



Bill Dennison, Interim Director
Chesapeake Watershed Cooperative Ecosystem Studies Unit (CW-CESU)
PO Box 775
Center for Environmental Science
University of Maryland
Cambridge, MD, 21613

October 7, 2014

Dr. Dennison,

Please accept the following application as the Rice Rivers Center at Virginia Commonwealth University's intent to enroll in the Chesapeake Watershed Cooperative Ecosystem Study Unit (CW-CESU).

Focused on the science and policy of large rivers and their fringing landscapes, the VCU Rice Rivers Center can provide a breadth of resources to complement the existing CESU Network. The VCU Rice Rivers Center has a rich array of environmental research, teaching, faculty, staff, equipment and partnerships. The VCU Rice Rivers Center itself is rich in cultural, historic and ecological resources, composed of approximately 500 acres of aquatic and terrestrial habitat along the tidal James River, in Charles City County, Virginia.

The attached application highlights the mission, research, education, resources, and commitment that the VCU Rice Rivers Center can bring to the CESU Network. We look forward to the opportunity to collaborate and with those opportunities, support the mission to educate and enhance public policy decision making.

Please contact me with any questions you may have. I look forward to hearing from you.

Sincerely,

Greg Garman, Ph.D.

Director, Center for Environmental Studies
Research Director, VCU Rice Rivers Center
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The Rice Rivers Center at Virginia Commonwealth University would like to formally submit our application to enroll in the Chesapeake Watershed Cooperative Ecosystem Study Unit (CW-CESU) regional network as a new partner institution. The VCU Rice Rivers Center will bring a breadth of new relationships, robust infrastructure, and innovative research opportunities to the network. VCU Rice Rivers Center will complement the existing member institutions of the Chesapeake Watershed regional CESU network and we look forward to the opportunity to participate as a partner.

The VCU Rice Rivers Center has read the CESU agreement and commits to supporting the CESU mission and goals while fulfilling our roles and responsibilities of a nonfederal partner per the CESU agreement. VCU's Office of Sponsored Programs (letter enclosed) accepts fully the terms and conditions of CESU agreements.

The Inger and Walter Rice Rivers Center for Environmental Life Sciences is Virginia Commonwealth University's field station and is devoted to a broad array of environmental research, teaching and public service. Located on nearly 500 acres of riparian habitat along the tidal James River, midway between Richmond and Williamsburg, the Rice Rivers Center is rich in natural and cultural resources. The Center has a variety of aquatic and terrestrial habitats, including upland forest, tidal marsh, and estuarine waters that provide many research and educational opportunities.

The VCU Rice Rivers Center mission is to be internationally recognized for its academic programs focused on scientific research, education and public outreach, and for informing public policy related to river ecosystems, their watersheds and the conservation of species that inhabit those watersheds (<http://www.vcu.edu/rice/about/mission.html>).

A primary focus of research at the site is on the science and policy of large rivers and their fringing riparian and wetland landscapes, with the broad and scenic James River as the focal point of that research. Such a focus on the ecology, conservation, and management of large coastal rivers is unique among academic field stations along the Atlantic Slope and will bring value to a CESU partnership.

The Center also is very active in undergraduate and graduate educational activities, providing field-based instruction for a number of courses taught at VCU. Many outreach education programs also are taught throughout the year at the center, focused on environmental education for K-12 schoolchildren, their teachers and lifelong learners.

The VCU Rice Rivers Center affiliated faculty and staff have had the opportunity to work with a variety of partners. Our research has leveraged partnerships with federal, state, local, academic, non-governmental, citizen and private entities. Our years of research and outreach have provided us with continued opportunities to interact with a community interested in helping support the pursuit of environmental education and research.

The current primary programs of the VCU Rice Rivers Center include, although are not limited to:

- The Atlantic Sturgeon Recovery in Chesapeake Bay: <http://www.vcu.edu/rice/research/research-sturgeon.html>
- The Mountains to the Sea Initiative (with USGS and Randolph Macon College): <http://www.vcu.edu/rice/blog/2014/07/mountains-to-sea.html>

- Prothonotary Warbler Conservation in Virginia and Panama: <http://www.vcu.edu/rice/research/research-warbler.html>
- Remote Sensing and Florescence Spectroscopy Lab (with ACOE/ERDC): www.erd.usace.army.mil/
- Tidal Wetland Restoration (with The Nature Conservancy): www.vcu.edu/rice/research/research-ecology.html
- Virginia Healthy Waters Initiative: www.dcr.virginia.gov
- Water Quality and Harmful Algal Blooms (with VIMS and ODU): http://www.vcu.edu/rice/blog/2012/08/harmful_algal_blooms_in_the_ja.html

The VCU Rice Rivers Center maintains relationships with our collaborating departments and centers within the University, including:

- Center for Conservation Biology (VCU & College of William and Mary): www.ccbirds.org/
- Center for Environmental Studies: www.vcu.edu/cesweb/
- Center for the Study of Biological Complexity: www.vcu.edu/csbc/
- Department of Biology: www.biology.vcu.edu/
- Department of Economics: <http://business.vcu.edu/economics.html>
- Division of Community Engagement: <http://www.community.vcu.edu/>
- Life Sciences: www.vcu.edu/lifesci/

Outside of the VCU community, the Rice Rivers Center has established working relationships and partnerships with the following collaborating agencies and institutions, including:

