

To: Cox, Cameron[cdcox@blm.gov]; Tyler Ashcroft[tashcrof@blm.gov]
From: Beckstead, Melanie
Sent: 2017-07-26T09:27:57-04:00
Importance: Normal
Subject: Ethnobotany Study
Received: 2017-07-26T09:28:11-04:00
[Budget Narrative July 2017.docx](#)
[For SF-424 L17AS00001.pdf](#)
[Project Narrative July 2017.pdf](#)
[Tech Evaluation.docx](#)

Cameron,

I am still waiting on one form from Lisbeth Louderback, but we have sufficient paperwork for you to complete your tech eval while we are waiting. I'm attaching all of the paperwork you need. Please complete your tech eval and get it back to me as soon as possible.

Thanks

--

Melanie Beckstead

Grants Management Officer

BLM Utah State Office

(801) 539-4169 Phone

BUREAU OF LAND MANAGEMENT
Grants & Cooperative Agreements



Agreement Modification TECHNICAL EVALUATION

INSTRUCTIONS

Part 1: Include information about you, the reviewer, the agreement, and the recipient.

Part 2: After review of the recipient's proposal and budget, discuss and confirm that the requested assistance is relevant to the program, beneficial to the Public, can be accomplished within the applicant's proposed timeframe and budget, that the estimated costs are necessary and reasonable for the work contemplated, and that you recommend this recipient and proposal for award.

Part 3: Provide details for the recommended award.

PART 1 - Reviewer & Applicant Information

Program Officer: _____ Date: _____

Agreement Number: _____

Project Title: _____

Recipient: _____

PART 2 - Proposal Merit Review

1. Purpose, Objectives, and Relevance:

(What makes the work relevant, realistic, measurable, etc.?)

2. Technical Approach:

(Are their approaches, roles, details, and outcomes clear?)

3. Qualifications, Experience, Past Performance:

(What makes the applicant's qualifications and experience relevant and sufficient?)

4. Detailed Budget:

(Discuss why each budgeted cost is necessary and reasonable for this project.)

a. Personnel: The recipient's estimated personnel salary and wage costs are necessary and reasonable because

b. Fringe Benefits: (Fringe Benefit costs will be evaluated by the Grants Mgmt. Specialist)

c. Travel: The recipient's estimated travel and per diem costs are reasonable and necessary because

d. Equipment: The requested equipment is necessary for the project, the estimated costs are within reason because

e. Supplies: The recipient's estimated costs for project supplies are reasonable and necessary because

Modification
Technical Evaluation

Page 2

f. Contractual: Estimated costs for contracted services are needed for completion of the project because

g. Construction: (Not applicable)

h. Other: The recipient's estimated costs for these expenses are reasonable and necessary because

5. Additional Monitoring Required: Did recipient perform work as stated in original proposal and meet all the performance goals and milestones?

6. Changes to the Performance Goals and Milestones: Did recipient spell out in original proposal their five year goals and milestones, if not provide goals and milestones for this modification.

PART 3 - For Award Recommendation Only

5. Period of Performance (POP):

(Maximum POP is 5 years)

☐ As stated on recipient's proposal

☐ Other: From: _____ Through: _____

6. Financial and Performance/Progress Reports submitted on time:

☐ No ☐ Yes (If Yes, provide details of the changes)

SF425

Details _____

Performance: _____

Details: _____

7. Changes in Key Personnel:

☐ No ☐ Yes (If Yes, provide details of the changes)

Changes: _____

8. Does the Liability Insurance Remain the Same:

☐ No ☐ Yes (If the recipient will be operating a Government-owned vehicle or performing hazardous activities, they must provide a Certificate of Liability Insurance displaying the agreement number and complete any required safety training.)

9. Program Income:

☐ Not Applicable ☐ Additive ☐ Deductive ☐ Cost Share or Match

INCOME NOTES ADDITIVE: Added to funds committed to the project and used to further project or program objectives. DEDUCTIVE: Deducted from the total BLM share of the project costs. COST SHARE or MATCH: Can be counted towards recipient matching requirements.

10. Government-owned Property Furnished:

☐ No ☐ Yes (If Yes, provide form DI-105 Receipt for Property)

Modification
Technical Evaluation

Page 3

11. Patents Resulting from Award:

☐ No ☐ Yes

12. Does the proposed work require the recipient to deliver a goods or complete a service for the benefit of BLM?

☐ No ☐ Yes

13. Program Officer's Recommendation:

I recommend support of this proposed project/program as requested by the recipient. The proposal and budget are reasonable and support both the objective of the recipient and the mission of the BLM.

Amount to be Obligated: \$ _____

Signature

Printed Name & Title

Date

Application for Federal Assistance SF-424		
* 1. Type of Submission: <input type="checkbox"/> Preapplication <input type="checkbox"/> Application <input checked="" type="checkbox"/> Changed/Corrected Application	* 2. Type of Application: <input type="checkbox"/> New <input type="checkbox"/> Continuation <input checked="" type="checkbox"/> Revision	* If Revision, select appropriate letter(s): <input type="text" value="A: Increase Award"/> * Other (Specify): <input type="text"/>
* 3. Date Received: <input type="text" value="07/19/2017"/>	4. Applicant Identifier: <input type="text"/>	
5a. Federal Entity Identifier: <input type="text"/>	5b. Federal Award Identifier: <input type="text" value="L17AS00001"/>	
State Use Only:		
6. Date Received by State: <input type="text"/>	7. State Application Identifier: <input type="text"/>	
8. APPLICANT INFORMATION:		
* a. Legal Name: <input type="text" value="University of Utah"/>		
* b. Employer/Taxpayer Identification Number (EIN/TIN): <input type="text" value="876000525"/>	* c. Organizational DUNS: <input type="text" value="0090953650000"/>	
d. Address:		
* Street1: <input type="text" value="1471 Federal Way"/> Street2: <input type="text"/> * City: <input type="text" value="Salt Lake City"/> County/Parish: <input type="text"/> * State: <input type="text" value="UT: Utah"/> Province: <input type="text"/> * Country: <input type="text" value="USA: UNITED STATES"/> * Zip / Postal Code: <input type="text" value="84102-8930"/>		
e. Organizational Unit:		
Department Name: <input type="text" value="Anthropology Department"/>	Division Name: <input type="text" value="COLL OF SOCIAL & BEHAV SCIENCE"/>	
f. Name and contact information of person to be contacted on matters involving this application:		
Prefix: <input type="text"/> Middle Name: <input type="text"/> * Last Name: <input type="text" value="Louderback"/> Suffix: <input type="text"/>	* First Name: <input type="text" value="Lisbeth"/> Title: <input type="text" value="Assistant Professor, Curator of Archaeology"/> Organizational Affiliation: <input type="text" value="University of Utah"/> * Telephone Number: <input type="text" value="801-585-2634"/> Fax Number: <input type="text"/> * Email: <input type="text" value="llouderback@anthro.utah.edu"/>	

