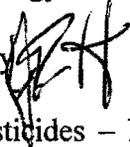


MEMORANDUM

June 11, 2015

TO: Transportation, Infrastructure, Energy and Environment Committee

FROM: Josh Hamlin, Legislative Attorney 

SUBJECT: **Worksession 3:** Bill 52-14, Pesticides – Notice Requirements – Non-Essential Pesticides – Prohibitions

Expected Attendees

Kelly Love, Urban Nutrient Management Specialist,
Maryland Department of Agriculture
Zack Kline, AOLCP, LICM, Owner
A.I.R. Lawn Care
Jody Fetzer, Green Management Coordinator
M-NCPPC – Montgomery Parks
Chip Osborne, President
Osborne Organics, LLC
Paul C. Chrostowski, Ph.D., QEP
Environmental Chemist, CPF Associates, Inc.

Bill 52-14, Pesticides – Notice Requirements – Non-Essential Pesticides – Prohibitions, sponsored by then Council Vice President Leventhal and Councilmembers Elrich, Riemer, Floreen, and Navarro was introduced on October 28. Public hearing on the Bill began on January 15, and was continued on February 12. The Transportation, Infrastructure, Energy and Environment (T&E) Committee has held worksessions on March 16 and March 30. An additional T&E Committee worksession will be scheduled at a later date.

Bill 52-14 would:

- (1) require posting of notice for certain lawn applications of pesticide;
- (2) prohibit the use of certain pesticides on lawns;
- (3) prohibit the use of certain pesticides on certain County-owned property;
- (4) require the County to adopt an integrated pest management program for certain County-owned property; and
- (5) generally amend County law regarding pesticides.

Background

Bill 52-14

Bill 52-14 includes provisions related to the application of pesticides on County-owned and private property, and requires the County to adopt an Integrated Pest Management (IPM) plan. IPM is a method of pest control which minimizes the use of chemical pesticides by focusing on pest identification, monitoring and assessing pest numbers and damage, and using a combination of biological, cultural, physical/mechanical and, when necessary, chemical management tools.¹ Council President Leventhal has explained the purpose of this Bill in his October 22, 2014 memorandum to Councilmembers (See ©14-17).²

Bill 52-14 will:

- 1) Require the posting of notice when a property owner applies a pesticide to an area of lawn more than 100 square feet, consistent with the notice requirements for when a landscaping business treats a lawn with a pesticide;
- 2) Require the Executive to designate a list of “non-essential” pesticides including:
 - all pesticides classified as “Carcinogenic to Humans” or “Likely to Be Carcinogenic to Humans” by the U.S. EPA;
 - all pesticides classified by the U.S. EPA as “Restricted Use Products;”
 - all pesticides classified as “Class 9” pesticides by the Ontario, Canada, Ministry of the Environment;
 - all pesticides classified as “Category 1 Endocrine Disruptors” by the European Commission; and
 - any other pesticides which the Executive determines are not critical to pest management in the County.
- 3) Generally prohibit the application of non-essential pesticides to lawns, with exceptions for noxious weed and invasive species control, agriculture and gardens, and golf courses;
- 4) Require the Executive to conduct a public outreach and education campaign before and during the implementation of the Bill;
- 5) Generally prohibit the application of non-essential and neonicotinoid pesticides to County-owned property; and
- 6) Require the County to adopt an Integrated Pest Management plan.

Bill 52-14 has an expiration date of January 1, 2019.

¹ <http://www.epa.gov/opp00001/factsheets/ipm.htm>

² For additional background on this Committee’s recent consideration of pesticides and pesticide use in Montgomery County, see the packet for the September 9, 2013 discussion at: http://www6.montgomerycountymd.gov/content/council/pdf/agenda/cm/2013/130909/20130909_TE3.pdf. Video of the discussion is available, beginning at 22:10, at: http://montgomerycountymd.granicus.com/MediaPlayer.php?view_id=6&clip_id=5704.

2015 legislation in the Maryland General Assembly

The Maryland General Assembly, in its 2015 session, considered two bills related to pesticides which have objectives similar to Bill 52-14. The bills would have: (1) imposed labeling requirements and future sale and use restrictions on neonicotinoid pesticides; and (2) prohibited, except in emergencies, the application of lawn care pesticides to certain areas used by children under the age of 18 years.

House Bill 605,³ cross-filed with Senate Bill 163, would have established a labeling requirement for any seed, plant material, nursery stock, annual plant, bedding plant, or other plant that has been treated with a neonicotinoid pesticide⁴ and would have established restrictions, effective January 1, 2016, on the sale and use of neonicotinoid pesticides. The future restrictions would have: (1) limited the use of neonicotinoid pesticides to applicators certified by the Maryland Department of Agriculture (MDA), and farmers using the pesticide for agricultural purposes; and (2) required a seller of neonicotinoid pesticides to be permitted by MDA to sell restricted-use pesticides. Neither bill advanced out of its respective committee assignment.

House Bill 995⁵ would have generally prohibited the application of certain pesticides on the grounds of certain child care centers, schools, and recreation centers and on certain other recreational fields. The prohibition would have applied to pesticides registered by the EPA and labeled pursuant to the FIFRA for use in lawn, garden, or ornamental sites and areas. A person would be able to apply for an emergency exemption from the prohibition when necessary to eliminate an immediate threat to human health. House Bill 995 did not advance out of committee.

Public Hearings and Correspondence

The Committee held public hearings on the Bill on January 15 and February 12, with 38 people testifying in January, and 30 speaking in February. In addition to the public hearing testimony, the Bill has been, and continues to be, the subject of a huge amount of written correspondence. The testimony and correspondence have coalesced around several recurring themes, which frame major issues for the Committee to examine as it considers the Bill. These themes include: (1) existing regulation of pesticides, particularly at the State and federal level is, or is not, sufficient; (2) chemical pesticides pose, or do not pose, serious threats to human health; (3) pesticides threaten, or do not threaten, the health of pollinators and the Chesapeake Bay watershed; and (4) it is, or is not, possible or feasible to maintain lawns and playing fields without the use of chemical pesticides.

³ <http://mgaleg.maryland.gov/webmga/frnMain.aspx?id=hb0605&stab=01&pid=billpage&tab=subject3&ys=2015RS>

⁴ The required label would read:

“WARNING: Bees are essential to many agricultural crops. This product has been treated with neonicotinoid pesticides, found to be a major contributor to bee deaths and the depletion of the bee population.”

⁵ <http://mgaleg.maryland.gov/webmga/frnMain.aspx?id=hb0995&stab=01&pid=billpage&tab=subject3&ys=2015RS>

March 16 Worksession

The T&E Committee held a worksession on Bill 52-14 on March 16. At that worksession, the Committee heard from regulators working at the County, State, and federal levels of government.⁶ Representatives of the County's Department of Environmental Protection, the Maryland Department of Agriculture, and the U.S. Environmental Protection Agency described the roles of their respective agencies in the regulation of pesticides in the County. A second panel at the March 16 worksession consisted of physicians with expertise in environmental health and toxicology, and an environmental chemist specializing in environmental and human risk assessment, with a focus on pesticides. The physicians, Dr. Jerome Paulson and Dr. Lorne Garrettson, informed the Committee of their views of the human health risks, particularly to children, of exposure to chemical pesticides. The chemist, Dr. Stuart Cohen, asserted that the testing protocols used by the EPA are sufficient to determine that registered pesticides are generally safe when used as directed.

March 30 Worksession

In its March 30 worksession, the Committee heard from experts in environmental impacts of pesticides and turf management, as well as public- and private-sector landscaping professionals. Two faculty members at the University of Maryland, Dr. Dennis vanEngelsdorp, an Assistant Professor of Entomology and Dr. Mark Carroll, an Assistant Professor of Plant Science and Landscape Architecture, spoke about pesticides and pollinator health and attenuation of pesticides applied to turf, respectively. Dr. Carroll directed the Committee to the Maryland Fertilizer Law, and its implications for compost application. The Committee also heard from representatives of the County Parks Department and the Director of Grounds and Environmental Management at the Maryland Soccerplex, about their current turf management practices. Chip Osborne, an expert in natural turf management, described how turf can be maintained without the use of chemical pesticides. Finally, the Committee heard from four landscaping professionals working in the County, using both traditional and chemical pesticide-free methods, about their practices and results.

Issues to Be Discussed at this Worksession

As with the two prior sessions, this worksession is geared toward providing the Committee with information it needs to fully consider the Bill. Issues for discussion at this worksessions include issues raised since the Bill was introduced: (1) is the County preempted under State law from implementing a ban on the lawn application of certain pesticides?: (2) what are the implications of the State's fertilizer law to pesticide-free lawn care?: (3) what are the specific criteria which lead to a particular pesticide's designation as "non-essential?"; and (4) how are other jurisdictions working to reduce or minimize pesticide use?

⁶ The packet for the March 16 worksession is at:
http://www.montgomerycountymd.gov/COUNCIL/Resources/Files/agenda/cm/2015/150316/20150316_TE1.pdf

State Preemption of a County Ban on Certain Pesticide Applications⁷

By letter to the Honorable Kirill Reznik dated April 1, 2015 (©38-43), Assistant Attorney General Kathryn M. Rowe of the Office of Counsel to the General Assembly provided advice on whether State law would preempt Montgomery County Bill 52-14. Ms. Rowe's view is "that the general ban on application of non-essential pesticides may well be preempted, but that other parts most likely would not be." Ms. Rowe sent a very similar letter, dated May 21, 2015, to Delegate Kumar Barve (©44-48), with a somewhat more forceful conclusion. In the May 21 letter, which contained essentially the same analysis as the April 1 letter, Ms. Rowe concluded: "It is my view that, to the extent that the bill bars application of a non-essential pesticide to a lawn, subject to certain exceptions, it is likely to be found to be preempted."⁸

As a general proposition, Council staff concurs with the view that "a court could conclude" that the County is preempted under State law from prohibiting the cosmetic use of pesticides on lawns, but believes that such a conclusion is far from certain. Indeed, given the existing Maryland case law, as well as the legislative history of the State pesticide law, staff believes that a very strong argument against implied preemption can be made. As such, staff does not agree with Ms. Rowe's modified conclusion, that preemption of a County prohibition of the application of certain pesticides in certain places is "likely."

Staff's view is based on a review of case law where Maryland courts have applied the implied preemption doctrine, as well as significant aspects of the legislative history of Maryland's pesticide law, including failed attempts in 1992, 1993 and 1994 to amend the law to expressly preempt local pesticide regulation. A finding of implied preemption in this instance would go beyond what Maryland appellate courts have held in local preemption cases, and would mark a departure from the "concurrent power" doctrine adhered to since 1969. Further, the failed attempts at express preemption in the early 1990s seem to be evidence of the General Assembly's understanding that the law was not preemptive, and an expression of intent not to preempt more restrictive local regulation of pesticides. While acknowledging the risk of an adverse determination, staff believes that the Council is on solid ground proceeding with the Bill's current provisions.

