Matt Fitzpatrick
University of Maryland Center for Environmental Science
Appalachian Laboratory
301 Braddock Road
Frostburg, MD 21532

21 January 2022

Dear Dr. Fitzpatrick,

Austin Peay State University (APSU) seeks to join the Chesapeake Watershed CESU as a non-federal partner to further its work with the National Park Service and other federal agencies on the research, restoration and re-creation of grassland ecosystems in the Mid-Atlantic region. Joining the Chesapeake Watershed CESU will simply be an expansion of relationships that have already developed. APSU has been a member of the Southern Appalachian CESU for many years, and APSU researchers have benefitted from access to more than $1.5 million in grants.

The Southeastern Grasslands Institute is the APSU headquarters for the broader 24-state Southeastern Grasslands Initiative (SGI). SGI, funded with private philanthropic support and private and government grants, has become one of the top authorities on southeastern grasslands in its short, five-year history. SGI is giving voice to the benefits of and perils facing native grasslands and grassland-related ecosystems that has been mostly absent from conservation efforts. SGI has also been working with the National Park Service in Interior Regions 1, the National Capital Area, and 2, the South Atlantic Gulf. In September 2021, the National Park Service asked SGI to apply for funding from the Chesapeake Watershed area, and the process of applying began. APSU and SGI look forward to furthering their collaboration with the National Park Service. As grasslands conservation gains the recognition that is critical in order to prevent biodiversity collapse, countless exciting opportunities will undoubtedly arise. Becoming a member of the Chesapeake Watershed CESU will open the door to many of those opportunities.

In past years, SGI and the APSU Center of Excellence for Field Biology, both affiliated with the Department of Biology, as well as with the APSU GIS Center, have worked on numerous impactful projects as a result of APSU's membership in the Southern Appalachian CESU. This includes projects with the U.S. Fish and Wildlife Service, Bureau of Land Management, U.S. Geological Survey, Department of Defense, Tennessee Valley Authority, and National Park Service, as well as other federally funded non-CESU projects with USDA Natural Resources Conservation Service. Thus, our team here at APSU has broad experience and a strong track record of excellence in working within the CESU system.

We'd like to confirm that we have reviewed the CESU multi-partner agreement, we agree to the established indirect cost rate of 17.5% for CESU projects, and we agree to support the CESU mission and goals and fulfill the roles and responsibilities of a nonfederal partner, as described in the CESU agreement. The enclosed materials include details concerning the relevant centers, institutes, and departments (Center of Excellence for Field Biology, Southeastern Grasslands Institute, Department of Biology, etc.) that will be relevant to federal land management and environmental research for the Chesapeake Watershed CESU.

Thank you for your time and consideration of this application.

Sincerely,

Chad Brooks

Chad Brooks

I. Description of the institution/organization, its mission, and the primary focus of collaborative activities to be supported through the CESU in the context of the CESU mission.

Mission
Austin Peay State University is mission-driven, community-minded institution that provides transformational experiences through innovative, creative, and scholarly activities. We welcome and inspire an inclusive community of learners to make a positive impact regionally and globally.
Vision
We will be the region's university of choice for those seeking to improve their lives. We will achieve this vision through student-centered teaching, unique developmental opportunities, and our focus on innovative research, and public service.
Values
We are a collaborative community that values personal growth and life-long engagement through the promotion of integrity and academic excellence.

Academic Excellence by providing meaningful and practical learning opportunities with highly qualified and dedicated faculty and staff.
Integrity by maintaining an honest, fair, and credible environment.
Community by fostering learning in an environment where all are welcomed and valued.
Personal Growth by providing the knowledge, tools, and resources for all Governors to reach their full potential.
Life-Long Engagement by providing services, programs, and experiences that promote loyalty, pride, and mutual support.
Collaboration by enriching our local, regional, and global communities through value-added programs, strategic partnerships, and meaningful service.

II. Description or list of the primary programs, departments, or other institutional units of relevance to federal land management, environmental, and research agencies that will likely be engaged in CESU activities.

The Center of Excellence for Field Biology (CEFB) (https://www.apsu.edu/field-biology/)

- CEFB is funded in part through state appropriations and APSU matching funds, the CEFB is composed of one Director, five additional Principal Investigators, and one Technical Clerk.
- The CEFB conducts research, provides expertise for various ecological, faunistic, floristic, and environmental issues, and provides leadership and training for environmental education.
- The CEFB provides a university link between research and education, supporting and training numerous undergraduate and graduate research assistants.

The Southeastern Grasslands Institute (https://www.segrasslands.org/)

- SGI is the APSU headquarters for the broader 24-state Southeastern Grasslands Initiative
- Funded in part with private philanthropic support and private and government grants. SGI is composed of one Executive Director, one Director of Operations & Finance, one Director of Strategic Initiatives, one Technical Clerk, one Chief Botanist, one Chief Ecologist, four regional grassland coordinators, one Plant Conservation Manager, one Volunteer Coordinator, one Geospatial Analyst, one Director of Seed Program, one Assistant Director of Seed Program, and numerous other support staff, graduate research assistants, and interns.
- SGI works to conserve, restore, research, and promote the native grasslands and grassland-related ecosystems of the southeastern U.S.
- SGI provides a link between academic research, training graduate and undergraduate students in

biodiversity conservation, and implementation of on-the-ground conservation and restoration

The APSU GIS Center (https://www.apsugis.org/)

- Comprised of one Director, one Project Manager, one Field Research Technician, two GIS Data Analysts, and one Administrative Assistant
- The GIS Center assists various cities, counties, governmental agencies, and university researchers with mapping, planning, and evaluating data.
- The GIS Center provides support of classes and students in conducting research using GIS and GPS technology and offers training for students and faculty.
- The GIS Center has added drone capability to its remote sensing tools.

