



PR Number: 0020054381

Award Number: P14AC01366

Project Number: NAU-454

CFDA #: 15.945

Park/NPS Unit: Denali National Park

Title of Project: Permafrost and Carbon Cycling Monitoring Protocol: Implementing and Validation of Standard Operating Procedures for the 8-Mile Lake site and measure permafrost index site in Denali National Park.

Administered through the: Colorado Plateau Cooperative Ecosystem Studies Unit Cooperative Agreement Number P14AC00921

CESU Partner: Northern Arizona University

PROJECT CONTACTS:

Principal Investigator: Dr. Edward Schuur, Professor, Northern Arizona University, Department of Biological Sciences, 617 S. Beaver St., PO Box: 5640, Flagstaff AZ 86011-5640, 928-523-2381, 928-523-7500, tschuur@ufl.edu

Partner Administrative Contact:

Cindy Judge, Grant and Contract Administrator, Northern Arizona University, tel. 928-523-6917, cindy.judge@nau.edu

NPS Certified ATR: David Schirokauer, Physical Science Program Manager, Denali National Park and Preserve, PO Box 9, Denali Park AK 99755, 907-683-9605 dave_schirokauer@nps.gov

NPS Technical Expert (if appropriate): NA

FUNDING INFORMATION:

Amount Funded: \$15,275

NPS Account Numbers (amounts in parentheses): PPAKAKIMC0 PPMRSNR1Y.AM0000 C3

Fund Source: ONPS

NPS Funding

Is this funded using a reimbursable account number? If yes, IMR contracting needs a copy of the Interagency Agreement.

PROJECT DATES:

Start Date: 08/31/2014

NOTE: This Task Agreement will become effective on the date of final signature or the effective date of the Award document, whichever is later.

End Date: 08/31/2015

NPS Administrative Contacts

Interim CESU Coordinator (May 18 – September 13, 2014): Todd Chaudhry, National Park Service/CPCESU, NAU P.O. Box 5765, Flagstaff, AZ 86011, 928-523-6638, Fax: 928-523-2014; todd_chaudhry@nps.gov

Intermountain Region Administrative Contact: Kelly Adams, Grants and Agreements Specialist, National Park Service, 12795 West Alameda Pkwy, Lakewood, CO 80228. Phone: 303-969-2303 Fax: 303-969-2992 Email: Kelly_adams@nps.gov

FEDERAL FINANCIAL REPORTS:

Federal Financial Reports (Check as required for project based on spending plan, period of performance, risk, cooperator history, etc.)

Quarterly Semi-annually Annually

Final (required): 11/30/2015

PROJECT SCHEDULE AND TECHNICAL REPORT DEADLINES:

List all technical reports and products in sequential order as required in the scope (more lines and milestones can be added as needed):

Project Start Date – 08/31/2014

Technical progress reports – Quarterly Semi-annually Annually
(Check as needed from PI to monitor progress of specific project. Content should be addressed in the scope.)

Investigator's Annual Reports (IAR) – 09/30/2015

Database, Collections/Specimens, Archives, and Maps provided to the NPS ATR or Technical Expert

Draft Final Report – 09/30/2015

Final Report – 11/30/2015

| *Project End Date* – ~~11/30/2015~~[08/31/2015](#)

| *Final SF425 FFR* must be submitted within 90 days of project end date; [no later than 11/30/2015](#)

PAYMENTS

2 CFR PART 215.22: Cash advance (drawdown) to recipient organization shall be limited to the minimum amounts needed and be timed to be in accordance with the actual immediate cash requirements of the recipient organization in carrying out the purpose 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.

2 CFR PART 215.25 (8)(e)(1): Incur pre-award costs 90 calendar days prior to award or more than 90 calendar days with the prior approval of the Federal awarding agency. All pre-award costs are incurred at the recipient's risk. (i.e. the Federal awarding agency is under no obligation to reimburse such costs if for any reason the recipient does not receive an award or if the award is less than anticipated and inadequate to cover such costs.)

CESU REQUIRED PRODUCTS (may be different from those products required by the ATR – See Statement of Work for Products required by the NPS unit):

The Principal Investigator will prepare a brief report abstract suitable for public distribution and two hard copies and an electronic version (in PDF file format) of the final report and mail all to Todd Chaudhry, National Park Service, CPCEU, NAU P.O. Box 5765, Flagstaff, AZ 86011. Please be sure to include the project number (e.g.; NAU-###) and the P number on the cover page of the final report.