⁷ A full memorandum on the issue of implied preemption and Bill 52-14 is at ©26-37.

⁸ On the basis of Ms. Rowe's conclusion in the April 1 letter to Delegate Reznik, Councilmember Berliner sent a letter dated May 28, 2015 to Attorney General Brian Frosh (©49-50), inquiring as to whether certain other measures would be preempted under State law. These measures included: (1) additional reporting requirements for pesticide applicators in Montgomery County; (2) requirement of a document signed by customers that identifies the reported health risks associated with pesticides, acknowledges that organic alternatives exist, and directs (or not) a lawn care provider to adhere to IPM practices; (3) a requirement that condominium and homeowners' associations have an affirmative vote of the unit or homeowners before applying pesticides; and (4) additional reporting requirements for pesticide applications to areas where children are frequently present. By letter dated June 5, 2015 (©51-52), from Adam D. Snyder, Chief Counsel, Opinions and Advice, the Office of the Attorney General respectfully declined Councilmember Berliner's request.

Maryland Fertilizer Law

At the March 30 worksession, Dr. Mark Carroll of the University of Maryland mentioned the impact the Maryland Commercial Fertilizer Law⁹ on the use of compost, in the context of the Glenstone project. Compost is often used as a soil additive to improve plant health and diminish reliance on chemical pesticides. However, compost often contains certain nutrients that are limited by the Fertilizer Law, and these limits may have the effect of severely restricting compost applications that are an important part of a pesticide-free lawn care program.¹⁰

Maryland substantially amended its fertilizer law in 2011, with key provisions taking effect in October, 2013 aimed at protecting the Chesapeake Bay from harmful excess nutrient runoff. The amendments targeted runoff from urban sources such as golf courses, parks and athletic fields, businesses, and residential lawns. The law regulates both the labelling and sale of lawn fertilizer products and the application of fertilizer by licensed and certified professional applicators. Dr. Carroll raised an issue related to the law's limits on the amount of soluble nitrogen and phosphorous contained in fertilizer applications, and the prospect that these limits would preclude the use of compost as it was used at Glenstone. The law's key provisions related to fertilizer applications *by professionals* include:

- Lawn fertilizer may not be applied to impervious surfaces and frozen ground;
- Fertilizer may not be applied within 15 feet of waterways, unless applied with a drop spreader, rotary spreader with deflector, or targeted spray liquid (in which case, the buffer area is 10 feet);
- Lawn fertilizer may not be applied between December 1 and March 1, and only water soluble nitrogen may be applied to lawns between November 16 and December 1 (at a maximum rate of ½ pound per 1,000 square feet);
- Professionals must take soil tests for each new customer and then once every three years;
- A single application must not exceed 0.9 pounds total nitrogen per 1,000 square feet and 0.7 pounds of soluble nitrogen per 1,000 square feet, unless “enhanced efficiency fertilizer”¹¹ is being used.
- Each application of natural organic¹² or organic¹³ fertilizer must not exceed more than 0.25 pounds of phosphorous per 1,000 square feet with an annual maximum of 0.5 pounds of phosphorous per 1,000 square feet.

⁹ MD Agriculture Code §§ 6-201 through 6-224.

¹⁰ Responsible Industry for a Sound Environment (RISE), the national trade association representing manufacturers, formulators, distributors, and other industry leaders involved with pesticides, submitted a document illustrating the potential problem for organic lawn care. The document is at ©53, and information about RISE can be found at: <http://www.pestfacts.org/>

¹¹ “Enhanced efficiency fertilizer means a fertilizer product that increases plant uptake and decreases the potential of nutrient loss to the environment, including gaseous loss, leaching, or runoff, when compared to an appropriate reference fertilizer product.” MD Agriculture Code § 6-201(i).

¹² “Natural organic fertilizer” means “a fertilizer product that is derived from either a plant or animal product containing carbon, and one or more elements, other than hydrogen or oxygen, that are essential for plant growth,” but “does not include a fertilizer product that contains synthetic materials or materials that are changed in any physical or chemical manner from their initial state, except by physical manipulation, including drying, cooking, chopping, grinding, shredding, or pelleting.” MD Agriculture Code § 6-201(u).

¹³ “Organic fertilizer” means a fertilizer product that is derived from either a plant or animal product containing carbon, and one or more elements, other than hydrogen or oxygen, that are essential for plant growth,” and “includes a fertilizer

- Enhanced efficiency fertilizer applications must not exceed 2.5 pounds total nitrogen per 1,000 feet per year, must not result in an application of more than 80% of the annual recommended rate for total nitrogen established by the University of Maryland, and must have a release rate not more than 0.7 pounds of nitrogen per 1,000 square feet.

Speakers:

- Kelly Love, an Urban Nutrient Management Specialist with the Maryland Department of Agriculture (MDA), is expected to attend this worksession, and will be able to discuss the key provisions of the law, and its implications with regard to compost use. MDA background materials are at ©54-61.
- Chip Osborne, of Osborne Organics, and Zack Kline of A.I.R. Lawn Care are also expected to attend, and will describe the law's implications from the standpoint of pesticide-free lawn-care practitioners. Mr. Osborne's work includes the maintenance of the Maryland State House grounds, and Mr. Kline operates a County-based business providing lawn care to both commercial and residential properties. Mr. Kline's materials are at ©62-63 and Mr. Osborne's background materials are at ©64-73.
- Jody Fetzer, Green Management Coordinator for Montgomery Parks will share the Parks Department's experience and perspective on this issue.

“Non-essential Pesticides” Under Bill 52-14

Bill 52-14 would require the Executive to establish a list of “non-essential pesticides” that would be subject to the use restrictions contained in the Bill. The list of non-essential pesticides would be composed of: (1) all pesticides classified as “Carcinogenic to Humans” or “Likely to Be Carcinogenic to Humans” by the U.S. EPA; (2) all pesticides classified by the U.S. EPA as “Restricted Use Products;” (3) all pesticides classified as “Class 9” pesticides by the Ontario, Canada, Ministry of the Environment; (4) all pesticides classified as “Category 1 Endocrine Disruptors” by the European Commission; and (5) any other pesticides which the Executive determines are not critical to pest management in the County. Each of the sub-lists which make up the list of non-essential pesticides is discussed below.

EPA Carcinogenicity List¹⁴

EPA reviews each pesticide chemical for its carcinogenic potential to humans when it is proposed for registration. When assessing possible cancer risk posed by a pesticide, EPA considers how strongly carcinogenic the chemical is (its potency) and the potential for human exposure. The pesticides are evaluated not only to determine if they cause cancer in laboratory animals, but also as to their potential to cause human cancer. For any pesticide classified as a potential carcinogen, the risk would depend on the extent to which a person might be exposed

product that contains no more than 50% synthetic materials and in which more than half the sum of the guaranteed primary nutrient percentages is derived from organic materials, or materials that are changed in a physical or chemical manner from their initial state.” MD Agriculture Code § 6-201(w).

¹⁴ http://npic.orst.edu/chemicals_evaluated.pdf

(how much time and to what quantity of the pesticide). The factors considered include short-term studies, long-term cancer studies, mutagenicity studies, and structure activity concerns.¹⁵

The hierarchy of classifications for carcinogenic potential,¹⁶ from highest to lowest, are:

1. Carcinogenic to Humans
2. Likely to be Carcinogenic in Humans
3. Suggestive Evidence of Carcinogenic Potential
4. Inadequate Information to Assess Carcinogenic Potential
5. Not Likely to be Carcinogenic to Humans

As mentioned above, “non-essential pesticides” under Bill 52-14 include pesticides designated as “Carcinogenic to Humans” or “Likely to Be Carcinogenic to Humans.”

A pesticide may be classified as “Carcinogenic to Humans” used when all of the following conditions are met:

- there is strong evidence of an association between human exposure and either cancer or the key precursor events of the pesticide’s mode of action but not enough for a causal association, and
- there is extensive evidence of carcinogenicity in animals, and
- the mode(s) of carcinogenic action and associated key precursor events have been identified in animals, and
- there is strong evidence that the key precursor events that precede the cancer response in animals are anticipated to occur in humans and progress to tumors, based on available biological information.

A designation as “Likely to be Carcinogenic to Humans” is appropriate when the weight of the evidence is adequate to demonstrate carcinogenic potential to humans, but does not reach the weight of evidence for a designation of “Carcinogenic to Humans.” A broad range of evidence may support a “Likely to be Carcinogenic to Humans,” and may include:

- a plausible (but not definitively causal) association between human exposure and cancer, in most cases with some supporting biological, experimental evidence, though not necessarily carcinogenicity data from animal experiments;
- positive tests in animal experiments in more than one species, sex, strain, site, or exposure route, with or without evidence of carcinogenicity in humans;

¹⁵ It should be noted that there is sometimes inconsistency between EPA’s classification and that of other evaluating entities, often because of the cyclical nature of these evaluations. For instance, EPA has classified glyphosate as “Group E - Evidence of Noncarcinogenicity for Humans,” while the World Health Organization’s International Agency for Research on Cancer has recently classified it as “probably carcinogenic to humans.” See ©74-77. EPA’s evaluation was done in 1991, and the “Group E” classification is no longer used, but is generally equivalent to the lowest-risk current classification, “not likely to be carcinogenic to humans.”

¹⁶ More than one classification may be used when a pesticide’s effects differ by dose or means of exposure. For example, a pesticide may be “Carcinogenic to Humans” by one means of exposure, but “Not Likely to Be Carcinogenic” by a different means of exposure by which it is not absorbed. Also, a pesticide could be “Likely to Be Carcinogenic” above a specified dose but “Not Likely to Be Carcinogenic” below that dose.

- a positive tumor study that raises additional biological concerns beyond that of a statistically significant result, for example, a high degree of malignancy, or an early age at onset;
- a rare animal tumor response in a single experiment that is assumed to be relevant to humans; or
- a positive tumor study that is strengthened by other lines of evidence, for example, either plausible (but not definitively causal) association between human exposure and cancer or evidence that the agent or an important metabolite causes events generally known to be associated with tumor formation (such as DNA reactivity or effects on cell growth control) likely to be related to the tumor response in this case.

EPA Restricted Use Products¹⁷

A pesticide that, when applied in accordance with its directions for use, has a higher risk/probability to cause unreasonable adverse effects on the environment, or that the acute dermal or inhalation toxicity of the pesticide presents a hazard to the applicator and/or other persons, is designated as a “restricted use product.”¹⁸ Restricted use pesticides make up about a quarter of total pesticides used and may be applied only by, or under the direct supervision of, trained and certified applicators. These products not available to the general public.