Degree Programs:

- B.S. in Agriculture
- B.S. in Biology
- M.S. in Biology (25-30 graduate students)
- B.S. in Chemistry
- B.S. in Computer Information Systems
- B.S. in Computer Information Technology
- B.S. in Computer Science
- B.S. in Geosciences
- B.A. or B.S. in History
- B.A. or B.S. in Sociology

III. A list of and brief description of the staff or faculty with expertise in disciplines and subject matter areas of relevance to federal land management, environmental, and research agencies

Agriculture:

- Sudbrink, Don (Chair) – Entomology, Plant Pathology, Integrated Pest Management (IPM)

Biology and Center of Excellence for Field Biology (CEFB):

- Baskauf, Carol – Plant ecology and population genetics; rare, threatened, and endangered (RTE) plant species
- Cashner, Mollie – Animal behavior, genetics, fish, ecology, conservation genetics
- Estes, L. Dwayne (CEFB) – Flora and vegetation of the Southeastern U.S. grasslands; RTE plant species, plant systematics, floristic inventories, biogeography of eastern North American flora
- Gentry, Christopher (CEFB, Director) – Biogeography, dendrochronology, cartography, geographic information systems (GIS), geospatial analysis, landscape ecology and fire ecology
- Gienger, Christopher M. (CEFB) – Ecology and physiology of amphibians and reptiles
- Haase, Catherine – Mammalogy, bat conservation, animal energetics, thermal biology, environmental physiology
- Johansen, Rebecca (CEFB) – Ichthyology, fish systematics, phylogeography, population and conservation genetics, biomonitoring, biogeography, and stream ecology
- Lebkuecher, Jefferson – Phycology and use of algae in water quality assessment; plant ecological physiology
- Rehm, Evan – Community ecology, conservation biology, global change biology, forest dynamics
- Rogers, Michelle (CEFB, Environmental Science Proj. Mgr., State Coordinator Project WET) – Science education, teacher education, sustainability
- Woltmann, Stefan – Avian ecology, conservation genetics, environmental impacts on birds

Education

- Philip Short – Environmental Education

Geographic Information Systems Center (APSU GIS Center):

- Wilson, Michael (Director) – Geographic Information Systems (GIS), field mapping
- Catellier, Douglas – GIS, drone technology and remote sensing, environmental geography
- Cordell, Mason – GIS data analysis
- Reeder, Danielle – GIS field research technician
- Wogsland, Jason – GIS data analysis

Geosciences:

- Deibert, Jack (Chair) – Sedimentogy, stratigraphy, petroleum geology, Earth materials, field geology
- Camilleri, Phyllis – Structural geology, tectonics, geologic mapping
- Dunkle, Kallina – Hydrogeology, environmental geology, glacial geology, and water quality
- Frederick, Daniel L. – Paleontology, biostratigraphy, foraminiferal paleontology, paleoecology, ground penetrating radar, scanning electron microscopy
- Gentry, Christopher M. – Biogeography, dendrochronology, cartography, geographic information systems (GIS), geospatial analysis, landscape ecology and fire ecology
- Giefer, Madeline – Land change science, land use policy, rural geography, GIS
- Haroldson, Erik – Economic geology, mineralogy, igneous and metamorphic petrology
- Mathenge, Christine – Environmental geography, political geography, global environmental change, landscape studies, natural resource management policy
- Ridenour, Gregory – Climatology, oceanography, geography of Asia, hydraulic geometry

Sociology:

- Butterfield, Jonniann (Chair) – Environmental sociology
- Brown, Tucker – Recreational studies, parks and recreations
- Steele, David – Environmental sociology

Southeastern Grasslands Institute

- Estes, Dwayne (Executive Director)
- Breeden, Cooper – Curator Conservation Seed Bank, Rare Plant Conservation, Tennessee Plant Conservation Alliance
- Brock, Mason – Herbarium Curator, flora of the east-central United States
- Ceska, Jennifer – plant conservation, rare plant species of Georgia
- DeVitis, Marcello – Seeds of Success-Southeast, seed development, seed biology research
- Dunlap, Layla – Project management, project budgeting, conservation horticulture, seed collection
- French, Jeremy – grassland restoration, USDA Farm Bill grassland programs, private lands outreach
- Haase, Catherine – mammals and mammal research, migration corridors, outreach and education
- Hunt, Laura – volunteer coordination, grassland restoration, citizen science
- Irick, Zach – National Park Service liaison, grassland research, grassland restoration, flora and rare plants of the Southeast
- Lowman, David – forestry, pine-oak savanna grassland restoration, implementation of USDA Farm Bill programs, wildlife biology, fire ecology
- Noss, Reed – ecology and conservation of North America, fire ecology, conservation planning and corridor design
- Overbeck, Will – Seeds of Success-Southeast, seed collection, grassland restoration and management, flora and plant communities of the east-central U.S.

