

Task Agreement Number P15AC01391
Under
Master Cooperative Agreement P14AC00727
Between
The United States Department of the Interior
National Park Service
And
Northern Arizona University
DUNS No: 806345542
NAU Office of Grant and Contract Services
P.O. Box 4130
Flagstaff, AZ 86011-4130

CFDA: 15.945 – Cooperative Research and Training Programs

Project Title: Field Ecology and Technical Support for Long-term Monitoring in National Parks of the Southern Colorado Plateau Network – 2015

Amount of Federal Funds Obligated: \$133,000

Total Amount of Task Agreement Award: \$133,000

Period of Performance: August 1, 2015 to March 31, 2017

ARTICLE I – BACKGROUND AND OBJECTIVES

Cooperative Agreement Number P14AC00727 was entered into by and between the Department of the Interior, National Park Service (NPS), and Northern Arizona University (NAU) for the purpose of providing field ecology and technical support for long-term monitoring in Southern Colorado Plateau Network parks. The purpose of the monitoring program is to improve our scientific understanding of the status and trends in the condition of a targeted subset of park resources, thus contributing to describing regional resource conditions. Unless otherwise specified herein, the terms and conditions as stated in the Cooperative Agreement will apply to this Task Agreement.

For performance under this task agreement, the regulations set forth in 2 CFR, Part 200, supersedes OMB Circulars A-21 (2 CFR 220), A-87 (2 CFR 225), A-110, and A-122 (2 CFR 230); Circulars A-89, A-102, and A-133; and the guidance in Circular A-50 on Single Audit Act follow-up. The recipient shall adhere to 2 CFR, Part 200 in its entirety in addition to any terms and conditions of the master agreement not superseded by 2 CFR 200, as well as the terms and conditions set forth in this agreement. In the event of a conflict between the original terms of the master agreement and 2 CFR, Part 200, relating to this task agreement, 2 CFR, Part 200 shall take precedence.

Field Ecology and Technical Support for Long-Term Monitoring in National Parks of the SCPN

As part of the Southern Colorado Plateau Network's (SCPN's) Vital Signs monitoring program, this project contributes to understanding the current status and tracking trends in condition through time for a selected suite of indicators of ecosystem condition. The purpose of the project described herein is for SCPN and NAU to collaborate to conduct long-term monitoring of upland, riparian/aquatic and landscape-level indicators in targeted park ecosystems and to communicate monitoring results to a broad

audience of park managers, partners and the general public. Through this collaboration, NPS and NAU will contribute to describing regional ecological integrity and furthering scientific understanding of the current conditions of park resources, which often serve as reference conditions when evaluating the condition of public lands that are more impacted by human use. Results from this project will be publicly available through the SCPN website (<http://science.nature.nps.gov/im/units/scpn/index.cfm>) and the Learning Center of the American Southwest website (<http://www.southwestlearning.org/>).

ARTICLE II – LEGAL AUTHORITY

54 U.S.C. §101702(a) - Cooperative Agreements, Transfer of Services Appropriate Funds
54 U.S.C. §101702(b) - Cooperative Agreements, Cooperative Research and Training Programs
54 U.S.C. §100703 - Cooperative Study Units

ARTICLE III – STATEMENT OF WORK

See the attached Statement of Work.

ARTICLE IV – TERM OF AGREEMENT

This Task Agreement will become effective on the date of final signature and extend through March 31, 2017.

ARTICLE V – KEY OFFICIALS

A. Key officials are essential to ensure maximum coordination and communication between the parties and the work being performed. They are:

1. **For the NPS:**

Agreement Technical Representative:

Lisa Thomas
SCPN Program Manager
Inventory and Monitoring Division, NRSS
National Park Service
U.S. Geological Survey
2255 N. Gemini Drive
Flagstaff, AZ 86001
928-556-7300
lisa_thomas@nps.gov

Awarding Officer:

Andrew Lubner
Financial Assistance and Contracting Officer

Washington Contracting Office
PO Box 25287, MS WCP
Denver, CO 80225
Ph: 303-969-2378
Fx: 303-969-2402
andrew_lubner@nps.gov

