

## Continuous Monitoring of Nitrates and Other Water Quality Parameters

### Description:

Nitrate is one of the most important parameters in assessing surface and ground water quality. Nitrates are naturally present in surface and ground waters in low concentrations, but are harmful to humans and livestock and cause aquatic ecosystem degradation in high concentrations. Nitrates enter the environment as human-induced pollution from a variety of sources, but the largest source is from agricultural fertilizer runoff. Other sources include wastewater treatment discharge, septic systems, and from pet waste. Nitrate is highly soluble in water and therefore readily leaches into water sources, whereas other human-associated pollutants, such as phosphates and ammonia, are not transported as easily. This ability to be quickly transported into ground and natural waters such as drinking water wells, aquifers, reservoirs, lakes, and streams, coupled with its health and environmental implications make nitrate pollution and monitoring of major concern. High nitrate levels in fresh and salt water systems accelerate algae growth. As these abnormally large populations of algae die and decompose, dissolved oxygen is consumed and can result in waters with oxygen levels too low to sustain aquatic life, called "dead zones." These dead zones most often form where rivers transporting high nitrate levels flow into a salt water body, such as an estuary or a bay, where nitrogen is a limiting nutrient. This excess nitrogen then results in accelerated growth of undesirable bacteria and algae. Dead zones are most prevalent in the summer months, when dissolved oxygen levels are already low due to the decreased solubility of oxygen in warmer waters.



### Application:

An environmental group was interested in quantifying the nitrate concentration over time at multiple locations in a major river that flowed through multiple natural, urban, suburban, and agricultural areas. The environmental group wanted to identify areas where high rates of nitrate pollutants were entering the river. They had performed field spot tests and collected baseline data along the river using a nitrate colorimeter, identifying what they thought to be problem areas. To confirm their initial observations, they wanted to continuously monitor nitrate concentrations upstream and downstream of the suspected site of nitrate pollution. Continuous monitoring would allow them to identify patterns present in the nitrate concentration in the river, such as increased concentrations after rainfall events or seasonal changes in nitrate concentrations. Hanna Instruments offered the HI9829 multiparameter meter with autonomously logging probe, nitrate ISE sensor, EC/turbidity sensor, and DO sensor. The autonomously logging probe allowed the scientists to deploy the waterproof (IP68) probe in the river to a depth of 20 meters and automatically log data for nitrate concentration, conductivity, TDS, turbidity, temperature, and DO every hour for more than two months. Although the primary parameter of concern was nitrate, the environmental group appreciated the ability to measure additional parameters simultaneously to better understand the overall health of the river. The HI9829 probe comes equipped with a weighted protective cover that ensures the probe sinks and stays in a fixed position even in turbulent water, and protects the electrodes. A feature that specifically assisted the customer was the ability to set up and deploy multiple logging probes from one meter, and the ability to upload the data to their PC directly from the logging probe. This ability to maximize the use of one meter with multiple probes decreased their expected cost, allowing the customer to purchase two additional probes and therefore, add an additional site to their study. Since replacement of the nitrate colorimetric test with the nitrate ISE eliminated the procurement of hazardous waste, the customer was relieved that they no longer needed to deal with inconvenient waste disposal while in the field. The HI9829 was the perfect solution for their environmental monitoring needs.



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**Subcategory:** Field Research

**Market:** Environmental

**Product:** HI9829