



R O C K Y M O U N T A I N S
C E S U

COOPERATIVE ECOSYSTEM STUDIES UNIT

FY2017 Annual Report

Cooperative Ecosystem Studies Units (CESU) Network is a national consortium of federal agencies, academic institutions, and other partners, organized around biogeographic areas. The CESUs were established to provide research, technical assistance, and education to federal resource and environmental managers. The **Rocky Mountains Cooperative Ecosystem Studies Unit (RM-CESU)** is one of 17 units in the CESU National Network. <http://www.cesu.psu.edu/>

The **Rocky Mountains Cooperative Ecosystem Studies Unit** has been operating since 1999 and was one of four pilot CESUs established through a competitive process. The partnership has grown steadily and is now comprised of 10 Agencies and 24 Non-Federal partners. Members of the RM-CESU are the following:

❖ University of Montana-host 1999	❖ Boise State University 2015
❖ University of Idaho 1999	❖ Western State Colorado University 2015
❖ Montana State University 1999	❖ University of Denver 2017
❖ Salish Kootenai College 1999	❖ Front Range Community College 2017
❖ Utah State University 1999	
❖ Washington State University 1999	USDI
❖ University of Wyoming 2002	❖ Bureau of Land Management 1999
❖ Colorado State University 2004	❖ Bureau of Reclamation 2004
❖ University of Colorado Boulder 2002	❖ Fish and Wildlife Service 2009
❖ University of Colorado Denver 2002	❖ Geological Survey 1999
❖ University of Northern Colorado 2006	❖ National Park Service 1999
❖ University of Calgary 2007	❖ Bureau of Indian Affairs 2017
❖ Metropolitan State University of Denver 2011	USDA
❖ Little Big Horn College 2012	❖ Forest Service 1999
❖ Northwest College 2013	❖ Natural Resources Conservation Service 2004
❖ University of Utah 2013	DOD
❖ Chief Dull Knife College 2014	❖ US Army Corps of Engineer- Civil Works 2008
❖ Blackfeet Community College 2014	❖ Office of Deputy Under Secretary of Defense (Installations and Environment) 2009
❖ University of Waterloo 2014	
❖ Wildlife Conservation Society 2014	

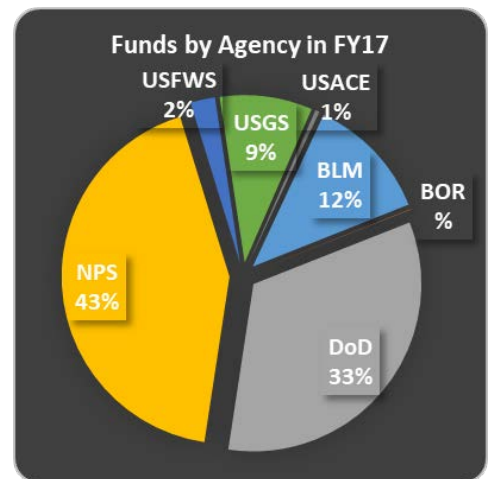
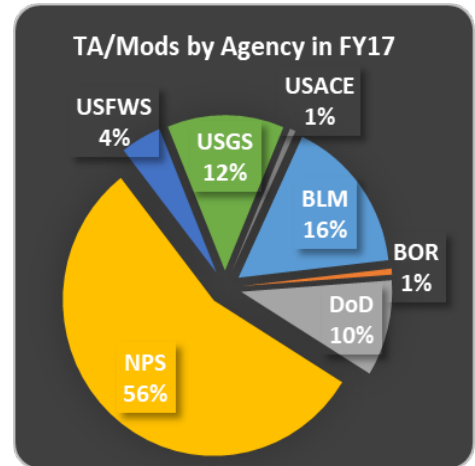
The mission of the Rocky Mountains Cooperative Ecosystem Studies Unit is to improve and disseminate the knowledge base for managing natural and cultural resources in the rapidly changing social, cultural, and environmental landscape of the Rocky Mountain Region, and to extend its expertise to national issues where appropriate.