- Rehm, Evan – grassland community ecology, vegetation analysis, experimental design, grassland soil seedbank, grassland climate change research
- Rosenthal, Deborah – project management and budgeting
- Trimboli, Shannon – Communications, science interpretation
- Viers, Brittney -- grassland restoration, USDA Farm Bill grassland programs, private lands outreach
- Weakley, Alan – flora, vegetation, and conservation of the southeastern U.S.
- Witsell, Theo –flora, vegetation, and conservation of the southeastern U.S.
- Wood, Zach – grassland restoration, prescribed fire, outreach & education, rare species conservation

IV. For academic institutions, include a description of student demographics and the institution's status as a minority-serving institution (e.g., as defined by the U.S. Department of Education).

For student demographic data, please see review the below hyperlinks for institutional reporting.
Austin Peay State University Quick Facts
https://www.apsu.edu/dsir/data/2020_21_apsu_quick_facts.pdf
Austin Peay State University Factbook
https://www.apsu.edu/dsir/data/2020_21_apsu_factbook.pdf
Austin Peay State University Institutional Data
https://www.apsu.edu/dsir/institutional-data.php

V. Description or list of facilities, equipment, centers, or institutes that would provide support to the research, technical assistance, or educational activities of relevance to federal land management, environmental, and research agencies that will be engaged in CESU activities.

The Austin Peay State University Department of Biology (http://www.apsu.edu/biology) and the Center of Excellence for Field Biology (CEFB; http://www.apsu.edu/field-biology) are housed in the Sundquist Science Complex (SSC), a $39 million, 220,000 ft^2 building completed in Fall 2001. The building is also occupied by the departments of Agriculture, Allied Health Science, Chemistry, and Physics and Astronomy. Biology and CEFB have a variety of large and small laboratory research spaces in addition to teaching labs. There is a large greenhouse and the APSU Native Plant Research and Teaching Garden with 350+ native species. Within 5 miles of campus there is a 475-acre Environmental Education Center housing a working cattle farm, a classroom/lab building and mixture of open land and mixed-age forest administered by the APSU Department of Agriculture. Biology and CEFB are well equipped with a variety of equipment for support of field and laboratory research. The CEFB has a fleet of four vehicles (three with 4-wheel drive and a crew-cab 2-wheel drive pickup), two small (12', 16') boats with motors, and multiple canoes and kayaks. The CEFB has a wide variety of aquatic sampling equipment. This includes various traps for vertebrates and invertebrates, a variety of fish seines and a backpack electro-fisher, invertebrate dip and kick nets, drift nets, plankton nets, Surber samplers, YSI multiparameter water quality meter, turbidimeter, and most other common equipment required in assessing lentic and lotic habits. The CEFB also has a wide variety of terrestrial sampling equipment. In addition to numerous types of vertebrate traps, the CEFB has radio tracking and data-logging equipment, wildlife cameras, bioacoustics sampling equipment with the computers and software to analyze bioacoustics data, mist nets and harp traps for bat sampling, binoculars and spotting scopes for observational sampling, etc. Within Biology and the CEFB there are also wildlife cameras for studying mammals. The CEFB has a Trimble backpack GPS unit and numerous handheld units as well as a remote station linked to the APSU GIS Center. Biology and the CEFB support several research quality biological collections including the largest

amphibian and reptile collection in Tennessee (33,332 specimens, 20,338 amphibians and 12,994 reptiles) and second largest in the Southeast, the largest herbarium in the Mid-South and second-largest in Tennessee (135,000 specimens), a rapidly growing fish collection (15,200 specimens), and significant bird and mammal collections (~1,500 specimens). In addition to many teaching grade microscopes, the CEFB and Biology have several research-grade light, phase-contrast, and fluorescence compound microscopes, several research-grade dissection microscopes with photo and imaging capabilities, as well as a confocal microscope. Labs are equipped with standard microbiological equipment, spectrophotometers, fluorometers, and other lab equipment to study algae and photosynthetic ecological physiology. Several molecular labs, including a molecular systematics laboratory, exist that are equipped with gradient thermocyclers, a real-time PCR thermocycler (ABI), SpeedVac centrifuge, microcentrifuges, ultracentrifuge, -80°C freezers, liquid N_2 tanks and cryostorage, BioSafety Level 2 hoods, spectrophotometers for DNA/RNA/protein analysis, DNA & protein gel electrophoresis equipment, gel imaging equipment with DNA/RNA/protein quantification software, CO_2 incubators, and ancillary equipment like micropipetters. All DNA sequencing and fragment analyses are outsourced.

The Southeastern Grasslands Institute, which houses the Southeastern Grasslands Initiative (www.segrasslands.org), is closely connected with the Dept. of Biology and CEFB and reports directly to the Dean of the College of Science & Mathematics. The Institute is housed in a separate building from Biology and the CEFB in a 16,000 ft^2 former Honda dealership purchased in recent years by the university. It occupies the entire lower floor (8,000 ft^2) of the building and includes offices for SGI administrative and conservation staff, as well as space for research, equipment and supply storage, a developing rare and native species seed lab and seed bank, and areas for training volunteers and students. The equipment and supplies within the Institute include everything needed to be successful at SGI's broad spectrum of conservation activities, and include a Kubota UTV and trailer, a canoe and multiple kayaks, numerous hand-held GPS units and tablet devices, various instruments for vegetation survey work (metric tapes, etc.), prescribed fire gear, insect traps, wildlife cameras, and the equipment and instruments required for rare species seed collection, cleaning, and storage. In addition to the physical space, SGI manages multiple prairie restorations within 2-10 miles from headquarters, including 15 acres at Dunbar Cave State Park, 24 acres at Interstate 24's Exit 1, 50 acres at Google's Clarksville, TN data center, and a 5-acre remnant wet prairie along the north edge Clarksville. These all serve as teaching, research, and training sites for staff, students, volunteers, and conservation partners.