Application for Federal Assistance SF-424*** 9. Type of Applicant 1: Select Applicant Type:**

H: Public/State Controlled Institution of Higher Education

Type of Applicant 2: Select Applicant Type:

Type of Applicant 3: Select Applicant Type:

* Other (specify):

*** 10. Name of Federal Agency:**

Bureau of Land Management

11. Catalog of Federal Domestic Assistance Number:

15.224

CFDA Title:

Cultural Resource Management

*** 12. Funding Opportunity Number:**

L17AS00001

* Title:

Ecosystems and Plant Resources of Archaeological Sites in the Four Corners Region, USA

13. Competition Identification Number:

Title:

14. Areas Affected by Project (Cities, Counties, States, etc.):

Add Attachment

Delete Attachment

View Attachment

*** 15. Descriptive Title of Applicant's Project:**

Ecosystems and Plant Resources of Archaeological Sites in the Four Corners Region, USA

Attach supporting documents as specified in agency instructions.

Add Attachments

Delete Attachments

View Attachments

Application for Federal Assistance SF-424	
16. Congressional Districts Of:	
* a. Applicant <input style="width: 80px;" type="text" value="UT-002"/>	* b. Program/Project <input style="width: 80px;" type="text" value="UT-003"/>
Attach an additional list of Program/Project Congressional Districts if needed.	
<input style="width: 300px;" type="text"/>	<input type="button" value="Add Attachment"/> <input type="button" value="Delete Attachment"/> <input type="button" value="View Attachment"/>
17. Proposed Project:	
* a. Start Date: <input style="width: 80px;" type="text" value="08/01/2017"/>	* b. End Date: <input style="width: 80px;" type="text" value="07/31/2018"/>
18. Estimated Funding (\$):	
* a. Federal	<input style="width: 150px;" type="text" value="55,501.00"/>
* b. Applicant	<input style="width: 150px;" type="text" value="28,424.00"/>
* c. State	<input style="width: 150px;" type="text"/>
* d. Local	<input style="width: 150px;" type="text"/>
* e. Other	<input style="width: 150px;" type="text"/>
* f. Program Income	<input style="width: 150px;" type="text"/>
* g. TOTAL	<input style="width: 150px;" type="text" value="83,925.00"/>
* 19. Is Application Subject to Review By State Under Executive Order 12372 Process?	
<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.	
* 20. Is the Applicant Delinquent On Any Federal Debt? (If "Yes," provide explanation in attachment.)	
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
If "Yes", provide explanation and attach	
<input style="width: 300px;" type="text"/>	<input type="button" value="Add Attachment"/> <input type="button" value="Delete Attachment"/> <input type="button" value="View Attachment"/>
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)	
<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>	
Authorized Representative:	
Prefix: <input style="width: 150px;" type="text"/>	* First Name: <input style="width: 300px;" type="text" value="Todd"/>
Middle Name: <input style="width: 300px;" type="text"/>	
* Last Name: <input style="width: 500px;" type="text" value="Nilsen"/>	
Suffix: <input style="width: 150px;" type="text"/>	
* Title: <input style="width: 400px;" type="text" value="Director"/>	
* Telephone Number: <input style="width: 200px;" type="text" value="801-581-4714"/>	Fax Number: <input style="width: 200px;" type="text"/>
* Email: <input style="width: 600px;" type="text" value="william.ernest@osp.utah.edu"/>	
* Signature of Authorized Representative:	* Date Signed: <input style="width: 100px;" type="text" value="07/19/2017"/>

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	35.224	\$	\$	\$ 55,501.00	\$ 28,424.00	\$ 83,925.00
2.						
3.						
4.						
5. Totals		\$	\$	\$ 55,501.00	\$ 28,424.00	\$ 83,925.00

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

SECTION B - BUDGET CATEGORIES

6. Object Class Categories	GRANT PROGRAM, FUNCTION OR ACTIVITY				Total (5)
	(1)	(2)	(3)	(4)	
	L17A800001				
a. Personnel	\$ 25,999.00	\$	\$	\$	\$ 25,999.00
b. Fringe Benefits	8,686.00				8,686.00
c. Travel	12,037.00				12,037.00
d. Equipment					
e. Supplies	93.00				93.00
f. Contractual	500.00				500.00
g. Construction					
h. Other					
i. Total Direct Charges (sum of 6a-6h)	47,235.00				\$ 47,235.00
j. Indirect Charges	8,266.00				\$ 8,266.00
k. TOTALS (sum of 6i and 6j)	\$ 55,501.00	\$	\$	\$	\$ 55,501.00
7. Program Income	\$	\$	\$	\$	\$

Authorized for Local Reproduction

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

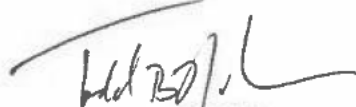
SECTION C - NON-FEDERAL RESOURCES					
(a) Grant Program	(b) Applicant	(c) State	(d) Other Sources	(e) TOTALS	
8. L17AS00001	\$ 28,424.00	\$	\$	\$ 28,424.00	
9.					
10.					
11.					
12. TOTAL (sum of lines 8-11)	\$ 28,424.00	\$	\$	\$ 28,424.00	

SECTION D - FORECASTED CASH NEEDS					
	Total for 1st Year	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
13. Federal	\$ 55,501.00	\$ 14,000.00	\$ 20,000.00	\$ 15,000.00	\$ 6,501.00
14. Non-Federal	\$				
15. TOTAL (sum of lines 13 and 14)	\$ 55,501.00	\$ 14,000.00	\$ 20,000.00	\$ 15,000.00	\$ 6,501.00

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	\$ 55,501.00	\$	\$	\$
17.				
18.				
19.				
20. TOTAL (sum of lines 16 - 19)	\$ 55,501.00	\$	\$	\$

SECTION F - OTHER BUDGET INFORMATION	
21. Direct Charges: 47,235.00	22. Indirect Charges: 8,266.00
23. Remarks: FAA cost rate (17.5%) is based on the University of Utah's CSU agreement with SLN.	

Authorized for Local Reproduction

Standard Form 424A (Rev. 7-97)
Prescribed by OMB (Circular A-102) Page 2

 TODD B. NILSEN, J.D.
 ASSOCIATE DIRECTOR
 OFFICE OF SPONSORED PROJECTS

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.

