153

The State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES

MAY 22'13 PM 12:04 DES

Thomas S. Burack, Commissioner

May 2, 2013

Her Excellency, Governor Margaret Wood Hassan
and The Honorable Council
State House
Concord, New Hampshire 03301

Sole Source

REQUESTED ACTION

Authorize the Department of Environmental Services to amend a **sole source** Cooperative Project Agreement (PO# 7000745) with the United States Geological Survey, St. Petersburg Coastal and Marine Science Center, St. Petersburg, Florida (VC #175772), to complete an airborne topographic survey of the Suncook River in support of the Suncook River Fluvial Erosion Hazard project by extending the completion date to June 30, 2015 from June 30, 2013. The original amount of this agreement is $62,920. No additional funding is involved in this time extension request. The original agreement was approved by Governor and Council on July 11, 2012, Item #60. 100% Capital (General) Funds.

EXPLANATION

Under this Cooperative Project Agreement, the United States Geological Survey, St. Petersburg Coastal and Marine Science Center (USGS-SPCMSC) will provide river topographic data that will significantly enhance the assessment of erosion hazards and improve the accuracy of the resulting hazard maps. The topographic survey will utilize the Experimental Advanced Airborne Research (EAARL-B) LiDAR system which is uniquely designed to "see" below the water surface in order to map submerged features of the channel bed, a capability that does not exist with conventional, commercial grade LiDAR systems. This request is for a **sole source** contract because USGS-SPCMSC is the developer and operator of the only EAARL-B system currently in existence. A no-cost extension is being requested to allow greater flexibility in scheduling the LiDAR survey, given uncertainties associated with the weather and operational readiness of the aircraft and pilot. This survey was slated to be performed during the fall of 2012. However, the aircraft and LiDAR unit were redeployed to areas in the Mid-Atlantic states in the aftermath of Hurricane Sandy.

On May 14-15, 2006, the Suncook River experienced an avulsion, by which about one mile of river channel changed location. The avulsion has resulted in major effects on the Suncook, including upstream migrating headcuts and considerable erosion on the present-day Suncook River mainstem and tributaries. These processes are occurring at a far greater rate than normal in response to the dramatic change represented by the avulsion. Residents on the Suncook River, as well as the traveling public that uses the U.S Route 4 bridge in Epsom, continue to be vulnerable to the effects of ongoing erosion and potential for future changes in the location of the river channel.

Fluvial erosion hazard assessments identify areas adjacent to rivers that are susceptible to river erosion where public safety, life and property are most at risk. These assessments are performed by specialists

trained in river processes and require the collection of detailed cross-sections of channel and floodplain elevations at strategic locations along the river. The EAARL-B LiDAR survey will capture detailed topography of both the riverbed and adjacent floodplain and allow for the creation of many more cross-sections than would otherwise be possible with standard field survey methods. Further, the detail obtained through this survey will serve as a baseline against which to compare the results of any future surveys so that the actual rate of change over time and associated erosion risks can be monitored. This type of monitoring has been recognized as an ongoing need for the Suncook River and is of great interest to community officials and citizens in the Suncook River valley.

The agreement has been approved by the Office of the Attorney General as to form, execution, and content. We respectfully request your approval.

Thomas S. Burack, Commissioner

AMENDMENT # 1 TO A COLLABORATIVE AGREEMENT BETWEEN
THE U.S. GEOLOGICAL SURVEY
AND
THE NEW HAMPSHIRE GEOLOGICAL SURVEY

Amendment Number: ____1_____
Agreement Number _12ESMN00SUN2372_____

The Collaborative Agreement between the U.S. Geological Survey (USGS) and New Hampshire Geological Survey (Collaborator), approved by the New Hampshire Governor and Council on July 11, 2012, for the purpose of creating a new Experimental Advanced Airborne Research Lidar survey at Suncook River, New Hampshire, is hereby modified as follows:

Article 3: The date of expiration of the agreement shall be extended from June 30, 2013 to June 30, 2015.

The Effective Date of this Amendment shall be the date it receives the signed approval of the Governor and Executive Council of the State of New Hampshire.

All other terms and conditions in the original agreement shall remain the same.

