

Connecting Volunteerism, Science, and Community Engagement to Protect Water Quality in a Southern Appalachian Watershed



B. Campbell, M. Cowart, M. Downs, M. Escamilla, D. Filicicchia, K. Floyd, E. Howell, M. Howington, B. Kenney, J. Nachtrieb, and M. White.
Advisors: J. Davis. Department of Biology. J. Pate. Department of Outdoor Leadership. Young Harris College, 1 College Street, Young Harris, GA, 30582.

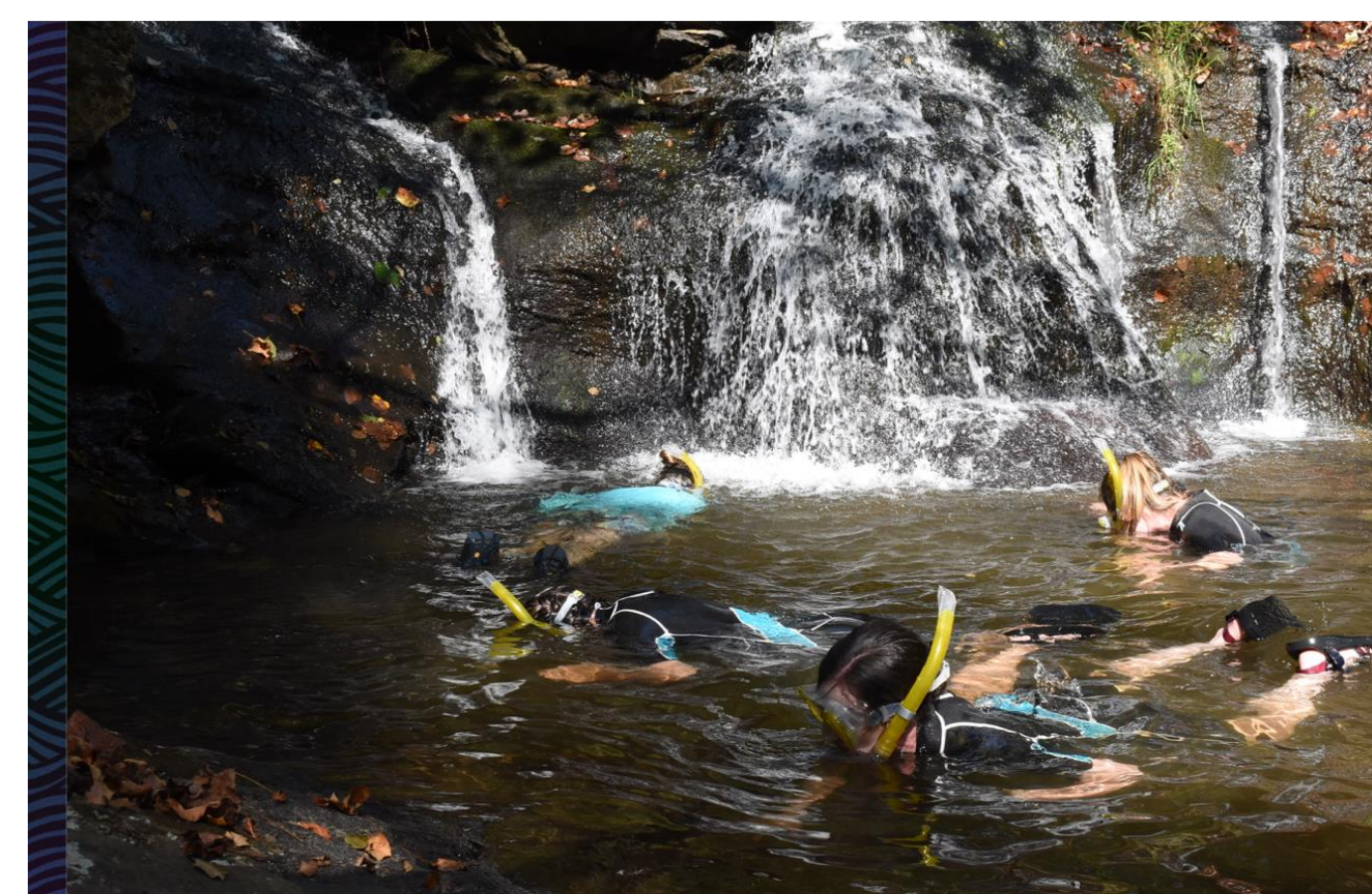


INTRODUCTION

Students from the Environmental Science and Outdoor Leadership programs collaborated with MountainTrue, a local nonprofit, to (1) implement community programming to engage the community in water quality issues and spur volunteerism and (2) analyze water quality data collected by citizen scientists throughout the Hiwassee River watershed. Analysis investigated the impact of land use on water quality such that data-driven recommendations were developed that could balance economic development, enhance outdoor recreational opportunity and protect of Appalachia’s natural water assets. To implement