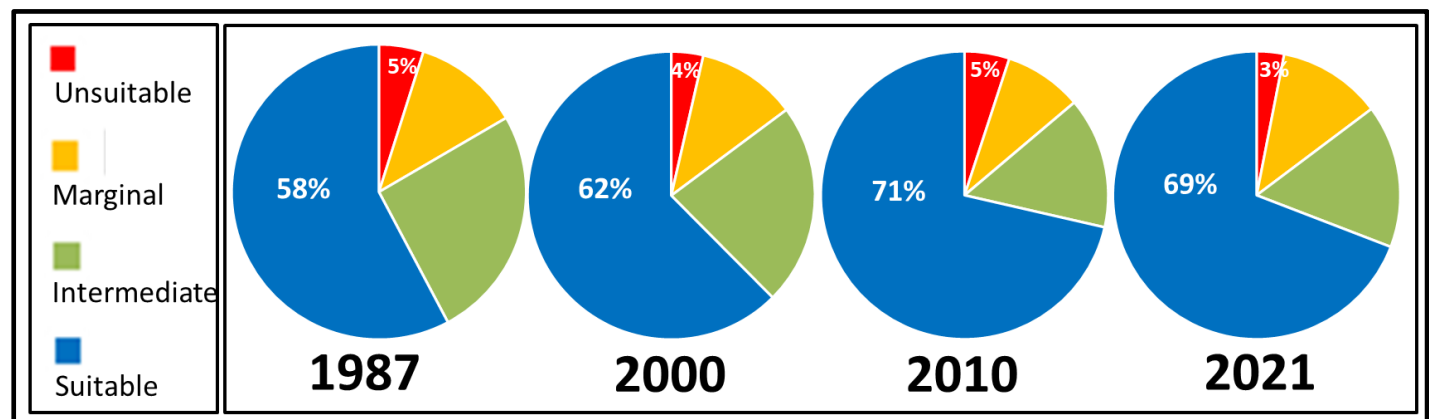
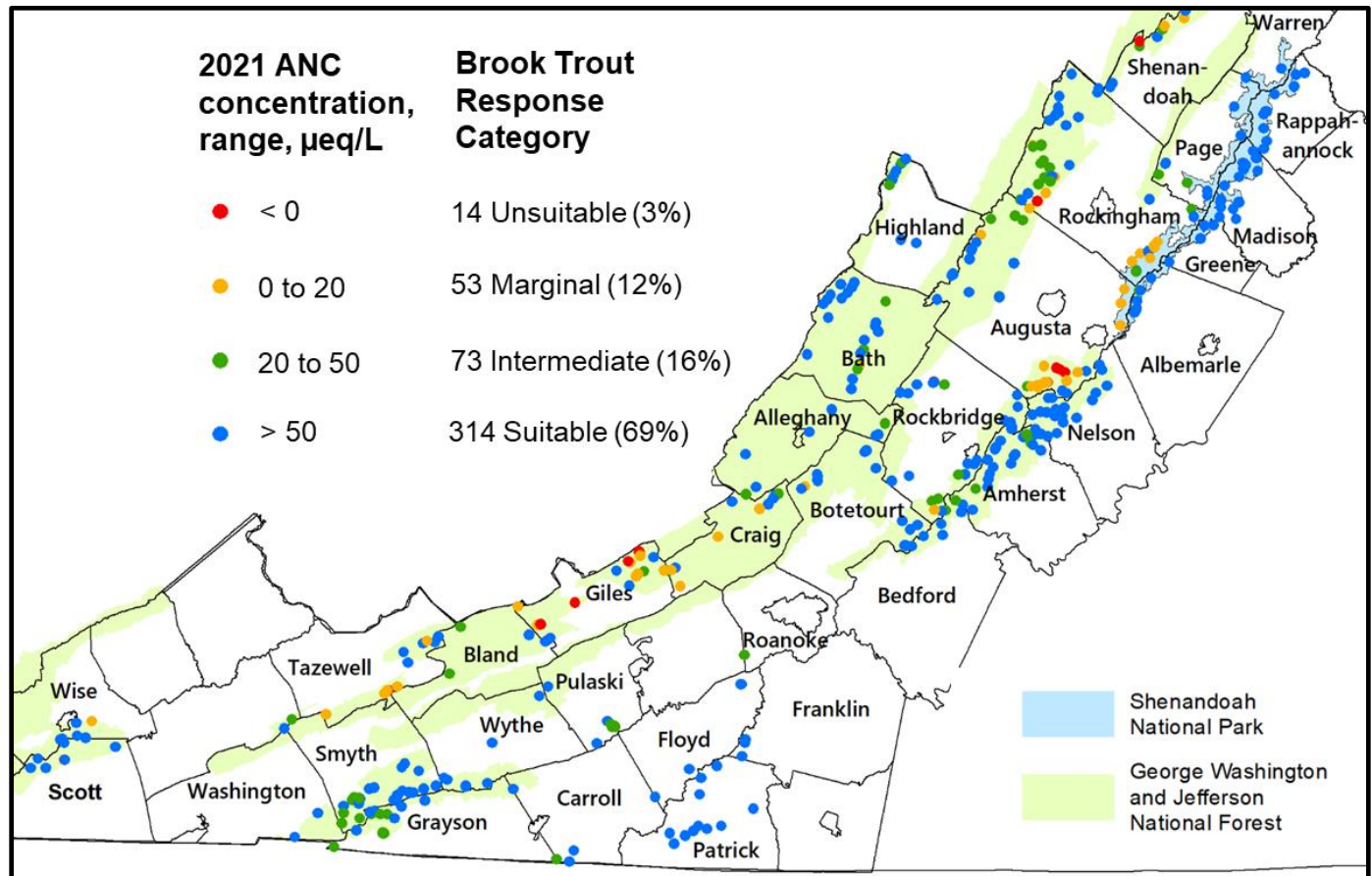