Person Submitting Proposal: Lisbeth Louderback Date: 7/25/2017
Organization Name: Natural History Museum of Utah, University of Utah
Agreement or Announcement No.: L17AS00001
Agreement or Announcement Title: BLM FY2017 Bureau-wide National Conservation Lands
Scientific Studies Support Program
Estimated Period of Performance: May 1, 2017 to April 30, 2022
BLM POC: Allison Ginn
Proposed Project Location: Bears Ears National Monument
This work will occur on: ☒ Public Lands ☐ Both Public & Private Lands

Ecosystems and Plant Resources of Archaeological Sites in the Four Corners Region, USA

YOUR MISSION:

The management of public lands requires a broad and detailed understanding of valuable *archaeological and biological resources* that relies on science to inform and develop best practices. Research is also required to assess the significance of archaeological sites under the National Historic Preservation Act (NHPA) and such assessments profoundly influence how the archaeological site is ultimately managed. Site significance is partially determined by the potential of archaeological remains to answer important questions about the past (criterion D of a site's significance under the NHPA). However, a *comprehensive* approach would include documenting ecosystem characteristics and condition, including an inventory of associated ethnobotanical species, to inform BLM management of archaeological and biological resources in tandem, a somewhat novel hybrid of two realms of inquiry.

Understanding the archaeology of the Four Corners is a world renowned scientific endeavor. The sophistication of the Ancestral Puebloan culture, especially concerning their use of both native and early domesticated plants for subsistence, medicinal and ceremonial purposes, tells us much about the ecology and technology of these early people. Well-known plant species such as maize, beans and squash were domesticated in Mesoamerica, transported to the Four Corners region and grown amongst the cliff dwellings and canyons like Mesa Verde, Chaco Canyon and Canyon de Chelly (Cordell and McBrinn 2012). But other lesser known species, such as the Four Corners potato (*Solanum jamesii*) (Figure 1), may have also been very important to the diet and possibly even domesticated locally (Kinder et al. 2017, Louderback and Pavlik 2017). This species, along with other native species, may have also been collected for medicinal or ceremonial purposes.



Figure 1. *Solanum jamesii* (left) and tubers from a single individual after one growing season.

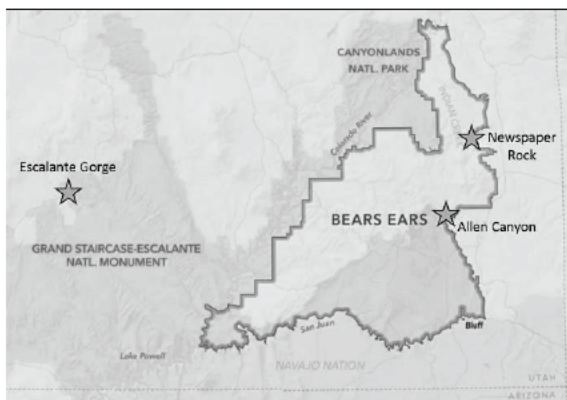


Figure 2. Map of Grand Staircase Escalante and Bears Ears National Monuments with locations of *S. jamesii* populations labeled. Map modified from Bears Ears Inter Tribal Coalition.

study, 2) describing the landscape and archaeological features of those sites, 3) quantifying the adjacent vegetation resources and 4) providing a detailed inventory and survey of ethnobotanically important

[There is a huge gap in our knowledge of the greater Ancestral Puebloan culture, especially in southeastern Utah. For example, the Bears Ears National Monument (Figure 2) contains an estimated 100,000 archaeological sites, the majority of which have never been inventoried or studied. But our previous field work shows that *S. jamesii* grows immediately adjacent to Newspaper Rock, a spectacular rock art site in the Indian Creek area and in Allen Canyon, both locations in or near Bears Ears (Figure 2, Bamberg et al. 2003, 2016). ***Our mission is to conduct an ecosystem assessment and an ethnobotanical inventory of National Conservation Lands in the Four Corners region*** by 1) collaborating with the BLM, USFS and Tribal representatives to select and identify a set of significant archeological and botanical sites for field

species, including present condition, threats and management recommendations. Ethnobotanically important species will be collected and vouchered in the Garrett Herbarium at the Natural History Museum of Utah and labeled as the “Flora of Bears Ears National Monument” collection. The inventory will also be entered into an existing ethnobotanical database (<https://nhmu.utah.edu/native-plants>) for the Colorado Plateau. This database, which was developed in partnership with the BLM (Applegate office in CA), will help inform resource management decisions to sustain landscapes, preserve archaeological resources, and conserve traditionally used plants within lands managed by the BLM. The database will also promote research on past human diets, environmental changes, and regional ethnography.

To bring an understanding of National Conservation Land ecosystems for purposes of resource management, we are emphasizing the importance of a broad perspective of cultural resource management that includes the conservation of not only archaeological sites, but their surrounding ecosystems. We already know of archaeological sites in Bears Ears where improved management practices could ensure the vigor of *S. jamesii* populations. For example, plants at Newspaper Rock are senescing before flowering, probably due to competition with weedy, invasive plants (Figure 3). Conversely, in Allen Canyon, *S. jamesii* populations are doing reasonably well in the absence of high weed cover. Populations of *S. jamesii* growing next to archaeological sites and a well-used trail in the Escalante Gorge of the Grand Staircase Escalante National Monument (GSENM) need to be mapped and included in management planning to ensure persistence.



Figure 3. Left image is Newspaper Rock with associated *S. jamesii* population. Right image is granary in Allen Canyon with *S. jamesii* population. Compare the poor condition of the Newspaper Rock population to the healthy population growing in Allen Canyon.

OBJECTIVES:

The overall mission of this project is to provide an ecosystem assessment in relation to significant archaeological sites in National Conservation Lands in the Four Corners region. In the first two years, we will focus our efforts in the Bears Ears and Grand Staircase Escalante National Monuments, but ultimately we would like to expand our study to meet the science and research needs of other National Conservation Lands in the Four Corners region. We will accomplish our overall mission by completing tasks pertaining to four specific objectives:

- Objective 1: Collaborate with Tribal representatives and identify culturally significant traditional use gathering areas or key plant communities where gathering occurs or has occurred.
- Objective 2: Describe the landscape and archaeological features
- Objective 3: Quantify the adjacent, dominant vegetation
- Objective 4: Inventory and survey ethnobotanically important species (dietary, medicinal, ceremonial, special status), including present condition threats and management recommendations.

