

## Interpreting The Metric

# Water Quality

### Why It Matters

When water leaves the farm field it takes the soil and residual crop inputs with it resulting in lost investments, reduced yields and negative impacts on water quality. Protecting water quality is beneficial for the economic health of the farm and the health of the local and downstream communities and industries that rely on clean water.

Crop protectants and nutrients can runoff directly into surface waters; leach through the soil profile and enter either tile lines that discharge to surface water; or leach into groundwater. Groundwater supplies approximately 95% of people living in agricultural communities with drinking water<sup>1</sup>. Agricultural chemicals can give drinking water a foul odor and flavor. More importantly, there are known negative health effects of nitrates in drinking water, particularly for infants and children<sup>2</sup>.

Excess nutrients from fertilizer and manure that run off of fields into surface water are also known to stimulate rapid expansion of algae populations. The massive algal "blooms" cause hypoxic, or oxygen-scarce, zones in ecologically and economically important bodies of water. Wildlife and fishing industries have been negatively impacted by hypoxia.

To reduce the amount of crop nutrients in watersheds, some states have created laws regulating nutrient application and manure management. These states may require nutrient management plans to be filed by growers with their state department of agriculture.

### How It Is Measured In The Fieldprint® Platform

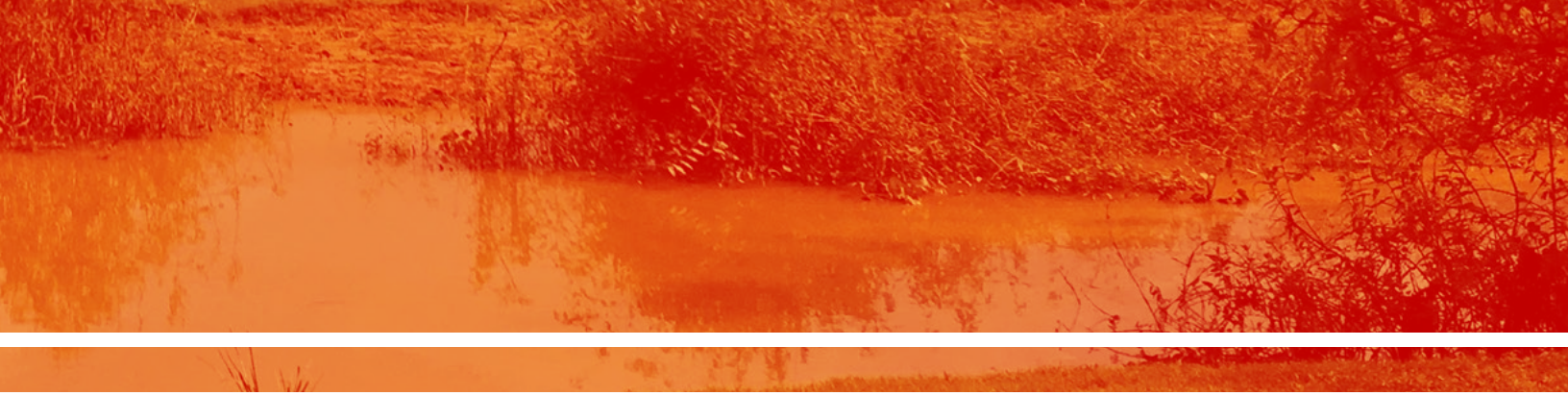
The Water Quality Metric uses the Stewardship Tool for Environmental Performance (STEP), developed by NRCS, to assess how likely a field is to lose nutrients to waterways. Based on soil properties and local climate characteristics, STEP assigns a Field Sensitivity Score (FSS) to each field that represents the potential for nutrient losses, either by runoff beyond the edge of the field (surface loss) or leaching below the rootzone (subsurface loss), for each of four loss pathways: Surface P (Phosphorus), Subsurface P, Surface N (Nitrogen), and Subsurface N. STEP then assigns mitigation points, the Risk Mitigation Score (RMS), for management practices that impact nutrient loss.

The goal is to mitigate all four nutrient loss pathways. A pathway is considered to be mitigated if the pathway ratio (RMS/FSS) is equal or greater than 1. Higher pathway ratios are desirable.

### Factors That Affect The Fieldprint Score

WQI is a complex index with several components. First, a WQI sub-factor is calculated by averaging the values of four sub-indices:

- STEP calculations are dependent on the crop being grown.
- FSS is assessed using the location of the field, the soil type, rainfall amounts, tile drainage and the amount of irrigation water applied (if relevant).
- RMS is determined by nutrient management techniques, such as the use of nitrification inhibitors and precision application, presence of a cover crop, tillage type, 4R nutrient management techniques and the implementation of NRCS conservation practices.



## How To Improve Your Score

Work with your adviser to develop the combination of practices that work best for your cropping system and location.



**Adopt NRCS conservation practices**, such as installing a riparian forest buffer, tailwater recovery system or vegetative barrier.



**Optimize nutrient applications** using 4R Nutrient Stewardship to **maximize plant uptake and keep inputs on the field**, including regular soil and manure testing.



**Reduce soil disturbance and keep water on the field.** This can be achieved through **reducing or eliminating tillage**, and **managing drainage and irrigation** to reduce runoff.

## Opportunities To Explore With Your Trusted Adviser

- What financial incentives are available to install NRCS conservation practices?
- How can I reduce or eliminate tillage?
- Should I convert to a drip irrigation system?
- Can my rotation be adjusted to increase the amount of vegetative cover on the fields each month?
- What are the best cover crops to include in my rotation?
- Is my nutrient management plan up-to-date?

<sup>1</sup> Pesticides in Groundwater, <https://water.usgs.gov/edu/pesticidesgw.html>

<sup>2</sup> Nitrates in Drinking Water, <https://extension.psu.edu/nitrates-in-drinking-water>