# Virginia Trout Stream Sensitivity Study 2021

## Results Brief

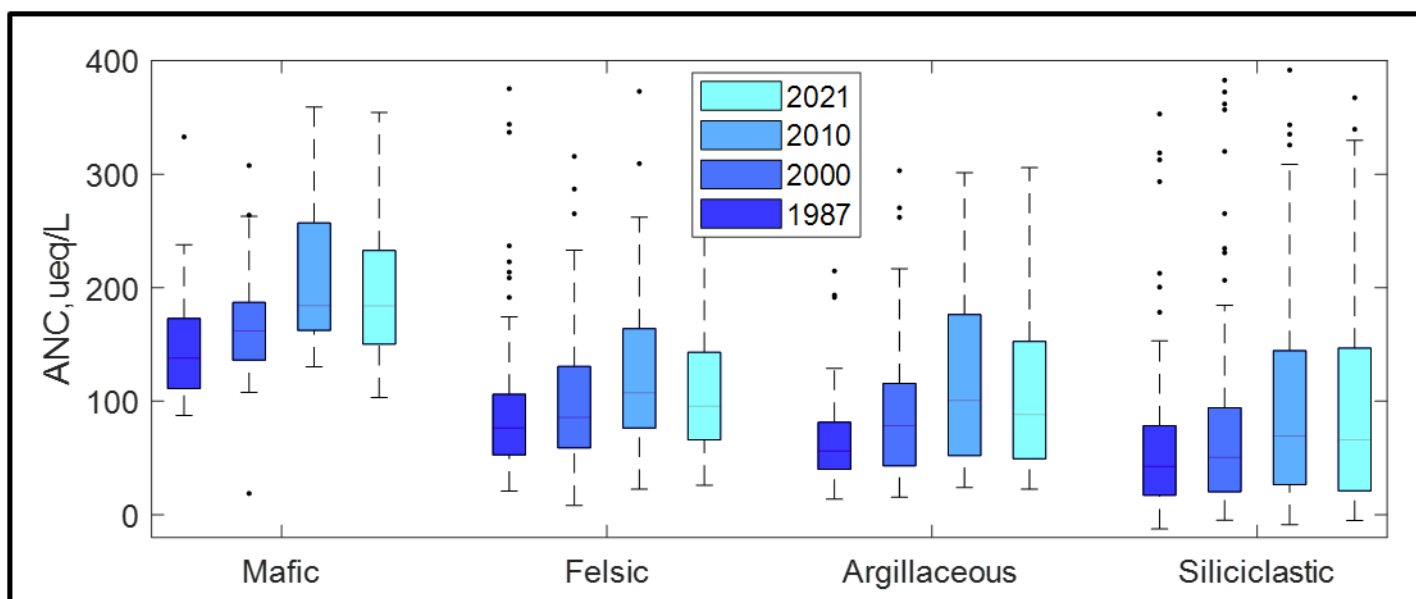
In collaboration with 13 Trout Unlimited Chapters, the Virginia Trout Stream Sensitivity Study (VTSSS) completed the fourth decadal sampling of the majority (454) of mountain headwater streams in Virginia that support reproducing brook trout to assess acidification status and habitat suitability. A summary of key findings from the 2021 sampling and trends evaluated with data from all decadal surveys (1987, 2000, 2010, and 2021) are provided in this brief. More detailed information about the Virginia Trout Stream Sensitivity Study (VTSSS) and a comprehensive presentation of findings from the study can be accessed at: <https://uva.theopenscholar.com/vtsss2021/>.