- Atlantic State Marine Fisheries Commission: <http://www.asmfc.org/about-us/program-overview>
- Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation: http://www.dcr.virginia.gov/soil_and_water/
- Virginia Department of Conservation and Recreation, Division of Natural Heritage: http://www.dcr.virginia.gov/natural_heritage/
- Virginia Department of Environmental Quality: <http://www.deq.virginia.gov/>
- Virginia Department of Game and Inland Fisheries: <http://www.dgif.virginia.gov/>
- USFWS Harrison Lake Fish Hatchery: <http://www.fws.gov/harrisonlake/>
- USFWS Presquile National Wildlife Refuge: <http://www.fws.gov/refuge/presquile/>
- Army Corps of Engineers (Norfolk): <http://www.nao.usace.army.mil/>
- Department of the Navy: <http://www.navy.mil/local/navfachq/>
- NOAA Office of Protected Resources: <http://www.nmfs.noaa.gov/pr/>
- J. Sargeant Reynolds Community College: <http://www.reynolds.edu/curriculum/ScienceAS.aspx>
- U.S. Geological Survey: <http://www.usgs.gov/>
- Virginia Institute of Marine Science: <http://www.vims.edu/>
- Virginia Sea Grant: <http://vaseagrant.vims.edu/>

The VCU Rice Rivers Center affiliated faculty and staff bring a wealth of knowledge and experience. Drawing on a broad range of environmental research, conservation and management expertise, the Rice Rivers Center scope of research is continually expanding. The following list represents the VCU Rice Rivers Center affiliated faculty and staff:

- Dr. Len Smock, Ph.D. Director VCU Rice Rivers Center. Professor of Biology. Dr. Smock's research focuses on aquatic ecology. <http://www.biology.vcu.edu/people/leonard-smock>.
- Dr. Greg Garman, Ph.D. Director, Center for Environmental Studies; Research Director VCU Rice Rivers Center; Associate Professor of Biology. Dr. Garman's research interests focus on the ecology of large coastal rivers, the biology of migratory fishes and the effects of urbanization on stream ecosystems. https://www.vcu.edu/cesweb/f_garman.html.
- Dr. Salvatore Agosta, Ph.D. Department of Biology and Center for Environmental Studies. Dr. Agosta's research interests focus on community ecology, evolutionary ecology, physiological ecology, macroecology and macrophysiology, and plant-animal interactions. http://www.vcu.edu/cesweb/f_agosta.html.
- Dr. Bonnie Brown, Ph.D. Associate Department Chair and Professor of Biology. Dr. Brown's research focuses on conservation genetics. <http://www.biology.vcu.edu/people/bonnie-brown>.
- Dr. Paul Bukaveckas, Ph.D. Department of Biology and Center for Environmental Studies. Dr. Bukaveckas' research focuses on river ecology and ecosystems ecology. <http://www.biology.vcu.edu/people/paul-bukaveckas>.
- Dr. Lesley Bulluck, Ph.D. Department of Biology and Center for Environmental Studies. Dr. Bulluck's research focuses on avian ecology. <http://www.biology.vcu.edu/people/lesley-bulluck>.
- Ms. Jennifer Ciminelli, M.S. Center for Environmental Studies, VCU Rice Rivers Center Data and Research Coordinator. Ms. Ciminelli's research focuses on watershed and land use effects and geospatial modeling.
- Dr. Vickie Connors, Ph.D. Center for Environmental Studies. Dr. Connors' research focuses on trophospheric chemistry, remote sensing, weather and climate and earth system science. http://www.vcu.edu/cesweb/f_connors.html.
- Dr. Edward Crawford, Ph.D. Rice Rivers Center Director of Wetland Research, Department of Biology. Dr. Crawford's research focuses on wetlands ecology and restoration. <http://www.biology.vcu.edu/people/edward-crawford>.
- Dr. Peter deFur, Ph.D. Center for Environmental Studies. Dr. deFur's research focuses on ecological and human health risk assessment, contaminated site assessment and remediation, endocrine disrupters, effects of low oxygen conditions on estuarine and coastal waters, and management of federal fisheries. http://www.vcu.edu/cesweb/f_defur.html.
- Dr. Rodney Dyer, Ph.D. Department of Biology. Dr. Dyer's research focuses on population genetics and biostatistics. <http://www.biology.vcu.edu/people/rodney-dyer>.
- Dr. Arthur Evans, Ph.D. Smithsonian Institution, Virginia Museum of Natural History, Adjunct faculty with the Department of Biology. Dr. Evan's research focuses on entomology, education and outreach.
- Dr. Linda Fernandez, Ph.D. Associate Professor, Center for Environmental Studies and School of Business, Department of Economics. Dr. Fernandez's research focuses on the development and application of environmental and resource economic models to evaluate public and private economic incentives in policies and markets in order to solve environmental issues at international and local scales. http://www.vcu.edu/cesweb/f_fernandez.html
- Dr. Michael Fine, Ph.D. Department of Biology. Dr. Fine's research focuses on fish neurobiology. <http://www.biology.vcu.edu/people/michael-fine>.
- Dr. Rima Franklin, Ph.D. Department of Biology. Dr. Franklin's research focuses on microbial ecology and environmental microbiology. <http://www.biology.vcu.edu/people/rima-franklin>.
- Dr. Christopher Gough, Ph.D. Department of Biology. Dr. Gough's research focuses on plant physiological and ecosystem ecology. <http://www.people.vcu.edu/~cmgough/index.htm>.

