

Oregon DEQ Harmful Algal Bloom (HAB) Strategy

Appendix F

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This report prepared by:

Andy Schaedel
Oregon Department of Environmental Quality
811 SW 6th Avenue
Portland, OR 97204
1-800-452-4011
www.oregon.gov/deq

Contact:
Dan Turner
(503) 229-6682
turner.daniel@deq.state.or.us

Appendix F

Web Research on Lawn Maintenance Fertilizers

As discussed in section 6.5.3, a number of states have restricted phosphorus in lawn maintenance fertilizers including: Illinois, Maine, Michigan, Minnesota, New York and Wisconsin. In Oregon, Dunes City has developed a local ordinance restricting use of any fertilizer within 50 feet of the shoreline and restricts the use of any phosphorus containing fertilizer within Dunes City (it can be used when first establishing turf and if need is shown through soil testing). Lake Oswego uses zero phosphorus fertilizer in its parks and the Lake Oswego Corporation has active educational program promoting the use of zero phosphorus lawn maintenance fertilizers when fertilizers are used. In 2011, Scotts Miracle Gro Company, a major producer of retail lawn fertilizer, announced that it was removing phosphorus from most of its lawn maintenance fertilizers by 2012.

As there are a number of lakes in urban areas and/or with residential development along the shoreline that are experiencing HABS in Oregon, it was felt that it would be good to further explore the need for phosphorus in lawn maintenance fertilizers and the availability of 0-P lawn maintenance fertilizers in Oregon. This source of phosphorus to waterbodies in urban areas can be significant as an initial study (Lehman et al, 2009) suggested that a 25% reduction in total phosphorus occurred after implementation of a lawn fertilizer ordinance in Ann Arbor, Michigan.

DEQ initially had discussions with Oregon Department of Agriculture (ODA) for use of fertilizer fee grant funds to explore this topic further. A conceptual proposal was submitted by the Center for Lakes and Reservoirs to the Department of Agriculture. While ODA was interested in the proposal, the project was not funded as it was felt that there was already a trend by fertilizer manufacturers to go toward 0-P lawn maintenance fertilizers and funds were needed to do further work related to the potential impact of fertilizers in the Umatilla Groundwater Management Area.

This topic was discussed further with EPA who indicated that they had an intern, Devin Groman, who had some limited time available and could do some further research on this topic. A set of questions were developed and Devin did phone and web research in the limited time that she had available.

This Appendix contains her report based on the set of questions and was edited only for clarity and format.

Are other major manufacturers of retail fertilizer doing what Scotts is doing? If so, when will it be done and what are the reasons? Indicate the brands of fertilizer.

Stores:

Home Depot: Pennington, Dynamite, Espoma, Monterey, Get it Green, Scotts, Vigoro, LESCO
Lowe's: Scotts, Sta-Green, Pennington, Lilly Miller, Milorganite, TurfGro, Black Hen, Sunniland, Ironite, Jobe's, Alaska, Rite Green, Espoma, Better Gro, Ultragreen, Richlawn, Soil Moist, Miracle Gro
Wal-mart: No listed fertilizer online
Fred Meyer: No listed fertilizer online
Ace Hardware: Ace Brand (has a phosphorus free version), Espoma, Milorganite, Scotts.

Major Brands:

(numbers after the brand refer percent of nitrogen-phosphorus-potassium)

Pennington:

Pennington Law Food: 27-4-6
Signature Series Lawn Fert.: 29-0-5, 16-4-8
Weed and Feed: 15-5-10, 18-0-18, 25-4-6, 17-0-6, 28-0-4
Lawn starter Fertilizer: 18-24-6

Espoma: ORGANIC

7-2-2, 18-0-3, and a weed preventer at 9-0-0

Sunniland:

6-6-6, 10-10-10-, 0-46-0, 18-4-10, 20-4-6, 25-4-6

Most brands carry fertilizer with no phosphorus in it, but none advertise it as a specifically “phosphorus free” fertilizer which would suggest they are not trying to promote it. However, it seems that if the consumer were to ask for a phosphorus free fertilizer, they would be available but the retail stores are not advertising the benefits of not using phosphorus in lawn fertilizer.

However, Scotts and Pennington both support restrictions on phosphorus as long as there are exceptions for starter and organic fertilizer (which tend to have much lower levels than regular fertilizer for both companies). In fact phosphorus-free lawn fertilizers account for 80% of Pennington's sales. Perhaps this indicates a motivation for the industry to change their lawn fertilizer products?