FOR THE U.S. GEOLOGICAL SURVEY:

By _____ Acting for 5/8/2013
Name: Richard Z. Poore
Title: Center Director

FOR COLLABORATOR:

THE STATE OF NEW HAMPSHIRE
Department of Environmental Services

By _____
Thomas S. Burack, Commissioner

Approved by Attorney General this 17 day of May, 2013

OFFICE OF ATTORNEY GENERAL

By _____

Attachment A: Copy of Original Agreement

Kim

The State of New Hampshire

Department of Environmental Services

Thomas S. Burack, Commissioner

Celebrating 25 Years of Protecting New Hampshire's Environment

June 15, 2012

PO 7000745

APPROVED G & C

DATE 7/11/2012

ITEM # 60

His Excellency, Governor John H. Lynch
and The Honorable Council
State House
Concord, NH 03301

REQUESTED ACTION

Authorize the Department of Environmental Services to enter into a **sole source** Cooperative Project Agreement with the United States Geological Survey, St. Petersburg Coastal and Marine Science Center, St. Petersburg, Florida (**VC #175772**), in the amount of $62,920 to complete an airborne topographic survey of the lower Suncook River in support of the Suncook River Fluvial Erosion Hazard project effective upon Governor and Council approval through June 30, 2013. 100% Capital (General) Funds.

WL 1616903
RQ 131251

Funding is available in the account as follows:

9185500

	FY 2013
03-44-44-440030-0960-034-500162	$62,920

Dept Environmental Services, Suncook River Infrastructure Protection Project, Capital Projects

EXPLANATION

A capital budget appropriation was secured to support infrastructure protection activities designed to address ongoing river instability issues on the Suncook River. This appropriation supports interrelated initiatives to protect critical public infrastructure, such as the U.S. Route 4 bridge in Epsom, and to facilitate long-term protection of public safety in lands that are adjacent to the Suncook River, through the assessment of fluvial erosion hazards and delineation of the Fluvial Erosion Hazard (FEH) zones. Under this Cooperative Project Agreement, the United States Geological Survey, St. Petersburg Coastal and Marine Science Center (USGS-SPCMSC) will provide river topographic data that will significantly enhance the assessment of erosion hazards and improve the accuracy of the resulting FEH zones. The topographic survey will utilize the Experimental Advanced Airborne Research (EAARL) LiDAR system which is uniquely designed to "see" below the water surface in order to map submerged features of the channel bed, a capability that does not exist with conventional, commercial grade LiDAR systems. This request is for a **sole source** contract because USGS-SPCMSC is the developer and operator of the only EAARL system currently in existence.

On May 14-15, 2006, the Suncook River experienced an avulsion, by which about one mile of river channel changed location. The avulsion has resulted in major effects on the Suncook, including upstream migrating headcuts and considerable erosion on the present-day Suncook River mainstem and tributaries. These processes are occurring at a far greater rate than normal in response to the dramatic change represented by the avulsion. Residents on the Suncook River, as well as the traveling public that uses the U.S Route 4 bridge in Epsom,

continue to be vulnerable to the effects of ongoing erosion and potential for future changes in the location of the river channel.

FEH assessments identify areas adjacent to rivers that are susceptible to river erosion where public safety, life and property are most at risk. These assessments are performed by specialists trained in river processes and require the collection of detailed cross-sections of channel and floodplain elevations at strategic locations along the river. The EAARL LiDAR survey will capture detailed topography of both the riverbed and adjacent floodplain and allow for the creation of many more cross-sections than would otherwise be possible with standard field survey methods. Further, the detail obtained through this survey will serve as a baseline against which to compare the results of any future surveys so that the actual rate of change over time and associated erosion risks can be monitored. This type of monitoring has been recognized as an ongoing need for the Suncook River and is of great interest to community officials and citizens in the Suncook River valley.

The agreement has been approved by the Office of the Attorney General as to form, execution, and content.

We respectfully request your approval.

Thomas S. Burack, Commissioner

Collaborative Agreement

Agreement between U.S. Geological Survey, a Bureau of the Department of the Interior, through the offices of its **St. Petersburg Coastal and Marine Science Center**, located in St. Petersburg, FL, hereinafter called "USGS"; and **the New Hampshire Geological Survey,** located in **Concord, NH,** hereinafter called "Collaborator."