RM-CESU PROJECTS ACTIVITY FOR FY2017

This year, the RM-CESU facilitated **160 task agreements (TAs) obligating \$19,343,250 to new projects (\$10,378,016/93 TAs) and adding funds to existing projects (\$8,965,234/67 TAs)**. A complete listing of projects may be found on the RM-CESU Project List for FY17 on the web site at <http://www.cfc.umt.edu/cesu/projects/default.php> (look under **Annual Reports**).

RM-CESU Activity by Agency Partners for FY2017

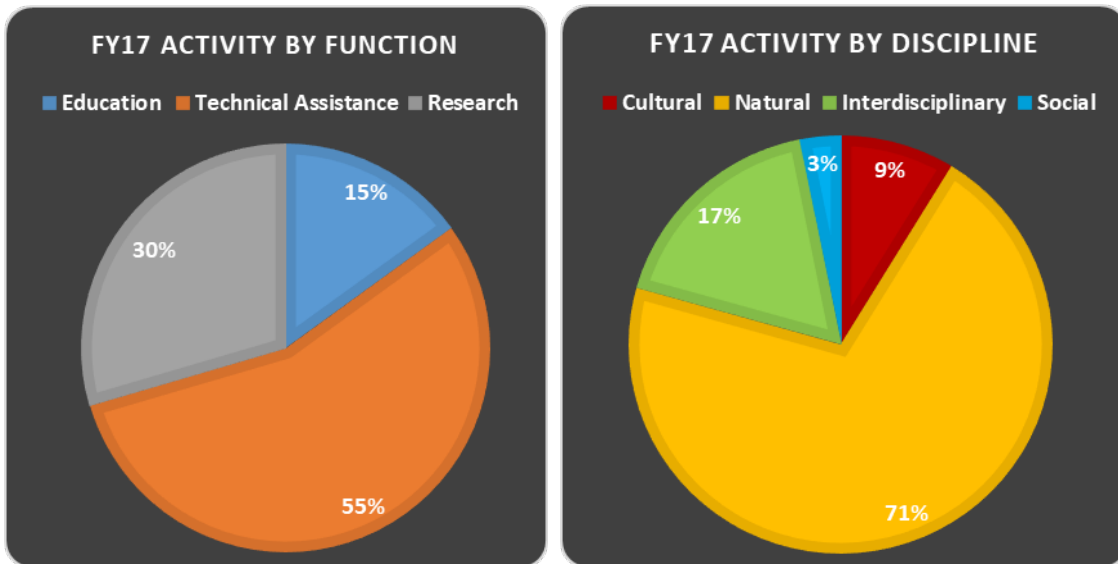
	<u>FY16 # of TA/Mods</u>	<u>FY16 Total Funding</u>	<u>FY17 # of TA/Mods</u>	<u>FY17 Total Funding</u>
RM-CESU	208	\$24,931,561	160	\$19,343,250
BLM	31	\$2,539,438	26	\$2,358,525
BOR	0	\$0	1	\$6,192
DOD	20	\$7,436,752	16	\$6,556,155
NPS	118	\$9,680,138	89	\$8,105,447
NRCS	9	\$2,036,132	0	\$0
USFWS	9	\$1,502,909	7	\$486,294
USGS	19	\$1,636,192	20	\$1,750,637
USACE	2	\$100,000	1	\$80,000
USFS	0	\$0	0	\$0



Observations:

- Seven of the nine Agencies facilitated task agreements through the RM-CESU this fiscal year. Four Agencies, BLM, DOD, NPS, and USGS moved \$1 million or more through the CESU agreement.
- NPS, both in terms of number of projects and project dollars, remains the most active user of the RM-CESU.
- DOD is the second most active Agency in terms of dollars moved through the agreement.
- NRCS after facilitating 9 agreements for \$2 million through the RM-CESU in FY16, did not report any activity this year.
- After a couple of years of no activity, BOR facilitated 1 task agreement.