<http://www.homeimprovementninja.com/2011/03/scotts-miracle-gro-to-finally-phase-out-phosphorus/>

What do lawn care services use?

Turf Tenders Landscape Maintenance: (Portland and Troutdale, OR)

- Use lawn fertilizer from Crop Productions- of various kinds
- Do not use phosphorus free fertilizer
- Customers do not ask and the landscapers do not mention it either

Valley green Inc: (Keizer, OR)

- Use fertilizer from Wilco only available to landscapers which is not phosphorus free
- Use of phosphorus free depends on the time of year but the option is available
- Use mainly P free at the beginning of the year

Green Thumb Landscaping (Portland and Salem, OR)

- Uses CHS (Store in Kalispel) triple 16 which contains phosphorus
- They do not use phosphorus free.
- Customers do not ask for phosphorus free fertilizer either (not a discussion topic between landscapers and consumers)

Cascade Grounds Management Inc: (Gresham, OR)

- Use mainly 15-5-10
- Do not use phosphorus free (person on phone didn't really know much about that as an option)
- Customers who call don't generally want phosphorus free specifically they just want it done cheap (Are there price differences between phosphorus free and regular fertilizers? Maybe that is an educational opportunity for consumers if they are comparable in price)

Master Lawn Care: (Beaverton, OR)

- Use of lawn fertilizer depends on the lawn
- Customers will often request certain kinds
- Use both phosphorus free and regular fertilizer depending on the needs of the lawn and customer

In general, most landscapers in Oregon do not use phosphorus free fertilizer but, for some, it depends on the specifics of the lawn, the time of year and what the customer wants.

Any statistics on this type of usage in Oregon? How do the lawn fertilizer numbers compared to usage of other fertilizers?

This is information from the EPA from 1996 concerning fertilizer use. On page 46 there is a table comparing consumption of specific fertilizer types by farm and non farm usage.

“Over 2,650,000 tons of fertilizer was used on non-agricultural land according to those states reporting data to the AAPFCO. This represents approximately 6% of the total fertilizer use defined as farm and non-farm. The states with the highest non-farm consumption of fertilizers are Florida (393,012 tons) and California (320,367 tons). The states with greater than 30% non-farm fertilizer use are New Jersey (124,661 tons), Nevada (12,408 tons) and Vermont (11,904 tons)” (44)

<http://www.epa.gov/oppt/pubs/fertilizer.pdf>

How are the different nutrients used by grass? In what amounts? Why does it appear that it is not needed?

Nitrogen: The basis of all protein and DNA. Used mostly for growth. Nitrogen application is said to "green up the grass" because it is incorporated into the leaf tissue.

Phosphorous: This nutrient plays an integral part in photosynthesis, energy transfer and flower/fruit growth. Plants without enough phosphorous do not produce many fruits and their seeds can be deformed or not fully formed.

Potassium: Many processes within the plant use potassium. Sugar movement, cell division, root development and water retention all require potassium.

www.lawncare.net

According to the Oregon Environmental Council, Many Oregon lawns need little or no fertilizer to grow and Most Oregon lawns only need to be fertilized once per year, if at all.

<http://www.oeconline.org/resources/livinggreen/athome/lawntips>

“Perennial grasses do not exhibit similar surface accumulations of soil nutrients as compared to shrubs. One explanation may relate to differences in rooting characteristics between shrubs and perennial grasses. Grasses, such as those examined in this research, exhibit root systems which are fibrous in nature and extend in a vertical fashion below the crown of the plant...The net effect of a limited root system for grasses may be a relatively small volume of soil available for nutrient extraction” <http://oregonstate.edu/dept/eoarc/sites/default/files/researchhome/documents/276.pdf>

“Phosphorus is critical in the metabolism of the plant, playing a role in cellular energy transfer, respiration and photosynthesis (Glass et al. 1980; Ozanne 1980; Usada and Shimogawara 1993). Light energy absorbed by chlorophyll during photosynthesis is stored in adenosine triphosphate (ATP) and serves as the primary source of energy for energy-requiring biological processes. Phosphorus is also a structural component of the nucleic acids of genes and chromosomes and of many coenzymes, phosphoproteins and phospholipids. Therefore, an adequate supply of P is essential from the earliest stages of plant growth.”