Whereas, the USGS is authorized to perform collaborative work and prosecute projects in cooperation with other agencies, Federal, State or private, pursuant to 43 USC §36c and 43 USC § 50b; and

Whereas, The USGS Geologic Discipline's Coastal and Marine Geology Program (CMGP) has supported the creation of new capabilities for the synoptic remote sensing of coastal marine and terrestrial environments based on aircraft and satellite sensors. Special emphasis has been placed on the use of aircraft-mounted light detection and ranging (lidar) to create high-resolution seamless topo-bathymetric maps in coastal environments.; and

Whereas, the Experimental Advanced Airborne Research Lidar B (EAARL-B) instrument provides unique capabilities to survey coral reefs, near-shore benthic habitats, riverbed topography, coastal and riparian vegetation, and sandy beaches. Operating in the blue-green portion of the electromagnetic spectrum, the EAARL-B is specifically designed to measure submerged topography and adjacent land elevations in a single scan of transmitted laser pulses. The EAARL-B system can accommodate a large signal dynamic range, thereby making it suited to mapping topography in the littoral zone. Post-processing of EAARL-B data is accomplished using a custom-built Airborne Lidar Processing System (ALPS) that combines laser return backscatter digitized at 1nanosecond intervals with aircraft positioning data derived from an Inertial Measurement Unit and precision Global Positioning System (GPS) receivers; and

Whereas, the broad usefulness of high-resolution topographic lidar surveys can be inhibited by the immensity of the data sets. In order to make these data available in a format that is fully documented and usable in standard GIS software, a DVD-based GIS product for each lidar survey is generated, and may be published as a USGS Data Series or Open File Report (OFR). The DVD product contains raw point cloud (x,y,z) data and DEMs (in geotiff format) along with associated FGDC-compliant metadata. The data are edited and quality-checked using a combination of automated and manual methods to remove errors. The data are organized in a tiled and indexed format to allow convenient access and ensure compatibility with GIS software. The resulting geospatial products can be distributed to federal, state, and local agencies interested in working with lidar data.; and

Whereas, The New Hampshire Geological Survey (NHGS) will be conducting a Fluvial Erosion Hazard (FEH) assessment along the Suncook River during the summer of 2012. The objective to delineate those areas adjacent to the channel that are susceptible to further erosion as the river continues to adjust to the 2006 avulsion. The suite of river geomorphic data collected includes a series of cross-sections of channel form across the bankfull width and onto the adjacent floodplain. Given the ability of EAARL-B LiDAR to penetrate the water surface in shallow conditions, the relative congruence of the two data collection efforts (EAARL-B LiDAR and in-field cross-section measurement) provides an excellent opportunity to evaluate the potential use

of EAARL-B LiDAR in similar river assessments. NHGS expects such assessments to play an increasing role in both natural hazard evaluation and water resource management initiatives. The EAARL-B digital terrain model for the study area will also be tested as input for the CAESAR (Coulthard, 2006) river meandering simulation model (Cellular Automaton Evolutionary Slope and River model). Because the future channel evolution of the Suncook River is of such critical interest, NHGS is in the process of exploring modeling approaches as an adjunct to the current field protocols for delineating fluvial erosion hazard zones.

Now therefore, the parties hereto agree as follows:

1. **Statement of Work:**

A. Acquire a new Experimental Advanced Airborne Research Lidar (EAARL-B) survey at Suncook River, NH.

The EAARL-B survey will be conducted in the project area as defined in Figure 1. The nominal pulse spacing will be 2.0 meters on average, with overlap of 10% or greater at the edges of each swath. 100% coverage may not be achievable if the survey area is deemed unsafe for aircraft navigation. This mainly occurs in canyons where switch-backs and steep mountainous slopes create navigation safety issues. The lidar survey will be conducted at an altitude of approximately 300 m (1000 ft), resulting in a swath width of approximately 220 m. The probable depth penetration for this survey is ~2.0 m, however, the capability to obtain valid submerged topography measurements will largely depend on ambient water turbidity and the reflectivity of the channel bottom. The acquisition window shall span from the date of approval by the New Hampshire Governor and Executive Council to June 30, 2013. We will make a best effort to conduct the survey in the most optimal conditions of water clarity. Note that delays in the completion of the EAARL-B instrument may require that the Suncook River lidar survey occur towards the end of the acquisition period defined above. The survey will be staged out of Salisbury, MD where the EAARL-B system and aircraft platform are permanently located, or out of an airport in close proximity to the project area. The vertical accuracy of the submerged topographic measurements is typically 15 cm RMSE. Geodetic control will be established by coupling GPS receiver and Inertial Measurement Unit (IMU) data aboard the aircraft with Continually Operating Reference Stations (CORS) data and/or USGS-provided GPS base station in close proximity to the project area.