2. **For NAU:**

James Allen
Director CPCEU and Executive Director, School of Forestry
Northern Arizona University
PO Box 15018
Flagstaff, AZ 86011
Ph: 928-523-5894
Fax: 928-523-1080
james.allen@nau.edu

Partner Administrative Contact:

Cindy Judge, Grant and Contract Administrator
Office of Grant and Contract Services
Northern Arizona University
P.O. Box 4130
Flagstaff, AZ 86011
Ph: 928-523-6917
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cindy.judge@nau.edu

- B. **Communications** - NAU will address any communication regarding this Agreement to the Awarding Officer with a copy also sent to the ATR. Communications that relate solely to routine operational matters described in the current work plan may be sent only to the ATR
- C. **Changes in Key Officials** - Neither the NPS nor NAU may make any permanent change in a key official without written notice to the other party reasonably in advance of the proposed change. The notice will include a justification with sufficient detail to permit evaluation of the impact of such a change on the scope of work specified within this Agreement. Any permanent change in key officials will be made only by modification to this Agreement.

ARTICLE VI – AWARD AND PAYMENT

- A. Financial Assistance: NPS will provide funding to NAU in an amount not to exceed \$133,000.00 for the work described in Article III and in accordance with the approved budget (Attachment A). Any award beyond the current fiscal year is subject to availability of funds.
- B. NAU shall request payment in accordance with the following:
1. **Method of Payment.** Payment will be made by advance and/or reimbursement through the Department of Treasury’s ASAP system.
 2. **Requesting Advances.** Requests for advances must be submitted via the ASAP system. Requests may be submitted as frequently as required to meet the needs of the FA Recipient to disburse funds for the Federal share of project costs. If feasible, each request should be timed so that payment is received on the same day that the funds are dispersed for direct project costs and/or the proportionate share of any allowable indirect costs. If same-day transfers are not feasible, advance payments must be as close to actual disbursements as administratively feasible.
 3. **Requesting Reimbursement.** Requests for reimbursements must be submitted via the ASAP system. Requests for reimbursement should coincide with normal billing patterns. Each request must be limited to the amount of disbursements made for the Federal share of direct project costs and the proportionate share of allowable indirect costs incurred during that billing period.
 4. **Adjusting payment requests for available cash.** Funds that are available from repayments to, and interest earned on, a revolving fund, program income, rebates, refunds, contract settlements, audit recoveries, credits, discounts, and interest earned on any of those funds must be disbursed before requesting additional cash payments.
 5. **Bank Accounts.** All payments are made through electronic funds transfer to the bank account identified in the U.S Treasury ASAP system by the FA Recipient.
 6. **Supporting Documents and Agency Approval of Payments.** Additional supporting documentation and prior Agency (NPS) approval of payments may be required when/if a FA Recipient is determined to be “high risk” or has performance issues. If prior Agency payment approval is in effect for an award, the ASAP system will notify the FA Recipient when they submit a request for payment. The Recipient must then notify the NPS Awarding Officer identified on the Assistance Agreement that a payment request has been submitted. The NPS Awarding Officer may request additional information from the Recipient to support the payment request prior to approving the release of funds, as deemed necessary. The FA Recipient is required to comply with these requests. Supporting documents may include invoices, copies of contracts, vendor quotes, and other expenditure explanations that justify the reimbursement requests.

ARTICLE VII – REPORTS AND/OR DELIVERABLES

- A. Specific projects or activities within this agreement will be tracked and reported by quarterly submission of a SF-425 Federal Financial Report (FFR) and quarterly submission of a Performance Report. A final SF-425 and Performance Report shall be submitted at the completion of the Agreement. The following reporting period end dates shall be used for interim reports: 3/31, 6/30, 9/30, 12/31. For final the SF-425 and Performance Report, the reporting period end date shall be the end date of the agreement. Interim reports shall be submitted no later than 30 days after the end of each reporting period. Annual and final reports shall be submitted no later than 90 days after the end period date. All reports shall be submitted via email to the NPS Awarding Officer at nps_waso_financial_assistance@nps.gov with a copy to the NPS Agreements Technical Representative via email.

