecipients shall certify and disclose accordingly This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352 title 31 U S Code Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10 000 and not more than \$100 000 for each such failure

Statement for Loan Guarantees and Loan Insurance

The undersigned states to the best of his or her knowledge and belief that

If any funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency a Member of Congress an officer or employee of Congress or an employee of a Member of Congress in connection with this commitment providing for the United States to insure or guarantee a loan the undersigned shall complete and submit Standard Form-LLL "Disclosure of Lobbying Activities " in accordance with its instructions Submission of this statement is a prerequisite for making or entering into this transaction imposed by section 1352 title 31 U S Code Any person who fails to file the required statement shall be subject to a civil penalty of not less than \$10 000 and not more than \$100 000 for each such failure

* APPL CANT'S ORGAN ZAT ON			
University of Southern California			
* PR NTED NAME AND T TLE OF AUTHOR ZED REPRESENTAT VE			
Prefix	Ms.	* First Name	Lillian
		Middle Name	Ann
* Last Name	Rivera	Suffix	
* Title	Contract and Grant Officer		
* S GNATURE	Lillian Ann Rivera	* DATE	02/02/2017

## Project Narrative File(s)

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\* Mandatory Project Narrative File Filename:

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* APPL CANT'S ORGAN ZAT ON			
University of Washington			
* PR NTED NAME AND T TLE OF AUTHOR ZED REPRESENTAT VE			
Prefix	* First Name	Middle Name	
	Carol		
* Last Name		Suffix	
	Rhodes		
* Title	OSP Director		
* S GNATURE	Autumn Eck	* DATE	02/01/2017

CERTIFICATION REGARDING LOBBYING

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* APPLICANT'S ORGANIZATION			
Natural History Museum of Utah, University of Utah			
* PRINTED NAME AND TITLE OF AUTHORIZED REPRESENTATIVE			
Prefix	* First Name	Middle Name	
	Brent		
* Last Name		Suffix	
Brown			
* Title	Director		
* SIGNATURE	Brent Brown	* DATE	01/24/2017

## Geology and Volcanology of the Sloan Canyon National Conservation Area

*Eugene Smith, University of Nevada Las Vegas*

### Purpose and Important Questions

Established in 2002 by Congress, the Sloan Canyon National Conservation Area (NCA) is a mountainous area just to the south of the Las Vegas Valley well known for its archaeological, biological and geological attractions. The most visited part of the NCA is Petroglyph Canyon containing more than 300 rock art panels. The panels represent a record of native cultures dating from about 7000 years ago to Historic periods (BLM, 2015). In addition to its archaeological significance, the Sloan Canyon NCA contains numerous features of geologic significance. The NCA and directly adjacent areas are composed of four volcanoes whose eroded edifices form the present mountainous terrain of the NCA. These volcanoes are (Fig. 1 and 2):

- Mt. Sutor
- Mt. Ian
- Mt. Hanna
- Center Mountain

The Mount Sutor volcano is of special interest because the rock art panels in Petroglyph Canyon were developed in the dacite rock that forms this volcano. Mt. Sutor is a composite volcano composed of many individual smaller volcanic vents. The boundaries and age relationships between these smaller volcanoes that together form the Mt. Sutor volcano are not well known.

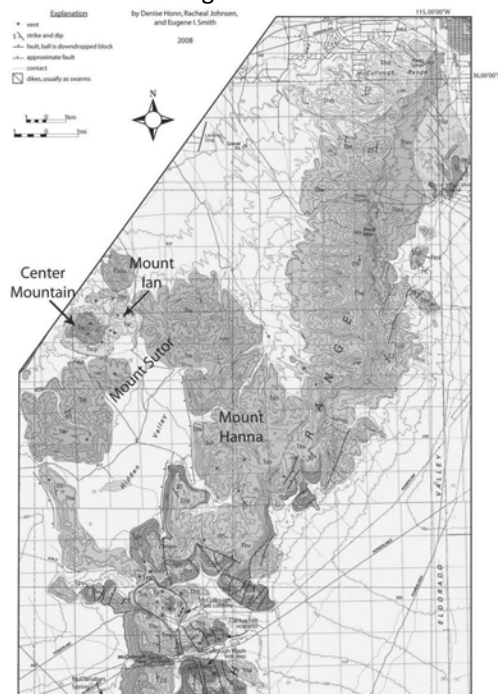


Figure 1. Geologic map of the northern and central McCullough Range. Explanation of the map units is in Figure 2. Map from Smith et al. (2010).

The purpose of work outlined in this proposal is to:

- Address important goals of the developmental plan for the Sloan Canyon NCA including “Research on and interpretation of the archaeological and geologic resources of the conservation area; and Conservation and research relating to the conservation area.”
- Provide state of the art geological information about the Sloan Canyon NCA to the public, citizen scientists (volunteers), and rangers through public talks, field trips, and classroom sessions.
- Improve our knowledge about the geologic history of southern Nevada, the Las Vegas area and the Basin and Range Province of the western US. This information will be disseminated through presentations at national and international scientific meetings and at least one paper in a scientific journal.

Over the past 10 years I have led field trips into Petroglyph Canyon for citizen scientists and the public and talked to them



in a classroom setting about the geology of Sloan Canyon NCA. I have also trained rangers in the field on geologic resources enabling them to present information to citizen scientists and interpretive programs on geology to the public. Work with rangers also helped with the production of informational signs and kiosks. Based on questions and comments from citizen scientists, rangers, and the public there are three questions that come up repeatedly. These are:

1. How many volcanic domes make up the Mount Sutor composite volcano?
2. When did Mount Hanna, Mount Ian and Center Mountain volcanoes form? How much time separates the different dome eruptions that formed the Mt. Sutor composite volcano?
3. Where did the magma (molten rock) that formed the four volcanoes come from?

We propose a two-year study to answer these questions.

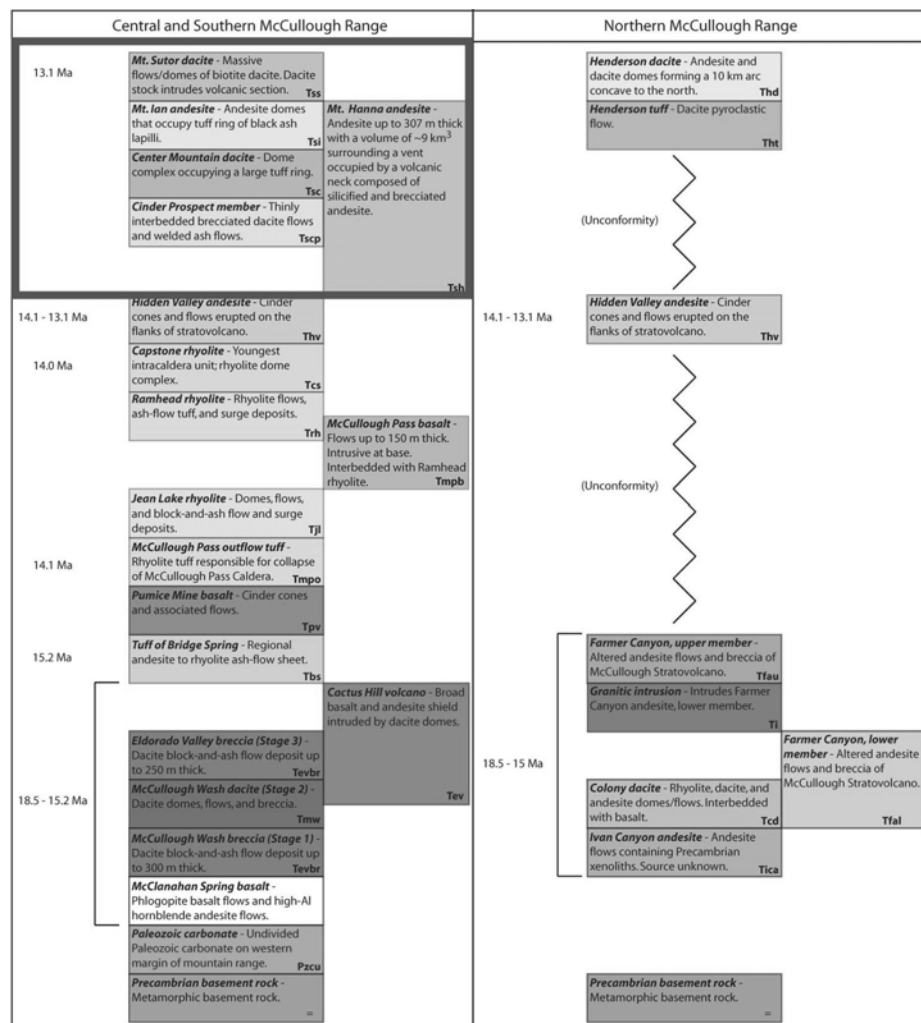


Figure 2. Explanation for the Geologic map of the northern and central McCullough Range. Red Box outlines the description of the Sloan volcanic section. Figure from Smith et al. (2010).

### Background to the Geology of the McCullough Range

The Sloan Canyon NCA extends over a large part of the northern McCullough Range, which stretches from southern margin of the Las Vegas Valley 100 km south to the New York Mountains at the California-Nevada state line (Fig. 3). The geology is summarized in an article by myself, Denise Honn and Racheal Johnsen in Geological Society of America Special Paper 493 published in 2010 (Smith et al., 2010).

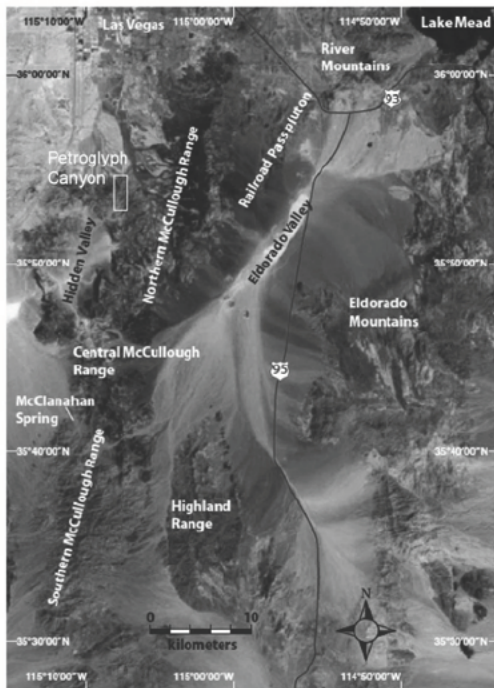
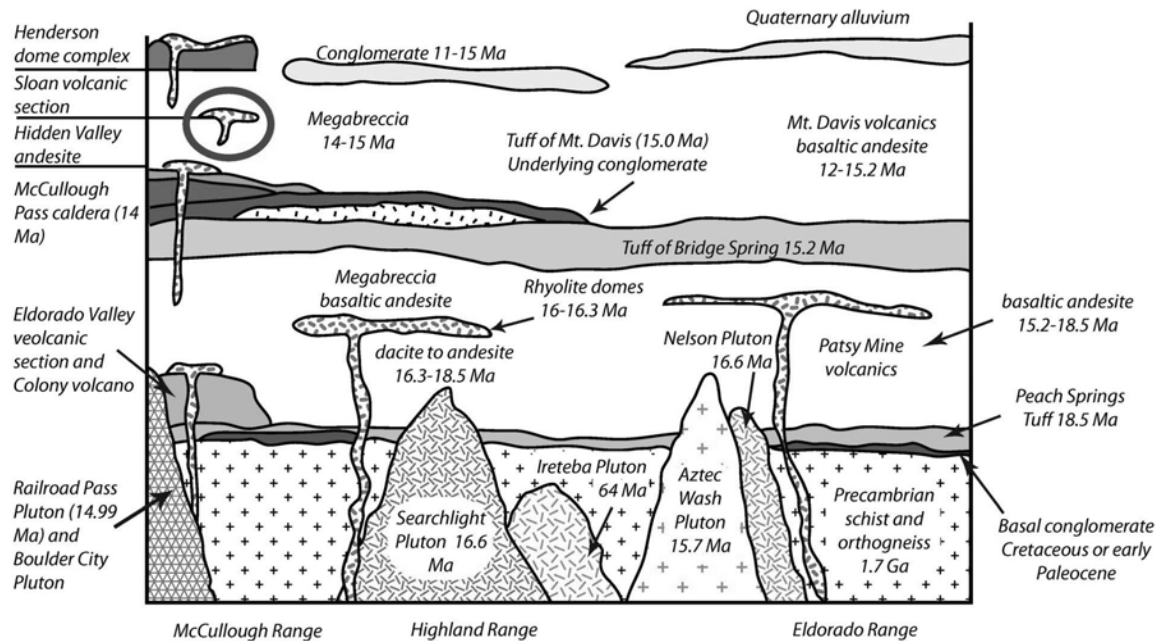


Figure 3. Index map showing location of Petroglyph Canyon, McCullough Range and surrounding geographic features. Image from Smith et al. (2010).

The McCullough Range forms the west side of the Eldorado Valley, an alluvial basin ringed by mountains consisting of mainly Tertiary volcanic, plutonic, and sedimentary rocks. The Range is divided into three parts: (1) the southern McCullough Range, composed mainly of Precambrian basement rock, (2) the central McCullough Range, centered in the area about McCullough Pass, and (3) the northern McCullough Range, extending from McCullough Pass to Henderson including the Sloan Canyon NCA. The McCullough Range lies within the northern Colorado River extensional corridor, a 50–100-km-wide structural zone that formed during Miocene crustal deformation (Faulds et al., 1990; Howard and John, 1987). Both magmatism and crustal extension migrated to the north during Miocene time (Anderson, 1971; Faulds et al., 1999; Gans et al., 1994; Smith and Faulds, 1994). While magmatism spread to the north in the Colorado River extensional corridor during Miocene time, volcanic activity in individual fields lasted for considerable periods of time. In the McCullough Range, for example, there is a 6-million-year record of volcanism.

During the period of active volcanism in the McCullough Range (18–12 million years (Ma)) volcanism also occurred in neighboring areas. Volcanic rocks for the most part erupted from local volcanoes and did not extend from range to range. Exceptions are the tuff of Mount Davis  $15.00 \pm 0.03$  Ma (Faulds et al., 2002), the tuff of Bridge Spring  $15.23 \pm 0.14$  Ma (Bridwell, 1991), and the Peach Springs Tuff ( $18.62 \pm 0.08$  Ma; (Johnsen, 2015)). All are regional units that are excellent stratigraphic markers (Fig. 4).

*Generalized Volcanic and Plutonic Stratigraphy of the McCullough,  
Highland and Eldorado Ranges, Clark County, Nevada*



**Figure 4. Regional correlation of volcanic and plutonic units between mountain ranges. The Sloan volcanic section is circled.**

Precambrian basement rocks (1.6-1.7 billion years (Ga)) composed mainly of granite paragneiss, granite, and monzogranite form a buttress on the west side of the central McCullough Range and locally crop out at low elevation along the east side of the northern McCullough Range (Boland, 1996). Most of the volcanic section lies on Precambrian basement. Paleozoic and Mesozoic strata common in the Spring Mountains to the west and on the Colorado Plateau to the east are missing in the McCullough Range, except for the southwestern side of the Sloan volcanic section. The absence of these units may be explained by the fact that the McCullough Range lies on the west flank of the Kingman Arch, a structural uplift that extends from central Arizona to the Las Vegas area (Bohannon, 1984; Herrington, 2000; Lucchitta, 1967; Young and Brennan, 1974). According to Herrington (2000) nearly 5.5 km of Mesozoic and Paleozoic strata were removed from the Kingman Arch between the onset of Sevier thrust faulting (146 Ma) and the deposition of the Peach Springs Tuff (18.62 Ma). Based on fission-track thermochronology, much of the uplift occurred at about 70 Ma coincident with the Laramide orogeny. The Kingman Arch, therefore, may represent the westernmost Laramide uplift in the western United States (Herrington, 2000). Locally, a thin (1–5 m) conglomerate containing well-rounded clasts of quartzite and carbonate (up to 30 cm in size) crops out between Precambrian crystalline rocks and the volcanic section. (Herrington, 2000) suggested that the conglomerate was shed from the rising Kingman Arch during Late Cretaceous–Early Tertiary time and represents the stripping of the Paleozoic and Mesozoic cover during the formation of the arch. Near McClanahan Spring, an ash-flow tuff crops out above the basal breccia but below the McClanahan Spring basalt. This exposure was identified as Peach Springs Tuff (Wells and Hillhouse, 1989) by its distinctive paleomagnetic pole.

The basal volcanic rocks in the McCullough Range are correlated with the “Patsy Mine volcanics” (Anderson, 1971) (18.5–15.2 Ma) and were named the Eldorado Valley volcanic section by Schmidt (1987) (Figs. 3 and 4). This unit contains dacite domes, debris aprons, and block-and-ash deposits as well as basalt to andesite cinder cones and broad shield volcanoes (Johnsen and Smith, 2007). This unit formed a stratovolcano that crops out from McCullough Spring in the south, to just north of McCullough Pass. The Eldorado Valley unit is composed of high-magnesium basalt, andesite, and dacite domes, block-and-ash deposits, and debris and mud flows (Johnsen, 2015; Johnsen and Smith, 2011; Smith et al., 2010).

The Eldorado Valley volcanic section is overlain by the tuff of Bridge Spring, a regional unit dated at  $15.23 \pm 0.14$  Ma (Bridwell, 1991). The tuff of Bridge Spring is a moderately welded andesite to rhyolite ash-flow tuff originally described by Anderson (1971) and studied in detail by Smith et al. (1993) and Morikawa (1994). The tuff is densely welded and vitric at the base and grades upward to a moderately welded tuff. The base of the tuff is commonly oxidized and has a distinctive orange color. The source of the tuff of Bridge Spring may be in the Eldorado Mountains (Fig. 3) (Druschke et al., 2004; Gans et al., 1994).

Basalt flows and scoria of the Pumice Mine basalt overlie the tuff of Bridge Spring and are in turn overlain by the McCullough Pass tuff  $14.11 \pm 0.06$  Ma; (Sanford (2000); Spell et al. (2001)), which erupted from the McCullough Pass caldera (Schmidt, 1987). The Hidden Valley volcanic section lies on the McCullough Pass tuff and consists of high-silica andesite flows and domes and an overlying section of basaltic-andesite flows. The northern McCullough Range lacks exposures of the tuff of Bridge Spring; therefore, in this area, the Hidden Valley volcanic section lies directly on the Farmer Canyon volcanic section (Figs. 4 and 5). Work by Boland (1996) determined basalt stratigraphy in the northern McCullough Range and provided a geochemical database.

The Sloan volcanic section ( $13.07 \pm 0.02$  Ma; Faulds et al. (1999) the subject of this proposal consists of four volcanoes arranged about Hidden Valley: Mount Hanna, Mount Ian, Center Dome, and Mount Sutor (Figs. 1 and 2) (Bridwell, 1991). Few faults cut this volcanic section, so it likely formed after the major phase of extension.

The youngest volcanic feature is the Henderson dacite dome complex at the northern tip of the McCullough Range ( $12.3 \pm 0.25$  Ma) (Figs. 1 and 2). Originally interpreted as a caldera (Smith et al., 1993), new mapping indicates that it is a complex of domes aligned along an arc concave to the north. Domes are associated with flows, pyroclastic flow, and mesobreccia. The 10-km-diameter dome complex cuts the tilted and faulted Farmer Canyon and Hidden Valley sections and clearly formed after extension.

### **Background to the Geology of the Sloan Canyon NCA**

The Sloan volcanic section sits stratigraphically above Hidden Valley andesite (Figs. 1, 2 and 4) and consists of the Mount Sutor, Mount Ian, Center Mountain, and Mount Hanna volcanoes. These are the major volcanoes that occur within the Sloan Canyon NCA.

Mount Hanna is the oldest of the volcanoes and was erupted from a single vent. A section of andesite up to 307 m thick with a volume of  $\sim 9 \text{ km}^3$  surrounds a vent occupied by a volcanic neck composed of silicified and brecciated andesite. Andesite is fine grained and commonly trachytic. Phenocrysts are rare (<1%) and consist of highly embayed and pitted plagioclase and biotite. Bridwell (1991) suggested that

the Mount Hanna andesite erupted at high temperature (1000 °C) with water content of less than 2% by a lava-fountaining mechanism. The eruption resulted in lava flows composed of agglutinated spatter.

Center Mountain is a dome complex occupying a large tuff ring formed by a pyroclastic unit with a matrix of blocky non-vesicular glass shards. Armored mud balls and discontinuous stringers of dacite suggest hydromagmatic activity and lava fountaining. The Center Mountain dacite erupted within the tuff ring and produced thick, viscous dacite with a volume of 0.44 km<sup>3</sup>. Dacite contains plagioclase and biotite phenocrysts in a matrix of aligned plagioclase microlites.

The Mount Ian volcano consists of numerous domes that occupy tuff rings of black ash and lapilli. Domes are characterized by andesite with foliation defined by platy slabs commonly dipping inward toward the conduit but becoming horizontal over the vent. Single domes are usually less than 0.5 km in diameter. The fine-grained andesite contains phenocrysts of plagioclase, oxidized biotite, orthopyroxene, and iddingsitized olivine. The groundmass consists of microlites of plagioclase.

Petroglyph Canyon where much of the rock art is found lies within the Mount Sutor dacite. This unit covers a large area to the north and west of Hidden Valley and is composed of massive flows and domes of biotite dacite. Eruptive centers are domes intruding tuff rings. In the north, Mount Sutor dacite forms a broad dome intruded by a hypabyssal dacite stock. Dacite contains phenocrysts and glomerocrysts of plagioclase, biotite, and clinopyroxene. Dacite of the stock is coarser grained but has the same mineralogy as Mount Sutor dacite flows.

### Background to the Geology of Petroglyph Canyon

The main access to the rock art panels in Petroglyph Canyon is trail 100 that originates from the visitor's contact station (Fig. 5). The trail from the station to the rock art panels traverses some of the most interesting and spectacular geology in the NCA. Because the trail only passes through dacite of the

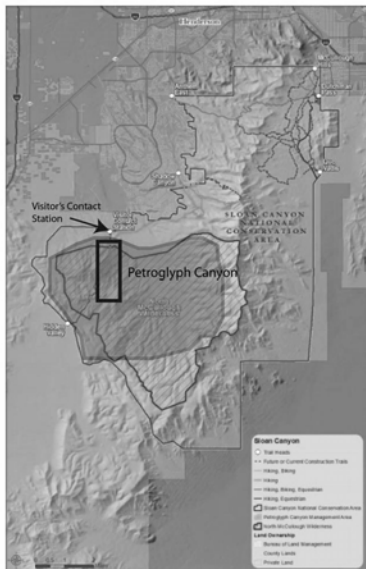


Figure 5. Location of Petroglyph Canyon and Visitor's contact Center. Figure from BLM (2015). Area to be mapped is outlined in green.

Mount Sutor volcano, at first glance the geology appears to be quite monotonous. When observed in detail, however, the geologic story becomes more complex. The Mount Sutor volcano is a composite volcano composed of many coalescing volcanic domes, however, the number and distribution of these domes is unknown except along Trail 100, where I have done preliminary geologic mapping and identified three volcanic domes (Fig. 6).

Dacite volcanic domes are composed of viscous lava that tends to shear during eruption and emplacement. Shearing results in the alignment of mineral grains parallel to the direction of flow and the segregation of the lava into gas rich and gas poor bands. In many rocks, this grain alignment and banding produces a distinct parallel break or fracture in the rock usually parallel to the banding planes. The orientation of the fractures commonly reflects the internal geometry of the domes. Volcanic domes usually have "onion skin" internal structure with steep banding about the margins and nearly horizontal banding at the tops of the domes (Fig. 6). Dome margins are also characterized by quickly chilled lava producing a glassy margin usually with a darker color than rocks in the interior of the dome. When doing geologic mapping, special attention must be

paid to fracture orientation and rock texture. This type of geologic mapping must be done carefully, because dacite may contain fracture sets related to cooling lava and to later tectonic activity. Cooling and tectonic fractures commonly cut across flow banding and grain alignments, so careful observation in the field is necessary to distinguish them from fractures related to grain alignments formed during the eruption of the dome. One of the challenges of mapping in this type of area is to clearly distinguish fractures related to shearing lava from other sets related to post-solidification events.

In Petroglyph Canyon, both steep and nearly horizontal banding is clearly visible. Steep banding with glassy dacite is more resistant to erosion than coarser grained rock of dome interiors. Thus, dome margins usually form rocky obstructions or “dry water falls” in the wash. This is the case along Trail 100 where “dry water falls” 1 and 3 marks the margin of a dome (Fig. 6). At some dome margins, volcanic debris representing material sliding off the dome during eruption is observed as breccia containing fragments of dacite (up to 2 m in size) in a finer grained matrix. Volcanic breccia crops out at several places along Trail 100, but its distribution is not entirely known. At contacts between domes, cross cutting relationships reveal the relative age of domes (younger domes cut older ones). Unfortunately, the absolute time between dome eruptions is unknown; determining this time interval is one of the goals of this proposal.

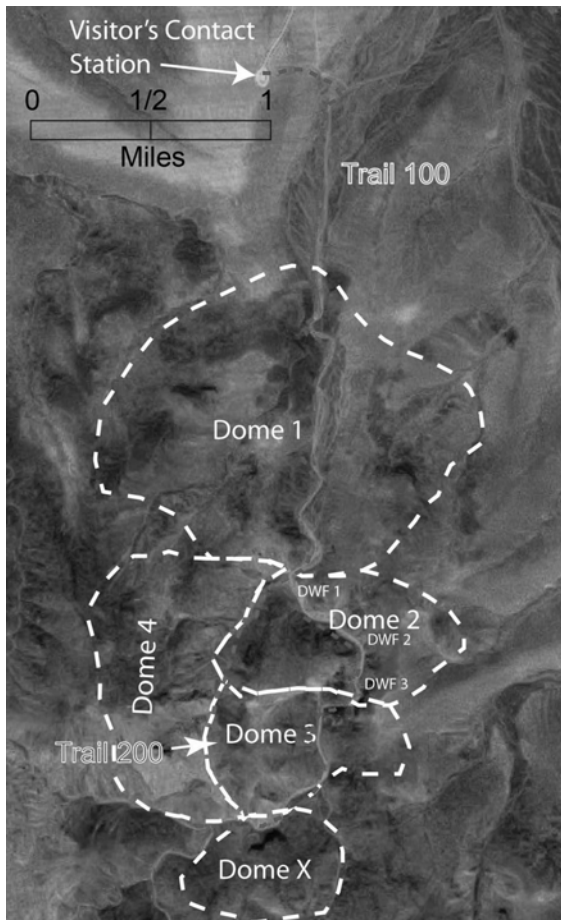


Figure 6. Geologic Map of the Petroglyph Canyon area showing the approximate distribution of volcanic domes. DWF 1, 2, and 3 show the location of the three dry waterfalls along trail 100.

### Objectives and Tasks

Our objective is to answer the three questions posed by volunteers, rangers and the public.

1. How many domes make up the Mount Sutor composite volcano?
2. When did each of the four volcanoes form? How much time separates the different dome eruptions that formed the Mt. Sutor composite volcano?
3. Where did the magma (molten rock) that formed the four volcanoes come from?

### Question 1- How many domes make up the Mount Sutor composite volcano?

Answering this question requires doing geologic mapping of the Mount Sutor composite volcano. We plan on doing this work in a 20-square mile area (Fig. 5) centered on the Petroglyph Canyon area. Mapping requires:

- Measuring the orientation of fractures related to lava flow geometry with the purpose of identifying dome margins. This is accomplished by taking the strike and dip of fractures. Several thousand measurements are required for this task.

- Mapping a 20-square mile area centered on Petroglyph Canyon by walking every canyon and ridge with the purpose of outlining the

distribution of distinctive rock textures and compositions.

- Collecting samples for rock identification, mineral chemistry, age dating and geochemistry. Appropriate permits will be obtained for sampling collection. Also to ensure regulatory compliance, no samples will be collected in the Petroglyph Management Area and along trails 100 and 200.
- Construction of a geologic map showing contacts between domes, fracture orientations, rock texture and composition. This information will be plotted on a topographic and satellite base map to produce a geologic map of the Mount Sutor dacite.

**Question 2- When did each of the four volcanoes form? How much time separates the different dome eruptions that formed the Mt. Sutor composite volcano?**

Age dating of samples from Mount Hanna, Mount Ian and Center Mountain as well as selected phases of the Mount Sutor composite volcano will provide the information required to answer this question. We will use a highly precise dating technique based on the uranium-thorium-Lead (U-Th-Pb) isotopic system. This technique measures isotopic ratios in small (< 1 mm) crystals of zircon ( $\text{ZrSiO}_4$ ) to determine the age of the rock.

U-Th-Pb analyses and cathodoluminescence (CL) imaging will be conducted at the Arizona LaserChron Center at the University of Arizona, which is a multi-user facility supported by the NSF EAR Instrumentation and Facilities Program ([www.laserchron.org](http://www.laserchron.org)).

U-Th-Pb analyses are conducted by laser-ablation multi-collector inductively coupled plasma mass spectrometry (ICP-MS) utilizing a Photon Machines Analyte G2 Excimer laser connected to a Thermo Scientific Element2 ICP-MS. These instruments can determine U-Th-Pb ages for zircon with a precision of ~2-3% (2-sigma) for an individual determination and an accuracy of ~1-2% for a set of ~10 measurements. This means that for samples that are 13 million years old (expected for Mount Sutor) events separated by more than 50,000 to 100,000 years can be detected. Conversely, if U-Pb zircon ages of Mount Sutor domes are all within error, this implies that the entire composite volcano formed in 100,000 years or less. Most analyses are conducted with a laser beam diameter of 10 to 35 microns and a pit depth of 4-15 microns. For igneous studies, ~35 grains are analyzed if there is no sign of Pb loss or inheritance, and ~50 grains are analyzed if complications (e.g., inheritance, overgrowths, Pb loss) are suspected.

Prior to analysis, samples are imaged with a Hitachi 3400N Scanning Electron Microscope (SEM) equipped with a Gatan Chroma2 (color) CL detector. CL images are generated for every sample to identify complexities such as inheritance or overgrowths, and to ensure that analyses are conducted only on homogenous portions of crystals.

We plan on collecting a total of 10 samples for U-Th-Pb dating. These include one sample each for the Mount Hanna, Mount Ian and Central Mountain volcanoes and six samples from different domes from the Mount Sutor composite volcano.

**Question 3. Where did the magma (molten rock) that formed the four volcanoes come from?**

Answering this question requires four types of observations and data. These are:

- Hand specimen description of the rocks.
- Thin section description of rocks by petrographic microscope.
- Mineral chemistry using Electron Probe Microanalysis.
- Major and trace element analyses.

Hand specimen identification is usually done in the field using a geologist hand lens to describe the mineral content and texture of the rock. For volcanic rocks, a four-fold rock classification scheme is commonly used (Table 1). According to this classification scheme, the rock that forms the Mount Sutor composite volcano contains biotite and plagioclase; therefore, classifies as a dacite.

**Table 1. Field Classification of Volcanic Rocks**

<i>Minerals present</i>	<i>Rock Name</i>
Olivine-pyroxene-plagioclase	Basalt
Hornblende-plagioclase	Andesite
Biotite-plagioclase	Dacite
Quartz-potassium feldspar	Rhyolite

Thin section identification is a more precise way of determining mineral content, rock name, and rock texture. Thin sections are prepared by cutting a thin slab from the rock, mounting it on a glass slide, and grinding it until it is 30 microns thick. The thin section is then analyzed using a polarizing microscope (or petrographic scope) to accurately identify minerals and rock textures. We use Spectrum Petrographics in Vancouver, Washington ([www.petrography.com](http://www.petrography.com)) for thin section preparation. An excellent guide to the use of the optical petrographic microscope for thin section study can be found at [http://www.minsocam.org/msa/openaccess\\_publications/Thin\\_Sctn\\_Mcrscopy\\_2\\_rdc\\_d\\_eng.pdf](http://www.minsocam.org/msa/openaccess_publications/Thin_Sctn_Mcrscopy_2_rdc_d_eng.pdf). We plan on preparing 20 samples of the Mount Sutor dacite for thin section study.

Mineral chemistry has become popular with the advent of modern electron microprobes. Minerals such as feldspar, olivine and pyroxene are commonly compositionally zoned. These zones reflect the growth of the crystal in the magma and are very sensitive to changing magma composition. Changes in magma composition can occur for a variety of reasons including crystal fractionation, magma mixing, and magma injection or recharge. Determining the composition of the zones helps in identifying the processes that were active in the magma chamber during crystal growth. We use the Electron Microscope Imaging Laboratory at UNLV to do mineral chemistry (<http://web.unlv.edu/centers/emil/facilities.htm>). Spectrum Petrographic will prepare samples for electron probe work as thin sections, but the sections are polished using a 0.5-micron abrasive to produce the ultra-smooth surface required for these analyses.

Geochemical analysis is the most powerful tool available to determine the origin of volcanic rocks. We plan on analyzing for three groups of elements. First we determine the major elements. These elements (Si, Al, Fe, Mg, Ca, K, Na, Ti, Mn and P plus volatile components like water and carbon dioxide) comprise 99% by weight of most volcanic rocks. The second group are the trace elements present in parts per million (ppm) in the rock (note that 10,000 ppm equal 1 wt. %). The trace elements are classified as **large ion lithophile** (e.g., Rb, Sr, Ba), **rare earths** (e.g., La, Eu, Lu), **high field strength** (Ta, Nb, Zr, Hf), and **metals** (Cr and Ni). Each group of trace elements provides important information about the geologic evolution and source of a volcanic rock. Table 2 summarizes some of the information that can be obtained for the Mount Sutor dacite by using trace elements.



**Table 2. How Trace Elements Help in Interpretation.**

<i>Trace element group</i>	<i>What does it mean?</i>
Large Ion Lithophile	High Rb, Sr, and Ba suggest melting of Earth's crust.
Rare earth elements	High La and Ce suggest crustal melting; low abundances may indicate that dacite evolved from a more basaltic magma. Low Eu indicates feldspar removal.
High field strength	Low Nb and Ta may suggest crustal melting or magma originating in the upper depleted mantle.
Metals	High Cr and Ni may suggest injection of magma chamber by a more basaltic magma.

Volcanic rocks have complex histories that can be unraveled by using geochemistry. There are four parts of a geochemical study. **First**, it is important to determine where the original magma formed. Did it form by melting existing rock in the upper or middle crust or did it originate deeper in the lower crust or upper mantle? **Second**, what processes occurred as the magma rose from its place of origin to near the surface? These processes include crystal fractionation, magma mixing and contamination. **Third**, did the magma reside in secondary magma chambers just below the surface before erupting or did it rise directly to the surface. Geochemistry along with mineral chemistry can help resolve this issue. **Last**, how did the magma change composition during eruption? When magma erupts as lava it can lose volatiles (like water and carbon dioxide) and this can cause changes in magma properties like viscosity and crystallinity. Changes in these properties influence the style of eruption and the type of volcano that forms at the surface.

Collecting unaltered samples are an important first step in obtaining geochemical information. Hand specimen samples are usually sufficient (4x5x1 inches). Samples are then ground to a fine powder using a jaw crusher and disk mill (at UNLV). The powers are sent to ALS laboratory in Reno, Nevada where they are prepared and analyzed. Major elements are determined by X-ray Fluorescence Spectrometry (XRF) and trace elements by ICP-MS.

We plan on analyzing 30 samples for major and trace elements.

### **Work Schedule**

Our proposed work schedule is summarized in Table 3.

**Table 3. Proposed Work Schedule.**

<i>Time period</i>	<i>Work Planned</i>
Year 1-first six months	Geologic mapping and sample collection.
Year 1-second six months	Finish map, prepare samples for dating and geochemistry, prepare progress report.
Year 2-first six months	Submit samples for geochemistry, complete U-Pb zircon dates.
Year 2-second six months	Interpret geochemical data; prepare final report and paper to be submitted to a journal.

### **Furthering the Sloan NCA Mission**

An important reason for doing this work is to provide the most complete and updated geologic information to NCA visitors, rangers, and volunteers (citizen scientists). We plan on doing the following to accomplish this goal.

#### *Involving rangers and citizen scientists with research*

We will invite rangers and citizen scientists to help with the geologic studies (especially the field mapping). This will involve them in the research. In our experience, the best way to promote excitement and interest in a project is to allow rangers, citizen scientists and the interested public to participate and work with us.

#### *Inviting Rangers to assist in fieldwork and leading subject matter hikes*

Classroom sessions and hikes to explain geology in the field will help to train NCA rangers. We have been involved in training for nearly 10 years and find this an excellent way to provide both information about basic geology and details about the geology of Sloan Canyon NCA to the rangers. This work helps train NCA rangers to talk to visitors and citizen scientists about subjects outside of their areas of academic training. For example, one of the Sloan NCA rangers has a degree in Biology and the other in History. The training provides them with the geologic information and field training to enable them to train volunteers, and lead interpretive hikes. My work with rangers has already led to the creation of a new interpretive program offered to the public. Additionally, one of the rangers used information from training sessions and hikes to teach 130 4<sup>th</sup> grade students about geology as part of an "On the Land" (HOL) hike along trail 100 to view the rock art panels.

#### *Presentation to Local Groups*

We will give talks to local groups like the Friends of Sloan Canyon. These talks are usually very popular and are well received (based on the many questions during and after the presentations).

#### *Develop Interpretive Material to be used to inform the public*

Informative signs at the Sloan Canyon visitor's center and along the trails are important to inform the public about the geologic history of the Sloan Canyon area. From the visitor contact station parking lot, there is an excellent view of the Las Vegas Valley. Informative signs identifying the mountain ranges and valleys and the geology of each will give the visitor to Sloan Canyon NCA an appreciation of how this NCA fits into the regional picture and provides them with a better appreciation of the cultural and scientific importance of the NCA.

## References

- Anderson, R. E., 1971, Thin skin distension in Tertiary rocks of southeastern Nevada: Geological Society of America Bulletin, v. 82, no. 1, p. 43-58.
- BLM, 2015, Sloan Canyon, National Conservation Area, Implementation Management Strategy, p. 83.
- Bohannon, R. G., 1984, Nonmarine Sedimentary Rocks of Tertiary Age in the Lake Mead Region, Southeastern Nevada and Northwestern Arizona: U.S. Geological Survey Professional Paper, v. 1259, p. 72.
- Boland, K. A., 1996, The Petrogenesis of Andesites Produced during Regional Extension: Examples from the Northern McCullough Range, Nevada and Xitle Volcano, Mexico [M.S.: University of Nevada, Las Vegas, 127 p.
- Bridwell, H. L., 1991, The Sloan Sag: A Mid-Miocene Volcanotectonic Depression, North-Central McCullough Range, Southern Nevada [M.S.: University of Nevada, Las Vegas, 147 p.
- Druschke, P., Honn, D., McKelvey, M., Nastanski, N., Rager, A., Smith, E. I., and Belliveau, R., 2004, Volcanology of the northern Eldorado Range, Nevada: New evidence for the source of the tuff of Bridge Spring: Geological Society of America Abstracts with Programs, v. 36, no. 5, p. 431.
- Faulds, J. E., Geissman, J. W., and Mawer, C. K., 1990, Structural development of a major extensional accommodation zone in the Basin and Range Province, northwestern Arizona and southern Nevada: Implications for kinematic models of continental extension., *in* Wernicke, B. P., ed., Basin and Range Extensional Tectonics near the Latitude of Las Vegas, Nevada, Geological Society of America Memoir, p. 37-76.
- Faulds, J. E., Olson, E. L., Harlan, S. S., and McIntosh, W. C., 2002, Miocene extension and fault-related folding in the Highland Range, southern Nevada: a three-dimensional perspective: Journal of Structural Geology, v. 24, p. 861-886.
- Faulds, J. E., Smith, E. I., and Gans, P., 1999, Spatial and temporal patterns of magmatism and extension in the northern Colorado River extensional corridor, Nevada and Arizona: A preliminary report, *in* Gans, P., and Faulds, J. E., eds., Cenozoic Geology of the Northern Colorado River Extensional Corridor, Southern Nevada and Northwestern Arizona: Economic Implications of Regional Segmentation Structures: 1999 Field Trip Guidebook, Nevada Petroleum Society, p. 171-183.
- Gans, P. B., Landau, B., and Darvall, P., 1994, Ashes, ashes, all fall down: Caldera-forming eruptions and extensional collapse of the Eldorado Range, southern Nevada: Geological Society of America Abstracts with Programs, v. 26, no. 2, p. 53.
- Herrington, J. M., 2000, Evolution of the Kingman Arch, Southern Nevada [M.S.: University of Nevada, Las Vegas, 83 p.
- Howard, K., and John, B., 1987, Crustal extension along a rooted system of imbricate low-angle faults: Colorado River extensional corridor, California and Arizona: Geological Society of London Special Publication, v. 28, p. 299-311.
- Johnsen, R., 2015, Subalkaline Volcanism in the Eastern Basin and Range Province: Examples from the Miocene McCullough Range Volcanic Field and the Pliocene to Holocene Black Rock Desert Volcanic Field [Ph.D.: University of Nevada, Las Vegas, 330 p.
- Johnsen, R., and Smith, E. I., 2007, Evidence for dome collapse and coeval mafic-felsic volcanism in the central McCullough Range, Nevada: Geological Society of America Abstracts with Programs, v. 39, no. 5, p. 35.
- Johnsen, R., and Smith, E. I., 2011, Unusual Chemistry of the Miocene Central Basin and Range: Zr- and LREE-enriched mafic rocks of the Lucy Gray and McCullough Mountains, Nevada: American Geophysical Union Fall Meeting, v. V31F-2588.
- Lucchitta, I., 1967, Cenozoic Geology of the Upper Lake Mead Area Adjacent to the Grand Wash Cliffs, Arizona [Ph.D.: Pennsylvania State University, 274 p.