project objectives within the community, outdoor leadership students programmed and facilitated events pertaining to watershed conservancy and appreciation; environmental science students conduct data analysis. This project demonstrates the valuable connections between local outreach and programming, community partnerships and involvement, and scientific study.

PROJECT COMMUNITY OUTREACH ACTIVITIES

Local outreach conducted to inspire clean water advocacy and volunteerism:



Freshwater snorkeling opportunities



Recreational tree climbing to discuss importance of riparian zones



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OUTDOOR RECREATION CONNECTS PEOPLE TO THE WATERSHED

Outdoor recreation is an immersive experience that provides economic, environmental, and personal benefits. Some benefits of outdoor recreation include:

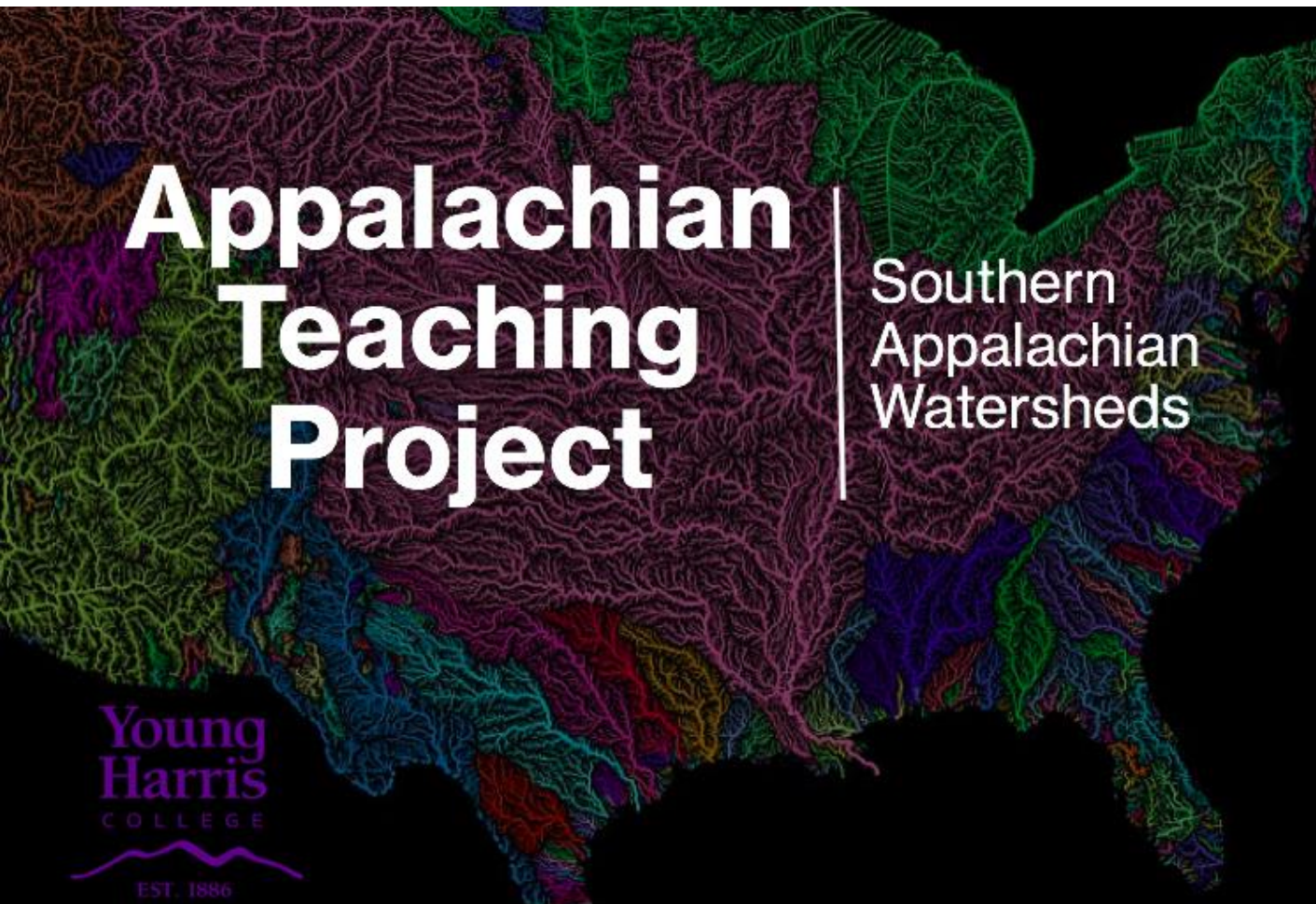
- viable in rural areas
- diversifies the economy
- increases environmental awareness
- employs 7.6 million Americans
- increases real estate value
- encourages sustainable practices