ARTICLE VIII – MODIFICATION AND TERMINATION

This Task Agreement may be modified at any time, prior to the expiration date, by the mutual concurrence of NAU and the NPS. Modifications will be in writing, approved and signed by the NPS Awarding Officer and the NAU signatory official.

ARTICLE IX – GENERAL PROVISIONS

1. **OMB Circulars and Other Regulations.** The following Federal regulations are incorporated by reference into this Agreement (full text can be found at <http://www.ecfr.gov>):
 - a) **Administrative Requirements:**

2 CFR, Part 200 – Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards, in its entirety;
 - b) **Determination of Allowable Costs:**

2 CFR, Part 200 – Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards, Subpart E;

and
 - c) **Audit Requirements:**

2 CFR, Part 200 – Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards, Subpart F.

Appendix A – Statement of Work

STATEMENT OF WORK COLORADO PLATEAU CESU AGREEMENT P14AC00727 TASK AGREEMENT NUMBER

FY2015 Field Ecology and Technical Support for Long-Term Monitoring in National Parks of the Southern Colorado Plateau Network – 2015

PROJECT ABSTRACT:

As part of the Southern Colorado Plateau Network's (SCPN's) Vital Signs monitoring program, this project contributes to understanding the current status and tracking long-term trends for a selected suite of indicators of ecosystem condition. The overall purpose of the project described herein is for SCPN and NAU to collaborate to conduct long-term monitoring of upland, riparian/aquatic and landscape-level indicators in targeted park ecosystems and to communicate monitoring results to a broad audience of park managers, partners and the general public. Through this collaboration, NPS and NAU will contribute to describing regional ecological integrity and furthering scientific understanding of the current conditions of park resources, which often serve as reference conditions when evaluating the condition of public lands that are more impacted by human use. Results from this project will be publicly available through the SCPN website (<http://science.nature.nps.gov/im/units/scpn/index.cfm>) and the Learning Center of the American Southwest website (<http://www.southwestlearning.org/>). The specific objectives of this Task Agreement are to implement long-term monitoring projects for water resources and upland ecosystems, to develop the network's data management system, to prepare reports, articles and other publications describing inventory and monitoring results, and to promote science communication to NPS managers, partners and the broader public.

PRINCIPAL INVESTIGATOR: James Allen, Director CPCEU and Executive Director, School of Forestry, Northern Arizona University

NPS COOPERATORS: Lisa Thomas, Program Manager, SCPN
Lee McCoy, Data Manager, SCPN
Cindy Parker, Assistant Data Manager, SCPN
Jodi Norris, Quantitative and Landscape Ecologist, SCPN
Kristin Straka, GIS Specialist, SCPN
Stacy Stumpf, Water Resources Crew Leader, SCPN
Jim DeCoster, Plant Ecologist, SCPN
Megan Swan, Botanist, SCPN

(specific to Learning Center of the American Southwest Website component)

Acting Program Manager, Chihuahuan Desert Network
Andy Hubbard, Program Manager, Sonoran Desert Network
Robert Bennetts, Program Manager, Southern Plains Network

PROJECT OBJECTIVES: The Southern Colorado Plateau Inventory and Monitoring Network (SCPN) is tasked with implementing a monitoring program to assess status and trends in the condition of natural resources across 19 NPS units on the Colorado Plateau. Since 2005, following a 3-year planning effort, SCPN staff has been working cooperatively with the Northern Colorado Plateau Network (NCPN), other Intermountain Region I&M networks, cooperators from NAU and other universities, and scientists from other agencies to develop long-term ecological monitoring protocols. The emphasis of our collaborative work has now shifted to implementing long-term monitoring in SCPN parks as outlined in the *Vital Signs Monitoring Plan for the Southern Colorado Plateau Network*.

