Abstract

The presence and location of riparian buffers play a critical role in water quality. Therefore, identifying and predicting loca-
tions where riparian buffers are absent is vital for watershed sustainability. To date, most, the Batteckill River watershed (~1100 km²) has a patchwork of buffers, leaving many sections of the river vulnerable to pollutants. For this research, we used geographical information systems (GIS) to map the current distribution of the buffers along the Batteckill River in 6ermont and locate the most suitable locations for buffer restoration projects on behalf of the Batteckill Conservation. For base maps we used 201 resolution orthophotography taken in 2004 for 6ermont and 1 meter resolution digital orthophotography taken in 2003 for Vermont. Existing hydrography coverages did not accurately overlay on locations on the ortho-
photographs so we digitized the main river Batteckill as well as tributaries. We overlaid 15 meter resolution hydrography data to determine areas without riparian buffers. The location of riparian buffers and coverages of land use, soil types, slope, and access points were used to identify areas of greatest concern for further protection of the Batteckill watershed. As a result, this research provides a comprehensive look at the current state of buffers along the Batteckill River as well as a database of accurate information for future use.

Introduction

Why are Buffers Important?

- Increase bank stability
- Create wildlife habitat
- Slow runoff
- Increase groundwater recharge
- Trap sediment and pollutants giving protection to downstream areas of the river
- Provide habitat for riparian vegetation
- Absorb and retard the buffer time to breakdown pollutants before they enter the river (USDA, At War’s Edge)

Methods

- Acquired (UGS 1992) land use and digital elevation model (DEM) hydrography data for New York, soil data for Vermont, and 2 foot per piece ortho-
photographic aerial photography for New York and 1 foot per pixel aerial photography for Vermont
- Digitized Batteckill and variable tributary areas from aerial photo base maps because existing hydrography coverage the river was too coarse
- Overlaid 10 meter buffers and digitized all the buffers that reached beyond the 10 meter buffer zone using the regions digitized hydrography coverage, county road coverage, and aerial photographic coverage
- Discriminated watered (using ODNs and divided area into 11 tributary watersheds, demarcating the drainage boundaries of the major tributaries of the Batteckill
- Calculated slope using ODNs, river length, number of bridges, streamflow, land use, and cover percentage, distribution of hydrologic soil groups, and buffers reaches for the Batteckill watershed and 11 tributary watersheds
- Buffers were overlaid within 200 of high runoff potential soils, with a slope greater than 0.10 degree, with developed or cultivated land use, and within 200 of a bridge or access point

BUFFERS ON THE BATTENKILL: MAPPING RIPARIAN BUFFERS USING GIS

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The Batteckill River and its tribu-
taries reach lengths and widths of the watershed is 1130 km². There are 560 bufferless reaches, totaling a length of 170 km or 29% of river length, that need to be identified and targeted points on the river.

The bufferless reaches in New York, generally have a higher percentage of bufferless reaches than the tributary watersheds in Vermont.

The soil coverage is 5 high runoff potential in Vermont and surficial geology coverage is 4% high runoff potential in New York, which gives a greater potential as well as base runoff. The Vermont soil data is based off of hydrologic soil groups, whereas the New York data group is based on surficial geology. There is no digital soil data for Washington County New York at the time.

The bufferless reaches and tributary buffers reach 7% of the watershed length. The town of 6ermont also show significantly fewer areas of concern than the towns in New York, which may be due to the town’s boundary, thus town data is not directly comparable.

Areas of Concern

The areas of potential concern for non-point source pollution input is identified based on five factors: lack of ripar-
ian buffers, proximity to high runoff potential soils, a slope of at least 0.01 degree, cultivation or development of land, and proximity to bridges. Out of the 664 bufferless reaches on the Batteckill River and its tributaries, 94 have been identified as areas of concern.