These objectives support the *‘Research Identified in Unit Science Plans’* and *‘Standardized Inventory and Monitoring’* (Troves et al. 2011) research themes. After an archaeological setting is described and mapped, vegetation sampling techniques (e.g. Mueller-Dombois and Ellenberg 2003) will be used to describe the dominant vegetation. From those data, we can then inventory and survey ethnobotanical species and monitor for condition threats and provide management recommendations. This comprehensive approach also supports the *‘Research Syntheses’* theme because we will inform BLM management of archeological and biological resources in tandem, a somewhat novel hybrid of two realms of inquiry. Our project also encourages *‘Citizen Science’* programs to engage people of the Four Corners region, especially Native Americans, encouraging traditional cultivation and inter-generational mentoring. The ethnobotanical database portion of our project will immediately engage existing stewards of the potato by recording their memories and cultivation techniques. If we find support, we could also propagate the potato and return them to the original stewards (the true owners) for local distribution. This would facilitate the participation of local schools and youth groups with an interest in such traditions, led by people who rightfully have a claim to fully exploit this wonderful resource.

Additionally, our project contributes to all four research themes stated in the BLM Utah National Conservation Lands Strategy (<https://www.blm.gov/sites/blm.gov/files/UtahNCLStrategyFinal.pdf>).

Theme 1. Ensure the Conservation, Protection, and Restoration of National Conservation Lands Values

We will provide a better understanding and appreciation for National Conservation Lands values by conducting ecosystem assessments, including vegetation surveys of archaeological settings and inventorying ethnobotanical species.

Theme 2. Collaboratively Managing the National Conservation Lands as Part of the Larger Landscape

Our ecosystem-based approach is to consider the context as equally important to the archaeological or botanical site. For this reason we will include documentation of landscape vegetation and ethnobotanical species.

Theme 3. Raise Awareness of the Value and Benefits of BLM’s National Conservation Lands

Establishing the cultural significance and potential economic importance of native plant species could enable better conservation and restoration efforts through local stewardship.

Theme 4. Build upon BLM’s Commitment to Conservation

We will collaborate with members of the Bears Ears Commission and the Utah Diné Bikéyah (UDB) to record and document their stories and/or memories about plants they use and their families use. In collaboration with the Natural History Museum of Utah’s Community Outreach department, we will develop programs or activities that would most benefit those communities.

RESEARCH THEME AND TECHNICAL APPROACH:

Please identify which themes apply to your projects:

- ☒ ***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***

Techniques, processes, methodologies:

We will collaborate with knowledgeable tribal members and BLM to map culturally important archaeological and botanical sites starting in Bears Ears National Monument. In general, these sites will possess significant archeological features or gathering areas and be reasonably accessible for field study. A small subset of these sites will be used for detailed study. We suggest a total of seven sites per year (three sites for pilot Year 1) would be visited twice, once in spring (May-June) and once in the fall (Aug-Sept) to capture plant species with different phenologies. The vegetation survey will generally be done in the spring visit.

Objective 1: Collaboration. Collaborate with American Indian Tribes including the Hopi, Zuni, Navajo Nation, Ute Mountain Ute and Northern Ute, to identify and map sites where native plant species of dietary, medicinal and/or ceremonial importance occur. Identification of these areas will be facilitated through field visits with Tribal representatives. A minimum of three separated field visits will be needed to gather these data.

Objective 2: Landscape and archaeology. The landscape setting of each selected site will be described with respect to geographic orientation, topography, general geology, hydrology, and other ecologically-relevant variables. A record of site conditions that records the types and degrees of disturbance from fire, humans and grazing animals. A standardized set of photographic survey points will be established with available GPS accuracy and a series of photographs taken for archival purposes. We will complete site forms for the archaeological sites, documenting and describing the different site types and providing a summary of the artifacts, (lithic scatter, ground stone tools, ceramics, etc.), features (hearths, pits, middens, etc.) and architectural features (granaries, dwellings, adobe walls, etc.). We will also provide site sketches with GPS reference points in relation to major features.

Objective 3: Quantify vegetation. Multiple vegetation sampling methods suited to the structural changes (number and height of canopy layers, life forms of dominant species) encountered at the sites will be applied. Herbaceous and shrub canopy layers will be sampled using quadrat and line-intercept methods, respectively (Mueller-Dombois and Ellenberg 2003). Another method, point-centered quarter, will be used in woodland and forest types that have an overstory canopy of trees (Mueller-Dombois and Ellenberg 2003). The taxonomic identity, relative abundance (e.g. density, cover) and presence of food resources on plant species occurring in these samples will be used to inventory the potential dietary palette. Representative stands of each vegetation type are recognized by their dominant species and will be identified and described. We will avoid atypical landscape features, such as narrow canyons and small-scale drainages, which might introduce azonal plant communities into the sample. Once located in a homogenous, representative stand, the plot center is established. The plot center marks the intersection of two 50 m transects (fiberglass tapes) oriented along north, south, west and east compass points. This process will be repeated twice in each vegetation type and will be assigned a site number and a GPS location to each plot center. It is most likely that all vegetation types in the study will be comprised of shrub-dominated and herbaceous-dominated canopy layers, therefore the line-intercept cover measurements will be uniformly applied to all sites. The higher elevation sites with tree-dominated overstories will be subject to the point-centered quarter sampling technique, in addition to the line-intercept method (Louderback 2014).

Objective 4: Inventory and survey ethnobotanical species. An inventory of ethnobotanically important species will be generated based on ethnographies from the Colorado Plateau and Great Basin regions (Couture, Ricks, and Housley 1986; Steward 1933; Kelly 1964; Fowler 1986; Chamberlain 1911). We will also interview Native Americans, pioneer descendants and local community members living in the Four Corners region to document historic and contemporary uses of specific plants. These data will be entered into an existing online database, "Ethnobotanical Guides for the Arid West", (<https://nhmu.utah.edu/native-plants>) (Figure 4). Developed in partnership with the BLM Applegate office,

the database has a standardized format for the display of available ethnographic and botanical information on the plant species. It includes key characteristics for identification using minimally technical terms followed by photographs and information on habitat, season of growth, phenology and distribution. The database also includes cultural information, such as subsistence use (e.g. food, medicine, clothing, shelter, etc.), traditional significance, when and how the plant was gathered, and how it was processed. The online database also has data sheets for volunteers and citizen scientists to complete and can be uploaded to the website.