- Morikawa, S. A., 1994, The Geology of the Tuff of Bridge Spring: Southern Nevada and Northeastern Arizona [M.S.: University of Nevada, Las Vegas, 165 p.
- Sanford, A. L., 2000, Geologic History of the McCullough Pass Caldera [M.S.: University of Nevada, Las Vegas, 111 p.
- Schmidt, C. S., 1987, A Mid-Miocene Caldera in the Central McCullough Range, Clark County, Nevada [M.S.: University of Nevada, Las Vegas, 78 p.
- Smith, E., Honn, D., and Johnsen, R., 2010, Volcanoes of the McCullough Range, southern Nevada: Geological Society of America Special Paper, v. 463, p. 203-219.
- Smith, E. I., and Faulds, J. E., 1994, Patterns of Miocene magmatism in the northern Colorado River extensional corridor (NCREC), Nevada, Arizona and California: Geological Society of America Abstracts with Programs, v. 26, no. 5, p. 93.
- Smith, E. I., Morikawa, S. A., Martin, M. W., Gonzales, D. A., and Walker, J. D., 1993, Tuff of Bridge Spring: A mid-Miocene ash-flow tuff, northern Colorado River extensional corridor, Nevada and Arizona: Geological Society of America Abstracts with Programs, v. 25, no. 5, p. A148.
- Spell, T., Smith, E., Sanford, A., and Zanetti, K., 2001, Systematics of xenocrystic contamination: preservation of discrete feldspar populations at McCullough Pass Caldera revealed by Ar-40/Ar-39 dating: Earth and Planetary Science Letters, v. 190, no. 3-4, p. 153-165.
- Wells, R. E., and Hillhouse, J. W., 1989, Paleomagnetism and tectonic rotation of the lower Miocene Peach Springs Tuff: Colorado Plateau, Arizona, to Barstow, California: Geological Society of America Bulletin, v. 101, p. 846-863.
- Young, R. A., and Brennan, W. J., 1974, The Peach Springs Tuff: Its bearing on the structural evolution of the Colorado Plateau and the development of Cenozoic drainage in Mohave County, Arizona: Geological Society of America Bulletin, v. 85, p. 83-90.

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University of New Mexico	Geology, Volcanology	M.S.	1968
University of New Mexico	Volcanology, Planetary Geology	Ph.D.	1970

#### b. Appointments

2013 to present	Professor Emeritus of Geology, UNLV
1988 - 2013:	Professor of Geology, UNLV
1983-1986:	Chair, Department of Geoscience, UNLV
1980-1988:	Associate Professor of Geology, UNLV
1976-1980:	Associate Professor of Earth Science, University of Wisconsin-Parkside
1972-1976:	Assistant Professor of Earth Science, University of Wisconsin-Parkside

1970-1972: Post-doctoral Research Associate to Professor W.E. Elston,  
Department of Geology, University of New Mexico

1968-1970: Graduate Research Assistant to Professor W.E. Elston, Department  
of Geology, University of New Mexico

1968-1980: Geologist WAE, U.S. Geological Survey, Branch of Astrogeology, Flagstaff, AZ

1966-1968: Geological Field Assistant WAE, U.S. Geological Survey, Branch of Astrogeology,  
Flagstaff, AZ

1964: Undergraduate Research Assistant to Professor A.J. Mozola,  
Department of Geology, Wayne State University, Detroit, MI

c. Publications Last 5 years

Cortés, J.A., Smith, E.I., Valentine, G.A., Johnsen, R., Rasoazanamparany, C., Widom, E., Sas, May, Ruth, D., 2015, Intrinsic conditions of magmas from Lunar Crater volcanic field (Nevada): implications for internal plumbing and magma ascent: *American Mineralogist*, v. 100, p. 396-413.

Balmer, M.D., Conrad, C.P., Smith, E.I., Johnsen, R., 2015, Intraplate volcanism at the edges of the Colorado Plateau sustained by a combination of edge-driven convection and shear-driven upwelling: *Geochemistry, Geophysics, Geosystems*, 16, doi:10.1002/2014GC005641

Rasoazanamparany, C., Widom, E., Valentine, G.A., Smith, E.I., Cortes, J.A., Kuentz, D., Johnsen, R., 2015, Multi-Isotopic Study of the Lunar Crater Volcanic Field, Nevada: Implications for Petrogenesis and Mantle Source Characteristics: *Chemical Geology*, v. 397m p. 76-93.

Rager, A., Smith, E., Scheu, B., Dingwell, D., 2014, The effects of water vaporization on rock fragmentation during rapid decompression: Implications for the formation of fluidized ejecta on Mars: *Earth and Planetary Science Letters*, v. 385, p. 68-78.

Simon, Adam, Yogodzinski, G.Y., Robertson, Kelly, Smith, Eugene I., Kiryukhin, Alexey V., Selyangin, Oleg, Mulcahy, Sean R., Walker, J. Douglas, 2014, The Evolution of Mutnovsky Volcano, Kamchatka: Insights through Geochemical Modeling and Thermobarometry: *Journal of Volcanology and Geothermal Research*, v. 286, p. 116-137.

Johnsen, R., Smith, E.I., and Walker, J.D., 2014, The 2.7–2.1 Ma Twin Peaks caldera—stratigraphy and petrogenesis, in MacLean, J.S., Biek, R.F., and Huntoon, J.E., editors, *Geology of Utah's Far South: Utah Geological Association Publication 43*, p. 617–638.

Ballmer, M.D., C.P. Conrad, Smith, E.I., and N. Harmon, 2013, Non-hotspot volcano chains produced by migration of shear-driven upwelling toward the East Pacific Rise, *Geology*, v. 41, p. 479-482

Robertson, K., Simon, A., Pettke, T., Smith, E., Selyangin, O., Kiryukhin, A., Mulcahy, S.R., Walker, J.D., 2013, Melt Inclusion Evidence for Magma Evolution at Mutnovsky Volcano, Kamchatka: *Geofluids*, doi: 10.1111/gfl.12060.

Bianco, T.A., Barker, D.S., Thompson, K.G., Smith, E.I., and McDowell, F.W., 2012, Disequilibrium crystal-liquid processes at Hamblin-Cleopatra volcano, Lake Mead area, Nevada: *Journal of Volcanology and Geothermal Research*, v. 237-238, p. 42-53.

Conrad, C.P., and Smith, E.L., 2011, Time dependence of intraplate volcanism caused by shear-driven upwelling of low-viscosity regions within the asthenosphere: Journal of Geophysical Research, V. 116, B11103, 17 pp., doi:10.1029/2011JB008270.

d. Synergistic Activities

1. Associate editor Journal of Geophysical Research Solid Earth, 1996-1999
2. Associate editor Geological Society of America Bulletin, 2000-2007
3. Co-chair field trips for the joint Cordillera-Rocky Mt. section meeting GSA 2007-2008.

e. Collaborators & Other Affiliations

(i) Collaborators:

Clint Conrad, University of Oslo, Norway; Maxim Ballmer, ETH Zurich, Switzerland; Greg Valentine University of Buffalo; Joaquin Cortes, Edinburgh University UK; Elizabeth Widom, Miami University of Ohio; Terry Plank, Lamont-Doherty Earth Observatory, Columbia University; Doug Walker, University of Kansas; Curtis Marean, Arizona State University; Jim Calzia, US Geological Survey; Adam Simon, University of Michigan; Betty Scheu and Don Dingwell, University of Munich (LHU).

(ii) Graduate and Postdoctoral Advisors

Dr. Wolfgang Elston (graduate and post-doctoral advisor), University of New Mexico.

(iii) Thesis Advisor and Postgraduate-Scholar Sponsor

Graduate students past 5 years: Denise Honn (Boston University), Audrey Rager (BLM, Denver, CO), Ashley Tibbetts (Ph.D. student Cornell University), Christi Emery (Las Vegas Valley Water Authority); Racheal Johnsen (UNLV Post-doctoral fellow); Amber Ciravolo (UNLV-Research Associate).

Over the past 30 years I have advised 45 graduate students and 11 post-doctoral fellows and research associates.

## Key Contacts Form

**\* Applicant Organization Name:**

Board of Regents, NSHE, obo Desert Research Institute

Enter the individual's role on the project (e.g., project manager, fiscal contact).

**\* Contact 1 Project Role:** Principal Investigator

Prefix:

Dr.

**\* First Name:**

Benjamin

Middle Name:

**\* Last Name:**

Hatchett

Suffix:

Title:

Organizational Affiliation:

**\* Street1:**

2215 Raggio Parkway

Street2:

**\* City:**

Reno

County:

**\* State:**

NV: Nevada

Province:

**\* Country:**

USA: UNITED STATES

**\* Zip / Postal Code:**

89512 1095

**\* Telephone Number:**

775 674 7111

Fax:

**\* Email:**

benjamin.hatchett@dri.edu

## Key Contacts Form

**\* Applicant Organization Name:**

Board of Regents, NSHE, obo Desert Research Institute

Enter the individual's role on the project (e.g., project manager, fiscal contact).

**\* Contact 2 Project Role:** Administrative Contact

Prefix:

**\* First Name:** Lycia

Middle Name:

**\* Last Name:** Ronchetti

Suffix:

Title:

Organizational Affiliation:

**\* Street1:** 2215 Raggio Parkway

Street2:

**\* City:** Reno

County:

**\* State:** NV: Nevada

Province:

**\* Country:** USA: UNITED STATES**\* Zip / Postal Code:** 89512 1095**\* Telephone Number:** 775 673 7411

Fax:

**\* Email:** lycia.ronchetti@dri.edu



## Key Contacts Form

**\* Applicant Organization Name:**

Board of Regents, NSHE, obo Desert Research Institute

Enter the individual's role on the project (e.g., project manager, fiscal contact).

**\* Contact 3 Project Role:** Financial Contact

Prefix:

**\* First Name:** Vicki

Middle Name:

**\* Last Name:** Hansen Marks

Suffix:

Title:

Organizational Affiliation:

**\* Street1:** 2215 Raggio Parkway

Street2:

**\* City:** Reno

County:

**\* State:** NV: Nevada

Province:

**\* Country:** USA: UNITED STATES**\* Zip / Postal Code:** 89512 1095**\* Telephone Number:** 775 673 7398

Fax:

**\* Email:** vicki.hansenmarks@dri.edu

## Key Contacts Form

**\* Applicant Organization Name:**

Board of Regents, NSHE, obo Desert Research Institute

Enter the individual's role on the project (e.g., project manager, fiscal contact).

**\* Contact 4 Project Role:** Authorized Official

Prefix:

**\* First Name:** Jenny

Middle Name:

**\* Last Name:** Frayer

Suffix:

Title:

Organizational Affiliation:

**\* Street1:** 2215 Raggio Parkway

Street2:

**\* City:** Reno

County:

**\* State:** NV: Nevada

Province:

**\* Country:** USA: UNITED STATES**\* Zip / Postal Code:** 89512 1095**\* Telephone Number:** 775 673 7444

Fax:

**\* Email:** jenny.frayer@dri.edu

CERTIFICATION REGARDING LOBBYING

Certification for Contracts Grants Loans and Cooperative Agreements

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

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

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

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts subgrants and contracts under grants loans and cooperative agreements) and that all subrecipients shall certify and disclose accordingly This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352 title 31 U S Code Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10 000 and not more than \$100 000 for each such failure

Statement for Loan Guarantees and Loan Insurance

The undersigned states to the best of his or her knowledge and belief that

If any funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency a Member of Congress an officer or employee of Congress or an employee of a Member of Congress in connection with this commitment providing for the United States to insure or guarantee a loan the undersigned shall complete and submit Standard Form-LLL "Disclosure of Lobbying Activities " in accordance with its instructions Submission of this statement is a prerequisite for making or entering into this transaction imposed by section 1352 title 31 U S Code Any person who fails to file the required statement shall be subject to a civil penalty of not less than \$10 000 and not more than \$100 000 for each such failure

* APPLICANT'S ORGANIZATION			
Board of Regents, NSHE, on behalf of University of Nevada, Las Vegas			
* PRINTED NAME AND TITLE OF AUTHORIZED REPRESENTATIVE			
Prefix	* First Name	Middle Name	
	R. David		
* Last Name	Suffix		
	Paul		
* Title			
Executive Director, Sponsored Programs			
* SIGNATURE		* DATE	
	Hallie Lyons		01/30/2017

## COLLEGES AND UNIVERSITIES RATE AGREEMENT

EIN: 916001537

DATE:05/26/2016

ORGANIZATION:

FILING REF.: The preceding  
agreement was dated  
03/02/2016University of Washington  
Management Accounting and Analysis  
4300 Roosevelt Way NE, Suite 300  
Box 354966  
Seattle, WA 98195-4966The rates approved in this agreement are for use on grants, contracts and other  
agreements with the Federal Government, subject to the conditions in Section III.**SECTION I: INDIRECT COST RATES**

RATE TYPES:		FIXED	FINAL	PROV. (PROVISIONAL)	PRED. (PREDETERMINED)
<u>EFFECTIVE PERIOD</u>					
<u>TYPE</u>	<u>FROM</u>	<u>TO</u>	<u>RATE (%)</u>	<u>LOCATION</u>	<u>APPLICABLE TO</u>
FINAL	07/01/2014	06/30/2015	54.50 (1) &	(A)	Organized Research
PRED.	07/01/2015	06/30/2017	54.50 (1) &	(A)	Organized Research
PRED.	07/01/2017	06/30/2018	55.00 (1) &	(A)	Organized Research
PRED.	07/01/2018	06/30/2020	55.50 (1) &	(A)	Organized Research
FINAL	07/01/2014	06/30/2015	26.00 (1) &	(B)	Organized Research
PRED.	07/01/2015	06/30/2020	26.00 (1) &	(B)	Organized Research
FINAL	07/01/2014	06/30/2015	53.00 (1) &	(A)	Instruction
PRED.	07/01/2015	06/30/2020	53.00 (1) &	(A)	Instruction
FINAL	07/01/2014	06/30/2015	26.00 (1) &	(B)	Instruction
PRED.	07/01/2015	06/30/2020	26.00 (1) &	(B)	Instruction
FINAL	07/01/2014	06/30/2015	33.80 (1) &	(A)	Other Sponsored Activities
PRED.	07/01/2015	06/30/2016	33.80 (1) &	(A)	Other Spon Act

ORGANIZATION: University of Washington Management Accounting and Analysis

AGREEMENT DATE: 5/26/2016

<u>TYPE</u>	<u>FROM</u>	<u>TO</u>	<u>RATE(%)</u>	<u>LOCATION</u>	<u>APPLICABLE TO</u>
PRED.	07/01/2016	06/30/2020	37.00	(1) & (A)	Other Sponsored Activities
FINAL	07/01/2014	06/30/2015	26.00	(1) & (B)	Other Spon Act
PRED.	07/01/2015	06/30/2016	26.00	(1) & (B)	Other Sponsored Activities
PRED.	07/01/2016	06/30/2020	25.00	(1) & (B)	Other Spon Act
FINAL	07/01/2014	06/30/2015	42.00	(1) & (C)	Core Grant
PRED.	07/01/2015	06/30/2016	42.00	(1) & (C)	Core Grant
PRED.	07/01/2016	06/30/2020	38.10	(1) & (C)	Core Grant
FINAL	07/01/2014	06/30/2015	78.00	(1) & (C)	Non-Core Fed
PRED.	07/01/2015	06/30/2016	78.00	(1) & (C)	Non-Core Fed
PRED.	07/01/2016	06/30/2020	83.10	(1) & (C)	Non-Core Fed
FINAL	07/01/2014	06/30/2015	17.00	(1) & (D)	
PRED.	07/01/2015	06/30/2016	17.00	(1) & (D)	
PRED.	07/01/2016	06/30/2020	19.00	(1) & (D)	
FINAL	07/01/2014	06/30/2015	25.00	(2) & (E)	
PRED.	07/01/2015	06/30/2020	25.00	(2) & (E)	
FINAL	07/01/2014	06/30/2015	74.00	(1) & (F)	Organized Research
PRED.	07/01/2015	06/30/2016	74.00	(1) & (F)	Organized Research
PRED.	07/01/2016	06/30/2017	75.00	(1) & (F)	Organized Research
PRED.	07/01/2017	06/30/2019	76.00	(1) & (F)	Organized Research
PRED.	07/01/2019	06/30/2020	76.50	(1) & (F)	Organized Research
PROV.	07/01/2020	Until Amended		(G)	

\*BASE

ORGANIZATION: University of Washington Management Accounting and Analysis

AGREEMENT DATE: 5/26/2016

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(1) Modified total direct costs, consisting of all direct salaries and wages, applicable fringe benefits, materials and supplies, services, travel and up to the first \$25,000 of each subaward (regardless of the period of performance of the subawards under the award). Modified total direct costs shall exclude equipment, capital expenditures, charges for patient care, rental costs, tuition remission, scholarships and fellowships, and the portion of each subaward in excess of \$25,000.

(2) Direct salaries and wages including vacation, holiday and sick pay and other paid absences but excluding other fringe benefits.

(A) On-Campus

(B) Off-Campus

(C) Washington National Primate Research Center - see Section II Special Remarks.

(D) Applied Physics Laboratory

(E) Vessel Operations

(F) Lake Union Campus

(G) Use same rates and conditions as those cited for fiscal year ending June 30, 2020.

ORGANIZATION: University of Washington Management Accounting and Analysis

AGREEMENT DATE: 5/26/2016

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**SECTION I: FRINGE BENEFIT RATES\*\***

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<u>TYPE</u>	<u>FROM</u>	<u>TO</u>	<u>RATE(%)</u>	<u>LOCATION</u>	<u>APPLICABLE TO</u>
FIXED	7/1/2015	6/30/2016	24.30	(1) & (B)	Faculty & Res. Assoc.
FIXED	7/1/2015	6/30/2016	30.70	(1) & (A)	Medical Residents & Senior Fellows
FIXED	7/1/2015	6/30/2016	17.70	(1) & (A)	Grad. Students
FIXED	7/1/2015	6/30/2016	22.80	(1) & (A)	Post Doc. Trainees
FIXED	7/1/2015	6/30/2016	39.40	(1) & (B)	Class. Staff
FIXED	7/1/2015	6/30/2016	30.50	(1) & (B)	Prof. Staff
FIXED	7/1/2015	6/30/2016	17.60	(1) & (B)	(D)
FIXED	7/1/2015	6/30/2016	21.20	(1) & (B)	(E)
FIXED	7/1/2015	6/30/2016	8.30	(1) & (B)	(F)
FIXED	7/1/2015	6/30/2016	18.80	(1) & (A)	Hourly
FIXED	7/1/2015	6/30/2016	23.90	(1) & (A)	Pre-Doctoral Trainees & Fellows
FIXED	7/1/2015	6/30/2016	67.50	(2) & (C)	Class. Staff
FIXED	7/1/2015	6/30/2016	53.30	(2) & (C)	Prof. Staff
FIXED	7/1/2015	6/30/2016	51.10	(2) & (C)	Faculty & Research Associates

**\*\* DESCRIPTION OF FRINGE BENEFITS RATE BASE:**

(1) Direct salaries and wages including vacation, holiday, and sick pay but excluding other fringe benefits.

(2) Direct salaries and wages excluding vacation, sick leave, holidays, other paid absences and all other fringe benefits.

- (A) Entire University
- (B) All except Applied Physics Laboratory
- (C) Applied Physics Laboratory
- (D) Professional Staff - Global (No Health)
- (E) Professional Staff - Global (No Retirement)
- (F) Professional Staff - Global (No Health or Retirement)

ORGANIZATION: University of Washington Management Accounting and Analysis

AGREEMENT DATE: 5/26/2016

## SECTION II: SPECIAL REMARKS

### TREATMENT OF FRINGE BENEFITS:

The fringe benefits are charged using the rate(s) listed in the Fringe Benefits Section of this Agreement. The following fringe benefits are included in the fringe benefit rate(s):

HEALTH INSURANCE, SOCIAL SECURITY & MEDICARE TAXES, WORKERS COMPENSATION, MEDICAL AID & INDUSTRIAL INSURANCE, UWRP, STATE RETIREMENT, UNEMPLOYMENT COMPENSATION, AND SEPARATION LEAVE PAYMENTS FOR CLASSIFIED & PROFESSIONAL STAFF.

### TREATMENT OF PAID ABSENCES

Vacation, holiday, sick leave pay and other paid absences are included in salaries and wages and are claimed on grants, contracts and other agreements as part of the normal cost for salaries and wages. Separate claims are not made for the cost of these paid absences. Beginning July 1, 2011, unused leave payments made upon separation of Classified and Professional Staff are included in the fringe benefit rates.

Beginning October 1, 1996 the Applied Physics Laboratory (APL) has separate fringe benefit rates from the remainder of the University of Washington. These rates include paid absences. Therefore, charges for direct salaries and wages from APL must exclude charges for paid absences, including vacation, sick leave, holidays, and other paid absences.

### DEFINITION OF EQUIPMENT

Prior to 07/01/2016, equipment is defined as tangible nonexpendable personal property having a useful life of more than one year, and an acquisition cost of \$2,000 or more per unit. Effective 07/01/2016, equipment is defined as tangible nonexpendable personal property having a useful life of more than one year, and an acquisition cost of \$5,000 or more per unit.

### DEFINITION OF ON-CAMPUS, OFF-CAMPUS AND SPECIAL RATES:

#### DEFINITION OF OFF-CAMPUS RATE

a. An off-campus program is one that is conducted (1) in leased facilities where space related costs (e.g. rent, utilities and maintenance) are charged directly to the program, or (2) in facilities made available (at no cost) to the program by a non-University organization, or (3) away from the University over an uninterrupted period of time in excess of 30 days for field work. The Off-Campus rate is not to be used as a substitute for the Vessel Operations rate or the Applied Physics Laboratory rate. Even though Pack Forest, Big Beef Creek, and Olympic Natural Resource Center are owned and operated by the University, these facilities are considered to be off campus.

b. Projects conducted at two or more locations:

There are instances where a project supported by a single grant or contract is conducted at two or more locations, thus requiring special consideration



ORGANIZATION: University of Washington Management Accounting and Analysis

AGREEMENT DATE: 5/26/2016

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in determining the appropriate indirect cost provision. The following should be observed in such circumstances:

(1) Where the total annual amount of the grant or contract direct costs is less than \$250,000, a single indirect cost rate will be applied. This rate will be the one currently applicable to the location where the preponderance of project salaries is located.

(2) Where the total annual amount of the grant or contract direct costs is \$250,000 or more, the appropriate rate for each location will be applied to the modified total direct costs specifically assigned to the respective location. In the absence of the institution's ability to specifically identify and assign costs to each location, the appropriate rate for each location will be applied to total project costs in the same ratio as direct salary costs incurred at each location during the period covered by the project billing or accounting.

PRIMATE CENTER RATES:

The Washington National Primate Research Center (WNPRC) has two Federally recognized rates for each time period. The NIH Office of the Director Primate Research Center (P51) Core Grant rate is 42.0% for 07/01/14 - 06/30/16. The NIH Office of the Director Primate Research Center (P51) Core Grant rate is 38.1% for 07/01/16 - 06/30/20. The Non-Core Federal Rate of 78.0% for 07/01/14 - 06/30/16 is the sum of the Core Grant (42.0%) and the WNPRC specific F&A expenditures (36.0%). The Non-Core Federal Rate of 83.1% for 07/01/16 - 06/30/20 is the sum of the Core Grant (38.1%) and the WNPRC specific F&A expenditures (45.0%).

NEXT PROPOSAL DUE DATE

An indirect cost proposal based on actual costs for fiscal year ending June 30, 2019 will be due no later than December 31, 2019.

ORGANIZATION: University of Washington Management Accounting and Analysis

AGREEMENT DATE: 5/26/2016

### SECTION III: GENERAL

#### A. LIMITATIONS:

The rates in this Agreement are subject to any statutory or administrative limitations and apply to a given grant, contract or other agreement only to the extent that funds are available. Acceptance of the rates is subject to the following conditions: (1) Only costs incurred by the organization were included in its facilities and administrative cost pools as finally accepted; such costs are legal obligations of the organization and are allowable under the governing cost principles; (2) The same costs that have been treated as facilities and administrative costs are not claimed as direct costs; (3) Similar types of costs have been accorded consistent accounting treatment; and (4) The information provided by the organization which was used to establish the rates is not later found to be materially incomplete or inaccurate by the Federal Government. In such situations the rate(s) would be subject to renegotiation at the discretion of the Federal Government.

#### B. ACCOUNTING CHANGES:

This Agreement is based on the accounting system purported by the organization to be in effect during the Agreement period. Changes to the method of accounting for costs which affect the amount of reimbursement resulting from the use of this Agreement require prior approval of the authorized representative of the cognizant agency. Such changes include, but are not limited to, changes in the charging of a particular type of cost from facilities and administrative to direct. Failure to obtain approval may result in cost disallowances.

#### C. FIXED RATES:

If a fixed rate is in this Agreement, it is based on an estimate of the costs for the period covered by the rate. When the actual costs for this period are determined, an adjustment will be made to a rate of a future year(s) to compensate for the difference between the costs used to establish the fixed rate and actual costs.

#### D. USE BY OTHER FEDERAL AGENCIES:

The rates in this Agreement were approved in accordance with the authority in Title 2 of the Code of Federal Regulations, Part 200 (2 CFR 200), and should be applied to grants, contracts and other agreements covered by 2 CFR 200, subject to any limitations in A above. The organization may provide copies of the Agreement to other Federal Agencies to give them early notification of the Agreement.

#### E. OTHER:

If any Federal contract, grant or other agreement is reimbursing facilities and administrative costs by a means other than the approved rate(s) in this Agreement, the organization should (1) credit such costs to the affected programs, and (2) apply the approved rate(s) to the appropriate base to identify the proper amount of facilities and administrative costs allocable to these programs.

BY THE INSTITUTION:

University of Washington Management Accounting and Analysis

(INSTITUTION)

(SIGNATURE)

Elizabeth Cherry

(NAME)

Interim Vice President, Finance & Facilities

(TITLE)

June 13, 2016

(DATE)

ON BEHALF OF THE FEDERAL GOVERNMENT:

DEPARTMENT OF HEALTH AND HUMAN SERVICES

(AGENCY)

Arif M. Karim -S

Digitally signed by Arif M. Karim -S  
DN: cn=US, o=U.S. Government, ou=HHS, ou=OSC, ou=People,  
c=US, email=Arif.M.Karim-S@HHS.gov, serial=1001, version=1  
Date: 2016.05.27 17:57:28 -0500

(SIGNATURE)

Arif Karim

(NAME)

Director, Cost Allocation Services

(TITLE)

5/26/2016

(DATE) 2129

HHS REPRESENTATIVE:

Janet Turner

Telephone:

(415) 437-7820

Manifest for Grant Application # GRANT12321940

Grant Application XML file (total 1):

1. GrantApplication.xml. (size 17171 bytes)

Forms Included in Zip File(total 7):

1. Form GG\_LobbyingForm-V1.1.pdf (size 23347 bytes)
2. Form ProjectNarrativeAttachments\_1\_2-V1.2.pdf (size 21576 bytes)
3. Form SF424\_2\_1-V2.1.pdf (size 30556 bytes)
4. Form BudgetNarrativeAttachments\_1\_2-V1.2.pdf (size 22792 bytes)
5. Form SF424A-V1.0.pdf (size 28889 bytes)
6. Form Key\_Contacts-V1.0.pdf (size 25083 bytes)
7. Form SF424B-V1.1.pdf (size 28363 bytes)

Attachments Included in Zip File (total 2):

1. ProjectNarrativeAttachments\_1\_2  
ProjectNarrativeAttachments\_1\_2-Attachments-NLCS\_2017\_NHMu\_Project\_Proposal1020317601.pdf  
application/octet-stream (size 169777 bytes)
2. BudgetNarrativeAttachments\_1\_2  
BudgetNarrativeAttachments\_1\_2-Attachments-NLCS\_2017\_Budget\_Detail\_Form1020317600.pdf  
application/octet-stream (size 141869 bytes)

**BUDGET INFORMATION - Non-Construction Programs**OMB Number: 4040-0006  
Expiration Date: 01/31/2019**SECTION A - BUDGET SUMMARY**

Grant Program Function or Activity (a)	Catalog of Federal Domestic Assistance Number (b)	Estimated Unobligated Funds		New or Revised Budget		
		Federal (c)	Non-Federal (d)	Federal (e)	Non-Federal (f)	Total (g)
1. Research	15.231	\$	\$	\$ 23,263.00	\$ 0.00	\$ 23,263.00
2.						
3.						
4.						
5. Totals		\$	\$	\$ 23,263.00	\$	\$ 23,263.00

Standard Form 424A (Rev. 7-97)  
Prescribed by OMB (Circular A -102) Page 1

Tracking Number: GRANT12325125

Funding Opportunity Number: L17AS00001 Received Date: Jan 30, 2017 06:02:38 PM EST

## SECTION B - BUDGET CATEGORIES

6. Object Class Categories	GRANT PROGRAM, FUNCTION OR ACTIVITY				Total (5)
	(1)	(2)	(3)	(4)	
	Research				
a. Personnel	\$ 12,000.00	\$	\$	\$	\$ 12,000.00
b. Fringe Benefits	378.00				378.00
c. Travel					
d. Equipment					
e. Supplies	7,420.00				7,420.00
f. Contractual					
g. Construction					
h. Other					
i. Total Direct Charges (sum of 6a-6h)	19,798.00				\$ 19,798.00
j. Indirect Charges	3,465.00				\$ 3,465.00
k. TOTALS (sum of 6i and 6j)	\$ 23,263.00	\$	\$	\$	\$ 23,263.00
7. Program Income	\$ 0.00	\$	\$	\$	\$

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SECTION C - NON-FEDERAL RESOURCES					
(a) Grant Program	(b) Applicant	(c) State	(d) Other Sources	(e) TOTALS	
8. Research	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00	
9.					
10.					
11.					
12. TOTAL (sum of lines 8-11)	\$	\$	\$	\$	

SECTION D - FORECASTED CASH NEEDS					
	Total for 1st Year	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
13. Federal	\$	\$	\$	\$	\$
14. Non-Federal	\$				
15. TOTAL (sum of lines 13 and 14)	\$	\$	\$	\$	\$

SECTION E - BUDGET ESTIMATES OF FEDERAL FUNDS NEEDED FOR BALANCE OF THE PROJECT					
(a) Grant Program	FUTURE FUNDING PERIODS (YEARS)				
	(b) First	(c) Second	(d) Third	(e) Fourth	
16. Research	\$	\$	\$	\$	
17.					
18.					
19.					
20. TOTAL (sum of lines 16 - 19)	\$	\$	\$	\$	

SECTION F - OTHER BUDGET INFORMATION	
21. Direct Charges: \$19,798	22. Indirect Charges: \$3,465
23. Remarks: 17.5% established CESU rate being used.	

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Prescribed by OMB (Circular A -102) Page 2

Tracking Number: GRANT12325125

Funding Opportunity Number: L17AS00001 Received Date: Jan 30, 2017 06:02:38 PM EST

# INDIVIDUAL EVALUATION SCORING SHEET

Funding Opportunity Announcement No. L17AS00001

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

Grants.gov Project # and Applicant Legal Business Name: 12321940 Utah Natural History MuseumEvaluator: Scott Foss Title: Critical Dinosaur Fossil Resource Protection, Inventory, and Salvage: Late Cretaceous

Evaluation Factors	Ratings (see attached description or use your own method)
<b><u>State Ranking</u></b> <b>(b)(5) DPP</b>	
<b><u>Clear Objective</u></b> (Maximum score 15/100 Points) Notes:	
<b><u>Research Theme and Technical Approach</u></b> (Maximum score 25/100 Points) Notes:	
<b><u>Public Benefit</u></b> (Maximum score 20/100 Points) Notes:	
<b><u>Qualifications</u></b> (Maximum score 10/100 Points) Notes:	

## Project Narrative File(s)

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\* Mandatory Project Narrative File Filename: 1234 DBG NLCS Research and Science Proposal 2017.01.31

Add Mandatory Project Narrative File

Delete Mandatory Project Narrative File

View Mandatory Project Narrative File

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To add more Project Narrative File attachments, please use the attachment buttons below.

Add Optional Project Narrative File

Delete Optional Project Narrative File

View Optional Project Narrative File



## **Structural and Geological Mapping, and Assessment of the Dominguez-Escalante National Conservation Area (D-E NCA)**

*Verner C. Johnson and Richard Livaccari*

### **I. ABSTRACT**

---

The Dominguez-Escalante National Conservation Area (D-E NCA) is located on the east-central portion of the Uncompahgre Plateau of western Colorado. For the past 300 million years, this area has played a key role in the geologic evolution of the western U.S. Classic fault structures of the Late Paleozoic Ancestral Rockies event (~350-250 m.y. ago) are found along southern margin of the Uncompahgre Plateau. Classic monoclinial structures of the younger Laramide Rocky Mountains event (~80 – 40 m.y. ago) are found along the northern margin of the Uncompahgre Plateau (Colorado National Monument). Deformation has continued into modern times (<25 m.y.) as Late Cenozoic with uplift and exhumation of the Uncompahgre Plateau along with the entire Colorado Plateau (4-Corners region). The focus of this proposal is to assess the timing and extent of geologic features that may be related to the Laramide Rocky Mountains event and younger geologic features found in the D-E NCA. There is currently a lack of direct evidence for the age and timing of geologic features in D-E NCA. Preliminary structural data suggests the presence of many fault structures in the D-E NCA, some of these structures are associated with wide zones of mineralized fault breccia, especially within and adjacent to the Unaweep Canyon (a prominent landscape feature along the northern margin of D-E NCA). Structural indicators along the canyon walls are preserved due to hydrothermal alteration including intense silicification associated with copper mineralization. These altered zones were able to resist erosion as the canyon was excavated by the ancient Gunnison River, Colorado River or a combination of both rivers. Geologists have long assumed the structures and associated mineral deposits are related to the Laramide Rocky Mountain event but there is little direct evidence for this assumption. These structures and mineral deposits may plausibly be much younger than Laramide. These uncertainties arise from the fact that much of the D-E NCA has not been geologically mapped in detail. Mapping may also reveal new, previously undiscovered faults and mineral deposits (economical?) in this area. Mapping the geology of this region will provide land-use planners with additional information regarding the potential for natural hazards, such as seismic risk, landslides, and flash-flood potential, and man-made hazards such as abandoned mine workings, some of which yet to be located and inventoried. This work will assist the Bureau of Land Management objective of ensuring public safety. To understand the geologic evolution of the D-E NCA, we propose detailed mapping of this area. This proposal is a collaboration between the BLM and Colorado Mesa University to map the D-E NCA in order to generate a detailed and accurate geological survey, seismic hazard risk assessment, and inventory of abandoned mines in this area.

### **II. KEYWORDS**

---

Geologic Mapping, Stratigraphy, Origins of Modern Landforms, Resource Management, Collection Protocols, Education

### III. RESEARCH THEMES

- 1) Research Identified in Unit Science Plans; 2) Standardized Inventory and Monitoring; 3) Citizen Science; and 4) Research Syntheses.

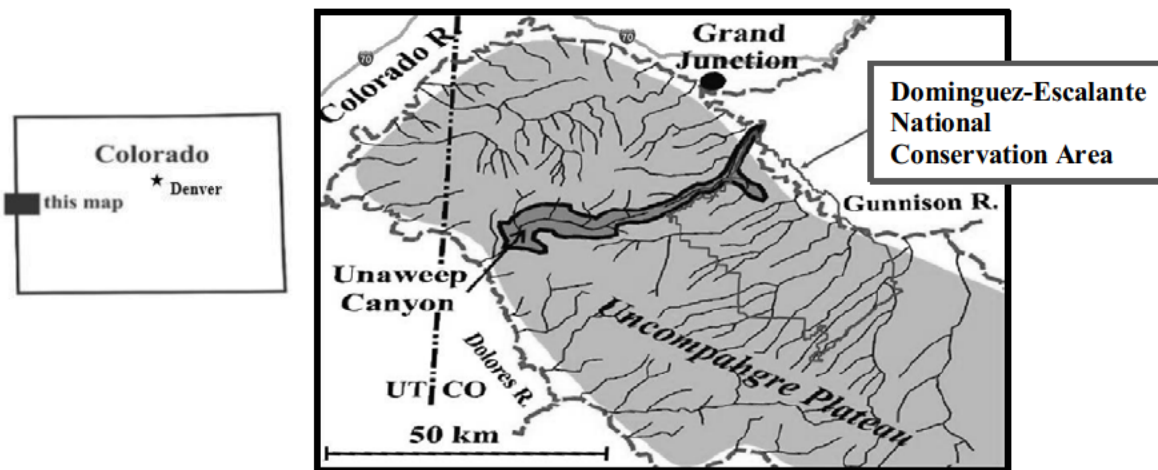
### IV. NATIONAL CONSERVATIONS LANDS INVOLVED

Dominguez – Escalante National Conservation Area (D-E NCA)

### V. INTRODUCTION

The Dominguez-Escalante National Conservation Area (D-E NCA) is located in the eastern-most region of the Uncompahgre Plateau of western Colorado, including parts of Mesa, Delta, and Montrose Counties (red outline in Figures 1-3). D-E NCA was established by Congress in 2009 for scientific study, landscape preservation and managing human uses in order to protect geologic, wildlife, and water resources.

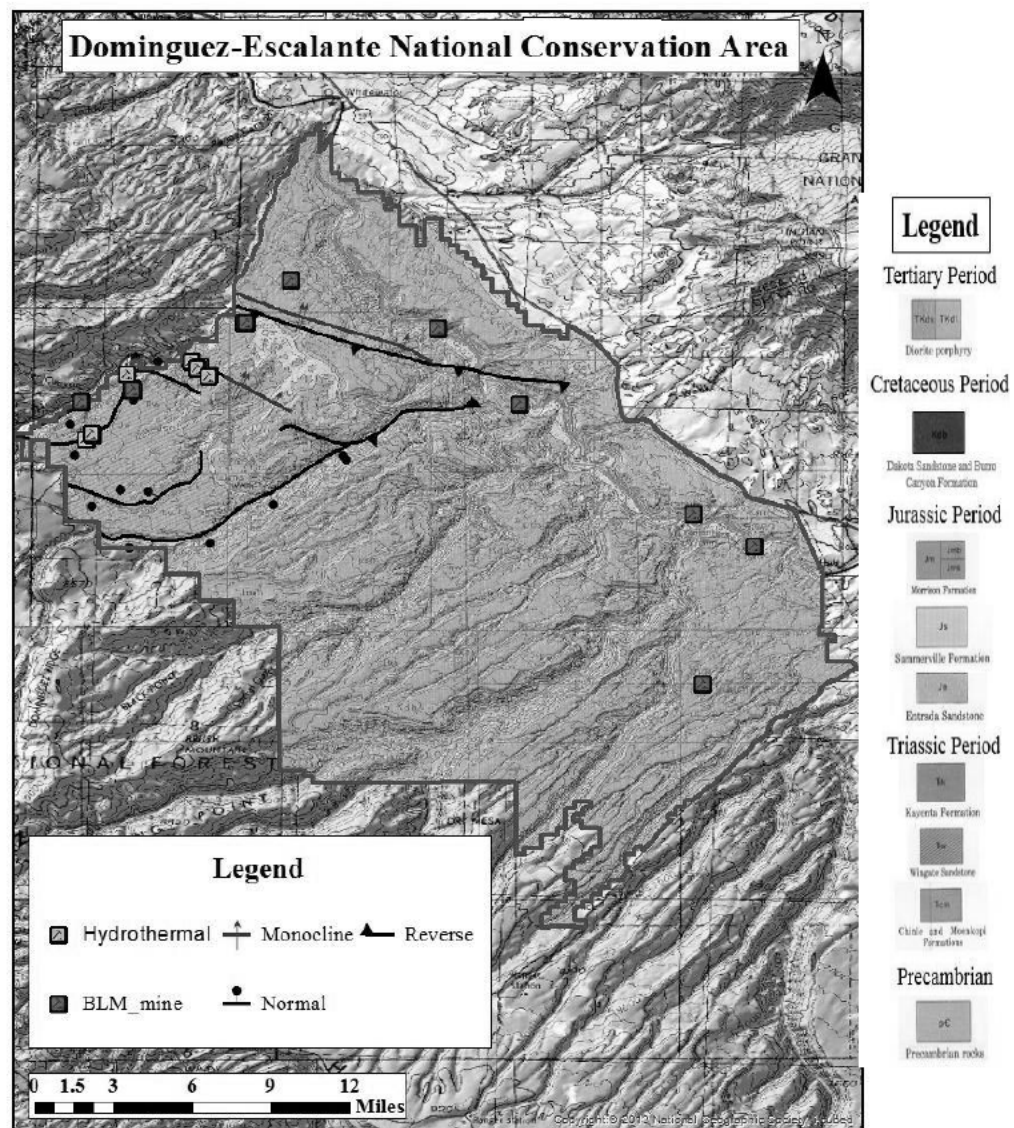
The Uncompahgre Plateau is a major Laramide-age (~80 – 40 m.y. ago) orogenic structural feature of the Colorado Plateau. Prior to this, classic fault structures of the Late Paleozoic (~350-250 m.y. ago) Ancestral Rockies event formed along southern margin of the Uncompahgre Plateau. It has been assumed that Late Cretaceous to Early Cenozoic (~80 – 40 m.y. ago), deformation related to development of the Laramide Rocky Mountains further modified the Uncompahgre uplift.



