

## HIGH-RESOLUTION NITRATE & NITRITE MONITORING IN A WEST CORK RIVER BASIN



*Rosscarberry, West Cork*

In October 2021, Ireland's Local Authority Water Programme (LAWPRO) for the South-West Region was using a mains-powered Aquamonitrix® analyser to quantify the nitrate load entering an estuary in Rosscarberry, West Cork, so the location was ideal to trial the performance of a battery/solar-powered pack we developed to power a second 'unplugged' Aquamonitrix® unit.

### Background

Ireland's Local Authority Water Programmes are organised on a regional level, and their role is to help identify the root causes of water-quality problems rather than to police environmental compliance. Agricultural-related issues are referred to Agricultural Sustainability Support and Advisory Programme (ASSAP) specialists, who work as trusted advisors to local farming communities.

The river that was being monitored by LAWPRO South-West was designated as having 'moderate' ecological status, with recognised nitrate issues. It is in an area of significant tourism and amenity value, with a strong dairy farming sector and several milk processing co-ops.

In this dual deployment, the battery/solar powered Aquamonitrix® unit was deployed upstream from the mains-powered Aquamonitrix® analyser.



*Aquamonitrix® mobile unit powered by a solar/battery pack*

## Results

Over the one-month deployment, both analysers provided identical nitrate measurements, ranging from >10 to >20 mg/L nitrate (as  $\text{NO}_3^-$ ) as shown in Figure 1 below.

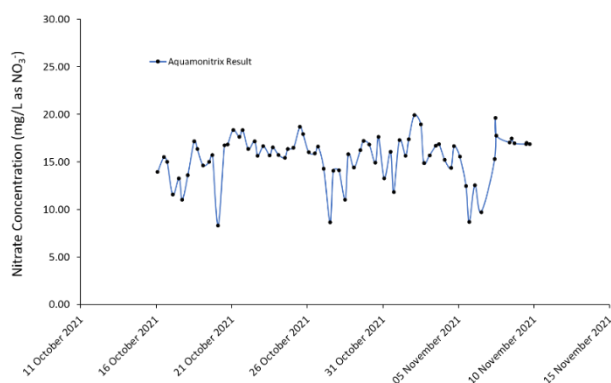


Figure 1: Nitrate level measured over as one-month period as mg/L  $\text{NO}_3^-$ .

However, the second unit, being deployed as the mobile analyser also picked up elevated nitrite concentrations of 1.58 mg/L (as  $\text{NO}_2^-$ ), as illustrated in figure 2 below.

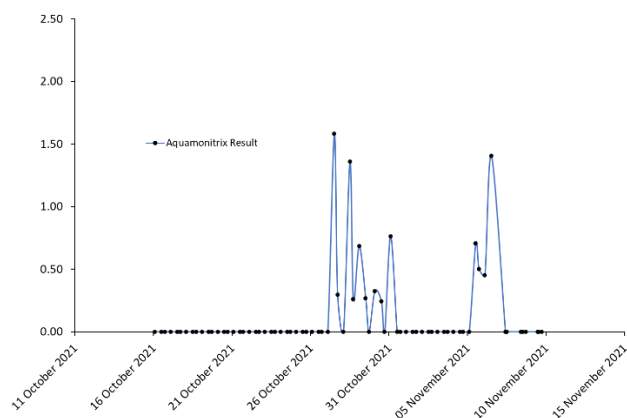


Figure 2: Nitrites level (as mg/L  $\text{NO}_2^-$ ) measured by the battery/solar powered mobile Aquamonitrix® unit

An assessment of the area revealed the source of the nitrite was a leaking storage tank on a farm approximately 1 km upstream, and this was confirmed with grab samples.

“Finding didn’t patricianly surprise me,” commented Dr Paul O’Callaghan, a Catchment Scientist with LAWPRO South West. “When you have ammonia and nitrate, you can expect that nitrite will also be in there somewhere. By the time the flow was reaching our fixed-position analyser at the mouth of the river, the nitrite had already oxidised to nitrate. But our mobile monitoring revealed that the nitrite pulse persisted for about 1 km downstream. That would indicate nitrite is less transient than some models indicate.”

## Implications

Finding the leak was a success in itself, as it was contributing to the overall nitrate load to the harbour. But the study also raises broader questions about nitrite in aquatic environments. For example, can it be highly effective as a marker of pollution sources in catchment studies? Also, is the presence of nitrite – and its potential ecological impact – currently being under-estimated? We await with interest to see what emerges from further studies of surface and ground-water using Aquamonitrix®.