

## 2022 COOPERATIVE SUMMER FELLOWSHIP PROGRAM – PROJECT PROPOSAL

APPLICANT TYPE: ESA;NAGT;

PROJECT TITLE: STREAM AND WETLAND ECOSYSTEMS: MEASURING CHANGES IN FUNCTIONS DUE TO MANAGEMENT AND CLIMATE CHANGE.

Greg Noe,

Discipline: Ecology;Geomorphology;

### PROJECT DESCRIPTION

#### BACKGROUND

The USGS Wetland Ecosystem Ecology and Biogeochemistry Laboratory investigates the role of wetlands in influencing water quality. We have ongoing and upcoming studies to measure and model the transport, cycling, and retention of nitrogen, phosphorus, carbon, and sediment in floodplain wetlands and associated streams and rivers. Our approach is to: 1) quantify the hydrogeomorphic and ecological controls of nutrient and contaminant fluxes in wetland ecosystems, 2) scale wetland fluxes from site to watershed scale, and 3) identify the principles and modeling tools needed to manage wetland and river ecosystems for water quality effectively in the context of climate and land use change. Most study locations are in the Chesapeake Bay watershed as well as tidal wetlands throughout the Southeastern U.S, and all are focused on understanding the effects of management actions or climate change.

#### INTERN TASKS

The intern will be trained in proper protocols and become responsible for making measurements and collecting samples in the field, processing and analyzing samples in the laboratory for biogeochemical and physical attributes, performing QA/QC, and entering data into databases. Field methods will include measuring hydroperiod using pressure transducers, surveying elevation, measuring rates of geomorphic change in stream floodplains and banks using artificial marker horizons, erosion pins, and dendrogeomorphology, collecting sediment and water samples, placing ion exchange resin bags on floodplains, and measuring soil carbon, nitrogen, and phosphorus biogeochemical cycling. The intern will carefully weigh, dry, and sieve sediment samples and weigh and extract soils and ion exchange resin for inorganic nutrients. Laboratory analyses will include pH, total carbon and nitrogen using an elemental analyzer, organic matter content using loss on ignition, and particle size using laser diffraction. Computer analyses could include GIS and statistics.

#### BENEFITS TO INTERN

The intern will gain valuable experience as part of an energized team of scientists with diverse expertise in geomorphology, biogeochemistry, ecology, and landscape/GIS analysis. The intern will be exposed to interdisciplinary research techniques in these fields and will gain balanced experience in field measurements and laboratory analyses that will enable his or her future career.

## MENTORING PLAN

The intern will become an integrated member of the research team. Mentoring will be primarily the responsibility of the PI, with additional guidance and support from other members of the research team and other collaborators. Meetings with the team happen three times a week, with additional 1-on-1 meetings as needed.

## ADDITIONAL DETAILS

### STUDENT SKILLS AND INTERESTS

Excellent verbal and written communication skills, ability to work in a research team, experience in fieldwork, and proficiency in data manipulation and graphing are essential. In addition, demonstrated experience and ability to perform detailed laboratory chemical analyses on environmental samples independently and demonstrated proficiency in the collection of ecologic, geomorphic, and hydrologic data are highly desirable. The intern must have a willingness to travel overnight and be comfortable spending long days in wetland environments of the Southeast and mid-Atlantic. Above all, the intern should have interest in and enthusiasm for researching the role of riparian wetlands in regulating water quality through their removal of sediment and nutrient pollutants from our waterways.

LOCATION: Reston/Virginia

### ACTIVITY LEVEL:

Level 8-2: The work requires some physical exertion such as long periods of standing, walking over rough, uneven, or rocky surfaces; recurring bending, crouching, stooping, stretching, reaching, or similar activities; or recurring lifting of moderately heavy items. The work may require specific, but common, physical characteristics and abilities such as above-average agility and dexterity.

FIELD WORK	25-50%	VIRTUAL?	Yes
LAB WORK	25-50%		
OFFICE WORK	25-50%		
OTHER	25-50%		

PROJECTED START DATE	6/1/2022
EXPECTED DURATION	3 months