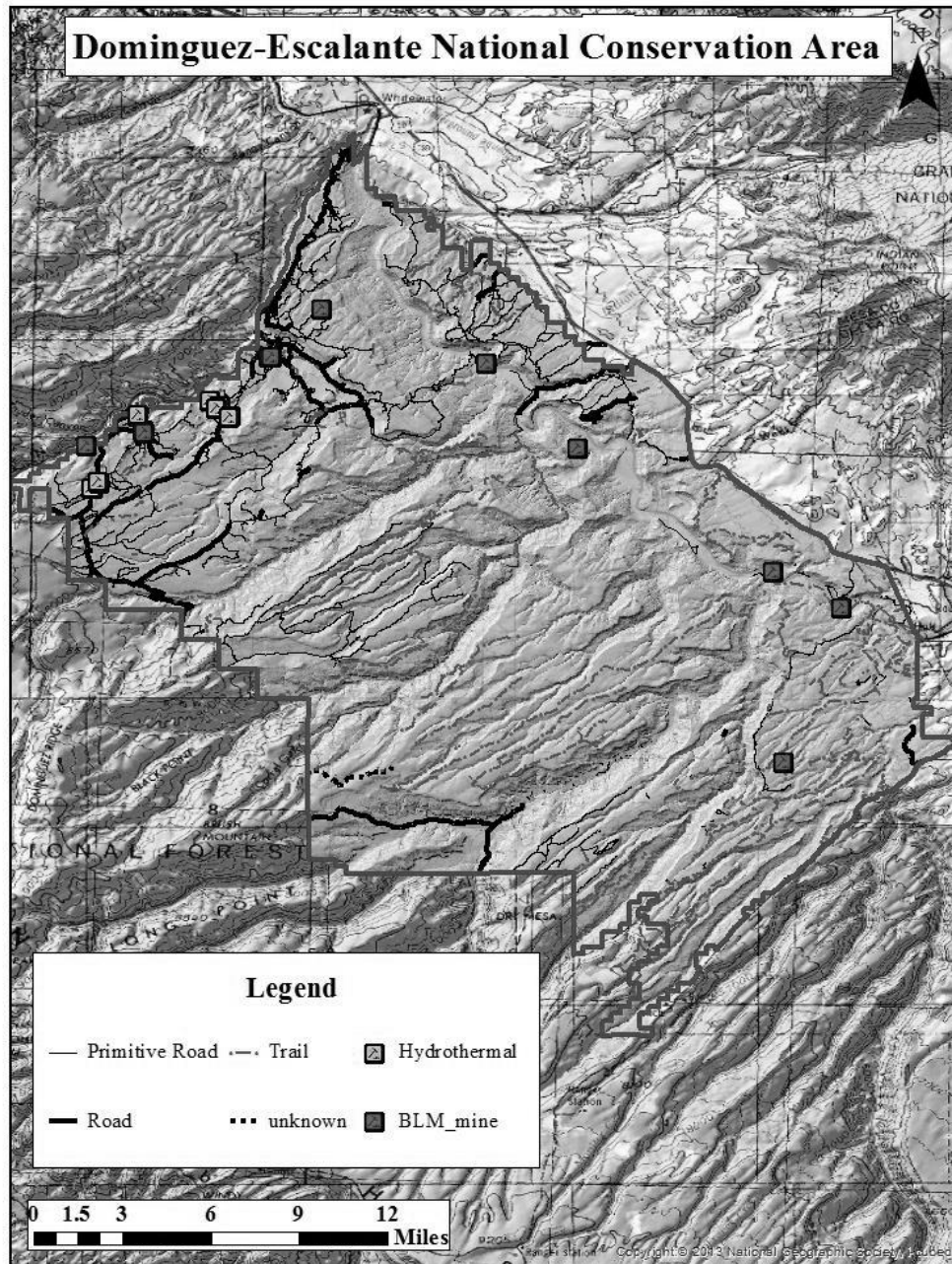
*Figure 1: Location map of the Uncompahgre Plateau just west of Grand Junction in western Colorado and eastern Utah. Red outline represents the D-E NCA.*

The conclusion of multiple studies is that significant uplift of the Uncompahgre Plateau occurred during the late Cenozoic (<25 m.y.; Cater, 1966; Scott and others, 2002a). Geologists debate whether the Uncompahgre Plateau and Colorado Plateau achieved their current elevations during the Laramide Rocky Mountain event or during late Cenozoic exhumation (uplift and erosion; Pederson and others, 2002). It is likely that some exhumation did occur in the late Cenozoic because a major river system (the Colorado or Gunnison Rivers, or both) abandoned the

deeply cut Unaweep Canyon during that time (Hunt, 1956; Scott and others, 2002a). Abandonment of Unaweep Canyon is considered as evidence for at least 500 meters of late Cenozoic uplift of the Uncompahgre Plateau (Cater, 1966; Perry, 1989; Scott and others, 2002a; Garhart and others, 2003). The Uncompahgre Plateau has played a very important role in unraveling the late Cenozoic geological history of the Colorado Plateau/Rocky Mountains, including the Dominguez-Escalante National Conservation Area (D-E NCA).



*Figure 2: Preliminary geologic map (modified from Williams, 1964, through ArcGIS; NAD83 projection) with access roads of the Dominguez-Escalante National Conservation Area (D-E NCA).*

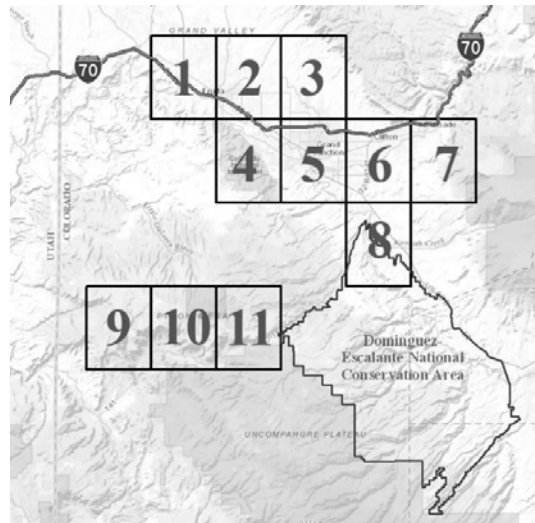


*Figure 3: Reference quality road and trail map (modified through ESRI ArcGIS; NAD83 projection) with initial inventory of mineral resources within the Dominguez-Escalante National Conservation Area (D-E NCA).*



The Colorado Geological Survey has identified numerous faults in the Uncompahgre Plateau that are suspected to have moved during the late Cenozoic (Widmann and others, 2002). This may have resulted in Quaternary (2.6 – 0 m.y.) seismic activity. According to a Colorado Geological Survey study (Widmann and others, 2002): “...structures with orientations favorable for slip in the modern stress environment **need to be investigated for seismic hazard**, even if there is no published evidence of late Cenozoic activity”. Part of the work proposed here will be identification of any older faults that may have been reactivated in the Quaternary.

Much of the geology of the Uncompahgre Plateau (including Dominguez-Escalante National Conservation Area) has yet to be mapped in detail. Existing maps are at a scale of 1:250,000 (Williams, 1964) or simply provide sketch maps of the area (Heyman, 1983; Heyman and others, 1986). This began to change in 2001 with the USGS publication of a 1:24,000 scale map of the Colorado National Monument quadrangle (Scott and others, 2001; Figure 4). The USGS has continued to map quadrangles in the more populated areas adjacent to the Uncompahgre Uplift (Figure 4, Grand Junction and Clifton quads; Scott and others, 2002b; Carrara, 2001). State Geologic Survey Mapping (STATEMAP) work done by the Colorado Geological Survey has recently produced a series of 1:24,000 scale geologic maps of nearby areas, but none of these include the Dominguez-Escalante National Conservation Area (Figure 4). The Colorado Geological Survey has no future plans for work in Mesa County.



*Figure 4: Location map western Colorado illustrating the Dominguez-Escalante National Conservation Area and 1:24,000 scale geologic quadrangle maps produced by the Colorado Geological Survey (1: Mack, 2: Fruita, 3: Corcoran Point, 8: Whitewater; 9: 2-V Basin; 10: Fish Creek; 11: Snyder Flat) and 1:24,000 scale geologic scale quadrant maps produced by the U.S. Geological Survey (4: Colorado National Monument, 5: Grand Junction, 6: Clifton; 7: Palisade)*

The geology of the Dominguez-Escalante National Conservation Area has yet to be studied in detail. The Uncompahgre Plateau has a unique spectrum of mining history stretching back to the late 1800's and significant archeological evidence of prior occupation by native American peoples. Historically, in the Dominguez-Escalante National Conservation Area, copper, uranium, and vanadium have been commercially mined, and materials from sedimentary rocks in the area were used by the Ute Indian Tribes. Old, long abandoned, small-scale mining operations are located in the area. Many have been located and mapped by the BLM, but there are more yet to be inventoried. More recently, mineral collectors have exploited small deposits of amethyst, fluorite, malachite, and azurite for their intrinsic appeal and natural beauty.

Here we request funding for a 1-year project to map the surficial geology, stratigraphy, mineral deposits and structures within the Dominguez-Escalante National Conservation Area. The main deliverable of this proposed research is to provide the BLM with informative and interpretive material on detailed geological mapping and historical references of the features found in the Dominguez-Escalante National Conservation Area that can be offered by the Grand Junction and Uncompahgre Field Offices to tourists, hikers, and K-12 and college educators. To accomplish these goals, we will use ArcGIS software to produce a basic geological map at 1:62500 scale, in addition to a generalized stratigraphic column, three geologic cross-sections. We will also use quantitative geochemical analysis of mineral resources using whole rock geochemistry and radiometric dating.

## **VI. SOCIETAL BENEFITS OF THIS WORK**

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According to a recent article in the Denver Post (<http://www.denverpost.com/2016/07/07/colorado-second-population-growth-2015/>), Colorado is the second-fastest growing state in the U.S. The population of Colorado increased 1.9 percent from 2010 to 2015. Based on older data, the population of western Colorado is growing at an even more rapid rate (10 to 17% from 1990 to 1994; Hecox and Ack, 1996). According to Hecox and Ack (1996), population growth of the Colorado Plateau region is outpacing growth in the western U.S. as a whole.

Because of this growth, western Colorado will experience significantly more human land-use impacts in the future. Mapping the geology of this region will provide land-use planners with additional information regarding potential natural hazards in this area such as seismic risk, landslides, and flash flood potential. Additionally, man-made hazards exist in the form of abandoned mine workings, some of which have not been inventoried. This area may be much more seismically active than previously thought and, therefore, the hazards from earthquakes may be greatly underestimated. Compared to locations on the east coast of the United States, Colorado is considered seismically benign. This may be related to the fact that the east coast has a much longer history of European settlement compared to that of Colorado, and therefore, a much longer recorded history of seismic activity. Since it is generally assumed that Colorado is seismically inactive, Colorado is not thoroughly monitored for earthquakes, and since it is not well monitored, few active faults have been discovered (Vince Matthews, former Colorado State Geologist, 2003 personal communication).

## **VII. RESEARCH QUESTIONS**

---

1. What geological formations are present in the Dominguez-Escalante National Conservation Area (DE - NCA)?
2. What geological structures are found in the DE - NCA?
3. What is the geologic timing and ages of major geologic events in the DE - NCA? (Are the faults and ore deposits Laramide in age?)
4. What is the origin, age, and pattern of ore deposits found in the DE - NCA and do any of these ore deposits have any current economic value?
5. What ancient and modern tectonic processes contributed to the formation of the present-day landscape of the DE - NCA?
6. Have any ancient (Laramide) faults may have been reactivated during modern times and do they contribute to any seismic hazards (are there any Holocene-age faults, <12,000 years)?
7. What additional unmapped mine workings are found in this area and do they pose a hazard to the public?

## **VIII. MATERIALS AND METHODS**

---

All geological contacts, structural aspects and hydrothermally altered contact zones will be physically traced using GPS data points. Locations of prior mining operations and areas of mineralogical significance will be recorded by GPS and researched with the resources provided by CMU. All data will be compiled into a geodatabase and reference map using ArcGIS. Thirty mineralogical samples are earmarked for analysis using whole rock lithogeochemistry using an Inductively Coupled Plasma –Mass Spectrometry Instrument to determine major and minor elemental composition and thereby indicate possible methods of radiometric dating. Twelve samples will be picked for either Krypton-Krypton, Strontium-Rubidium, and/or Neodymium-Samarium dating to determine an absolute age of mineralization in the faults. This analysis will be conducted through the same lab to maintain continuity. Thin sections will be prepared from mineralogical samples to analyze mineral assemblage and survey for fluid inclusions.

## **IX. RESULTS TO DATE**

---

More than 100 hours of field work has been completed measuring structural aspects on the southern rim of Unaweep Canyon and determining a preliminary classification of geological units in the same area. These data, along with elevation measurements and multiple structural points taken outside of the conservation area were used to establish preliminary evidence for the existence of a normal fault zone located within Unaweep Canyon with a post mid-Jurassic (~170 m.y. ago) age based on crosscutting relationships through the Jurassic Entrada Formation. This information was presented at the 2016 national conference of the Geological Society of America in Denver, CO. Two hydrothermally altered mineral samples from the southern expression of the Nancy Hanks Gulch Fault have been sent to ALS laboratory and subjected to geochemical analysis providing quantitative minor and major elemental data as well as REE concentrations. Strike and dip measurements of the Bridgeport Fault and Cactus Park Fault have been collected and analyzed. Data from structural folding in the Precambrian basement within Big Dominguez Canyon have been measured and analyzed.

## **X. BENEFITS OF PROJECT FOR BLM MANAGEMENT**

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- a. Inventory of roads, hiking trails and access points in D-E NCA
- b. Outlines of all known and inferred hydrothermally altered rock
- c. Inventory and monitoring of all known abandoned mine lands and a written assessment of the mineralization pattern of each location.
- d. Standard 'check list' of what we want to describe at these locations
  - Extent of mineral veins
  - Mineral assemblages of ore deposits
  - Pattern of mineralization and fluid inclusion survey (analysis by thin section)
  - Elemental analysis of ore samples (whole rock lithogeochemistry)
  - Extent of contact aureole
  - Sketch map of each site with workings, historic structures (or ruins), and equipment
- e. Senior Thesis for an undergraduate student enrolled in the Geosciences Program at CMU
- f. Professional papers detailing structural geology and geochemistry of the region

## **XI. DELIVERABLES**

---

1. Report containing the geological history of D-E NCA including detailed geologic map referencing structures and surficial mineral resources.
2. Compiled ArcGIS geodatabase including all data gathered in the field.

## **XII. STATEMENTS OF SUPPORT**

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Colorado Mesa University has agreed to provide working access to computer and necessary programs, laboratory access, and sample storage. All tools for field work are provided by members of the research team. A grant from the Grand Junction Geological Society has been provided for preliminary geochemical analysis from sites adjacent to Unaweep Canyon and the D-E NCA

## **XIII. TIMELINE FOR PROJECT**

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### Summer and Fall 2017

- a. Field work, data gathering, thin section analysis, and geochemical analysis of mineral samples.

### Winter and Spring 2018

- a. Submission of Annual Report to the BLM.
- b. Manuscript preparation for a peer-reviewed, open access article.
- c. Submission of final report, manager's summary, and plain English synopsis.



#### **XIV. POINT PEOPLE FOR PROJECT**

---

Eric E. Eckberg, *Minerals, AML, or Paleo*, Email: [eeckberg@blm.gov](mailto:eeckberg@blm.gov)  
Grand Junction Field Office, BLM, 2815 H Road, Grand Junction, CO 81506 Office: 970.244.3077  
(office)/ Fax: 970-244-3083/ 970.210.6807 (mobile)

Nikki Grant-Hoffman, PhD, *Colorado NCL Science Coordinator/ Ecologist*,  
Email: [mnhoffman@blm.gov](mailto:mnhoffman@blm.gov)  
Grand Junction Field Office, BLM, 2815 H Road, Grand Junction, CO 81506: (970) 244 3020

Collin Ewing, *Manager, Dominguez-Escalante National Conservation Area and McInnis Canyon National Conservation Area*, Email: [cewing@blm.gov](mailto:cewing@blm.gov)  
Grand Junction Field Office, BLM, 2815 H Road, Grand Junction, CO 81506 Office: 970.244.3049

Matt Morgan, *Assistant Director/Senior Research Geologist*, Colorado Geological Survey:  
Email: [mmorgan@mines.edu](mailto:mmorgan@mines.edu)  
College of Earth Resource Sciences & Engineering, Colorado School of Mines, 1801 19th St.,  
Golden, CO 80401; phone: office-303-384-2647 cell-720-346-8606

#### **XV. PARTNER QUALIFICATIONS, AFFILIATIONS, & CONTACT DETAILS**

---

Verner C. Johnson, Email: [vjohnson@coloradomesa.edu](mailto:vjohnson@coloradomesa.edu)  
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Professional Societies: Geological Society of America, Society of Exploration Geophysicists, American Association of Petroleum Geologists, and Grand Junction Geological Society.

Dr. Rick Livaccari, Email: [rlivacca@coloradomesa.edu](mailto:rlivacca@coloradomesa.edu)  
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Professional Societies: Geological Society of America and Grand Junction Geological Society.

## XVI. REFERENCES CITED

- Cater, F.W., Jr., 1966, Age of the Uncompahgre Uplift and Unaweep Canyon, west-central Colorado, 'in' Geological Survey Research 1966, Chapter C: U.S. Geological Survey Professional Paper 550-C, p. C86-C92.
- Carrara, P. E., 2001, Geologic map of the Clifton Quadrangle, Mesa County, Colorado, Miscellaneous Field Studies Map-2359
- Garhart, A., Aslan, A. and Betton, C., 2003, Origin of Late Cenozoic Lacustrine Deposits on the Uncompahgre Plateau of western Colorado, Geological Society of America, Abstracts with Programs, v. 35, no. 6, p. 170.
- Hecox, W. and Ack, B. 1996, Charting the Colorado Plateau: An economic and demographic exploration. Grand Canyon Trust, Flagstaff, AZ, p. 25
- Heyman, O.G., 1983, Distribution and structural geometry of faults and folds along the northwestern Uncompahgre Uplift, western Colorado and eastern Utah, in: Averett, W.R., Northern Paradox Basin-Uncompahgre Uplift, Grand Junction Geological Society 1983 Field Trip, p. 45 - 57.
- Heyman, O.G., Huntoon, P.W., and White-Heyman, M.A., 1986, Laramide Deformation of the Uncompahgre Plateau-Geometry and Mechanisms, Rocky Mountain Association of Geologists 1986 Symposium, p. 65 - 76.
- Hunt, C.B., 1956, Cenozoic Geology of the Colorado Plateau: U.S. Geol. Survey Professional Paper 600-C.
- Livaccari, R.F., Trumbo, A.L., and Feil, M.J., 2016, Laramide Structure Of The Uncompahgre Plateau Of Western Colorado, *Geological Society of America Abstracts with Programs* v. 48, no. 7.
- Pederson, J.L., Mackley, R.D., and Eddleman, J.L., 2002, Colorado Plateau uplift and erosion evaluated using GIS, *GSA Today*, v. 12, no. 8, p. 4-10.
- Perry, T.W.V., 1989, Tectonic inference and computer simulation in stream longitudinal profile evolution, Unaweep Canyon and vicinity, Colorado and Utah [abs.]: Geological Society of America, Abstracts with Programs, v. 21, no. 6, p. 269.
- Scott, R.B., Harding, A.E., Hood, W.C., Cole, R.D., Livaccari, R.F., Johnson, J.B., and Dickerson, R.P., 2001, Geologic map of the Colorado National Monument quadrangle and the Colorado National Monument, Mesa County, Colorado: U.S.G.S., Geologic Investigations Series, I-2740.
- Scott, R.B., Steven, T.A., Betton, C.W., Cole, R.D., Aslan, A., and Hood, W.C., 2002a, Evidence for Late Cenozoic Uplift on the Uncompahgre Plateau, Northeastern Colorado Plateau, Geological Society of America, Abstracts with Programs, v. 34, p.472.
- Scott, R.B., Carrara, P.E., Hood, W.C., and Murray, K.E., 2002b, Geologic map of the Grand Junction Quadrangle, Mesa County, Colorado: Miscellaneous field studies map MF-2363.
- Trumbo, A.L., Feil, M.J., Livaccari, R.F., Johnson, V.C., Price, A.M. and Mazza, J. M., 2016, Laramide-Age Structure, Geochemistry and Origin of Unaweep Canyon in Northern Uncompahgre Plateau, Colorado, Geological Society of America Abstracts with Programs v. 48, no. 7.
- Williams, P.L., 1964, Geology, structure, and uranium deposits of the Moab quadrangle, Colorado and Utah: U.S. Geological Survey Miscellaneous Geologic Investigations Map I-360 (Scale: 1:250,000).

Widmann, B. L., Kirkham, R. M., Morgan, M. L., and Rogers, W. P., with contributions by Crone, A. J., Personius, S. F., and Kelson, K. I., and GIS and Web design by Morgan, K. S., Pattyn, G. R., and Phillips, R. C., 2002, Colorado Late Cenozoic Fault and Fold Database and Internet Map Server: Colorado Geological Survey Information Series 60a, <http://geosurvey.state.co.us/pubs/ceno/>

# COLORADO GEOLOGICAL SURVEY

---

1801 19<sup>th</sup> Street  
Golden, Colorado 80401  
303-384-2655



January 27, 2017

Dear Proposal Review Panel:

Karen Berry  
Director and State Geologist

This letter is in support of the proposal "**Structural and Geological Mapping and Assessment of the Dominguez-Escalante National Conservation Area**" by Dr. Verner Johnson and Dr. Richard Livaccari of Colorado Mesa University. This proposal dovetails nicely with the Colorado Geological Survey's Long Range Geologic Mapping Plan within western Colorado and will aid our geologic hazard assessments in the region. In addition, several CGS and USGS geologic maps of varying scales are within or surround the proposed area of research which will provide an outstanding basis for this project.

Drs. Johnson and Livaccari plan to map the bedrock and surficial geology and structure within the Dominguez-Escalante National Conservation Area (D-ENCA). Mapping the geology and structures here will provide needed information about the evolution of the Laramide orogeny in western Colorado. The region is an ideal field area to study the structural signatures of Laramide and post-Laramide deformation because the exposed faults are typically mineralized and brecciated making them relatively resistant to erosion and easily mapped. The ages of the fault zones are not well constrained and this study will provide the opportunity to determine the absolute age of the faulting. Furthermore, characterization of these faults and mapping the extents of landslide- and flood-prone deposits will help local and state land-use and hazard planners delineate and mitigate potentially devastating geologic hazards.

The CGS is very interested in the structural geology of this area and how it pertains to future CGS mapping nearby. Our plans include mapping to the west and southeast of the proposed study area. Undoubtedly, the work of Drs. Johnson and Livaccari will be utilized in our projects to gain further insight into the structural evolution and geologic hazards of the region.

In closing, we enthusiastically endorse this proposal because of the high quality of work of Drs. Johnson and Livaccari, the integration with our mapping plans, and the structural and geologic hazard questions it promises to answer.

Sincerely,

A handwritten signature in dark ink, appearing to read "Matthew Morgan".

Matthew Morgan  
Deputy Director  
STATEMAP Program Manager  
Colorado Geological Survey

## Key Contacts Form

**\* Applicant Organization Name:**

University of Southern California

Enter the individual's role on the project (e.g., project manager, fiscal contact).

**\* Contact 1 Project Role:** Principal Investigator

Prefix:

Dr.

**\* First Name:** Adam

Middle Name:

**\* Last Name:** Huttenlocker

Suffix:

Title: Assistant Professor

Organizational Affiliation:

University of Southern California

**\* Street1:** 1333 San Pablo St., BMT 301

Street2: Dept. of Cell and Neurobiology

**\* City:** Los Angeles

County:

**\* State:** CA: California

Province:

**\* Country:** USA: UNITED STATES**\* Zip / Postal Code:** 90089 9235**\* Telephone Number:** (323) 442 2752

Fax:

**\* Email:** (b) (6) @gmail.com

## Key Contacts Form

**\* Applicant Organization Name:**

University of Southern California

Enter the individual's role on the project (e.g., project manager, fiscal contact).

**\* Contact 2 Project Role:** Co Principal Investigator

Prefix:

Dr.

**\* First Name:** Stuart

Middle Name:

**\* Last Name:** Sumida

Suffix:

Ph.D.

Title:

Professor

Organizational Affiliation:

California State University, San Bernardino

**\* Street1:** 5500 University Parkway

Street2: Department of Biology

**\* City:** San Bernardino

County:

**\* State:** CA: California

Province:

**\* Country:** USA: UNITED STATES**\* Zip / Postal Code:** 92407 2318**\* Telephone Number:** (909) 537 5346

Fax:

**\* Email:** ssumida@csusb.edu

## COLLEGES AND UNIVERSITIES RATE AGREEMENT

EIN:

DATE:07/22/2016

ORGANIZATION:

FILING REF.: The preceding  
agreement was dated  
01/28/2013University of Nevada, Las Vegas  
4505 Maryland Parkway  
P.O. Box 451004  
Las Vegas, NV 89154-1004

The rates approved in this agreement are for use on grants, contracts and other agreements with the Federal Government, subject to the conditions in Section III.

**SECTION I: Facilities And Administrative Cost Rates**

RATE TYPES:      FIXED              FINAL              PROV. (PROVISIONAL)      PRED. (PREDETERMINED)

EFFECTIVE PERIOD

<u>TYPE</u>	<u>FROM</u>	<u>TO</u>	<u>RATE (%)</u>	<u>LOCATION</u>	<u>APPLICABLE TO</u>
PRED.	07/01/2016	06/30/2017	48.00	On-Campus	Organized Research
PRED.	07/01/2017	06/30/2021	49.50	On-Campus	Organized Research
PRED.	07/01/2016	06/30/2021	26.00	Off-Campus	Organized Research
PRED.	07/01/2016	06/30/2021	48.00	On-Campus	Instruction
PRED.	07/01/2016	06/30/2021	26.00	Off-Campus	Instruction
PRED.	07/01/2016	06/30/2021	36.00	On-Campus	Other Sponsored Activities
PRED.	07/01/2016	06/30/2021	26.00	Off-Campus	Other Sponsored Activities
PROV.	07/01/2021	Until Amended		(1)	

\*BASE

ORGANIZATION: University of Nevada, Las Vegas

AGREEMENT DATE: 7/22/2016

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Modified total direct costs, consisting of all salaries and wages, fringe benefits, materials, supplies, services, travel and up to the first \$25,000 of each subaward (regardless of the period of performance of the subawards under the award). Modified total direct costs shall exclude equipment, capital expenditures, charges for patient care, student tuition remission, rental costs of off-site facilities, scholarships, and fellowships as well as the portion of each subaward in excess of \$25,000.

(1) Use same rates and conditions as those cited for fiscal year ending June 30, 2021.



ORGANIZATION: University of Nevada, Las Vegas

AGREEMENT DATE: 7/22/2016

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## **SECTION II: SPECIAL REMARKS**

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### TREATMENT OF FRINGE BENEFITS:

The fringe benefits are specifically identified to each employee and are charged individually as direct costs. The directly claimed fringe benefits are:

SUI, HEALTH INSURANCE, NEVADA INDUSTRIAL COMPENSATION, AND RETIREMENT.

### TREATMENT OF PAID ABSENCES

Vacation, holiday, sick leave pay and other paid absences are included in salaries and wages and are claimed on grants, contracts and other agreements as part of the normal cost for salaries and wages. Separate claims are not made for the cost of these paid absences.

### DEFINITION OF EQUIPMENT

Equipment is defined as tangible nonexpendable personal property having a useful life of more than one year and an acquisition cost of \$5,000 or more per unit.

### DEFINITION OF OFF-CAMPUS ACTIVITIES

Off-campus activities are those activities that operate entirely off University property (either owned, leased or rented) and do not increase, nor decrease the costs of those activities (i.e., operations and maintenance) that would be affected had the activities been operated on property maintained and/or depreciated by the University.

### NEXT PROPOSAL DUE DATE

A proposal based on actual costs for fiscal year ending 06/30/2020 will be due no later than 12/31/2020.

ORGANIZATION: University of Nevada, Las Vegas

AGREEMENT DATE: 7/22/2016

**SECTION III: GENERAL****A. LIMITATIONS:**

The rates in this Agreement are subject to any statutory or administrative limitations and apply to a given grant, contract or other agreement only to the extent that funds are available. Acceptance of the rates is subject to the following conditions: (1) Only costs incurred by the organization were included in its facilities and administrative cost pools as finally accepted; such costs are legal obligations of the organization and are allowable under the governing cost principles; (2) The same costs that have been treated as facilities and administrative costs are not claimed as direct costs; (3) Similar types of costs have been accorded consistent accounting treatment; and (4) The information provided by the organization which was used to establish the rates is not later found to be materially incomplete or inaccurate by the Federal Government. In such situations the rate(s) would be subject to renegotiation at the discretion of the Federal Government.

**B. ACCOUNTING CHANGES:**

This Agreement is based on the accounting system purported by the organization to be in effect during the Agreement period. Changes to the method of accounting for costs which affect the amount of reimbursement resulting from the use of this Agreement require prior approval of the authorized representative of the cognizant agency. Such changes include, but are not limited to, changes in the charging of a particular type of cost from facilities and administrative to direct. Failure to obtain approval may result in cost disallowances.

**C. FIXED RATES:**

If a fixed rate is in this Agreement, it is based on an estimate of the costs for the period covered by the rate. When the actual costs for this period are determined, an adjustment will be made to a rate of a future year(s) to compensate for the difference between the costs used to establish the fixed rate and actual costs.

**D. USE BY OTHER FEDERAL AGENCIES:**

The rates in this Agreement were approved in accordance with the authority in Title 2 of the Code of Federal Regulations, Part 200 (2 CFR 200), and should be applied to grants, contracts and other agreements covered by 2 CFR 200, subject to any limitations in A above. The organization may provide copies of the Agreement to other Federal Agencies to give them early notification of the Agreement.

**E. OTHER:**

If any Federal contract, grant or other agreement is reimbursing facilities and administrative costs by a means other than the approved rate(s) in this Agreement, the organization should (1) credit such costs to the affected programs, and (2) apply the approved rate(s) to the appropriate base to identify the proper amount of facilities and administrative costs allocable to these programs.

BY THE INSTITUTION:

University of Nevada, Las Vegas

(INSTITUTION)

(SIGNATURE)

(NAME)

(TITLE)

(DATE)

ON BEHALF OF THE FEDERAL GOVERNMENT:

DEPARTMENT OF HEALTH AND HUMAN SERVICES

(AGENCY)

**Arif M. Karim -A**

(SIGNATURE)

Arif Karim

(NAME)

Director, Cost Allocation Services

(TITLE)

7/22/2016

(DATE) 0227

HHS REPRESENTATIVE: Helen Fung

Telephone: (415) 437-7820

Digitally signed by Arif M. Karim -A  
DN: c=US, o=U.S. Government, ou=HHS, ou=PSC,  
ou=People, cn=Arif M. Karim -A,  
0.9.2342.19200300.100.1.1=2000212895  
Date: 2016.07.29 20:28:06 -05'00'

UNIVERSITY OF NEVADA, LAS VEGAS  
FACILITIES AND ADMINISTRATIVE COST RATES  
FOR THE PERIOD JULY 1, 2016 THROUGH JUNE 30, 2021

EXHIBIT A  
PAGE 1 OF 1

ORGANIZED RESEARCH					
JULY 1, 2016 THROUGH JUNE 30, 2017			JULY 1, 2017 THROUGH JUNE 30, 2021		
	ON-CAMPUS	OFF-CAMPUS		ON-CAMPUS	OFF-CAMPUS
BUILDING	7.6%			7.7%	
EQUIPMENT	1.6%			1.7%	
INTEREST	1.1%			0.7%	
OPERATIONS & MAINTENANCE	10.6%			11.9%	
LIBRARY	1.1%			1.5%	
GENERAL ADMINISTRATION	7.0%			6.4%	
DEPARTMENT ADMINISTRATION	8.1%			10.3%	
SPONSORED PROJECTS ADMINISTRATION	10.9%			9.3%	
STUDENT SERVICES	0.0%			0.0%	
ADMINISTRATION COMPONENTS	26.0%	26.0%		26.0%	26.0%
TOTAL	48.0%	26.0%		49.5%	26.0%

INSTRUCTION			OTHER SPONSORED ACTIVITIES		
JULY 1, 2016 THROUGH JUNE 30, 2021			JULY 1, 2016 THROUGH JUNE 30, 2021		
	ON-CAMPUS	OFF-CAMPUS		ON-CAMPUS	OFF-CAMPUS
BUILDING	4.0%			2.5%	
EQUIPMENT	0.5%			0.5%	
INTEREST	0.5%			0.5%	
OPERATIONS & MAINTENANCE	7.5%			5.0%	
LIBRARY	9.5%			1.5%	
GENERAL ADMINISTRATION	3.4%			7.1%	
DEPARTMENT ADMINISTRATION	7.7%			8.7%	
SPONSORED PROJECTS ADMINISTRATION	4.9%			10.2%	
STUDENT SERVICES	10.0%			0.0%	
ADMINISTRATION COMPONENTS	26.0%	26.0%		26.0%	26.0%
TOTAL	48.0%	26.0%		36.0%	26.0%

ADMINISTRATIVE COMPONENTS ARE CAPPED AT 26.0% IN ACCORDANCE WITH OMB A-21, DATED JULY 26, 1993.  
CONCUR:

(SIGNATURE)

TITLE

DATE

Manifest for Grant Application # GRANT12325125

Grant Application XML file (total 1):

1. GrantApplication.xml. (size 14948 bytes)

Forms Included in Zip File(total 7):

1. Form GG\_LobbyingForm-V1.1.pdf (size 23575 bytes)
2. Form ProjectNarrativeAttachments\_1\_2-V1.2.pdf (size 21499 bytes)
3. Form SF424\_2\_1-V2.1.pdf (size 30577 bytes)
4. Form BudgetNarrativeAttachments\_1\_2-V1.2.pdf (size 22716 bytes)
5. Form SF424A-V1.0.pdf (size 28728 bytes)
6. Form Key\_Contacts-V1.0.pdf (size 22935 bytes)
7. Form SF424B-V1.1.pdf (size 28318 bytes)

Attachments Included in Zip File (total 3):

1. ProjectNarrativeAttachments\_1\_2  
ProjectNarrativeAttachments\_1\_2-Attachments-1236-Smith UNLV BLM Sloan Project  
Proposal.pdf application/pdf (size 1700897 bytes)
2. BudgetNarrativeAttachments\_1\_2  
BudgetNarrativeAttachments\_1\_2-Attachments-1234-Smith UNLV BLM Sloan Budget Attachment  
B.pdf application/pdf (size 587712 bytes)
3. BudgetNarrativeAttachments\_1\_2  
BudgetNarrativeAttachments\_1\_2-Attachments-1235-Research-UNLV-F&A-Rate-Agreement-FY17  
.pdf application/pdf (size 606297 bytes)

# INDIVIDUAL EVALUATION SCORING SHEET

Funding Opportunity Announcement No. L17AS00001

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

Grants.gov Project # and Applicant Legal Business Name: 12327996 Colorado Mesa UniversityEvaluator: Scott Foss Title: Geological Mapping

Evaluation Factors	Ratings (see attached description or use your own method)
<b><u>State Ranking</u></b> <b>(b)(5) DPP</b>	
<b><u>Clear Objective</u></b> (Maximum score 15/100 Points) Notes:	
<b><u>Research Theme and Technical Approach</u></b> (Maximum score 25/100 Points) Notes:	
<b><u>Public Benefit</u></b> (Maximum score 20/100 Points) Notes:	
<b><u>Qualifications</u></b> (Maximum score 10/100 Points) Notes:	

CERTIFICATION REGARDING LOBBYING

Certification for Contracts Grants Loans and Cooperative Agreements

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

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

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

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts subgrants and contracts under grants loans and cooperative agreements) and that all subrecipients shall certify and disclose accordingly This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352 title 31 U S Code Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10 000 and not more than \$100 000 for each such failure

Statement for Loan Guarantees and Loan Insurance

The undersigned states to the best of his or her knowledge and belief that

If any funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency a Member of Congress an officer or employee of Congress or an employee of a Member of Congress in connection with this commitment providing for the United States to insure or guarantee a loan the undersigned shall complete and submit Standard Form-LLL "Disclosure of Lobbying Activities " in accordance with its instructions Submission of this statement is a prerequisite for making or entering into this transaction imposed by section 1352 title 31 U S Code Any person who fails to file the required statement shall be subject to a civil penalty of not less than \$10 000 and not more than \$100 000 for each such failure

* APPL CANT'S ORGAN ZAT ON			
Desert Botanical Garden, Inc.			
* PR NTED NAME AND T TLE OF AUTHOR ZED REPRESENTAT VE			
Prefix	Dr.	* First Name	Kimberlie
		Middle Name	
* Last Name	McCue	Suffix	
* Title	Program Director, Conservation		
* S GNATURE	Kimberlie	McCue	* DATE
			02/02/2017

**BUDGET INFORMATION - Non-Construction Programs**OMB Number: 4040-0006  
Expiration Date: 01/31/2019**SECTION A - BUDGET SUMMARY**

Grant Program Function or Activity (a)	Catalog of Federal Domestic Assistance Number (b)	Estimated Unobligated Funds		New or Revised Budget		
		Federal (c)	Non-Federal (d)	Federal (e)	Non-Federal (f)	Total (g)
1. L17AS00001		\$	\$	\$ 24,993.64	\$	\$ 24,993.64
2.						
3.						
4.						
5. Totals		\$	\$	\$ 24,993.64	\$	\$ 24,993.64

Standard Form 424A (Rev. 7-97)  
Prescribed by OMB (Circular A -102) Page 1

Tracking Number: GRANT12326432

Funding Opportunity Number: L17AS00001 Received Date: Feb 01, 2017 12:22:06 PM EST

## SECTION B - BUDGET CATEGORIES

6. Object Class Categories	GRANT PROGRAM, FUNCTION OR ACTIVITY				Total (5)
	(1)	(2)	(3)	(4)	
	L17AS00001				
a. Personnel	\$ 9,549.00	\$	\$	\$	\$ 9,549.00
b. Fringe Benefits	1,937.58				1,937.58
c. Travel	5,474.64				5,474.64
d. Equipment					
e. Supplies	2,875.00				2,875.00
f. Contractual					
g. Construction					
h. Other					
i. Total Direct Charges (sum of 6a-6h)	19,836.22				\$ 19,836.22
j. Indirect Charges	5,157.42				\$ 5,157.42
k. TOTALS (sum of 6i and 6j)	\$ 24,993.64	\$	\$	\$	\$ 24,993.64
7. Program Income	\$	\$	\$	\$	\$

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SECTION C - NON-FEDERAL RESOURCES					
(a) Grant Program	(b) Applicant	(c) State	(d) Other Sources	(e) TOTALS	
8. L17AS00001	\$ <input type="text"/>	\$ <input type="text"/>	\$ <input type="text"/>	\$ <input type="text"/>	
9. <input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	
10. <input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	
11. <input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	
12. TOTAL (sum of lines 8-11)	\$ <input type="text"/>	\$ <input type="text"/>	\$ <input type="text"/>	\$ <input type="text"/>	

SECTION D - FORECASTED CASH NEEDS					
	Total for 1st Year	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
13. Federal	\$ <input type="text" value="24,993.64"/>	\$ <input type="text" value="24,993.64"/>	\$ <input type="text"/>	\$ <input type="text"/>	\$ <input type="text"/>
14. Non-Federal	\$ <input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
15. TOTAL (sum of lines 13 and 14)	\$ <input type="text" value="24,993.64"/>	\$ <input type="text" value="24,993.64"/>	\$ <input type="text"/>	\$ <input type="text"/>	\$ <input type="text"/>

SECTION E - BUDGET ESTIMATES OF FEDERAL FUNDS NEEDED FOR BALANCE OF THE PROJECT					
(a) Grant Program	FUTURE FUNDING PERIODS (YEARS)				
	(b) First	(c) Second	(d) Third	(e) Fourth	
16. L17AS00001	\$ <input type="text" value="24,993.64"/>	\$ <input type="text"/>	\$ <input type="text"/>	\$ <input type="text"/>	
17. <input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	
18. <input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	
19. <input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	
20. TOTAL (sum of lines 16 - 19)	\$ <input type="text" value="24,993.64"/>	\$ <input type="text"/>	\$ <input type="text"/>	\$ <input type="text"/>	

SECTION F - OTHER BUDGET INFORMATION	
21. Direct Charges: <input type="text"/>	22. Indirect Charges: <input type="text"/>
23. Remarks: <input type="text"/>	

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Tracking Number: GRANT12326432

Funding Opportunity Number: L17AS00001 Received Date: Feb 01, 2017 12:22:06 PM EST

**ASSURANCES - NON-CONSTRUCTION PROGRAMS**

Public reporting burden for this collection of information is estimated to average 15 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Office of Management and Budget, Paperwork Reduction Project (0348-0040), Washington, DC 20503.