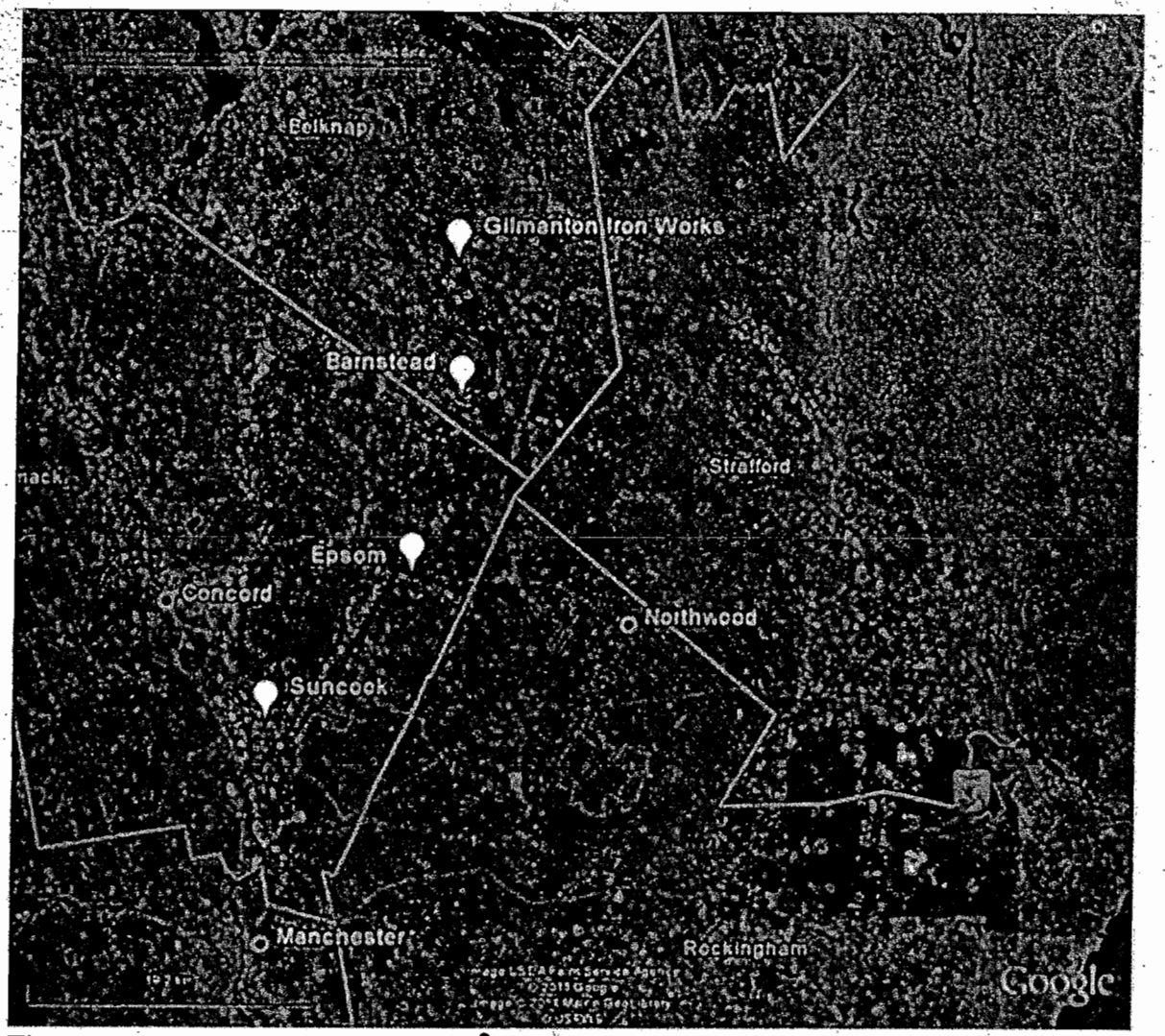

Figure 1: The red polygon depicts the planned project area for the EAARL lidar survey.

B. Process the data acquired from the survey conducted above as follows:
a) Develop GIS-ready metadata-documented topography data set for lidar surveys based on the above data acquisition. These data sets will be provided in geotiff (1-m resolution DEM), ASCII (xyz) and LAS formats for submerged topography.
b) Generate RGB / Color Infrared (CIR) imagery.
The processed data will be delivered within 6 months of data acquisition. Initial quick-look data and products for selected areas will be delivered upon request within 2 months of data acquisition. Creating a clean bare-earth topography product will largely depend on the density of the canopy above the subareal land surface. Bare-earth under very dense canopies where the laser pulse cannot reach the ground will result in gaps or holes in the bare-earth point cloud data. If the USGS elects to publish the results of the Suncook River surveys, the publication of the topography products as a data series DVD will likely be completed within 2 years of data acquisition. Example published products are available here: http://ngom.usgs.gov/dsp/data/google_maps.php

2. **Principal Contacts:** The Principal Investigator assigned to this project from the USGS is John Brock, 703-648-6053, jbrock@usgs.gov. The Principal Contact for Collaborator is Rick Chormann, 603-271-1975, Frederick.chormann@des.nh.gov.

