CHARACTERIZATION OF SPATIAL AND TEMPORAL VARIATIONS IN NUTRIENT CONCENTRATION IN PASSAIC RIVER BASIN, NEW JERSEY, USA

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HOW TOO MUCH NUTRIENT POLLUTION IMPACTS THE ECOSYSTEM
STUDY LOCATION
ANNUAL NUTRIENT VARIATION

- Two stations (USGS Station 1389500 and 1391500) were chosen to study the nutrients variation trend.
- TIN (total inorganic nitrogen) and TPP (total phosphate-phosphorus) concentration were compared seasonally and annually.
REGRESSION ANALYSIS OF NUTRIENT CONCENTRATION AND THE FLOW

(a) 1389500-TIN/TPP

\[ y = 0.1395x + 0.1061 \]
\[ R^2 = 0.5595 \]

(b) 1391500-TIN/TPP

\[ y = 0.1315x + 0.2597 \]
\[ R^2 = 0.3013 \]
(a) 1389500-TIN/Flow

\[ y = 6.2239x^{-0.464} \]

\[ R^2 = 0.7294 \]

(b) 1389500-TPP/Flow

\[ y = 1.1748x^{-0.465} \]

\[ R^2 = 0.6711 \]

(c) 1391500-TIN/Flow

\[ y = 4.6168x^{0.351} \]

\[ R^2 = 0.3073 \]

(d) 1391500-TPP/Flow

\[ y = 1.0294x^{-0.656} \]

\[ R^2 = 0.6255 \]
ANNUAL VARIATION OF NUTRIENTS CONCENTRATION IN DIFFERENT STATIONS

(a) TIN
(b) TPP
SEASONAL VARIATION OF TWO SPECIFIC STATIONS
SPATIAL VARIATION
RELATIONSHIP OF LAND USE CHANGE AND NUTRIENTS CONCENTRATION VARIATION

(a) TIN against U/R

\[ y = 4.0799x + 0.0729 \]

\[ R^2 = 0.8469 \]

(b) TPP against U/R

\[ y = 22.346x + 1.2985 \]

\[ R^2 = 0.7969 \]
CONCLUSION

- There seemed a decreasing trend of TIN and TPP concentration in the watershed with time.
- There were striking seasonal variations in TIN and TPP concentrations with significantly higher concentrations in summer and autumn than that in spring and winter.
- Storm events may be a major factor affecting the distribution of nutrients in watershed. TIN and TPP concentrations under normal flow condition were significantly higher than that under storm flow condition.
- Land use change had significant impact on TIN and TPP concentrations in the watersheds.
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