A second important component of the NPS Inventory and Monitoring Division (IMD) mission is to communicate monitoring results and the broader ecological context for those results to a diverse audience of park managers, partners and the general public. Toward that goal, the results of most inventory and monitoring projects are published in the NPS Natural Resource Publication Series and are publicly available through network websites (see <http://science.nature.nps.gov/im/units/scpn/> for the SCPN).

In addition to these venues for science communication, SCPN is working collaboratively with three other I&M networks (Chihuahuan Desert Network, Sonoran Desert Network, and Southern Plains Network) in the intermountain west region to develop and maintain the Learning Center of the American Southwest or LCAS (<http://www.southwestlearning.org/>) – a virtual learning center dedicated to attaining high quality scholarly and scientific information for our parks and protected areas and for making that information accessible to land managers, partners, and the public for use toward better resource stewardship.

The SCPN collaborates with university faculty from NAU, as well as from other CPESU partners and USGS scientists to develop long-term monitoring plans and protocols and implement these monitoring projects in SCPN parks. NAU employees and students involved in the I&M program gain direct experience with the development and application of a park-based science program.

The specific objectives of this Task Agreement are:

1. To implement long-term water resources monitoring of selected SCPN streams and springs and to collaborate with the SCPN staff toward the completion of water resources monitoring protocols and reports. Monitoring topics include 1) riparian ecosystems, 2) aquatic macroinvertebrates, 3) water quality, and 4) spring ecosystems.
2. To implement long-term upland vegetation and soils monitoring within selected upland ecological sites and to collaborate with the SCPN staff toward the completion of upland monitoring reports.
3. To implement the *SCPN Data Management Plan* and to collaborate with the SCPN staff toward developing and maintaining the program's data management and GIS capabilities.
4. To collaborate with SCPN staff to develop science communication materials about the natural resources of SCPN parks and related NPS management and science issues/activities. These projects will contribute to public understanding of park resources and resource topics and may be written for the SCPN and/or LCAS websites. To provide support for the Learning Center of the American Southwest (LCAS) website in coordination with SCPN and the Chihuahuan, Sonoran, and Southern Plains Networks.
5. To provide project oversight and administration. The NAU Principal Investigator will supervise the NAU staff involved with tasks above and will serve as a senior scientist providing scientific review and guidance, as well as coordination with SCPN staff.

PROJECT BACKGROUND:

National Park managers across the country are confronted with increasingly complex and challenging issues that require broad-based understanding of the status and trends of park resources as a foundation for making decisions, working with other agencies, and communicating with the public to protect park natural systems and native species. Monitoring data help to define the normal limits of natural variation in park resources, detect long-term environmental change, provide insights into the ecological consequences of change, and inform stakeholders and the general public of changes in resource conditions that may be caused by stressors operating at regional and global scales.

The NPS monitoring program provides information on the overall condition of park natural resources and the long-term effectiveness of management regimes based on changes in the status and trend of selected park resources. The first few years of monitoring data are being used to document current conditions for selected vital signs across network park ecosystems. Over the long term, consistently collected monitoring data will provide park managers with information describing the status and long-term trends in resource condition. This information is fundamental to natural resources stewardship because it provides the context for interpreting observed changes and may provide the basis for modifying or initiating new management practices. The NPS I&M data will also have broad regional scientific utility because NPS lands often provide the closest approximation of undisturbed reference conditions as a point of comparison for areas that are more impacted by human use.

Southern Colorado Plateau Network Parks: The SCPN includes 19 parks and monuments located throughout the northern Arizona, northwestern New Mexico, southwestern Colorado and southeastern Utah: Aztec Ruins National Monument (AZRU), Bandelier National Monument (BAND), Canyon de Chelly National Monument (CACH), Chaco Culture National Historical Park (CHCU), El Malpais National Monument (ELMA), El Morro National Monument (ELMO), Glen Canyon National Recreation Area (GLCA), Grand Canyon National Park (GRCA), Hubbell Trading Post National Historic Site (HUTR), Mesa Verde National Park (MEVE), Navajo National Monument (NAVA), Petrified Forest National Park (PEFO), Petroglyph National Monument (PETR), Rainbow Bridge National Monument (RABR), Salinas Pueblo Missions National Monument (SAPU), Sunset Canyon National Monument (SUCR), Walnut Canyon National Monument (WACA), Wupatki National Monument (WUPA), Yucca House National Monument (YUHO).