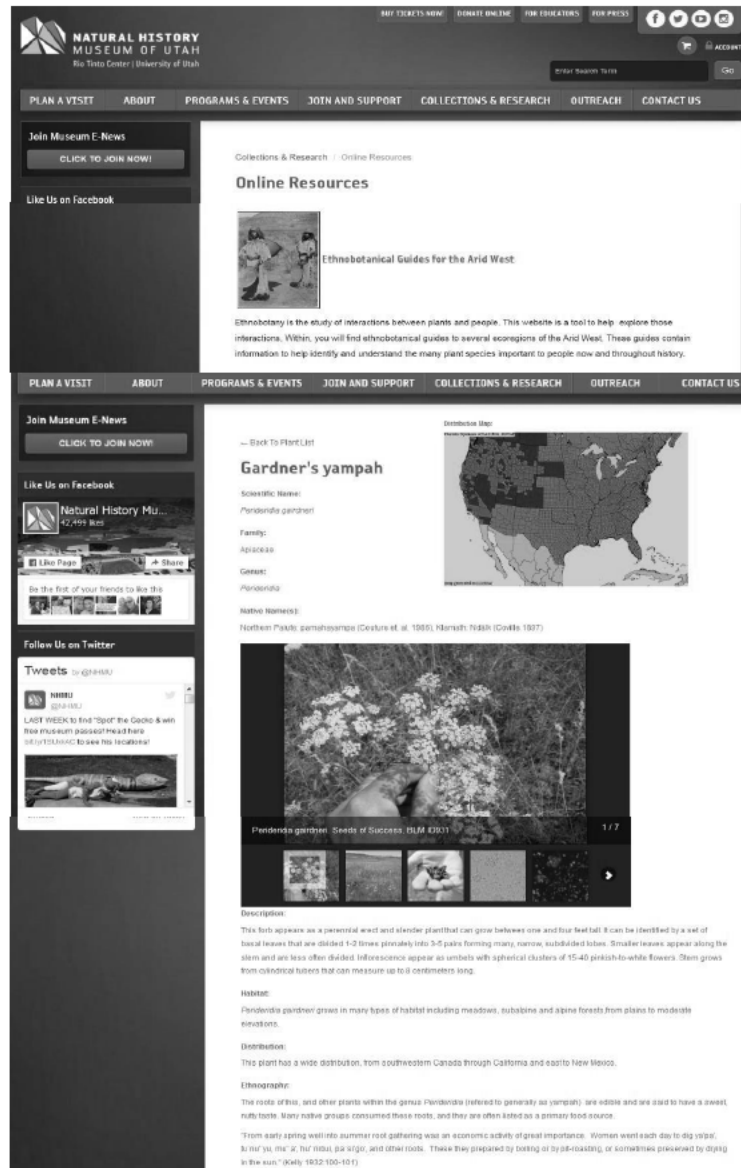


Figure 4. Screen shots of the opening page for the 'Ethnobotanical Guides for the Arid West' and the species page for *Perideridia* spp., published on the NHMU website. This ethnobotanical database was developed in partnership with the BLM Applegate Office (BLM CESU Assistance Agreement L15AC00099).

Proposed period of performance, primary goals and products:

We envision this as a five-year project, each year building upon the accumulated experiences, data and relationships. The size, diversity and complexity of National Conservation Lands in the Four Corners Region will require a multi-year, interdisciplinary and synthetic approach to develop effective management plans. Here we present an overview of those five years, with details provided for only Year 1.

Year 1: Consultation and Site Selection. We will meet with the BLM, USFS and Tribal representatives in May-June 2017 to discuss the identification and field mapping of ethnobotanically important species. In addition to conducting field visits with Tribal leaders and initiating mapping, we will work with agencies and Tribal leaders on the selection of approximately 10 archaeological or botanical sites in Bears Ears for the Year 1 pilot effort. The criteria for selection will include high tribal priority, BLM priority, size, complexity, access and perceived threats. We will perform a summer/fall survey of those sites. The survey will begin the processes of data collection and methodological refinement to meet objectives 2, 3 and 4 (above). But our ***primary goal*** in this first year is to address the concerns and honor the knowledge of members of the Bears Ears Commission and UDB. It would also be wise at this point to discuss with the tribes what benefits they would like to see from this project. For example, they could recommend potato propagation, native plant exhibits, a teaching tool kit for local schools, learning gardens or other useful ways to ensure conservation and dissemination of results. **Products:** We will write a report to record progress in Year 1 and make preliminary management recommendations, especially for sites that are imminently threatened or have special archaeological and/or biological qualities.

Years 2 - 4: Consultation, Site Selection, and Objectives 1, 2, and 3. We imagine that years 2, 3 and 4 will require less initial planning than year 1. We will continue to meet with our BLM PO and coordinate with tribal members to prepare for the field seasons. But our ***primary, post-pilot goal*** will be to select 7 sites each year and accomplish objectives 1, 2, and 3 at each of those sites. Depending on research priorities of the BLM and tribal members, our study could be expanded to include other national monuments throughout the Four Corners region (e.g., GSENM, Vermillion Cliffs, Canyons of the Ancients). **Products:** Annual reports will be generated after each year and preliminary management recommendations will be incorporated.

Year 5: Synthesize and Interpret Data; Formulate Management Recommendations; Finalize Database; Accomplish Outreach and Public Benefits.

The synthesis of survey data will first take the form of distribution maps of archaeological sites and related plant resources. This will allow the analysis of patterns that could reveal ancient settlement, trade routes and plant cultivation. Vegetation data will be summarized in standard form, providing information on species composition, cover (dominance) and the abundance of plant resources. All ethnobotanically important species encountered will be entered into the database to include subsistence use, traditional significance, when and how the plant was gathered, and how it was processed. Preliminary management recommendations from Years 1 to 4 will be examined with a monument-wide perspective to prioritize sensitive areas and develop overall management strategies with the maximum possible efficiency. The relevance and practical application of these management strategies will be examined for other National Conservation Lands in the Four Corners region that have similar resource issues. And finally, we will work with the NHMU Community Outreach department to develop and implement a program and/or activity that would benefit all stakeholders.

Milestone / Task / Activity – <i>Pilot Year 1 only</i>	Start Date	Completion Date
Consultations and site selections	May 2017	June 2017
Surveys, data collection, method improvement (objectives 1, 2 and 3)	June 2017	October 2017
Data synthesis, preliminary management recommendations, report	November 2017	April 2018

OUTREACH AND PUBLIC BENEFIT:

The current paradigm for agricultural origins in the Four Corners is that people adopted exogenous domesticates (i.e., maize, beans and squash) instead of manipulating native plant populations. But we have strong evidence (Louderback and Pavlik 2017) that *Solanum jamesii*, a native potato to the Four Corners region, was not only used by people over 10,000 years ago, but that it might have been manipulated in ancient gardens.

Escalante Valley was named ‘Potato Valley’ by the first settlers (Woosley 1964) where *S. jamesii* was once ubiquitous and an important food source in historic times (Dunmire and Tierney 1995, Roundy 2000). Overgrazing in the early 20th Century dramatically altered the natural vegetation (Nelson 1952) and the species is now considered rare and imperiled in the region (Bamberg et al. 2003). In many parts of the Four Corners, the history and memory of this and other species are fading. From previous interviews in the field, we know it has been grown in gardens in Escalante, Canyon de Chelly and on Zuni reservations.

