

**Date: May 28, 2019**

**Project Proposal: Engineering Senior Design Project for Cellular Enabled Stream Sampler**

On behalf of the Nature Conservancy of Delaware, the Delaware Nature Society, and the White Clay Wild and Scenic River Program, Jeff Chambers and Rob Tuttle, trained stream stewards and volunteer water quality monitors for the aforementioned organizations, sponsored a University of Delaware Junior Engineering Design class project to design and prototype a low-cost stream sampling device during the Spring semester 2019. The junior design class developed the prototype for a cellular enabled stream sampler, and now we would like to bring the project forward to a senior design class to refine and make any required design improvements to make this an affordable and useful tool for watershed managers and volunteer monitoring programs.

The senior project will consider additional user needs to make the automated sampler:

- easy to tailor and relocate to another site,
- easy to manufacture and assemble by minimizing or eliminating machining of components, maximizing use of purchased components, limiting manufacturing operations to cutting, drill, filing, and assembling with purchased fasteners, and
- easy to follow kit directions for assembly and installation by purchaser.

When complete, the device will allow a 500 mL stream sample to be taken and stored on demand through a cellular network. There is a demonstrated need for water quality monitoring programs to take grab samples during storm events which are often difficult to time and more dangerous for volunteers to obtain. This device would allow volunteers and water quality managers to sample the stream from a place of safety, and collect the sample after the danger has passed. The short-term goal is to keep the cost per unit below \$500, and to approach \$250 per unit in volume making it more affordable for volunteer programs and smaller watershed organizations to implement. Demand will determine who will manufacture or provide supports for kits. We, the stream stewards, can supply some initial assembled units if there is an immediate need.

Participation in the University of Delaware senior class engineering and design projects requires a participation fee of \$5,000 plus material costs. While we can cover material costs, we would appreciate it if the White Clay Watershed Association had funding it could put towards all or part of the participation fee. The participation fee will yield one sampler installed at a location of WCWA's choice by Jeff and Rob. There will be 3 samplers created in total.

Sincerely,

Jeff Chambers  
TNC Stream Steward

Rob Tuttle  
TNC Stream Steward/  
WCWA volunteer