“Early season limitations in P availability can result in restrictions in crop growth, from which the plant will not recover, even when P supply is increased to adequate levels.”

“The P concentration in tissue of annual plants generally declines with advancing plant age/stage of growth (Racz et al. 1965; Bélanger and Richards 1999), as do critical nutrient concentrations (Bélanger and Richards 1999). Thus, highest tissue P concentrations are required at early growth

stages. Phosphorus concentrations decline with time in annual plants because as the plant matures an increasing proportion of its dry weight is composed of low-P structural and storage tissues.”

“In an agronomic sense, the argument becomes that with cold soil, native soil P will be less available to the plant and fertilizer P will remain more available. This increases the relative value of fertilizer P for cold soils.”

---Maybe this has some importance for Oregon where there can be a colder climate?

“They reported that the beneficial action of fertilizer P was due to the plant being able to make a more vigorous early start, and that late growth was completed largely from P absorbed from the soil.”

<http://pubs.aic.ca/doi/pdf/10.4141/P00-093>

Table F-1. Phosphorus recommendations for a new lawn or turfgrass area before seeding or sodding.

Phosphorus (P) Soil Test Level		Amount of Phosphate (P ₂ O ₅) to Apply ^b
Bray-P1	Olsen-P	
———— ppm ————		lb. P ₂ O ₅ /1000 sq. ft.
0-10	0-7	5
11-25	8-18	2
over 25	over 18	1

^aPhosphate fertilizer should be incorporated (tilled in) 4 to 6 inches before seeding or sodding.

^bMultiply by 44 to convert the rate from lb/1000 sq. ft. to lb/acre.

Table F-2. Annual phosphorus recommendations for existing grass^a.

Phosphorus (P) Soil Test Level		Amount of Phosphate (P ₂ O ₅) to Apply ^b
Bray-P1	Olsen-P	
———— ppm ————		lb. P ₂ O ₅ /1000 sq. ft.
0-10	0-7	1.0
11-25	8-18	0.5
over 25	over 18	0.0

<http://www.extension.umn.edu/distribution/horticulture/dg2923.html>

This shows that in general the amount of phosphorus that needs to be added to soils is much lower for existing grass vs. a new lawn especially for soils with a high level of natural phosphorus sources.

Based on my research it seems that phosphorus is only important when establishing a new lawn (perhaps why Scotts and Pennington want to make exceptions for starter fertilizer for lawns). As the lawn matures, phosphorus seems to be less important especially in soils where phosphorus levels are higher.

“In general, phosphorus does not induce the visible response in turf grasses that is observed with the application of N materials. When responses are obtained they are generally during the establishment phase of the turf grass. Only at extremely low soil test P levels would a P response be observed.”

<http://edis.ifas.ufl.edu/pdf/SS/SS31800.pdf>

What is the language of other state bans and any information on the effectiveness of the bans?

Minnesota:

From the Minnesota Department of Agriculture “Phosphorus Lawn Fertilizer Law” 2002

Use of Phosphorus Fertilizer on Lawns and Turf is Restricted (Minnesota Statutes [18C.60](#))

Fertilizers containing phosphorus cannot be used on lawns and turf in Minnesota unless one of the following situations exists:

- A soil test or plant tissue test shows a need for phosphorus.
- A new lawn is being established by seeding or laying sod.
- Phosphorus fertilizer is being applied on a golf course by trained staff.
- Phosphorus fertilizer is being applied on farms growing sod for sale.

When these situations do not exist, state law requires phosphorus-free lawn fertilizer is to be used.

<http://www.mda.state.mn.us/protecting/waterprotection/phoslaw.aspx>

Minnesota: Information on Effectiveness of the Ban:

Has the law reduced phosphorus lawn fertilizer use?

- In 2006, 82% of lawn fertilizer used was phosphorus-free, based on weight. All of the top five lawn fertilizer products used in 2006 were phosphorus-free.
- Tons of phosphorus contained in lawn fertilizers used decreased 48% between 2003 and 2006.