PROJECT ABSTRACT:

The Central Alaska Inventory and Monitoring Network of the National Park Service (NPS) is in the process of implementing a permafrost monitoring program. This work builds on previous work that resulted in draft permafrost monitoring protocol plan. This project will continue the implementation of data collection for core metrics identified by the National Park Service and Edward Schuur, PhD of the University of Florida (UF) under a prior cooperative research project (Task Agreement: J9836100075) for the Eight Mile Lake research site. The objectives of this project are to: 1) facilitate continuation of monitoring efforts at the Eight Mile Lake permafrost research site, and 2) provide recommendations for an effective and efficient design for monitoring the relevant components of permafrost at satellite index sites within Denali National Park and Preserve (DENA); and 3) provide the data, report and data analysis for this annual performance period.

SCOPE OF WORK:

Background: Permafrost, defined as subsurface earth materials remaining below 0°C for two consecutive years, is widespread in the Arctic and boreal regions of the Northern Hemisphere, where permafrost regions occupy 22% of the exposed land surface area (Zhang et al. 1999). Permafrost temperature, thickness, and geographic continuity are controlled to a large extent by the surface energy balance and thus vary strongly with latitude. Permafrost thickness spans a wide range; in the continuous permafrost zone of the Northern Hemisphere, permafrost thickness typically ranges between 350-650 m, while in the discontinuous zone farther south is typically from <1 to 50 m thick (Yershov 1998). In the discontinuous zone, regional temperature is not low enough to sustain permafrost everywhere, thus patterns of permafrost distribution are determined to a large extent by local factors such as topography, hydrology, vegetation, snow cover, and subsurface material properties. Interior Alaska, the location of the Central Alaska Network Parks and Preserves Network (CAKN), lies within the discontinuous permafrost zone. Permafrost in this area is especially susceptible to change in the coming decades as a result of observed and anticipated climate change.

The Central Alaska Inventory and Monitoring Network of the National Park Service is in the process of implementing a permafrost monitoring program. This pilot implementation will provide a continuation of monitoring efforts at the Eight Mile Lake permafrost research site, and additional recommendations for an effective and efficient design for monitoring the relevant components of permafrost at satellite index sites within Denali National Park and Preserve (DENA).

Approach: This project will continue the implementation of data collection for core metrics identified by the NPS and PI during the previous agreement (TA: R9836100075) for the Eight Mile Lake research site. The project will occur for one field seasons (2014-15) under this tasks agreement.

Site Description: The primary, intensive, monitoring site is located at 8-Mile Lake off of the Stampede Road, in the northern foothills of the Alaska Range just outside Denali National Park. Ground temperature in a borehole has been monitored for several decades at this site, before and after the permafrost was observed to thaw on a gentle north-facing slope. Permafrost thawing was local (<1x1 km area) and permafrost appears to remain in adjacent areas. In this area, there are three sites that represent differing amounts of disturbance from permafrost thawing based on observations of the vegetation and the borehole measurements: 1) tussock tundra typical of arctic ecosystems, dominated by the sedge *Eriophorum vaginatum* and Sphagnum spp mosses, 2) a site near the borehole used for permafrost temperatures where the vegetation composition has been shifting to

include more shrub species, such as *Vaccinium uliginosum* and *Rubus chamaemorus*, and 3) a site located where permafrost melted more than several decades ago, now completely dominated by shrub species. These three sites are a natural experimental gradient representing the long-term effects of permafrost thaw on ecosystems. As such, this area is unique for addressing the impact of changes in permafrost at the time and spatial scales relevant for change in northern ecosystems.

Methods: 1) Established methods and draft SOPs for the thermal state of permafrost will continue to be implemented along the established thaw gradient at the 8-Mile Lake study area. 2) Established methods and SOPs for monitoring CO₂ flux will continue to be implemented at the Eight Mile Lake study area. 3) At least two remote index monitoring site will be established. Established methods and SOPs for monitoring the physical state of permafrost will be conducted, evaluated, and modified if necessary. 4) Late season (late August to mid-September) water samples collected at index monitoring site(s) in Denali NP&P for measuring hydrological carbon flux. The existing draft permafrost monitoring protocol for monitoring hydrological carbon flux and SOPs will be used as a methods guide.

Tasks and schedule:

The period of performance of this agreement is from 8/30/2014 through 11/30/2015. The cooperator shall perform the following tasks according to the projected schedule.

