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Evaluating Impacts of Anthropogenic Disturbance to Wetland Water Quality Functions

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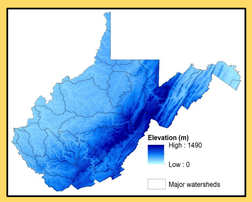
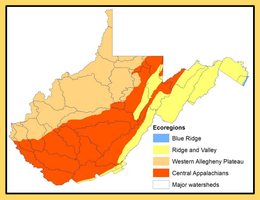
Introduction

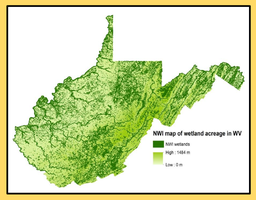
- Wetland ecosystems play fundamental roles in regulating our freshwater resources, they function to regulate runoff, sediment, nutrient and pollution retention and uptake, and overall water quality improvement.
- Despite their importance and ecological significance, current wetland regulations do not consider threats from their contributing watersheds. Especially for wetlands that are disconnected from “navigable waters of the U.S.”
- Anthropogenic disturbance is known to have detrimental effects on natural ecosystems. Therefore, these disturbances within contributing watersheds of wetlands can also impact a wetland’s water quality functions which then adversely impacts freshwater resources downstream.
- Therefore, we are evaluating how anthropogenic disturbance consequent of watershed land-use practices impact wetland water quality functions.

Study design

- The state of West Virginia, USA provides a unique opportunity to study these impacts to wetlands. Especially across hydrologic gradients and in relation to geographic and landscape features. West Virginia is also composed of a diverse range of land-use practices.
- We are studying 100 wetlands per year for 2 years, distributed across private and public lands.
- At each wetland, representative water quality is evaluated seasonally, macroinvertebrate diversity and abundance is assessed biannually, vegetation diversity and abundance alongside soil characteristics are assessed annually.
- These data will be evaluated for their relationships with anthropogenic disturbance from the wetland’s watershed land-use practices.







Methods

- Water samples are collected from the inlet, middle and outlet of every wetland using a PushPoint™ Pore sampler and analyzed for 20 water quality parameters.

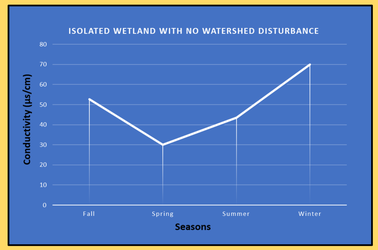
- Macroinvertebrate samples are collected using Core samplers and D-net sweeps

- Vegetation and soil assessments are conducted using the West Virginia Wetland Rapid Assessment Method (WVWRAM).

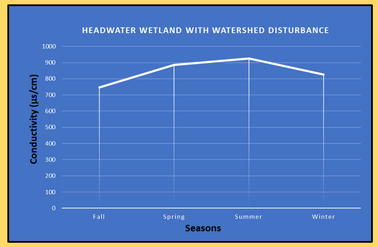
- Land-use analysis will be performed using ArcPro GIS software.
- Climate data (precipitation and temperature) will be acquired from local climate stations and the PRISM database.

Preliminary results

- Isolated wetlands at high elevation with no anthropogenic disturbance reported lower conductivity readings across all four seasons.



- Headwater wetlands at lower elevations with ongoing anthropogenic disturbance reported higher conductivity readings across all four seasons.



Future goals

- We will evaluate water quality, macroinvertebrate and vegetation data to determine their relationship to past and ongoing watershed land-use practices.
- Based on these relationships we will evaluate the impacts of watershed land-use practices to wetland water quality functions.

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