The Austin Peay Chemistry Department (http://www.apsu.edu/chemistry), located in the SSC, also maintains equipment and facilities to provide services to CESU and CESU partners. For inorganic chemistry, the equipment allows for microscopic and spectroscopic analysis of inorganic samples (equipment includes polarizing light microscope that is useful for soil analysis; and a dip-prode UV/Vis spectrometer for water and other sample analysis). For biochemistry, APSU maintains an ultracentrifuge, cold room, and electrophoresis equipment (protein and DNA), PCR machine, UV-VIS spec, and full tissue culture facilities. For organic chemistry, APSU maintains an H2 and C13 NMR, UV/Vis spectrometer, and various computational software packages for chemical modeling and prediction.

Currently, the APSU GIS Center (https://apsugis.org) is housed in a recently renovated off-campus facility. It is a unit that reports directly to the Dean of the College of Science, Technology, Engineering, and Mathematics (CoSTEM). The APSU GIS Center works with a variety of local, state, and federal agencies and supports numerous faculty researchers. The Center currently employs 7 permanent staff, 15 student interns/workers from such diverse departments as arts, business, chemistry, computer science, English, and geoscience. In addition, the Center houses a computer lab, maker space, and the VR Lab.

The Department of Geosciences (http://www.apsu.edu/geosciences) houses in the renovated McCord Hall laboratories, equipment and software to support the CESU and CESU partners program. Facilities include a fully equipped computer laboratory with 30 Dell computers, scanners, and laser and color printers, GIS and remote sensing software (ESRI ArcGIS 10, ERDAS Imagine 2010), hydrologic software (AquaChem, Visual MODFlow, AquiferTest, BASINS [Better Assessment Science Integrating point & Non-point Sources], PLOAD [Pollutant Load Model], SWAT [Soil & Water Assessment Tool], HSPF [Hydrological Simulation Program-Fortran]), statistical software, and SigmaPlot. Facilities also include the Scanning Electron Microscope Laboratory equipped with a Hitachi model TM-1000 SEM, EDS-elemental analysis, digital photography software, and a Dell computer. The Microscope Laboratory equipment includes 15 Olympus polarizing petrographic microscopes, digital microscope camera, video microscope camera and monitor, complete suite of petrographic thin-sections for mineralogy, and sedimentary, metamorphic, and igneous petrography. The Ground Penetrating Radar Lab equipment includes Geophysical Survey Systems Inc. model GSSI SR-20 GPR, cart, computer, and analysis software. The Radon Detection equipment includes RadStar Model RS300 Continuous Radon Monitor unit. The hydrogeologic and environmental testing equipment includes Armfield Stream Flume, Price digital current meter, digital water level meter, and equipment for soil and regolith testing of the Atterburg limits of plasticity. The Rock Preparation Lab equipment includes Ingram Thin-Section Cut-Off Saw for thin-sections, Ingram Thin-Section Grinder, 3 lapidary wheels, 18" oil-based rock saw, 8" water-based rock saw, Rock Crusher, Ro-Tap Testing Sieve Shaker, and an Air Abrasive machine. The Meterology and Climatology Laboratory equipment includes Davis Vantage Pro weather station, hurricane tracking maps, sling psychrometers, Mannix Instruments handheld anemometers and temperature instruments, and Control Company electronic Traceable® Hygrometer, thermometer and dew point instruments. The Biogeography, Environment, and Tree-Ring Laboratory equipment includes MeasureJ2X and FHX2: Fire History Software, Velmex Measuring System, Hagloff increment bores, Hagloff Laser Vertex Hypsometer, field tapes and diameter tapes, Stihl 460 Chainsaw with 28" bar (with full complement of safety equipment), Trimble Nomad Handheld Computer, GeoXM Handheld Field Computer, Makita 4x24 Belt Sander (with sand paper grits ranging from 50 to 400), and Meiji EMZ-8T Trinocular Microscope (with boom stand and fiber optic light source. The Paleontology Laboratory equipment includes binocular microscopes, binocular macroscope, air abrasive and pneumatic airscribe for fossil preparation, and wet laboratory facilities for acid preparation. General field equipment includes GPS units (Garmin GPSMap 60CSx and Garmin Rino 530HCx), Brunton compasses, Topcon GPT-300W Series Reflectorless Total Station for surveying, measuring tapes, and field belts, rock hammers, acid bottles and holders.

The Department of Sociology (http://www.apsu.edu/sociology), located in McCord Hall, has access to the Social Science Research Lab that includes the statistical software SPSS and JMP. The combined faculty has expertise in survey research, participator action research, decision-making, interviewing, and secondary data analysis.

VI. Description or list of past research, technical assistance, and educational services supported through federal financial assistance awards that are of relevance to federal land management, environmental, and research agencies that will be engaged in CESU activities.