RM-CESU projects provide needed research, technical assistance, and/or education to our Federal partners and cover the fields of natural resources, cultural resources, social sciences, and interdisciplinary.



- RM-CESU facilitated \$15.7 million in natural resource projects in FY17.
- RM-CESU facilitated \$3.6 million in cultural, social and interdisciplinary projects in FY17. NPS and DOD accounted for 56% and 33%, respectively of the \$3.6 million.

Smallest Task Agreement: \$6,200 Bureau of Reclamation/University of Denver PI: Brooke Rohde; Analysis and Curation of Materials from Lake Pueblo State Park, Pueblo County, Colorado

Largest Task Agreement: \$1,193,999 National Park Service/Colorado State University; PI: Judith Hannah; Inventorying and Monitoring Natural Resources Status and Trends in the National Park System – Geologic Resources Inventory

Mean: **\$120,895** (Five-year Mean: \$115,415) Median: **\$50,000** (Five-year Median: \$41,928)

To learn more about **all** the projects receiving funding in FY17, view the Project Summary Sheets at http://www.cfc.umn.edu/cesu/projects/agency_reports/default.php; click on “Agency” and then “Year”

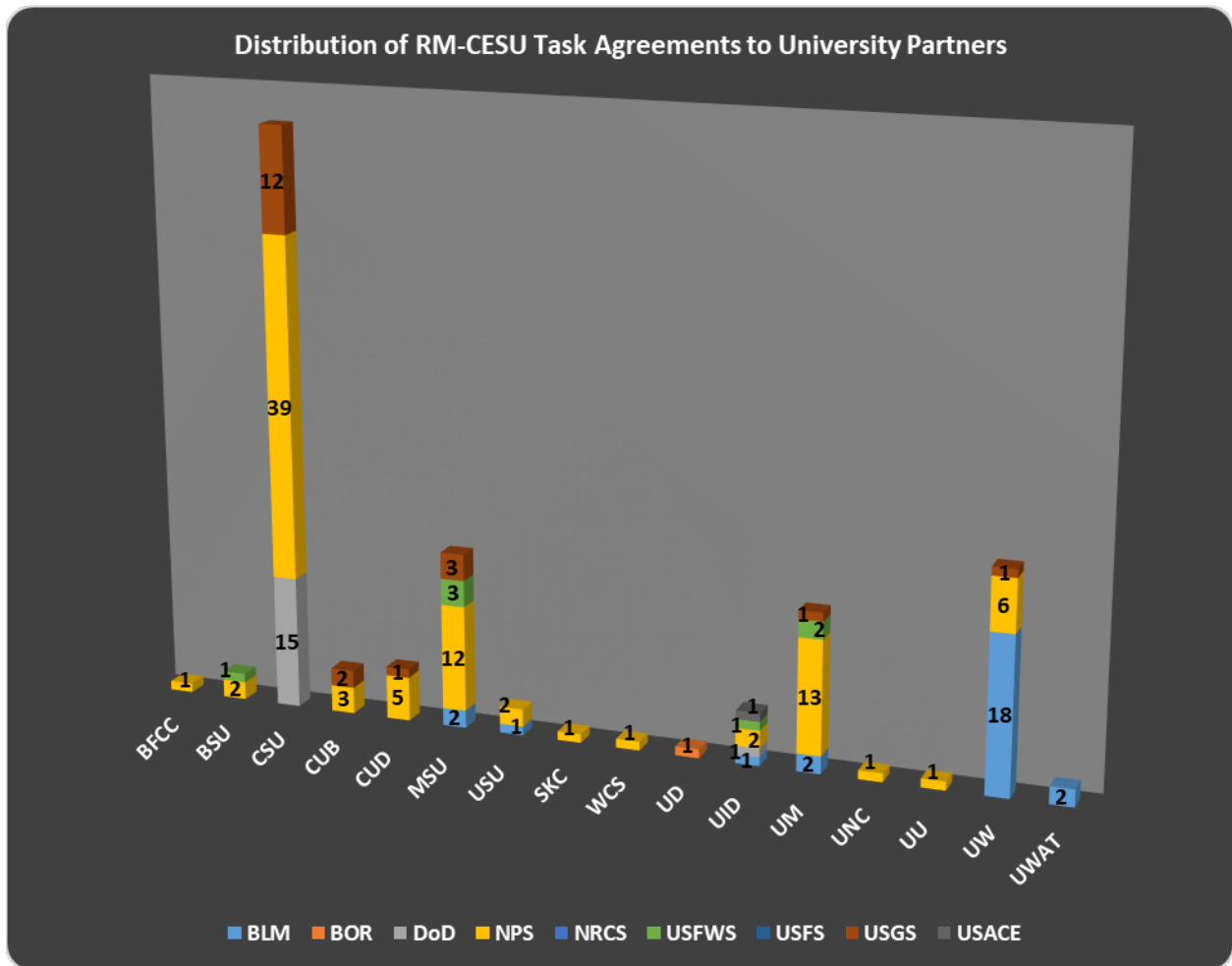
RM-CESU Activity by Non-Federal Partners for FY2017