Minnesota Department of Agriculture staff measured the amount of lawn fertilizers used in the state between 2003 and 2006; 2003 being the year before the Minnesota Phosphorus Lawn Fertilizer Law prohibited phosphorus lawn fertilizer use in the Twin Cities metro area, and 2006 being the year after the law prohibited phosphorus lawn fertilizer use statewide. Their findings are:

- The law did not appear to reduce overall lawn fertilizer use.
- Between 2003 and 2006, phosphorus-free lawn fertilizer use increased from 44% to 82% of market share by weight.
- In 2003, only one of the top five lawn fertilizer products used were phosphorus-free; in 2005 and 2006, all of the top five lawn fertilizers used were phosphorus-free.
- Total amount of phosphorus contained in lawn fertilizer used decreased 48% between 2003 and 2006.

A substantial amount of phosphorus-free lawn fertilizer was already used in 2003, the year before the state restriction on phosphorus lawn fertilizer use went into effect. There are two likely reasons for this: 1) Numerous local city ordinances in the Twin Cities metro area were already in effect requiring the use of phosphorus-free product, and, 2) Some stores “got a jump” on providing phosphorus-free product, making it their predominate offering in 2003, the year before the state restriction.

Has the law increased costs to the consumer?

- Phosphorus-free lawn fertilizer costs were similar to products that contain phosphorus.

A cost comparison was made of lawn fertilizer products at two large chain stores which operate in Minnesota, Wisconsin, and North Dakota. Within store chains, similar lawn fertilizer products were compared, the only difference being Minnesota products were phosphorus-free and North Dakota and Wisconsin products contained a maintenance level of 3% P2O5. Prices were the same within store chains, giving indication that consumers were not paying an increased cost for phosphorus-free product.

How have consumers responded to the law?

- Based on interviews with retail store staff, customers are very supportive of the law.
- Consumers sought guidance on proper disposal of surplus phosphorus lawn fertilizer.

According to store staff interviewed during the October 2006 store survey, customer response to the law is very supportive. Ninety-seven percent (97%) of store staff reported customers were supportive of the law. Only 3% of store staff reported instances where customers did not buy product because phosphorus lawn fertilizer was not available. Consumer questions were received by the Minnesota Department of Agriculture and University of Minnesota Extension about proper disposal of leftover phosphorus lawn fertilizer. A fact sheet addressing available options was developed and distributed (available at: www.mda.state.mn.us/phoslaw).

How has the law impacted lawn fertilizer manufacturers?

- Formulating new phosphorus-free fertilizer products has not been a problem.
- Challenges were encountered with registering, inventorying, labeling, and marketing new products.
- Two year advance notice on law's effective date helped manufacturers plan for changes.

Ten fertilizer manufacturers were interviewed by telephone to gain insights into how the Minnesota Phosphorus Lawn Fertilizer Law affected their operations. They were asked the following questions:

Have you experienced problems in the manufacture, packaging, or marketing of Phosphorus-free lawn fertilizer?

- None of the manufacturers reported problems in formulating phosphorus-free products. One manufacturer did note extra care was required to prevent phosphorus-free product from being contaminated with trace amounts of phosphorus left in mixing equipment from previous blends.
- Six manufacturers did report challenges associated with introducing new product lines including cataloging, inventorying, marketing, and answering retailer questions.
- Two manufacturers reported increased costs associated with product registration and creating new packaging and labeling.
- One manufacturer reported problems with distribution and restocking when phosphorus-free or phosphorus containing products were shipped to the wrong state.
- Two manufacturers noted the importance of the two year advance notice on the law's effective date. It allowed them to do advance planning and use up existing stocks of packaging.

Have there been concerns about customer satisfaction with phosphorus-free lawn fertilizer products?

- Three manufacturers reported receiving inquiries into why phosphorus was missing from products that historically were three-way blends of nitrogen, phosphorus, and potassium.
- Two manufacturers reported that most consumers are unaware of the composition of fertilizers. Consumers are satisfied as long as a product contains nitrogen, the nutrient that "greens up" lawns.
- Three manufacturers expressed concerns that use of phosphorus-free lawn fertilizer will cause deficiencies in soil phosphorus over time, and without increased education and use of soil testing, these deficiencies may lead to decline of lawn health.

Do you plan to continue producing phosphorus-free fertilizer?

- All ten manufacturers plan to continue offering phosphorus-free lawn fertilizer.
- Eight manufacturers noted expanding markets for phosphorus-free lawn fertilizer in other areas concerned with water quality, including the Chesapeake Bay region, Florida, Michigan, and Wisconsin.

How has the law impacted lawn fertilizer retailers?

