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Phosphorus - Why the concern about water quality?

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Phosphorus - Why the concern about water quality?

Abstract

This article concludes a series that provides producers with information to help with on-farm management of phosphorus (P) and in understanding the complex economic and environmental issues involved in P management. This article discusses potential regulatory action and offers options to help producers move toward compliance. Iowa has many water quality challenges. It may be helpful to take a step back from the science of water quality and review the politics of water quality. What are some potential regulations and what can producers do to be in compliance?

Keywords

Agronomy

Disciplines

Agricultural Science | Agriculture | Agronomy and Crop Sciences | Hydrology

INTEGRATED CROP MANAGEMENT

A photograph of a person in a field, possibly a farmer or researcher, with large, stylized text overlaid. The text reads 'INTEGRATED CROP MANAGEMENT'. The background shows a field with tall grasses and a person in the distance.

Phosphorus - Why the concern about water quality?

This article concludes a series that provides producers with information to help with on-farm management of phosphorus (P) and in understanding the complex economic and environmental issues involved in P management. This article discusses potential regulatory action and offers options to help producers move toward compliance.

Iowa has many water quality challenges. It may be helpful to take a step back from the science of water quality and review the politics of water quality. What are some potential regulations and what can producers do to be in compliance? The challenge to regulators will be in identifying scientifically defensible nutrient criteria. Regulation will probably be based on both the cause (such as sediment, nitrogen, and P) and response (such as turbidity and chlorophyll) associated with eutrophication.

What does P do in water?

Nutrients in surface waters are the leading cause of impairment because they cause eutrophication, and P is the primary agent for eutrophication. The consequences of eutrophication include algal blooms, low levels of dissolved oxygen, fish kills, turbidity, and shifts in plant and animal populations in surface waters.

The Iowa Department of Natural Resources designates a water body's uses and then assesses the water quality needed to ensure safe use of the water. When pollutant loading in a lake, river, or stream is above acceptable levels, the water body is placed on the impaired waters or [303d List](#) [1]. Most of Iowa's waters could potentially be listed as impaired for one or more pollutants, which is why there is concern about water quality in Iowa.

Because water quality is measured in surface water bodies, regulatory action will probably be approached on a watershed basis. Phosphorus levels in water resources are the sum of all operations, both in agricultural and urban areas of a watershed, so everyone needs to look at the issue to make progress. That means rethinking old geopolitical systems and working across municipal, county, and state boundaries.

Regulation could focus on the levels of P in surface waters that are considered appropriate, and thus, what level of runoff (or P loss to surface waters) is required to achieve those levels. Producers might be asked to reduce levels of P in water by using best management practices such as soil testing, limiting P applications when indicated, and using conservation tillage to reduce soil erosion.

What can producers do?

Because the sources of nutrient pollution include animal manure and commercial fertilizers carried to streams by soil erosion, these activities would be among the targets of possible regulation. Soil tests could be used as a guide for building soil fertility programs. The nature, amount, distribution, and chemical composition of P compounds in soil also could be considered.

Although much is known about P and its interaction with soils, there is still much to be learned about the relationships between soil management, P management, and P movement to surface waters. Producers collecting data on P management by field, soil type, and crop requirements could be ahead of the game. Also, producers can use tools such as Iowa's P Index [2] to assess their current P management practices. This tool may contribute to improved water quality.

The challenges of change in agriculture (such as an increased concentration of livestock) also present concerns for manure and fertilizer P management by increasing the concentration of P to be applied as manure. However, feeding low phytate corn with reduced levels of inorganic P supplementation to swine lowers the concentration of P in manure without sacrificing performance or carcass characteristics.

Another challenge for producers will be working with multiple agencies when dealing with water quality issues. Agencies that will play a role in regulation include the U.S. Environmental Protection Agency and the Iowa Department of Natural Resources. Finally, look for possible cost-share or eligibility for participation in programs with local, state, and federal agencies as well as private organizations and nonprofit organizations.

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Links:

[1] <http://www.state.ia.us/dnr/organiza/epd/wtresrce/303dnotc.htm>

[2] <http://www.ia.nrcs.usda.gov/Technical/Phosphorus/phosphorusstandard.htm>

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