Grants and Contracts (last 5 years):

During the past five-year period, the amount of funding related to conservation, biodiversity research, restoration, and related education that has been brought in from government funding (with an emphasis on those stemming from federal sources) is approximately $3.8 million.

AGENCY-SHORTENED TITLE	AMOUNT	PI	Unit	START/END
DOD: Northern Long-Eared Bat Roost Survey	$388,385.00	K. Haase	BIOL	2020-2023
DOD: ISGA Wetland Planning Survey	$143,842.00	M. Wilson	GIS	2019-2020
EPA: Project WET 2020	$16,500.00	M. Rogers	CEFB	2020-2022
Nashville Metro Parks: Botany survey	$21,515.00	D. Estes	SGI	2018-2022
NFWF: Soak Creek Savanna Restoration	$45,719.00	E. Rehm	SGI	2021-2023
NPS. Big South Fork Old Field Study.	$43,651.00	Z. Irick	SGI	2021-2022
NPS. Botanical survey of Clear Fork riverscour	$27,642.00	D. Estes	CEFB	2018-2022
NPS. Cumberland-Piedmont invent. & monitor.	$282,000.00	Z. Irick	SGI	2019-2023
NPS. National Capital Area grasslands study.	$49,116.00	D. Estes	SGI	2021-2022
NPS. National Park grassland flora project. I.	$97,500.00	D. Estes	SGI	2021-2022
NPS. National Park grassland flora project. II.	$80,000.00	D. Estes	SGI	2022-2023
NPS. Obed Wild and Sc. River Hydrilla survey	$35,000.00	D. Estes	CEFB	2018-2022
NSF. APSU Herbarium grant.	$389,385.00	D. Estes	CEFB	2016-2021
NSF. APSU Herbarium & Museum grant	$309,000.00	R. Johansen	CEFB	2014-2017
NSF ISU Trng Dendrochronologists	$4,395.00	C. Gentry	GEOS	2018-2021
TDEC. Tennessee wetland vegetation study	$30,000.00	D. Estes	SGI	2020-2021
TDEC. Plan for Whorled Sunflower	$3,604.00	C. Breeden	SGI	2019-2020
TDEC TN Water Sampling	$4,500.00	J. Lebkuecher	BIOL	2018-2023
TDEC, Clean TN Energy Program	$200,000.00	L. Prange	APSU	2017-2019
TDOT. Tennessee roadside grassland survey.	$150,000.00	D. Estes	SGI	2018-2021
TVA. Powerline grassland study plants/insects.	$300,000.00	D. Estes	SGI	2019-2022
TWRA Digi Veri Amp Rep 2	$30,000.00	C. Gienger	CEFB	2021-2022
TWRA Grassland Bird Survey	$7,500.00	S. Woltmann	CEFB	2019-2019
TX Parks & Wildlife: Texas bat survey	$62,004.00	K. Haase	BIOL	2022-2023
USDA NRCS. Tennessee seed program	$100,000.00	D. Estes	SGI	2020-2025
USDA NRCS. Urban Grasslands Restoration	$4,000.00	Z. Irick	SGI	2020-2022
USFS. Botany survey, Land Between the Lakes	$25,176.00	D. Estes	CEFB	2015-2020
USFWS. Partners F&W. Restoring grasslands	$315,000.00	D. Estes	SGI	2021-2026
USFWS. Partners F&W. Restoring grasslands	$116,000.00	D. Estes	SGI	2020-2025
USFWS. Seeds of Success-Southeast	$288,000.00	D. Estes	SGI	2020-2025
USFWS. Whorled Sunflower in Mississippi.	$26,188.00	C. Breeden	SGI	2021-2022
USFWS Endangered Jumping Mice	$59,977.00	J. Malaney	BIOL	2019-2021
USFWS. Price's Potato Bean pop. genetics	$3,000.00	C. Baskauf	BIOL	2020-2022
USFWS. Enhanced genetics of Blackside Dace	$2,495.00	M. Cashner	BIOL	2021-2021
USGS. Climate impacts on SE grasslands	$133,629.00	E. Rehm	SGI	2020-2022
USGS. Grassland science needs workshop	$45,000.00	D. Estes	SGI	2019-2021
VA Game & Fish: Genetics of Duskytail Darter	$25,287.00	R. Johansen	CEFB	2019-2022
USGS: Development of Lentic Periphytic Algal	$6,870.00	J. Lebkuecher	BIOL	2020-2021

Relevant Experience and Expertise:

- Grassland biodiversity, restoration, and conservation
- Historical ecology of eastern U.S.
- Native seed collection and storage
- Wetlands, watersheds and stream restoration
- Plant ecology and population genetics