Ontario “Class 9” Pesticides¹⁹

The province of Ontario, Canada has regulated pesticides pursuant to its “Pesticides Act” since 1990. The Pesticides Act includes a classification system for pesticides to regulate the sale, use, transportation, storage, and disposal of pesticides in Ontario. In 2008, the Ontario legislature passed the “Cosmetic Pesticides Ban Act,”²⁰ which added a new classification (“Class 9”) of pesticide ingredients, the use and sale of which is generally prohibited. In general, pesticides cannot be used for cosmetic purposes on lawns, vegetable and ornamental gardens, patios, driveways, cemeteries, and in parks and school yards. Class 9 pesticides include 119 substances that are active ingredients in lawn and garden pesticides, and is part of a scheme that includes 11 classifications.²¹ The classifications are as follows:

- Class 1 pesticides are products intended for manufacturing purposes;
- Class 2, 3 and 4 pesticides are restricted or commercial products;
- Class 5, 6 and 7 pesticides are domestic products intended for household use;
- Class 8 pesticides are banned for sale;
- Class 9 pesticides are banned for use unless used under an exception to the ban;
- Class 10 pesticides are allowed for use under the promotion of public health or safety exception; and

¹⁷ <http://www.epa.gov/opprd001/rup/rupreport-sec3-update.pdf>

¹⁸ FIFRA sec. 3(d)(1)(C); 7 U.S.C.A. § 136a(d)

¹⁹ <http://docs.files.ontario.ca/documents/4325/class-9-pesticides-march-27-2015.pdf>

²⁰ <http://news.ontario.ca/ene/en/2009/03/ontarios-cosmetic-pesticides-ban.html>

²¹ Ontario is currently considering a proposal to specifically classify and regulate neonicotinoid pesticides by adding a 12th class of pesticides. See: <http://news.ontario.ca/ene/en/2015/03/proposed-new-requirements-for-neonicotinoid-pesticides-to-protect-pollinators.html>

- Class 11 pesticides are biopesticides or “lower-risk” pesticides generally allowed for cosmetic uses under the ban.

European Commission “Category 1 Endocrine Disruptors”²²

The endocrine system is a collection of glands that produce hormones that regulate the body's growth, metabolism, and sexual development and function. The hormones are released into the bloodstream and transported to tissues and organs throughout the body. *Endocrine disruptors* are chemicals that may interfere with the body's endocrine system and produce adverse developmental, reproductive, neurological, and immune effects in both humans and wildlife.²³

The European Commission has commissioned a series of studies, and established a list of priority substances for further evaluation of their role in endocrine disruption.²⁴ An initial list was assembled from lists of 'suspected endocrine disruptors' published by various organizations, supplemented by a search of the scientific literature to identify reports and papers describing effects suggestive of endocrine disrupting activity for specific chemicals. Multiple studies were conducted, and clear evidence of endocrine disrupting activity was noted for 194 substances, which were assigned Category 1 status.²⁵ It should be noted that the majority of these substances are not used as pesticides. The City of Takoma Park's Safe Grow Ordinance bans cosmetic use of Category 1 endocrine disruptors, and its current list of pesticides subject to this restriction is at ©94.

Speaker:

- Dr. Paul Chrostowski, an environmental chemist familiar with all of the above lists and pesticide risk assessment generally, will discuss with the merits and possible drawbacks of relying on the lists in determining what pesticides should be deemed “non-essential. Dr. Chrostowski's brief resume and background materials are at ©78-93.

Pesticide Reduction Approaches in Other Jurisdictions

Due to the fact that the vast majority of states have preempted local jurisdictions from regulating pesticides, there are only two examples of local jurisdictions that have banned pesticide use on public *and* private property²⁶: Takoma Park, Maryland²⁷, and Ogunquit, Maine.²⁸ Several local jurisdictions have enacted legislation or adopted administrative policies related to pesticide

²² http://ec.europa.eu/environment/chemicals/endocrine/pdf/bkh_report.pdf#page=128

²³ <http://www.niehs.nih.gov/health/topics/agents/endocrine/>

²⁴ http://ec.europa.eu/environment/chemicals/endocrine/strategy/substances_en.htm

²⁵ The designations of chemicals on the list are: Category 1 - evidence of endocrine disrupting activity in at least one species using intact animals; Category 2 - at least some in vitro evidence of biological activity related to endocrine disruption; and Category 3 - no evidence of endocrine disrupting activity or no data available.

²⁶ <http://www.telegraph.co.uk/news/worldnews/10959057/End-of-the-perfect-American-lawn-Campaigners-call-for-pesticide-ban.html>

²⁷ <http://www.takomaparkmd.gov/safegrow>

²⁸ http://ogunquitconservation.org/ogunquitconservation.org/Pesticide_Ordinance_Overview.html

reduction on public property, integrated pest management (IPM), and pesticide free parks.²⁹ Locally, in addition to Takoma Park, the District of Columbia enacted the Pesticide Education and Control Amendment Act Of 2012³⁰ which restricts the application of certain pesticides near waterways, at schools, day care centers and on District property, and imposes certain reporting and data collection requirements.

San Francisco's IPM law³¹ represents a good example of a local pesticide reduction program implemented in a jurisdiction preempted from regulating pesticide use on private property. The San Francisco law, enacted in 1996, requires an IPM program be used, preference be given to nonpesticide methods of pest control, and permits the use of only "reduced risk"³² pesticides on City property. San Francisco's Environment Commission also provides information to residents on safer pest control methods that might be available, including desired contract language and techniques, as well as pesticide-related illnesses.³³ California State law requires Homeowners' Associations to provide notice to HOA members and residents of pesticide applications.³⁴

Beyond IPM, several jurisdictions have implemented pesticide-free parks on public property. Seattle has maintained 14 parks in the city without the use of any pesticides since 2001, and is expanding the program to include eight more parks and about 25 more acres, for a total of 22 parks and about 50 acres. These pesticide-free parks are distributed geographically throughout the city and are being used by Parks to help develop and test sustainable maintenance practices and design guidelines. Pesticide-free parks are part of Seattle's overall pesticide reduction plan.³⁵

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²⁹ <http://www.beyondpesticides.org/lawn/activist/>

³⁰ The signed Act is at: <http://lms.dccouncil.us/Download/26399/B19-0643-SignedAct.pdf>. The Committee report is at: <http://lms.dccouncil.us/Download/2594/B19-0643-COMMITTEEREPORT.pdf>

³¹ [http://www.amlegal.com/nxt/gateway.dll/California/environment/chapter3integratedpestmanagementprogram?f=templates\\$fn=default.htm\\$3.0\\$vid=amlegal:sanfrancisco_ca](http://www.amlegal.com/nxt/gateway.dll/California/environment/chapter3integratedpestmanagementprogram?f=templates$fn=default.htm$3.0$vid=amlegal:sanfrancisco_ca)

³² http://www.sfenvironment.org/sites/default/files/fliers/files/sfe_reduced_risk_pesticide_list_2015_finaldraft.pdf

³³ http://www.sfenvironment.org/sites/default/files/fliers/files/sfe_th_reducedriskpesticidelist.pdf

³⁴ <http://hoalaw.tinnellylaw.com/2014/01/hoa-compliance-with-california.html>

³⁵ <http://www.seattle.gov/environment/trees-and-green-space/pesticide-reduction>

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Bill No. 52-14
Concerning: Pesticides – Notice
Requirements – Non-essential
Pesticides – Prohibitions
Revised: October 22, 2014
Draft No. 9
Introduced: October 28, 2014
Expires: April 28, 2016
Enacted: _____
Executive: _____
Effective: _____
Sunset Date: January 1, 2019
Ch. _____, Laws of Mont. Co. _____

COUNTY COUNCIL FOR MONTGOMERY COUNTY, MARYLAND

By: Council Vice President Leventhal and Councilmembers Elrich, Riemer, Floreen, and Navarro

AN ACT to:

- (1) require posting of notice for certain lawn applications of pesticide;
- (2) prohibit the use of certain pesticides on lawns;
- (3) prohibit the use of certain pesticides on certain County-owned property
- (4) require the County to adopt an integrated pest management program for certain County-owned property; and
- (5) generally amend County law regarding pesticides.

By amending

Montgomery County Code
Chapter 33B, Pesticides
Sections 33B-1, 33B-2, 33B-3, 33B-4, 33B-5, 33B-6, and 33B-7

By adding

Montgomery County Code
Chapter 33B, Pesticides
Articles 2, 3, 4, and 5
Sections 33B-8, 33B-9, 33B-10, 33B-11, 33B-12, and 33B-13

Boldface	<i>Heading or defined term.</i>
<u>Underlining</u>	<i>Added to existing law by original bill.</i>
[Single boldface brackets]	<i>Deleted from existing law by original bill.</i>
<u>Double underlining</u>	<i>Added by amendment.</i>
[[Double boldface brackets]]	<i>Deleted from existing law or the bill by amendment.</i>
* * *	<i>Existing law unaffected by bill.</i>

The County Council for Montgomery County, Maryland approves the following Act:

27 (4) uses non-chemical pest-control methods and the careful use of
 28 least-toxic chemical methods when non-chemical methods have
 29 been exhausted or are not feasible.

30 Larvicide means a pesticide designed to kill larval pests.

31 *Lawn* means an area of land, except agricultural land, that is:

32 (1) [Mostly] mostly covered by grass, other similar herbaceous
 33 plants, shrubs, or trees; and

34 (2) [Kept] kept trim by mowing or cutting.

35 Lawn includes an athletic playing field other than a golf course. Lawn does
 36 not include a garden.

37 Neonicotinoid means a class of neuro-active pesticides chemically related to
 38 nicotine. Neonicotinoid includes acetamiprid, clothianidin, dinotefuran,
 39 imidacloprid, nitenpyram, nithiazine, thiacloprid, and thiamethoxam.

40 Non-essential pesticide means a pesticide designated as a non-essential
 41 pesticide under Section 33B-4.

42 *Pest* means an insect, snail, slug, rodent, nematode, fungus, weed, or other
 43 form of plant or animal life or microorganism (except a microorganism on or
 44 in a living human or animal) that is normally considered to be a pest or defined
 45 as a pest by applicable state regulations.

46 *Pesticide* means a substance or mixture of substances intended or used to:

- 47 (1) prevent, destroy, repel, or mitigate any pest;
- 48 (2) be used as a plant regulator, defoliant, or desiccant; or
- 49 (3) be used as a spray adjuvant, such as a wetting agent or adhesive.

50 However, *pesticide* does not include an antimicrobial agent, such as a
 51 disinfectant, sanitizer, or deodorizer, used for cleaning that is not considered a
 52 pesticide under any federal or state law or regulation.

53 Private lawn application means the application of a pesticide to a lawn on
 54 property owned by or leased to the person applying the pesticide. Private
 55 lawn application does not include:

- 56 (1) applying a pesticide for the purpose of engaging in agriculture;
- 57 (2) applying a pesticide around or near the foundation of a building
 58 for purpose of indoor pest control;
- 59 (3) applying a pesticide to a golf course or turf farm.