The proposed research will contribute a collaborative and multidisciplinary approach altering long-accepted paradigms regarding indigenous knowledge, agricultural origins and the domestication of wild plant species. And, at the local level, it will restore an ancient food crop to communities of the Four Corners region. Thus, the outcomes will not only alter our thinking about the origins of North American food crops, but also have broad, positive societal impacts.

QUALIFICATIONS, PAST PERFORMANCE, ACTIVE BLM COOPERATIVE AGREEMENT:

Key Personnel:

Dr. Lisbeth Louderback is Curator of Archaeology at the Natural History Museum of Utah and Assistant Professor in Anthropology Department at the University of Utah. Lisbeth has extensive experience in ethnographic and archaeological plant use, including the analysis of macro- and microbotanical remains (Rhode and Louderback 2007; Louderback 2014; Louderback et al. 2013; Louderback et al. 2015). She has developed a comprehensive ethnobotanical reference collection for the arid West and also studies paleoenvironmental change in the Great Basin and Colorado Plateau (e.g., Louderback and Rhode 2009). Her background is in archaeology, archaeobotany, paleoecology and vegetation ecology. She has done wide-ranging fieldwork in the Great Basin and Colorado Plateau. **Responsibilities:** Lisbeth will oversee the project; she will conduct archaeological surveys and ethnobotanical inventories with research assistants.

Dr. Bruce Pavlik is Director of Conservation at the Red Butte Gardens, University of Utah. Bruce’s research has focused on the ecology and physiology of plants native to western North America, including the conservation of endangered species. Ecological restoration has become central to his research program and recent projects have emphasized the design and active management of populations and communities using field-based, experimental approaches. He has authored or co-authored more than 60 scientific and popular publications in plant conservation, inventory, and ethnobotany (e.g. Pavlik 2008; Wilken et al. 1994). His research interests include the biology of founding populations, the role of adaptive management for resources *in-situ* and the development of restoration protocols for complex, species-rich ecosystems.

Responsibilities: Bruce will conduct vegetation surveys and ethnobotanical inventories in the field. He will also aid in plant collection and identification, and provide botanical expertise.

Dr. Brian Coddling is Associate Professor of Anthropology at University of Utah. Brian's research focuses on the ecology of foraging economies, examining the ways in which populations interact dynamically with their natural and social environments. His research interests include human ecology, behavioral ecology, hunter-gatherers, ethnoecology, ethnoarchaeology, anthropogenic impacts, data analysis, and spatial analysis and he has authored or co-authored over 40 publications. He is currently working on a project with the Navajo Dine on firewood use. His input, therefore, will be valuable when we collaborate with the tribal members. **Responsibilities:** Brian will be responsible for describing, documenting and mapping the landscape and archaeological settings. He will work with a graduate student to generate the maps for the annual reports.

Past performance:

1. From 2015-2017, we were awarded an Assistance Agreement (BLM CA CESU Archaeological and Archaeobotanical Research Partnership L15AC00099). Through this award we established the framework for an online regional ethnobotanical database. We completed the project in January 2016 (screenshots see: Figure 4). The webpages include a publically available database which can be viewed at <https://nhmu.utah.edu/native-plants>. The database currently contains ethnobotanical data on seven species in the northwest Great Basin. As part of the Assistance Agreement, we also created an internal framework from which to continue to add ethnobotanical information to the database. The funds requested for this project will expand the database to include plants from the Colorado Plateau.
2. We recently completed archaeobotanical analyses for a large-scale CRM project documenting the macro- and microbotanical components of human diets for nine excavated sites throughout central and southern Utah (Louderback et al. 2016). We found evidence of maize, several common grasses and geophytes, and evidence suggesting consumption of a rare tuber (Four Corners potato) likely transported from southwestern Utah. Results will be published in a regional journal (Herzog et al. in press).
3. Louderback and members of the Archaeobotany lab recently completed a high-quality macrobotanical reference collection at NHMU. This collection contains over 350 plant specimens from the Great Basin, Mojave Desert, and Colorado Plateau. These are cataloged and described, and are currently used as teaching collections for the University of Utah's Paleoethnobotany courses. They also serve as references for NHMU archaeologists, and will be used to establish a similar collection containing archaeological botanical specimens (in progress).

BLM Cooperative Agreements:

University of Utah is partners with the following Cooperative Agreements:

- Colorado Plateau CESU (http://www.cesu.psu.edu/unit_portals/COPL_portal.htm)
- Great Basin CESU (http://www.cesu.psu.edu/unit_portals/GRBA_portal.htm)
- Desert Southwest CESU (http://www.cesu.psu.edu/unit_portals/DESO_portal.htm)

References Cited:

- Bamberg, J., A. del Rio, Z. Huaman, S. Vega, M. Martin, A. Salas, J. Pavlek, S. Kiru, C. Fernandez, and D. Spooner, 2003. A decade of collecting and research on wild potatoes of the Southwest USA. *American Journal of Potato Research* 80:159-172.
- Bamberg, J.B., Del Rio, A.H., Kinder, D., Louderback, L.A., Pavlik, B.M., Fernandez, C., 2016. Core Collections of Potato (*Solanum*) Species Native to the USA. *Am. J. Potato Res.* DOI:10.1007/s12230-016-9536-2.
- Cordell, L.S., McBrinn, M.E., 2012. *Archaeology of the Southwest*. Left Coast Press, Inc., Walnut Creek, CA.
- Chamberlain, R. V. 1911. "The Ethnobotany of the Gosiute Indians." In *Proceedings of the Academy of Science of Philadelphia*, 63:24–99.
- Couture, M.D., Ricks, M.F., Housley, L., 1986. "Foraging Behavior of a Contemporary Northern Great Basin Population." *Journal of California and Great Basin Anthropology* 8 (2): 150–60.
- Dunmire, W.W., Tierney, G.D., 1995. *Wild Plants of the Pueblo Province: Exploring Ancient and Enduring Uses*. Museum of New Mexico Press, Santa Fe.
- Fowler, C.S., 1986. "Subsistence." In *Handbook of North American Indians*, edited by W. L. D' Azevedo and William C. Sturtevant, 11: Great Basin:64–97. Washington D.C.: Smithsonian Institution.
- Kelly, I.T. 1964. "Southern Paiute Ethnography." <http://core.tdar.org/document/92633>.
- Kinder, D.H., Adams, K.A., Wilson, H., 2017. *Solanum jamesii* Torr.: Evidence for Cultivation of Wild Potato Tubers by Ancestral Puebloan Groups. *J. Ethnobiol.* (In press).
- Louderback, L.A., Pavlik, B.M., 2017. Starch Granule Evidence for the Earliest Potato Use in North America. *Proceedings of the National Academy of Sciences* 114(29) 7606-7610.
- Louderback, L.A., Herzog, N.M., Baker, M., Magargal, K., Pavlik, B.M., 2016. "Archeobotany of the Sigurd to Red Butte Data Recovery Project, Utah." Prepared for SWCA Environmental Consultants. Salt Lake City: Natural History Museum of Utah.
- Louderback, L.A., Herzog, N.M., Pavlik, B.M., 2016. A new approach for the identification of starch granules of wild food plants in arid western North America. *Starch - Stärke* 68, 1–7.
- Louderback, L.A., Field, J., Janetski, J.C., 2015. "Curation Practices and Extraction Methods in Relation to Starch Grain Yields from Ground Stone Artifacts." *Journal of Archaeological Science: Reports* 4: 535–540.
- Louderback, L.A., Rhode, D., Madsen, D.B., Metcalf, M., 2015. "Rapid Vegetation Shifts in the Uinta Mountains (Utah and Wyoming, USA) during the Late Pleistocene and Holocene." *Palaeogeography, Palaeoclimatology, Palaeoecology* 438: 327–343.
- Louderback, L.A., 2014. The Ecology of Human Diets during the Holocene at North Creek Shelter, Utah (Ph.D. dissertation). Department of Anthropology, University of Washington, Seattle. <https://digital.lib.washington.edu/researchworks/handle/1773/25980>.