- Rare, threatened and endangered (RTE) plants
- Plant systematics
- Herbarium curation and documentation
- New species discovery and description
- Floristic inventory
- Vegetation classification and sampling
- Microbial pathogenesis: DNA extraction methods from invertebrates and vertebrates, DNA-analyses such as PCR, quantitative real-time PCR, reverse-transcriptase PCR, DNA sequencing, DNA cloning, protein purification and antibody generation
- Terrestrial and aquatic ecology
- Fish Systematics, ecology and conservations
- Population, conservation, and landscape genetics
- Aquatic toxicology
- Aquatic entomology
- Aquatic biomonitoring – bacteria, algae, macroinvertebrates and fish
- Bird ecology and conservation
- Mammal ecology and conservation
- Insect systematics and inventory
- Geographic Information Systems (GIS), global positioning, field mapping
- Disaster Mitigation and Recovery (DMARK) is a unique application for Android Mobile phones that allow emergency responders to record damage assessments immediately following disasters and collecting information by near real-time electronic feeds from DMARK Server.
- Foraminiferal analysis of the Eocene/Oligocene boundary
- Upper Cretaceous Foraminifera of the Gulf Coast
- Statistical analysis of foraminiferal data sets
- Taxonomic analysis of foraminiferal genera
- Ground penetrating radar survey of active and abandon graveyards
- Forensic analysis of stream sediments
- Forensic analysis of potential grave sites
- Determining depositional environments
- Sequence stratigraphy
- Quantitative sedimentary modeling and basin analysis
- Sedimentary responses to large-scale basin dynamics and tectonics
- Stratigraphy and sedimentation of geologic formations
- Surface to subsurface clastic and carbonate reservoir analysis
- Interpretation of sedimentary rocks and depositional environments from geophysical logs
- Petrographic analysis of all rock types
- Geologic field mapping of all types of geologic terrains
- Relationship between land tenure and environmental change
- Food insecurity and sustainable livelihood strategies
- Political economy of post-conflict societies
- Inorganic chemistry, including microscopic and spectroscopic analysis of inorganic samples; polarizing light microscopy; UV/Vis spectrometry
- Biochemistry – enzyme studies (structure/function relationships and enzymatic assays), ultracentrifuge electrophoresis, tissue cultures, enzymatic assays, DNA electrophoresis, protein chromatography, protein electrophoresis, tissue culture/protein over-expression, bacterial culture and expression
- Organic chemistry – small molecule synthesis, physical organic methodology, computational

chemistry
- Pest management, precision agriculture, Berlese funnels for soil invertebrate sampling

VII. Description or list of current formal agreements and informal relationships with federal agencies that are of relevance to federal land management, environmental, and research agencies that will be engaged in CESU activities.

In summary, the CEFB, SGI, and Biology Department have been involved in biodiversity research (plants, animals, natural ecosystems) and conservation with most of the major federal agencies across multiple states and ecoregions. We also have conducted numerous focused inventories and assessments for RTE (Rare, Threatened and Endangered) plant and animal species. Our current or recent projects have been done in collaboration with Bureau of Land Management (BLM), National Fish and Wildlife Foundation (NFWF), National Park Service (NPS), Tennessee Valley Authority (TVA), US Army Corps of Engineers (USACE), US Fish and Wildlife Service (USFWS), US Forest Service (USFS), US Geological Survey (USGS), USDA Natural Resources Conservation Service (USDA NRCS), as well as numerous state and municipal agencies and private organizations.

We have or are in the process of conducting plant and animal surveys at such Federal facilities such as Big South Fork Nat. River & Rec. Area (NPS), Cherokee National Forest (USFS), Cumberland Gap National Historic Park (NPS), Fort Campbell Army Base (DOD), Fort Donelson National Battlefield (NPS), Harper's Ferry (NPS), Land Between the Lakes Nat. Rec. Area (USFS), Mammoth Cave National Park (NPS), Obed Wild and Scenic River (NPS), Rock Creek Park (NPS).

SGI is working with BLM, USFWS, and USDA NRCS on seed collection, seed banking and native plant materials development. This involves collecting seeds of native grassland, wetland, and woodland species as part of the National Seed Strategy and the federal Seeds of Success program. SGI serves as the hub for the newly designated Seeds of Success-Southeast, an effort to collect native seeds from across a ten-state region of the southeastern U.S.

SGI is working with USDA NRCS, NFWF, Tennessee State Parks, Roundstone Native Seed, Google, Quail Forever, American Bird Conservancy, and municipal governments (cities of Chattanooga and Nashville, TN) on restoring native grasslands in urban and rural landscapes. This involves everything from seed mix design to installation and post-planting management and monitoring. This involves multiple projects done in collaboration with the USACE on restoring wet grasslands as part of wetland mitigation banks.

Members have conducted water quality monitoring in western and central Tennessee for the Tennessee Department of Agriculture Non-point Source Program and in south-central Kentucky for the Kentucky Department of Waters Non-point Source Program and U.S. E.P.A. Region 4. Additionally, we have worked with the Tennessee Department of Environment and Conservation to identify and collect data from high-quality reference wetlands across Tennessee.

The CEFB and Biology Department have also conducted gene-based studies of fish, crayfish, and plant species as part of phylogenetic, phylogeographic, and population genetics research.

SGI and the CEFB worked with the USGS and 40 different representatives of many federal and state agencies to host regional science-based workshops and needs assessments which resulted in the publication of a white paper in the USGS Bulletin addressing the "Science Needs of Southeastern Grassland Species of Conservation Concern." SGI and CEFB also teamed up to host a major regional symposium, the "Mid-South Prairie Symposium" which brought together 150 people from 50 different organizations (including 30 speakers), including many federal agencies, to learn about

regional grasslands and their conservation needs.

SGI, CEFB, Biology, and the Dept. of Physics are working with USGS on a study of the impacts of climate change on prairie restoration, and concurrently as part of the same grant we are working with a science advisory team to model the impacts to native grassland ecosystems posed by climate change, urbanization, land use change, and invasive species.