**PLEASE DO NOT RETURN YOUR COMPLETED FORM TO THE OFFICE OF MANAGEMENT AND BUDGET. SEND IT TO THE ADDRESS PROVIDED BY THE SPONSORING AGENCY.**

**NOTE:** Certain of these assurances may not be applicable to your project or program. If you have questions, please contact the awarding agency. Further, certain Federal awarding agencies may require applicants to certify to additional assurances. If such is the case, you will be notified.

As the duly authorized representative of the applicant, I certify that the applicant:

1. Has the legal authority to apply for Federal assistance and the institutional, managerial and financial capability (including funds sufficient to pay the non-Federal share of project cost) to ensure proper planning, management and completion of the project described in this application.
2. Will give the awarding agency, the Comptroller General of the United States and, if appropriate, the State, through any authorized representative, access to and the right to examine all records, books, papers, or documents related to the award; and will establish a proper accounting system in accordance with generally accepted accounting standards or agency directives.
3. Will establish safeguards to prohibit employees from using their positions for a purpose that constitutes or presents the appearance of personal or organizational conflict of interest, or personal gain.
4. Will initiate and complete the work within the applicable time frame after receipt of approval of the awarding agency.
5. Will comply with the Intergovernmental Personnel Act of 1970 (42 U.S.C. §§4728-4763) relating to prescribed standards for merit systems for programs funded under one of the 19 statutes or regulations specified in Appendix A of OPM's Standards for a Merit System of Personnel Administration (5 C.F.R. 900, Subpart F).
6. Will comply with all Federal statutes relating to nondiscrimination. These include but are not limited to: (a) Title VI of the Civil Rights Act of 1964 (P.L. 88-352) which prohibits discrimination on the basis of race, color or national origin; (b) Title IX of the Education Amendments of 1972, as amended (20 U.S.C. §§1681-1683, and 1685-1686), which prohibits discrimination on the basis of sex; (c) Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. §794), which prohibits discrimination on the basis of handicaps; (d) the Age Discrimination Act of 1975, as amended (42 U.S.C. §§6101-6107), which prohibits discrimination on the basis of age; (e) the Drug Abuse Office and Treatment Act of 1972 (P.L. 92-255), as amended, relating to nondiscrimination on the basis of drug abuse; (f) the Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment and Rehabilitation Act of 1970 (P.L. 91-616), as amended, relating to nondiscrimination on the basis of alcohol abuse or alcoholism; (g) §§523 and 527 of the Public Health Service Act of 1912 (42 U.S.C. §§290 dd-3 and 290 ee-3), as amended, relating to confidentiality of alcohol and drug abuse patient records; (h) Title VIII of the Civil Rights Act of 1968 (42 U.S.C. §§3601 et seq.), as amended, relating to nondiscrimination in the sale, rental or financing of housing; (i) any other nondiscrimination provisions in the specific statute(s) under which application for Federal assistance is being made; and, (j) the requirements of any other nondiscrimination statute(s) which may apply to the application.
7. Will comply, or has already complied, with the requirements of Titles II and III of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (P.L. 91-646) which provide for fair and equitable treatment of persons displaced or whose property is acquired as a result of Federal or federally-assisted programs. These requirements apply to all interests in real property acquired for project purposes regardless of Federal participation in purchases.
8. Will comply, as applicable, with provisions of the Hatch Act (5 U.S.C. §§1501-1508 and 7324-7328) which limit the political activities of employees whose principal employment activities are funded in whole or in part with Federal funds.

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Prescribed by OMB Circular A-102

DOI-2020-12 01472

9. Will comply, as applicable, with the provisions of the Davis-Bacon Act (40 U.S.C. §§276a to 276a-7), the Copeland Act (40 U.S.C. §276c and 18 U.S.C. §874), and the Contract Work Hours and Safety Standards Act (40 U.S.C. §§327-333), regarding labor standards for federally-assisted construction subagreements.
10. Will comply, if applicable, with flood insurance purchase requirements of Section 102(a) of the Flood Disaster Protection Act of 1973 (P.L. 93-234) which requires recipients in a special flood hazard area to participate in the program and to purchase flood insurance if the total cost of insurable construction and acquisition is \$10,000 or more.
11. Will comply with environmental standards which may be prescribed pursuant to the following: (a) institution of environmental quality control measures under the National Environmental Policy Act of 1969 (P.L. 91-190) and Executive Order (EO) 11514; (b) notification of violating facilities pursuant to EO 11738; (c) protection of wetlands pursuant to EO 11990; (d) evaluation of flood hazards in floodplains in accordance with EO 11988; (e) assurance of project consistency with the approved State management program developed under the Coastal Zone Management Act of 1972 (16 U.S.C. §§1451 et seq.); (f) conformity of Federal actions to State (Clean Air) Implementation Plans under Section 176(c) of the Clean Air Act of 1955, as amended (42 U.S.C. §7401 et seq.); (g) protection of underground sources of drinking water under the Safe Drinking Water Act of 1974, as amended (P.L. 93-523); and, (h) protection of endangered species under the Endangered Species Act of 1973, as amended (P.L. 93-205).
12. Will comply with the Wild and Scenic Rivers Act of 1968 (16 U.S.C. §§1271 et seq.) related to protecting components or potential components of the national wild and scenic rivers system.
13. Will assist the awarding agency in assuring compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. §470), EO 11593 (identification and protection of historic properties), and the Archaeological and Historic Preservation Act of 1974 (16 U.S.C. §§469a-1 et seq.).
14. Will comply with P.L. 93-348 regarding the protection of human subjects involved in research, development, and related activities supported by this award of assistance.
15. Will comply with the Laboratory Animal Welfare Act of 1966 (P.L. 89-544, as amended, 7 U.S.C. §§2131 et seq.) pertaining to the care, handling, and treatment of warm blooded animals held for research, teaching, or other activities supported by this award of assistance.
16. Will comply with the Lead-Based Paint Poisoning Prevention Act (42 U.S.C. §§4801 et seq.) which prohibits the use of lead-based paint in construction or rehabilitation of residence structures.
17. Will cause to be performed the required financial and compliance audits in accordance with the Single Audit Act Amendments of 1996 and OMB Circular No. A-133, "Audits of States, Local Governments, and Non-Profit Organizations."
18. Will comply with all applicable requirements of all other Federal laws, executive orders, regulations, and policies governing this program.
19. Will comply with the requirements of Section 106(g) of the Trafficking Victims Protection Act (TVPA) of 2000, as amended (22 U.S.C. 7104) which prohibits grant award recipients or a sub-recipient from (1) Engaging in severe forms of trafficking in persons during the period of time that the award is in effect (2) Procuring a commercial sex act during the period of time that the award is in effect or (3) Using forced labor in the performance of the award or subawards under the award.

<b>SIGNATURE OF AUTHORIZED CERTIFYING OFFICIAL</b>	<b>TITLE</b>
Tim Foster	President
<b>APPLICANT ORGANIZATION</b>	<b>DATE SUBMITTED</b>
Colorado Mesa University	02/02/2017

Standard Form 424B (Rev. 7-97) Back

Manifest for Grant Application # GRANT12326432

Grant Application XML file (total 1):

1. GrantApplication.xml. (size 14686 bytes)

Forms Included in Zip File(total 7):

1. Form GG\_LobbyingForm-V1.1.pdf (size 23011 bytes)
2. Form ProjectNarrativeAttachments\_1\_2-V1.2.pdf (size 21223 bytes)
3. Form SF424\_2\_1-V2.1.pdf (size 30282 bytes)
4. Form BudgetNarrativeAttachments\_1\_2-V1.2.pdf (size 22200 bytes)
5. Form SF424A-V1.0.pdf (size 28368 bytes)
6. Form Key\_Contacts-V1.0.pdf (size 22916 bytes)
7. Form SF424B-V1.1.pdf (size 28026 bytes)

Attachments Included in Zip File (total 3):

1. ProjectNarrativeAttachments\_1\_2  
ProjectNarrativeAttachments\_1\_2-Attachments-1236-Project Proposal (Attachment A).pdf  
application/pdf (size 174804 bytes)
2. BudgetNarrativeAttachments\_1\_2  
BudgetNarrativeAttachments\_1\_2-Attachments-1234-Budget Proposal (Attachment B).pdf  
application/pdf (size 243344 bytes)
3. BudgetNarrativeAttachments\_1\_2 BudgetNarrativeAttachments\_1\_2-Attachments-1235-UW  
NICRA (FA-FB-Rates-2016-05-26).pdf application/pdf (size 410409 bytes)

## Project Narrative File(s)

---

\* Mandatory Project Narrative File Filename:

[Add Mandatory Project Narrative File](#)

[Delete Mandatory Project Narrative File](#)

[View Mandatory Project Narrative File](#)

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To add more Project Narrative File attachments, please use the attachment buttons below.

[Add Optional Project Narrative File](#)

[Delete Optional Project Narrative File](#)

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**ASSURANCES - NON-CONSTRUCTION PROGRAMS**

Public reporting burden for this collection of information is estimated to average 15 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Office of Management and Budget, Paperwork Reduction Project (0348-0040), Washington, DC 20503.

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**NOTE:** Certain of these assurances may not be applicable to your project or program. If you have questions, please contact the awarding agency. Further, certain Federal awarding agencies may require applicants to certify to additional assurances. If such is the case, you will be notified.

As the duly authorized representative of the applicant, I certify that the applicant:

1. Has the legal authority to apply for Federal assistance and the institutional, managerial and financial capability (including funds sufficient to pay the non-Federal share of project cost) to ensure proper planning, management and completion of the project described in this application.
2. Will give the awarding agency, the Comptroller General of the United States and, if appropriate, the State, through any authorized representative, access to and the right to examine all records, books, papers, or documents related to the award; and will establish a proper accounting system in accordance with generally accepted accounting standards or agency directives.
3. Will establish safeguards to prohibit employees from using their positions for a purpose that constitutes or presents the appearance of personal or organizational conflict of interest, or personal gain.
4. Will initiate and complete the work within the applicable time frame after receipt of approval of the awarding agency.
5. Will comply with the Intergovernmental Personnel Act of 1970 (42 U.S.C. §§4728-4763) relating to prescribed standards for merit systems for programs funded under one of the 19 statutes or regulations specified in Appendix A of OPM's Standards for a Merit System of Personnel Administration (5 C.F.R. 900, Subpart F).
6. Will comply with all Federal statutes relating to nondiscrimination. These include but are not limited to: (a) Title VI of the Civil Rights Act of 1964 (P.L. 88-352) which prohibits discrimination on the basis of race, color or national origin; (b) Title IX of the Education Amendments of 1972, as amended (20 U.S.C. §§1681-1683, and 1685-1686), which prohibits discrimination on the basis of sex; (c) Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. §794), which prohibits discrimination on the basis of handicaps; (d) the Age Discrimination Act of 1975, as amended (42 U.S.C. §§6101-6107), which prohibits discrimination on the basis of age; (e) the Drug Abuse Office and Treatment Act of 1972 (P.L. 92-255), as amended, relating to nondiscrimination on the basis of drug abuse; (f) the Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment and Rehabilitation Act of 1970 (P.L. 91-616), as amended, relating to nondiscrimination on the basis of alcohol abuse or alcoholism; (g) §§523 and 527 of the Public Health Service Act of 1912 (42 U.S.C. §§290 dd-3 and 290 ee-3), as amended, relating to confidentiality of alcohol and drug abuse patient records; (h) Title VIII of the Civil Rights Act of 1968 (42 U.S.C. §§3601 et seq.), as amended, relating to nondiscrimination in the sale, rental or financing of housing; (i) any other nondiscrimination provisions in the specific statute(s) under which application for Federal assistance is being made; and, (j) the requirements of any other nondiscrimination statute(s) which may apply to the application.
7. Will comply, or has already complied, with the requirements of Titles II and III of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (P.L. 91-646) which provide for fair and equitable treatment of persons displaced or whose property is acquired as a result of Federal or federally-assisted programs. These requirements apply to all interests in real property acquired for project purposes regardless of Federal participation in purchases.
8. Will comply, as applicable, with provisions of the Hatch Act (5 U.S.C. §§1501-1508 and 7324-7328) which limit the political activities of employees whose principal employment activities are funded in whole or in part with Federal funds.

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9. Will comply, as applicable, with the provisions of the Davis-Bacon Act (40 U.S.C. §§276a to 276a-7), the Copeland Act (40 U.S.C. §276c and 18 U.S.C. §874), and the Contract Work Hours and Safety Standards Act (40 U.S.C. §§327-333), regarding labor standards for federally-assisted construction subagreements.
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11. Will comply with environmental standards which may be prescribed pursuant to the following: (a) institution of environmental quality control measures under the National Environmental Policy Act of 1969 (P.L. 91-190) and Executive Order (EO) 11514; (b) notification of violating facilities pursuant to EO 11738; (c) protection of wetlands pursuant to EO 11990; (d) evaluation of flood hazards in floodplains in accordance with EO 11988; (e) assurance of project consistency with the approved State management program developed under the Coastal Zone Management Act of 1972 (16 U.S.C. §§1451 et seq.); (f) conformity of Federal actions to State (Clean Air) Implementation Plans under Section 176(c) of the Clean Air Act of 1955, as amended (42 U.S.C. §7401 et seq.); (g) protection of underground sources of drinking water under the Safe Drinking Water Act of 1974, as amended (P.L. 93-523); and, (h) protection of endangered species under the Endangered Species Act of 1973, as amended (P.L. 93-205).
12. Will comply with the Wild and Scenic Rivers Act of 1968 (16 U.S.C. §§1271 et seq.) related to protecting components or potential components of the national wild and scenic rivers system.
13. Will assist the awarding agency in assuring compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. §470), EO 11593 (identification and protection of historic properties), and the Archaeological and Historic Preservation Act of 1974 (16 U.S.C. §§469a-1 et seq.).
14. Will comply with P.L. 93-348 regarding the protection of human subjects involved in research, development, and related activities supported by this award of assistance.
15. Will comply with the Laboratory Animal Welfare Act of 1966 (P.L. 89-544, as amended, 7 U.S.C. §§2131 et seq.) pertaining to the care, handling, and treatment of warm blooded animals held for research, teaching, or other activities supported by this award of assistance.
16. Will comply with the Lead-Based Paint Poisoning Prevention Act (42 U.S.C. §§4801 et seq.) which prohibits the use of lead-based paint in construction or rehabilitation of residence structures.
17. Will cause to be performed the required financial and compliance audits in accordance with the Single Audit Act Amendments of 1996 and OMB Circular No. A-133, "Audits of States, Local Governments, and Non-Profit Organizations."
18. Will comply with all applicable requirements of all other Federal laws, executive orders, regulations, and policies governing this program.
19. Will comply with the requirements of Section 106(g) of the Trafficking Victims Protection Act (TVPA) of 2000, as amended (22 U.S.C. 7104) which prohibits grant award recipients or a sub-recipient from (1) Engaging in severe forms of trafficking in persons during the period of time that the award is in effect (2) Procuring a commercial sex act during the period of time that the award is in effect or (3) Using forced labor in the performance of the award or subawards under the award.

<b>SIGNATURE OF AUTHORIZED CERTIFYING OFFICIAL</b>	<b>TITLE</b>
Robert J Gay	Curator of Museum Education
<b>APPLICANT ORGANIZATION</b>	<b>DATE SUBMITTED</b>
Museums of Western Colorado	02/02/2017

Standard Form 424B (Rev. 7-97) Back

## Budget Narrative File(s)

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\* Mandatory Budget Narrative Filename:

[Add Mandatory Budget Narrative](#)

[Delete Mandatory Budget Narrative](#)

[View Mandatory Budget Narrative](#)

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To add more Budget Narrative attachments, please use the attachment buttons below.

[Add Optional Budget Narrative](#)

[Delete Optional Budget Narrative](#)

[View Optional Budget Narrative](#)



## Budget Narrative File(s)

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\* **Mandatory Budget Narrative Filename:**

[Add Mandatory Budget Narrative](#)

[Delete Mandatory Budget Narrative](#)

[View Mandatory Budget Narrative](#)

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To add more Budget Narrative attachments, please use the attachment buttons below.

[Add Optional Budget Narrative](#)

[Delete Optional Budget Narrative](#)

[View Optional Budget Narrative](#)

## Desert Botanical Garden

EIN #: 860136925-A1

NSF INS CODE: 4014783000

ORGANIZATION:  
Desert Botanical Garden  
1201 North Galvin Parkway  
Phoenix, AZ 85008

DATE: July 28, 2015

FILING REF: First rate agreement

The rates approved in this agreement are for use on grants, contracts and other agreements with the Federal Government, subject to the conditions in Section II.

## SECTION I: INDIRECT COST RATES

<u>Type</u>	<u>Effective Period</u>	<u>Rate</u>	<u>Base</u>
FINAL	10/1/13 – 09/30/14	62.5%	(a)
Predetermined	10/1/14 – 09/30/17	62.5%	(a)

Rate Application Base

- (a) Modified Total Direct Costs - Total direct costs excluding capital expenditures, participant support costs, and subawards. .

## SECTION II: GENERAL TERMS

- A. **LIMITATIONS:** Use of the rate contained in this agreement are subject to any applicable contractual or grant limitations. Acceptance of these rates agreed to herein is predicated upon the conditions: (1) that no costs other than those incurred by the contractor or grantee were included in its indirect cost proposal and that such costs are legal obligations of the contractor or grantee, (2) that the same costs that have been treated as indirect costs have not been claimed as direct costs, and (3) that similar types of costs have been accorded consistent treatment.
- B. **ACCOUNTING CHANGES:** The rates contained in this agreement are based on the accounting system in effect at the time the proposal was prepared and the rates were negotiated. Changes to the method of accounting which effect the amount of reimbursement resulting from the use of these rates require the prior approval of this office. Failure to obtain such approval may result in subsequent cost disallowances.
- C. **NOTIFICATION TO FEDERAL AGENCIES:** Copies of this document may be provided to other Federal offices as a means of notifying them of the rates agreed to herein.

Desert Botanical Garden

BY THE ORGANIZATION:

Desert Botanical Garden

(Organization)

*Lillian Predny*

(Signature)

*Lillian Predny*

(Name)

*Accountant*

(Title)

*8-3-2015*

(Date)

ON BEHALF OF THE FEDERAL

GOVERNMENT:

National Science Foundation

(Agency)

*Charles Zeigler*

(Signature)

Charles Zeigler

(Name)

Team Lead for Indirect Costs

CAAR/DIAS/BFA

(Title)

*7/28/2015*

(Date)

NSF Negotiator: Alisha L. Williams

Telephone: (703) 292-4539

## BUDGET INFORMATION - Non-Construction Programs

OMB Number: 4040-0006  
Expiration Date: 01/31/2019

## SECTION A - BUDGET SUMMARY

Grant Program Function or Activity (a)	Catalog of Federal Domestic Assistance Number (b)	Estimated Unobligated Funds		New or Revised Budget		
		Federal (c)	Non-Federal (d)	Federal (e)	Non-Federal (f)	Total (g)
1. Water sample analysis		\$	\$	16,202.00		16,202.00
2. Pressure transducers and wildlife cameras				4,200.00		4,200.00
3. Personnel+Fringe					17,812.50	17,812.50
4. Travel				4,598.00	2,391.00	6,989.00
5. Totals		\$	\$	25,000.00	20,203.50	45,203.50

Standard Form 424A (Rev. 7-97)  
Prescribed by OMB (Circular A -102) Page 1

Tracking Number:GRANT12328912

Funding Opportunity Number:L17AS00001 Received Date:Feb 02, 2017 08:49:35 PM EST

## SECTION B - BUDGET CATEGORIES

6. Object Class Categories	GRANT PROGRAM, FUNCTION OR ACTIVITY				Total (5)
	(1)	(2)	(3)	(4)	
	Water sample analysis	Pressure transducers and wildlife cameras	Personnel+Fringe	Travel	
a. Personnel	\$	\$	15,750.00	\$	15,750.00
b. Fringe Benefits			2,062.50		2,062.50
c. Travel				6,989.00	6,989.00
d. Equipment					
e. Supplies					
f. Contractual					
g. Construction					
h. Other	16,202.00	4,200.00			20,402.00
i. Total Direct Charges (sum of 6a-6h)	16,202.00	4,200.00	17,812.50	6,989.00	45,203.50
j. Indirect Charges					
k. TOTALS (sum of 6i and 6j)	16,202.00	4,200.00	17,812.50	6,989.00	45,203.50
7. Program Income	\$	\$	\$	\$	\$

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SECTION C - NON-FEDERAL RESOURCES					
(a) Grant Program		(b) Applicant	(c) State	(d) Other Sources	(e) TOTALS
8.	Water sample analysis	\$	\$	\$	\$
9.	Pressure transducers and wildlife cameras				
10.	Personnel+Fringe	17,812.50			17,812.50
11.	Travel	2,391.00			2,391.00
12. TOTAL (sum of lines 8-11)		\$ 20,203.50	\$	\$	\$ 20,203.50
SECTION D - FORECASTED CASH NEEDS					
	Total for 1st Year	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
13. Federal	\$ 25,000.00	\$ 5,000.00	\$ 9,900.00	\$ 9,900.00	\$ 200.00
14. Non-Federal	\$ 20,203.50	2,383.50	5,940.00	5,940.00	5,940.00
15. TOTAL (sum of lines 13 and 14)	\$ 45,203.50	\$ 7,383.50	\$ 15,840.00	\$ 15,840.00	\$ 6,140.00
SECTION E - BUDGET ESTIMATES OF FEDERAL FUNDS NEEDED FOR BALANCE OF THE PROJECT					
(a) Grant Program		FUTURE FUNDING PERIODS (YEARS)			
		(b) First	(c) Second	(d) Third	(e) Fourth
16.	Water sample analysis	\$	\$	\$	\$
17.	Pressure transducers and wildlife cameras				
18.	Personnel+Fringe				
19.	Travel				
20. TOTAL (sum of lines 16 - 19)		\$	\$	\$	\$
SECTION F - OTHER BUDGET INFORMATION					
21. Direct Charges: \$45,203.50		22. Indirect Charges: \$18,125.94			
23. Remarks:		Indirect charges calculated at NICRA rate of 62.5% (calculations do not include expenses for UofA services)			

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Prescribed by OMB (Circular A -102) Page 2

Tracking Number: GRANT12328912

Funding Opportunity Number: L17AS00001 Received Date: Feb 02, 2017 08:49:35 PM EST

DOI-2020-12 01484

Key Contacts Form	
<b>* Applicant Organization Name:</b>	
University of Washington	
Enter the individual's role on the project (e.g., project manager, fiscal contact).	
<b>* Contact 1 Project Role:</b> Principal Investigator	
Prefix:	Dr.
* First Name:	Gregory
Middle Name:	
* Last Name:	Wilson
Suffix:	
Title:	Associate Professor
Organizational Affiliation:	
* Street1:	Department of Biology, 24 Kincaid Hall
Street2:	Box 351800
* City:	Seattle
County:	
* State:	WA: Washington
Province:	
* Country:	USA: UNITED STATES
* Zip / Postal Code:	98195 1800
* Telephone Number:	(206) 543 8917
Fax:	
* Email:	gpwilson@u.washington.edu

**ASSURANCES - NON-CONSTRUCTION PROGRAMS**

Public reporting burden for this collection of information is estimated to average 15 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Office of Management and Budget, Paperwork Reduction Project (0348-0040), Washington, DC 20503.

**PLEASE DO NOT RETURN YOUR COMPLETED FORM TO THE OFFICE OF MANAGEMENT AND BUDGET. SEND IT TO THE ADDRESS PROVIDED BY THE SPONSORING AGENCY.**

**NOTE:** Certain of these assurances may not be applicable to your project or program. If you have questions, please contact the awarding agency. Further, certain Federal awarding agencies may require applicants to certify to additional assurances. If such is the case, you will be notified.

As the duly authorized representative of the applicant, I certify that the applicant:

1. Has the legal authority to apply for Federal assistance and the institutional, managerial and financial capability (including funds sufficient to pay the non-Federal share of project cost) to ensure proper planning, management and completion of the project described in this application.
2. Will give the awarding agency, the Comptroller General of the United States and, if appropriate, the State, through any authorized representative, access to and the right to examine all records, books, papers, or documents related to the award; and will establish a proper accounting system in accordance with generally accepted accounting standards or agency directives.
3. Will establish safeguards to prohibit employees from using their positions for a purpose that constitutes or presents the appearance of personal or organizational conflict of interest, or personal gain.
4. Will initiate and complete the work within the applicable time frame after receipt of approval of the awarding agency.
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6. Will comply with all Federal statutes relating to nondiscrimination. These include but are not limited to: (a) Title VI of the Civil Rights Act of 1964 (P.L. 88-352) which prohibits discrimination on the basis of race, color or national origin; (b) Title IX of the Education Amendments of 1972, as amended (20 U.S.C. §§1681-1683, and 1685-1686), which prohibits discrimination on the basis of sex; (c) Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. §794), which prohibits discrimination on the basis of handicaps; (d) the Age Discrimination Act of 1975, as amended (42 U.S.C. §§6101-6107), which prohibits discrimination on the basis of age; (e) the Drug Abuse Office and Treatment Act of 1972 (P.L. 92-255), as amended, relating to nondiscrimination on the basis of drug abuse; (f) the Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment and Rehabilitation Act of 1970 (P.L. 91-616), as amended, relating to nondiscrimination on the basis of alcohol abuse or alcoholism; (g) §§523 and 527 of the Public Health Service Act of 1912 (42 U.S.C. §§290 dd-3 and 290 ee-3), as amended, relating to confidentiality of alcohol and drug abuse patient records; (h) Title VIII of the Civil Rights Act of 1968 (42 U.S.C. §§3601 et seq.), as amended, relating to nondiscrimination in the sale, rental or financing of housing; (i) any other nondiscrimination provisions in the specific statute(s) under which application for Federal assistance is being made; and, (j) the requirements of any other nondiscrimination statute(s) which may apply to the application.
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8. Will comply, as applicable, with provisions of the Hatch Act (5 U.S.C. §§1501-1508 and 7324-7328) which limit the political activities of employees whose principal employment activities are funded in whole or in part with Federal funds.

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10. Will comply, if applicable, with flood insurance purchase requirements of Section 102(a) of the Flood Disaster Protection Act of 1973 (P.L. 93-234) which requires recipients in a special flood hazard area to participate in the program and to purchase flood insurance if the total cost of insurable construction and acquisition is \$10,000 or more.
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14. Will comply with P.L. 93-348 regarding the protection of human subjects involved in research, development, and related activities supported by this award of assistance.
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18. Will comply with all applicable requirements of all other Federal laws, executive orders, regulations, and policies governing this program.
19. Will comply with the requirements of Section 106(g) of the Trafficking Victims Protection Act (TVPA) of 2000, as amended (22 U.S.C. 7104) which prohibits grant award recipients or a sub-recipient from (1) Engaging in severe forms of trafficking in persons during the period of time that the award is in effect (2) Procuring a commercial sex act during the period of time that the award is in effect or (3) Using forced labor in the performance of the award or subawards under the award.

<b>SIGNATURE OF AUTHORIZED CERTIFYING OFFICIAL</b>	<b>TITLE</b>
Lillian Ann Rivera	Contract and Grant Officer
<b>APPLICANT ORGANIZATION</b>	<b>DATE SUBMITTED</b>
University of Southern California	02/02/2017

Standard Form 424B (Rev. 7-97) Back

[Attachment B]

**BUREAU OF LAND MANAGEMENT**  
Financial Assistance (Cooperative Agreements)



## PROJECT PROPOSAL

(Suggested Format)

**Instructions:** A Project Proposal must be submitted with the Standard Form (SF) 424 Application for Federal Assistance for all BLM Assistance Agreements. Complete each section below. Use additional sheets as needed.  
\*\*If this is a continuation of existing BLM cooperative agreement identify the current BLM agreement number and project title below.

Person Submitting Proposal: Randall Irmis, PhD Date: 01/23/2017

Organization Name: Natural History Museum of Utah, University of Utah

\*\*Agreement or Announcement No.: L17AS00001 / L12AC20378

\*\* Agreement or Announcement BLM FY2017 Bureau-wide National Conservation Lands  
Title: Scientific Studies Support Program

Estimated Period of Performance: 05/01/2017 to 04/30/2018

BLM POC: \_\_\_\_\_  
Proposed Project Location: Grand Staircase-Escalante National Monument

This work will occur on: ☒ Public Lands ☐ Both Public & Private Lands

### MISSION AND OBJECTIVE:

The founding presidential proclamation for Grand Staircase-Escalante National Monument (GSENM) highlighted this area as a scientific frontier for geology and paleontology, emphasizing that its establishment preserved “...one of the best and most continuous records of Late Cretaceous terrestrial life in the world (Clinton, 1996).” These words could not have been more prophetic; the decade and a half of paleontological survey and scientific research on the Kaiparowits Plateau in GSENM have elucidated spectacular ancient ecosystems from 95-75 million years ago that teemed with a vast array previously un-recognized species of amphibians, turtles, lizards, crocodylians, dinosaurs, early mammals, birds, and many other organisms. These discoveries are a direct result of a fifteen-year-long collaborative inventory, collection, and research effort between the Natural History Museum of Utah (NHMU) and GSENM that is just now beginning to paint a much more lucid picture of the significance of the Kaiparowits Plateau’s fossil resources.

This GSENM-NHMU collaboration is guided by Monument Management Plan Decisions SCI-1, SCI-2, and PAL-1, which directs that critical fossil resources deserve inventory and protection (collection). Not only has this project revealed the presence of giant dinosaur-eating alligators, unique new species of horned, duck-billed, and tyrant dinosaurs, as well as fossil dinosaur skeletons covered in skin impressions, but it has surveyed nearly 100,000 acres of fossiliferous Late Cretaceous bedrock exposures, discovering over a thousand significant paleontological sites, and saving thousands of rare fossils from destruction by erosion and/or human impact.

The paleontological survey and research also provides a positive public face for natural science at GSENM and on BLM-managed lands in general, as it is a gateway towards a better public understanding of scientific resources on federal lands. Results from the GSENM-NHMU collaboration reach *millions* of people statewide, nationally, and internationally, through BLM

**Project Proposal**

Page 2

visitor centers, NHMU museum visitation, statewide NHMU education and outreach, and national and international media coverage of GSENM-NHMU scientific research.

By conducting paleontological inventory of the nearly one million acres of Late Cretaceous bedrock exposures at GSENM, this collaborative project not only identifies and protects the fossil resources for which the monument was founded, but also opens a critical window onto the unique ancient ecosystems that are preserved nowhere else on earth. Our work over the past 14 years has discovered nearly three thousand fossil specimens of species of dinosaurs, crocodylians, turtles, lizards, mammals, and other organisms that are only found in the 95-75 million-year-old rocks at GSENM; at least twenty of the dinosaur species alone are completely new to science. These ecosystems represent the height of dinosaur diversity, just 10 million years before they went extinct.

Even more important than the discovery of numerous new species is that these data demonstrate that each local region of western North America during the Late Cretaceous greenhouse world had its own unique ecosystems. We thus look to test the hypothesis that latitudinal differences in climate controlled the evolution of life on land during this time. Furthermore, can we determine if these regional differences were controlled by repeated rise and fall of sea level through the Late Cretaceous? Such research questions are directly relevant for understanding the biotic effects of *current anthropogenically-forced global climate change, which is leading to a warming high-CO<sub>2</sub> world not unlike the Late Cretaceous.*

**RESEARCH THEME AND TECHNICAL APPROACH:**

Please identify which themes apply to your projects (please check boxes that apply by placing cursor in front of the box and clicking twice):

- ☒ ***Research Identified in Unit Science Plans (for National Monuments, National Conservation Areas, and Similar Designations)***
- ☐ *Effectiveness Research*
- ☒ ***Standardized Inventory and Monitoring***
- ☐ *Research Syntheses*
- ☐ *Citizen Science*
- ☐ *Other Management-Driven Research* All themes and goals apply

**Fieldwork** - We propose to continue the inventory, monitoring, and scientific collection of Late Cretaceous bedrock exposures in GSENM, starting with Wahweap Headwaters area and east towards the Blue Wash headwaters area (Kaiparowits Fm) that was not previously accessible (SE portion of Canaan Peak Quad), areas north and east of Nipple Spring (Wahweap and Straight Cliffs fms), the area between Wahweap Wash and Blue Wash in the northeast portion of the Butler Valley Quad, northern Horse Mountain area (NW quadrant), the Four Mile Bench Flats, and north of Death Ridge (all Kaiparowits Formation), for a joint BLM-NHMU total of 3,000 acres. In particular, a very rare associated tyrannosaurid skeleton requires excavation in the NE Butler Valley Quad, and this area requires extensive inventory. Nearby exposures to the north and west have not been systematically surveyed and inventoried in ten years. The paleontological resources of the Straight Cliffs and Wahweap formations are poorly known; we will also focus on surveying these formations given our success in discovering significant sites the past five years, including an extremely rare 80-million-year old proto-duck-billed dinosaur, an 80 million-year-old giant crocodylian, and the first diagnostic carnivorous dinosaur and turtle remains from these formations.

During inventory the crews will walk in teams of two to three abreast over exposed bedrock,

recording in detail via GPS, notebooks, standardized forms, and photographs the location of any significant fossil resource encountered. Late summer would be spent conducting additional inventory, and collection/stabilization of significant specimens that can be collected on surface authority or have prior authorization. Collection techniques consist of photo documenting the site and re-acquiring GPS data prior to collection, along with the recording of the rock context and associated fossils. Sites yielding more than one element are mapped using meter grids. Site maps are subsequently digitized for archival purposes.

**Research** - In addition to initiating investigation of any important new fossil specimens collected during the 2017 inventory, we will focus our scientific research and publication efforts on a number of already-collected specimens. In particular, a manuscript on a new species of ankylosaurid (armored) dinosaur from the Kaiparowits Formation, which was part of a recent M.S. thesis by Jelle Wiersma under the direction of PI Randall Irmis, is currently in revision for the open access journal *PeerJ*, and we expect that a paper on a second new ankylosaur from the same thesis will be submitted to *Journal of Vertebrate Paleontology* during the first half of 2017. Irmis is about to submit a manuscript with Dr. Alan Titus (GSENM) on the giant alligator *Deinosuchus*. Irmis also has in preparation two manuscripts with Dr. Joseph Sertich (Denver Museum of Nature & Science) that will be submitted for publication in 2017: one on a new species that is the oldest caiman-relative yet discovered, and a second on important new material of a large crocodilian called *Denazinosuchus*. NHMU preparator Tylor Birthisel continues to work on his M.S. thesis on skull growth and variation of the crested duck-billed dinosaur *Parasaurolophus* (started in Fall 2016), based on nearly a dozen skulls collected by NHMU & BLM crews from GSENM during this partnership. *By placing these new discoveries in an evolutionary and geologic context, we can start testing our research questions about latitudinal zonation and effects of sea level change.* Finally, undergraduate student Nathan Ong is using bone histology to study ontogenetic change in soft-shelled turtles (trionychoids) from the Kaiparowits Formation; he presented this work at the 2016 Society of Vertebrate Paleontology Annual Meeting, and is currently writing it up for publication in a peer-reviewed journal.

**Data Management** - All information related to the survey will be archived digitally. Specimen and site records will be input into NHMU's new collections database that uses the EMu software platform. This system also allows us to archive associated records (field notes, photos, accession records, preparation and conservation records, publications, etc) through its digital asset management system. We can also generate custom reports at the BLM's request. Site and specimen information will be provided to the BLM in multiple formats, including as spreadsheets (Excel or CSV) and GIS-compatible files.

**Public Dissemination, Education, and Outreach** - New fossil discoveries and research findings are integrated into all aspects of NHMU's public and school programs. Fossil casts and new research will be added to our on-site programs such as *Scientist in the Spotlight*, *Junior Science Academy*, and teacher workshops, as well as off-site programs such as *Museum on the Move* and *Teaching Toolboxes*. Work on new fossil specimens from GSENM is publically visible daily, as our fossil preparation lab has large windows through which students and visitors can observe fossils being extracted from their rocky matrix. Collections work is also featured annually in NHMU's 2-day *Behind the Scenes* event, an open house for the public to see specimens in the collections that are not otherwise on display. In 2017, two new skeletal mounts of GSENM fossils will go on display; in early 2017 the new armored dinosaur species mentioned above will be exhibited coincident with publication, and later in the year it will be joined by a juvenile of the horned dinosaur species *Utahceratops*. Coinciding with the paper's publication, we also plan to put on display the original fossil of the new caiman-relative mentioned above. Our new digital database EMu has a web-based public portal so that the public can search our collections and see photos of specimens not on display (all sensitive information such as site coordinates are redacted). Finally, we publish scientific results published in a variety of technical

**Project Proposal**

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journals (with Open Access options where possible), and we will issue press releases and related material that publicize an accessible summary of the exciting new discoveries and research coming from the GSENM-NHMu partnership.

**Mitigation of Resource Degradation** - To prevent the degradation or destruction of newly discovered fossil resources, we will prioritize the collection of significant fossil specimens deemed to be at risk. This work will be done in consultation with GSENM paleontologist Alan Titus. All newly located paleontological sites will be evaluated for risk to resources, and these management recommendations will be forwarded to GSENM as part of our annual report. We will specifically note any sites that appear to be at risk to vandalism or degradation from visitor traffic. Finally, we continually re-visit previously-located sites to monitor the condition of existing paleontological resources.

**Project Evaluation** - The project will be fully successful if NHMu & GSENM jointly monitor 50 sites and inventory 3,000 acres. Also, fieldwork at the four to six sites estimated to need collection will be finished by November 2017. In addition, the submittal of the two manuscripts and final report with GIS data must be made by March of 2018 and the skeletal mounts will also be installed by that time. A moderately successful outcome would be if only 75-80% of the targets for monitoring, collection, and inventory were met and only one exhibit and one paper finished, however this is at full funding levels (\$20K). Not successful would see 60% or less of each target accomplished and neither a paper nor exhibit submitted.

NHMu work will be monitored by the GSENM paleontologist. This person will monitor our fieldwork progress and ensure that we are meeting our goals with respect to the timeline and objectives outlined above. In the past, we have been in contact with the GSENM paleontologist on a weekly to monthly basis.

<b>Milestone / Task / Activity</b>	<b>Start Date</b>	<b>Completion Date</b>
Background research, planning, and coordination with BLM field office and GSENM	March 2017	May 2017
Fieldwork in GSENM to inventory fossil resources. Tasks include systematic prospecting to identify new fossil sites, evaluation of these sites, and excavation of those sites under risk. This will be undertaken by crews of trained staff and volunteers from the NHMu	May 2017	October 2017
Preparation and curation begun at the NHMu of specimens collected in 2017	August 2017	December 2017
Preparation and submission of final report to BLM	November 2017	March 2018

**PUBLIC BENEFIT:**

By collaborating with GSENM staff to survey, inventory, collect, and research Cretaceous paleontological resources within the monument, we are providing strong value to the general public in a number of ways. At a fundamental level, this work provides a baseline understanding for the fossil resources within the monument, so that these resources can be effectively managed and preserved – one of the main goals of designating a particular area of federal land as a national monument. Thus, this helps keep these fossils in the public trust, enriches the visitor experience, and deepens the public's understanding of science and natural history. In the specific case of GSENM, our discoveries have shown that not only is this a fossil-rich monument, but the Late Cretaceous ecosystems preserved within its boundaries are unique among those known worldwide, with species of plants and animals (including dinosaurs) not found anywhere else on earth. As these discoveries are disseminated to the public through

exhibits, public (interpretive) programs, educational programs, and the news media, it fosters a greater appreciation and respect for GSENM and public lands in general, particularly for non-renewable scientific resources such as fossils that can be easily damaged.

