
Analysis of Data: Water Quality of the Eno River

1. Colors and odors in streams are often due to the presence of organic matter in the water. Do the test results that there are high levels of organic matter in the stream?
2. Did you notice scum on the water accompanied by a fishy odor and a low dissolved oxygen reading? These characteristics are signs of an algal bloom.
3. Phosphates enter water from human and animal wastes, bedrock that is rich in phosphorus, laundry, cleaning, industries, and fertilizer runoff. Phosphate levels were set by the EPA at:

0.01 - 0.03 mg/L - the level in uncontaminated lakes

0.025 - 0.1 mg/L - level at which plant growth is stimulated

Was your phosphate level healthy? Explain.

4. To be considered safe, the level of nitrates in water should be less than 10 mg/L. What was the level in the Eno? Is it safe? Explain.
5. Nitrites should not be present in clean fresh water. The lower the amount, the healthier the water. Nitrite presence indicates pollution or decomposing organic matter. Was the level of nitrites in the Eno acceptable? Explain.
6. Both nitrates and phosphorus fertilize aquatic plants. If there is an algal bloom, the nitrate and phosphate levels may not be high because the plants are absorbing the nutrients. It is unlikely that you will find an algal bloom in a cold, fast-flowing stream that is shaded. The stream will carry the excess nitrates and phosphates into a lake or a bay. Where the water is warmer and receives more sunlight, the nutrients create more plant growth.

The plants die faster than they are decomposed. Along with sediment that enters from the streams, the plant matter fills in the bay or lake making it shallower. The decay of the plant matter uses oxygen, and the level of dissolved oxygen may become too low for some species of fish.

Consider the nitrate and phosphate readings. Will the levels of these nutrients contribute to problems downstream? Explain.

What body of water will be affected if the Eno becomes polluted with nitrates and phosphates? (Check the wall map.)

Explain (on this page) to a homeowner, golf course keeper, or a farmer the connection between use of fertilizers and healthy populations of fish in lakes.

7. The generally accepted minimum amount of dissolved oxygen that will support a large population of various species of fish is 5 mg/L, with desirable levels (best for all) between 8 and 12 mg/L. Does the D.O. level of the Eno indicate that there is enough oxygen to support most species of fish? Explain.

Some species of trout require more than 6 mg/L D.O. Is there enough dissolved oxygen for these species of trout to survive? Explain.

Some species of aquatic insects- mayfly nymphs, stonefly nymphs, caddisfly larvae, and beetle larvae cannot survive if the level of dissolved oxygen is low. On the basis of your macroinvertebrate survey, is the D.O. level adequate for aquatic insects? Explain.

8. Most fish can tolerate a pH value of 5-9, but do best between 6.7 and 8.6. Would most species of freshwater fish be able to reproduce in this stream? Explain.
9. Water is classified according to how much calcium and magnesium is dissolved in it. The general guidelines for analyzing total hardness of water are:

mg/l Ca/Mg	classification
0-60	soft
61-120	moderately hard
121-180	hard
181-200	very hard

A hard-water stream is characterized by an abundance of minerals that facilitate plant growth. In contrast, a soft-water stream will be the opposite, with few nutrients and little plant growth. Which kind of river is the Eno? Did your observations of plant growth agree with the quantitative data? Explain.

10. Conductivity is a measure of how well electricity is conducted in a solution. The basic unit for measurement is the mho (which is ohm backward-ohms measure resistance, or how hard it is to conduct electricity). Conductivity is related to the concentrations of dissolved minerals such as calcium and magnesium. Distilled water, which contains no dissolved minerals, has a conductivity of about .000001 mhos.

Normal clean stream water has a conductivity of between 5 and 50 mhos, depending on what kind of soil and rock is in the area. Does the water in the Eno fall within this range? Explain.

11. The greater the variety of organisms present, the healthier the aquatic ecosystem. Based on the types of variety or organisms collected, is this stream a healthy aquatic ecosystem?
12. Using the information obtained in the investigation, write a brief report that summarizes the water quality of the Eno River in Durham.