**Stream chemical suitability** for brook trout is characterized by Acid Neutralizing Capacity (ANC). ANC is a general measure of stream sensitivity to acid inputs. Four categories of Brook Trout suitability have been determined based on ANC concentration ranges. VTSSS sites include streams in each of the classes as illustrated in the map below.

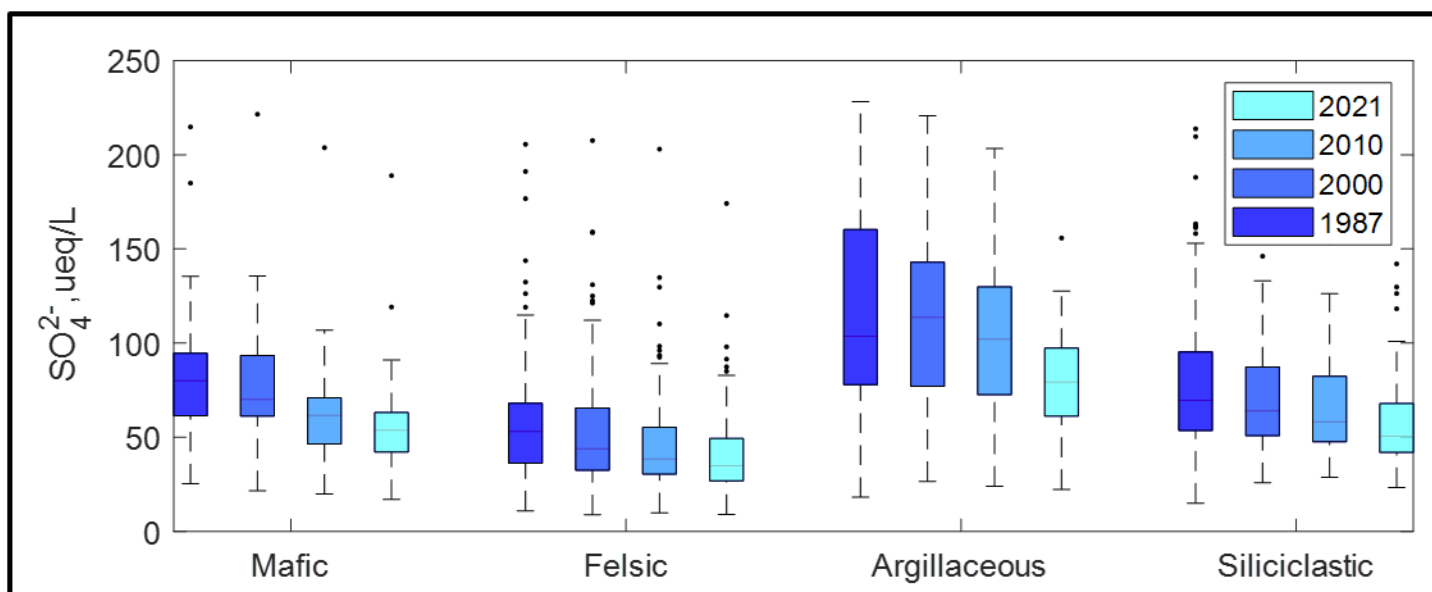


The percentage of sites within each ANC Brook Trout response category for each of the 4 VTSSS Decadal Surveys is illustrated in the pie charts above. The percent of suitable streams has increased between 1987 and 2021.

**Bedrock** is a watershed characteristic known to influence stream sensitivity to acidification. Due to differences in composition and weatherability, the bedrock types ranked from least to most sensitive to acidification are: Mafic (29 sites), Felsic (104 sites), Argillaceous (105 sites) and Siliciclastic (215 sites).



**Acid Neutralizing Capacity (ANC)** concentrations have increased between 1987-2021 at sites within each of the bedrock classes. The greatest increases were observed at Mafic sites, which are the least acid sensitive.



**Sulfate ( $\text{SO}_4^{2-}$ )** is the primary contributor to acidification in this region due to elevated deposition from fossil fuel combustion emissions. Subsequent to the 1990 Clean Air Act Amendments, U.S. sulfur emissions have declined over 90%. Declines in stream sulfate were observed between 1987 and 2021 at sites within each of the bedrock classes.

## Key Findings

- Chemical conditions in Appalachian mountain streams that support native brook trout have improved for the majority of sites (86%) between 1987 and 2021.
- Declines in stream sulfate concentrations, driven by emission regulations initiated with the 1990 Clean Air Act Amendments, contribute to improvements in stream chemistry.
- Despite improvements, only 69% of streams were considered chemically suitable for brook trout in 2021.