- Dr. Derek Johnson, Ph.D. Department of Biology. Dr. Johnson's research focuses on landscape ecology and modeling. <http://www.biology.vcu.edu/people/derek-johnson>.
- Dr. Leigh McCallister, Ph.D. Department of Biology and Center for Environmental Studies. Dr. McCallister's research focuses on aquatic ecology and oceanography. <http://www.biology.vcu.edu/people/leigh-mccallister>.
- Dr. Daniel McGarvey, Ph.D. Center for Environmental Studies. Dr. McGarvey's research focuses on macroecology, river ecology, fish ecology, ecological modeling, ecosystem services and natural resource management and policy. http://www.vcu.edu/cesweb/f_mcgarvey.html.
- Dr. Stephen McIninch, Ph.D. Center for Environmental Studies. Dr. McIninch's research focuses on biological integrity and assessment of riverine assemblages and their environments; water quality, habitat degradation, and biopollution and its effects on aquatic communities; and the ecology, life history and biogeography of riverine fishes. http://www.vcu.edu/cesweb/f_mcininch.html.
- Dr. Scott Neubauer, Ph.D. Department of Biology. Dr. Neubauer's research focuses on wetlands ecology, biogeochemistry and global change ecology. <http://biology.vcu.edu/people/scott-neubauer>.
- Dr. Robert Reilly, Ph.D. Department of Economics. Dr. Reilly's research focuses on experimental economics, individual behavior under uncertainty, biodiversity and ecological economics, applied microeconomics and avian biology. <http://business.vcu.edu/faculty/persondetail.php?urn=rreilly>.
- Mr. William Shuart, M.S. VCU Rice Rivers Center Director of Information Technology, Center for Environmental Studies. Mr. Shuart's research focuses on landscape effects on aquatic systems, eco-informatics, geospatial modeling and remote sensing. http://www.vcu.edu/cesweb/f_shuart.html.
- Dr. Arif Sikder, Ph.D. Center for Environmental Studies. Dr. Sikder's research focuses on fluvial sedimentology, characterization of sediments in regards to environmental pollution, paleo-environmental reconstruction, geochemistry of compactional anisotropy in the argillaceous sequence, and catastrophic events preserved in the stratigraphic succession. http://www.vcu.edu/cesweb/f_sikder.html.
- Dr. Brian Verrelli, Ph.D. Department of Biology. Dr. Verrelli's research focuses on population and evolutionary genetics. <http://www.biology.vcu.edu/people/brian-verrelli>.
- Ms. Cathy Viverette, M.S. VCU Rice Rivers Center Research Coordinator. Center for Environmental Studies. Ms. Viverette's research focuses on river and avian ecology. http://www.vcu.edu/cesweb/f_viverette.html.
- Dr. James Vonesh, Ph.D. Department of Biology. Dr. Vonesh's research focuses on population and community ecology. <http://www.biology.vcu.edu/people/james-vonesh>.
- Dr. Bryan Watts, Ph.D. Center for Environmental Studies, Director, The Center for Conservation Biology William and Mary. Dr. Watt's research focuses on avian ecology. <http://www.ccbirds.org/about-us/staff/bryan-watts/>.
- Ms. Anne Wright, M.S. Coordinator, Environmental Out Research Education, Department of Biology. Ms. Wright's research focuses on outreach education and aquatic ecology.
- Dr. Donald Young, Ph.D. Department Chair, Biology. Dr. Young's research focuses on coastal plant ecology and physiological ecology. <http://www.biology.vcu.edu/people/donald-young>.

- Dr. Julie Zinnert, Ph.D. Department of Biology. Dr. Zinnert's research focuses on linking remote sensing methods to plant physiology and architecture. <http://cpel.vcu.edu/people.html>.

Virginia Commonwealth University provides an academic home to a diverse and engaged community. The VCU Fall 2013 headcount is estimated at 31,288. Categorized at the student level, there are 23,657 undergraduate students, 5,923 graduate students and 1,708 first professional students. The demographic breakdown of the student population is:

- Gender:
 - 42% male
 - 57% female
 - 1% not reported
- Race/Ethnicity
 - <1% American Indian/Alaskan
 - 11% Asian
 - 16% Black/African-American
 - <1% Hawaiian/Pacific Islander
 - 6% Hispanic/Latino
 - 5% International
 - 4% Two or more races
 - 5% Not reported
 - 53% White

(2013-14 Fact Card. VCU Office of Planning and Decision Support. Accessed September 2014, http://www.opds.vcu.edu/documents/Facts_2013-14_FINAL_forwebsite.pdf)

“Among the most important assets of Virginia Commonwealth University is the vibrant diversity of its students. While students from underrepresented populations comprise around 40 percent of the student body, the university is challenged to authenticate diversity across all disciplines and levels at the university, including graduate students, faculty and institutional leadership. Nonetheless, the range of ideas, cultures, backgrounds and experiences present at VCU represents a microcosm of the world in which we live and for which students are being prepared, producing transformative research and scholarship, and providing effective service and community partnerships” (<http://www.inclusive.vcu.edu/about/statement.html>).

The VCU Rice Rivers Center hosts a robust infrastructure to support current research and educational needs and future growth expansion. Affiliated centers and institutes also provide supporting infrastructure for research development and education outreach.

Facilities include:

- VCU Rice Rivers Center Walter L. Rice Education Building (<http://www.vcu.edu/rice/facilities/building.html>)
- VCU Rice Rivers Center Boat House and Pier (<http://www.vcu.edu/rice/facilities/pier.html>)
- The VCU Rice Rivers Center plan to expand includes research and lodging facilities: (<http://www.vcu.edu/rice/facilities/research.html>).
- VCU Eugene P. and Lois E. Trani Center for Life Sciences (<http://www.maps.vcu.edu/monroepark/tranilifesci/>)

Equipment:

- Eddy Covariance Flux Tower
- Seismometer
- 1 M Meteorological tower with an Axis Q3500 and Ubiquiti Bullet
- 7m Meteorological tower
 - A Vaisala WXT520 solid state meteorological suite is also located on this tower collecting data at 10 minute intervals
 - Storage Process: Locally on a Campbell CR1000 Data logger
 - Wi-Fi Access
- James River Pier
 - A Vaisala WXT520 solid state meteorological suite is also located on this tower collecting data at 15 minute intervals.
 - Photosynthetic Active Radiation (PAR) sensor collecting data at 15 minute intervals
 - Storage Process: Locally on a Campbell CR1000 Data logger and pulled remotely back to VCU CES Servers every hour.
 - Wi-Fi Access accessible via fiber
- Lake Charles Pier
 - Campbell data logger CR1000
- Route 5 Site
 - Campbell data logger CR200X
- VCU RRC (CBIBS) Buoy
 - AXYS Buoy structure
 - YSI Exo Sondes
 - Meteorological Suite
 - Vemco Fish Receiver
- Weyanoke Pier Station
 - YSI 6600v2 multiparameter sonde
 - Vemco VR2C telemetry Receiver
 - Acoustic Doppler Current Profiler
- Presquile NWR Station
 - Vemco VR2C telemetry Receiver
- Rocketts Landing Station
 - Vemco VR2C telemetry Receiver
- SOLAR TECHNOLOGY AT THE PIER
 - 2 solar arrays (4 panels total)
 - 4 inverters (per 1 array)
 - 2 monitoring boxes
- Osprey Tower
 - Osprey webcam
- Research Vessels ranging from 18'-27'
- Canoes
- Data logger CR1000

- 5 YSI Exo Sondes

Centers / Departments:

- VCU Life Sciences: <http://www.vcu.edu/lifesci/>
- VCU Center for Environmental Studies: <http://www.vcu.edu/cesweb/>
- VCU Center for the Study of Biological Complexity: <http://www.vcu.edu/csbc/>
- William and Mary Center for Conservation Biology: <http://www.cbbirds.org/>
- VCU Department of Biology: <http://biology.vcu.edu/>
- VCU Department of Economics: <http://business.vcu.edu/economics.html>
- VCU Division of Community Engagement: <http://www.community.vcu.edu/>

Institutions:

- J. Sargeant Reynolds: <http://www.reynolds.edu/curriculum/ScienceAS.aspx>
- Virginia Institute of Marine Science: <http://www.vims.edu/>
- Atlantic State Marine Fisheries Commission: <http://www.asmfc.org/about-us/program-overview>
- NOAA Office of Protected Resources: <http://www.nmfs.noaa.gov/pr/>

VCU Rice Rivers Center faculty and staff have conducted extensive research and educational outreach that support the Rice Rivers Center’s mission to advance our knowledge of the environment and ecological sciences. The topics of research cover a wide range of environmental research, ranging from genetics to large river ecosystems, their riparian habitats and wetlands (<http://www.vcu.edu/rice/research/index.html>). Education and outreach supported with federal funding at the Rice Rivers Center has reached over 1,270 students, teachers and educators.

Research and educational services supported through federal assistance awards that are applicable for inclusion from the past 10 years include over 140 federal grants:

- Bureau of Land Management: *Evaluating the Breeding Bird Community Near Upper Massey Creek, Mason Neck*
- National Fish and Wildlife Foundation: *Nutrient Assimilation Credits from Oyster Aquaculture*
- National Oceanic and Atmospheric Administration: *Aerial surveys of migrating shorebirds along the Delmarva Peninsula*
- National Oceanic and Atmospheric Administration: *Chesapeake Bay Atlantic Sturgeon Recovery*
- National Oceanic and Atmospheric Administration: *Coastal GEM Version 3 Draft Development*
- National Oceanic and Atmospheric Administration: *Coastal GEMS Version 3 Final Development and Implementation*
- National Oceanic and Atmospheric Administration: *Coastal Management GIS Support*
- National Oceanic and Atmospheric Administration: *Coastal Management GIS Support and Coastal GEM Maintenance*
- National Oceanic and Atmospheric Administration: *Coastal Management GIS Support and Coastal GEMS Phase III*
- National Oceanic and Atmospheric Administration: *Developing a population framework for evaluating wind development impacts on seabirds in the western Atlantic.*

- National Oceanic and Atmospheric Administration: *Forecasting the Potential Effects of Invasive Catfishes in the Chesapeake Bay Watershed: A web-based, Geospatial Vulnerability Assessment*
- National Oceanic and Atmospheric Administration: *Investigating fall Whimbrel migration along the lower Delmarva Peninsula*
- National Oceanic and Atmospheric Administration: *Pathways to Productivity: An Assessment of Fishery Responses to Oyster Reef Restoration and the Tropic Pathways that Link the Resource to the Reef*
- National Oceanic and Atmospheric Administration: *Predator Prey Interactions Among Fish-Eating Birds and Selected Fisheries Resources in the Chesapeake Bay: Temporal and Spatial Trends and Implications for Fishery Assessment and Management*
- National Oceanic and Atmospheric Administration: *Sustainable Communities: Assessment of Priority Conservation Areas and Their Vulnerability to Development*
- National Oceanic and Atmospheric Administration: *Virginia Ocean Plan*
- National Oceanic and Atmospheric Administration: *Virginia Ocean Spatial Plan*
- National Oceanic and Atmospheric Administration: *Virginia Waters Woods and Wildlife a Watershed Education Program for Teachers*
- National Oceanic and Atmospheric Administration: *XML data Development and Submission*
- National Oceanic and Atmospheric Administration: *Assessing the impact of Phragmites on sensitive marsh-nesting birds along the seaward margin of the Delmarva Peninsula*
- National Oceanic and Atmospheric Administration: *Assessing the impact of Phragmites on sensitive marsh-nesting birds along the seaward margin of the Delmarva Peninsula (Wintering birds)*
- National Oceanic and Atmospheric Administration: *DEQ Coastal Zone Delmarva Migration Habitat Management*
- National Oceanic and Atmospheric Administration: *Investigating Whimbrel along the Seaside of Delmarva*
- National Oceanic and Atmospheric Administration: *Predator-prey Interactions Among Fish-eating Birds and Selected Fishery Resources in the Chesapeake Bay: Temporal and Spatial Trends and Implications for Fishery Assessment and Management*
- National Oceanic and Atmospheric Administration: *Stopover ecology of Red Knots on the Virginia Barrier Islands.*
- National Oceanic and Atmospheric Administration: *Synthesizing Information for the Virginia Important Bird Area Program: Phase I - Eastern Shore & Southern Tidewater*
- National Oceanic and Atmospheric Administration: *Synthesizing Information for the Virginia Important Bird Area Program: Phase II – Western Shore*
- National Oceanic and Atmospheric Administration and Department of Commerce: *Predation by introduced blue catfish as a potentially important and novel source of mortality for selected fishery resources in Chesapeake Bay waters*
- National Oceanic and Atmospheric Administration and Department of Commerce: *WEBS Watershed Education by Students*
- National Oceanic and Atmospheric Administration and Department of Commerce: *River Networks Real Time*
- National Park Service: *A Survey of the New River Gorge National River, Gauley River National Recreation Area, and Bluestone National Scenic River for Peregrine Falcons*
- National Park Service: *Gateway Sites in the Chesapeake Bay*

