Assessment of Water Quality of the Gulpha Creek Watershed, Hot Springs National Park

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This study provides a baseline assessment of the water quality of the Upper Gulpha Creek Watershed within Hot Springs National Park boundaries with an emphasis on the two residing man-made impoundments. A study performed in 1978 found the area to be mildly productive, but limited by the presence of phosphorus. Studies performed since 1978 have found the watershed to be mildly impaired and susceptible to nutrient loading. There have also been reports of significant urban influence in the watershed such as habitat disruption and waste dumping. The effects of the impoundments, which will inevitably become eutrophic, as well as many other anthropogenic factors facilitate the need for a comprehensive and updated evaluation of the water quality of Gulpha Creek. Due to the harmful developments in Gulpha Creek Watershed since 1978, it is hypothesized that the overall water quality has decreased since then. To test this hypothesis, water samples were analyzed for temperature, pH, conductance, TDS, D.O., BOD, turbidity, nitrate, and phosphate. The data for each sample location and collection date were evaluated using a water quality index (WQI) so that the results would be publicly accessible. An additional WQI, calculated using the mean values of each parameter, indicated that the area was of good, but not excellent, water quality. Each station's WQI was evaluated for trends due to hydrological conditions as well as position within the watershed. WQIs were calculated for the locations which were sampled in both this study and the 1978 study. The WQIs were compared and it was found that there was a decrease of at least 5.68 for each station. This result supports the hypothesis that the water quality of Gulpha Creek has decreased since 1978.

Awards Won:

Drexel University: Full tuition scholarship $250,000