Sixteen of the twenty-four RM-CESU non-federal members received at least one project this year.

Two of our four tribal colleges received funding for project this year. Blackfeet Community College will work with Glacier National Park staff, affiliated Tribal Historic Preservation Offices, Tribal Culture Committees and student interns to develop and implement culturally appropriate education and interpretation programs for the Park. Also in Glacier, Salish Kootenai College will

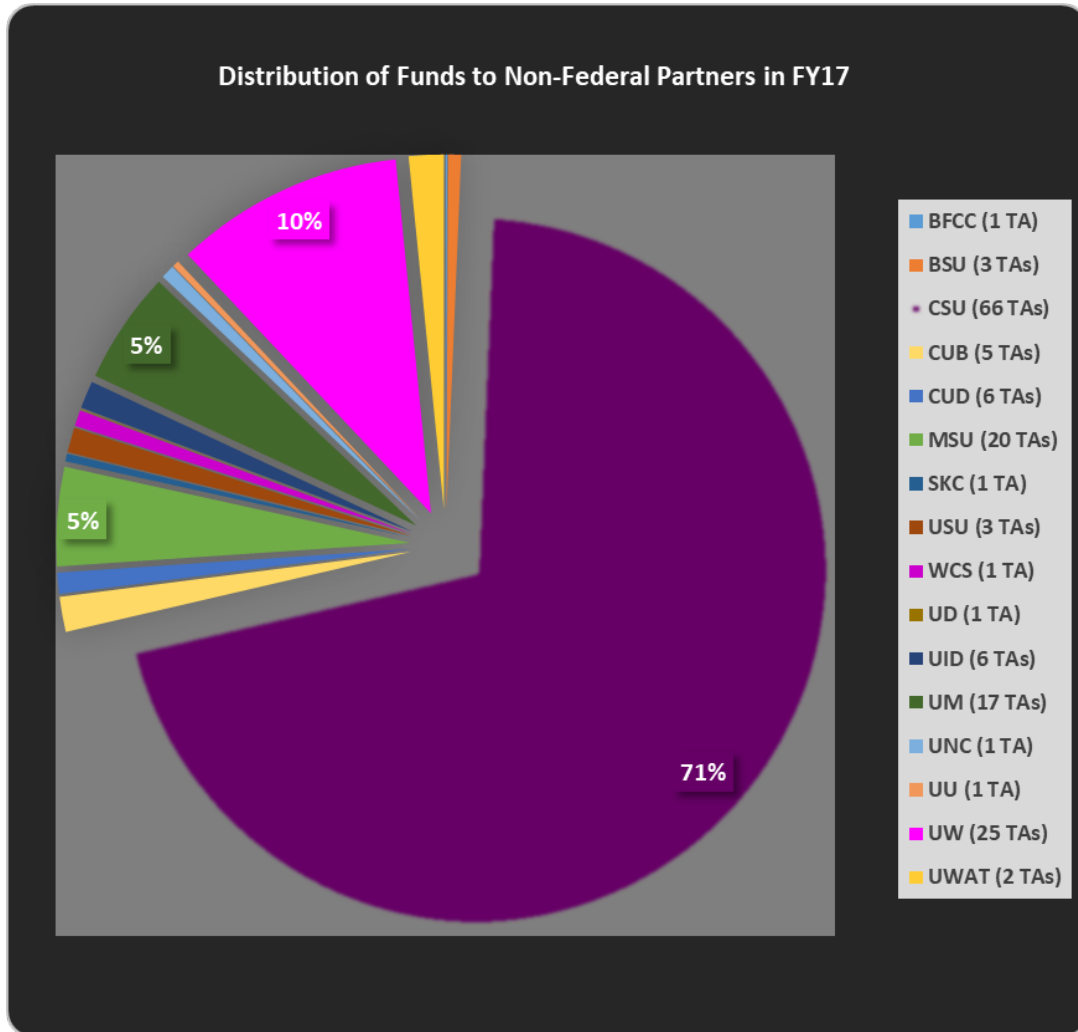
complete a Culturally Scarred Tree Traditional Ethnographic Resource Use Study. Culturally scarred trees (CST) are an important traditional source of food and technology to Salish, Pend d’Oreille, and Kootenai peoples associated with Glacier National Park. Completing an inventory of CST’s will provide general and specific information about the potential uses and significance of tree species as natural resources, cultural resources and places of cultural significance.