Table 1. Core SCPN monitoring projects and the vital signs to be monitored.

Monitoring Project	Vital Signs
Land surface phenology	Start & end of season, spring peak greenness, monsoon peak greenness, season-long productivity, snow cover extent & duration
Integrated upland ecosystems	Vegetation composition & structure, soil stability & upland hydrologic function
Habitat-based bird communities	Bird community composition & abundance; habitat metrics (vegetation cover by functional group, tree basal area, sapling density, canopy closure)
Aquatic macroinvertebrates	Aquatic macroinvertebrate composition & abundance; habitat metrics (water depth, water velocity, substrate size, canopy closure)
Integrated riparian	Streamflow & depth to groundwater, fluvial geomorphology, vegetation composition & structure
Spring Ecosystems	Spring flow & depth to groundwater, vegetation composition & structure
Water quality of streams & springs	Core parameters (temperature, pH, specific conductivity, dissolved oxygen, turbidity, flow); bacteria, nutrients, trace metals, & major ions

DETAILED TASK DESCRIPTIONS:

1. **Water Resources Monitoring.** NAU will support four part-time temporary positions to serve on the water resources monitoring crew. The water resources crew will work with SCPN staff (including SCPN hydrologist, water resource crew leader, & hydrologic technician), park staff, and cooperating scientists to develop and implement specific long-term monitoring projects. The water resources crew will be focused on the following tasks during 2016.
 - a. Collaborate with SCPN staff by compiling scientific literature, reports, data and other information to support the implementation of water resource monitoring projects and the interpretation of monitoring results.
 - b. Contribute to the development, testing and revision of protocols related to monitoring riparian ecosystems, and spring ecosystems.
 - c. Work with SCPN staff to organize, schedule, and execute a wide variety of water resource monitoring projects.
 - d. Serve as field crew members and/or crew leads and coordinate field inventory and monitoring activities or related field surveys and research within SCPN parks.
 - e. Conduct routine data summary and analysis. Write summaries of projects and assist with preparation of reports and publications.

The 2016 work will emphasize:

- Final editing of the integrated riparian monitoring protocol
- Completion of the springs monitoring protocol
- Continued establishment of riparian monitoring sites and implementation of integrated riparian protocol at those sites.
- Continued implementation of aquatic macroinvertebrate protocol at established sites.
- Continued implementation of water quality monitoring protocol.
- Initial implementation of springs monitoring protocol.
- Data summary for monitoring completed in 2014/2015.

2. **Integrated Upland Monitoring.** NAU will support four to five part-time temporary positions to serve on the upland monitoring crew. The upland monitoring crew will work with SCPN staff (including SCPN plant ecologist and botanist), and park staff to implement specific long-term monitoring projects. The uplands crew will be focused on the following tasks during 2016.
 - a. Collaborate with SCPN staff and cooperators by compiling scientific literature, reports, data and other information to support the implementation of upland vegetation and soils monitoring projects and the interpretation of monitoring results.
 - b. Work with SCPN staff to organize, schedule, and execute a wide variety of upland inventory and monitoring projects.
 - c. Serve as field crew members and/or crew leads and coordinate field inventory and monitoring activities or related field surveys and research within SCPN parks.
 - d. Conduct routine data summary and analysis. Write summaries of projects and assist with preparation of reports and publications.

The 2016 work will emphasize:

- Continued establishment of upland monitoring sites and implementation of integrated upland protocol at those sites.
- Resampling of upland monitoring sites previously established.
- Data summary for monitoring completed in 2014/2015.

3. ***Data management and GIS Support.*** NAU will support two part-time temporary position to provide spatial data management and GIS support.

