



# Phosphorus and Home Lawns: Quick Facts and Recommendations

WASHINGTON STATE UNIVERSITY EXTENSION FACT SHEET • FS058E

## Why the issue?

Phosphorus (P) is an essential plant nutrient, but it is also a potential pollutant. Phosphorus fertilization helps maintain healthy lawns growing in P-deficient soils, but P runoff into lakes and streams can cause excessive growth of algae—harming water quality and aquatic ecosystems. (Figure 1.)



Figure 1. Pond near Centralia, Washington, choked by algal growth.

## What is changing?

The new Washington state Water Quality—Fertilizer Restrictions law takes effect on January 1, 2013. This law limits the use of lawn fertilizers that contain phosphorus to the following situations:

- When establishing grass or repairing damaged grass, using either seed or sod, during the growing season in which the grass is established
- When the soil in the area is deficient in plant-available phosphorus, as confirmed by a soil test performed no more than 36 months before the application

Violating these restrictions is a misdemeanor and subject to civil fines.

## How do I determine if my lawn needs fertilizer?

Test the soil before using phosphorus fertilizer.

- The amount of phosphorus you apply should be based on soil test results.
- Soil test samples should consist of at least 10 cores taken from across your lawn, which are then combined. If you have areas of your lawn that are very different from each other in soil type or appearance, sample and test these areas separately.
- Turfgrass soil samples should be taken at a depth of 4 inches, and should not include any existing thatch.
- If the soil pH is 7 or lower (acidic), the testing laboratory should use the “Bray P1” phosphorus test. If soil pH is higher than 7 (alkaline), the “Olsen” test should be used.
- If soil test values are above the levels listed in the chart below, it is unlikely your lawn will benefit from fertilizer P.

Minimum adequate levels of soil P for turfgrass in WA (parts per million, ppm)	
Bray P1 (western WA)	Olsen P (eastern WA)
25 ppm	18 ppm

## How do I apply phosphorus fertilizer most effectively, if it is needed?

Apply phosphorus fertilizers in spring or early fall.

- The best time to apply phosphorus fertilizer is following core aeration of turf in spring or early fall. Aeration is often necessary in compacted or poorly drained soils. Phosphorus amounts ranging from 1/8 lb. to 1 lb. of P<sub>2</sub>O<sub>5</sub> should be applied, based on soil test results and depending on the fertilizer formulation. (Figure 2.)
- Fertilizer should not be applied immediately before mowing. Do not collect clippings for several mow-

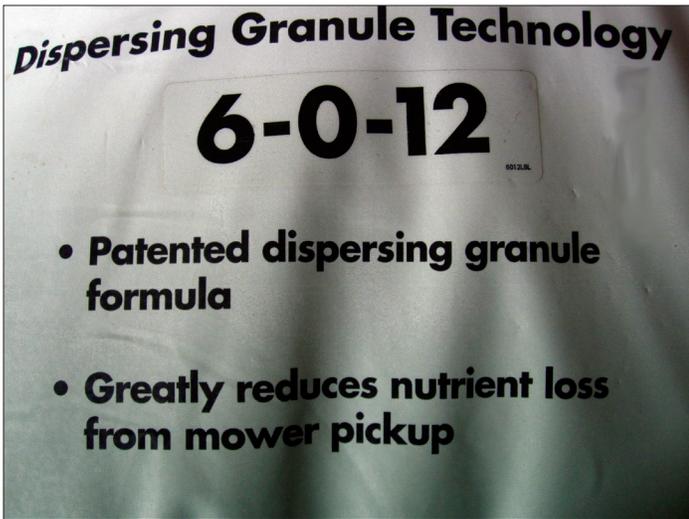


Figure 2. Fertilizer labels list the amounts of nitrogen (N), phosphorus ( $P_2O_5$ ), and potassium ( $K_2O$ ), always in that order: N-P-K. The label shown here is for fertilizer that has zero phosphorus.

ings after applying fertilizer or until the pellets have dissolved.

- Light to moderate rainfall following fertilizer application can help the fertilizer sink in, but avoid fertilizing if heavy or prolonged rain is expected.
- In colder climates, the greatest runoff occurs from late fall through early spring when soil is frozen or when there is snowmelt. Avoid the application of fertilizer at these times. (Figure 3.)



Figure 3. Runoff from home properties can leach lawn chemicals into surface waters.

Avoid applying fertilizers to frozen soils, hard surfaces, or adjacent to open water.

- Never apply fertilizer to frozen soil or on an impervious surface, such as asphalt. If fertilizer is spilled onto an impervious surface, sweep it back onto the turf or into the fertilizer bag to reduce the risk of runoff.

- Always leave an unfertilized buffer strip, (10 ft. wide or more, depending on the slope) planted with turf, landscape plants, or native vegetation, between the fertilized area and open water, such as a pond, lake, or river.

Apply P to new lawns (which are likely to need it more than established lawns).

- If you are planting a new lawn, have your soil tested for P and other nutrients as well as pH before you prepare the soil.
- Application of phosphorus fertilizer on recently planted or developing turf helps build strong root systems.
- Since lawn sod is often fertilized with phosphorus during production, newly sodded lawns may require less P fertilizer than newly seeded turf.
- New lawns often take 2 to 3 years to become established. Many established lawns with a history of fertilization need little or no additional P. Sample the soil from established lawns every 3 to 5 years to determine if P fertilizer is needed.

### What about organic fertilizers?

Many organic fertilizers are relatively high in phosphorus and, therefore, are not appropriate if soil P is adequate. Organic P is also susceptible to runoff.

### What is the bottom line?

Phosphorus is an important plant nutrient, but it can harm fresh water sources if used incorrectly. Remember to base P applications on soil tests. Also, remove fertilizer from driveways, sidewalks, and streets (Figure 4), and leave a buffer zone around surface bodies of water.



Figure 4. Sweep up spilled or thrown fertilizer and grass clippings to prevent them from washing into surface waters.

## References

- Bannerman, R.T., D.W. Owens, R.B. Dodds, and N.J. Hornewer. 1993. "Source of pollutants in Wisconsin stormwater." *Water Science and Technology* 28:241-259.
- Soldat, D.J. and A.M. Petrovic. 2008. "The Fate and Transport of Phosphorus in Turfgrass Ecosystems." *Crop Science*. 48:2051-2065.
- Washington House Bill 1489, Water Quality—Fertilizer Restrictions: <http://apps.leg.wa.gov/documents/bill-docs/2011-12/Pdf/Bills/Session%20Law%202011/1489-S.SL.pdf>.



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Use pesticides with care. Apply them only to plants, animals, or sites as listed on the label. When mixing and applying pesticides, follow all label precautions to protect yourself and others around you. It is a violation of the law to disregard label directions. If pesticides are spilled on skin or clothing, remove clothing and wash skin thoroughly. Store pesticides in their original containers and keep them out of the reach of children, pets, and livestock.

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