60 Vector means an animal, insect, or microorganism that carries and transmits an
 61 infectious pathogen into another organism.

62 **[33B-4.] 33B-2. Signs with retail purchase of pesticide.**

63 A person who sells at retail a pesticide or material that contains a pesticide
 64 must make available to a person who buys the pesticide or material that contains a
 65 pesticide:

- 66 (a) [Notice] notice signs and supporting information that are approved by
 67 the [department] Department; and
- 68 (b) [The] the product label or other information that the federal Insecticide,
 69 Fungicide, and Rodenticide Act (FIFRA) [, 7 U.S.C. 136 et seq.,]
 70 requires for sale of the pesticide.

71 The Department must enforce this Section and must annually inspect each
 72 person who sells at retail a pesticide or material that contains a pesticide.

73 **[33B-5] 33B-3. Storage and handling of pesticides.**

74 * * *

75 **[33B-6] 33B-4. Regulations.**

- 76 (a) The [County] Executive must adopt regulations to carry out this Chapter
 77 under method (2).

78 (b) The Executive must include in the regulations adopted under this
 79 [section] Section the minimum size or quantity of pesticide subject to
 80 [section 33B-4] Section 33B-2.

81 (c) The Executive must include in the regulations adopted under this
 82 Section a list of non-essential pesticides. The list of non-essential
 83 pesticides must include:

84 (1) all pesticides classified as “Carcinogenic to Humans” or “Likely
 85 to Be Carcinogenic to Humans” by the U.S. Environmental
 86 Protection Agency;

87 (2) all pesticides classified by the U.S. Environmental Protection
 88 Agency as a “Restricted Use Product”;

89 (3) all pesticides classified as a “Class 9” pesticide by the Ontario,
 90 Canada, Ministry of the Environment;

91 (4) all pesticides classified as a “Category 1 Endocrine Disruptor” by
 92 the European Commission; and

93 (5) any other pesticides which the Executive determines are not
 94 critical to pest management in the County.

95 (d) The Executive must include in the regulations adopted under this
 96 Section a list of invasive species that may be detrimental to the
 97 environment in the County.

98 (e) The Executive must review and update the lists of non-essential
 99 pesticides and invasive species designated under subsections (c) and (d)
 100 by July 1 of each year.

101 **[33B-7] 33B-5. Penalty for violating chapter.**

102 (a) Any violation of this Chapter is a class C violation.

103 (b) Each day a violation continues is a separate offense.

104 **ARTICLE 2. Notice Requirements.**

105 **[33B-2] 33B-6. Notice about pesticides to customer.**106 (a) In this [section] Section:107 (1) Customer means a person who makes a contract with a custom
108 applicator to have the custom applicator apply a pesticide to a
109 lawn.110 (2) New customer includes a customer who renews a contract with a
111 custom applicator.

112 (b) A custom applicator must give to a new customer:

113 (1) [Before] before application, a list of:114 [a.](A) [The] the trade name of each pesticide that might be
115 used;116 [b.](B) [The] the generic name of each pesticide that might
117 be used; and118 [c.](C) [Specific] specific customer safety precautions for
119 each pesticide that might be used; and120 (2) [After] after application, a list of:121 [a.](A) [The] the trade name of each pesticide actually used;
122 and123 [b.](B) [The] the generic name of each pesticide actually
124 used; and125 (3) [A] a written notice about pesticides prepared by the [department]
126 Department under subsection (c) [of this section].127 (c) The [department] Department must prepare, keep current, and provide
128 to a custom applicator a written notice about pesticides for the custom
129 applicator to give to a customer under subsection (b) [of this section].130 (d) The notice prepared by the [department] Department under subsection
131 (c) [of this section] must include:

- 132 (1) [Government] government agency phone numbers to call to:
 133 [a.](A) [Make] make a consumer complaint;
 134 [b.](B) [Receive] receive technical information on
 135 pesticides; and
 136 [c.](C) [Get] get assistance in the case of a medical
 137 emergency;
- 138 (2) [A] a list of general safety precautions a customer should take
 139 when a lawn is treated with a pesticide;
- 140 (3) [A] a statement that a custom applicator must:
 141 [a.](A) [Be] be licensed by the Maryland Department of
 142 Agriculture; and
 143 [b.](B) [Follow] follow safety precautions; and
- 144 (4) [A] a statement that the customer has the right to require the
 145 custom applicator to notify the customer before each treatment of
 146 the lawn of the customer with a pesticide.

147 **[33B-3] 33B-7. Posting signs after application by custom applicator.**

- 148 (a) Immediately after a custom applicator treats a lawn with a pesticide, the
 149 custom applicator must [post a sign on the lawn] place markers within
 150 or along the perimeter of the area where pesticides will be applied.
- 151 (b) A [sign posted] marker required under this [section] Section must:
- 152 (1) [Be] be clearly visible [from the principal place of access to] to
 153 persons immediately outside the perimeter of the property;
- 154 (2) [Be] be a size, form, and color approved by the [department]
 155 Department;
- 156 (3) [Be] be made of material approved by the [department]
 157 Department; [and]

- 158 (4) [Have] have wording with content and dimensions approved by
 159 the [department] Department[.]; and
 160 (5) be in place on the day that the pesticide is applied.

161 **33B-8. Posting signs after application by property owner or tenant.**

- 162 (a) A person who performs a private lawn application treating an area
 163 more than 100 square feet must place markers within or along the
 164 perimeter of the area where pesticides will be applied.
 165 (b) A marker required under this Section must:
 166 (1) be clearly visible to persons immediately outside the perimeter of
 167 the property;
 168 (2) be a size, form, and color approved by the Department;
 169 (3) be made of material approved by the Department; and
 170 (4) have wording with content and dimensions approved by the
 171 Department; and
 172 (5) be in place on the day that the pesticide is applied.

173 **ARTICLE 3. Application restrictions.**

174 **33B-9. Prohibited application.**

175 A person must not apply a non-essential pesticide to a lawn.

176 **33B-10. Exceptions and Exemptions.**

- 177 (a) A person may apply a non-essential pesticide for the following
 178 purposes:
 179 (1) for the control of weeds as defined in Chapter 58, Weeds;
 180 (2) for the control of invasive species listed in a regulation adopted
 181 under Subsection 33B-4(d);
 182 (3) for pest control while engaged in agriculture; and
 183 (4) for the maintenance of a golf course.

184 (b) A person may apply to the Director for an exemption from the
185 prohibition of Section 33B-9 for a non-essential pesticide. The Director
186 may grant an exemption to apply a non-essential pesticide on property
187 where application is prohibited under Section 33B-9 if the applicant
188 shows that:

189 (1) effective alternatives are unavailable;

190 (2) granting an exemption will not violate State or federal law; and

191 (3) use of the non-essential pesticide is necessary to protect human
192 health or prevent significant economic damage.

193 (c) A person may apply to the Director for an emergency exemption from
194 the prohibition in Section 33B-9 if a pest outbreak poses an imminent
195 threat to public health or if significant economic damage would result
196 from the inability to use a pesticide prohibited by Section 33B-9. The
197 Director may impose specific conditions for the granting of emergency
198 exemptions.

199 **33B-11. Outreach and Education Campaign.**

200 The Executive must implement a public outreach and education campaign
201 before and during implementation of the provisions of this Article. This campaign
202 should include:

203 (a) informational mailers to County households;

204 (b) distribution of information through County internet and web-based
205 resources;

206 (c) radio and television public service announcements;

207 (d) news releases and news events;

208 (e) information translated into Spanish, French, Chinese, Korean,
209 Vietnamese, and other languages, as needed;

- 210 (f) extensive use of County Cable Montgomery and other Public,
- 211 Educational, and Government channels funded by the County; and
- 212 (g) posters and brochures made available at County events, on Ride-On
- 213 buses and through Regional Service Centers, libraries, recreation
- 214 facilities, senior centers, public schools, Montgomery College, health
- 215 care providers, hospitals, clinics, and other venues.

ARTICLE 4. County Property

33B-12. Prohibition on County-owned property.

- 218 (a) *Prohibition.* Except as provided in subsection (b), a person must not
- 219 apply to any property owned by the County:
- 220 (1) a non-essential pesticide; or
- 221 (2) a nionicotinoid.
- 222 (b) *Exceptions.*
- 223 (1) A person may use any larvicide or rodenticide on property owned
- 224 by the County as a public health measure to reduce the spread of
- 225 disease vectors under recommendations and guidance provided
- 226 by the Centers for Disease Control and Prevention, the United
- 227 States Environmental Protection Agency, or the State Department
- 228 of Agriculture. Any rodenticide used must be in a tamper-proof
- 229 product, unless the rodenticide is designed and registered for a
- 230 specific environment inaccessible to humans and pets.
- 231 (2) A person may use a non-essential pesticide or neonicotinoid for
- 232 the purposes set forth in Subsection 33B-10(a).
- 233 (3) A person may use a non-essential pesticide or neonicotinoid on
- 234 property owned by the County if the Director determines, after
- 235 consulting the Directors of General Services and Health and
- 236 Human Services, that the use of pesticide is necessary to protect

237 human health or prevent imminent and significant economic
238 damage, and that no reasonable alternative is available. If a
239 pesticide is used under this paragraph, the Director must, within
240 30 days after using the pesticide, report to the Council on the
241 reasons for the use of the pesticide.

242 **33B-13. Integrated pest management.**

243 (a) Adoption of program. The Department must adopt, by a method (2)
244 regulation, an integrated pest management program for property owned
245 by the County.

246 (b) Requirements. Any program adopted under subsection (a) must require:

- 247 (1) monitoring the turf or landscape;
248 (2) accurate record-keeping documenting any potential pest problem;
249 (3) evaluating the site for any injury caused by a pest and
250 determining the appropriate treatment;
251 (4) using a treatment that is the least damaging to the general
252 environment and best preserves the natural ecosystem;
253 (5) using a treatment that will be the most likely to produce long-
254 term reductions in pest control requirements and is operationally
255 feasible and cost effective in the short and long term;
256 (6) using a treatment that minimizes negative impacts to non-target
257 organisms;
258 (7) using a treatment that is the least disruptive of natural controls;
259 (8) using a treatment that is the least hazardous to human health; and
260 (9) exhausting the list of all non-chemical and organic treatments
261 available for the targeted pest before using any synthetic
262 chemical treatments.

263 (c) The Department must provide training in integrated pest management
264 for each employee who is responsible for pest management.

265 **Sec. 2. Initial Lists of Non-Essential Pesticides and Invasive Species.** The
266 Executive must submit the lists of non-essential pesticides and invasive species
267 required by Subsections 33B-4(c) and (d) to the Council for approval by October 1,
268 2015.