New partner, University of Denver (DU), partnered with the Bureau of Reclamation this year. DU will provide two museum or cultural resources interns to help analyze and curate materials recovered during 2017 archeological investigations at Lake Pueblo State Park, Colorado.



Colorado State University (CSU) remains the largest recipient of CESU awards. CSU received \$13.7 million in 66 task agreements/modifications with the Department of Defense, National Park Service, and US Geological Survey. Projects range from sound and light ecology research to cultural resources program support on military installations to implementing diversity internships in parks.

University of Wyoming (UW) received over two million dollars in project funding with \$1.8 million in projects with the BLM. These UW/BLM partnerships are studying pronghorn response to environmental change to mapping analysis and assessment of soil salinity risk.



Sixteen principal investigators receiving project funds in FY17 were using the RM-CESU agreement for the first time and contributed \$943,775 to RM-CESU totals.

Blackfeet Community College: Lester Johnson (workforce development)

Salish Kootenai College: Dean Nicholai (Native American studies)

Colorado State University: Jeffrey Cannon (forest restoration), Michelle Haefele (resource economics), Jennifer Hoeting (statistics)

Montana State University: Lindsay Albertson (ecology), Andrew Hoegh (statistical ecology), Richard Sojda (ecological modeling)

University of Colorado Boulder: Nichole Barger (arid lands ecology), Sarah Elmendorf (ecological datasets), Talia Karim (invertebrate paleontology)

University of Denver: Brooke Rohde (NAGPRA)

University of Idaho: Timothy Prather (weed management)

University of Montana: Shawn Devlin (ecology), Joshua Millspaugh (wildlife conservation), Erin Sexton (aquatic ecology/conservation biology)

PI Spotlight: **Lindsay Albertson, Assistant Professor, Department of Ecology, Montana State University**
 Albertson Lab: <http://www.montana.edu/alindsey/index.html>

RM-CESU Project: **Amphipods of Yellowstone Lake Related to Lake Trout Suppression Strategies**

In the late 90s, soon after lake trout were discovered in Yellowstone Lake, studies of lake trout diet indicated that native cutthroat trout were the primary items consumed (Ruzyki and Beauchamp 1997). More recent diet studies show that although native cutthroat trout are still present, the most common food item consumed by lake trout is crustaceans (amphipods; Syslo et al. 2016). As a non-native more than 300,000 lake trout are killed annually by the aggressive NPS gillnetting program, with >1.5 million killed during just the past five years. Since the beginning of the lake trout gillnetting program in 1995, the dead lake trout have been returned to deep areas of Yellowstone Lake. This has been done primarily so nutrients are retained in the lake rather than being removed through marketing or other exporting of the fish carcasses from the system.