- Louderback, L.A., Pavlik, B.M., Spurling, A.M., 2013. "Ethnographic and Archaeological Evidence Corroborating Yucca as a Food Source, Mojave Desert, USA." *Journal of Ethnobiology* 33 (2): 281–97.
- Louderback, L.A., Rhode, D.E., 2009. "15,000 Years of Vegetation Change in the Bonneville Basin: The Blue Lake Pollen Record." *Quaternary Science Reviews*, 28 (3–4): 308–26.
- Mueller-Dombois, D., Ellenberg, H., 2003. *Aims and Methods of Vegetation Ecology*. Wiley, New York.
- Nelson, L., 1952. *The Mormon Village: A Pattern and Technique of Land Settlement*. University of Utah Press, Salt Lake City.
- Pavlik, B.M., 2008. *The California Deserts: An Ecological Rediscovery*. Oakland: Univ of California Press.
- Roundy, J.C., 2000. *Advised Them to Call the Place Escalante*. Art City Publishing, Springville, UT.
- Steward, J.H., 1933. "Ethnography of the Owens Valley Paiute." *University of California Publications in American Archaeology and Ethnology* 33 (3): 233–350.
- Toeves, G.R., J.J. Taylor, C.S. Spurrier, W.C. MacKinnon, and M.R. Bobo, 2011. Bureau of Land Management Assessment, Inventory, and Monitoring Strategy: For integrated renewable resources management. Bureau of Land Management, National Operations Center, Denver, CO
- Wilken, D.H., Barbour, M., Pavlik, B.M., Drysdale, F., Lindstrom, S., 1994. *California's Changing Landscapes*. JSTOR. <http://www.jstor.org/stable/41425023>.
- Woolsey, N.G., 1964. *The Escalante Story, 1875-1964*. Art City Publishing, Springville, UT.

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.: L17AS00001 Date: 7/19/2017
 Organization Name: University of Utah
 Project Title: Ecosystems and Plant Resources of Archaeological Sites in the Four Corners Region, USA

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.					Personnel Justification
Name & Title or Position Title	Salary or Wage	Months or Hours	Matching Funds (if applicable)	BLM Funds	
*Lisbeth Louderback, Curator of Archaeology, NHMU	\$11,666.00	2 mos	\$5,833.00	\$5,833.00	
*Bruce Pavlik, Director of Conservation, Red Butte Garden	\$13,332.00	2 mos	\$6,666.00	\$6,666.00	
*Brian Coddling, Assoc. Professor, Univ of Utah	\$9,000.00	1 mo	\$4,500.00	\$4,500.00	
Archaeology Research Assistants (x2)	\$25/hour	64 hrs		\$1,600.00	
Botany Research Assistants (x3)	\$25/hour	96 hrs		\$2,400.00	
Elizabeth Johnson, Garrett Herb.	\$1,875.00	.5 mo	\$1,875.00		
Volunteer Research Assistants (x4)	\$25/hour	128 hrs	\$3,200.00		
Tribal members (Honoraria x 5)	\$200.00			\$1,000.00	
Graduate Student Research Assistant	\$25/hour	160 hrs		\$4,000.00	
A) TOTAL PERSONNEL COSTS: (SF 424A Object Class Category 6a. Personnel)			\$22,074.00	\$25,999.00	
<i>Budget justification of costs:</i> We have increased the number of archaeological and botanical sites from 3 to 9. We also added 3 field visits with tribal representatives for a total of 12 sites. This will increase our pilot data capture by a factor of 4, thus requiring more meetings, more analysis, more reporting time and more people. Our staffing needs increased because Lisbeth and Bruce will be conducting field visits with tribal					

representatives while archaeology and botany research assistants will be conducting field surveys. We will have four teams that come out at different times, each for 4 days. Each team will have an archaeologist, a botanist and a volunteer. The teams will be responsible for conducting the archaeology and botanical surveys at 9 sites. Funds are requested for 1 month salary for Drs. Lisbeth Louderback and Bruce Pavlik who will oversee the fieldwork, participate in field surveys (4 days), conduct field visits with tribal reps (3 days), hold meetings with BLM, USFS and BE coalition, consult with GIS specialist, analyze all data and write up the annual report. We also request funds of 0.5 mo for Dr. Brian Coddington who will participate in field surveys (4 days), compile all archaeological data and write up the archaeological section of the annual report. Funds are also requested for two archaeology research assistants (Coddington and Louderback will be the other 2 archaeologists) who will describe the archaeological site according to its ecological setting. We also request funds for three botany research assistants (Pavlik will be the fourth botanist) who will survey for, inventory and collect botanical species associated with the archaeology. Botany research assistants will also prepare plant specimens for vouchering. Elizabeth Johnson, Collections Manager at the Garrett Herbarium, will donate her time to mount the specimens and start a collection for the "Flora of Bears Ears NM". Each team will also assess the archaeological and/or botanical site for condition and threats. We request Honoraria for 5 tribal member consultations (\$200 per tribal member). Funds are also requested for a graduate student (\$4,000) to help with herbarium vouchers and entering the plant species and transcribe interviews conducted with tribal representatives these data will be entered into the NHMU Ethnobotanical Database.