269 **Sec. 3. Effective Date.** The prohibitions on use of non-essential pesticides
270 contained in Section 33B-9 and the prohibitions on use of non-essential pesticides
271 and neonicotinoids contained in Section 33B-12 take effect on January 1, 2016.

272 **Sec. 4. Expiration.** This Act and any regulation adopted under it expires on
273 January 1, 2019.

274 *Approved:*

275 _____
George Leventhal, President, County Council Date

276 *Approved:*

277 _____
Isiah Leggett, County Executive Date

278 *This is a correct copy of Council action.*

279 _____
Linda M. Lauer, Clerk of the Council Date

LEGISLATIVE REQUEST REPORT

Bill 52-14

Pesticides – Notice Requirements – Non-Essential Pesticides - Prohibitions

DESCRIPTION:	This Bill would require posting of notice for certain lawn applications of pesticide, prohibit the use of certain pesticides on lawns, prohibit the use of certain pesticides on certain County-owned property and require the County to adopt an integrated pest management program for certain County-owned property.
PROBLEM:	Long term use of and exposure to certain chemical pesticides has been linked to several health problems, including birth defects, cancer, neurological problems, immune system problems, and male infertility.
GOALS AND OBJECTIVES:	To protect the health of families, especially children, from the unnecessary risks associated with the use of certain pesticides that have been linked to a wide-range of diseases.
COORDINATION:	Department of Environmental Protection
FISCAL IMPACT:	To be requested.
ECONOMIC IMPACT:	To be requested.
EVALUATION:	To be requested.
EXPERIENCE ELSEWHERE:	To be researched.
SOURCE OF INFORMATION:	Josh Hamlin, Legislative Attorney
APPLICATION WITHIN MUNICIPALITIES:	To be researched.
PENALTIES:	Class C violation



MONTGOMERY COUNTY COUNCIL
ROCKVILLE, MARYLAND

GEORGE LEVENTHAL
COUNCILMEMBER
AT-LARGE

MEMORANDUM

October 22, 2014

TO: Councilmembers

FROM: George Leventhal, Council Vice President *George Leventhal*

SUBJECT: Pesticide Legislation

This coming Tuesday, October 28, I will be introducing legislation aimed at protecting the health of families – and especially children - from the unnecessary risks associated with the use of certain cosmetic pesticides that have been linked to a wide-range of diseases, and which provide no health benefits.

As you know, for the better part of the last year, I have been working towards introducing legislation on this matter. Since the September 2013 meeting of the T&E committee, I have met with countless stakeholders, on both sides of the issue, to learn more about how pesticides are being applied in the county, what other governments are doing to ensure that the public's health is being protected, and what the latest research tells us about their risks. The legislation that I am introducing on Tuesday incorporates feedback I received from proponents and opponents on the previous draft of the bill, which I shared with your offices back in May. The result is a bill that balances the rights of homeowners to maintain a beautiful lawn with the rights of residents who prefer to not be exposed to chemicals that have known health effects; I view this bill as a starting point in our discussion which can be tweaked along the way.

I want to preface my concerns by affirming the value of pesticides when they are used to protect public health, the environment, our food or our water supply, but when pesticides are used solely to improve the appearance of landscapes, they can cause more harm than good. In my view, cosmetic pesticides present a substantial threat to the health of today's children. The American Academy of Pediatrics states that children face the greatest risk from the chemicals they contain, and that epidemiologic evidence demonstrates associations between early life exposure to pesticides and pediatric cancers, decreased cognitive function and behavioral problems such as ADHD.¹ Certain toxic chemicals can cause permanent brain damage in children even at low levels of exposure that would have little to no adverse effect in an adult.² A child doesn't even

¹ *Pediatrics*, Pesticide Exposure in Children, Volume 130, No. 6, 1757 – 1763, December, 2012

² Dr. Phillippe Grandjean, MD, Dr. Phillip Landrigan, MD, *The Lancet Neurology*, Neurobehavioral Effects of Developmental Toxicity, Volume 13, Issue 3, 330-338, March 2014

STELLA B. WERNER OFFICE BUILDING • 100 MARYLAND AVENUE, 6TH FLOOR, ROCKVILLE, MARYLAND 20850
240/777-7811 OR 240/777-7900, TTY 240/777-7914, FAX 240/777-7989
WWW.MONTGOMERYCOUNTYMD.GOV/COUNCIL

have to be directly exposed to a pesticide to suffer negative health outcomes. During pregnancy, chemicals in women can cross the placenta and result in higher fetal exposure than the mother has been exposed to. Prenatal exposure to certain chemicals has been documented to increase the risk of cancer in childhood.³ Virtually every pregnant woman in the United States is exposed to multiple chemicals during a sensitive period of fetal development that have been linked to adverse reproductive and developmental outcomes.⁴

Adults are also at risk of developing serious health problems due to pesticide exposure. Researchers at the National Institutes of Health have linked pesticide use to a wide range of diseases and conditions. Exposure to certain pesticides has been linked to Parkinson's disease, diabetes, leukemia, lymphoma, lupus, rheumatoid arthritis, dementia, reproductive dysfunction, Alzheimer's disease, and variety of cancers including breast, colon, prostate and lung cancer.⁵

In addition to the adverse health effects to humans, pesticides can also affect animals, both pets and wildlife, and our waterways. A recent study by the United States Geological Survey has found that 90% of urban area waterways now have pesticide levels high enough to harm aquatic life, and moreover, the USGS said the harm to aquatic life was likely understated in their report.⁶ Terrestrial wildlife is also being harmed by the use of certain pesticides. The most concerning example involves honeybees, which pollinate nearly one-third of the food we eat, and a particular class of pesticides called neonicotinoids. Neonicotinoids have been repeatedly and strongly linked with the collapse of honey bee colonies. In just the last year, Maryland lost nearly 50 percent of its honeybee population, an increase over previous years, which averaged about a one-third loss annually.⁷

Before I describe what this bill does, let me describe what this bill does not do. This bill does not ban the use of all pesticides; it would, however, restrict the use of certain toxic chemicals that are most dangerous to human health. This bill does not prohibit the use of any pesticide for gardens. And this bill would not prohibit the use of any pesticide for agricultural use. What this bill does do is seek to limit children's exposure to harmful pesticides in places where children are most likely to be exposed to them. That being said, the major provisions of the bill are:

- 1) Require the posting of notice when a property owner applies a pesticide to an area of lawn more than 100 square feet, consistent with the notice requirements for when a landscaping business treats a lawn with a pesticides;
- 2) Require the Executive to designate a list of "non-essential" pesticides including:
 - all pesticides classified as "Carcinogenic to Humans" or "Likely to Be Carcinogenic to Humans" by the U.S. EPA;
 - all pesticides classified by the U.S. EPA as "Restricted Use Products;"

³ *American College of Obstetricians & Gynecologists*. Committee Opinion No. 575. American College of Obstetricians and Gynecologists. 931-5. October 2013

⁴ *Environmental Health Perspectives*. Environmental Chemicals in Pregnant Women in the United States: NHANES 2003-2004. Tracey J. Woodruff, Ami R. Zota, Jackie M. Schwartz, Volume 119, No. 6, 878-885. June 2011

⁵ Jan Ehrman. *NIH Record*, Pesticide Use Linked to Lupus, Rheumatoid Arthritis, http://nihrecord.nih.gov/newsletters/2011/03_18_2011/story4.htm (accessed August 3, 2014)

⁶ *U.S. Geological Survey*, An Overview Comparing Results from Two Decades of Monitoring for Pesticides in the Nation's Streams and Rivers, 1992-2001 and 2002-2011, Wesley W. Stone, Robert J. Gilliom, Jeffrey D. Martin, <http://pubs.usgs.gov/sir/2014/5154/pdf/sir2014-5154.pdf> (accessed October 20, 2014)

⁷ Tim Wheeler, Mysterious bee die-off continues, extends beyond winter, *Baltimore Sun*, http://articles.baltimoresun.com/2014-05-15/features/bal-mysterious-bee-dieoff-continues-nearly-half-maryland-hives-lost-20140515_1_bee-informed-partnership-honey-bee-beekeepers (accessed October 20, 2014)

- all pesticides classified as “Class 9” pesticides by the Ontario, Canada, Ministry of the Environment; and
 - all pesticides classified as “Category 1 Endocrine Disruptors” by the European Commission
- 3) Generally prohibit the application of non-essential pesticides to lawns, with exceptions for noxious weed and invasive species control, agriculture and gardens, and golf courses;
 - 4) Require the Executive to conduct a public outreach and education campaign before and during the implementation of the Bill;
 - 5) Generally prohibit the application of a non-essential or neonicotinoid pesticide to County-owned property; and
 - 6) Require the County to adopt an Integrated Pest Management program.
 - 7) Sunset the act and any regulation adopted under it on January 1, 2019

The pesticide industry will respond to this legislation by saying “the science isn’t there” and that “all pesticides are extensively tested and approved as safe by the EPA,” but while both statements sound believable, they belie the truth. In response to the charge that the science isn’t there to legislate, the absence of incontrovertible evidence does not justify inaction. As evidenced by this memo, the number of studies from respected institutions of science linking pesticides to a variety of cancers, neurodevelopmental disorders and diseases is abundant and persuasive. Furthermore, due to the inestimable number of chemical combinations possible from the thousands of products on the market and the complex interactions with the human body, the research that opponents to this legislation will demand will never be possible within the ethical confines of research. The real danger lies not in being exposed to one chemical, but a mixture of chemicals. The EPA risk assessment fails to look at the synergistic effects of multiple chemicals, even though studies show that exposure to multiple chemicals that act on the same adverse outcome can have a greater effect than exposure to an individual chemical.⁸

And to the charge that a pesticide must be safe if it has been approved by the EPA, the Government Accountability Office (GAO) has found that many pesticides are currently being approved for consumer use by the EPA without receipt and review of data that the manufacturer is required to provide on the safety of the chemicals.⁹ Alarming, in some cases the manufacturer was given two years to submit studies on the effects of a pesticide, and ten years later no studies had been received or reviewed by the EPA.¹⁰ What’s more, the EPA itself publishes an entire manual – *Recognition and Management of Pesticide Poisonings* - for healthcare professionals that acknowledges the toxic nature and effects of many pesticides. As an educated populace, we like to think that we have a high bar for pesticide safety in this country, but sadly, when a pesticide has been approved by the EPA, it connotes little about its safety.

