

EVALUATING SURFACE WATER pH LEVELS IN NEW JERSEY'S COASTAL PLAIN

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ABSTRACT

The State of New Jersey currently has two surface water quality criteria for pH. One is restricted to New Jersey's unique Pinelands ecosystem (pH from 3.5 to 5.5). The other applies to the rest of freshwaters of the State (pH from 6.5 to 8.5). Assessment of surface water data has revealed that a disproportionate amount of violations of the pH criteria occur in the southern half of the State (the Coastal Plain, which includes the Pinelands region) due to the gap between the two ranges of existing criteria. This suggests that a new criteria range is needed to span the gap.

In terms of violations, most pH levels were below the criteria of 6.5 to 8.5. Being below 6.5, pH levels seem to be more similar to Pinelands levels (3.5 to 5.5). Anecdotally, it is widely accepted that most of the Coastal Plain, was once or still is similar to the Pinelands region. Streams in the Coastal Plain are low-gradient, and slow moving with sandy bottoms, which is very similar to Pinelands streams. Streams in the Northern part of the State are conversely, high gradient, fast moving waters with rocky bottoms. Vegetation in the Coastal Plain is also more similar to that of the Pinelands than the Northern half of the State. It therefore seems plausible that some natural characteristic of the Coastal Plain is influencing surface water pH levels, and "violations" of the criteria may actually be natural conditions.

In an effort to determine if the existing criteria should be revised, an intensive review of historical pH data was undertaken. In addition, a number of new pH samples were taken in areas where little or no data existed. These new samples were largely taken at or near headwaters of streams to minimize any anthropogenic effects on pH levels. Data was then mapped out using Geographical Information Systems (GIS) in an attempt to find possible patterns in pH levels. GIS layers of bedrock and surficial aquifers, bedrock geology, ecoregions and soils were looked at in conjunction with the data to see if pH levels could be explained in those terms. Although all of these layers did show some correlations with pH levels, soil type appeared to be the dominant factor. Soil types, similar to those in the Pinelands, which have a characteristically low pH, appear to coincide well with surface water pH levels.

For this reason, a new surface water criterion for pH may be included for freshwaters of South Jersey outside of Pinelands boundaries. Data indicates that a pH range that captures the gap between Pinelands waters and all the other freshwaters may be developed specific to the Coastal Plain outside of the Pinelands region.

KEYWORDS

pH, Standards, Water Quality Criteria, Coastal Plain