Educational outreach on fish biodiversity in a local stream



Teaching fly fishing methods



Leading discussion of project activities with Young Harris City Council

ENGAGED VOLUNTEERS CREATE SCIENTIFIC OPPORTUNITIES TO STUDY WATER QUALITY

Research Goal- To determine the effect of land use on water quality in the Hiwassee River basin.

Methodology: Water quality (WQ) data, collected by volunteers, was assessed via Georgia Adopt-A-Stream <https://aas.gaepd.org>. Land use data was delineated from each sample site using USGS StreamStats.

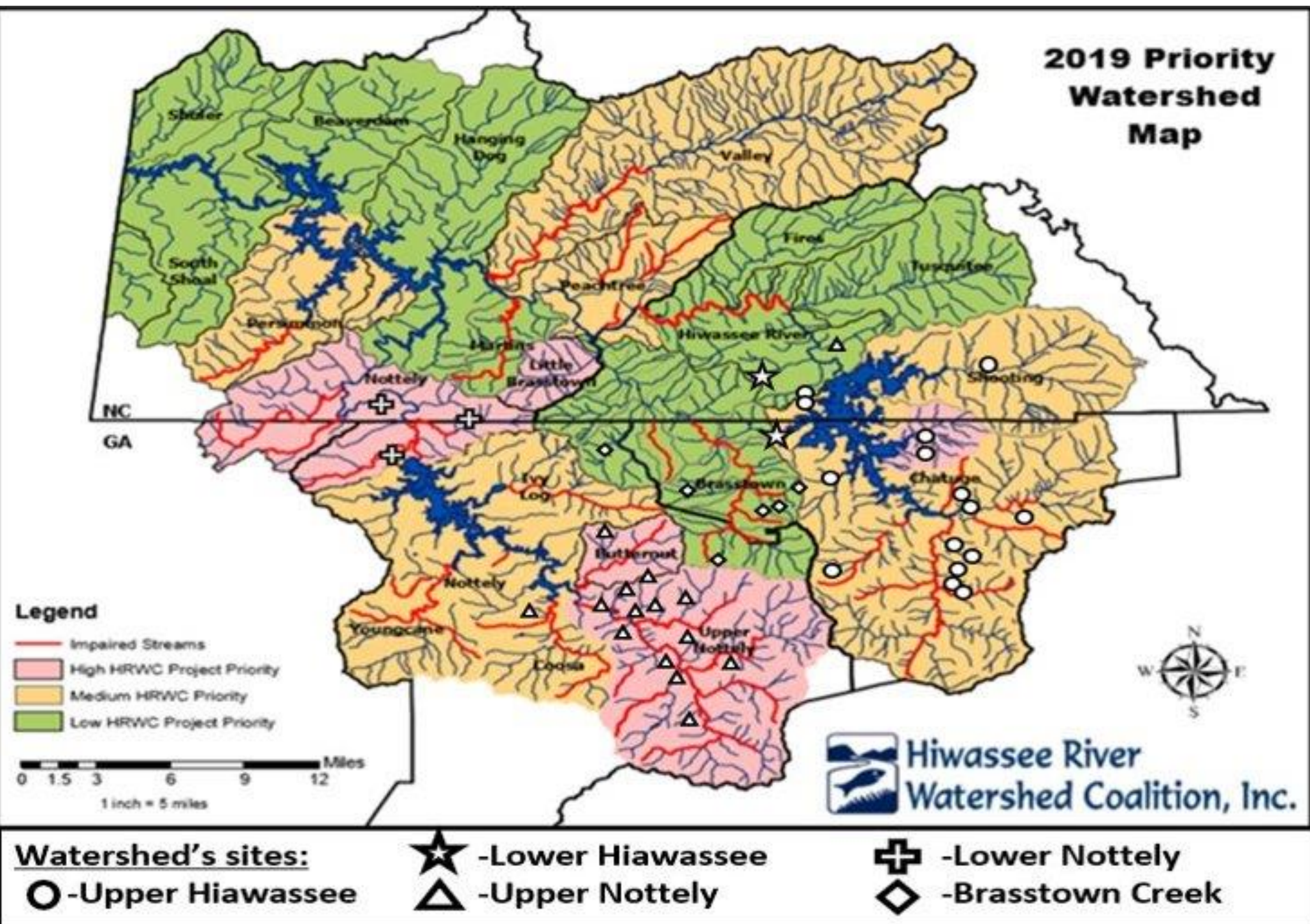


Figure 1. Volunteer-collected data was used from 41 sites through 2011-19 in the Hiwassee River basin collected using GA Adopt-A-Stream protocols.