- Stores report no problem in stocking phosphorus-free product in general, some problem in stocking specific products.
- All 87 stores surveyed during October 2006 reported that they could obtain phosphorus-free product, although 14% said they could not find phosphorus-free product in a certain brand or for a certain application (e.g., “winterizer”). The experience of stores in Greater Minnesota and the Twin Cities metro area were similar.

Source:

<http://www.mda.state.mn.us/en/sitecore/content/Global/MDADocs/protecting/waterprotection/07phoslawreport.aspx>

Michigan (2009)

(2) If a tissue, soil, or other test performed within the preceding 3 years by a laboratory experienced in conducting tests for phosphorus that adhere to recognized national standards indicates that the level of available phosphate (P_2O_5) in the soil is deficient to support healthy turf grass growth or establishment, a person may apply fertilizer to the turf at an application rate for available phosphate not exceeding that necessary to correct the deficiency.

Sec. 8512g. The department, in consultation with the fertilizer industry representatives, fertilizer retailers, statewide environmental organizations, lake groups, and other interested parties, may approve consumer information on use restrictions and recommended best practices for lawn fertilizer containing available phosphate (P_2O_5), and on best management practices for other residential uses of phosphorus. The information shall be in a format and include content suitable for use by the general public or posting and distribution at retail points of sale of turf fertilizer.

<http://legislature.mi.gov/documents/2009-2010/publicact/htm/2010-PA-0299.htm>

Ann Arbor, Michigan: Information on Effectiveness of the Ban:

“After the first year of data collection and analysis statistically significant reductions have been documented for TP and, to a lesser degree, for DP for every month from May to September. We can state objectively with a considerable degree of confidence that phosphorus concentrations were lower in 2008 at experimental sites compared with the reference period (2003 to 2005) and that the reductions were coincident with a City ordinance restricting use of lawn fertilizers containing phosphorus.”

DP= dissolved phosphorus

TP=total phosphorus

http://www.ci.ann-arbor.mi.us/government/publicservices/systems_planning/Environment/Documents/FertilizerStudyYear1.pdf

“The results from their data show that after the ordinance went into effect, total phosphorus concentrations (2008-2009 data) for the urban creeksheds were 36% lower on average when compared to pre-ordinance levels. Again, the phosphorus fertilizer ordinance is one explanation for the significant phosphorus reductions in urban creeksheds.”

<http://annarborchronicle.com/2010/04/13/environmental-indicators-phosphorus/>

Florida

Florida's law in 2009 requires all local governments to adopt a model fertilizer use ordinance as a minimum standard.

Sarasota County in effect February 2008

“Sarasota County's fertilizer measure will go into effect in February 2008. It prohibits residents from applying fertilizers that contain nitrogen or phosphorus between June 1 and Sept. 30. It sets maximum levels for the amount of nitrogen and phosphorus that legal fertilizers can contain. It sets a fertilizer-free zone within 10 feet of any body of water and creates a voluntary "low maintenance zone" within six feet of water bodies. It recommends use of "slow-release fertilizers." It requires fertilizer application companies to create a training course. It sets penalties for violators that start with a warning and rise to \$500.”

<http://florida.sierraclub.org/suncoast/SarasotaCountypassesstrongFertilizerOrdinance.htm>

<http://www.heraldtribune.com/article/20070828/NEWS/708280507>

Illinois

The Illinois Department of Agriculture reports that the new law prohibits lawn care services from applying phosphorus fertilizer on residential lawns unless the lawn is new or has a proven phosphorus deficiency. The fertilizer also cannot be applied to lawns that are frozen or already saturated. The law prevents fertilizer from being applied to impervious surfaces and restricts the area and application method in which any fertilizer may be applied within 15ft of a water body.

<http://www.epa.state.il.us/newsletter/>

Maine

Maine passed a law (May 2007) prohibiting the sale or use of fertilizer containing phosphorus for nonagricultural lawn or turf (with some reasonable exceptions). There is no prohibition against display of phosphorus lawn fertilizer, although there is a signage requirement. There is momentum in Maine to looking at strengthening their law.

Title 38, 419 “Cleaning agents and lawn and turf fertilizer containing phosphate banned”

“A person may not:

A. Sell or use a high phosphorus detergent; or [2007, c. 65, §1 (NEW).]

B. Sell fertilizer containing phosphorus at a retail store after January 1, 2008 unless the seller posts a department-approved sign that indicates that the product is not appropriate for use on nonagricultural lawns or turf due to potential adverse effects on water quality, except when:

(1) Soil test results from a laboratory indicate that additional phosphorus is needed for that lawn or turf; or
(2) The fertilizer will be used in establishing a new lawn or turf, including establishing turf at a sod farm, or for reseeded or over-seeding an existing lawn or turf.”

