

## What are nitrates?

Nitrates are a form of nitrogen, which is found in several different forms in terrestrial and aquatic ecosystems. These forms of nitrogen include ammonia ( $\text{NH}_3$ ), nitrates ( $\text{NO}_3^-$ ), and nitrites ( $\text{NO}_2^-$ ), all of which are part of the **nitrogen cycle**. Nitrogen is plentiful in the atmosphere making up 79% of the air we breathe but it is not readily available in a useable form to plants and animals because of the very strong covalent bond between nitrogen atoms. Fortunately there are many ways to “fix” or bound it to hydrogen or oxygen making it useable. Once fixed, plants quickly consume nitrogen, which in turn feeds the animal community.

Nitrates are essential plant nutrients, but in excess amounts they can cause significant water quality problems. Together with phosphorus, nitrates in excess amounts can accelerate **eutrophication**, causing dramatic increases in aquatic plant growth and changes in the types of plants and animals that live in the stream. This, in turn, affects dissolved oxygen, temperature, and other indicators. Excess nitrates can cause hypoxia (low levels of dissolved oxygen) and can become toxic to warm-blooded animals at higher concentrations (10 mg/L) or higher under certain conditions. The natural level of ammonia or nitrate in surface water is typically low (less than 1 mg/L); in the effluent of wastewater treatment plants, it can range up to 30 mg/L.

Sources of nitrates include wastewater treatment plants, runoff from fertilized lawns and cropland, failing on-site septic systems, runoff from animal manure storage areas, and industrial discharges that contain corrosion inhibitors.

## Nitrate – Nitrogen (3354)



1. Collect your sample water using a clean plastic sample bottle then transfer the sample to the test tube.
2. Clean the test tube by rinsing with sample water or distilled water (3-times), then fill with sample water to the 5-ml line.
3. Add one Nitrite #1 Tablet (2799A). Cap and mix until tablet disintegrates.
4. Add one Nitrate #2 Tablet (NN-3703A). Cap and mix until tablet disintegrates.
5. Wait 5-minutes.
6. Insert the Octa-Slide Bar (3494) into the Octa-Slide Viewer (1100). Insert the test tube into the Octa-Slide Viewer and match the sample color to a standard color.
7. Record your result as ppm Nitrate-Nitrogen.

## Aquatic Nitrogen Cycle