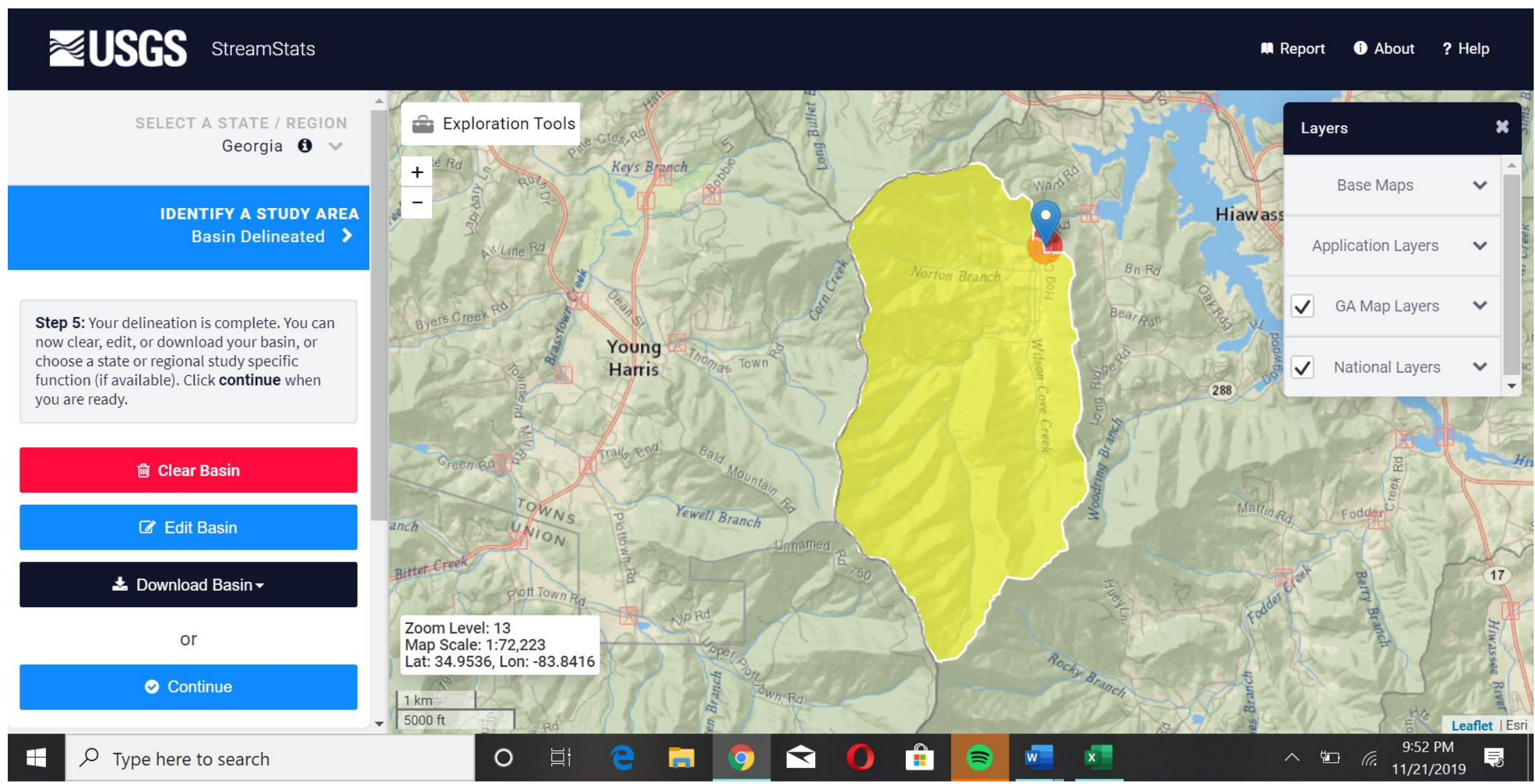