As outlined in the 'Past Performance' section below, the results of our collaborative project with GSENM are broadly disseminated to the public in many different ways. Statewide, our education programs reach over 100,000 K-12 students each year, and exhibits at GSENM and NHMU reach well over 300,000 nationwide and international visitors per year. We also reach a worldwide audience, with over 100,000 people reading our open-access publication of scientific journal articles, and *millions* of people reading about these discoveries in the news media. This ability to interface with the public on a local, statewide, national, and international levels makes our GSENM-NHMU partnership a singular project in educating the public about the value of paleontology, science, and public lands. Paleontology provides an intuitive and accessible gateway to natural science and conservation for all ages, and increases the wonder and excitement that visitors feel when visiting a national monument. Our work at GSENM brings to the forefront these long-vanished environments and organisms from millions of years ago and provides to the public a tangible connection to understand change through time, the history of life on earth, and the value of science on public lands.

#### **QUALIFICATIONS, PAST PERFORMANCE, ACTIVE BLM COOPERATIVE AGREEMENTS:**

Our previous collaborative GSENM-NHMU paleontological survey, inventory, monitoring, and research work in Grand Staircase-Escalante National Monument has been conducted under a succession of assistance agreements: JSA015003, JSA071004, and L12AC20378. A summary of the accomplishments and work done under these agreement is presented below.

**Resource & Scientific Significance** - NHMU teams have logged a total of 950 days of fieldwork, amounting to 6,255 person days, for a grand total of about 56,875 person hours of fieldwork alone. During this time, the area surveyed in both the Wahweap and Kaiparowits formations has totaled ~48,340 acres. Over 964 vertebrate localities have been discovered, and over 3,200 vertebrate fossils saved from erosion, including over 95 partial to complete skeletons. Scientific discoveries include four new species of giant herbivorous horned dinosaurs (Kirkland & DeBlieux, 2010; Sampson et al., 2010, 2013; Lund et al. 2016a,b), a new species of giant duck-billed dinosaur (Gates & Sampson, 2007), two new species of giant carnivorous tyrannosaurs (Carr et al., 2011; Loewen et al., 2013), a sickle-clawed "raptor" dinosaur (Zanno et al., 2011), six different species of crocodylians including the giant dinosaur-eating alligator *Deinosuchus* (Irmis et al., 2013), and over a dozen species of turtles, including a new pig-nosed species (Lively, 2015, 2016; Hutchison et al., 2013).

**Public Value** - The results of this collaborative GSENM-NHMU project have literally reached millions of people statewide, nationwide, and internationally. Research products include over twenty peer-reviewed scientific articles, dozens of presentations at scientific meetings, two internationally-attended symposia, a 634 page multi-authored scientific volume (Titus & Loewen, 2013), and four professional society field trips. We have committed to publishing this work in open-access venues so that all U.S. citizens can read the results; the last six open-access papers (Sampson et al., 2010, 2013; Zanno et al., 2011; Boyd et al., 2013; Loewen et al., 2013; Lund et al., 2016b) have been read by a combined total of over 136,000 people, and shared via social media by over 20,000 people, a remarkable feat given these are technical scientific articles. These discoveries have been broadcast by thousands of media outlets nationally and internationally. For example, the recent announcement of the new pig-nosed turtle species *Arvinachelys* caught public imagination and was covered by 613 media outlets; the recent new

tyrannosaur *Lythronax* was covered by nearly 1100 outlets. The *Arvinachelys* press release (October 2015) resulted in positive media exposure for the BLM and GSENM equivalent to \$7.74 million in advertising. More recently, in May 2016, the announcement of the new horned dinosaur *Machairoceratops* was covered by nearly 100 media outlets worldwide. We expect that our early 2017 publication of a new species of armored dinosaur, which is also set to be in an open-access journal (*PeerJ*), will garner similar positive coverage for GSENM. Additionally, the cooperative GSENM-NHMU project was the focus of a feature article in the May 2014 issue of *National Geographic Magazine*, and was promoted in a July 2015 *New York Times* feature article (<http://tinyurl.com/oj5bdg9>). Finally, research, specimens, and scientists from the GSENM-NHMU partnership have been featured in a new richly-illustrated popular science book by Christa Sadler entitled '*Where Dinosaurs Roamed: Lost Worlds of Utah's Grand Staircase*', published by Glen Canyon Natural History Association in November 2016.

Even more important is how these scientific discoveries can directly reach the public and transform their understanding of the history of life on earth, and the importance of scientific resources from federally-managed lands. These discoveries, including hundreds of original fossils from GSENM, are featured in the 90,000 square-foot *Utah's Past Worlds* Gallery at the Natural History Museum of Utah. Since opening the new building at NHMU in late 2011, the exhibits have been visited by over 1.53 million people, with 266,316 visitors in calendar year 2016 alone. In early November 2013 we opened a special exhibit focusing on the new GSENM tyrannosaur *Lythronax*, and have had over 950,000 visitors to date. GSENM fossils were also featured in our *Behind the Scenes* event in November 2016, which allows visitors to see collections not normally on display; we received over 3,000 visitors in this two-day event. *Lythronax* and GSENM fossils in our exhibits and preparation lab were part of the 2016 NHMU legislative evening, attended by over 670 Utah state and county legislators and their families; we expect similar attendance at this year's event. GSENM fossils are also featured in a 3-year exhibit at the Utah State Capitol entitled 'A Paleontologist's Paradise', **where they are seen by state legislators, staffers, and over 150,000 members of the public each year.**

Educational benefits from this work are equally critical. In addition to the many University of Utah students that visit NHMU exhibits (including 150-200 per semester from the World of Dinosaurs course), we have made it a priority to integrate K-12 education with our work. During the 2015-2016 school year, 57,000 K-12 students and teachers visited NHMU on class field trips. We also strive to reach classrooms statewide by bringing programs to schools themselves. Our outreach programs such as *Museum on the Move* focus on core curriculum objectives, and feature replicas (casts) of GSENM fossils; these programs reached over 25,700 elementary students and teachers in the 2015-16 school year. Finally, we loan teaching toolkits that also feature GSENM fossil casts to K-12 teachers throughout the state, and this program reached an additional 41,700 students and teachers this past school year.

A separate project awarded through funding opportunity L16AS00092 in FY2016 was a collaborative project between NHMU and the BLM Utah Moab Field Office to produce a series of short web videos about dinosaur tracksites in and around Moab that A) encouraged the public to visit the sites while also promoting the new **Respect and Protect** initiative; and B) give an informative introduction to the paleontology of each site. Planning for this project occurred in Spring and early Summer 2016, and filming occurred over a one-week period in late August 2016. Editing and post-production occurred during Fall 2016, and preliminary versions of the videos were presented at the 76<sup>th</sup> Society of Vertebrate Paleontology Annual Meeting in Salt Lake City, UT (Hunt-Foster et al., 2016). The videos have now been finalized, and we are working to develop contextual web content to go along with them; all content should be publically available by March 2017, and promoted through both NHMU and BLM social media.

## REFERENCES CITED

- Boyd, C. A., S. K. Drumheller, and T. A. Gates. 2013. Crocodyliform feeding traces on juvenile ornithischian dinosaurs from the Upper Cretaceous (Campanian) Kaiparowits Formation, Utah. *PLoS One* **8**: e57605, 1-8.
- Carr, T. D., T. E. Williamson, et al. 2011. *Bistahieversor sealeyi*, gen. et sp. nov., a new tyrannosauroid from New Mexico and the origin of deep snouts in Tyrannosauroida. *Naturwissenschaften* **98**: 241-246.
- Clinton, W. J. 1996. Establishment of the Grand Staircase-Escalante N. M. *Presid. Proc.* **6920**: 1788-1791.
- Gates, T. A., and S. D. Sampson. 2007. A new species of *Gryposaurus* (Dinosauria: Hadrosauridae) from the late Campanian Kaiparowits Formation, southern Utah, USA. *Zoological J. Linnean Soc.* **151**: 351-376.
- Hunt-Foster, R. K., N. Toth, J. Uglesich, B. King, R. B. Irmis, J. R. Foster, A. A. Farke, M. Whittaker, and S. King. 2016. Respect and Protect: paleontological education and outreach in BLM Canyon Country district, southeastern Utah. *J. Vertebrate Paleontology* **36**(Online Supplement): 159.
- Hutchison, J. H., M. J. Knell, and D. B. Brinkman. 2013. Turtles from the Kaiparowits Formation, Utah. Pp. 295-318 in A. L. Titus and M. A. Loewen (eds.), *At the Top of the Grand Staircase*. Indiana University Press.
- Irmis, R. B., J. H. Hutchison, J. J. W. Sertich, and A. L. Titus. 2013. Crocodyliforms from the Late Cretaceous of Grand Staircase-Escalante National Monument and vicinity, southern Utah, U.S.A. Pp. 424-444 in A. L. Titus and M. A. Loewen (eds.), *At the Top of the Grand Staircase*. Indiana University Press.
- Kirkland, J. I., and D. D. DeBlieux. 2010. New centrosaurine ceratopsians from the Wahweap Formation, Grand Staircase-Escalante National Monument, southern Utah. Pp. 117-140 in M. J. Ryan, B. J. Chinnery-Allgeier, and D. A. Eberth (eds.), *New Perspectives on Horned Dinosaurs*. Indiana University Press.
- Lively, J.A. 2015. A new species of baenid turtle from the Kaiparowits Formation (Upper Cretaceous, Campanian) of southern Utah. *J. Vertebrate Paleontology* **35**: e1009084, 1-16.
- Lively, J.A. 2016. Baenid turtles of the Kaiparowits Formation (Upper Cretaceous: Campanian) of southern Utah, USA. *J. of Systematic Palaeontology* **14**: 891-918.
- Lund, E. K., S. D. Sampson, and M. A. Loewen. 2016a. *Nasutoceratops titusi* (Ornithischia, Ceratopsidae), a basal centrosaurine ceratopsid from the Kaiparowits Formation, southern Utah. *J. Vertebrate Paleontology* **36**: e1054936, 1-26.
- Lund, E. K., P. M. O'Connor, M. A. Loewen, and Z. A. Jinnah. 2016b. A new centrosaurine ceratopsid, *Machairoceratops cronusi* gen et sp. nov., from the Upper Sand Member of the Wahweap Formation (middle Campanian), southern Utah. *PLoS One* **11**: e0154403, 1-21.
- Loewen, M. A., R. B. Irmis, et al. 2013. Tyrant dinosaur evolution tracks the rise and fall of Late Cretaceous oceans. *PLoS One* **8**: e79420, 1-14.
- Sampson, S. D., M. A. Loewen, et al. 2010. New horned dinosaurs from Utah provide evidence for intracontinental dinosaur endemism. *PLoS One* **5**: e12292, 1-12.
- Sampson, S. D., E. K. Lund, et al. 2013. A remarkable short-snouted horned dinosaur from the Late Cretaceous (late Campanian) of southern Laramidia. *Proc. Royal Society London, Biological Sciences* **280**: 20131186, 1-7.
- Titus, A. L., and M. A. Loewen (eds.). 2013. *At the Top of the Grand Staircase: The Late Cretaceous of Southern Utah*. Indiana University Press, 634 p.



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Zanno, L. E., D. J. Varricchio, et al. 2011. A new troodontid theropod, *Talos sampsoni* gen. et sp. nov., from the Upper Cretaceous Western Interior Basin of North America. *PLoS One* **6**: e24487, 1-20.

[Attachment B]

**BUREAU OF LAND MANAGEMENT**  
Financial Assistance (Cooperative Agreements)



## BUDGET DETAIL

(Suggested Format)

**Instructions:** Using the estimated amounts listed on your SF 424A Budget Information form, use this worksheet to provide details of those estimated costs. In the Narrative Boxes, explain the purpose of each cost and provide sufficient detail so costs may be analyzed for reasonableness.

Agreement or Funding Opportunity No.: L17AS00001 Date: 1/25/17

Organization Name: University of Washington

Project Title: BLM FY2017 Bureau wide National Conservation Lands Scientific Studies Support Program

<b>A) PERSONNEL COSTS (SF-424A Object Class Category 6a.)</b> Estimated costs of salaries/wages, <u>not</u> including fringe benefits, paid to Recipient employees working directly on this agreement. Indicate Key Personnel with an asterisk (*), provide more detail in the Narrative Box if needed.					
Name & Title or Position Title	Salary or Wage	Months or Hours	Matching Funds (if applicable)	BLM Funds	Personnel Justification
Project Manager salary	\$2,805/Mo.	1 Mo.		\$2,805.00	Oversees research goals and personnel
Grad student salary	\$2,572/Mo.	1 Mo.		\$2,572.00	Helps lead field crew; assists with research and reporting
Grad student salary	\$2,572/Mo.	1 Mo.		\$2,572.00	Helps lead field crew; assists with research and reporting
Hourly Curatorial Salary	\$16/hr	100 hrs		\$1,600.00	Assists with specimen organization, curation, and reporting
<i>Example: James Smith, Executive Director</i>	<i>\$20,000.00/Mo.</i>	<i>3 Mos.</i>	<i>\$15,000.00</i>	<i>\$45,000.00</i>	
<b>A) TOTAL PERSONNEL COSTS:</b> (SF 424A Object Class Category 6a. Personnel)			<b>\$</b>	<b>\$9,549.00</b>	
<i>Budget justification of costs:</i> The listed personnel are critical to the success of the project. They are responsible for the development and execution of the project's goals, as well as the storage of any collected specimens and the reporting of completed work.					

## Budget Detail

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**B) FRINGE BENEFIT COSTS (SF-424A Object Class Category 6b.)**

Estimated costs of fringe benefits (e.g. health insurance, vacation, FICA, etc.) paid to Recipient employees working on this agreement. List employees/positions below, and their fringe benefit rates as a percentage (%) of their salaries. List what are considered fringe benefits in the Narrative Box.

Name & Title/Position	Salary/Wage Base (BLM Amounts budgeted in Section A above)	Fringe Benefit Rate (%)	Matching Funds (if applicable)	BLM Funds
Project Manager fringe benefits	\$2805/Mo.	37.9%		\$1,063.10
Grad student fringe benefits	\$2572/Mo.	17%		\$437.24
Grad student fringe benefits	\$2572/Mo.	17%		\$437.24
<i>Example: James Smith, Executive Director</i>	\$20,000.00	30%	\$0.00	\$6,000.00
<b>B) TOTAL FRINGE BENEFIT COSTS:</b> (SF 424A Object Class Category 6b. Fringe Benefits)			<b>\$</b>	<b>\$1,937.58</b>

Budget Justification of Costs: Fringe benefits provided to eligible staff listed in the Personnel section; rates provided by the University of Washington.

## Budget Detail

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**C) TRAVEL COSTS** (SF-424A Object Class Category 6c.)

**SUB TOTAL, LODGING & PER DIEM** The cost of lodging & meals while traveling for agreement activities. Give details and purpose of the travel in the Narrative Box. Current Federal rates may be found online at: <http://www.gsa.gov/portal/category/21287>.

Proposed Travel (Lodging & Per Diem)		No. of People	No. of Days	Cost Per Person Per Day	Matching Funds (if applicable)	BLM Funds
To:	Jordan, MT	10	16	\$10.00 (food)		\$1,600.00
From:	Seattle, WA					
To:	Jordan, MT	10	16	\$12.50 (lodging)		\$2,000.00
From:	Seattle, WA					
To:						
From:						
To:	Example: Portland, OR	1	2	\$150.00/ Day	\$100.00	\$200.00
From:	Eugene, OR					

**SUB TOTAL, MILEAGE REIMBURSEMENT** The cost of reimbursement for estimated mileage traveled in recipient vehicles for agreement activities. Give details and the purpose of the travel in the Narrative Box. Current Federal mileage reimbursement rates may be found online at: [www.GSA.gov](http://www.GSA.gov). **NOTE:** Mileage reimbursement rates include all vehicle costs, i.e. fuel, insurance, maintenance, etc.

Proposed Travel (Mileage Reimbursement)		No. of Miles	No. of Trips	Cost Per Mile	Matching Funds (if applicable)	BLM Funds
To:	Jordan, MT	876	2	\$0.535		\$937.32
From:	Seattle, WA					
To:	Jordan, MT	876	2	\$0.535		\$937.32
From:	Seattle, WA					
To:						
From:						
To:	Example: Portland, OR	110 Miles	2	\$0.10/ Mile	\$0.00	\$22.00
From:	Eugene, OR					

**SUB TOTAL, OTHER TRAVEL COSTS** The costs of airfare, bus fare, car rental, etc., required for agreement activities. Explain the details and the purpose of the costs in the Narrative Box.

Proposed Other (Travel Reimbursement)		Type	Cost	No.	Matching Funds (if applicable)	BLM Funds
To:						
From:						
To:						
From:						
To:						
From:						

**C) TOTAL TRAVEL COSTS:**

(SF 424A Object Class Category 6c. Travel)

\$ \$5,474.64

Budget justification of costs: The above costs are for lodging/camping fees and vehicle usage required for conducting fieldwork in northeastern Montana on NLCS lands.

## Budget Detail

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**D) EQUIPMENT COSTS** (SF-424A Object Class Category 6d. Equipment)

The cost of equipment purchased for use on this agreement. Equipment is defined as items with a useful life of more than one (1) year and a cost of \$5,000+ per unit. If your organization has a written policy for purchasing equipment, please submit a copy with your application. Explain the need and purpose of the equipment in the Narrative Box below.

Equipment	Quantity	Cost per Unit	Matching Funds (if applicable)	BLM Funds
<i>Example: John Deere Compact Tractor</i>	1	\$17,500.00	\$7,500.00	\$10,000.00

**D) TOTAL EQUIPMENT COSTS:**

(SF 424A Object Class Category 6d. Equipment)

\$

\$0.00

Budget justification of costs: n/a

**E) SUPPLY COSTS** (SF-424A Object Class Category 6e. Supplies)

Estimated costs of materials and supplies used directly on this agreement, e.g. safety glasses, work gloves, office supplies, etc. If your organization has a written policy for purchasing supplies, please submit a copy with your application. Explain the purpose of the costs in the Narrative Box below.

Item	Quantity	Cost per Unit	Matching Funds (if applicable)	BLM Funds
GPS units	3	\$100.00		\$300.00
Plaster	25	\$15.00		\$375.00
Burlap	25	\$10.00		\$250.00
Field Notebooks	10	\$10.00		\$100.00
Specimen storage cabinet	1	\$1,500.00		\$1,500.00
Specimen storage boxes	70	\$5.00		\$350.00
<i>Example: Work Gloves, Leather</i>	6	\$10.00/Pair	\$50.00	\$10.00

**E) SUPPLY COST TOTAL:**

(SF 424A Object Class Category 6e. Supplies)

\$

\$2,875.00

Budget justification of costs: The above costs are necessary for proper paleontological fieldwork in northeastern Montana (e.g., prospecting and surveying lands, collecting fossils), as well as curating and storing collected specimens.

## Budget Detail

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**F) CONTRACTUAL COSTS** (SF-424A Object Class Category 6f. Contractual)

Estimated costs of contracted/sub contracted services and sub grant/recipient awards. If your organization has a written contracting policy, please submit a copy with your application. Provide contractor names, if available, and explain the details and purposes of the costs in the Narrative Box below. **NOTE:** Calculation of your Indirect Costs may be affected by contracted and/or pass through expenses. See Section J) INDIRECT COSTS, for more information.

Contractor Name, Type, etc.	Cost	Matching Funds (if applicable)	BLM Funds
<i>Example: Ace Delivery Service (Yearly Contract)</i>	\$2,500.00	\$0.00	\$2,500.00
<b>F) CONTRACTUAL COST TOTAL:</b> (SF 424A Object Class Category 6f. Contractual)		<b>\$</b>	<b>\$0.00</b>

Budget justification of costs: n/a

**G) CONSTRUCTION COSTS** (SF-424A Object Class Category 6g. Construction)

The estimated costs of construction. "Construction" is the intent to construct, alter, or repair (including dredging, excavating, and painting) buildings, structures, or other real property FAR Part 2 Definitions. Explain the details and purpose of the costs in the Narrative Box below.

Contractor: Name/Type/Organization/Etc.	Cost	Matching Funds (if applicable)	BLM Funds
<b>G) CONSTRUCTION COST TOTAL:</b> (SF 424A Object Class Category 6g. Construction)		<b>\$</b>	<b>\$0.00</b>

Budget justification of costs: n/a

## Budget Detail

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**H) OTHER COSTS** (SF-424A Object Class Category 6h. Other)

Estimated costs which don't fit any other Object Class Category, e.g. duplicating and printing costs, postage and freight, rental of equipment, etc. Explain the details and purpose of the costs in the Narrative Box below.

Item	Cost	Matching Funds (if applicable)	BLM Funds
<i>Example: Ace Equipment Rental (Post-Hole Digger, 4 Days)</i>	<i>\$25/Day</i>	<i>\$0.00</i>	<i>\$100.00</i>
<b>H) OTHER COSTS TOTAL:</b> (SF 424A Object Class Category 6h. Other)		<b>\$</b>	<b>\$0.00</b>
<u>Budget justification of costs:</u> n/a			

**I) TOTAL DIRECT COSTS** (SF-424A Object Class Category 6i. Sum of 6a.-6h.)

The total of all direct costs applicable to this project.

Total Direct Costs	Matching Funds (if applicable)	BLM Funds
<b>I) TOTAL DIRECT COSTS:</b> (SF 424A Object Class Category 6i. Total, Sum of 6a. 6h.)	<b>\$</b>	<b>\$19,836.22</b>

**J) INDIRECT COSTS** (SF-424A Object Class Category 6j. Indirect Charges)

Indirect costs are expenses which cannot be readily identified and charged to a particular project or agreement, e.g. building rent, utilities, office supplies, etc. Such costs are charged to the project as a percentage of the Direct Costs (items A through H above) and this percentage is called the Indirect Cost Rate. If your organization has a Negotiated Indirect Cost Rate Agreement (NICRA) please submit a copy of the agreement with your application. If your organization has no NICRA, the BLM may allow a "de minimis" indirect cost rate of up to 10% of your Modified Total Direct Costs (MTDC), which are your Direct Costs excluding sub grant and sub contract costs in excess of \$25,000. See 2 CFR 200.68 Modified Total Direct Cost (MTDC) and 2 CFR 200.414(f) Indirect (F&A) Costs for more information.

If your organization is a Cooperative Ecosystems Studies Unit (CESU) partner, your indirect cost rate will be 17.5% of your NICRA determined indirect cost base.

Use the Narrative Box below to explain how you calculated your indirect cost base and resulting indirect costs.

Indirect Cost Rate to be used on this Grant (%):	26.00%		
Indirect Cost Base for this Grant:	\$19,836.22		
<b>Total Indirect Costs</b>	<b>Matching Funds (if applicable)</b>	<b>BLM Funds</b>	
<b>J) TOTAL INDIRECT COSTS:</b> (SF 424A Object Class Category 6j. Indirect Charges)	\$	\$5,157.42	
<i>Budget justification of costs:</i> The above indirect cost rate was provided by the Office of Sponsored Programs at the University of Washington.			

**K) TOTALS** (SF-424A Object Class Category 6k. TOTALS)

The sum total of all Direct and Indirect Costs (Sum of 6i. & 6j.) applicable to this agreement.

<b>Total Project Costs</b>	<b>Matching Funds (if applicable)</b>	<b>BLM Funds</b>
<b>K) TOTAL COSTS:</b> (SF 424A Object Class Category 6k. TOTALS)	\$	\$24,993.64

I certify that to the best of my knowledge the costs detailed above are correct and complete and for the purposes set forth in the associated application for Federal Assistance.

Brody Hovatter, Lab Manager

*Name & Title of Person Completing Budget*

Rev 4/2016



## Project Narrative File(s)

---

\* Mandatory Project Narrative File Filename:

[Add Mandatory Project Narrative File](#)

[Delete Mandatory Project Narrative File](#)

[View Mandatory Project Narrative File](#)

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To add more Project Narrative File attachments, please use the attachment buttons below.

[Add Optional Project Narrative File](#)

[Delete Optional Project Narrative File](#)

[View Optional Project Narrative File](#)

Manifest for Grant Application # GRANT12328840

Grant Application XML file (total 1):

1. GrantApplication.xml. (size 25938 bytes)

Forms Included in Zip File(total 7):

1. Form GG\_LobbyingForm-V1.1.pdf (size 23274 bytes)
2. Form ProjectNarrativeAttachments\_1\_2-V1.2.pdf (size 21764 bytes)
3. Form SF424\_2\_1-V2.1.pdf (size 30371 bytes)
4. Form BudgetNarrativeAttachments\_1\_2-V1.2.pdf (size 22471 bytes)
5. Form SF424A-V1.0.pdf (size 29988 bytes)
6. Form Key\_Contacts-V1.0.pdf (size 28933 bytes)
7. Form SF424B-V1.1.pdf (size 28594 bytes)

Attachments Included in Zip File (total 2):

1. ProjectNarrativeAttachments\_1\_2  
ProjectNarrativeAttachments\_1\_2-Attachments-1235-Gay - 2017 BLM NLCS Bears Ears  
Proposal.docx application/vnd.openxmlformats-officedocument.wordprocessingml.document  
(size 41517 bytes)
2. BudgetNarrativeAttachments\_1\_2 BudgetNarrativeAttachments\_1\_2-Attachments-1234-Gay  
- 2017 BLM NLCS Bears Ears Budget Narrative.docx  
application/vnd.openxmlformats-officedocument.wordprocessingml.document (size 14793  
bytes)

<b>Application for Federal Assistance SF-424</b>		
<b>* 1. Type of Submission:</b> <input type="checkbox"/> Preapplication <input checked="" type="checkbox"/> Application <input type="checkbox"/> Changed/Corrected Application	<b>* 2. Type of Application:</b> <input checked="" type="checkbox"/> New <input type="checkbox"/> Continuation <input type="checkbox"/> Revision	<b>* If Revision, select appropriate letter(s):</b> <input style="width: 100%;" type="text"/> <b>* Other (Specify):</b> <input style="width: 100%;" type="text"/>
<b>* 3. Date Received:</b> <input style="width: 100%;" type="text" value="02/02/2017"/>	<b>4. Applicant Identifier:</b> <input style="width: 100%;" type="text"/>	
<b>5a. Federal Entity Identifier:</b> <input style="width: 100%;" type="text"/>	<b>5b. Federal Award Identifier:</b> <input style="width: 100%;" type="text"/>	
<b>State Use Only:</b>		
<b>6. Date Received by State:</b> <input style="width: 100%;" type="text"/>	<b>7. State Application Identifier:</b> <input style="width: 100%;" type="text"/>	
<b>8. APPLICANT INFORMATION:</b>		
<b>* a. Legal Name:</b> <input style="width: 100%;" type="text" value="Board of Regents, NSHE, obo Desert Research Institute"/>		
<b>* b. Employer/Taxpayer Identification Number (EIN/TIN):</b> <input style="width: 100%;" type="text" value="88 6000024"/>	<b>* c. Organizational DUNS:</b> <input style="width: 100%;" type="text" value="1345991740000"/>	
<b>d. Address:</b>		
<b>* Street1:</b> <input style="width: 100%;" type="text" value="2215 Raggio Parkway"/> <b>Street2:</b> <input style="width: 100%;" type="text"/> <b>* City:</b> <input style="width: 100%;" type="text" value="Reno"/> <b>County/Parish:</b> <input style="width: 100%;" type="text"/> <b>* State:</b> <input style="width: 100%;" type="text" value="NV: Nevada"/> <b>Province:</b> <input style="width: 100%;" type="text"/> <b>* Country:</b> <input style="width: 100%;" type="text" value="USA: UNITED STATES"/> <b>* Zip / Postal Code:</b> <input style="width: 100%;" type="text" value="89512 1095"/>		
<b>e. Organizational Unit:</b>		
<b>Department Name:</b> <input style="width: 100%;" type="text"/>	<b>Division Name:</b> <input style="width: 100%;" type="text"/>	
<b>f. Name and contact information of person to be contacted on matters involving this application:</b>		
<b>Prefix:</b> <input style="width: 100%;" type="text" value="Ms."/> <b>Middle Name:</b> <input style="width: 100%;" type="text"/> <b>* Last Name:</b> <input style="width: 100%;" type="text" value="Ronchetti"/> <b>Suffix:</b> <input style="width: 100%;" type="text"/>	<b>* First Name:</b> <input style="width: 100%;" type="text" value="Lycia"/>	
<b>Title:</b> <input style="width: 100%;" type="text" value="Business Manager"/>		
<b>Organizational Affiliation:</b> <input style="width: 100%;" type="text"/>		
<b>* Telephone Number:</b> <input style="width: 100%;" type="text" value="775 673 7411"/>	<b>Fax Number:</b> <input style="width: 100%;" type="text" value="775 674 7016"/>	
<b>* Email:</b> <input style="width: 100%;" type="text" value="lycia.ronchetti@dri.edu"/>		

<b>Application for Federal Assistance SF-424</b>			
<b>* 9. Type of Applicant 1: Select Applicant Type:</b> <input type="text" value="M: Nonprofit with 501C3 IRS Status (Other than Institution of Higher Education)"/>			
<b>Type of Applicant 2: Select Applicant Type:</b> <input type="text"/>			
<b>Type of Applicant 3: Select Applicant Type:</b> <input type="text"/>			
<b>* Other (specify):</b> <input type="text"/>			
<b>* 10. Name of Federal Agency:</b> <input type="text" value="Bureau of Land Management"/>			
<b>11. Catalog of Federal Domestic Assistance Number:</b> <input type="text" value="15.231"/>			
<b>CFDA Title:</b> <input type="text" value="Fish, Wildlife and Plant Conservation Resource Management"/>			
<b>* 12. Funding Opportunity Number:</b> <input type="text" value="L17AS00001"/>			
<b>* Title:</b> <input type="text" value="BLM FY2017 Bureau wide National Conservation Lands Scientific Studies Support Program"/>			
<b>13. Competition Identification Number:</b> <input type="text"/>			
<b>Title:</b> <input type="text"/>			
<b>14. Areas Affected by Project (Cities, Counties, States, etc.):</b> <div> <input type="text"/> <input type="button" value="Add Attachment"/> <input type="button" value="Delete Attachment"/> <input type="button" value="View Attachment"/> </div>			
<b>* 15. Descriptive Title of Applicant's Project:</b> <input type="text" value="Towards an Improved Understanding of Hydroclimate Variability in the Black Rock National Conservation Area"/>			
Attach supporting documents as specified in agency instructions. <div> <input type="button" value="Add Attachments"/> <input type="button" value="Delete Attachments"/> <input type="button" value="View Attachments"/> </div>			

<b>Application for Federal Assistance SF-424</b>	
<b>16. Congressional Districts Of:</b>	
* a. Applicant <input type="text" value="NV 002"/>	* b. Program/Project <input type="text" value="NV 002"/>
Attach an additional list of Program/Project Congressional Districts if needed.	
<input type="text"/>	<input type="button" value="Add Attachment"/> <input type="button" value="Delete Attachment"/> <input type="button" value="View Attachment"/>
<b>17. Proposed Project:</b>	
* a. Start Date: <input type="text" value="04/01/2017"/>	* b. End Date: <input type="text" value="03/31/2018"/>
<b>18. Estimated Funding (\$):</b>	
* a. Federal	<input type="text" value="24,993.00"/>
* b. Applicant	<input type="text" value="10,104.00"/>
* c. State	<input type="text" value="0.00"/>
* d. Local	<input type="text" value="0.00"/>
* e. Other	<input type="text" value="0.00"/>
* f. Program Income	<input type="text" value="0.00"/>
* g. TOTAL	<input type="text" value="35,097.00"/>
<b>* 19. Is Application Subject to Review By State Under Executive Order 12372 Process?</b>	
<input type="checkbox"/> a. This application was made available to the State under the Executive Order 12372 Process for review on <input type="text"/> .	
<input type="checkbox"/> b. Program is subject to E.O. 12372 but has not been selected by the State for review.	
<input checked="" type="checkbox"/> c. Program is not covered by E.O. 12372.	
<b>* 20. Is the Applicant Delinquent On Any Federal Debt? (If "Yes," provide explanation in attachment.)</b>	
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
If "Yes", provide explanation and attach	
<input type="text"/>	<input type="button" value="Add Attachment"/> <input type="button" value="Delete Attachment"/> <input type="button" value="View Attachment"/>
<b>21. *By signing this application, I certify (1) to the statements contained in the list of certifications** and (2) that the statements herein are true, complete and accurate to the best of my knowledge. I also provide the required assurances** and agree to comply with any resulting terms if I accept an award. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties. (U.S. Code, Title 218, Section 1001)</b>	
<input checked="" type="checkbox"/> ** I AGREE	
** The list of certifications and assurances, or an internet site where you may obtain this list, is contained in the announcement or agency specific instructions.	
<b>Authorized Representative:</b>	
Prefix: <input type="text"/>	* First Name: <input type="text" value="Lycia"/>
Middle Name: <input type="text"/>	
* Last Name: <input type="text" value="Ronchetti"/>	
Suffix: <input type="text"/>	
* Title: <input type="text" value="Business Manager"/>	
* Telephone Number: <input type="text" value="775 673 7411"/>	Fax Number: <input type="text" value="775 674 7016"/>
* Email: <input type="text" value="lycia.ronchetti@dri.edu"/>	
* Signature of Authorized Representative: <input type="text" value="Lycia Ronchetti"/>	* Date Signed: <input type="text" value="02/02/2017"/>

Manifest for Grant Application # GRANT12328846

Grant Application XML file (total 1):

1. GrantApplication.xml. (size 19512 bytes)

Forms Included in Zip File(total 7):

1. Form GG LobbyingForm v1.1.pdf (size 23289 bytes)
2. Form ProjectNarrativeAttachments 1 2 V1.2.pdf (size 21491 bytes)
3. Form SF424 2 1 V2.1.pdf (size 30360 bytes)
4. Form BudgetNarrativeAttachments 1 2 V1.2.pdf (size 22446 bytes)
5. Form SF424A V1.0.pdf (size 28882 bytes)
6. Form Key Contacts V1.0.pdf (size 28862 bytes)
7. Form SF424B V1.1.pdf (size 28304 bytes)

Attachments Included in Zip File (total 2):

1. ProjectNarrativeAttachments 1 2 ProjectNarrativeAttachments 1 2 Attachments 1235 BLKRockNCA hatchett.pdf application/pdf (size 1126850 bytes)
2. BudgetNarrativeAttachments 1 2 BudgetNarrativeAttachments 1 2 Attachments 1234 Budget narrative.pdf application/pdf (size 1459855 bytes)

**ASSURANCES - NON-CONSTRUCTION PROGRAMS**

Public reporting burden for this collection of information is estimated to average 15 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Office of Management and Budget, Paperwork Reduction Project (0348-0040), Washington, DC 20503.

**PLEASE DO NOT RETURN YOUR COMPLETED FORM TO THE OFFICE OF MANAGEMENT AND BUDGET. SEND IT TO THE ADDRESS PROVIDED BY THE SPONSORING AGENCY.**

**NOTE:** Certain of these assurances may not be applicable to your project or program. If you have questions, please contact the awarding agency. Further, certain Federal awarding agencies may require applicants to certify to additional assurances. If such is the case, you will be notified.

As the duly authorized representative of the applicant, I certify that the applicant:

1. Has the legal authority to apply for Federal assistance and the institutional, managerial and financial capability (including funds sufficient to pay the non-Federal share of project cost) to ensure proper planning, management and completion of the project described in this application.
2. Will give the awarding agency, the Comptroller General of the United States and, if appropriate, the State, through any authorized representative, access to and the right to examine all records, books, papers, or documents related to the award; and will establish a proper accounting system in accordance with generally accepted accounting standards or agency directives.
3. Will establish safeguards to prohibit employees from using their positions for a purpose that constitutes or presents the appearance of personal or organizational conflict of interest, or personal gain.
4. Will initiate and complete the work within the applicable time frame after receipt of approval of the awarding agency.
5. Will comply with the Intergovernmental Personnel Act of 1970 (42 U.S.C. §§4728-4763) relating to prescribed standards for merit systems for programs funded under one of the 19 statutes or regulations specified in Appendix A of OPM's Standards for a Merit System of Personnel Administration (5 C.F.R. 900, Subpart F).
6. Will comply with all Federal statutes relating to nondiscrimination. These include but are not limited to: (a) Title VI of the Civil Rights Act of 1964 (P.L. 88-352) which prohibits discrimination on the basis of race, color or national origin; (b) Title IX of the Education Amendments of 1972, as amended (20 U.S.C. §§1681-1683, and 1685-1686), which prohibits discrimination on the basis of sex; (c) Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. §794), which prohibits discrimination on the basis of handicaps; (d) the Age Discrimination Act of 1975, as amended (42 U.S.C. §§6101-6107), which prohibits discrimination on the basis of age; (e) the Drug Abuse Office and Treatment Act of 1972 (P.L. 92-255), as amended, relating to nondiscrimination on the basis of drug abuse; (f) the Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment and Rehabilitation Act of 1970 (P.L. 91-616), as amended, relating to nondiscrimination on the basis of alcohol abuse or alcoholism; (g) §§523 and 527 of the Public Health Service Act of 1912 (42 U.S.C. §§290 dd-3 and 290 ee-3), as amended, relating to confidentiality of alcohol and drug abuse patient records; (h) Title VIII of the Civil Rights Act of 1968 (42 U.S.C. §§3601 et seq.), as amended, relating to nondiscrimination in the sale, rental or financing of housing; (i) any other nondiscrimination provisions in the specific statute(s) under which application for Federal assistance is being made; and, (j) the requirements of any other nondiscrimination statute(s) which may apply to the application.
7. Will comply, or has already complied, with the requirements of Titles II and III of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (P.L. 91-646) which provide for fair and equitable treatment of persons displaced or whose property is acquired as a result of Federal or federally-assisted programs. These requirements apply to all interests in real property acquired for project purposes regardless of Federal participation in purchases.
8. Will comply, as applicable, with provisions of the Hatch Act (5 U.S.C. §§1501-1508 and 7324-7328) which limit the political activities of employees whose principal employment activities are funded in whole or in part with Federal funds.

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DOI-2020-12 01509

9. Will comply, as applicable, with the provisions of the Davis-Bacon Act (40 U.S.C. §§276a to 276a-7), the Copeland Act (40 U.S.C. §276c and 18 U.S.C. §874), and the Contract Work Hours and Safety Standards Act (40 U.S.C. §§327-333), regarding labor standards for federally-assisted construction subagreements.
10. Will comply, if applicable, with flood insurance purchase requirements of Section 102(a) of the Flood Disaster Protection Act of 1973 (P.L. 93-234) which requires recipients in a special flood hazard area to participate in the program and to purchase flood insurance if the total cost of insurable construction and acquisition is \$10,000 or more.
11. Will comply with environmental standards which may be prescribed pursuant to the following: (a) institution of environmental quality control measures under the National Environmental Policy Act of 1969 (P.L. 91-190) and Executive Order (EO) 11514; (b) notification of violating facilities pursuant to EO 11738; (c) protection of wetlands pursuant to EO 11990; (d) evaluation of flood hazards in floodplains in accordance with EO 11988; (e) assurance of project consistency with the approved State management program developed under the Coastal Zone Management Act of 1972 (16 U.S.C. §§1451 et seq.); (f) conformity of Federal actions to State (Clean Air) Implementation Plans under Section 176(c) of the Clean Air Act of 1955, as amended (42 U.S.C. §7401 et seq.); (g) protection of underground sources of drinking water under the Safe Drinking Water Act of 1974, as amended (P.L. 93-523); and, (h) protection of endangered species under the Endangered Species Act of 1973, as amended (P.L. 93-205).
12. Will comply with the Wild and Scenic Rivers Act of 1968 (16 U.S.C. §§1271 et seq.) related to protecting components or potential components of the national wild and scenic rivers system.
13. Will assist the awarding agency in assuring compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. §470), EO 11593 (identification and protection of historic properties), and the Archaeological and Historic Preservation Act of 1974 (16 U.S.C. §§469a-1 et seq.).
14. Will comply with P.L. 93-348 regarding the protection of human subjects involved in research, development, and related activities supported by this award of assistance.
15. Will comply with the Laboratory Animal Welfare Act of 1966 (P.L. 89-544, as amended, 7 U.S.C. §§2131 et seq.) pertaining to the care, handling, and treatment of warm blooded animals held for research, teaching, or other activities supported by this award of assistance.
16. Will comply with the Lead-Based Paint Poisoning Prevention Act (42 U.S.C. §§4801 et seq.) which prohibits the use of lead-based paint in construction or rehabilitation of residence structures.
17. Will cause to be performed the required financial and compliance audits in accordance with the Single Audit Act Amendments of 1996 and OMB Circular No. A-133, "Audits of States, Local Governments, and Non-Profit Organizations."
18. Will comply with all applicable requirements of all other Federal laws, executive orders, regulations, and policies governing this program.
19. Will comply with the requirements of Section 106(g) of the Trafficking Victims Protection Act (TVPA) of 2000, as amended (22 U.S.C. 7104) which prohibits grant award recipients or a sub-recipient from (1) Engaging in severe forms of trafficking in persons during the period of time that the award is in effect (2) Procuring a commercial sex act during the period of time that the award is in effect or (3) Using forced labor in the performance of the award or subawards under the award.