3. **Term.** The collaborative effort provided by USGS and Collaborator will commence on the effective date of this agreement. The effective date of this agreement shall be the date of approval by the New Hampshire Governer and Executive Council. The expiration date of this agreement shall be June 30, 2013. This agreement is subject to renewal only by mutual written agreement of the parties.

4. **Funding.** Collaborator is providing funds to USGS with an estimated value of approximately **$62,920.** The USGS requires an advance of **$0** to begin work on the project. The USGS will submit invoices on a monthly basis to the administrative contact identified in Article 8. Invoices not paid within 60 days of receipt bear interest at the annual rate established by the U.S. Treasury, pursuant to 31 USC §3717.

Collaborator is providing in-kind services valued at $ 0 .

USGS is providing in-kind services valued at $ 0 .

5. **Termination:** This Agreement may be terminated by either party on 30 days written notice to the other party. In the event of an early termination USGS shall be reimbursed for any completed work or work in progress at the time of termination of the agreement. This provision shall survive the termination of the agreement.

6. **Publications/Reports:** Each Party is free to publish the information and data developed by the study.

7. **Intellectual Property:** No intellectual property is expected to be developed under the research effort. A copy of the data and the reports provided for in the SOW will be delivered to Collaborator at the end of the project.

8. **Notices:** Any notice required to be given or which shall be given under this Agreement shall be in writing and delivered by first class mail to the parties as follows:

USGS:
Dianna Jarvis / Patti Hartsing
USGS
600 4th Street South
St. Petersburg, FL 33701
(727) 803-8747 x 3011
dljarvis@usgs.gov / phartsing@usgs.gov

Collaborator:
Rick Chormann
New Hampshire Geological Survey
PO Box 95, 29 Hazen Dr.
Concord, NH 03302-0095
(603) 271-1975
frederick.chormann@des.nh.gov

9. **Independent Entity:** For purposes of this Agreement and all services to be provided hereunder, each party shall be, and shall be deemed to be, an independent party and not an agent or employee of the other party. Each party shall have exclusive control over its employees in the performance of the work. .

Neither party may use the name of the other in advertising or other form of publicity without the written permission of the other.

10. **Governing Law/Disclaimer:**

a) The validity and interpretation of this Agreement are subject to interpretation under Federal Law. Each party agrees to be responsible for the activities, including the negligence, of their employees. As a federal agency, USGS liability is limited by the Federal Tort Claims Act, codified at 28 USC 2671 et seq. USGS warrants that it is self-insured for purposes of Worker's Compensation.

b) **THE USGS AND COLLABORATOR MAKE NO EXPRESS OR IMPLIED WARRANTY AS TO THE CONDITIONS OF THE RESEARCH, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE RESEARCH, DATA OR RESULTING PRODUCT INCORPORATING DATA DEVELOPED AND EXCHANGED UNDER THE STATEMENT OF WORK. THESE PROVISIONS SHALL SURVIVE THE TERMINATION OF THE AGREEMENT.**

11. **Entire Agreement:** This Agreement contains all of the terms of the parties and supercedes all prior agreements and understandings related thereto. This Agreement can be changed or amended only by a written instrument signed by the parties.

12. **Disputes:** The signatories to this Agreement shall expend their best efforts to amicably resolve any dispute that may arise under this Agreement. Any dispute that the signatories are unable to resolve shall be submitted to the Director of the USGS or his/her designee and the President/Chairman/ Sr. Manager of Collaborator or his/her designee for resolution.

13. **Miscellaneous Provisions:** Pursuant to the Anti-Deficiency Act, codified at 31 U.S.C. §1341 (a)(1), nothing herein contained shall be construed as binding the USGS to expend in any one fiscal year any sum in excess of its appropriations or funding in excess or what it has received for the collaborative work outlined in the Statement of Work.

IN WITNESS WHEREOF, the parties have caused this agreement to be executed the last date listed below.

U.S. GEOLOGICAL SURVEY

By: _____

Name: Richard Z. Poore

Title: Center Director
St. Petersburg Coastal and Marine Science Center

Date: 30 May 2012

COLLABORATOR

By: Thomas S. Burack

Name: Thomas S. Burack

Title: Commissioner, NH Department of Environmental Services

Date: 6/14/2012