08/30/2014	Initiate project In-person or teleconference with PI to set general field schedules
01/01/2015	Teleconference with PI and NPS to confirm field schedules
03/01/2015	Deliver annual study plan to NPS
8/31/2015	Complete annual fieldwork in conjunction with the NPS
9/30/2015	Draft final report delivered to the NPS (Begin 60 day wrap-up period)
11/30/2015	Final report delivered to the NPS

COOPERATIVE AGREEMENTS OR TASK AGREEMENTS INVOLVING COOPERATORS WORKING ON-SITE

Background

In cooperative agreements or task agreements with universities where the university utilizes interns, student employees, research associates (RAs) or cooperators on-site (hereafter called “cooperator personnel”), these cooperator personnel sometimes work on government sites in close proximity to federal employees. It is illegal (without specific statutory authority) for federal employees to directly supervise the cooperator personnel or any university employees or for the students or other university employees to supervise federal employees. When cooperator personnel are working on an NPS site, it is important that there is a clear distinction between students and federal employees.

Office Environment and Vehicles

- The office space of the cooperator personnel and NPS personnel should be clearly labeled (Name and NPS or University affiliation on office or cubicle space).

- Cooperator personnel should be listed separately from NPS personnel in telephone lists, other identification or organizational rosters, and publication credits.
- Cooperator personnel should not receive “all-employee” e-mail or other communications intended for NPS personnel (unless it relates directly to the work the cooperator is doing for the NPS). When the e-mail does relate to the work being done, a copy of the same e-mail message should be sent to the University or cooperator’s supervisor.
- Cooperator personnel may use NPS e-mail systems when the communication relates directly to the work the cooperator is doing for the NPS. The e-mail addresses of the cooperator personnel must include a label associated with their NPS e-mail address that identifies the cooperator’s status (i.e., “Linda Webb, Cooperator” would be the label associated with the e-mail address, linda_webb@contractor.nps.gov). Doing so clearly identifies this individual each time they send an e-mail message using the NPS system, and it identifies their status as a research associate, student intern or student employee in the e-mail directory.
- Unless stipulated in the agreement, cooperator personnel should not drive government vehicles.
- Unless stipulated in the agreement, cooperator personnel should not ride as a passenger in a government vehicle. When this is planned as part of the agreement, an appropriate amount of liability insurance should be negotiated.
- Prior written approval by the Park Superintendent or Center Manager must be obtained in order for a task to allow cooperator personnel to drive or ride in government vehicles.

Supervision and Scheduling

- Each task must specify the university’s/cooperator’s supervisor for the cooperator personnel.
- Unless stipulated in the agreement, NPS staff should not set hours for cooperator personnel, specify where the work should be done, or conduct performance appraisals. National Park Service staff may give performance feedback to the cooperator personnel supervisor.
- Cooperator personnel should report leave, scheduling, and other related issues to the university or cooperator’s supervisor, not to NPS employees. The supervisor of the cooperator personnel should then communicate with the NPS. National Park Service employees cannot directly supervise cooperator personnel on a day-to-day basis. Work should be given to the cooperator personnel (via the cooperator’s supervisor) on a “task basis.” Cooperators should work without NPS supervision to accomplish each task, although technical consultations and cooperation is permissible.
- The Cooperator will be responsible for any disciplinary action needed to correct student employee conduct or performance problems. The NPS agreements technical representative will inform the university/cooperator’s supervisor of any conduct or performance problems.
- The Cooperator will remove student employees from their positions if they fail to improve performance or address conduct issues.
- The NPS will review and provide feedback to students or interns regarding work assignments.
- The NPS will inform the cooperator of conduct or performance problems with cooperator personnel so that the university can counsel employees and correct the performance problems.
- The NPS will recommend to the cooperator dismissal of cooperator personnel based on conduct or performance issues.
- The Cooperator will hire students, interns or RAs to work on NPS tasks identified in the agreement. Hiring will be conducted in consultation with the NPS Agreements Technical Representative (ATR).
- The Cooperator will: pay students, interns or RAs for hours they have worked in support of the agreement.

Representation and Communication

- Cooperator personnel cannot in any way represent themselves to the public as NPS employees.
- Cooperator personnel are required to wear visible identification at all times.

Other Issues

- Cooperator personnel should not list an NPS affiliation on publications, but rather should list the cooperative agreement under which the work was performed.
- Cooperator personnel should not be invited to official NPS “social” events.
- Cooperator personnel will follow the local policy of the facility when federal facilities are closed due to early release for holidays, snow days, etc.

PRODUCTS:

1. Annual reports including data tables and figures for each year of the project
2. A least one evening seminar at Denali lead by NAU field staff per year for the general public
3. A final report that synthesizes the measurements made during the course of the Task Agreement and a manuscript for publication presenting key findings.

BUDGET:

See attached