<http://www.mainelegislature.org/legis/statutes/38/title38sec419.html>

Wisconsin

Dane County passed an ordinance restricting the use, sale, and display of phosphorus lawn fertilizer in 2004; and has not experienced any implementation problems.

“The Dane County Board of Supervisors finds that Dane County’s lakes and streams are a natural asset which enhance the environmental, recreational, cultural and economic resources of the area and contribute to the general health and welfare of the public. The Board further finds that regulating the amount of nutrients and contaminants, including phosphorus contained in fertilizer and polycyclic aromatic hydrocarbons (PAHs) contained in coal tar sealcoat products, entering the lakes will improve and maintain lake water quality.”

“Effective January 1, 2005, no person shall apply any lawn fertilizer within Dane County that is labeled as containing more than 0% phosphorus or other compound containing phosphorus, such as phosphate, except as provided in section 80.06.

(2) No lawn fertilizer shall be applied when the ground is frozen.

(3) No person shall apply fertilizer to any impervious surface including parking lots, roadways, and sidewalks. If such application occurs, the fertilizer must be immediately contained and either legally applied to turf or placed in an appropriate container.”

(1) Effective January 1, 2005, no person shall sell or offer for sale any lawn fertilizer within Dane County that is labeled as containing more than 0% phosphorus, or other compound containing phosphorus, such as phosphate, except such fertilizer may be sold for use as provided in section 80.06. **(2)** Effective January 1, 2005, no person shall display lawn fertilizer containing phosphorus. Signs may be posted advising customers that lawn fertilizer containing phosphorus is available upon request for uses permitted by s. 80.06. **(3)** Effective May 1, 2004, a sign containing the regulations set forth in this ordinance and the effects of phosphorus on Dane County’s waters must be prominently displayed where lawn fertilizers are sold.

<http://pdf.countyofdane.com/ordinances/ord080.pdf>

New Jersey

New Jersey is requiring more than 100 municipalities to adopt local ordinances prohibiting use of fertilizers containing phosphorous

The Department is in the process of adopting each of the phosphorus TMDLs to the appropriate water quality management plan and does not anticipate that there will be significant, if any, change to TMDL implementation plans upon its adoption. The adoption of fertilizer ordinances is part of the implementation plan to reduce phosphorus. These phosphorus TMDLs will affect 110 municipalities, primarily in the northeastern section of the state. When these phosphorus TMDLs become adopted, the implementation plans become part of the DEP regulatory framework. Municipalities located in those watersheds with phosphorus TMDLs will be required to adopt local ordinances that prohibit the use of fertilizers containing phosphorus except under special circumstances. This adoption of this ordinance will be required through the Municipal Stormwater Permit Program.

<http://www.state.nj.us/dep/watershedmgt/DOCS/focus/FALL06.pdf>

Implementation Plan for NJ:

Phase I: Effective **immediately**, fertilizer may not be applied from November 15 through March 1 by residential consumers and from December 1 through March 1 by professionals. Application of fertilizer is restricted during winter months when the ground is frozen and not able to be absorbed allowing it to be washed away when it rains. Fertilizer application is prohibited during – or just before – heavy rainfall, and on impervious ground. Fertilizer containing phosphorus or nitrogen can not be applied within 25 feet of any water body except when applied with a drop spreader or targeted spray – then the buffer may be reduced to 10 feet.

Phase II: Effective **January 5, 2012**, all professional applicators will be required to undergo training and become certified through the New Jersey Agricultural Experiment Station at Rutgers University. Rutgers University is in the process of developing the training program in consultation with the department’s Healthy Lawns Healthy Water workgroup.