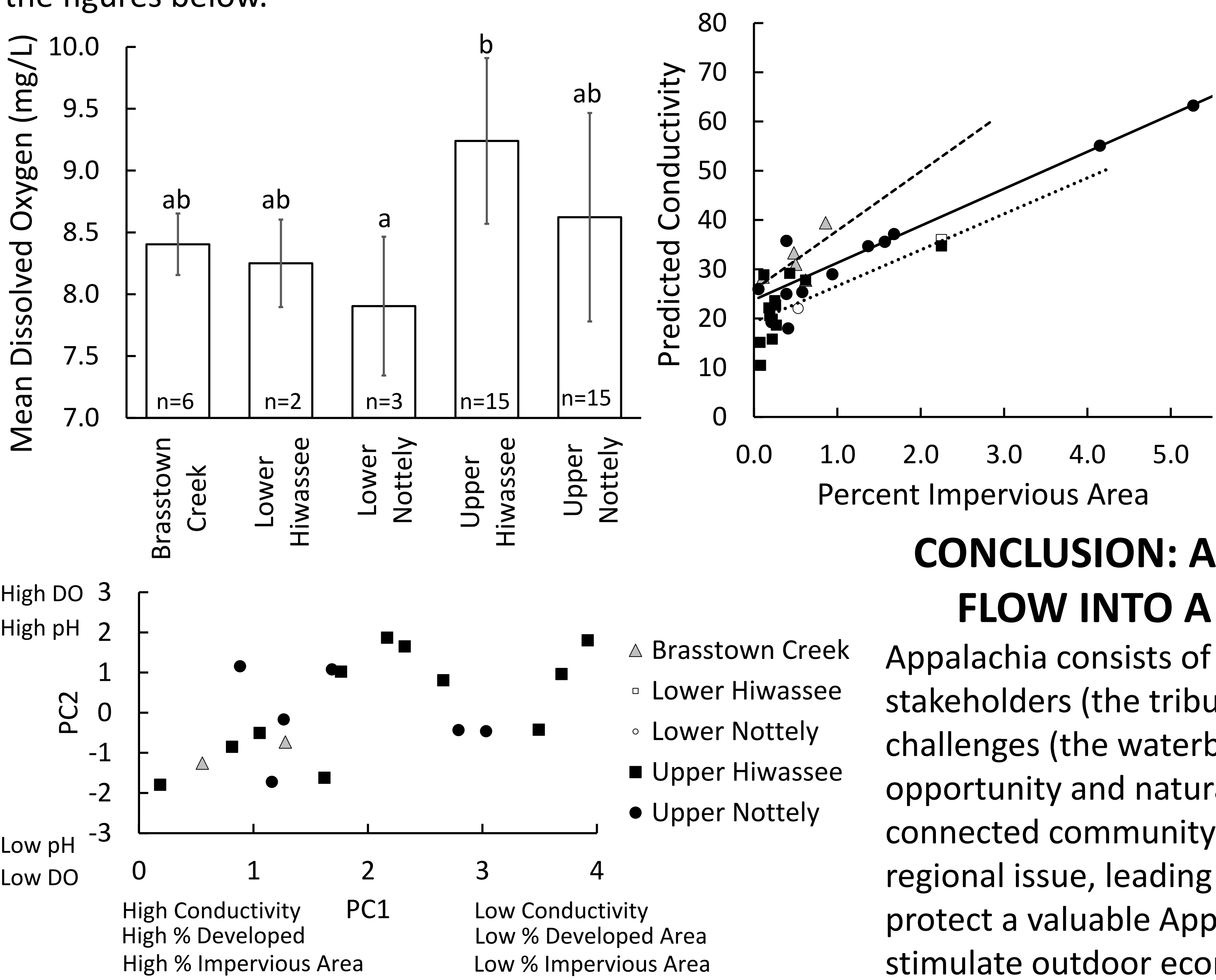