Crews remove invasive lake trout from Yellowstone Lake.

The amphipods of Yellowstone Lake are known to feed upon the dead lake trout carcasses. Because a large number/biomass of carcasses are now deposited in the lake each year, there is a need to understand the ecological implications of this management action, especially as it relates to the production of amphipods and (potentially) lake trout. NPS is also investigating the use of lake trout carcasses and fine sediments (sand, silt) as an alternative suppression method for smothering lake trout embryos on spawning sites following the peak spawning period in late fall. Because these carcasses and sediments will be placed in relatively shallow water and within the photic zone, there is a need to document any impacts of these actions on the ecology and overall productivity of these sites.

The overall goal of this project is to determine the potential effects of lake trout suppression strategies on the ecology of Yellowstone Lake. Specific objectives are to: 1) Document the large-scale spatial variation of amphipods among lake basins, depths, river inlets, geothermal features, and/or other significant habitat characteristics of Yellowstone Lake. 2) Determine if amphipod spatial distribution and abundance is related to lake trout carcass deposition by the suppression program. 3) Assess effects of alternative suppression methods including carcass and sediment placement on the ecology of lake trout spawning sites. 4) Make recommendations to NPS managers regarding the need (if any) for changes in lake trout suppression strategies.



Non-native lake trout have been disruptive influence to the ecosystem.

Student Participation

The majority of all RM-CESU projects (and 75% of RM-CESU National Park Service projects) have student participation. Student participation includes research work by graduate and undergraduate students, as well as internships, field schools and class participation in projects.

2017 RM-CESU Student Award

Each year the RM-CESU recognizes the outstanding contribution of a student on a RM-CESU project. The recipients of the **2017 Student Award** are **Robin Graham, MS, Utah State University** and **Jeremy Sueltenfuss, PhD in Ecology, Colorado State University**.

Robin was nominated for this award by Dr. Chris Monz for her contributions to two CESU projects—the “Rocky Mountain National Park (ROMO) Visitor Use” and “Transportation Management Study and ROMO Angler/Riparian Use Study.”

For both of these projects Robin took leadership on all aspects of project design and fieldwork implementation. She coordinated the work of three field technicians and two volunteers to collect three types of data including daily vehicle and pedestrian GPS tracking, visitor surveys, vehicle turning movement tallies, and vehicle volume and classification counts from eight pneumatic traffic counters. Robin also worked with science communicators at ROMO to disseminate information about the study to the public via social media and park websites.



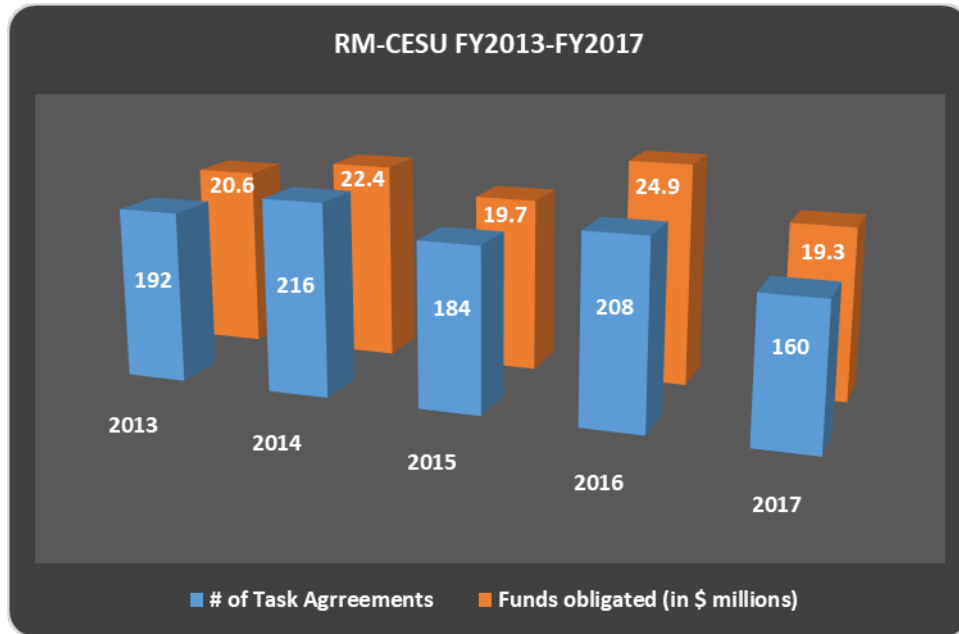
Jeremy was nominated for this award by Dr. David Cooper for his contributions to the CESU project “Restoration Design for Lulu City Wetland, Rocky Mountain National Park, Colorado.”