- National Science Foundation: *Bacterial Respiration of Terrestrial Carbon in Freshwater Systems*
- National Science Foundation: *Climate Change Effects on Costal Wetlands-Linking Microbial Community Composition and Ecosystem Responses*
- National Science Foundation: *Collaborative Research: Impact of Saltwater Intrusion on C Storage in Tidal Freshwater Wetlands*
- National Science Foundation: *Collaborative Research: The Role of Ecomorphodynamic Feedbacks in Barrier Island Response to Climate Change*
- National Science Foundation: *Collaborative Research: Impact of Salt Water Intrusion on C Storage in Tidal Freshwater Marshes*
- National Science Foundation: *Dissertation Research: Evaluating the functional significance of microbial community*
- National Science Foundation: *Diversity and biogeography of microbial communities in submerged caves*
- National Science Foundation: *How Important is "Old" Carbon in Lake Superior? A Radiocarbon Investigation*
- National Science Foundation: *LTRE V: Barrier Island Shrub Thicket Dynamics and Landscape Level Interactions*
- National Science Foundation: *LTRE VI: Barrier Island Vegetation Alternate Stable States and Threshold Response*
- National Science Foundation: *LTREB: Drivers of Forest C Storage from Canopy Closure Through Successional Time*
- National Science Foundation: *Planning Grant for the Inger and Walter Rice Center*
- National Science Foundation: *The Evolution of Genetic Structure in Species-Specific Plant-Insect*
- National Science Foundation: *U.S.-New Zealand Planning Visit: Radiocarbon Measurements of Organic Carbon*
- National Science Foundation: *Unifying the Two Generation Analysis to Pollen Movement*
- United States Department of Agriculture: *A mark-resight investigation of Black Vulture use of the Dutch Gap power plant.*
- United States Department of Agriculture: *Climate Controlled Reproductive Asynchrony in Gypsy Moth Populations*
- United States Department of Agriculture: *Factors Leading to Gypsy Moth Stasis and Retraction in Virginia*
- United States Department of Agriculture: *Managing the impact of wild birds on food safety and farm hygiene*
- United States Department of Defense: *Bald Eagle and colonial waterbird aerial surveys within Outlying Landing Fields*
- United States Department of Defense: *Baseline Surveys for Amphibians and Prothonotary Warblers*
- United States Department of Defense: *Bird Survey and Summary for Fort Lee and Combined Arms Support Command Installation*
- United States Department of Defense: *Combined Fluorescence & Reflectance Remote Sensing of Plants to Detect UXO's*
- United States Department of Defense: *Continued tracking of bald eagles using satellite transmitters in the upper Chesapeake Bay*

- United States Department of Defense: *Continuing investigations of Bald Eagle movements within the upper Chesapeake Bay*
- United States Department of Defense: *Interrelatedness and Inbreeding in the Deer Population of Ft. Eustis, Virginia*
- United States Department of Defense: *Investigating bird communities within Fort Lee Army Base, Virginia*
- United States Department of Defense: *Investigating reproductive rates and contaminant loads in Bald Eagles nesting at NSF Indian Head*
- United States Department of Defense: *Investigating reproductive rates and contaminant loads in bald eagles nesting on Indian Head, MD.*
- United States Department of Defense: *Investigating the spatial dynamics of Bald Eagles on Aberdeen Proving Grounds.*
- United States Department of Defense: *Investigation of breeding eagles on Indian Head, Dahlgren, and Patuxent Naval Air Station*
- United States Department of Defense: *Investigation of Enzymatic Enrichment of Samples to Enhance Detection of Bioagent*
- United States Department of Defense: *Monitoring Avian Productivity and Survivorship (MAPS) at the Marine Corps Base Quantico and Indian Head Naval Weapons Station*
- United States Department of Defense: *Monitoring Avian Productivity and Survivorship (MAPS) at the Marine Corps Base Quantico, Virginia*
- United States Department of Defense: *Monitoring Avian Productivity and Survivorship at Quantico (2009)*
- United States Department of Defense: *Monitoring avian productivity and survivorship on Indian Head and Dahlgren*
- United States Department of Defense: *Monitoring Avian Productivity and Survivorship on military installations within Chesapeake Bay*
- United States Department of Defense: *Monitoring Avian Productivity and Survivorship on Quantico Marine Base and Indian Head Naval Facility (2012)*
- United States Department of Defense: *Monitoring Avian Productivity and Survivorship on Quantico Marine Base, Dahlgren, and Indian Head*
- United States Department of Defense: *Remote Sensing Plant Stress Using Combined Fluorescence and Reflectance*
- United States Department of Defense: *Survey of bald eagles on Indian Head, Dahlgren, and Patuxent Naval Air Station*
- United States Department of Defense: *Survey of Indian Head, Dahlgren, and Patuxent Naval Air Station for breeding bald eagles*
- United States Department of Defense-Legacy Program: *A reassessment of shorebird use in the upper Bay of Panama, Panama.*
- United States Department of Defense-Legacy Program: *Developing an approach for the use of thermal imaging to identify nocturnal communal bird roosts.*
- United States Department of Defense-Legacy Program: *Development of an approach to spatially-explicit management of grassland birds on DOD installations in the mid-Atlantic region using habitat assessment data*
- United States Department of Defense-Legacy Program: *Marsh bird community profiling and management guide for Mid-Atlantic DoD installations.*