Lawn care does not have to be poisonous to people, pets, wildlife, or our waterways. It is simply false to say that you can’t have a lush, green lawn - free of weeds - without the use of toxic pesticides. Through proper management of the soil, along with the use of natural, organic alternatives to synthetic pesticides, a high quality landscape can be achieved. And under my

⁸ *National Research Council. Committee on Improving Risk Analysis Approaches Used by the U.S. EPA. Science and Decisions: Advancing Risk Assessment. Washington, DC: National Academies Press; 2008*

⁹ *United States Government Accountability Office. Pesticides – EPA Should Take Steps to Improve its Oversight of Conditional Registrations, <http://www.gao.gov/assets/660/656825.pdf> (accessed October 20, 2014)*

¹⁰ *United States Government Accountability Office, Pesticides – EPA Should Take Steps to Improve its Oversight of Conditional Registrations, <http://www.gao.gov/assets/660/656825.pdf> (accessed October 20, 2014)*

legislation, residents will still be free to hire any lawn care professional to treat their lawn or to manage their own lawn care.

Much like the public debate that occurred in the 1950's before cigarettes were found to be cancer-causing, I believe we are approaching a similar turning point in the discourse on pesticides as the public is made more aware of the known health effects. In a poll taken earlier this year, more than three-quarters of Marylanders expressed concern about the risk that pesticides pose to them or their families, and when respondents learned of the adverse health effects that pesticides are linked to, 90% of Marylanders expressed concern.¹¹

America lags behind by the rest of the developed world in recognizing the serious risks that certain pesticides pose to health and life. The GAO's report confirms that the regulatory approach taken by the EPA is broken and failing the public. In the face of mounting scientific evidence, and in the absence of action on the federal level, I find it impossible not to act now to protect the health of our children. In Montgomery County, we regularly take a precautionary approach to public health and environmental issues, such as with the forthcoming legislation on e-cigarettes and the Council's action on Ten Mile Creek. Our approach to pesticides should be no different.

I have attached all of the studies that I have cited in this memo for your reference, but I hope you will take time to review research beyond what I have provided. If, after reviewing the research, you feel compelled to act as I do, I would welcome your co-sponsorship on this bill.

This issue is among the most technically complex which the Council has ever faced. Therefore, it is critical that we approach this in a thoughtful manner and that we consult with a variety of experts who are knowledgeable in the field so we can make a well-informed decision regarding this important public health issue.

¹¹ *OpinionWorks*, Maryland Voter Survey on Pesticides <http://www.mdpestnet.org/wp-content/uploads/2014/02/Pesticide-Poll-Memo-2-10-14.pdf> (Accessed on October 20, 2014)



ROCKVILLE, MARYLAND

MEMORANDUM

January 26, 2015

TO: George Leventhal, President, County Council

FROM: Jennifer A. Hughes, Director, Office of Management and Budget
Joseph F. Beach, Director, Department of Finance

SUBJECT: FEIS for Bill 52-14, Pesticides -Notice Requirements -Non-Essential Pesticides Prohibitions

Please find attached the fiscal and economic impact statements for the above-referenced legislation.

JAH:fz

cc: Bonnie Kirkland, Assistant Chief Administrative Officer
Lisa Austin, Offices of the County Executive
Joy Nurmi, Special Assistant to the County Executive
Patrick Lacefield, Director, Public Information Office
Fariba Kassiri, Acting Director, Department of Environmental Protection
Joseph F. Beach, Director, Department of Finance
David Platt, Department of Finance
Matt Schaeffer, Office of Management and Budget
Alex Espinosa, Office of Management and Budget
Felicia Zhang, Office of Management and Budget
Naeem Mia, Office of Management and Budget

Fiscal Impact Statement

Bill 52-14: Pesticides – Notice Requirements – Non-Essential Pesticides – Prohibitions

1. Legislative Summary.

The bill would update county law with regard to pesticides application in the following manner:

- (1) require posting of notice for certain lawn applications of pesticide;
- (2) prohibit the use of certain pesticides on lawns;
- (3) prohibit the use of certain pesticides on certain County-owned property;
- (4) require the County to adopt an integrated pest management program for certain County-owned property;
- (5) generally amend County law regarding pesticides; and
- (6) require the creation of a media campaign to inform residents and businesses of the change in county law related to non-essential pesticides.

2. An estimate of changes in County revenues and expenditures regardless of whether the revenues or expenditures are assumed in the recommended or approved budget. Includes source of information, assumptions, and methodologies used.

County revenues are not expected to be impacted by Bill 52-14. The Maryland-National Capital Park and Planning Commission (M-NCPPC) did report that there is a potential for lost revenues if playing fields are not able to be adequately maintained – this revenue has traditionally come in in the form of field rental from athletic leagues.

County departments and agencies performed a fiscal impact analysis of the major provisions and conclude the following:

- Section 33B-4 requires the county to develop a list of non-essential pesticides and invasive species which would be detrimental to the environment. The Department of Environmental Protection (DEP) does not envision a fiscal impact as a result of these tasks given that many jurisdictions have taken the similar action with regards to non-essential pesticides and significant documentation exists related to successful implementation of this type of prohibition. If classification becomes difficult, a consultant may need to be brought in to assist with this task.
- Section 33B-13 requires the County Executive to create an Integrated Pest Management (IPM) program. The Department of General Services (DGS) reported no fiscal impact and is currently operating under an IPM and the Executive branch would utilize this plan across county departments under Bill 52-14.
- Enforcement of Bill 52-14 is not clarified in great detail within the legislation. Similar to other prohibition legislation, executive staff recommends a complaint-driven enforcement model to control costs of implementation. It is likely that complaint-driven enforcement would have a minimal fiscal impact on county departments while estimates for a proactive enforcement effort include a dedicated inspector with estimated personnel costs of \$75,000 and vehicle costs of approximately \$40,000 for a total of \$115,000 per inspector.
- Bill 52-14 would also require county departments and agencies to convert to approved landscaping practices outside of the list of banned non-essential pesticides

in the cases wherein prohibited pesticides are being used.

Montgomery County Public Schools (MCPS) reported that it is likely that pesticides prohibited under Bill 52-14 are being used currently and that a conversion cost estimate would be available after an agreed list of prohibited pesticides is established.

Based on estimates of conversion costs for M-NCPPC fields, the costs of maintaining similar fields within MCPS are expected to be significant.

Montgomery College reported no fiscal impacts as a result of Bill 52-14.

To maintain the quality of fields at the current level, M-NCPPC reported the following conversion costs associated with the move to allowable treatment methods on fields:

Athletic Fields:

- 40 athletic fields can be organically treated at the following cost:

\$648,048 in supplies and labor costs;

\$327,062 to provide a top dressing;

\$100,000 for the purchase of two aerators;

for a total first year cost of \$1,075,110.

Additional costs in subsequent years also include:

Sod replacement every two years at a cost of \$20,440 per field or \$817,600 and additional grading every four years at a total of \$10,000 per field or \$400,000.

- Five Bermuda playing fields cannot be organically treated and would need to be replaced with treatable sod for \$102,200 per field or a total cost of \$511,000.
- *Optional* replacement costs for a synthetic turf option are \$1,400,000 per field with \$3,700 in annual maintenance or a total capital cost of \$56,000,000 and a \$148,000 annual maintenance cost for all forty fields.

Regional Fields:

- 35 regional fields will need irrigation installed to maintain organic maintenance standards at the following cost:

\$3,500,000 in capital costs for system installations;

\$231,000 in annual water costs;

\$350,000 in annual maintenance costs;

for a first year cost of \$4,081,000.

Local Fields:

- 300 local fields would require manual or mechanical weed elimination at a total annual cost of \$229,860.

In total, implementation costs to bring M-NCPPC fields into compliance (absent a total conversion to synthetic turf) would be:

Total first year costs to M-NCPPC would be \$5,896,970.

Recurring annual costs for M-NCPPC would be \$810,860.

Sod Replacement costs every two years would be \$817,600.

Additional grading costs every four years for M-NCPPC would be \$400,000.

3. Revenue and expenditure estimates covering at least the next 6 fiscal years.

Total conversion costs to allowable landscaping practices for the county would include an undetermined amount for MCPS to replace current pesticides in inventory and a six year

total of \$12,804,070 for M-NCPPC as a part of converting maintenance practices on current fields to allowable practices under Bill 52-14.

M-NCPPC's six-year estimate of \$12,804,070 in conversion costs consists of:
\$5,896,970 in first year costs
\$4,054,300 in subsequent annual expenses [\$810,860 X 5 years]
\$2,452,800 in sod replacement costs on athletic fields [\$817,600 X 3 applications]
\$400,000 in additional grading costs

If it is determined that a proactive enforcement effort is needed to enforce the bill, a dedicated inspector would be required at a personnel cost of \$75,000 and a vehicle cost would of \$40,000, for a total of \$115,000 for the first year and a six year total of \$490,000. The County Executive recommends a complaint-driven enforcement program.

Bill 52-14 also requires the County Executive to establish an awareness campaign related to the prohibitions noted in the bill. Costs related to the media campaign will depend on the scope and size of the media campaign. The County Executive recommends an education and outreach program of minimal cost to the county.

- 4. An actuarial analysis through the entire amortization period for each bill that would affect retiree pension or group insurance costs.**

Not Applicable.

- 5. An estimate of expenditures related to County's information technology (IT) systems, including Enterprise Resource Planning (ERP) systems.**

Not Applicable.

- 6. Later actions that may affect future revenue and expenditures if the bill authorizes future spending.**

Not Applicable.

- 7. An estimate of the staff time needed to implement the bill.**

The impact of implementation of Bill 52-14 on staff time will depend on the extent of the enforcement required for the provisions in the bill. Inspections on lawns, commercial sales establishments for signage, and other general enforcement actions will have an impact on various county departments similar to other countywide ban legislation.

If Bill 52-14 requires an enforcement inspector, approximate personnel costs of an inspector would be \$75,000 and a vehicle would be \$40,000 for a total of \$115,000 per inspector.

If enforcement of Bill 52-14 is complaint-driven, there would be an impact to current inspection operations by increasing the extent of some existing inspection protocols but would result in minimal fiscal impact to the county.

8. An explanation of how the addition of new staff responsibilities would affect other duties.

Depending on the enforcement model of Bill 52-14, the bill would impact the total number of inspection hours required. An inspector carrying out an inspection in a retailer for health code and other violations, for example, could be required to add on additional inspections for checks of signage and other sales requirements of pesticides to their normal inspection process.

9. An estimate of costs when an additional appropriation is needed.

There are three potential areas of cost related to Bill 52-14:

1) Conversion costs related to replacing old pesticides or converting contracts to include compliant pesticide application- County departments reported no fiscal impacts considering DGS already operates an IPM. MCPS reported that there would be costs associated with converting to approved pesticides from pesticides currently in use and that the extent of these conversion costs will not be known until a final list of banned pesticides has been established by DEP.

M-NCPPC estimates their conversion costs to allowable landscaping practices (excluding a conversion to artificial turf) to be \$12,804,070 over the next six years. See item 3 for additional information on M-NCPPC's estimated conversion costs.