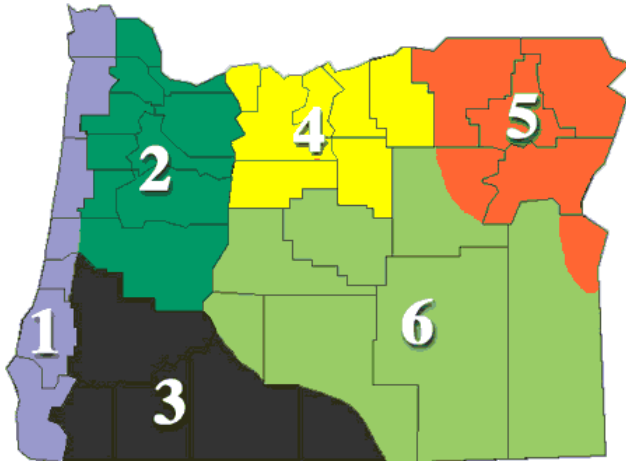
Phase III: Effective **January 5, 2013**, all fertilizer products for turf must contain at least 20 percent slow-release nitrogen, and zero phosphorus unless a soil test demonstrates a need for more
<http://www.nj.gov/dep/healthylawnshealthywater/>

Is there a way to indicate the P levels of soils, native rock in Oregon as a way of showing where it is likely in excess?

<http://www.american-lawns.com/states/or.html>

In some areas, Oregon lawns need little or no fertilizer to grow other than to replace nitrogen. Oregon has specific geologic areas concerning the soil. Each area requires different fertilization techniques depending on the regional soil makeup. A soil test is recommended to fully understand your particular regional soil composition.

The Regional Soils of Oregon



Coastal Oregon (1):

Here soils range from fine sand to clay with a pH range of 5.5. Phosphorus levels might be low, but potassium is typically medium to high. These soils might benefit from a lime application. Bent grasses are suitable for this area.

Southwestern Oregon (3):

Soils here include decomposed granite to black clay. Soil pH is in the low 6 with phosphorus and potassium at medium levels. Decomposed granite is infertile and requires complete fertilizers.

Central/Eastern Oregon (4, 5, 6):

Soils often are a sandy loam to silt. Phosphorus levels are normal, but potassium is usually high in this area. Calcium and magnesium are plentiful. Check the soil pH level. Some areas here may require additional iron.

Willamette Valley (2):

Mostly clay with balanced pH levels with adequate phosphorus, potassium, calcium and magnesium.

More Sources:

“Agricultural phosphorus management using the Oregon/Washington Phosphorus Indexes”

The P indexes are field scale qualitative assessment tools that are used to estimate the relative potential for P loss from a field to surface waters. The P Index uses source factors (quantity of P present) and transport factors (potential for P loss to surface water) to assess the site vulnerability to P loss.

This is a great source. It provides comparisons between East and West of the Cascades. It distinguishes between natural and commercial phosphorus and provides management options and goals.

<http://extension.oregonstate.edu/catalog/pdf/em/em8848-e.pdf>

“Maintaining a healthy lawn in western Oregon”

The fertilizer section provides a good chart for the timing of fertilizer application in Western Oregon by month. <http://extension.oregonstate.edu/lane/sites/default/files/documents/ec1521.pdf>

Regional Soils in Oregon

Willamette Valley:

In the Willamette Valley, the existing soil often is a silty clay or clay loam. These soils typically have a pH of 6, adequate to high phosphorus (P) levels, medium to high potassium (K) levels, and adequate levels of calcium and magnesium. Fertility wise, that is not a bad soil at all.

Most commonly planted turf grasses do just fine at a soil pH between 5.5 and 6.5. The only reason to lime this soil is to grow a mix containing a high percentage of Kentucky bluegrass. Otherwise there is no need for special fertilizer or lime when preparing most Valley soils.

Central/Eastern Oregon:

In central and eastern Oregon, soils are variable but often fall in the sandy loam to silt loam categories. Soil pH generally runs around 6.5. P levels generally are adequate, and potassium levels often are very high. Calcium and magnesium generally are more than adequate to grow healthy turf grass. With these soils, there is little need to do more than plant your grass.

Coastal Oregon:

On the Oregon coast, soils range from fine sands to subsoil clays and often have a pH in the range of 5.5/ P levels might be low to adequate but potassium levels often are medium to very high. Calcium and magnesium might be low to adequate.

Southwestern Oregon:

Southwestern Oregon has the most unusual soils in the state, ranging from decomposed granite to black clay. The clay soils are fine to work with when dry but impossible to work with when wet. Soil pH typically is in the low to mid 6 range, and P and potassium levels often are in the medium range. The decomposed granite soils can be quite infertile and might require regular applications of complete turf fertilizers.

<http://extension.oregonstate.edu/catalog/pdf/ec/ec1550.pdf>