- United States Department of Defense-Legacy Program: *Pineland management and bird species of conservation concern on DOD installations in the mid-Atlantic region.*
- United States Department of Energy: *University of Michigan Biological Station Ameriflux Core Site Award*
- United States Department of the Army: *Aberdeen Proving Ground Bald Eagle Telemetry*
- United States Department of the Army: *Enterprise-Based Architecture and Analysis from LiDAR Point Clouds*
- United States Department of the Army: *Fish Age and Growth Analysis*
- United States Department of the Interior: *Experimental Treatment Effects on the Lonicera Japonica and Foeniculum Vilgare*
- United States Department of the Interior, USGS: *Analysis of Chlorophyll and Biogeochemistry Samples for the EMAP Great River Ecosystems Project*
- United States Department of the Navy: *Bald Eagle Nest Surveys Indian Head, Dahlgren, Patuxent River*
- United States Department of the Navy: *Monitoring Avian Productivity and Survival (MAPS) Program at the Marine Corps Base, Quantico, Virginia*
- United States Department of the Navy: *Monitoring Avian Productivity and Survivorship on Indian Head Naval Facility and Quantico Marine Base.*
- United States Department of the Navy: *Survey of proposed OLF sites for the endangered Red-cockaded Woodpecker.*
- United States Environmental Protection Agency: *Applied Academic Research in Wetland and Stream Restoration at the VCU Rice Center*
- United States Environmental Protection Agency: *Applied Academic Research in Wetland and Stream Restoration at the VCU Rice Center, Years 2 and 3*
- United States Environmental Protection Agency: *Chesapeake 2000 Support*
- United States Environmental Protection Agency: *Chesapeake Bay Watershed Implementation Plan Technical Support*
- United States Environmental Protection Agency: *Chowan Basin Healthy Waters Program*
- United States Environmental Protection Agency: *Coastal Nonpoint Source Program Management*
- United States Environmental Protection Agency: *Data Development Needs for Virginia's Healthy Waters Initiative in the Chesapeake Bay*
- United States Environmental Protection Agency: *DCR Coastal Nonpoint Program Management*
- United States Environmental Protection Agency: *Evaluation of the Impact of Phosphorus Species on Water Quality EPA*
- United States Environmental Protection Agency: *GIS Technical Support for Chesapeake Bay Management*
- United States Environmental Protection Agency: *Investigation of bird communities within reference wetlands*
- United States Environmental Protection Agency: *NEPA Management Technical Support*
- United States Environmental Protection Agency: *Phase 1 Healthy Waters Outreach*
- United States Environmental Protection Agency: *Stream Health Ecological Assessment for the Upper James River Basin, Virginia*
- United States Environmental Protection Agency: *TMDL Watershed Coordinator*

- United States Environmental Protection Agency: *VA Healthy Waters Initiative Program Management and Nonpoint Source Program*
- United States Environmental Protection Agency: *Virginia Chesapeake Bay Implementation Program*
- United States Environmental Protection Agency: *Virginia Coastal Nonpoint Source Pollution Program*
- United States Environmental Protection Agency: *Virginia Healthy Waters*
- United States Environmental Protection Agency: *Virginia Healthy Waters Initiative Program Management*
- United States Environmental Protection Agency: *Virginia Healthy Waters Program Management and Nonpoint Source Program Support*
- United States Environmental Protection Agency: *Virginia Network Education for Municipal Officials*
- United States Fish and Wildlife Service: *A systematic survey of cliff-nesting birds of the southern Appalachians with emphasis on peregrine falcons: Phase I*
- United States Fish and Wildlife Service: *An Investigation of Reproductive Constraints for American Oystercatchers on Fisherman Island National Wildlife Refuge*
- United States Fish and Wildlife Service: *Estimating staging red knots in Georgia using resight techniques*
- United States Fish and Wildlife Service: *Estimating sustainable mortality limits for shorebirds*
- United States Fish and Wildlife Service: *Evaluating Effective Resource Supply for Migrant Bird Consumers on the Lower Delmarva Peninsula*
- United States Fish and Wildlife Service: *Evaluating mercury loads in Saltmarsh and Nelson's Sparrows during winter*
- United States Fish and Wildlife Service: *Fall stopover ecology and habitat use by shrub-dependent birds*
- United States Fish and Wildlife Service: *Investigating stopover ecology of whimbrel along the lower Delmarva*
- United States Fish and Wildlife Service: *Investigating the impact of Deep Horizon oil spill on breeding ospreys within the Gulf of Mexico*
- United States Fish and Wildlife Service: *Investigating the stopover ecology of red knots along the Virginia Barrier Islands using band resights*
- United States Fish and Wildlife Service: *Investigating Whimbrel migration with satellite Transmitters*
- United States Fish and Wildlife Service: *Linking Bald Eagle Communal Roosts to Forage Areas*
- United States Fish and Wildlife Service: *Mason Neck Eagle Surveys*
- United States Fish and Wildlife Service: *Mortality Limits in Shorebirds*
- United States Fish and Wildlife Service: *Red Knot Surveys VA Barrier Islands*
- United States Fish and Wildlife Service: *Saltmarsh Mercury Contamination*
- United States Fish and Wildlife Service: *Shrub-Scrub Ecology on Delmarva Peninsula*
- United States Fish and Wildlife Service: *Space use by bald eagles around communal roosts – an evaluation using satellite tracking data*
- United States Fish and Wildlife Service: *Status Assessment and Conservation Action Plan for the Eastern Black Rail Across the Southeast Region*
- United States Fish and Wildlife Service: *Stopover ecology of Whimbrels within the mid-Atlantic*