SGI is collaborating with the TVA, Electric Power Research Institute (EPRI), and Mississippi State University on a study of the grassland flora and pollinators associated with powerline corridors in Alabama and Tennessee.

SGI is collaborating with the NPS and University of North Carolina-Chapel Hill on a multi-year project to identify the grassland ecosystems and grassland plant species found across 40 southeastern U.S. national parks and to use this information to predict which species should be prioritized for use in park-specific and regional grassland conservation and restoration efforts.

SGI and CEFB are working with numerous federal and state partners, especially the NPS, and the Natural Areas Association, to publish a research compendium in the *Natural Areas Journal* devoted to riverscour ecosystems of eastern U.S. This work also builds on recent research that SGI-CEFB has conducted in collaboration with numerous NPS parks such as Obed Wild and Scenic River, Big South Fork Nat. River & Rec. Area and Little River Canyon National Preserve.

SGI and CEFB have partnered with NPS's Cumberland-Piedmont Network to help conduct inventory and monitoring across 15 national parks across multiple states. This includes detailed vegetation plotwork, species identifications, and data analysis.

SGI is collaborating with the USFWS Partners for Fish and Wildlife Program to help restore remnant native grasslands on private lands across five states (AL, AR, KY, MS, TN), by implementing prescribed fire, woody plant removal, seeding, and invasive plant control.

SGI-CEFB is collaborating with USFWS and the Plant Conservation Alliances to develop safeguarding plans, search for new populations, and help restore populations of federally-listed rare plant species in MS and TN.

The APSU CEFB and GIS Center has worked with the Milan Army Ammunition Plant (MLAAP, Milan, TN). For six years, the CEFB has and continues to participate in long-term monitoring of amphibian, reptiles, and aquatic macroinvertebrates in support of MLAAP's Integrated Resource Management Plan (IRMP). The GIS Center has worked with MLAAP to update numerous GIS layers that are used to assist the IRMP.

The CEFB has recently been under contract with the U.S. Department of Agriculture – Forest Service to provide plant community assessments, rare and invasive plant surveys, and conduct bioacoustics bat surveys of Land Between the Lakes National Recreation Area (LBL).

The CEFB has or continues to assess the conservation status of numerous fish in Kentucky, Tennessee and Mississippi including the Black-sided Dace, Egg-mimic Darter, Kentucky Arrow Darter, Smallscale Dater, Saddled Madtom and Piebald Madtom. This research has been supported directly from the U.S. Fish and Wildlife Service or through State Section 6 funds provided by U.S. FWS.

CEFB botanists have conducted plant community surveys, and rare and invasive plant surveys in the Cherokee National Forest for the U.S. Forest Service to evaluate potential future highway corridors in the Blue Ridge Mountains of southeast Tennessee.

Under contract with Southern Conservation Corporation, CEFB botanists have conducted botanical studies of the Clarks River National Wildlife Refuge (U.S. FWS) in western Kentucky including mapping vegetation types, documenting vascular flora and populations of rare and invasive plant species.

For the Obed Wild and Scenic River (National Park Service), the CEFB has assessed the invasive aquatic plant hydrilla to determine the extent of the infestation and made a preliminary evaluation of the plant's impact on the aquatic macroinvertebrate, native aquatic flora, and aquatic vertebrate communities. CEFB botanists also conducted a survey of rare and invasive plants for this park.

CEFB botanists worked with Great Smoky Mountains National Park in the description of a new species of sedge that is endemic to the Park.

The CEFB has been a cooperating partner with South Carolina Department of Natural Resources on a conservation genetics study of the McGillivray's Seaside Sparrow. Funding was from the Southeastern Association of Fish and Wildlife Agencies and the U.S. Fish and Wildlife Service.

CEFB adopted the unsupported and orphaned Western Kentucky University Herbarium (68,000 specimens) with funding from the National Science Foundation titled "CSBR: Ownership Transfer. Rescuing three imperiled Kentucky herbarium collections and integrating them into the Austin Peay State University Herbarium to establish the Herbarium of the Interior Plateau Ecoregion." This builds on an earlier (2014) NSF grant to help support APSU's herbarium and vertebrate collections.

Biology faculty conducted a survey of Northern Long-eared Bat roosts at Fort Campbell Military Installation for the U.S. Army Corps of Engineers.

Biology and Mathematics faculty received an NSF S-STEM grant titled "Increasing the Number of Regional Community College Graduates and Active Duty Military Personnel, Veterans, and Dependents Enrolling in and Completing a STEM Baccalaureate Degree." The purpose of the five-year project was to increase the number and graduation rates of students transferring from regional community colleges and from military service to four-year STEM degrees at Austin Peay State University (APSU) by providing financial assistance, career information, counseling, and learning communities that are academically and socially supportive. APSU partnered with Columbia State Community College, Volunteer State Community College, Nashville State Community College, and the APSU Center located on the Fort Campbell Military Base (in Fort Campbell, KY).

The GIS Center at APSU has developed the Disaster Mitigation and Recovery Kit (DMARK), a system to aid disaster damage assessors in collecting property damage information in a digital format via mobile devices. By collecting information in a digital format, the assessors can save time and get aid to individuals more quickly. DMARK was funded by the South East Research Initiative (SERRI) managed by Oak Ridge National Laboratory for the Department of Homeland Security Science & Technology.