2) Costs associated with a media campaign-Bill 52-14 requires that the County Executive establish a media campaign to publicize the ban on certain non-essential pesticides. Costs related to this media campaign will vary depending on the scope and size of the campaign; and

3) Costs associated with enforcement of Bill 52-14-If dedicated enforcement personnel are needed to enforce the provisions of Bill 52-14, approximate personnel costs of an inspector would be \$75,000 and a vehicle would be \$40,000 for a total of \$115,000 per inspector.

10. A description of any variable that could affect revenue and cost estimates.

See Item 9 above.

11. Ranges of revenue or expenditures that are uncertain or difficult to project.

M-NCPPC reports that loss of revenue is likely to occur if the spraying of certain non-essential pesticides prohibited in Bill 52-14 is eliminated as a part of the current playing field maintenance program. M-NCPPC reports that other jurisdictions have seen a loss of revenue from athletic tournaments leagues choose to take outside of the county.

12. If a bill is likely to have no fiscal impact, why that is the case.

Not Applicable.

13. Other fiscal impacts or comments.

Both M-NCPPC and the Department of Recreation (REC) are also concerned about how this prohibition will impact recreational and sport fields throughout the county. There are multiple jurisdictional studies suggesting a prohibition of this type on sport fields leads to degradation of the playing field and may lead to injury.

14. The following contributed to and concurred with this analysis:

Stan Edwards, Department of Environmental Protection
James Song, Montgomery County Public Schools
David Vismara, Maryland-National Capital Park and Planning Commission
Beryl Feinberg, Department of General Services
Matt Schaeffer, Office of Management and Budget



Jennifer A. Hughes, Director
Office of Management and Budget

1/26/15

Date

Economic Impact Statement
Bill 52-14, Pesticides – Notice Requirements - Non-Essential Prohibitions

Background:

This legislation would require the posting of a notice when a property owner applies a pesticide to an area of lawn more than 100 square feet. Bill 52-14 requires the County Executive to designate a list of “non-essential” pesticides that include the following:

- All pesticides classified as “Carcinogenic to Humans” or “Likely to Be Carcinogenic to Humans” by the United States Environmental Protection Agency (USEPA);
- All pesticides classified by USEPA as “Restricted Use Products”;
- All pesticides classified as “Class 9” by the Ministry of the Environment and Climate Change, Government of Ontario, Canada
- All pesticides classified as “Category 1 Endocrine Disrupters” by the European Commission; and
- Other pesticides which the County Executive determines are not critical to pest management in the County.

The Bill would prohibit the application of non-essential pesticides to lawns, with exceptions for noxious weed and invasive species control, agriculture and gardens, and golf courses. The Bill would also require the County Executive to conduct a public outreach and education campaign during the implementation of Bill 52-14, and would prohibit the application of non-essential and neonicotinoid pesticides to County-owned property.

1. The sources of information, assumptions, and methodologies used.

Department of Environmental Protection (DEP)
SafeLawns.org
Diffen.org
The Fertilizer Institute (TFI)
Grassroots Environmental Education

2. A description of any variable that could affect the economic impact estimates.

The variable that could affect the economic impact estimates is the cost differential between organic pesticides and chemical pesticides. However, according to SafeLawns.org, the cost differential is comparing apples to oranges since one product provides a short-term solution while the other product aims to provide a long-term solution. Organic products “function by building up life in the soil (soil biology) and their payoff is long-term and lasting” while synthetic products, which are instantaneous, are applied frequently and in greater amounts. Therefore, SafeLawns.org indicates that the users of organic products will spend less money on lawn care over a two-year period than users of chemical or synthetic pesticides.

Economic Impact Statement
Bill 52-14, Pesticides – Notice Requirements - Non-Essential Prohibitions

According to Diffen.org, organic pesticides are much more expensive than synthetic or chemical pesticides because synthetic or chemical pesticides have more concentrated levels of nutrients per weight of product than organic pesticides. The user of organic pesticides needs several pounds of organic pesticide that would provide the same nutrient levels as synthetic or chemical pesticide. That differential in the amounts would result in a higher cost of organic pesticide.

Therefore, there is a conflict between the information provided by SafeLawns.org and Diffen.org regarding the cost differential between organic and synthetic/chemical pesticides. SafeLawns.org suggests there is less application of organic to synthetic/chemical pesticide while according to Diffen.org, one needs a higher quantity of organic pesticide to synthetic/chemical pesticide to achieve the same nutrient level.

3. The Bill's positive or negative effect, if any on employment, spending, saving, investment, incomes, and property values in the County.

Because of the differences of opinions in terms of the amount of application of organic versus synthetic/chemical pesticide as stated in paragraph #2, it is uncertain whether Bill 52-14 would have economic impact on employment, spending, saving, investment, incomes, and property values in the County. Because of the specific climate and soil type endemic to Montgomery County, more consultation with the experts and research are needed to determine the economic effect on the County.

4. If a Bill is likely to have no economic impact, why is that the case?

It is uncertain if Bill 52-14 has an economic impact.

5. The following contributed to or concurred with this analysis: David Platt and Rob Hagedoorn, Finance, and Stan Edwards, Department of Environmental Protection.



Joseph E. Beach, Director
Department of Finance

1/23/15

Date

MEMORANDUM

June 9, 2015

TO: Transportation, Infrastructure, Energy and Environment Committee

FROM: Josh Hamlin, Legislative Attorney 

SUBJECT: Letters from Assistant Attorney General Kathryn M. Rowe to Delegates Kirill Reznik and Kumar Barve, RE: possible preemption of Bill 52-14, Pesticides – Notice Requirements – Non-Essential Pesticides – Prohibitions

By letter to the Honorable Kirill Reznik dated April 1, 2015, Assistant Attorney General Kathryn M. Rowe of the Office of Counsel to the General Assembly provided advice on whether State law would preempt Montgomery County Bill 52-14. Ms. Rowe's view is "that the general ban on application of non-essential pesticides may well be preempted, but that other parts most likely would not be." Ms. Rowe sent a very similar letter, dated May 21, 2015, to Delegate Kumar Barve, with a somewhat more forceful conclusion. In the May 21 letter, which contained essentially the same analysis as the April 1 letter, Ms. Rowe concluded: "It is my view that, to the extent that the bill bars application of a non-essential pesticide to a lawn, subject to certain exceptions, it is likely to be found to be preempted."

As a general proposition, Council staff concurs with the view that "a court could conclude" that the County is preempted under State law from prohibiting the cosmetic use of pesticides on lawns, but believes that such a conclusion is far from certain. Indeed, given the existing Maryland case law, as well as the legislative history of the State pesticide law, staff believes that a very strong argument against implied preemption can be made. As such, staff does not agree with Ms. Rowe's modified conclusion, that preemption of a County prohibition of the application of certain pesticides in certain places is "likely."

Ms. Rowe's initial conclusion did not address the *probability* of a finding of preemption with regard to Bill 52-14, but only its *possibility*. In her second letter, she does speak to the probability, as noted above. However, the discussion provided by the entirety of both letters (virtually identical in each) does not clearly indicate the likelihood that a *Maryland* Court would conclude that the County is preempted from implementing any of the Bill's provisions. Ms. Rowe examined pesticide regulation-related implied preemption cases from other jurisdictions and described the provisions of State law regulating pesticides. With regard to the cases from other jurisdictions, she notes that "[t]he cases are not as helpful as they could be, however, because different states apply different tests as to preemption, and, of course, the types of regulation that have been attempted at the local level vary greatly." The different preemption tests applied by the

various states and the different types of attempted local regulation, as well as, and perhaps more importantly, the different state pesticide regulation laws held to preempt local regulation, all combine to greatly limit the instructive value of these cases.

Significantly, neither of Ms. Rowe's letters discuss how Maryland courts have applied the implied preemption doctrine, nor do they discuss significant aspects of the legislative history of Maryland's pesticide law. Staff believes that such discussion is critical to assessing the likelihood of a finding that the County is impliedly preempted from prohibiting the use of certain pesticides on certain areas in the County. The following discussion of implied preemption law in Maryland, and important General Assembly actions related to the pesticide law, lead staff to believe that, should the County enact Bill 52-14 prohibiting the application of certain pesticides, a finding of implied preemption would be possible, but not necessarily "likely."

Background

The regulation of pesticides is the shared responsibility of federal, state, and local governments. This shared approach, known as "environmental federalism," is consistently applied among several federal environmental protection laws,¹ and has evolved largely over the last 50 years.

At the national level, the Federal Insecticide, Fungicide and Rodenticide Act ("FIFRA") is the primary vehicle for pesticide regulation. FIFRA was enacted in 1947, and has evolved from being primarily a labeling statute to become a somewhat more broad regulation. In 1972, administration of FIFRA was transferred to the newly created Environmental Protection Agency ("EPA"), which is responsible for classifying pesticides based on a review of the scientific evidence of their safety and impact on the health of individuals and the environment. FIFRA also requires EPA to maintain a registry of all but "minimum risk" pesticides.² In addition to the classification and registry of pesticides, FIFRA provides a uniform national standard for labeling pesticides. FIFRA does not comprehensively regulate pesticides, however, and does not include public notice or permit requirements for the use of pesticides.

Under FIFRA, the states are the primary enforcers of pesticide use regulations, and FIFRA expressly authorizes states to enact their own regulatory measures concerning the sale or use of any federally registered pesticides in the state, provided the state regulation is at least as restrictive as FIFRA itself. In Maryland, pesticides are regulated by the Maryland Department of Agriculture, through the enforcement of Subtitles 1 and 2 of Title 5 of the Agriculture Article of the Maryland Code.³ Maryland law and regulations generally create a pesticide registration and labeling regime at the state level, and a licensing program for applicators of certain pesticides. Title 5 does not

¹ The 1972 Federal Water Pollution Control Act, the 1986 amendments to the Safe Drinking Water Act, the Toxic Substances Control Act, the Resource Conservation and Recovery Act, and the Oil Pollution Control Act of 1990 all provide for state and local regulatory roles.