<b>SIGNATURE OF AUTHORIZED CERTIFYING OFFICIAL</b>	<b>TITLE</b>
Kimberlie McCue	Program Director, Conservation
<b>APPLICANT ORGANIZATION</b>	<b>DATE SUBMITTED</b>
Desert Botanical Garden, Inc.	02/02/2017

Standard Form 424B (Rev. 7-97) Back



## Key Contacts Form

**\* Applicant Organization Name:**

Desert Botanical Garden, Inc.

Enter the individual's role on the project (e.g., project manager, fiscal contact).

**\* Contact 1 Project Role:** Principal Investigator

Prefix:

Dr.

**\* First Name:** Andrew

Middle Name:

**\* Last Name:** Salywon

Suffix:

Title: Research Botanist

Organizational Affiliation:

Desert Botanical Garden

**\* Street1:** 1201 N Galvin Pkwy

Street2:

**\* City:** Phoenix

County:

**\* State:** AZ: Arizona

Province:

**\* Country:** USA: UNITED STATES**\* Zip / Postal Code:** 85008 3437**\* Telephone Number:** 480.481.8107

Fax:

**\* Email:** asalywon@dbg.org

**BUDGET INFORMATION - Non-Construction Programs**OMB Number: 4040-0006  
Expiration Date: 01/31/2019**SECTION A - BUDGET SUMMARY**

Grant Program Function or Activity (a)	Catalog of Federal Domestic Assistance Number (b)	Estimated Unobligated Funds		New or Revised Budget		
		Federal (c)	Non-Federal (d)	Federal (e)	Non-Federal (f)	Total (g)
1. L17AS00001	15.231	\$	\$	\$ 25,000.00	\$	\$ 25,000.00
2.						
3.						
4.						
5. Totals		\$	\$	\$ 25,000.00	\$	\$ 25,000.00

Standard Form 424A (Rev. 7-97)  
Prescribed by OMB (Circular A -102) Page 1

Tracking Number: GRANT12327996

Funding Opportunity Number: L17AS00001 Received Date: Feb 02, 2017 01:16:04 PM EST

## SECTION B - BUDGET CATEGORIES

6. Object Class Categories	GRANT PROGRAM, FUNCTION OR ACTIVITY				Total (5)
	(1)	(2)	(3)	(4)	
	L17AS00001				
a. Personnel	\$ 3,504.00	\$	\$	\$	\$ 3,504.00
b. Fringe Benefits	28.00				28.00
c. Travel	1,960.00				1,960.00
d. Equipment					
e. Supplies	560.00				560.00
f. Contractual	10,000.00				10,000.00
g. Construction					
h. Other	5,225.00				5,225.00
i. Total Direct Charges (sum of 6a-6h)	21,277.00				\$ 21,277.00
j. Indirect Charges	3,723.00				\$ 3,723.00
k. TOTALS (sum of 6i and 6j)	\$ 25,000.00	\$	\$	\$	\$ 25,000.00
7. Program Income	\$ 0.00	\$	\$	\$	\$

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SECTION C - NON-FEDERAL RESOURCES					
(a) Grant Program	(b) Applicant	(c) State	(d) Other Sources	(e) TOTALS	
8. L17AS00001	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00	
9.					
10.					
11.					
12. TOTAL (sum of lines 8-11)	\$	\$	\$	\$	

SECTION D - FORECASTED CASH NEEDS					
	Total for 1st Year	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
13. Federal	\$ 25,000.00	\$ 6,250.00	\$ 6,250.00	\$ 6,250.00	\$ 6,250.00
14. Non-Federal	\$				
15. TOTAL (sum of lines 13 and 14)	\$ 25,000.00	\$ 6,250.00	\$ 6,250.00	\$ 6,250.00	\$ 6,250.00

SECTION E - BUDGET ESTIMATES OF FEDERAL FUNDS NEEDED FOR BALANCE OF THE PROJECT				
(a) Grant Program	FUTURE FUNDING PERIODS (YEARS)			
	(b) First	(c) Second	(d) Third	(e) Fourth
16. L17AS00001	\$	\$	\$	\$
17.				
18.				
19.				
20. TOTAL (sum of lines 16 - 19)	\$	\$	\$	\$

SECTION F - OTHER BUDGET INFORMATION	
21. Direct Charges: 21,277.00	22. Indirect Charges: 3,723.00
23. Remarks:	

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Prescribed by OMB (Circular A-102) Page 2

Tracking Number: GRANT12327996

Funding Opportunity Number: L17AS00001 Received Date: Feb 02, 2017 01:16:04 PM EST

**TITLE:** INVENTORY AND SALVAGE OF PRE-DINOSAUR FOSSIL VERTEBRATES IN THE CARBONIFEROUS-PERMIAN CUTLER GROUP, VALLEY OF THE GODS AND JOHN’S CANYON, SE UTAH

**SUMMARY:** As a component of the NLCS, the BLM administered lands and former wilderness study areas encompassed by the newly formed Bears Ears National Monument are a priority for scientific investigation that will inform future conservation, protection, and restoration decisions. This work represents the first collaborative survey and inventory the oldest Paleozoic vertebrate fossils of the Bears Ears National Monument, and emphasizes their scientific application in understanding the age, biochronology, and large-scale climate changes recorded in southern Utah’s Cutler Group rocks.

**KEYWORDS:** paleontology; fossils; Paleozoic; resource management; education

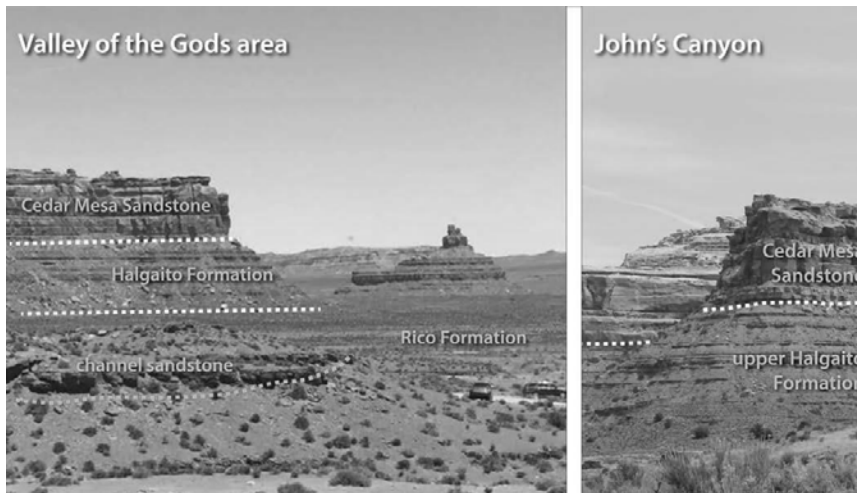
**RESEARCH THEMES:** **(1B)** *Expand Understanding of the NLCS Values through Assessment, Inventory, and Monitoring;* **(1C)** *Provide a Scientific Foundation for Decision-Making*

**NLCS LANDS:** Valley of the Gods and John’s Canyon (now Bears Ears National Monument)

## INTRODUCTION

The late Paleozoic rocks of southern Utah are central to our understanding of an extensive shift in climate that was unparalleled in geologic history (Montañez et al., 2007, 2016). A long-term shift from cool but wet “coal swamp” environments of the Carboniferous to more monsoonal conditions across the Pangean supercontinent stoked conditions that would lead to the formation of vast desert biomes that would characterize the western portion of the continent for millions of years. This marked Earth’s last major pre-Quaternary icehouse-hothouse transition, and was associated with several higher-order, glacioeustasy-driven sea level fluctuations during the Carboniferous-Permian (C-P) transition ~307-283.5 million years ago. Its impacts on animal communities would have likely been severe given that tropical ectotherms in warm, open habitats lack behavioral specializations to avoid heat and water stress, and are most vulnerable to even ‘small magnitude’ climate warming (Huttenlocker et al., 2005, 2008; DiMichele et al., 2006, 2009, 2014; Pardo et al., 2008; Tabor et al., 2008; Deutsch et al., 2008; Huey and Tewksbury, 2009; Sahney et al., 2010). Consequently, there is a need to understand how vertebrate diversity varies in space and time during such large-scale climatic shifts. Unfortunately, a fuller understanding of C-P vertebrate diversity is hamstrung by uneven sampling across North America, with many of the best-known sites occurring in the Permian redbeds of north Texas and Oklahoma. Given its excellent fossil preservation and extensive exposures of marine and continental rocks spanning the C-P transition, the Canyon Country of southeastern Utah in the vicinity of Valley of the Gods is the best location to study these trending research questions. Of equal importance, this study system also provides the BLM with a timely opportunity to re-identify and inventory its exceptional Paleozoic vertebrate fossil sites in a way that can inform future management decisions and education programs.

The record of terrestrial vertebrates in the Cutler Group of Utah is key to understanding C-P regional faunal turnover and provincialism because of (1) its unique physiography buffered by the Ancestral Rocky Mountains and Uncompahgre highlands and (2) its partial marine influence that allows the tetrapod assemblages to be tied to a well-constrained biostratigraphic framework based on marine index fossils (Fig. 1). Previous collecting low in the C-P Halgaito Formation (Cutler Group) in Valley of the Gods (VOG) revealed an assemblage of aquatic fishes, temnospondyl amphibians, and terrestrial reptiles and synapsids (early relatives of mammals), and included some species that are distinctly different from those found in the geologically younger Organ Rock Formation and undifferentiated Cutler farther to the north (Vaughn, 1962, 1964, 1966a,b), suggesting these different



**Figure 1.** Transitional beds of the Carboniferous Rico Formation (*left*) give way to the continental rocks of the C P Halgaito Formation in Valley of the Gods, which preserves a diverse tetrapod fossil assemblage. Only the upper portion of the Halgaito Formation is exposed in John's Canyon (*right*), a site that has also produced some tetrapod localities. These formations are protected by tall mesas capped by the Permian Cedar Mesa Sandstone.

lithologic units contain their own unique tetrapod assemblages (Sumida et al., 1999b,c). These areas have also produced a variety of plants that indicate a monsoonal climate with occasional wetlands and streams sourced by the Uncompahgre highlands (DiMichele et al., 2014). Unfortunately, many of the fossils have not been placed within a proper stratigraphic context, limiting interpretation of their precise temporal succession, and unambiguous C-P index taxa have yet to be identified (e.g., see Scott, 2013). Vertebrate localities occur throughout the vertical succession of the lower Cutler beds in VOG and at least up to 75 meters above its base in nearby John's Canyon, an area that is higher in sequence and vastly underexplored. Preliminary biostratigraphy conducted by us in 2016 also produced the first marine 'conodonts' (microfossils used to determine ages of Paleozoic marine rock formations) from the lower Cutler beds, in addition to several new vertebrate localities that include small amphibian and synapsid bones. However, this work has only covered a small portion of outcrops between VOG and John's Canyon, and requires a review of problematic records of taxa previously regarded as strictly Permian elsewhere (e.g., *Seymouria*; Vaughn, 1966b; Sumida et al., 1999b). Because early workers did not record detailed stratigraphic data, renewed fieldwork in VOG and, especially, John's Canyon will place better confidence in these occurrences, facilitate new prospecting, collecting, and will fit this unique system into a broader continental framework.

In addition to using the study area to test hypotheses of faunal turnover and provincialism during the C-P transition, our surveys of the areas between VOG and John's Canyon would have important conservation impacts. The backcountry of VOG is a BLM managed area that has recently been designated part of the new Bears Ears National Monument. Sensitivity in the nearby Comb Ridge area has facilitated collaborations between the BLM and paleontologists to locate and document paleontologically significant sites. Moreover, given our team's long history of collecting Paleozoic vertebrates in Utah (1960s to present) and the PI's association with the Carnegie Museum of Natural History which houses the world's largest collection of Paleozoic vertebrates from Utah, our research group is solely positioned to provide the BLM with a comprehensive and systematic review of these precious sites.

## RESEARCH OBJECTIVES

During summer of 2017, our team proposes to conduct a multidisciplinary paleontological study of the lower Cutler beds with emphasis on the vertebrates of the upper Halgaito Formation of the John's Canyon area. This work includes surveying outcrops from VOG to John's Canyon for vertebrate

fossils, recording detailed stratigraphic logs, and collecting marine carbonate samples to find conodont index taxa important for biostratigraphy. Our specific objectives are as follows:

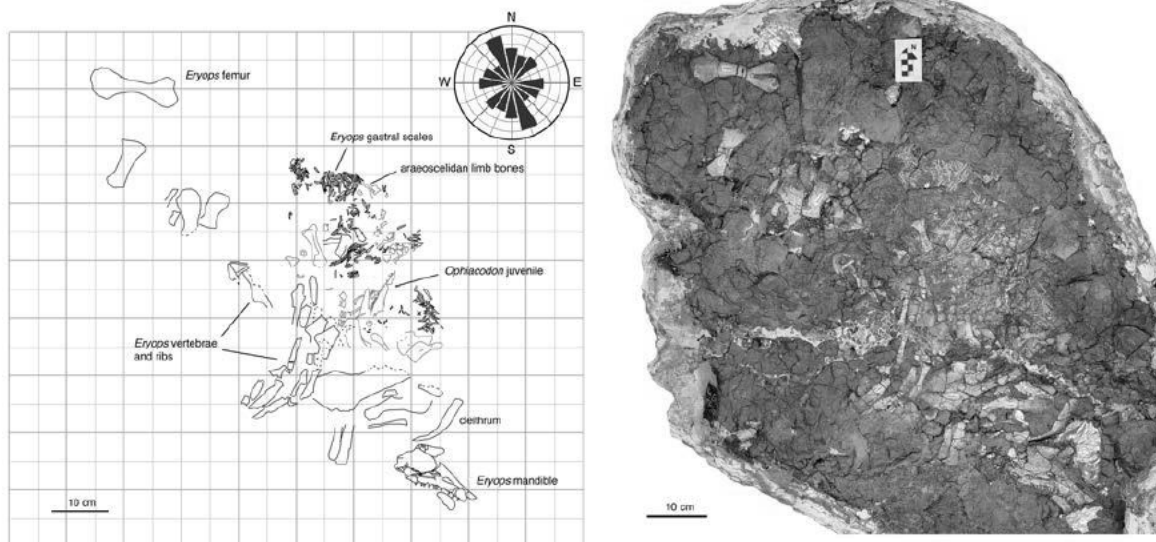
- *Objective 1: Survey, excavate, and describe significant vertebrate-bearing sites*
- *Objective 2: Measure sections at fossil-bearing sites between VOG and John's Canyon*
- *Objective 3: Improve marine conodont biostratigraphy by sampling marine marker beds*

## RESEARCH METHODS

### *Objective 1: Survey, excavate, and describe significant vertebrate localities.*

Vertebrate fossils in VOG occur in isolated localities throughout the vertical succession of the lower Cutler beds, often associated with sandstone bodies, but sometimes occurring as bone beds. Earlier work in the vicinity of Mexican Hat produced: xenacanth sharks; palaeonisciforms; crossopterygians; the temnospondyl amphibians *Eryops*, *Platyhystrix*, and an unidentified dissorophoid; a neotridian; the anamniotes *Diadectes* and a limnoscelid; and the synapsids *Ophiacodon* and *Sphenacodon* (Vaughn, 1962). Additional records by our team have increased the abundances of some of these taxa (Sumida et al., 1999a,b,c, 2005; Scott, 2013) and produced new records such as the westernmost occurrence of the lungfish *Sagenodus* and a multispecies bone bed, the 'Birthday Bone Bed' (Fig. 2) which includes several articulated skeletons along with the synapsid *Edaphosaurus* and a new araeoscelidan reptile. Less emphasis has been placed on John's Canyon, which is higher in section and includes notable records such as the xenacanth *Orthacanthus texensis*, the crossopterygian fish *Lohsania*, and a possible record of the Permian anamniote *Seymouria*.

Collectively, this material was discovered in multiple horizons of the Halgaito Formation from Mexican Hat to VOG, and in John's Canyon, but substantial outcrops exposed along the southwestern cliffs of Cedar Mesa between these localities has great potential to produce more records that could be integrated and correlated between both collecting areas. Moreover, the



**Figure 2.** Mixed assemblage of vertebrate fossils from the 'Birthday Bone Bed,' C-P Halgaito Formation, lower Cutler Group. Quarry map (left); photograph of field jacket containing scattered skeletons (right).

similarities of some taxa to those of the younger Organ Rock Formation (which overlies the Cedar Mesa Sandstone) suggests that the first occurrences of some classic Permian taxa such as *Seymouria* may be found within the upper Halgaito. Support from the BLM to collect in these areas is vital to growing a fossil dataset with a large enough sample size to make comparisons to other younger Permian formations in Utah and to understand how faunal turnover compared to other regions (e.g., Texas-Oklahoma). This inventory will be databased electronically and made available to the BLM with detailed maps and KMZ files locating each site.

***Objective 2: Measure sections at fossil-bearing sites between VOG and John's Canyon***

Early collections made by Peter Vaughn in the 1960s firmly established the significance of fossil resources in the Halgaito Formation of southern Utah, but precious stratigraphic data were not recorded for these fossils. We are working to place these fossils in their proper stratigraphic context in order to understand more precisely the succession of key fossil taxa (e.g., *Orthacanthus*, *Seymouria*). In addition to surveying the outcrops between VOG and John's Canyon for new fossil vertebrate localities, we plan to measure a series of stratigraphic sections along an east-west transect through the southern margin of Cedar Mesa, and correlate the lithostratigraphy of each collecting area. This will provide a lithostratigraphic context against which we will map each individual vertebrate record in its precise vertical position. This will be the first such study of vertebrate biostratigraphy in the C-P rocks of southern Utah, and will set a standard for future fossil collections in Cutler Group rocks. Ultimately, it will be possible to subdivide the fossil vertebrate assemblages in the lower and upper portions of the Cutler Group in Utah and the broader Four Corners region.

***Objective 3: Improve marine conodont biostratigraphy by sampling marine marker beds***

Controversy over the position of the C-P boundary in VOG has created confusion over the precise age of its fauna and flora. For example, the vertebrate assemblage of the Halgaito has variably been assigned to Permian (Vaughn, 1962), Carboniferous (Sumida, 1999a,b,c), or Carboniferous-Permian (Scott, 2013). Our preliminary work on the microfossils from the marine marker beds (in prep for publication) has now produced conodont fragments of the Carboniferous-through-Triassic *Hindeodus* sp. (9 jaw elements), as well as Carboniferous index taxa *Ellisonia conflexa* (12 elements) and *Adetognathus* sp. (four elements). The latter two species, found in two limestone marker beds above and below the Birthday Bone Bed at the base of the Halgaito Formation, are not younger than late Carboniferous, and the absence of the basal Permian conodont *Streptognathodus isolatus* is so far consistent with that age assignment. This strongly suggests that the Birthday Bone Bed assemblage at the base of the Halgaito Formation is late Carboniferous, but does not preclude the possibility that stratigraphically higher records (particularly those in John's Canyon) could be Permian. We plan to work with conodont expert Charles Henderson (University of Calgary) to identify conodonts and other significant microfossils from the marine marker beds, placing them in a global chronostratigraphic framework for the first time. Because marine conodonts are otherwise poorly known from the Cutler Group of Utah and elsewhere in the southwest, our work will be the first to tie the vertebrate assemblages to a well-constrained marine chronostratigraphic framework that has been established for the C-P transition of the US midcontinent (Kansas, Nebraska). This is significant because the C-P cyclothems of the midcontinent represent the primary North American datum for the C-P boundary, having been correlated to C-P global stratotype in Europe. The opportunity to tie the Cutler Group of Utah into a more global framework will strengthen the role Utah plays in understanding paleoecology and faunal turnover during this time.



## **BENEFITS**

Another goal of our work is to inform the public and other scientists that the understudied Paleozoic icehouse presents an unparalleled opportunity to understand the impacts of Quaternary climate change on vertebrate ecology and physiology. Given its role as an analog to modern climate change, the charismatic nature of its pre-dinosaur fauna, and the stunning backdrop of southern Utah's vermillion canyons and mesas, we anticipate broad interest across the state, country, and even internationally, and hope to promote our work through a variety of public speaking opportunities. The co-investigator has a history of NSF Noyce Teacher Scholarship support for STEM education and California Department of Education grants for science and literacy, among others. We plan outreach in both Utah and California via engagement with the Utah Friends of Paleontology (UFOP) and classroom visitations at our local Bravo Medical Magnet High School in Los Angeles. The latter outreach in California high schools will feature this work as a means of encouraging high school students to get involved in lab activities within the PI's department (which has a growing 'paleosciences' program) and grow awareness of the fossil resources of the new Bears Ears National Monument beyond Utah. We also plan to present results of fieldwork at local professional and amateur societies, including UFOP and Southern California Paleontological Society meetings. Moreover, the Natural History Museum of Los Angeles County hosts several behind-the-scenes events, such as its annual 'Dino Fest,' providing the opportunity for the PI to interact directly with thousands of museum visitors in a two-day weekend event that occurs each year. The PI's affiliations with two museums, one on each coast, present opportunities for outreach across the United States.

## **DETAILED TIMELINE**

The project would start in summer of 2017 with arrival to previously identified fossil sites in the Halgaito Formation of VOG. This will begin near Castle Butte in VOG in early July 2017, representing the start of our east-west transect from the Rico-Halgaito transition through the upper Halgaito Formation. At each site, fossils identified will be collected and a stratigraphic log created to place the new and previous fossil collections into their proper stratigraphic context. While creating our measured sections, we will also sample prominent marine limestones and minor incursions that produce biostratigraphically informative microfossils. During this first week, we will continue our transect from Castle Butte to the Birthday Bone Bed, Cedar Point, and John's Canyon sites, recording fossil occurrences, collections, and stratigraphic logs to be correlated. Our crew will continue to prospect for new sites throughout the week. By week two, we will primarily be logging sections and prospecting for fossils in John's Canyon, an underexplored area where we plan to prospect for more records higher in section (upper Halgaito Formation). We therefore anticipate the duration of the fieldwork to be two weeks spanning early to mid-July 2017.

The collected material will be transported back to museum repositories for curation and preparation starting in late July/August 2017. This is also why vehicular travel is budgeted as a more cost effective means of transporting crew and field materials than air travel. Rock samples collected for microfossils will be shipped to C. Henderson for preparation and analysis as early as August 2017. Vertebrate fossils will be prepared at participating institutions (Natural History Museum of Los Angeles County and Carnegie Museum of Natural History) by student trainees and/or voluntary preparators over the course of the following months (Winter 2017 through Spring 2018). Some preparation may take place longer than the duration of the initial funding period. However, some materials can be prioritized for reporting purposes and we would keep the BLM and NLCS managers informed of progress leading up to the reporting period. The final report would be written within six months leading up to July 2018 (within a year of the field work's completion), and results will be used in any publications following the grant period. All grants and permits will be acknowledged in any of the resulting publications and public presentations.

**DELIVERABLES**

Peer-review of the final report may be arranged by solicitation to colleagues who specialize in Carboniferous and Permian vertebrate paleontology and in the sedimentology and stratigraphy of Utah's Cutler Group. Results of the reviewed report would be incorporated into publications that would be further reviewed. Likely venues for publication would include highly regarded paleontological journals including *Palaeo3*, *Journal of Paleontology*, and *Journal of Vertebrate Paleontology*, but also open access journals with wide readership such as *PLOS:One* and *PeerJ*. With these publications, results will be announced via press releases for local and national newspapers, magazines, and web media. Replicas of important or exceptionally-preserved fossils will be produced and disseminated to collaborating institutions, including collaborating museums, schools, and the BLM's field offices for interpretive uses. Results will also be shared through professional and amateur society meetings, school visitations, and museum outreach events. Collected specimens will be repositied at the Carnegie Museum of Natural History, which houses and maintains the largest collection of Paleozoic vertebrates from Utah (and neighboring states).

**BLM CONTACT PERSON**

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**PARTNER'S QUALIFICATIONS***Principal Investigator*

Adam Huttenlocker, University of Southern California, Los Angeles, CA USA

*Co-PI (Biographical Sketch provided below)*

Stuart Sumida, California State University, San Bernardino, CA USA

*Additional Research Team*

David Berman (researcher), Carnegie Museum of Natural History, Pittsburgh, PA USA  
Charles Henderson (researcher), University of Calgary, Calgary, Alberta, Canada  
Amy Henrici (researcher), Carnegie Museum of Natural History, Pittsburgh, PA USA  
Jason Jung (student), California State University, San Bernardino, CA USA

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**Biographical Sketch – Principal Investigator** – Adam K. Huttenlocker, PhD, Assistant Professor of Cell & Neurobiology, University of Southern California; Research Associate, Carnegie Museum of Natural History, Pittsburgh; Research Associate, Natural History Museum of Los Angeles County

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**Education**

<b>Ph. D. Biology</b>	2013	<b>University of Washington, Seattle</b>
<b>M.S. Biology</b>	2008	<b>California State University, San Bernardino</b>
<b>B.A. Biology w/ Geology minor</b>	2005	<b>University of Colorado, Boulder</b>

**Employment**

2016–present

**Assistant Professor of Cell & Neurobiology**, *Keck School of Medicine of the University of Southern California (USC), Los Angeles, CA*

2013–2016

**NSF Postdoctoral Research Fellow**, *University of Utah (U of U), Salt Lake City, UT*  
National Science Foundation Postdoctoral Fellowship in Biology (NSF-DBI-1309040)  
Sponsor: C. G. Farmer

2008–2013

**Graduate Research Associate**, *UW Burke Museum of Natural History & Culture (UWBM), Seattle, WA*  
Paleontological and geological reconnaissance of the Permo-Triassic Argana Basin, Morocco;  
Collaborative Research: New research on the Mesozoic vertebrate faunas of the Beardmore Glacier region, Antarctica (NSF-ANT-0838762); Collaborative Research: Testing climate-induced endemism in central Pangea (NSF-EAR-0617718)  
Supervisor/PI: Christian Sidor**Grants and Fellowships**

- National Science Foundation Postdoctoral Research Fellowship in Biology, 2013–2016, \$207,000
- National Science Foundation Doctoral Dissertation Improvement Grant, 2012–2013, \$14,365
- Evolving Earth Foundation Student Grant Program, 2011, \$3,000
- UW Department of Biology WRF-Hall Fellowship, 2010–2011, \$5,780
- Society of Vertebrate Paleontology Richard Estes Award, 2009, \$1,200
- University of California, Berkeley Doris and Samuel P. Welles Fund, 2009, \$600
- UW Department of Biology Snyder Award, 2009, \$1,250
- CSUSB Outstanding Graduate Thesis Award, 2008, \$500
- CSUSB Associated Students Incorporated Research & Travel Award, 2008, \$1,000
- CSUSB Sally Casanova Predoctoral Scholar, 2006–2007, \$3,000
- CSUSB Associated Students Incorporated Research & Travel Award, 2006, \$500

**Selected Published Articles and Abstracts (10 shown out of 61)**

- Codron, J., J. Botha-Brink, D. Codron, A. K. Huttenlocker, and K. D. Angielczyk. 2016. Predator-prey interactions among Permo-Triassic terrestrial vertebrates as a deterministic factor influencing faunal collapse and turnover. *Journal of Evolutionary Biology* (2016) 12983.
- Sidor, C., D. Vilhena, K. Angielczyk, A. Huttenlocker, S. Nesbitt, B. Peacock, S. Steyer, R. Smith, & L. Tsuji. 2013. Provincialization of terrestrial faunas following the end-Permian mass extinction. *Proceedings of the National Academy of Sciences of the United States of America* 110:8129–8133. [Covered by *NBC News & Science Magazine*.]
- Huttenlocker, A. K., J. D. Pardo, B. J. Small, and J. S. Anderson. 2013. Cranial morphology of recumbirostrans from the Permian of Kansas and Nebraska, and early morphological evolution inferred by micro-computed tomography. *Journal of Vertebrate Paleontology* 33:540–552.
- Huttenlocker, A. K., E. Rega, and S. Sumida. 2010. Comparative anatomy and osteohistology of hyperelongate neural spines in the sphenacodontids *Sphenacodon* and *Dimetrodon* (Amniota: Synapsida). *Journal of Morphology* 271:1407–1421.
- Huttenlocker, A. K., J. D. Pardo, B. J. Small, and A. Milner. 2009. Vertebrate responses to climate change across Central Pangea. *1<sup>st</sup> International Congress of North African Vertebrate Paleontology, Marrakech, Morocco*.

- Huttenlocker, A. K., J. D. Pardo, B. J. Small, and A. Milner. 2008. Biotic responses to climate change in the Permo-Carboniferous transition, Part 2: Beta diversity, regional responses, and Vaughn's faunal cline. *Society of Vertebrate Paleontology 68<sup>th</sup> Annual Meeting, Cleveland*.
- Pardo, J. D., A. K. Huttenlocker, B. J. Small, and A. Milner. 2008. Biotic responses to climate change in the Permo-Carboniferous transition, Part 1: Vertebrate faunal distributions and regional provincialism. *Society of Vertebrate Paleontology 68<sup>th</sup> Annual Meeting, Cleveland*.
- Huttenlocker, A. K., B. J. Small, and J. Pardo. 2007. *Plemmyradytes shintoni* gen. et sp. nov., an Early Permian amphibamid (Temnospondyli: Dissorophoidea) from the Eskridge Formation, Nebraska. *Journal of Vertebrate Paleontology* 27(2):316–328
- Small, B. J., J. D. Pardo, and A. K. Huttenlocker. 2006. Taxonomic diversity of estivating species in the lowest Permian of North America: onset of seasonality and comments on physiological plasticity. *Society of Vertebrate Paleontology 66<sup>th</sup> Annual Meeting, Ottawa*.
- Huttenlocker, A. K., J. D. Pardo, and B. J. Small. 2005. An earliest Permian nonmarine vertebrate assemblage from the Eskridge Formation, Nebraska. Pp. 133–143 in S. G. Lucas and K. E. Ziegler (eds.) *The Nonmarine Permian: Bulletin of the New Mexico Museum of Natural History and Science* 30.

#### **Professional Affiliations**

Society of Vertebrate Paleontology (SVP)  
 Society for Integrative and Comparative Biology (SICB)  
*Sigma Xi*, Associate Member  
 Palaeontological Society of Southern Africa (PSSA)  
 The Paleontological Society  
 Geological Society of America (GSA)  
 Utah Friends of Paleontology (UFOP)

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**Biographical Sketch – Co-PI** – Stuart Sumida, PhD, Professor of Biology, California State University, San Bernardino

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#### **Education**

<b>Ph. D. Biology</b>	<i>1987</i>	<b>University of California, Los Angeles</b>
<b>M.A. Biology</b>	<i>1983</i>	<b>University of California, Los Angeles</b>
<b>B.A. Biology</b>	<i>1981</i>	<b>University of California, Los Angeles</b>

#### **Employment**

1992 – present

**Professor of Biology**, *California State University San Bernardino, San Bernardino, CA*

2003–present

**Adjunct Professor of Kinesiology and Human Ecology**, *California State Polytechnic University, Pomona, CA*

2010–present

**Adjunct Professor of Anatomy**, *Department of Anatomy, College of Osteopathic Medicine of the Pacific, Western University of Health Sciences, Pomona, CA*

2013–present

**Professor and Master of Animation and Anatomy**, *DeTao Masters Academy, Shanghai, China*

#### **Grants and Fellowships**

- VolkswagenStiftung, 2011, € 288,000 (Volkswagen Foundation, Germany) “Early Amniote Locomotion” (with Drs. John Niyakatura, Thomas Martens, David Berman, John Hutchinson, and Martin Fischer)
- The Pittsburgh Foundation, 2010, \$6228 “Dinosaurs, Art and, Children” For symposium to be held at 2010 Annual Meeting of Society of Society of Vertebrate Paleontology Meetings, Pittsburgh, Pennsylvania.
- National Science Foundation, 2006-2008, \$463,198. “Noyce Math and Science Scholars for the Inland Empire” (with Drs. Davida D. Fischman, Charles Schindler, and Joseph Jesunathadas).
- California State University San Bernardino Minigrant, 2005-2006; \$4,115. “Developing a Digital Atlas of the Ceratopsian Hindlimb”
- National Geographic Society Grant, 2002-2003; \$25,116 “The Lower Permian Bromacker Locality of Germany and Interpretation of Late Palaeozoic Palaeoenvironments”.
- The Annenberg Foundation, 2000, \$15,000. “Science, Entertainment and Teaching: Bringing Cutting-edge Technology to the Scientific and Teaching Communities” (with Dr. Elizabeth Rega)
- California State University *T. rex* Initiative, 1999-2000; \$60,000. California State University System-wide Grant.
- California State University San Bernardino Minigrant, 1999-2000; \$3,430. “Ceratopsian dinosaurs from Dinosaur Provincial Park, Alberta, Canada.”
- National Geographic Society Grant, 1997-8; \$23,836. “New Information from Lower Permian Fossils from the Rotliegend of Central Germany” (with Drs. David Berman and Thomas Martens)
- California State University *T. rex* Initiative, 1998-9; \$80,000. California State University System-wide Grant.
- California State University *T. rex* Initiative, 1997-8; \$30,000 California State University System-wide Grant.
- NATO (North Atlantic Treaty Organization) Collaborative Research Grant, 1998; \$2,700. “Continued Study of Lower Permian Fossils from the Upper Rotliegend of Germany”
- National Geographic Society Grant, 1997-8; \$21,406. “Lower Permian Fossils from the Rotliegend of Central Germany” (with Drs. David Berman and Thomas Martens)
- NATO (North Atlantic Treaty Organization) Collaborative Research Grant, 1994-5; \$3,125. “Lower Permian Fossils from the Upper Rotliegend of Germany”
- National Geographic Society, 1994-5; \$13,500. “Lower Permian Vertebrates from a North American-like Assemblage of the Rotliegend of Germany”

#### **Selected Published Articles and Abstracts (4 shown)**

- Sumida, S. S., G. M. Albright, & E. Rega. 1999a. Late Paleozoic fishes of Utah. In *Vertebrate Paleontology in Utah: Geological Survey of Utah Miscellaneous Publication 99:13–20*.
- Sumida, S. S., J. B. Walliser, & R. E. Lombard. 1999b. Late Palaeozoic amphibian-grade tetrapods of Utah. In *Vertebrate Paleontology in Utah: Utah Geological Survey, Miscellaneous Publication 99:21–30*.

- Sumida, S. S., R. E. Lombard, D. S. Berman, & A. C. Henrici. 1999c. Late Paleozoic Amniotes and Their Near Relatives from Utah and Northeastern Arizona, With Comments on the Permian-Pennsylvanian Boundary in Utah and Northern Arizona in Gilete. In *Vertebrate Paleontology in Utah: Utah Geological Survey, Miscellaneous Publication*, 99:31–43.
- Sumida, S. S., Scott, K. M., & Wideman, N. 2005. New crossopterygian material from the Late Paleozoic of southeastern Utah. In *The Nonmarine Permian: Bulletin of the New Mexico Museum of Natural History & Science* 30:307.

**Professional Affiliations**

*ASIFA* – Association of Animation Professionals  
British Palaeontological Society  
Paleontological Society  
*Phi Beta Delta*, Society of International Scholars  
*Phi Kappa Phi* Academic Honor Society  
*Sigma Xi*, National Scientific Research Society  
Society of Integrative and Comparative Biology  
Society of Vertebrate Paleontology  
Southern California Academy of Sciences  
Western Association of Vertebrate Paleontologists

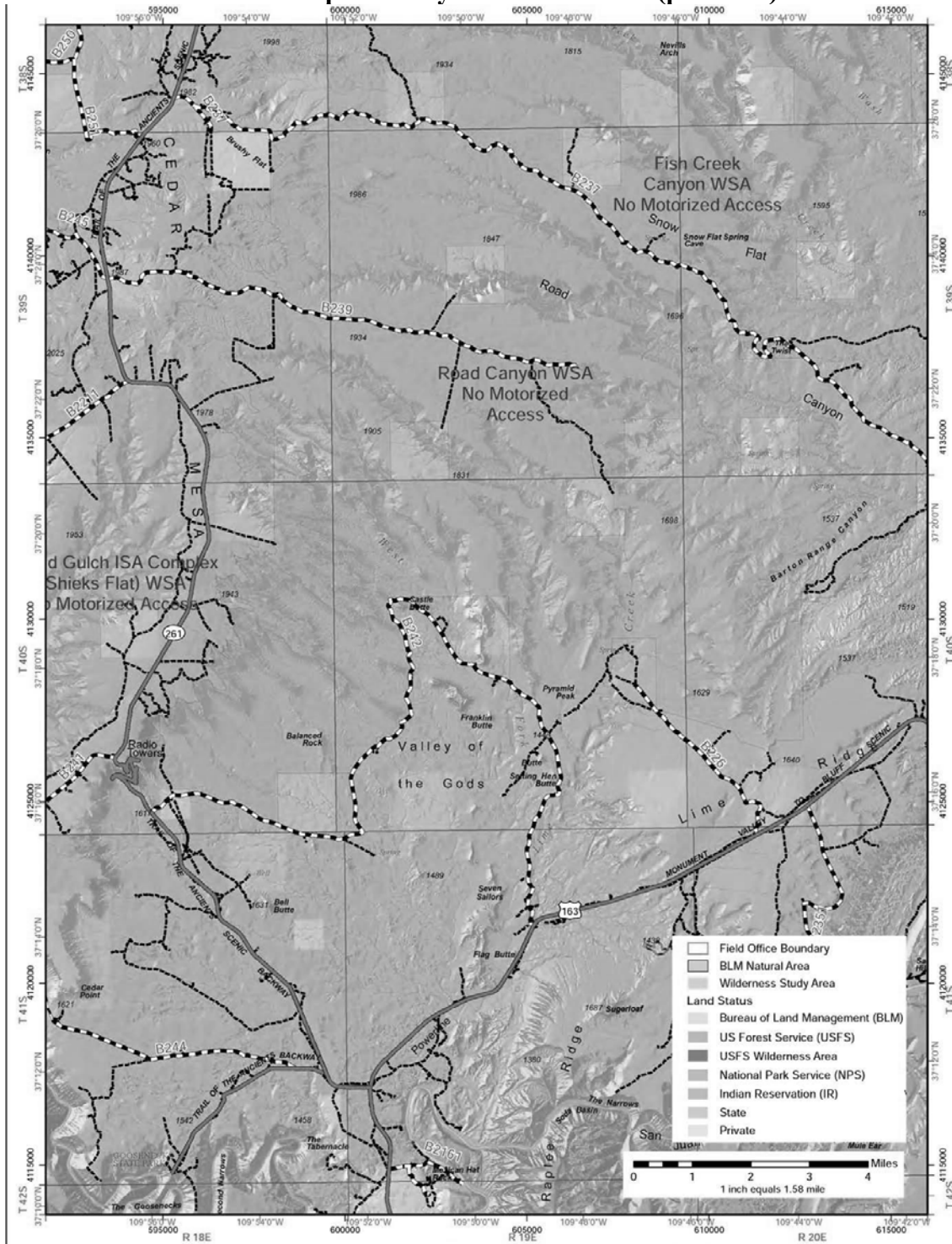
## References

- Deutsch, C. A., J. J. Tewksbury, R. B. Huey, K. S. Sheldon, C. K. Ghalambor, D. C. Haak, and P. R. Martin. 2008. Impacts of climate warming on terrestrial ectotherms across latitude. *PNAS* 105:6668–6672.
- DiMichele, W. A., N. J. Tabor, D. S. Chaney, and W. J. Nelson. 2006. From wetlands to wetspots: environmental tracking and the fate of Carboniferous elements in Early Permian tropical floras. In S. F. Greb and W. A. DiMichele (eds.), *Wetlands through time: Geological Society of America Special Paper* 399.
- DiMichele, W. A., I. P. Montañez, C. J. Poulsen, and N. J. Tabor. 2009. Climate and vegetational regime shifts in the late Paleozoic ice age earth. *Geobiology* 7:200–226.
- DiMichele, W. A., C. B. Cecil, D. S. Chaney, S. D. Elrick, & W. J. Nelson. 2014. Fossil floras from the Pennsylvanian-Permian Cutler Group of southeastern Utah. *Geology of Utah's Far South: Utah Geological Association Publication* 43:491–504.
- Huey, R. B., and J. J. Tewksbury. 2009. Can behavior douse the fire of climate warming? *Proceedings of the National Academy of Sciences* 106:3647–3648.
- Huttenlocker, A. K., J. D. Pardo, and B. J. Small. 2005. An earliest Permian nonmarine vertebrate assemblage from the Eskridge Formation, Nebraska. In S. G. Lucas and K. E. Ziegler (eds.) *The Nonmarine Permian: Bulletin of the New Mexico Museum of Natural History and Science* 30:133–143.
- Huttenlocker, A. K., J. D. Pardo, B. J. Small, and A. Milner. 2008. Biotic responses to climate change in the Permo-Carboniferous transition, Part 2: Beta diversity, regional responses, and Vaughn's faunal cline. *Society of Vertebrate Paleontology 68<sup>th</sup> Annual Meeting*, Cleveland.
- Montañez, I. P. 2016. A Late Paleozoic climate window of opportunity. *Proceedings of the National Academy of Sciences* 113:2334–2336.
- Montañez, I. P., N. J. Tabor, D. Niemeier, W. DiMichele, T. D. Frank, C. R. Fielding ... & M. C. Rygel. 2007. CO<sub>2</sub>-forced climate and vegetation instability during Late Paleozoic deglaciation. *Science* 315:87–91.
- Pardo, J. D., A. K. Huttenlocker, B. J. Small, and A. Milner. 2008. Biotic responses to climate change in the Permo-Carboniferous transition, Part 1: Vertebrate faunal distributions and regional provincialism. *Society of Vertebrate Paleontology 68<sup>th</sup> Annual Meeting*, Cleveland.
- Sahney, S., M. J. Benton & H. J. Falcon-Lang. 2010. Rainforest collapse triggered Carboniferous tetrapod diversification in Euramerica. *Geology* 38:1079–1082.
- Scott, K. 2013. Carboniferous-Permian boundary in the Halgaito Formation, Cutler Group, Valley of the Gods and surrounding area, southeastern Utah. In *The Carboniferous-Permian Transition: Bulletin of the New Mexico Museum of Natural History and Science* 60:398.
- Sumida, S. S., G. M. Albright, & E. Rega. 1999a. Late Paleozoic fishes of Utah. In *Vertebrate Paleontology in Utah: Geological Survey of Utah Miscellaneous Publication* 99:13–20.
- Sumida, S. S., J. B. Walliser, & R. E. Lombard. 1999b. Late Palaeozoic amphibian-grade tetrapods of Utah. In *Vertebrate Paleontology in Utah: Utah Geological Survey, Miscellaneous Publication* 99:21–30.
- Sumida, S. S., R. E. Lombard, D. S. Berman, & A. C. Henrici. 1999c. Late Paleozoic Amniotes and Their Near Relatives from Utah and Northeastern Arizona, With Comments on the Permian-Pennsylvanian Boundary in Utah and Northern Arizona in Gilette. In *Vertebrate Paleontology in Utah: Utah Geological Survey, Miscellaneous Publication*, 99:31–43.
- Sumida, S. S., Scott, K. M., & Wideman, N. 2005. New crossopterygian material from the Late Paleozoic of southeastern Utah. In *The Nonmarine Permian: Bulletin of the New Mexico Museum of Natural History & Science* 30:307.