Figure 2. Land use data was acquired from usgs.streamstats.gov. for each site. Land use variables for each site included % agricultural area, % forested area, % developed area, and % impervious surface area. Basin characteristics included stream gradient, elevation, drainage area, and mean basin slope.

Data Analysis: WQ data and land use data was paired for each site to test for (1) differences in WQ parameters among watersheds, (2) relationships among parameters, and (3) explanatory factors contributing to WQ issues.

Results: Some watersheds differed significantly in WQ. When accounting for differences among sites, the amount of impervious and developed area in a watershed were related to impaired WQ. Example findings are displayed in the figures below.



Significance and Implications:

- (1) Identification of problem sites and watersheds.
- (2) Identification of harmful land use activities.
- (3) Guide recommendations to partners, stakeholders, and policymakers.
- (4) Robust findings to support acquisition of future grants and funding.
- (5) Ability to monitor restoration and WQ over time.

CONCLUSION: APPALACHIAN TRIBUTARIES FLOW INTO A COMMON WATERBODY

Appalachia consists of complex communities with many stakeholders (the tributaries) addressing common challenges (the waterbody) that can affect economic opportunity and natural and cultural assets. Our project connected community to a common resource and regional issue, leading to productive inquiry that can protect a valuable Appalachian resource, its water, and stimulate outdoor economic opportunity.