- United States Fish and Wildlife Service: *Support for Status Assessment and Conservation Action Plan for the Eastern Black Rail (Laterallus jamaicensis jamaicensis) Across the Northeast Region*
- United States Fish and Wildlife Service: *Surveillance for Avian Influenza (HPAI-H5NI) in Shorebirds along the Eastern Shore of Virginia.*
- United States Fish and Wildlife Service: *Survey of nesting bald eagles and great blue herons on Mason Neck (2013)*
- United States Fish and Wildlife Service: *Using Brownian Bridge*
- United States Fish and Wildlife Service: *Virginia Bald Eagle Survey (2009)*
- United States Fish and Wildlife Service: *Whimbrel Shorebird Survey*
- United States Fish and Wildlife Service / Army Corp Engineers: *Virginia bald eagle breeding survey (2011)*

The scope of research and educational outreach opportunities undertaken by the faculty, staff and friends of the VCU Rice Rivers Center has created an atmosphere of collaboration and coordination. The VCU Rice Rivers Center is able to leverage these relationships to help promote our mission.

Two examples of noteworthy relationships include the Cooperative Research and Development Agreement with the US Army Engineer Research and Development Center and the relationship with the USFWS Presquile National Wildlife Refuge to use the refuge facilities as part of the Atlantic Sturgeon Recovery project. The Center has a variety of informal and formal relationships with several federal partners, as exemplified in the submitted letters of support, as well as with the state and private industry sectors.

The VCU Rice Rivers Center works to maintain its existing relationships and agreements, while seeking out new opportunities to foster collaboration and promotion of environmental research and education outreach.

If accepted into the CESU, the VCU technical representative will be:

Dr. Gregory Garman, Director, Center for Environmental Studies; Research Director, VCU Rice Rivers Center; Associate Professor, Department of Biology. Located at 1000 West Cary Street, P.O. Box 843050, Richmond, Virginia 23284-3050. Phone 804-828-1574, Fax 804-828-1622, Email ggarman@vcu.edu.

VCU is committed to effectively participating in the CESU network. As such, VCU agrees to relay agency-specific research, technical assistance, educational needs and associated funding opportunities to CESU institutional / organizational members. We look forward to this collaboration and partnership with the CESU network.

**VCU**

Make It real.

October 6, 2014

Bill Dennison, Interim Director
Chesapeake Watershed Cooperative Ecosystem Studies Unit (CW CESU)
PO Box 775
Center for Environmental Science
University of Maryland
Cambridge, MD, 21613

Office of Research and Innovation
BioTech One, Suite 3000
800 East Leigh Street
PO Box 980598
Richmond, VA 23298-0598

Ph: 804 827-0470 Fax: 804 828-2051
TDD: 1-800-828-1120
srobb@vcu.edu

Susan E. Robb, CRA, CHRC
Senior Associate Vice President for
Research Administration and Compliance

Dear Dr. Dennison

The Office of Research and Innovation at Virginia Commonwealth University (VCU) is pleased to support this application for membership in the Chesapeake Watershed Cooperative Ecosystem Studies Unit. VCU's Rice Rivers Center (www.vcu.edu/rice) supports a very active research program focused on Chesapeake Bay management and restoration. Many Rice Center faculty work closely with federal agencies that cooperate with CESU and we believe that our membership would benefit all parties and would advance understanding of the Chesapeake Bay Watershed. We hope that this application makes a strong case for VCU membership in CW CESU and appreciate the opportunity to submit it.

VCU agrees to the terms and conditions of CESU funding agreements, including those related to Facilities and Administrative Costs, which are currently limited by CESU to 17.5% of direct costs.

Please contact me or Dr. Greg Garman (ggarman@vcu.edu) if you have any questions about our application. We truly appreciate your consideration.

Sincerely,

Susan E. Robb, CRA, CHRC
Senior Associate Vice President for
Research Administration and Compliance



DEPARTMENT OF THE ARMY
ARMY CORPS OF ENGINEERS
TOPOGRAPHIC ENGINEERING CENTER
7701 TELEGRAPH ROAD
ALEXANDRIA, VIRGINIA 22315-3864

US Army Engineer Research and Development Center
Geospatial Research Laboratory
7701 Telegraph Road
Alexandria, VA 22315 (804) 314-6097

Bill Dennison, Interim Director
Chesapeake Watershed Cooperative Ecosystem Studies Unit (CW-CESU)
PO Box 775
Center for Environmental Science
University of Maryland
Cambridge, MD, 21613

SUBJECT: VCU Membership in Watershed Cooperative Ecosystem Studies Unit (CW-CESU)

1. Our agency has had a research association with VCU Biology and Center for Environmental Studies for over a decade under our Cooperative Research and Development Agreement (CRADA) program. As a senior scientist and program manager for several of our collaborative geospatial and remote sensing R&D programs, I would like to lend my support for VCU's application for membership to the Chesapeake Watershed Cooperative Ecosystem Studies Unit (CW-CESU).
2. VCU's Rice Rivers Center (www.vcu.edu/rice) supports a very active research program focused on Chesapeake Bay management and restoration. Rice Center faculty work closely with many federal agencies, including the Army Corps of Engineers and the ERDC Topographic Engineering Center that cooperate with CESU. Our recent work involves the deployment of several unmanned aircraft for the construction of rapid orthophoto and elevation models critical to terrain and watershed modeling.
3. As the chief collaborator under the CRADA, I believe that VCU's membership would benefit all parties—including CW-CESU—and will help to advance our understanding of the Chesapeake Bay Watershed. I encourage you to give this application every possible consideration.

Please feel free to contact me if you have any questions or require additional information.