- Vaughn, P. P. 1962. Vertebrates from the Halgaito Tongue of the Cutler Formation, Permian of San Juan County, Utah. *Journal of Paleontology* 36:529–539.
- Vaughn, P. P. 1964. Vertebrates from the Organ Rock Shale of the Cutler Group, Permian of Monument Valley and vicinity, Utah and Arizona. *Journal of Paleontology* 38:567–583.
- Vaughn, P. P. 1966a. Comparison of the Early Permian vertebrate faunas of the Four Corners region and North-Central Texas. *Los Angeles County Museum of Natural History Contributions in Science* 105:1–13.
- Vaughn, P. P. 1966b. *Seymouria* from the Lower Permian of southeastern Utah, and possible sexual dimorphism in that genus. *Journal of Paleontology*, 40(3), 603–612.
- Tabor, N. J., I. P. Montañez, C. R. Scotese, C. J. Poulsen, & G. H. Mack. 2008. Paleosol archives of environmental and climatic history in paleotropical western Pangea during the latest Pennsylvanian through Early Permian. *Geological Society of America Special Papers* 441:291–303.

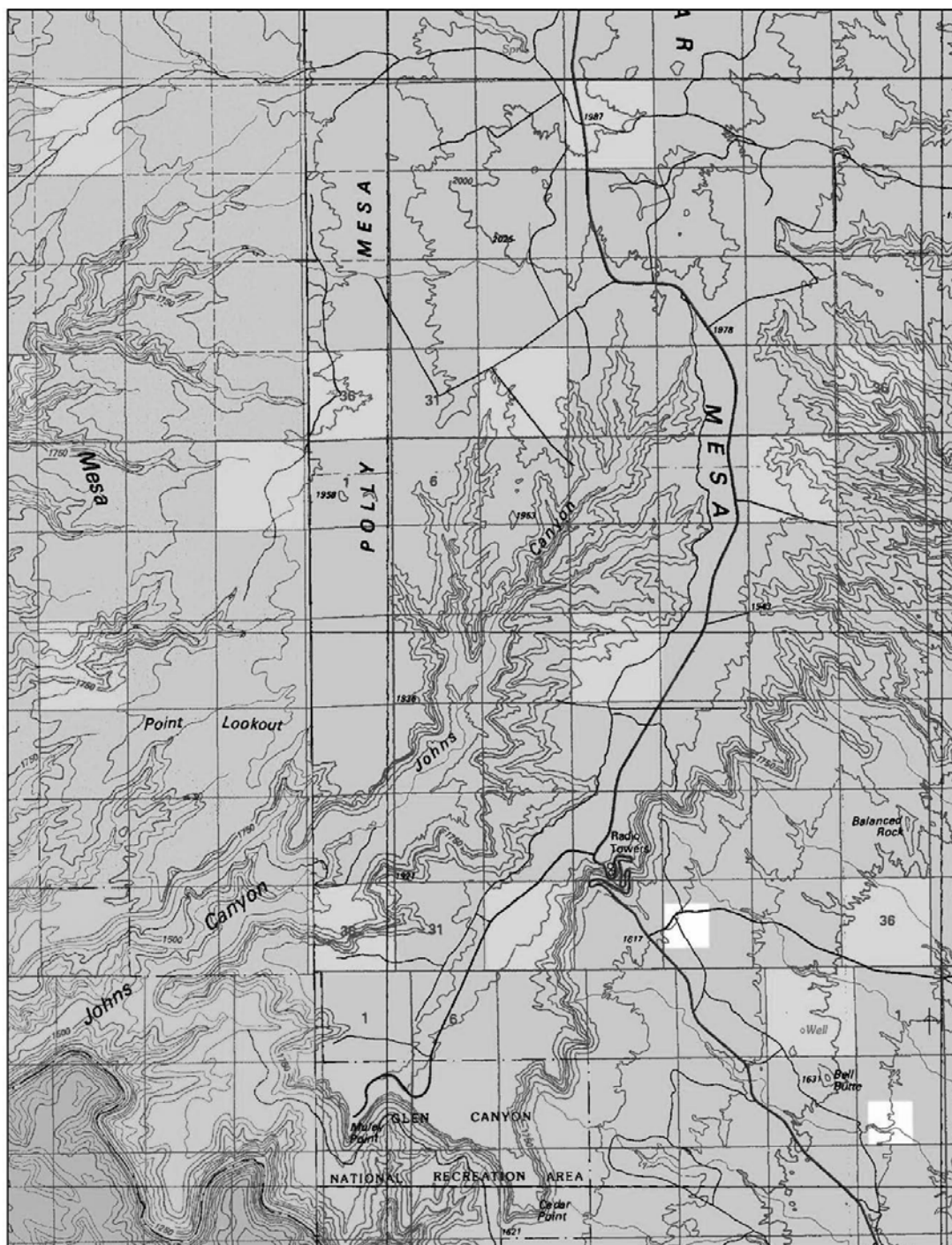


### General map of Valley of the Gods area (pre-2017)



BLM administered (light brown) and state lands (blue) now encompassed within the southern boundary of the new Bears Ears National Monument, marked by the San Juan River (bottom); former wilderness study areas (yellow)

### General map of John's Canyon area (pre-2017)



*BLM administered (yellow) and state lands (blue) now encompassed within the southern boundary of the new Bears Ears National Monument*

## BUDGET JUSTIFICATION

Funds from a NLCS grant will provide field support where none is available, ameliorating challenges to the duration of the fieldwork, constraints on crew size, and ensuring that collected material can be properly prepared and curated by the repository. Our total annual budget for this project is \$23,501; the amount requested is \$21,470. Because museum curation and subsequent laboratory work are partially facilitated by existing laboratory consumables, and student and volunteer labor, a portion of field and lab expenses are offered 'in-kind.' We have separated the field budget into itemized sections, including (1) vehicular transport of crew, fossils, and supplies (to/from the field), and accommodation in Bluff, Utah, (2) field supplies and other direct costs, (3) student preparator salary for one year, and (4) indirect costs.

### (1) Travel/Transport

PI (USC), Fleet Vehicle Rental (vehicle type, SUV-Intermediate 4x4)

Vehicle rental fee (to be covered in-kind): 409.00 (long-term base fee) + 0.42 mileage * 1480 total estimated miles	<i>\$1031</i>
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Estimated fuel cost: 1380 miles round trip from Los Angeles to site (Bluff, Utah) + 100 miles on site (trips between outcrops to/from Bluff and resupply trips) * \$0.54/mi (2016 average gas mileage)	<i>\$800</i>
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Co-PI plus one graduate student (California State University), personal vehicular transport Estimated fuel cost: 1288 miles round trip from San Bernardino to site (Bluff, Utah) * \$0.54/mi	<i>\$696</i>
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Additional field crew, David Berman and Amy Henrici (Carnegie Museum), personal vehicular transport Estimated fuel cost: 3,600 miles round trip from Pittsburgh to site (Bluff, Utah) * \$0.54/mi	<i>\$1944</i>
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Accommodation in Bluff, Utah (\$200/night for entire ~6 member crew * 14 nights)	<i>\$2800</i>
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Per Diem (\$25/day * crew of ~6 * 14 days)	<i>\$2100</i>
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<b><i>Total Travel:</i></b>	<b><i>\$9371</i></b>
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### (2) Supplies and Other Direct Costs

Plaster (2 bags * \$15.00)	<i>\$30</i>
Burlap (1 large roll)	<i>\$90</i>
Toilet paper (1 large pack)	<i>\$20</i>
Paper towels (1 pack of 8)	<i>\$12</i>
Gallon-sized ziplock baggies (2 boxes * \$4.00)	<i>\$8</i>
Cyanoacrylate glue (6 bottles * \$10.00)	<i>\$60</i>
Acryloid/paraloid beads	<i>\$150</i>
Duct tape (6 rolls * \$10.00)	<i>\$60</i>
Collecting bags (sold in quantity of 100)	<i>\$100</i>
Est. in-kind supplies from USC and Museum (e.g., preparation consumables)	<i>\$1000</i>
Mailing of rock/carbonate samples (conodont microfossils)	<i>\$250</i>
Publication fees	<i>\$3000</i>

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<b><i>Total Supplies:</i></b>	<b><i>\$4780</i></b>
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### (3) Salaries

In addition to travel and field data collection conducted by the PI, Co-PI, and participating field crew, financial support is requested in the form of salary for curation of collected materials, including fossil preparation by a student trainee. The PI's salary will be paid through his percent effort (4%) in-kind matching. Given students' needs for consistent employment following a regular weekly schedule, we propose to hire and train a part-time undergraduate assistant over two academic semesters who will assist in fossil preparation. Per University of Southern California's policies, fringe benefits do not apply to part-time student employees.

#### Salaries

Principal Investigator 4% effort in-kind matching	\$5500
Undergraduate (two 15-wk semesters) 10 hrs/wk * 30 wks * \$15/hr	\$4500

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<b>Total Salary:</b>	<b>\$10,000</b>
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<b>+ Indirect Costs:</b>	<b>\$4321</b>
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<b>Total Budget (including Indirect Costs):</b>	<b>\$28472</b>
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<b>Total Requested:</b>	<b>\$20941</b>
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Budget Category	NLCS Requested	USC In-Kind	Museum In-Kind
Travel	\$8340	\$1031	
Supplies	\$3780	~\$500.00	~\$500.00
PI Salary		\$5500	
Student salary	\$4500		
Indirect costs	\$4321		
<b>Totals</b>	<b>\$20941</b>	<b>\$7031</b>	<b>\$500.00</b>

### Indirect Costs

The off-campus rate at University of Southern California is 26% of MTDC, as determined by the University of Southern California's most recent indirect cost negotiation agreement. The off-campus MTDC base excludes facilities rental costs and operations and maintenance expenses from the direct cost items of materials, supplies, and services.

## COLLEGES AND UNIVERSITIES RATE AGREEMENT

EIN:  
 ORGANIZATION:  
 University of Southern California  
 University Park  
 Los Angeles, CA 90089-0011

DATE:07/21/2016  
 FILING REF.: The preceding  
 agreement was dated  
 07/08/2015

The rates approved in this agreement are for use on grants, contracts and other agreements with the Federal Government, subject to the conditions in Section III.

**SECTION I: INDIRECT COST RATES**

RATE TYPES:      FIXED              FINAL              PROV. (PROVISIONAL)      PRED. (PREDETERMINED)

EFFECTIVE PERIOD

<u>TYPE</u>	<u>FROM</u>	<u>TO</u>	<u>RATE (%)</u>	<u>LOCATION</u>	<u>APPLICABLE TO</u>
PRED.	07/01/2016	06/30/2020	65.00	On-Campus	Organized Res.
PRED.	07/01/2016	06/30/2020	26.00	Off-Campus	Organized Res.
PRED.	07/01/2016	06/30/2020	45.00	On-Campus	Instruction
PRED.	07/01/2016	06/30/2020	26.00	Off-Campus	Instruction
PRED.	07/01/2016	06/30/2020	30.50	On-Campus	Other Spon Act
PRED.	07/01/2016	06/30/2020	26.00	Off-Campus	Other Spon Act
PRED.	07/01/2016	06/30/2020	26.00	Off-Campus	Info Sci Inst
PRED.	07/01/2016	06/30/2020	26.00	Off-Campus	Ctr Creative Tech
PROV.	07/01/2020	Until Amended		(1)	

\*BASE



ORGANIZATION: University of Southern California

AGREEMENT DATE: 7/21/2016

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(1) Use the same rates and conditions as those cited for fiscal year ending June 30, 2020.

\*BASE: Modified total direct costs, consisting of all direct salaries and wages, fringe benefits, materials, supplies, services, travel and up to the first \$25,000 of each subaward (regardless of the period of performance of the subawards under the award). Modified total direct costs shall exclude equipment, capital expenditures, charges for patient care, tuition remission, rental costs of off-site facilities, scholarships, and fellowships as well as the portion of each subaward in excess of \$25,000.

The off-campus base shall exclude facilities rental costs and operations and maintenance expenses from the direct cost items of materials and supplies and services.

ORGANIZATION: University of Southern California

AGREEMENT DATE: 7/21/2016

**SECTION I: FRINGE BENEFIT RATES\*\***

<u>TYPE</u>	<u>FROM</u>	<u>TO</u>	<u>RATE(%)</u>	<u>LOCATION</u>	<u>APPLICABLE TO</u>
PRED.	7/1/2016	6/30/2018	33.20 (1)	All	All Employees
FIXED	7/1/2016	6/30/2017	9.00 (2)	All	Info Sci. Inst.
FIXED	7/1/2016	6/30/2017	8.80 (2)	All	Ctr. Creative Tech.
FIXED	7/1/2016	6/30/2017	22.50 (3)	All	Post Docs

**\*\* DESCRIPTION OF FRINGE BENEFITS RATE BASE:**

(1) Direct salaries and wages including vacation, holiday, and sick pay of faculty and staff personnel only. Rate does not apply to student employees, Research Assistants or Teaching Assistants.

(2) Direct salaries and wages excluding all fringe benefits.

(3) Direct salaries and wages including vacation, holiday and sick pay. This rate is applicable for post docs who received their hire notification after 7/1/12.

ORGANIZATION: University of Southern California

AGREEMENT DATE: 7/21/2016

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**SECTION II: SPECIAL REMARKS**

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TREATMENT OF FRINGE BENEFITS:

This organization uses a fringe benefit rate which is applied to salaries and wages for both budgeting and charging purposes for Federal projects. The following fringe benefits are included in the fringe benefit rate: SOCIAL SECURITY, RETIREMENT PLANS, HEALTH AND DENTAL, UNEMPLOYMENT, WORKERS COMPENSATION, SABBATICAL LEAVE, EMPLOYEE TUITION REMISSION, LIFE INSURANCE, AND MISCELLANEOUS EMPLOYEES SERVICES. A separate rate is also applied for the Information sciences Institute and the Centers for Creative Technologies for vacation and personal days off.

TREATMENT OF PAID ABSENCES

Vacation, holiday, sick leave pay and other paid absences are included in salaries and wages and are claimed on grants, contracts and other agreements as part of the normal cost for salaries and wages. Separate claims for the costs of these paid absences are not made except for paid absences that have been earned but not taken when an individual separates from the university prior to the completion of the grant, contract or other agreement.

The cost of vacation and personal days off are included in the Information Sciences Institute and the Centers for Creative Technologies fringe benefit rates. Federal projects must be credited for salaries and wages for periods when employees are on vacation or personal days off. Holiday, sick leave pay, and other paid absences are included in salaries and wages and are charged to Federal projects as part of the normal charge for salaries and wages.



ORGANIZATION: University of Southern California

AGREEMENT DATE: 7/21/2016

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DEFINITION OF OFF-CAMPUS: A project is considered off-campus if the activity is conducted at locations other than in University owned or operated facilities and indirect costs associated with physical plant and library are not considered applicable to the project.

Projects conducted partially on-campus and partially off-campus: Actual costs will be apportioned between on-campus and off-campus sites consistent with where the work is performed and each portion will bear the appropriate on-campus or off-campus rate.

DEFINITION OF EQUIPMENT

Equipment is defined as tangible nonexpendable personal property having a useful life of more than one year and an acquisition cost of \$5,000 or more per unit.

The rates relating to the Information Sciences Institute (ISI) and Centers for Creative Technologies (CCT) are effective for the periods identified in the negotiation agreement provided that the ISI and CCT funding or costing mechanisms now in place remain unchanged.

The four year extension of the F&A rates was granted in accordance with 2 CFR 200.414(g).

NEXT PROPOSAL DUE DATE

A F&A proposal based on actual costs for fiscal year ending 06/30/19, will be due no later than 12/31/19.

The next fringe rate proposal based on actual costs for the fiscal year ending 6/30/16, will be due no later than 12/31/16.

ORGANIZATION: University of Southern California

AGREEMENT DATE: 7/21/2016

**SECTION III: GENERAL****A. LIMITATIONS:**

The rates in this Agreement are subject to any statutory or administrative limitations and apply to a given grant, contract or other agreement only to the extent that funds are available. Acceptance of the rates is subject to the following conditions: (1) Only costs incurred by the organization were included in its facilities and administrative cost pools as finally accepted; such costs are legal obligations of the organization and are allowable under the governing cost principles; (2) The same costs that have been treated as facilities and administrative costs are not claimed as direct costs; (3) Similar types of costs have been accorded consistent accounting treatment; and (4) The information provided by the organization which was used to establish the rates is not later found to be materially incomplete or inaccurate by the Federal Government. In such situations the rate(s) would be subject to renegotiation at the discretion of the Federal Government.

**B. ACCOUNTING CHANGES:**

This Agreement is based on the accounting system purported by the organization to be in effect during the Agreement period. Changes to the method of accounting for costs which affect the amount of reimbursement resulting from the use of this Agreement require prior approval of the authorized representative of the cognizant agency. Such changes include, but are not limited to, changes in the charging of a particular type of cost from facilities and administrative to direct. Failure to obtain approval may result in cost disallowances.

**C. FIXED RATES:**

If a fixed rate is in this Agreement, it is based on an estimate of the costs for the period covered by the rate. When the actual costs for this period are determined, an adjustment will be made to a rate of a future year(s) to compensate for the difference between the costs used to establish the fixed rate and actual costs.

**D. USE BY OTHER FEDERAL AGENCIES:**

The rates in this Agreement were approved in accordance with the authority in Title 2 of the Code of Federal Regulations, Part 200 (2 CFR 200), and should be applied to grants, contracts and other agreements covered by 2 CFR 200, subject to any limitations in A above. The organization may provide copies of the Agreement to other Federal Agencies to give them early notification of the Agreement.

**E. OTHER:**

If any Federal contract, grant or other agreement is reimbursing facilities and administrative costs by a means other than the approved rate(s) in this Agreement, the organization should (1) credit such costs to the affected programs, and (2) apply the approved rate(s) to the appropriate base to identify the proper amount of facilities and administrative costs allocable to these programs.

BY THE INSTITUTION:

University of Southern California

(INSTITUTION)

(SIGNATURE)

James Staten

(NAME)

Sr. Vice President,  
Finance and Chief Financial Officer

(TITLE)

7/25/16

(DATE)

ON BEHALF OF THE FEDERAL GOVERNMENT:

DEPARTMENT OF HEALTH AND HUMAN SERVICES

(AGENCY)

Arif M. Karim -A

Digitally signed by Arif M. Karim -A  
DN: cn=US, o=U.S. Government, ou=HHS, ou=PSC,  
ou=People, c=us, email=Arif.M.Karim-A,  
0.9.2342.19200300.100.1.1=2000212895  
Date: 2016.07.24 07:50:37 -0500

(SIGNATURE)

Arif Karim

(NAME)

Director, Cost Allocation Services

(TITLE)

7/21/2016

(DATE) 0239

HHS REPRESENTATIVE:

Patrick Smith

Telephone:

(415) 437-7820

**ASSURANCES - NON-CONSTRUCTION PROGRAMS**

Public reporting burden for this collection of information is estimated to average 15 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Office of Management and Budget, Paperwork Reduction Project (0348-0040), Washington, DC 20503.

**PLEASE DO NOT RETURN YOUR COMPLETED FORM TO THE OFFICE OF MANAGEMENT AND BUDGET. SEND IT TO THE ADDRESS PROVIDED BY THE SPONSORING AGENCY.**

**NOTE:** Certain of these assurances may not be applicable to your project or program. If you have questions, please contact the awarding agency. Further, certain Federal awarding agencies may require applicants to certify to additional assurances. If such is the case, you will be notified.

As the duly authorized representative of the applicant, I certify that the applicant:

1. Has the legal authority to apply for Federal assistance and the institutional, managerial and financial capability (including funds sufficient to pay the non-Federal share of project cost) to ensure proper planning, management and completion of the project described in this application.
2. Will give the awarding agency, the Comptroller General of the United States and, if appropriate, the State, through any authorized representative, access to and the right to examine all records, books, papers, or documents related to the award; and will establish a proper accounting system in accordance with generally accepted accounting standards or agency directives.
3. Will establish safeguards to prohibit employees from using their positions for a purpose that constitutes or presents the appearance of personal or organizational conflict of interest, or personal gain.
4. Will initiate and complete the work within the applicable time frame after receipt of approval of the awarding agency.
5. Will comply with the Intergovernmental Personnel Act of 1970 (42 U.S.C. §§4728-4763) relating to prescribed standards for merit systems for programs funded under one of the 19 statutes or regulations specified in Appendix A of OPM's Standards for a Merit System of Personnel Administration (5 C.F.R. 900, Subpart F).
6. Will comply with all Federal statutes relating to nondiscrimination. These include but are not limited to: (a) Title VI of the Civil Rights Act of 1964 (P.L. 88-352) which prohibits discrimination on the basis of race, color or national origin; (b) Title IX of the Education Amendments of 1972, as amended (20 U.S.C. §§1681-1683, and 1685-1686), which prohibits discrimination on the basis of sex; (c) Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. §794), which prohibits discrimination on the basis of handicaps; (d) the Age Discrimination Act of 1975, as amended (42 U.S.C. §§6101-6107), which prohibits discrimination on the basis of age; (e) the Drug Abuse Office and Treatment Act of 1972 (P.L. 92-255), as amended, relating to nondiscrimination on the basis of drug abuse; (f) the Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment and Rehabilitation Act of 1970 (P.L. 91-616), as amended, relating to nondiscrimination on the basis of alcohol abuse or alcoholism; (g) §§523 and 527 of the Public Health Service Act of 1912 (42 U.S.C. §§290 dd-3 and 290 ee-3), as amended, relating to confidentiality of alcohol and drug abuse patient records; (h) Title VIII of the Civil Rights Act of 1968 (42 U.S.C. §§3601 et seq.), as amended, relating to nondiscrimination in the sale, rental or financing of housing; (i) any other nondiscrimination provisions in the specific statute(s) under which application for Federal assistance is being made; and, (j) the requirements of any other nondiscrimination statute(s) which may apply to the application.
7. Will comply, or has already complied, with the requirements of Titles II and III of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (P.L. 91-646) which provide for fair and equitable treatment of persons displaced or whose property is acquired as a result of Federal or federally-assisted programs. These requirements apply to all interests in real property acquired for project purposes regardless of Federal participation in purchases.
8. Will comply, as applicable, with provisions of the Hatch Act (5 U.S.C. §§1501-1508 and 7324-7328) which limit the political activities of employees whose principal employment activities are funded in whole or in part with Federal funds.

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DOI-2020-12 01537

9. Will comply, as applicable, with the provisions of the Davis-Bacon Act (40 U.S.C. §§276a to 276a-7), the Copeland Act (40 U.S.C. §276c and 18 U.S.C. §874), and the Contract Work Hours and Safety Standards Act (40 U.S.C. §§327-333), regarding labor standards for federally-assisted construction subagreements.
10. Will comply, if applicable, with flood insurance purchase requirements of Section 102(a) of the Flood Disaster Protection Act of 1973 (P.L. 93-234) which requires recipients in a special flood hazard area to participate in the program and to purchase flood insurance if the total cost of insurable construction and acquisition is \$10,000 or more.
11. Will comply with environmental standards which may be prescribed pursuant to the following: (a) institution of environmental quality control measures under the National Environmental Policy Act of 1969 (P.L. 91-190) and Executive Order (EO) 11514; (b) notification of violating facilities pursuant to EO 11738; (c) protection of wetlands pursuant to EO 11990; (d) evaluation of flood hazards in floodplains in accordance with EO 11988; (e) assurance of project consistency with the approved State management program developed under the Coastal Zone Management Act of 1972 (16 U.S.C. §§1451 et seq.); (f) conformity of Federal actions to State (Clean Air) Implementation Plans under Section 176(c) of the Clean Air Act of 1955, as amended (42 U.S.C. §7401 et seq.); (g) protection of underground sources of drinking water under the Safe Drinking Water Act of 1974, as amended (P.L. 93-523); and, (h) protection of endangered species under the Endangered Species Act of 1973, as amended (P.L. 93-205).
12. Will comply with the Wild and Scenic Rivers Act of 1968 (16 U.S.C. §§1271 et seq.) related to protecting components or potential components of the national wild and scenic rivers system.
13. Will assist the awarding agency in assuring compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. §470), EO 11593 (identification and protection of historic properties), and the Archaeological and Historic Preservation Act of 1974 (16 U.S.C. §§469a-1 et seq.).
14. Will comply with P.L. 93-348 regarding the protection of human subjects involved in research, development, and related activities supported by this award of assistance.
15. Will comply with the Laboratory Animal Welfare Act of 1966 (P.L. 89-544, as amended, 7 U.S.C. §§2131 et seq.) pertaining to the care, handling, and treatment of warm blooded animals held for research, teaching, or other activities supported by this award of assistance.
16. Will comply with the Lead-Based Paint Poisoning Prevention Act (42 U.S.C. §§4801 et seq.) which prohibits the use of lead-based paint in construction or rehabilitation of residence structures.
17. Will cause to be performed the required financial and compliance audits in accordance with the Single Audit Act Amendments of 1996 and OMB Circular No. A-133, "Audits of States, Local Governments, and Non-Profit Organizations."
18. Will comply with all applicable requirements of all other Federal laws, executive orders, regulations, and policies governing this program.
19. Will comply with the requirements of Section 106(g) of the Trafficking Victims Protection Act (TVPA) of 2000, as amended (22 U.S.C. 7104) which prohibits grant award recipients or a sub-recipient from (1) Engaging in severe forms of trafficking in persons during the period of time that the award is in effect (2) Procuring a commercial sex act during the period of time that the award is in effect or (3) Using forced labor in the performance of the award or subawards under the award.

<b>SIGNATURE OF AUTHORIZED CERTIFYING OFFICIAL</b>	<b>TITLE</b>
Hallie Lyons	Executive Director, Sponsored Programs
<b>APPLICANT ORGANIZATION</b>	<b>DATE SUBMITTED</b>
Board of Regents, NSHE, obo University of Nevada, Las Vegas	01/30/2017

Standard Form 424B (Rev. 7-97) Back

# INDIVIDUAL EVALUATION SCORING SHEET

Funding Opportunity Announcement No. L17AS00001

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

Grants.gov Project # and Applicant Legal Business Name: 12338846 Desert Research InstituteEvaluator: Scott Foss Title: Black Rock National Conservation Area Paleoclimate Research

Evaluation Factors	Ratings (see attached description or use your own method)
<b><u>State Ranking</u></b> <b>(b)(5) DPP</b>	
<b><u>Clear Objective</u></b> (Maximum score 15/100 Points) Notes:	
<b><u>Research Theme and Technical Approach</u></b> (Maximum score 25/100 Points) Notes:	
<b><u>Public Benefit</u></b> (Maximum score 20/100 Points) Notes:	
<b><u>Qualifications</u></b> (Maximum score 10/100 Points) Notes:	

Manifest for Grant Application # GRANT12328912

Grant Application XML file (total 1):

1. GrantApplication.xml. (size 20382 bytes)

Forms Included in Zip File(total 7):

1. Form GG\_LobbyingForm-V1.1.pdf (size 23292 bytes)
2. Form ProjectNarrativeAttachments\_1\_2-V1.2.pdf (size 21511 bytes)
3. Form SF424\_2\_1-V2.1.pdf (size 30355 bytes)
4. Form BudgetNarrativeAttachments\_1\_2-V1.2.pdf (size 22445 bytes)
5. Form SF424A-V1.0.pdf (size 29531 bytes)
6. Form Key\_Contacts-V1.0.pdf (size 22897 bytes)
7. Form SF424B-V1.1.pdf (size 28598 bytes)

Attachments Included in Zip File (total 3):

1. BudgetNarrativeAttachments\_1\_2  
BudgetNarrativeAttachments\_1\_2-Attachments-1235-Budget Narrative.pdf application/pdf  
(size 397633 bytes)
2. BudgetNarrativeAttachments\_1\_2 BudgetNarrativeAttachments\_1\_2-Attachments-1236-NSF  
Indirect Cost Rate Agreement 7.28.15.pdf application/pdf (size 37448 bytes)
3. ProjectNarrativeAttachments\_1\_2  
ProjectNarrativeAttachments\_1\_2-Attachments-1234-DBG NLCS Research and Science Proposal  
2017.01.31.pdf application/pdf (size 616029 bytes)

## Budget Narrative File(s)

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\* Mandatory Budget Narrative Filename:

Add Mandatory Budget Narrative

Delete Mandatory Budget Narrative

View Mandatory Budget Narrative

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To add more Budget Narrative attachments, please use the attachment buttons below.

Add Optional Budget Narrative

Delete Optional Budget Narrative

View Optional Budget Narrative



[Attachment A]

**BUREAU OF LAND MANAGEMENT**  
Financial Assistance (Cooperative Agreements)



## PROJECT PROPOSAL

(Suggested Format)

**Instructions:** A Project Proposal must be submitted with the Standard Form (SF) 424 Application for Federal Assistance for all BLM Assistance Agreements. Complete each section below. Use additional sheets as needed.  
\*\*If this is a continuation of existing BLM cooperative agreement identify the current BLM agreement number and project title below.

Person Submitting Proposal: Dr. Gregory P. Wilson Date: 1/25/17

Organization Name: University of Washington

\*\*Agreement or Announcement No.: Agreement No.: L16AC00402  
Announcement No.: L17AS00001

\*\* Agreement or Announcement Agreement Title: BLM-MT, Archaeological and Paleontological  
Studies and Curation Support

Title: Announcement Title: BLM FY2017 Bureau-wide National  
Conservation Lands Scientific Studies Support Program

Estimated Period of Performance: April 1, 2017 to March 31, 2022

BLM POC: Jordan, MT and surrounding areas; Seattle, WA  
Proposed Project Location: \_\_\_\_\_

This work will occur on: ☒ Public Lands ☐ Both Public & Private Lands

**YOUR MISSION:** (Describe your mission. Describe why this support is being requested.)

The management of paleontological resources is a major concern of both the BLM and the National Landscape Conservation System (NLCS). The Wilson Lab at the University of Washington has a longstanding relationship with the BLM, and was awarded funding through the NLCS Research Support Program in fiscal year 2016 to survey and inventory paleontological resources on selected Wilderness Study Areas (WSAs). Here, we request additional funds for a continuation and expansion of this current project. Specifically, we request funds to conduct a more thorough analysis of three WSAs on our previously funded project (Billy Creek, Terry Badlands, and Seven Blackfoot), survey and collect on two new WSAs (Musselshell Breaks and Bridge Coulee), and increase the involvement of our outreach and citizen science program the Discoveries in Geosciences (DIG) Field School.

To date, our project has shown that these WSAs contain or are likely to contain both vertebrate macro- and microfossils, as well as invertebrate and plant fossils. Clearly, these areas are critical resources to both the public and scientific communities, and protecting and maintaining them is paramount. To that end, we plan to continue to conduct large-scale and detailed surveys of these areas with targeted fieldwork, as well as increase the involvement of DIG Field School participants in both the fieldwork and curational aspects of the project. This study will provide the BLM with valuable paleontological information and improve their management of NLCS lands, as well as optimize the curation and public use of BLM specimens. Additionally, this project will continue to help establish unit science plans in the area, support research across a wide range of scientific investigations, and promote K–12 education and citizen science through the DIG Field School and other local public outreach efforts.



**OBJECTIVE:**

1. Describe your objectives and how the objectives support one or more research themes listed in Section 3 A. Program Performance Goals of this announcement and identify the National Conservation Lands involved.

**RESEARCH THEME AND TECHNICAL APPROACH:**

Please identify which themes apply to your projects (please check boxes that apply by placing cursor in front of the box and clicking twice):

- ☒ *Research Identified in Unit Science Plans (for National Monuments, National Conservation Areas, and Similar Designations)*
- ☐ *Effectiveness Research*
- ☒ *Standardized Inventory and Monitoring*
- ☒ *Research Syntheses*
- ☒ *Citizen Science*
- ☐ *Other Management-Driven Research*
- ☐ *All themes and goals apply*

**Introduction***Management question*

A major concern of both the BLM and the NLCS is the management of paleontological resources. These resources have significant scientific and educational value, and ensuring they are collected and curated carefully for the public trust is a crucial endeavor. Moreover, the presence of fossils is one of the characteristics used to designate certain National Conservation Lands. While some fossiliferous areas have been discovered on NLCS lands, these areas are often grossly understudied compared to other areas managed by the BLM. This brings to the forefront a pressing need to survey NLCS lands for paleontological resources that will otherwise erode and be lost from the public trust.

National Conservation Lands involved:

1. Billy Creek WSA: 3,450 acres
  2. Seven Blackfoot WSA: 20,250 acres
  3. Terry Badlands WSA: 44,910 acres
  4. Musselshell Breaks WSA: 8,650 acres
  5. Bridge Coulee WSA: 5,900 acres
- Total acreage for potential study: 83,160

*Connection to research themes*

The Wilson Lab and our collaborators focus our research on the Cretaceous–Paleogene (K–Pg) mass extinction event, which is famous for causing the extinction of all non-avian dinosaurs and giving rise to the evolutionary radiation of mammals. Northeastern Montana is well known for its preservation of fossils that span the time directly before, during, and after this critical event in Earth’s history. Accordingly, the fossils that come from these areas provide valuable insight into

the evolutionary and ecological changes that surround mass extinctions and their ensuing recoveries.

Our research project, referred to as the Hell Creek Project, is a multi-disciplinary endeavor that incorporates researchers from many institutions across the U.S and Canada. The aim is to determine the evolutionary and ecological patterns and processes of the K–Pg mass extinction event and subsequent recovery. Much of the paleontological and geological field work for the Hell Creek Project takes place in BLM, CMR, State, and private areas that closely surround or directly overlap with the National Landscape Conservation System. This presents us with an excellent, synergistic opportunity to combine our research goals with the land management goals of the BLM.

Section 6220 of the BLM Manual outlines the need to develop science plans for designated units of the NLCS lands. Currently, no such plan has been finalized for units in Montana. By extending the Hell Creek Project to include NLCS lands, we could effectively integrate an already well-established and high-impact research program directly into those units. Moreover, the fusion of the DIG Field School program's professionally designed and Next Generation Science Standards (NGSS)-aligned curriculum into this project would effectively further this endeavor (see "PUBLIC BENEFIT" section for more information on the DIG Field School).

As stated above, the Hell Creek Project incorporates a large number of researchers who study a wide range of fossil organisms. The NLCS lands that overlap with our research area are known to contain fossil sites, but have been historically underexplored. As a result, there is an opportunity to examine a relatively untapped reservoir of fossils. By uncovering these previously unknown fossils, we could potentially add valuable knowledge to our understanding of the changes in the local fauna and the evolutionary and ecological dynamics surrounding the K–Pg event. Furthermore, this would provide a detailed survey of the fossils in this area, helping the BLM to prioritize the management of certain areas.

In addition to a lack of exploration, no systematic method of monitoring for fossils on National Conservation Lands presently exists. Using these funds, we plan to address this need by developing a predictive mapping system of fossiliferous areas. The map would be a combination of geographic information system (GIS) data from known fossil localities, as well as geochronology, palynostratigraphy, lithology, and biostratigraphy data. This would allow us to understand the greater context of our fossil and geological data, predict areas where fossils might occur, and provide detailed, structured way for us and other researchers to track the study of NLCS lands. Researchers in other areas of Montana have developed similar mapping methods, and these exhibited a great deal of success (Oheim, 2007). Integrating this system would increase the efficiency of both the research and the management of these areas.

We also plan to incorporate the Discoveries in Geosciences (DIG) Field School (<http://digfieldschool.org/>), which is a unique, non-profit professional development and outreach program for K-12 teachers. Founded by myself and former graduate student Lauren DeBey in 2010, this program brings teachers into the field with our crew, where they are fully immersed in

the research and get to collect and prospect for fossils themselves. The teachers then bring what they learned about paleontology, biology, and geology back to their students, allowing for them to draw connections between the science they do in their classrooms with real, active research. We offer this program completely free of charge, and have served 110 teachers across the U.S. so far. In addition to cultivating our public outreach efforts, the DIG directly benefits our research by providing trained personnel to help investigate potential fossiliferous sites across a larger number of areas. Once trained workforce could be used now and into the future to help monitor National Conservation Lands while simultaneously executing an impactful citizen science endeavor.

### **Research questions/hypotheses**

The primary focus of our research is a high-resolution understanding of the patterns and processes of the K–Pg mass extinction and recovery. Most famously, this extinction marked the end of non-avian dinosaurs, but many other taxonomic groups were also critically affected by this event. By developing a precise understanding of the evolutionary and ecological changes that took place, we can infer broader patterns regarding the dynamics behind mass extinctions and biotic responses to ecological change. We ask research questions like why do certain groups go extinct while others survive? What were the ecomorphological adaptations of these taxonomic groups? How can we use morphology to infer information about the lifestyle of an organism, such as diet and locomotion? What were the phylogenetic relationships of the organisms in this area? And how might these findings relate to our modern biodiversity crisis?

### **Research methods**

Our primary method of collecting fossil data is through surface and in situ material collecting of micro- and macrovertebrates at localities in the Hell Creek and Tullock formations. Macrovertebrate specimens are carefully excavated with hand tools and power tools, encased in plaster jackets for protection, and then extracted from the ground. Our DIG participants receive training in this entire process; for example, last summer they helped excavate the hindquarters of a large hadrosaurid dinosaur. We also collect bulk sediment samples containing microvertebrates. The volume of these samples is reduced by underwater screenwashing in the field and back in the lab. Members of our lab then pick the fossils from this sediment under microscopes. Our DIG participants (K–12 teachers) also contribute by incorporating this process of fossil picking into lesson plans for their students through the school year. All of the fossils are prepared, identified, and curated through the Burke Museum. The Burke Museum houses a state of the art preparation facility with seven stations that allow many local volunteers to assist with the fossil preparation and be involved in the research. These fossils then become available for exhibit and for research by qualified researchers.