Three key personnel (Drs. Lisbeth Louderback, Bruce Pavlik, and Brian Coddington) are donating half of their time and expertise to supervise fieldwork, analyze data and writing report. Their salary is based on annualized base salary/12 months. Four volunteers are also donating their time to help with field surveys (but their per diem will be paid for). And Elizabeth Johnson at the Garrett Herbarium will donate her time to mount plant specimens for vouchering.

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
Lisbeth Louderback, Curator of Arch., NHMU	\$5,833.00	35%	\$2,042.00	\$2,042.00
Bruce Pavlik, Dir. of Conservation, Red Butte	\$6,666.00	23%	\$1,533.00	\$1,533.00
Brian Coddington, Assoc. Professor, Univ of Utah	\$9,000.00	35%	\$1,575.00	\$1,575.00
Archaeology Research Assistants (x2)	\$3,200.00	49%	\$1,200.00	\$1,568.00
Botany Research Assistants (x3)	\$3,200.00	49%		\$1,568.00
Elizabeth Johnson, Garrett Herb.	\$1,875.00	64%		
Graduate Student Research Assistant	\$4,000.00	8%		\$320.00
B) TOTAL FRINGE BENEFIT COSTS: (SF 424A Object Class Category 6b. Fringe Benefits)			\$ 6,350.00	\$ 8,606.00

Budget Justification of Costs: Fringe Benefit rates for University of Utah <http://osp.utah.edu/resources/quick-reference/benefits.php>.

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: Monticello, UT (consultation in August)	From: Salt Lake City, UT					
	Lodging	2	4 nights	\$91.00		\$728.00
	Meals and Incidental Expense	2	5 days	\$51.00		\$510.00
To: Monticello, UT (fieldwork in Sept)	From: Salt Lake City, UT					
	Lodging	10	2 nights	\$91.00		\$1,820.00
	Meals and Incidental Expense	10	5 days	\$51.00		\$2,550.00
To: Monticello, UT (fieldwork in Sept)	From: Salt Lake City, UT					
	Lodging	2	9 nights	\$91.00		\$1,638.00
	Meals and Incidental Expense	2	10 days	\$51.00		\$1,020.00
To: Monticello, UT (fieldwork spring 2018)	From: Salt Lake City, UT					
	Lodging	2	4 nights	\$91.00		\$728.00
	Meals and Incidental Expense	2	5 days	\$51.00		\$510.00

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. **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: Monticello, UT (consultation)	From: Salt Lake City, UT	600	1	0.535		\$321.00
To: Monticello, UT (fieldwork)	From: Salt Lake City, UT	800	4	0.535		\$1,712.00

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: Monticello, UT	From: Various (locations of tribal members)	mileage	\$100	5		\$500.00

C) TOTAL TRAVEL COSTS:

(SF 424A Object Class Category 6c. Travel)

\$0.00 **\$12,037.00**

Budget justification of costs: **Consultation meeting (Louderback, Pavlik, BLM, USFS, BE Coalition)** Funds are requested for lodging and per diem for 2 people (Louderback and Pavlik) for 5 days/4 nights. Each person will receive \$51/day (5 days) for ME&I and \$91/night for lodging (4 nights). The BLM PO will use matching funds.

Fieldwork in Sept 2017 Funds are requested for lodging and per diem for 10 people (Coddington, 2 archaeology research assistants, 3 botany research assistants, 4 volunteers) for 5 days/2 nights (2 nights camping, 2 nights hotel). Each person will receive \$51/day (5 days) for ME&I and \$91/night for lodging (2 nights). Louderback and Pavlik will spend 10 days in the field overseeing the fieldwork and conducting field visits with tribal representatives. Because we are unsure of the logistics, we are requesting lodging (\$91/night) for 9 nights for 2 people and ME&I for 10 days (\$51/day).

Fieldwork in spring 2018 Funds are requested for Louderback and Pavlik to travel to Bears Ears for field visits with tribal representatives and land agencies. Four nights lodging (\$91/night) and 5 days ME&I (\$51/day).

Mileage reimbursement (consultation) Funds are requested for Louderback, Pavlik to drive roundtrip 600 miles (SLC Monticello SLC) at \$0.535/mile for a total of \$321.00. Mileage funds are also requested for 5 tribal members. Since we don't know where they are coming from, but assuming they are closer to Monticello, we request \$100 per tribal member for a total of \$500.

Mileage reimbursement (fieldwork) Funds are requested for each of the 4 field crews to drive roundtrip 600 miles (SLC Monticello SLC) and around Bears Ears (200 miles) at \$0.535/mile for a total of \$1,712.00.

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)			\$0.00	\$0.00
<u>Budget justification of costs:</u>				

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
Herbarium unprinted newsprint (1 box = 100 sheets)	1	\$15.35/box		\$15.35
Herbarium mounting papers (1 box = 100 sheets)	1	\$54.75/box		\$54.75
Herbarium labels	1	\$22.50/box		\$22.50
<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)			\$0.00	\$92.60

Budget justification of costs: Herbarium lab supplies for the mounting and vouchering of plant specimens.

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
Digit Lab, University of Utah (for GIS services)	\$500.00		\$500.00
<i>Example: Ace Delivery Service (Yearly Contract)</i>	<i>\$2,500.00</i>	<i>\$0.00</i>	<i>\$2,500.00</i>
F) CONTRACTUAL COST TOTAL: (SF 424A Object Class Category 6f. Contractual)		\$0.00	\$500.00

Budget justification of costs: For Year 1, we will need an initial consultation with GIS specialist at Digit Lab (\$50/hour) and they will also make a map of the 9 archaeological sites with agricultural terraces in Bears Ears National Monument (\$450).

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
G) CONSTRUCTION COST TOTAL: (SF 424A Object Class Category 6g. Construction)		\$0.00	\$0.00
<u>Budget justification of costs:</u>			

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)		\$0.00	\$0.00
<u>Budget justification of costs:</u>			

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
I) TOTAL DIRECT COSTS: (SF 424A Object Class Category 6i. Total, Sum of 6a. 6h.)	\$0.00	\$47,235.00

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:	\$47,235.00		
Total Indirect Costs	Matching Funds (if applicable)	BLM Funds	
J) TOTAL INDIRECT COSTS: (SF 424A Object Class Category 6j. Indirect Charges)	\$	\$8,266.00	
<i>Budget justification of costs:</i> F&A cost rate (17.5%) is based on the University of Utah's CESU agreement with BLM.			

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
K) TOTAL COSTS: (SF 424A Object Class Category 6k. TOTALS)	\$	\$55,501.00

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