Executive Summary

RIVERE Ecological Center | Updated November 20, 2026

The need to enhance access to emerging technologies is a top national water challenge priority for the coming decades. Scientific research using automated water quality sensors, machine learning, augmented and virtual reality (AR/VR), and integrated data systems will play an increasingly important role in water research, watershed stewardship, and informed water management decisions. The Rappahannock, the longest free-flowing river in Virginia, is an ideal watershed for supporting this work and advancing collaborative ecological innovation.

Best Management Practices (BMPs) are engineered or nature-based solutions designed to capture and filter polluted stormwater runoff before it enters waterways. The Rappahannock River is large enough to provide meaningful challenges for testing watershed BMPs while remaining accessible enough to demonstrate scalable and measurable outcomes. Because population growth in the Greater Fredericksburg Area is projected to increase by 73% over the next 25 years, long-term watershed monitoring, stewardship, innovation, and public education will be increasingly critical to protecting the Rappahannock. Emerging sensor technologies provide an exciting opportunity to proactively monitor river conditions over time through deployment of a watershed-scale wireless sensor network. In addition, the use of AR/VR immersive experiences can better connect people with their watershed in powerful ways and inspire river stewardship.

RIVERE, a 501(c)(3) nonprofit organization, is creating the RIVERE Ecological Center, a shared hub for watershed research, environmental education, ecological innovation, and community engagement along the Rappahannock River. Designed as shared infrastructure for regional impact, the Center will provide spaces, systems, and tools that enable partners to collaborate, innovate, and expand their impact. By bringing together researchers, educators, nonprofits, public agencies, ecopreneurs, and community members, RIVERE will strengthen watershed stewardship, environmental learning, and regional resilience while creating new opportunities for long-term environmental, educational, and economic vitality.

- **Location:** The RIVERE Ecological Center will be located on a 4-acre site housing the historic, abandoned Embrey Power Station, contributing to the revitalization of Fredericksburg's Creative Maker District. The Center will be within walking distance of vibrant downtown Fredericksburg, local hotels, the Canal Path walking and biking trail, and a train station that connects to Richmond and Washington, D.C.

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- **A Collaborative Infrastructure Approach:** RIVERE will provide shared space, infrastructure, and immersive technologies for water researchers, government agencies, nonprofits, environmental educators, Tribal partners, and technology entrepreneurs working to benefit the Rappahannock, the Chesapeake Bay, and watershed science. RIVERE will support and enhance their work by offering:
  - **Indoor & Outdoor Space:** A high-tech facility with laboratories, conference and education space, direct river access, and native landscaping designed to demonstrate watershed BMPs and ecological stewardship principles.
  - **Coworking Membership Model:** A modern alternative to traditional office rentals, providing flexibility, cost savings, and collaboration opportunities for organizations working in research, education, and environmental innovation. RIVERE is seeking the expertise of Gather® to manage the Center's coworking facility in alignment with Gather's successful coworking model in Richmond and Hampton Roads.
  - **Immersive Learning Experiences:** A regional hub designed to showcase scientific research, ecological systems, and Traditional Ecological Knowledge through augmented and virtual reality (AR/VR) immersive experiences that connect the public with science, stewardship, and ecoculture.
  - **Commitment to economic, environmental, and social sustainability** through Green Building design and an entrepreneurial business model that generates revenue to support annual operating costs and giving opportunities for partner organizations with shared missions.
- **Supporting Research and Technology:** RIVERE will coordinate the Rappahannock SmartRiver Initiative to serve as a focal point for collaboration involving emerging technologies designed to enhance water quality monitoring, ecological research, and watershed stewardship.
  - **Goal:** Support the development and testing of environmental technologies and BMPs that can scale to larger river systems. Integrate artificial intelligence, wireless sensors, and real-time data systems to support monitoring, rapid response capabilities, and predictive modeling related to water quality and quantity.
  - **Advisory Board:** Experts from Virginia Cooperative Extension, Virginia Tech, Virginia Innovation Partnership Corporation, Friends of the Rappahannock, Chesapeake Bay Foundation, USGS Next Generation Water Observing System, Rappahannock River Basin Commission, and University of Mary Washington.
  - **Key Collaborators:** Through a partnership with Virginia Innovation Partnership Corporation (VIPC), RIVERE will facilitate research related to wireless water quality

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sensor acquisition and deployment, data integration, and cloud-based computing through engagement with the Virginia Smart Community Testbed, a partnership between VIPC and Stafford County EDA.

- **Supporting Education, Outreach, and Ecoculture:** RIVERE will offer convening space to support and enhance environmental education, outreach, and ecoculture initiatives.
  - **Goal:** Provide adaptable, technology-enhanced learning, meeting, and exhibit spaces to host educational programs, conferences, and public engagement opportunities. Leverage AR/VR technologies to expand accessibility and create immersive learning experiences connected to Rappahannock River ecology, watershed systems, and regional Native American history and culture.
  - **Key Collaborators:** Educational initiatives at the RIVERE Center will largely be led by Friends of the Rappahannock, a nonprofit organization providing nationally recognized environmental education programs to over 15,000 students annually. Outreach and ecoculture initiatives will be conducted in partnership with Virginia Cooperative Extension and the Patawomeck Native American Tribe.
- **Impact:** Combined, the Rappahannock SmartRiver Initiative and immersive learning experiences at RIVERE create an opportunity to connect the public with watershed research and ecological stewardship while supporting regional collaboration and ecotourism. According to an independent study by Chmura Economics & Analytics, the RIVERE Center is projected to generate an average annual economic impact of ~$37.8 million and support an average of 208 jobs annually across GO Virginia Region 6 between 2035 and 2045.

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