With our collaborators, we use these fossil data to address a wide range of research questions, using many different analytical methods. These include looking at temporal patterns in species richness, evenness, and relative abundance distributions in paleocommunities, using morphometrics and high-resolution CT scanners to analyze morphology in order to reconstruct

locomotion, diet, and evolutionary relationships. These studies are presented at professional meetings, public lectures, published in professional journals, and exhibited in public museums.

### **Results to date**

Members of the Wilson Lab and associated colleagues have and continue to publish this research in professional, peer-reviewed journals (e.g., Wilson 2005, 2013, 2014, 2015, 2016; Smith et al. 2016; DeMar 2013; DeBey & Wilson 2014; Sprain et al. 2014, 2015). Additional aspects were published in Geological Society of America Special Paper 503 “Through the End of the Cretaceous in the Type Locality of the Hell Creek Formation in Montana and Adjacent Areas” edited by me, William A. Clemens, John R. Horner, and Joseph H. Hartman. This volume was published in January of 2014. We also continue to present our research to public audiences (museums, libraries, schools) and at annual meetings of professional societies, such as the Society for Integrative and Comparative Biology (Smith and Aranoff 2016), the Society of Vertebrate Paleontology (Smith and Wilson 2016, 2015; Hovatter and Wilson 2016, 2015; Mercier et al. 2016, 2014; DeMar & Wilson 2013; Smith & Wilson 2013; Renne et al. 2013), the Geological Society of America (DeBey 2012), and the North American Paleontological Convention (DeBey & Wilson 2014; Wilson 2014). Additional information regarding our research is available at our website (<http://faculty.washington.edu/gpwilson/>). In our presentations and publications, we gladly recognize the assistance and special permission of the BLM (see also “QUALIFICATIONS, PAST PERFORMANCE, ACTIVE BLM COOPERATIVE AGREEMENT” section).

### **Benefits to the BLM**

In addition to establishing unit science plans in the area, the primary benefit to the BLM would be a large-scale and detailed study of the paleontological resources within previously unsurveyed National Conservation Lands. These funds would enable us to devote a substantial amount of our field season to targeted work in these specific areas, and allow us to bring a greater number of crew members and DIG participants into the field. This significantly increases the amount of land covered, ensures that more of these resources are safeguarded, and provides the BLM with detailed feedback on how to manage these lands. Furthermore, we would introduce a systematic method of monitoring for fossils that could be used by our crews as well as researchers from other institutions. By standardizing the way researchers survey these areas, the BLM could make more efficient and more informed management decisions.

This project would also help increase the efficiency and effectiveness of the curation and organization of BLM specimens. If awarded this opportunity, we would devote a portion of these funds to curatorial staff and museum exhibit design and implementation. These efforts would further the safe and proper preservation of valuable paleontological specimens.

<b>Milestone / Task / Activity</b>	<b>Start Date</b>	<b>Completion Date</b>
New survey of Seven Blackfoot WSA	6/26/17	6/29/17
New survey of Musselshell Breaks WSA	6/30/17	7/3/17
New survey of Bridge Coulee WSA	7/4/17	7/6/17
Continued survey of Billy Creek WSA	7/7/15	7/9/17
Continued survey of Terry Badlands WSA	7/10/17	7/11/17
Organization and commencement of specimen curation	August 2017	March 2022
Shipments of BLM specimens to K 12 classrooms; outreach events	September 2017	March 2022
Completion of specimen curation	August 2017	March 2022

**PUBLIC BENEFIT:**

(Describe how this project benefits the general public.)

This project would directly benefit K–12 educators and students involved with the DIG Field School, as well as northeastern Montana locals. The DIG is a free, non-profit professional development program for K–12 STEM teachers affiliated with the Burke Museum. The DIG aims to connect teachers from across the country with scientific research and researchers through hands-on, immersive learning experiences. Since 2010, the DIG has served 116 teachers from 18 states, translating to over 3,480 hours of professional development, specifically via a four-day program at our active field research site in the Hell Creek area of eastern Montana.

Recently, we have expanded the DIG to provide continuing education and engagement for teachers and students throughout the year. A centerpiece of this effort is sending bags of fossil-rich sediment to classrooms along with lesson plans on biodiversity, evolution, ecology, and extinction aligned with the Next Generation Science Standards (NGSS). The lesson plans teach science as a process and bring real science into the classroom. We have reached ~9,500 students, but we believe we can substantially enhance this effort.

First, to increase the use of DOI collections and reduce our cataloging backlog, we propose to send BLM sediment to these classrooms (instead of from private land). Second, to expand and manage this effort, we would develop and implement a web-based database platform to facilitate real-time scientific interaction, collaboration, and discovery among teachers, students, and scientists nationwide. This Fossil Engagement Research Network (FERN) would work like this: (1) The DIG sends classrooms sediment from our research area; (2) Via engaging lessons, students discover fossils in these samples and use guides to identify them; (3) Students compile these data and image fossils for upload to FERN; (4) Students analyze their data and discuss results using lesson plans and FERN's graphic applications, compare results with other classrooms across the country, and interact virtually with classrooms and DIG scientists about how their results impact dinosaur extinction research; and (5) DIG scientists vet these data and upload them to the Burke Museum catalog as a permanent record of the scientific contribution made by that classroom.

This high-throughput solution would (1) increase student achievement in the geosciences, enhance student engagement with the scientific process, and foster the development of science teachers and future scientists; (2) increase the use of DOI resources; (3) increase efficiency of BLM specimen curation; (4) facilitate a bridge between the Burke's database system and the ICMS; and (5) tailor lesson plans to educate students about BLM resources.

The increased engagement provided by the FERN would create a profound impact on K–12 education. We pledge that in FERN’s first year we would be able to positively affect 100 classrooms and 10,000 new students from across the country. We plan to provide open access to our learning materials and database, which would extend the outreach of our resources well beyond the classrooms we directly serve. Moreover, the fossil data would be widely available to researchers from other museums and institutions, providing a valuable resource to the research community.

Furthermore, this project would translate into increased involvement with locals in the area. Many of the residents are uninformed or completely unaware of the scientific significance of the land right in their own backyard. We have previously teamed up with the Montana State Parks to host informational talks for the locals to inform them of the research. This past summer, for example, we hosted a community event at the Hell Creek State Park for locals to learn about the research we do and the scientific importance of the area. Over 50 residents of the area attended the event. Similar efforts could also be extended to connect with already existent BLM public outreach endeavors, e.g., the “Outdoor Classrooms,” “Take It Outside,” and “Handle With Care” programs

([http://www.blm.gov/style/medialib/blm/wo/Law Enforcement/nlcs/education interpretation/reports.Par.7343.File.dat/EEupdate 2010.pdf](http://www.blm.gov/style/medialib/blm/wo/Law%20Enforcement/nlcs/education%20interpretation/reports/Par.7343.File.dat/EEupdate%202010.pdf) for more details). These funds would continue to help promote more of these citizen science and educational efforts, serving to strengthen the relationship between locals, the paleontological community, and the BLM as a whole.

#### **QUALIFICATIONS, PAST PERFORMANCE, ACTIVE BLM COOPERATIVE AGREEMENT:**

(List key personnel and their responsibilities. Describe similar successful projects completed in the past and any unique qualifications your organization may possess and describe all BLM Active Cooperative Agreements. )

As previously stated, the Wilson Lab currently has a cooperative agreement with the BLM to conduct research on NLCS lands (L16AC00402), as well as permits to collect on other BLM-managed areas. In July of 2016, our NLCS project crew conducted a detailed survey of the Billy Creek and Terry Badlands WSAs. Specifically, the field team completely or partially studied sections 2, 3, 9, and 10 of the Chalk Butte Quadrangle in Garfield County (Billy Creek WSA), sections 1, 2, 3, 10, 11, and 34 of the Calypso Quadrangle, and sections 1, 6, 34, and 35 of the Terry Quadrangle (Terry Badlands), both in Prairie County. These surveys yielded several discoveries, including (but not limited to) dinosaur, salamander, lizard, turtle, fish, and plant fossils. With further funding, this project could be both continued and expanded, leading to enhanced collection on and understanding of these areas in line with the BLM’s land management goals.

#### **Key Project Personnel:**

##### 1. Dr. Greg Wilson, Principal Investigator

Responsibilities: Develops and oversees project goals; manages personnel.

##### 2. Brody Hovatter, Project Manager

Responsibilities: Assists with development of project; oversees planning and logistics.

##### 3. Graduate students(s), Project Assistants

Responsibilities: Helps lead field crew, assists with planning, research, and reporting.

## Key Contacts Form

**\* Applicant Organization Name:**

Colorado Mesa University

Enter the individual's role on the project (e.g., project manager, fiscal contact).

**\* Contact 1 Project Role:** Principal Investigator

Prefix:

**\* First Name:** Verner

Middle Name:

**\* Last Name:** Johnson

Suffix:

Title:

Organizational Affiliation:

**\* Street1:** 1100 North Avenue

Street2:

**\* City:** Grand Junction

County:

**\* State:** CO: Colorado

Province:

**\* Country:** USA: UNITED STATES**\* Zip / Postal Code:** 81501 3122**\* Telephone Number:** 970 248 1672

Fax:

**\* Email:** vjohnson@coloradomesa.edu

## Key Contacts Form

**\* Applicant Organization Name:**

Colorado Mesa University

Enter the individual's role on the project (e.g., project manager, fiscal contact).

**\* Contact 2 Project Role:** Co Principal Investigator

Prefix:

**\* First Name:** Richard

Middle Name:

**\* Last Name:** Livaccari

Suffix:

Title:

Organizational Affiliation:

**\* Street1:** 1100 North Avenue

Street2:

**\* City:** Grand Junction

County:

**\* State:** CO: Colorado

Province:

**\* Country:** USA: UNITED STATES**\* Zip / Postal Code:** 81501 3122**\* Telephone Number:** 970 248 1081

Fax:

**\* Email:** rlivacca@coloradomesa.edu



## Key Contacts Form

**\* Applicant Organization Name:**

Colorado Mesa University

Enter the individual's role on the project (e.g., project manager, fiscal contact).

**\* Contact 3 Project Role:** Fiscal Contact

Prefix:

**\* First Name:** Tracy

Middle Name:

**\* Last Name:** Mundy

Suffix:

Title:

Organizational Affiliation:

**\* Street1:** 1100 North Avenue

Street2:

**\* City:** Grand Junction

County:

**\* State:** CO: Colorado

Province:

**\* Country:** USA: UNITED STATES**\* Zip / Postal Code:** 81501 3122**\* Telephone Number:** 970 248 1493

Fax:

**\* Email:** tmundy@coloradomesa.edu

**BUDGET INFORMATION - Non-Construction Programs**OMB Number: 4040-0006  
Expiration Date: 01/31/2019**SECTION A - BUDGET SUMMARY**

Grant Program Function or Activity (a)	Catalog of Federal Domestic Assistance Number (b)	Estimated Unobligated Funds		New or Revised Budget		
		Federal (c)	Non-Federal (d)	Federal (e)	Non-Federal (f)	Total (g)
1. Summer 2017 Field Work		\$	\$	7,506.18	2,900.00	10,406.18
2. Fall 2017 Preparation Work				528.00		528.00
3. Summer 2018 Field Work				15,239.82	4,500.00	19,739.82
4. Fall 2018 Preparation Work				1,072.00		1,072.00
5. Totals		\$	\$	24,346.00	7,400.00	31,746.00

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Tracking Number: GRANT12328840

Funding Opportunity Number: L17AS00001 Received Date: Feb 02, 2017 06:57:53 PM EST

## SECTION B - BUDGET CATEGORIES

6. Object Class Categories	GRANT PROGRAM, FUNCTION OR ACTIVITY				Total (5)
	(1) Summer 2017 Field Work	(2) Fall 2017 Preparation Work	(3) Summer 2018 Field Work	(4) Fall 2018 Preparation Work	
a. Personnel	\$ 4,055.04	\$	\$ 8,232.96	\$	\$ 12,288.00
b. Fringe Benefits					
c. Travel	528.00		1,072.00		1,600.00
d. Equipment					
e. Supplies	1,815.00		3,685.00		5,500.00
f. Contractual					
g. Construction					
h. Other	673.20	528.00	1,366.80	1,072.00	3,640.00
i. Total Direct Charges (sum of 6a-6h)	7,071.24	528.00	14,356.76	1,072.00	\$ 23,028.00
j. Indirect Charges	460.56	460.56	460.56	460.56	\$ 1,842.24
k. TOTALS (sum of 6i and 6j)	\$ 7,531.80	\$ 988.56	\$ 14,817.32	\$ 1,532.56	\$ 24,870.24
7. Program Income	\$	\$	\$	\$	\$

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SECTION C - NON-FEDERAL RESOURCES					
(a) Grant Program		(b) Applicant	(c) State	(d) Other Sources	(e) TOTALS
8.	Summer 2017 Field Work	\$ 43,527.00	\$	\$ 2,900.00	\$ 46,427.00
9.	Fall 2017 Preparation Work	3,633.96			3,633.96
10.	Summer 2018 Field Work	88,373.00		4,900.00	93,273.00
11.	Fall 2018 Preparation Work	7,378.04			7,378.04
12. TOTAL (sum of lines 8-11)		\$ 142,912.00	\$	\$ 7,800.00	\$ 150,712.00
SECTION D - FORECASTED CASH NEEDS					
	Total for 1st Year	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
13. Federal	\$ 7,599.24	\$	\$ 3,134.69	\$ 3,761.62	\$ 702.93
14. Non-Federal	\$ 49,735.32		20,515.67	24,618.81	4,600.84
15. TOTAL (sum of lines 13 and 14)	\$ 57,334.56	\$	\$ 23,650.36	\$ 28,380.43	\$ 5,303.77
SECTION E - BUDGET ESTIMATES OF FEDERAL FUNDS NEEDED FOR BALANCE OF THE PROJECT					
(a) Grant Program		FUTURE FUNDING PERIODS (YEARS)			
		(b) First	(c) Second	(d) Third	(e) Fourth
16.	Summer 2017 Field Work	\$ 7,071.24	\$	\$	\$
17.	Fall 2017 Preparation Work	528.00			
18.	Summer 2018 Field Work		16,199.00		
19.	Fall 2018 Preparation Work		1,072.00		
20. TOTAL (sum of lines 16 - 19)		\$ 7,599.24	\$ 17,271.00	\$	\$
SECTION F - OTHER BUDGET INFORMATION					
21. Direct Charges: 23028.00		22. Indirect Charges: 1842.24			
23. Remarks:					

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<b>Application for Federal Assistance SF-424</b>			
<b>* 1. Type of Submission:</b> <input type="checkbox"/> Preapplication <input checked="" type="checkbox"/> Application <input type="checkbox"/> Changed/Corrected Application		<b>* 2. Type of Application:</b> <input checked="" type="checkbox"/> New <input type="checkbox"/> Continuation <input type="checkbox"/> Revision	
		<b>* If Revision, select appropriate letter(s):</b> <input style="width: 100%;" type="text"/> <b>* Other (Specify):</b> <input style="width: 100%;" type="text"/>	
<b>* 3. Date Received:</b> <input style="width: 100%;" type="text" value="02/02/2017"/>		<b>4. Applicant Identifier:</b> <input style="width: 100%;" type="text"/>	
<b>5a. Federal Entity Identifier:</b> <input style="width: 100%;" type="text"/>		<b>5b. Federal Award Identifier:</b> <input style="width: 100%;" type="text"/>	
<b>State Use Only:</b>			
<b>6. Date Received by State:</b> <input style="width: 100%;" type="text"/>		<b>7. State Application Identifier:</b> <input style="width: 100%;" type="text"/>	
<b>8. APPLICANT INFORMATION:</b>			
<b>* a. Legal Name:</b> <input style="width: 100%;" type="text" value="Museums of Western Colorado"/>			
<b>* b. Employer/Taxpayer Identification Number (EIN/TIN):</b> <input style="width: 100%;" type="text" value="840588068"/>		<b>* c. Organizational DUNS:</b> <input style="width: 100%;" type="text" value="0863422350000"/>	
<b>d. Address:</b>			
<b>* Street1:</b>	<input style="width: 100%;" type="text" value="462 Ute Ave"/>		
<b>Street2:</b>	<input style="width: 100%;" type="text"/>		
<b>* City:</b>	<input style="width: 100%;" type="text" value="Grand Junction"/>		
<b>County/Parish:</b>	<input style="width: 100%;" type="text"/>		
<b>* State:</b>	<input style="width: 100%;" type="text" value="CO: Colorado"/>		
<b>Province:</b>	<input style="width: 100%;" type="text"/>		
<b>* Country:</b>	<input style="width: 100%;" type="text" value="USA: UNITED STATES"/>		
<b>* Zip / Postal Code:</b>	<input style="width: 100%;" type="text" value="81501 2516"/>		
<b>e. Organizational Unit:</b>			
<b>Department Name:</b> <input style="width: 100%;" type="text"/>		<b>Division Name:</b> <input style="width: 100%;" type="text"/>	
<b>f. Name and contact information of person to be contacted on matters involving this application:</b>			
<b>Prefix:</b> <input style="width: 100%;" type="text"/>	<b>* First Name:</b> <input style="width: 100%;" type="text" value="Robert"/>		
<b>Middle Name:</b> <input style="width: 100%;" type="text"/>			
<b>* Last Name:</b> <input style="width: 100%;" type="text" value="Gay"/>			
<b>Suffix:</b> <input style="width: 100%;" type="text"/>			
<b>Title:</b> <input style="width: 100%;" type="text" value="Curator of Museum Education"/>			
<b>Organizational Affiliation:</b> <input style="width: 100%;" type="text" value="Museums of Western Colorado"/>			
<b>* Telephone Number:</b> <input style="width: 100%;" type="text" value="970 361 0285"/>		<b>Fax Number:</b> <input style="width: 100%;" type="text" value="970 858 3532"/>	
<b>* Email:</b> <input style="width: 100%;" type="text" value="robertg@westcomuseum.org"/>			

<b>Application for Federal Assistance SF-424</b>			
<b>* 9. Type of Applicant 1: Select Applicant Type:</b> <input type="text" value="M: Nonprofit with 501C3 IRS Status (Other than Institution of Higher Education)"/>			
<b>Type of Applicant 2: Select Applicant Type:</b> <input type="text"/>			
<b>Type of Applicant 3: Select Applicant Type:</b> <input type="text"/>			
<b>* Other (specify):</b> <input type="text"/>			
<b>* 10. Name of Federal Agency:</b> <input type="text" value="Bureau of Land Management"/>			
<b>11. Catalog of Federal Domestic Assistance Number:</b> <input type="text" value="15.231"/>			
<b>CFDA Title:</b> <input type="text" value="Fish, Wildlife and Plant Conservation Resource Management"/>			
<b>* 12. Funding Opportunity Number:</b> <input type="text" value="L17AS00001"/>			
<b>* Title:</b> <input type="text" value="BLM FY2017 Bureau wide National Conservation Lands Scientific Studies Support Program"/>			
<b>13. Competition Identification Number:</b> <input type="text"/>			
<b>Title:</b> <input type="text"/>			
<b>14. Areas Affected by Project (Cities, Counties, States, etc.):</b> <div> <input type="text"/> <input type="button" value="Add Attachment"/> <input type="button" value="Delete Attachment"/> <input type="button" value="View Attachment"/> </div>			
<b>* 15. Descriptive Title of Applicant's Project:</b> <input type="text" value="A survey of the paleontological resources of the new Bears Ears National Monument, San Juan County, Utah"/>			
Attach supporting documents as specified in agency instructions. <div> <input type="button" value="Add Attachments"/> <input type="button" value="Delete Attachments"/> <input type="button" value="View Attachments"/> </div>			

Application for Federal Assistance SF-424	
<b>16. Congressional Districts Of:</b>	
* a. Applicant <input style="width: 80px;" type="text" value="CO 003"/>	* b. Program/Project <input style="width: 80px;" type="text" value="UT 003"/>
Attach an additional list of Program/Project Congressional Districts if needed. <div style="display: flex; align-items: center; gap: 10px;"> <input style="width: 200px;" type="text"/> <input type="button" value="Add Attachment"/> <input type="button" value="Delete Attachment"/> <input type="button" value="View Attachment"/> </div>	
<b>17. Proposed Project:</b>	
* a. Start Date: <input style="width: 80px;" type="text" value="05/15/2017"/>	* b. End Date: <input style="width: 80px;" type="text" value="10/15/2018"/>
<b>18. Estimated Funding (\$):</b>	
* a. Federal	<input style="width: 100px;" type="text" value="24,871.00"/>
* b. Applicant	<input style="width: 100px;" type="text" value="142,912.00"/>
* c. State	<input style="width: 100px;" type="text" value="0.00"/>
* d. Local	<input style="width: 100px;" type="text" value="0.00"/>
* e. Other	<input style="width: 100px;" type="text" value="7,800.00"/>
* f. Program Income	<input style="width: 100px;" type="text" value="0.00"/>
* g. TOTAL	<input style="width: 100px;" type="text" value="175,583.00"/>
<b>* 19. Is Application Subject to Review By State Under Executive Order 12372 Process?</b>	
<input checked="" type="checkbox"/> a. This application was made available to the State under the Executive Order 12372 Process for review on <input style="width: 80px;" type="text" value="02/02/2017"/> .	
<input type="checkbox"/> b. Program is subject to E.O. 12372 but has not been selected by the State for review.	
<input type="checkbox"/> c. Program is not covered by E.O. 12372.	
<b>* 20. Is the Applicant Delinquent On Any Federal Debt? (If "Yes," provide explanation in attachment.)</b>	
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
If "Yes", provide explanation and attach <div style="display: flex; align-items: center; gap: 10px;"> <input style="width: 200px;" type="text"/> <input type="button" value="Add Attachment"/> <input type="button" value="Delete Attachment"/> <input type="button" value="View Attachment"/> </div>	
<b>21. *By signing this application, I certify (1) to the statements contained in the list of certifications** and (2) that the statements herein are true, complete and accurate to the best of my knowledge. I also provide the required assurances** and agree to comply with any resulting terms if I accept an award. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties. (U.S. Code, Title 218, Section 1001)</b>  <input checked="" type="checkbox"/> ** I AGREE	
** The list of certifications and assurances, or an internet site where you may obtain this list, is contained in the announcement or agency specific instructions.	
<b>Authorized Representative:</b>	
Prefix: <input style="width: 100px;" type="text"/>	* First Name: <input style="width: 150px;" type="text" value="Robert"/>
Middle Name: <input style="width: 150px;" type="text"/>	
* Last Name: <input style="width: 150px;" type="text" value="Gay"/>	
Suffix: <input style="width: 100px;" type="text"/>	
* Title: <input style="width: 200px;" type="text" value="Curator of Museum Education"/>	
* Telephone Number: <input style="width: 100px;" type="text" value="970 858 7282"/>	Fax Number: <input style="width: 100px;" type="text" value="970 858 3532"/>
* Email: <input style="width: 200px;" type="text" value="robertg@westcomuseum.org"/>	
* Signature of Authorized Representative: <input style="width: 150px;" type="text" value="Robert J Gay"/>	* Date Signed: <input style="width: 100px;" type="text" value="02/02/2017"/>

DOI-2020-12 01557

**BUDGET INFORMATION - Non-Construction Programs**OMB Number: 4040-0006  
Expiration Date: 01/31/2019**SECTION A - BUDGET SUMMARY**

Grant Program Function or Activity (a)	Catalog of Federal Domestic Assistance Number (b)	Estimated Unobligated Funds		New or Revised Budget		
		Federal (c)	Non-Federal (d)	Federal (e)	Non-Federal (f)	Total (g)
1. L17AS00001	15.231	\$	\$	\$ 24,993.00	\$ 10,104.00	\$ 35,097.00
2.						
3.						
4.						
5. Totals		\$	\$	\$ 24,993.00	\$ 10,104.00	\$ 35,097.00

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Tracking Number: GRANT12328846

Funding Opportunity Number: L17AS00001 Received Date: Feb 02, 2017 07:01:54 PM EST



## SECTION B - BUDGET CATEGORIES

6. Object Class Categories	GRANT PROGRAM, FUNCTION OR ACTIVITY				Total (5)
	(1)	(2)	(3)	(4)	
	L17AS00001				
a. Personnel	\$ 13,165.00	\$	\$	\$	\$ 13,165.00
b. Fringe Benefits	4,840.00				4,840.00
c. Travel	1,176.00				1,176.00
d. Equipment					
e. Supplies	2,090.00				2,090.00
f. Contractual					
g. Construction					
h. Other					
i. Total Direct Charges (sum of 6a-6h)	21,271.00				\$ 21,271.00
j. Indirect Charges	3,722.00				\$ 3,722.00
k. TOTALS (sum of 6i and 6j)	\$ 24,993.00	\$	\$	\$	\$ 24,993.00
7. Program Income	\$	\$	\$	\$	\$

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SECTION C - NON-FEDERAL RESOURCES					
(a) Grant Program	(b) Applicant	(c) State	(d) Other Sources	(e) TOTALS	
8. L17AS00001	\$ 10,104.00	\$	\$	\$ 10,104.00	
9.					
10.					
11.					
12. TOTAL (sum of lines 8-11)	\$ 10,104.00	\$	\$	\$ 10,104.00	

SECTION D - FORECASTED CASH NEEDS					
	Total for 1st Year	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
13. Federal	\$ 24,993.00	\$ 6,248.25	\$ 6,248.25	\$ 6,248.25	\$ 6,248.25
14. Non-Federal	\$ 10,400.00	2,600.00	2,600.00	2,600.00	2,600.00
15. TOTAL (sum of lines 13 and 14)	\$ 35,393.00	\$ 8,848.25	\$ 8,848.25	\$ 8,848.25	\$ 8,848.25

SECTION E - BUDGET ESTIMATES OF FEDERAL FUNDS NEEDED FOR BALANCE OF THE PROJECT				
(a) Grant Program	FUTURE FUNDING PERIODS (YEARS)			
	(b) First	(c) Second	(d) Third	(e) Fourth
16. L17AS00001	\$	\$	\$	\$
17.				
18.				
19.				
20. TOTAL (sum of lines 16 - 19)	\$	\$	\$	\$

SECTION F - OTHER BUDGET INFORMATION	
21. Direct Charges: \$21,271	22. Indirect Charges: \$3,722
23. Remarks:	

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[Attachment B]

**BUREAU OF LAND MANAGEMENT**  
Financial Assistance (Cooperative Agreements)



**ATTACHMENT B: BUDGET DETAIL (SUGGESTED FORMAT)**

**Instructions:** Using the estimated amounts listed on your SF 424 Budget Information form, use this worksheet to provide details of those estimated costs. In the Narrative Boxes, explain the purpose of each cost and provide sufficient detail so costs may be analyzed for reasonableness.

Agreement or Funding Opportunity No.: L17AS00001 Date: 1/27/17  
 Organization Name: Board of Regents, NSHE, obo University of Nevada, Las Vegas  
 Project Title: Geology and Volcanology of the Sloan Canyon National Conservation Area

<b>A) PERSONNEL COSTS (SF-424A Object Class Category 6a.)</b>					
Estimated costs of salaries/wages, <u>not</u> including fringe benefits, paid to Recipient employees working directly on this agreement. Indicate Key Personnel with an asterisk (*), provide more detail in the Narrative Box if needed.					
Name : Title or Position Title	Salary or Wage	Months or Hours	Matching Funds (if applicable)	BLM Funds	Personnel Justification
Letter of Appointment	\$20/hour	300 hours		\$ 000/year= \$12,000	Field assistant for mapping and lab assistant to prepare samples for analysis
<i>Example: James Smith, Executive Director</i>	<i>\$20,000.00/Mo.</i>	<i>3 Mos.</i>	<i>\$15,000.00</i>	<i>\$45,000.00</i>	
<b>A) TOTAL PERSONNEL COSTS:</b> (SF 424A Object Class Category 6a. Personnel)			<b>\$</b>	<b>\$12,000</b>	
<u><b>Budget justification of costs:</b></u>					
This person will assist in the field during mapping and in the lab to prepare samples for chemical and geochronological analyses.					

**B) FRINGE BENEFIT COSTS (SF-424A Object Class Category 6b.)**

Estimated costs of fringe benefits (e.g. health insurance, vacation, FICA, etc.) paid to Recipient employees working on this agreement. List employees/positions below, and their fringe benefit rates as a percentage (%) of their salaries. List what are considered fringe benefits in the Narrative Box.

Name & Title/Position	Salary/Wage Base (BLM Amounts budgeted in Section A above)	Fringe Benefit Rate (%)	Matching Funds (if applicable)	BLM Funds
Letter of Appointment	\$12,000	3.15%		\$378
<i>Example: James Smith, Executive Director</i>	\$20,000.00	30%	\$0.00	\$6,000.00
<b>B) TOTAL FRINGE BENEFIT COSTS:</b> (SF 424A Object Class Category 6b. Fringe Benefits)			\$	\$378

*Budget Justification of Costs:*

This is the University prescribed rate for a Letter of Appointment position.

<b>C) TRAVEL COSTS (SF-424A Object Class Category 6c.)</b>						
<b>SUB TOTAL, LODGING &amp; PER DIEM</b> The cost of lodging & meals while traveling for agreement activities. Give details and purpose of the travel in the Narrative Box. Current Federal rates may be found online at: <a href="http://www.gsa.gov/portal/category/21287">http://www.gsa.gov/portal/category/21287</a> .						
<b>Proposed Travel (Lodging &amp; Per Diem)</b>		<b>No. of People</b>	<b>No. of Days</b>	<b>Cost Per Person Per Day</b>	<b>Matching Funds (if applicable)</b>	<b>BLM Funds</b>
<b>To:</b>						0
<b>From:</b>						
<b>To:</b>						
<b>From:</b>						
<b>To:</b>						
<b>From:</b>						
<b>To:</b>	<i>Example: Portland, OR</i>	1	2	\$150.00/Day	\$100.00	\$200.00
<b>From:</b>	<i>Eugene, OR</i>					
<b>SUB TOTAL, MILEAGE REIMBURSEMENT</b> The cost of reimbursement for estimated mileage traveled in recipient vehicles for agreement activities. Give details and the purpose of the travel in the Narrative Box. Current Federal mileage reimbursement rates may be found online at: <a href="http://www.GSA.gov">www.GSA.gov</a> . <b>NOTE:</b> Mileage reimbursement rates include all vehicle costs, i.e. fuel, insurance, maintenance, etc.						
<b>Proposed Travel (Mileage Reimbursement)</b>		<b>No. of Miles</b>	<b>No. of Trips</b>	<b>Cost Per Mile</b>	<b>Matching Funds (if applicable)</b>	<b>BLM Funds</b>
<b>To:</b>						0
<b>From:</b>						
<b>To:</b>						
<b>From:</b>						
<b>To:</b>						
<b>From:</b>						
<b>To:</b>	<i>Example: Portland, OR</i>	110 Miles	2	\$0.10/Mile	\$0.00	\$22.00
<b>From:</b>	<i>Eugene, OR</i>					
<b>SUB TOTAL, OTHER TRAVEL COSTS</b> The costs of airfare, bus fare, car rental, etc., required for agreement activities. Explain the details and the purpose of the costs in the Narrative Box.						
<b>Proposed Other (Travel Reimbursement)</b>		<b>Type</b>	<b>Cost</b>	<b>No.</b>	<b>Matching Funds (if applicable)</b>	<b>BLM Funds</b>
<b>To:</b>						0
<b>From:</b>						
<b>To:</b>						
<b>From:</b>						
<b>To:</b>						
<b>From:</b>						
<b>C) TOTAL TRAVEL COSTS:</b>						
(SF 424A Object Class Category 6c. Travel)					\$	\$0
<b>Budget justification of costs::</b>  The Sloan Canyon NCA is within 10 miles of the City of Henderson; therefore Lodging, per diem, and millege costs will not be charged.						

**D) EQUIPMENT COSTS** (SF-424A Object Class Category 6d. Equipment)

The cost of equipment purchased for use on this agreement. Equipment is defined as items with a useful life of more than one (1) year and a cost of \$5,000+ per unit. If your organization has a written policy for purchasing equipment, please submit a copy with your application. Explain the need and purpose of the equipment in the Narrative Box below.

Equipment	Quantity	Cost per Unit	Matching Funds (if applicable)	BLM Funds
<i>Example: John Deere Compact Tractor</i>	<i>1</i>	<i>\$17,500.00</i>	<i>\$7,500.00</i>	<i>\$10,000.00</i>

**D) TOTAL EQUIPMENT COSTS:**

(SF 424A Object Class Category 6d. Equipment)

\$

\$0

Budget justification of costs:**E) SUPPLY COSTS** (SF-424A Object Class Category 6e. Supplies)

Estimated costs of materials and supplies used directly on this agreement, e.g. safety glasses, work gloves, office supplies, etc. If your organization has a written policy for purchasing supplies, please submit a copy with your application. Explain the purpose of the costs in the Narrative Box below.

Item	Quantity	Cost per Unit	Matching Funds (if applicable)	BLM Funds
<i>Example: Work Gloves, Leather</i>	<i>6</i>	<i>\$10.00/Pair</i>	<i>\$50.00</i>	<i>\$10.00</i>

**E) SUPPLY COST TOTAL:**

(SF 424A Object Class Category 6e. Supplies)

\$

\$0

Budget justification of costs:

No additional laboratory supplies will be required to complete this project. Everything needed is currently in the laboratory and available for use for this project.

**F) CONTRACTUAL COSTS** (SF-424A Object Class Category 6f. Contractual)

Estimated costs of contracted/sub contracted services and sub grant/recipient awards. If your organization has a written contracting policy, please submit a copy with your application. Provide contractor names, if available, and explain the details and purposes of the costs in the Narrative Box below. **NOTE:** Calculation of your Indirect Costs may be affected by contracted and/or pass through expenses. See Section J) INDIRECT COSTS, for more information.

Contractor Name, Type, etc.	Cost	Matching Funds (if applicable)	BLM Funds
<i>Example: Ace Delivery Service (Yearly Contract)</i>	\$2,500.00	\$0.00	\$2,500.00
<b>F) CONTRACTUAL COST TOTAL:</b> (SF 424A Object Class Category 6f. Contractual)		<b>\$</b>	<b>\$0</b>

Budget justification of costs:

**G) CONSTRUCTION COSTS** (SF-424A Object Class Category 6g. Construction)

The estimated costs of construction. "Construction" is the intent to construct, alter, or repair (including dredging, excavating, and painting) buildings, structures, or other real property FAR Part 2 Definitions. Explain the details and purpose of the costs in the Narrative Box below.

Contractor: Name/Type/Organization/Etc.	Cost	Matching Funds (if applicable)	BLM Funds
<b>G) CONSTRUCTION COST TOTAL:</b> (SF 424A Object Class Category 6g. Construction)		<b>\$</b>	<b>\$0</b>

Budget justification of costs:

## Budget Detail

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<b>H) OTHER COSTS</b> (SF-424A Object Class Category 6h. Other)			
Estimated costs which don't fit any other Object Class Category, e.g. duplicating and printing costs, postage and freight, rental of equipment, etc. Explain the details and purpose of the costs in the Narrative Box below.			
Item	Cost	Matching Funds (if applicable)	BLM Funds
Analytical costs: U Pb dating of zircons	\$5,500		\$5,500
Analytical costs: major and trace element analyses	\$1,920		\$1,920
<i>Example: Ace Equipment Rental (Post-Hole Digger, 4 Days)</i>	<i>\$25/Day</i>	<i>\$0.00</i>	<i>\$100.00</i>
<b>H) OTHER COSTS TOTAL:</b> (SF 424A Object Class Category 6h. Other)		<b>\$</b>	<b>\$7,420</b>
<p><u>Budget justification of costs:</u>            U-Pb dating will be done at the LaserChron lab at the University of Arizona. Costs for one sample are based on the number of laser points. For our samples we require 35 points to obtain a statistically significant date. The cost per point is \$14. A cathodoluminescence image is required for each sample to help locate points and view any external zoning. The cost/sample for these images is \$60/sample. The total cost/sample is \$550. We require 10 samples to obtain a complete view of the age differences between volcanoes and between phases of the Mt. Sutor composite volcano.</p> <p>Major and trace elements will be analyzed at ALS labs in Reno, Nevada. A complete package of 66 elements costs \$68.75. Major elements use X-ray fluorescence analysis, trace elements by ICP-MS. An explanation of methods and the need for the analyses are in the proposal.</p>			

<b>I) TOTAL DIRECT COSTS</b> (SF-424A Object Class Category 6i. Sum of 6a.-6h.)		
The total of all direct costs applicable to this project.		
Total Direct Costs	Matching Funds (if applicable)	BLM Funds



**J) INDIRECT COSTS** (SF-424A Object Class Category 6j. Indirect Charges)

Indirect costs are expenses which cannot be readily identified and charged to a particular project or agreement, e.g. building rent, utilities, office supplies, etc. Such costs are charged to the project as a percentage of the Direct Costs (items A through H above) and this percentage is called the Indirect Cost Rate. If your organization has a Negotiated Indirect Cost Rate Agreement (NICRA) please submit a copy of the agreement with your application. If your organization has no NICRA, the BLM may allow a "de minimis" indirect cost rate of up to 10% of your Modified Total Direct Costs (MTDC), which are your Direct Costs excluding sub-grant and sub-contract costs in excess of \$25,000. See **2 CFR 200.68 Modified Total Direct Cost (MTDC)** and **2 CFR 200.414(f) Indirect (F&A) Costs** for more information.

If your organization is a Cooperative Ecosystems Studies Unit (CESU) partner, your indirect cost rate will be 17.5% of your NICRA-determined indirect cost base.

Use the Narrative Box below to explain how you calculated your indirect cost base and resulting indirect costs.

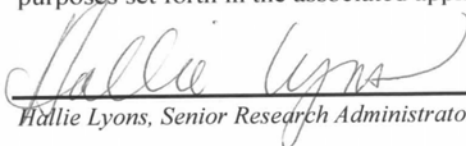
Indirect Cost Rate to be used on this Grant (%):	17.5%		
Indirect Cost Base for this Grant:	\$19,798		
<b>Total Indirect Costs</b>	<b>Matching Funds</b> (if applicable)	<b>BLM Funds</b>	
<b>J) TOTAL INDIRECT COSTS:</b> (SF-424A Object Class Category 6j. Indirect Charges)	\$	\$3,465	
<u>Budget justification of costs:</u>			
UNLV is a CESU partner with BLM and charges a 17.5% indirect cost rate.			

**K) TOTALS** (SF-424A Object Class Category 6k. TOTALS)

The sum total of all Direct and Indirect Costs (Sum of 6i. & 6j.) applicable to this agreement.

<b>Total Project Costs</b>	<b>Matching Funds</b> (if applicable)	<b>BLM Funds</b>
<b>K) TOTAL COSTS:</b> (SF-424A Object Class Category 6k. TOTALS)	\$	\$23,263

I certify that to the best of my knowledge the costs detailed above are correct and complete and for the purposes set forth in the associated application for Federal Assistance.

 1-27-17  
Hallie Lyons, Senior Research Administrator, Sponsored Programs

Rev 4/2016

**Evaluation Instructions:**

- Fill out an Individual Evaluation Scoring Sheet for each proposal submitted. The notes do not need to be in paragraph form and can be brief.
- Please use rating factors similar to, or the same as, the descriptions below.
- Please have all Individual Evaluation Scoring Sheets completed and returned to Mara Alexander ([malexander@blm.gov](mailto:malexander@blm.gov)) by COB March 27<sup>th</sup>, 2017.

**Example Financial Assistance Evaluation Rating Factors:**

Below are the rating factors that can be used when assessing the quality and responsiveness of an applicant's proposal to each Evaluation Criteria. You may also develop your own criteria.

**OUTSTANDING** - Very comprehensive, in depth, clear response. Proposal consistently meets this standard with no omissions. Consistently high quality performance can be expected.

**EXCELLENT** - Extensive, detailed response to the opportunity similar to outstanding in quality, but with minor areas of unevenness or spottiness. High quality performance is likely but not assured due to minor omissions or areas where less than excellent performance might be expected.

**GOOD** .....No deficiencies in the response. Better than acceptable performance can be expected but in some significant areas there is an unevenness or spottiness which might impact performance.

**FAIR** .....The response generally meets minimum requirements but there is no expectation of better than acceptable performance. Deficiencies are confined to areas with minor impact on performance and may be corrected during negotiation without major revision to the proposal.

**POOR**.....The response fails to address one or more areas of the opportunity. Either, deficiencies exist in significant areas but may be corrected during negotiations without major revision to the proposal, or serious deficiencies exist in areas with minor impact.

**UNSATISFACTORY** - Serious deficiencies exist in significant areas. The proposal cannot be expected to address the opportunity without major revisions. The proposal only indicates a willingness to perform without specifying how or demonstrating the capacity to do so.