Thank you,

J. Anderson, Ph.D.
USACE ERDC



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND
DIRECTORATE OF PUBLIC WORKS FORT A.P. HILL
19952 NORTH RANGE ROAD
FORT A.P. HILL, VIRGINIA 22427-3123

October 1, 2014


Bill Dennison, Interim Director
Chesapeake Watershed Cooperative Ecosystem Studies Unit (CW-CESU)
PO Box 775
Center for Environmental Science
University of Maryland
Cambridge, MD, 21613

Dear Dr. Dennison

The Environmental, Natural Resources Division of Fort A.P. Hill is pleased to support the enclosed membership application to the Chesapeake Watershed Cooperative Ecosystem Studies Unit (CW-CESU). VCU's Rice Rivers Center (www.vcu.edu/rice) supports a very active research program focused on Chesapeake Bay management and restoration. Rice Center faculty work closely with many federal agencies, including the Environmental Natural Resources Division of Fort A.P. Hill, that cooperates with CESU. I believe that VCU's membership would benefit all parties—including CW-CESU—and will help to advance our understanding of the Chesapeake Bay Watershed. I encourage you to give this application every possible consideration.

Please feel free to contact me if you have any questions or require additional information.

Sincerely,

E-Signed by BANKS.TERRY.L.1229466123
VERIFY authenticity with ApproveIt 

BANKS.TERRY.L.1229466123

Terry Banks
Chief, Environmental and Natural
Resources Division



United States Department of the Interior

FISH AND WILDLIFE SERVICE



Eastern Virginia Rivers National Wildlife Refuge Complex

James River/Presquile/Plum Tree Island NWR Division

11116 Kimages Road

Charles City, Virginia 23030-2844

Telephone (804) 829-9020

Fax (804) 829-9606

September 30, 2014

Bill Dennison, Interim Director
Chesapeake Watershed Cooperative Ecosystem Studies Unit (CW-CESU)
PO Box 775
Center for Environmental Science
University of Maryland
Cambridge, MD, 21613

Dear Dr. Dennison

The US Fish and Wildlife Service (FWS) is pleased to support the enclosed membership application to the Chesapeake Watershed Cooperative Ecosystem Studies Unit (CW-CESU). VCU's Rice Rivers Center (www.vcu.edu/rice) supports a very active research program focused on Chesapeake Bay management and restoration. Rice Center faculty work closely with many departments with our agency, including the refuges of the Eastern Virginia National Wildlife Refuge Complex (specifically Presquile NWR, James River NWR, and Rappahannock River Valley NWR), the Harrison Lake National Fish Hatchery and the Virginia Fisheries Coordinators Office, that cooperate with CESU. We feel strongly that VCU's membership would benefit all parties—including CW-CESU—and will help to advance our understanding of the Chesapeake Bay Watershed. We encourage you to give this application every possible consideration.

Please feel free to contact me if you have any questions or require additional information.

Thank you,

Cyrus Brame
Wildlife Refuge Specialist
cyrus_brame@fws.gov



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Virginia Fisheries Coordinator Office
11110 Kimages Road
Charles City, Virginia 23030



October 7, 2014

Bill Dennison, Interim Director
Chesapeake Watershed Cooperative Ecosystem Studies Unit (CW-CESU)
PO Box 775
Center for Environmental Science
University of Maryland
Cambridge, MD, 21613

Dear Dr. Dennison,

The U.S. Fish and Wildlife Service's Virginia Fisheries Coordinator Office is pleased to support the enclosed membership application to the Chesapeake Watershed Cooperative Ecosystem Studies Unit (CW-CESU). Virginia Commonwealth University's (VCU) Rice Rivers Center (www.vcu.edu/rice) supports an active research program focused on Chesapeake Bay management and restoration issues. Rice Center faculty has worked closely, and continues to do so, with the FWS' Virginia Fisheries Coordinator Office, on several issues important to the Chesapeake Bay, including Atlantic sturgeon, American shad, including habitat restoration, and education and outreach.

I believe that VCU's membership would further the mission of CW-CESU to understand and protect the natural and cultural resources of the Chesapeake Bay region. I enthusiastically encourage you to approve VCU's membership request into CW-CESU.

Please feel free to contact me if you have any questions or require additional information (Phone 804-829-5627, or email albert_spells@fws.gov).

Sincerely,

Albert J. Spells
Project Leader





United States Department of the Interior

U. S. GEOLOGICAL SURVEY

WATER RESOURCES DISCIPLINE

Virginia Water Science Center

1730 East Parham Road

Richmond, Virginia 23228

<http://va.water.usgs.gov>

October 2, 2014

Bill Dennison, Interim Director
Chesapeake Watershed Cooperative Ecosystem Studies Unit (CW-CESU)
PO Box 775
Center for Environmental Science
University of Maryland
Cambridge, MD, 21613

Dear Dr. Dennison,

The U.S. Geological Survey (USGS) Virginia Water Science Center is pleased to support the enclosed membership application to the Chesapeake Watershed Cooperative Ecosystem Studies Unit (CW-CESU). VCU's Rice Rivers Center (www.vcu.edu/ricc) supports a very active research program focused on Chesapeake Bay management and restoration. They actively collaborate with me and other USGS researchers through our *James River Mountains to Sea Water-Quality Network* which provides technical assistance and hands-on student learning experience toward understanding a major tributary to the Chesapeake Bay. Rice Center faculty work closely with many federal agencies, including the USGS, that cooperate with CESU. I believe that VCU's membership would benefit all parties—including CW-CESU—and will help to advance our understanding of the Chesapeake Bay Watershed. I encourage you to give this application every possible consideration.

Please feel free to contact me if you have any questions or require additional information.

Thank you,

Jennifer L. Krstolic
BioGeographer
804-261-2635
jkrstoli@usgs.gov