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WATER NUMERIC NUTRIENT CRITERIA: WHAT, WHY AND THE 4RS

State water quality agencies have the major responsibility of ensuring the protection of water resources from nutrient (N and/or P) pollution. For decades, lake, stream, and river water quality nutrient levels have been periodically monitored by either state agencies or federal agencies.

Historically, most states have relied on narrative nutrient criteria that stipulate that designated uses of water resources shall not be impaired by nutrients. Since about 2000, the U.S. EPA has emphasized the need for more robust numeric nutrient criteria by states, based on sampling of reference waters and human-impacted waters. The EPA has advocated use of overlapping frequency distributions of nutrient levels from least-impacted reference streams/rivers and monitored streams/rivers, in selecting numeric nutrient criteria.

Last year, in its 2013 release of the 2008-2009 National Rivers and Streams Assessment Report on water quality (http://water.epa.gov/type/watersheds/monitoring/aquaticsurvey_index.cfm), the EPA used a more narrowed statistical approach than in the past, in interpreting stream/river quality conditions. Overall, the U.S. EPA found that 55% of the monitored rivers and streams were in poor biological condition. Compared to the 2004 EPA Wadeable Stream Assessment, 7% fewer stream miles were in good biological condition and 19% fewer stream miles were in good condition for P.

The good news was that 9% more stream miles were in good condition for N, 17% more stream miles were in good condition for in-stream fish habitat, and 12% more stream miles were in good condition, as measured by riparian disturbance.

Currently, seven states have statewide or partial N numeric criteria for rivers/streams; while 11 have statewide or partial P numeric criteria for rivers/streams. More states are making progress (<http://cfpub.epa.gov/wqsits/nnc-development/>), and the number of states with statewide or partial numeric criteria may double by 2016. According to a 2013 paper published in the Journal of Environmental Quality (<https://www.agronomy.org/publications/jeq/pdfs/42/4/1002?search-result=1>), among the several states with site-specific nutrient criteria for streams and rivers, only Wisconsin and Florida have statewide criteria which are well-supported by peer-reviewed and technical papers documenting the process of criteria development. A number of states have developed new nutrient loss reduction strategies. Several state strategies are designed to primarily encourage agriculture, and other nonpoint or diffuse sources of nutrient loss from land to water resources, to become more aggressive with their best management practice implementation and mitigation actions.

The 12 states adjacent to the Mississippi River are under greater pressures to do even more to reduce the losses of N and P that get transported downstream to the Gulf of Mexico, and which aggravate the early summer development of low dissolved oxygen conditions (hypoxia) in the northern Gulf of Mexico. Each of those 12 states is developing, or has developed, a nutrient loss reduction strategy to further its commitment to improved and protected water quality throughout the Mississippi River Basin and the northern Gulf of Mexico.

More agricultural losses of N and P from nonpoint (diffuse) sources can be curbed, through more timely and wise implementation of 4R (right source at the right rate, time, and place) nutrient management practices. Those 4R practices will be most effective when skillfully combined with in-field and edge-of-field soil and water conservation practices. There is no time like the present to keep more of our applied nutrients in fields and out of water resources.

How will you be adjusting your 4R nutrient management and soil and water conservation plans to be part of the winning water quality solution?

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Abbreviations: N = nitrogen; P = phosphorus.

Note: *Plant Nutrition TODAY* articles are available online at the IPNI website: www.ipni.net/pnt