The Sr. Research Specialist (GIS) and Research Specialist will work with SCPN staff (including the SCPN data manager and GIS specialist), park staff, and cooperating personnel to assist in the gathering, processing, archival and distribution of spatial data. The following tasks will be the focus of work in 2016.

- Process MODIS data in preparation for statistical analysis of landscape greenness and snowcover in parks and adjacent areas.
- Load and download plot coordinates onto GPS units for SCPN field crew use.
- Create consistent attribute structure and assign attribute metadata for datasets being created as part of the monitoring program.
- Provide map products for routine SCPN tasks including permit applications, and annual reports, and field maps.
- Complete metadata in GIS catalog for inventory and query of SCPN spatial datasets.
- Find and download new and updated spatial datasets from local, state and federal websites.

4. ***Learning Center of the American Southwest (LCAS) and Science of the American Southwest Website Management.***

NAU and SCPN will continue to collaborate to produce web-based science communication materials for NPS managers, our science partners, and for the public. NAU will hire a part-time temporary Junior Web Designer to oversee content management and maintenance of the LCAS website and to transition LCAS content to the new nps.gov website (Science of the American Southwest). Duties will include:

- Maintain the LCAS Virtual Learning Center (VLC) website until the nps.gov site is complete.
- Work with NPS website developers to refine NPS Content Management System (CMS) to accommodate LCAS website content. Continue migrating a range of LCAS content into the NPS CMS. Work with Southern Colorado Plateau, Sonoran Desert, Southern Plains and Chihuahuan Desert Network staff to populate the NPS CMS with science content. Identify current LCAS features that should be supported through the NPS CMS and work with NRSS web development staff to solve identified problems and complete full site migration.

5. ***SCPN – NAU Project Oversight and Administration.*** The NAU Principal Investigator will supervise the NAU staff involved with tasks above, will serve as a senior scientist providing scientific review and guidance, and will coordinate closely with SCPN program manager, project managers, and technical staff to ensure that NPS safety procedures & monitoring protocols are

followed and science standards are met. The NAU Project Coordinator will coordinate day-to-day activities with the NPS Project Managers and Field Crew Leaders and will provide NAU administrative functions including time-keeping and travel processing. NAU will also assist with hosting meetings and workshops of agency and university scientists to support monitoring program goals.

NPS SUBSTANTIAL INVOLVEMENT: National Park Service staff from SCPN will be fully engaged with NAU staff throughout the course of this project. The NPS will continue to provide overall coordination of the project and to set the priorities and work schedule. NPS will provide relevant reports, data and other supporting materials from SCPN and park files. NPS will also provide timely review of products associated with this project and input as needed. NAU staff will use NPS vehicles to accomplish field work described herein. NPS will provide field and office equipment to accomplish monitoring objectives (e.g. computers, water quality probes, GPS equipment, data loggers, etc.). NPS and NAU will work collaboratively to meet project objectives.

PRODUCTS AND SCHEDULE: All cooperators shall continue to have full opportunity to review, cooperate in the planning, execution, and publication of the results of the work conducted under this agreement. NPS will be responsible for management review and approval of all products. NAU cooperators will prepare I&M annual reports as appropriate to meet NPS deadlines.

1. Trip reports to describe results of riparian, water quality, aquatic macroinvertebrate, and other water resource related monitoring trips – due by December 31 of the year in which the work occurred.
2. Annual reports to summarize data collected during the previous field season -- due six months after field work is completed for riparian and water quality monitoring; due one year after field work is completed for macroinvertebrate monitoring.
3. Trip reports to describe results of upland monitoring trips – due by December 31 of the year in which the work occurred.
4. Annual reports to summarize integrated upland data collected during the previous field season – due six months after field work is completed.
5. Multiple I&M reports and other materials to be published in NRTR Series and posted to appropriate websites.
6. Science communication products (written reports and multi-media products) for posting to park, SCPN and Science of the American Southwest websites.
7. Brief report abstract suitable for public distribution. 2 hard copies, 1 electronic copy (pdf format) of final report provided to the NPS Research Coordinator.