VIII. Confirmation of the institution's/organization's willingness to accept the CESU programmatic indirect cost (IDC) rate and cost items to which this rate is applicable for activities conducted through the CESU, including research, technical assistance, and educational activities (this IDC rate applies to the entire institution/organization for CESU activities).

Austin Peay State University is willing to accept a limited overhead rate of 17.5% for activities conducted through CESU.

IX. Technical representatives

Chris Gentry Ph.D.
Director, Center of Excellence for Field Biology
Austin Peay State University
P.O. Box 4718
Clarksville, TN 37044
Phone: (931) 221-7783
Fax: (931) 221-6372
Email: gentryc@apsu.edu

Dwayne Estes Ph.D.
Executive Director, Southeastern Grasslands Institute
Austin Peay State University
P.O. Box 4718
Clarksville, TN 37044
Phone: (931) 221-7771
Fax: (931) 221-6372
Email: estesL@apsu.edu

X. Designation of an administrative or grants and agreements representative (with full contact information – name, title, full address, phone, fax, email) to serve as financial assistance point of contact.

Tim Atkinson Ed.D.
Director, Research & Sponsored Programs
Austin Peay State University
P.O. Box 4517
Clarksville, TN 37044
Phone: (931) 221-7881
Fax: (931) 221-7304
Email: atkinsont@apsu.edu

XI. Agreement to relay agency-specific research, technical assistance, and educational needs and associated funding opportunities to other institutional/organizational members (e.g., faculty, students, staff).

Austin Peay State University and Southeastern Grasslands Institute agree in good faith to relay agency specific research, technical assistance, and educational needs and associated funding opportunities to other partners and institutional members involved in the projects of the relevant CESU Chesapeake scopes of work.

XII. Signature (or endorsement) from an appropriate official, with authority to commit institutional resources in a binding multi-year federal cooperative and joint venture CESU New Partner Application and agreement (e.g., president, executive director, chief financial officer, vice president for research, authorized organizational representative, director of sponsored programs).

XIII. Letter(s) of support from one or more CESU federal agency partners sponsoring the new partner's application, including a description of successful past collaborative work supported through federal financial assistance awards.

See two included letters from the National Park Service

United States Department of the Interior

NATIONAL PARK SERVICE
Atlanta Federal Center
1924 Building
100 Alabama Street, SW
Atlanta, GA 30303

14 January 2022

Matthew Fitzpatrick, Director
Chesapeake Watershed CESU
University of Maryland Center for Environmental Science
Appalachian Laboratory
301 Braddock Road
Frostburg, MD 21532

Dear Dr. Fitzpatrick,

We support Austin Peay State University joining the Chesapeake Watershed CESU.

Austin Peay State University has worked cooperatively with the national parks in Interior Region 2—South Atlantic Gulf as a new partner during the last two years. We understand that the University is also working with the National Capital Area.

The Austin Peay State University, the Center of Excellence for Field Biology, Southeastern Grasslands Initiative staff, are currently working with regional staff to provide information gathering, technical expertise, and project management support for a project related to grasslands across all NPS units in the southeastern United States.

We plan to build upon the recent efforts so that parks in our region can successfully create, restore, or enhance grasslands in parks. The information we are gathering now is essential to that goal and Austin Peay State University is one of the top authorities on southeastern grasslands. We anticipate that the staff and students involved at Austin Peay along with NPS staff and interns will gain valuable experiences from the current and future projects.

Thank you for your consideration of the Austin Peay State University application package.

Sincerely,

MARK FREY Digitally signed by MARK FREY Date: 2022.01.14 10:59:08 -05'00'

Mark Frey
Chief, Science and Natural Resources Management
National Park Service, Interior Region 2 - South Atlantic Gulf
100 Alabama St., SW, Atlanta, GA 30303
o) 404-507-5704 / c) 470-259-2168

United States Department of the Interior

NATIONAL PARK SERVICE
Interior Region 1- National Capital Area
Natural Resources & Science
4598 MacArthur Boulevard, NW
Washington, D.C. 20007

29 September 2021

Matthew Fitzpatrick, Director
Chesapeake Watershed CESU
University of Maryland Center for Environmental Science
Appalachian Laboratory
301 Braddock Road
Frostburg, MD 21532

Dear Dr. Fitzpatrick,

We support Austin Peay State University joining the Chesapeake Watershed CESU.

Austin Peay State University has worked cooperatively with the national parks in Interior Region 1--National Capital Area (NCA) as a new partner during fiscal year 2021. Federal financial assistance to Austin State Peay has been less than $50,000 for NCA. We know that they have worked cooperatively with the NPS Southeast Region for several years.

The Austin Peay State University, the Center of Excellence for Field Biology, Southeastern Grasslands Initiative staff, are currently working with NCA to provide expert technical assistance and research to national park managers for project planning, rigorous data collection and analyses, and biological inventories for the management and protection of plants and pollinators.

We plan to work together on future projects through the Chesapeake Watershed CESU to provide guidance to national parks through best management practices to establish and enhance viable populations of plants and animals and control invasive nonnative species during rehabilitation and creation of native prairies, meadows, savannahs, glades, barrens, and other wet grassland habitats and survey and census plant and animals in select parks. We anticipate that students will gain valuable educational experiences from assisting subject matter experts and park staff in the field.

Thank you for your consideration of the Austin Peay State University application package.

Sincerely,

Patrick Campbell

J. Patrick Campbell, Chief