Jeremy’s work is directly assisting Rocky Mountain National Park address their resource needs for wetland restoration and landscape planning, management, implementation and monitoring. This work is of exceptional value to RMNP and will also be used by other parks in the network, as well as the Rocky Mountain Inventory and Monitoring Program of NPS.” Dr. Cooper went on to report “Jeremy’s work is interdisciplinary, involving hydrology, geomorphology, vegetation science, ecology and technology. Because he can integrate so many fields his work is of exceptional value to RMNP and the public.”



RM-CESU ACTIVITY FY13-FY17

In last five years of operation, the RM-CESU has facilitated **960 task agreements/modifications obligating 106 million dollars** to non-federal partners for project work with our Federal partners.

**UNIVERSITY OF MONTANA – HOST ACTIVITY AND ACCOMPLISHMENTS**

- Coordinated two Executive Committee meetings, including one-hour spring conference call on May 5, and annual fall meeting hosted this year at Western State Colorado University (WSCU) September 13-14, 2017. Fall meeting encompassed both a business meeting and outreach tour WSCU's campus, facilities, and programs.
- Participated in monthly CESU Directors' call with Tom Fish, the National Coordinator.
- Participated in outreach visit to Salish Kootenai College. Met with SKC administrators and faculty members in Media Design, Native American Studies/Tribal Historic Preservation, Psychology, Forestry, Hydrology, and Business Management.
- Maintained RM-CESU web site including posting meetings, project abstracts and reports, and CESU calls for interests.
- Produced and distributed bi-monthly online RM-CESU Newsletter. The newsletters provide updates on CESU and partner activity, as well as, posts funding, training, and job opportunities.
- Produced RM-CESU Annual Report and project lists.
- Worked with the National CESU Office to gather non-Federal partners' signatures for RM-CESU Agreement (2014-2019), Amendment Two adding the Bureau of Indian Affairs, University of Denver, and Front Range Community College. Additionally Amendment 2 updated federal assistance authorities and administrative language and updated the

programmatic process per the CESU Network Council – streamlining the agreement amendment process when adding new partners or administrative changes.

- Facilitated Western Association of Fish and Wildlife Agencies’ membership application, review, and approval actions.
- Coordinated RM-CESU Annual Student Award (see page 8 for 2017 awardees).
- Coordinated NPS Jerry O’Neal Student Research Fellowship. This fellowship provides support for graduate students or superior upper division undergraduate students at RM-CESU universities and colleges conducting research in Glacier National Park, Grant-Kohrs Ranch National Historic Site, and Little Bighorn Battlefield National Monument.
- Participating in National CESU working group to facilitate USFS National Forest Systems and State and Private Forest use of the CESU agreement.
- Kathy Tonnessen, NPS-emeritus, assisted Brendan Moynahan, NPS RM-CESU Research Coordinator, and the host university it requesting and gathering final reports on NPS/RM-CESU projects.
- Hired student intern to assist with project reporting – writing project summaries and requesting final reports from partners.