² Minimum risk pesticides are a special class of pesticides that are not subject to federal registration requirements because their ingredients, both active and inert, are *demonstrably* safe for the intended use. Information about EPA's treatment of minimum risk pesticides can be found at: <http://www.epa.gov/oppbppd1/biopesticides/regtools/25b/25b-faq.htm>

³ Subtitle 1 is entitled the "Maryland Pesticide Registration and Labeling Law." Subtitle 2 is the "Pesticide Applicator's Law."

include any express preemption language, nor does it expressly authorize the use of any particular pesticides. In 2011, the Office of the County Attorney opined that, as a general matter, the County may regulate pesticides in a manner at least as restrictive as, and consistent with, federal and State law. Specifically, the opinion expressed the view that the County could enact a local ban on the use of the pesticide methyl bromide.⁴

The authority of local governments to regulate pesticides was the subject of significant litigation in the 1980s, with a County law struck down as preempted by FIFRA. In *Maryland Pest Control Assn. v. Montgomery County, Maryland*, 646 F. Supp. 109 (D. Md. 1986), the U.S. District Court held that FIFRA preempted the County's local law imposing pesticide posting and notice requirements. The Court held that if Congress had wanted to include local governments in the regulation of pesticides, it would have expressly done so. However, in *Wisconsin Public Intervenor v. Mortier*, 501 U.S. 597 (1991), the U.S. Supreme Court held, contrary to the *Maryland Pest Control Assn.* decision, that a unit of local government has the power, under FIFRA, to regulate pesticides within its own jurisdiction, provided that the local regulation is at least as restrictive as, and consistent with, FIFRA and any applicable state law. Since *Mortier* was decided, many states have expressly preempted local jurisdictions from regulating pesticides, but Maryland is one of nine states which permit local regulation. The County currently imposes certain notice, storage, handling, and consumer information requirements in Chapter 33B of the County Code, and Bill 52-14 would add certain additional notice requirements, and would prohibit the use of certain pesticides on County property and certain private property.

Preemption of local pesticide regulation

Federal Law on Local Regulation of Pesticides

As noted above, the question of whether local jurisdictions are permitted to regulate pesticides under federal law was settled by the Supreme Court in *Wisconsin Public Intervenor v. Mortier*. A brief discussion of the *Mortier* decision is helpful in providing context for considering local pesticide regulation generally.

On June 21, 1991, the Supreme Court unanimously decided in *Wisconsin Public Intervenor v. Mortier* that FIFRA did not preempt local regulation of pesticides. In doing so, the Court reversed the holdings of two lower courts, explaining that FIFRA, while a comprehensive regulatory act, left open to the states and localities the power to supplement federal pesticide regulation. Moreover, the Court reiterated its standard of "clear and manifest purpose" when inferring congressional intent in preemption cases. In *Mortier*, the Court discussed and rejected each of the ways by which federal law could preempt state or local laws: (1) where a federal law expressly preempts state or local law; (2) where the federal law so pervasively occupies the field that state or local supplemental action must be precluded; (3) where federal and state or local laws conflict; and (4) where a state or local law stand as an obstacle to the fulfillment of federal goals. The Court, in its analysis of FIFRA's statutory language, could not find that Congress had indicated a "clear and manifest purpose" to preempt local regulation:

⁴ Memorandum to Councilmember Roger Berliner from Associate County Attorney Walter E. Wilson, dated October 25, 2011, which is attached to this memorandum.

FIFRA nowhere seeks to establish an affirmative permit scheme for the actual use of pesticides. It certainly does not equate registration and labeling requirements with a general approval to apply pesticides throughout the Nation without regard to regional and local factors like climate, population, geography, and water supply. Whatever else FIFRA may supplant, it does not occupy the field of pesticide regulation in general or the area of local use permitting in particular.

501 U.S. 597, 613-14.

Following the *Mortier* decision, pesticide proponents and opponents mobilized for activity on federal and state levels. Bills were introduced in both the Senate and the House of Representatives to amend FIFRA to expressly preempt state and local regulation, though neither passed. At the state level, coalitions made up of pesticide industry and agricultural representatives worked to get state legislatures to pass legislation preempting local pesticide regulation. Notably, in Maryland, bills were introduced in the House of Delegates and the Senate to expressly preempt local pesticide regulation in 1992, 1993, and 1994, but none were enacted.⁵

Implied Preemption Law in Maryland

In resolving questions of preemption of local legislation, Maryland courts have recognized “three grounds on which otherwise valid local legislation might be invalidated because of State legislation concerning the same matter: (1) ordinances which conflict with public general law, (2) ordinances which deal with matters which are part of an entire subject matter on which the General Assembly has expressly reserved unto itself the right to legislate, and (3) ordinances which deal with an area in which the General Assembly has acted with such force that an intent to occupy the entire field must be implied.” *McCarthy v. Board of Education of Anne Arundel County*, 280 Md. 634, 639 (1977). It appears that Ms. Rowe bases her conclusion that the prohibition on the use of non-essential pesticides on lawns could be preempted on the doctrine of implied preemption set forth in (3) above. In any event, the Maryland pesticide law contains no language expressly preempting local jurisdictions from any area of pesticide regulation, and there has been no assertion made that the prohibition in Bill 52-14 would conflict with State law. As such, the focus of the discussion below is on the doctrine of implied preemption.

The Maryland Court of Appeals, in *Mayor and City Council of Baltimore v. Sitnick & Firey*, 254 Md. 303 (1969),⁶ articulated the “concurrent powers theory,” first applied in *Rosberg v. State*, 111 Md. 394 (1909), which allows local legislation in certain fields where the State legislature has acted if the local jurisdictions are otherwise empowered to legislate on the subject. The *Sitnick* Court surveyed prior Court decisions, and described the concurrent powers theory succinctly: “a political subdivision may not prohibit what the State by general public law has permitted, but it may prohibit what the State has not expressly permitted.” 254 Md. at 317

⁵ 1992: HB 762/ SB549 - Pesticides - Uniform Regulation. 1993: SB 429 - Pesticides - Regulation. 1994: HB 948/SB 481 - Uniform Regulation of Pesticides.

⁶ In *Sitnick*, the Court of Appeals held that a Baltimore City ordinance establishing minimum wage standards higher than the standard set by State law was not invalid under the theory that the State had preempted the field of minimum wage regulation, but was valid on the basis of the City’s exercise of “concurrent power.” The *Sitnick* Court articulated the doctrine of concurrent power, and contrasted it with the concept of implied preemption.

(emphasis supplied). The Court recognized, however, that “there may be times when the [State] legislature may so forcibly express its intent to occupy a specific field of regulation that the acceptance of the doctrine of pre-emption by occupation is compelled. . .” *Id.* at 323.

The Court has had many opportunities since *Sitnick* to consider whether the State had so forcibly expressed its intent to occupy a particular field of regulation so as to preempt local enactments in that field. In these cases, the Court has exercised the necessary caution observed by Judge Finan in *Sitnick*, avoiding a broad application of implied preemption that would render home rule virtually worthless. *Id.* In its post-*Sitnick* implied preemption analyses, the Court has sought to divine the legislature’s intent, with “the primary indicia of a legislative purpose to preempt an entire field of law [being] the comprehensiveness with which the General Assembly has legislated in the field.” *Ad+Soil v. County Commissioners of Queen Anne’s County*, 307 Md. 307, 328 (1986). Under this cautious approach, there have been only six distinct instances where a finding of implied preemption has resulted in the invalidation of a local law in Maryland since the *Sitnick* decision in 1969.⁷

In *County Council for Montgomery County v. Montgomery Association*, 274 Md. 52 (1975), the Court of Appeals invalidated a Montgomery County law regulating the campaign finance practices of candidates for County Executive and the County Council. The Court held that “the matter of election campaign financing was intended to be completely occupied by state law, to the exclusion of any local legislation on the subject . . .” *Id.* at 60. After reviewing the State constitutional provisions setting for the legislature’s duty of protecting the electoral process in Maryland and the State Election Code, the Court concluded that the General Assembly “has enacted a comprehensive plan for the conduct of elections in Maryland” and in particular “has enacted detailed provisions governing the financing of election campaigns in this state.” *Id.* at 64.⁸ In so holding the Court noted the “chaos” that would result from dual systems of campaign finance regulation, saying that allowing local regulation in the field of campaign finances “would inevitably lead to utter confusion” *Id.* at 64. The Court noted that its holding was “in no way inconsistent with concurrent powers theory set forth in *Rossberg* and *Sitnick* cases.” *Id.* at 65.

The Court in *McCarthy v. Board of Education of Anne Arundel County* considered an Anne Arundel County law directing the County board of education, a State agency, to make rules and enter contracts to provide transportation to children attending private, non-profit schools in the County and directing the County Council to appropriate funds to pay the costs of providing such transportation. The *McCarthy* Court invalidated the law, finding that “the field of education has

⁷ Two other cases also found implied preemption of local regulation, but without a separate analysis. In *Montgomery County Board of Realtors v. Montgomery County*, 287 Md. 101 (1980), the Court struck down a Montgomery County law imposing a tax on real property in the County on the amount by which the taxable value of the property, at the date of a transfer, exceeded the assessed valuation of the property. The Court examined the State law’s “detailed scheme for the assessment and levy of taxes,” and held that “[b]ecause the scheme of taxation here is in direct conflict with [State law], the County Council was without power to enact it.” *Id.* at 110. The Court also noted, without separate discussion, held that the General Assembly had fully occupied the field of property tax assessment and levy. *Id.* In *Soaring Vista Properties, Inc. v. Board of County Commissioners of Queen Anne’s County*, 356 Md. 660 (1999), the Court invalidated a county law regulating sewage sludge utilization, applying its holding in *Talbot County v. Skipper*, 329 Md. 481 (1993) that local regulation in the field of sewage sludge utilization was impliedly preempted by virtue of the “comprehensive” State regulatory scheme.

⁸ The State Election Code is codified as the Election Law Article, with Title 13 comprehensively regulating campaign finance.

been preempted by the General Assembly, thus rendering local enactments affecting boards of education void.” 280 Md. at 638. The Court reviewed the long history of statewide provision and regulation of public and private education, and surveyed the existing State education law, and deemed it an “excellent example of what the Court had in mind in *Baltimore v. Sitnick & Firey* when it referred to the fact that the General Assembly might ‘so forcibly express its intent to occupy a specific field of regulation that the acceptance of the doctrine of preemption by occupation is compelled . . .’” *Id.* at 650-51 (quoting *Baltimore v. Sitnick & Firey* 254 Md. 303, 323).⁹

In *Howard County v. Potomac Electric Power Company*, 319 Md. 511 (1990), the Court found that the General Assembly had expressed its intent to occupy completely the field of public utility service. In the case, Howard County and Montgomery County each sought to enforce its respective zoning ordinance against a utility that had obtained a certificate of public convenience and necessity from the Public Service Commission (“PSC”) to construct a high-voltage, overhead transmission line in the counties. The Court reviewed the PSC’s broad authority over public utilities, and noted that: (1) the State law “states with particularity that the PSC shall have *final authority* over the granting of construction permits for overhead transmission lines in excess of 69,000 volts,” *Id.* at 524 (emphasis supplied), (2) the imposition of conflicting conditions associated with high-voltage overhead transmission lines could generate confusion, *Id.* at 527, and (3) allowing local authority over the construction of a transmission line providing service statewide could permit the local jurisdiction to regulate the utility “in a manner that may be antithetical to the interests of the rest of the state.” *Id.* at 527-28.¹⁰

The Court in *Talbot County v. Skipper*, 329 Md. 481 (1993) found an intent to fully occupy the field of sewage sludge utilization, invalidating a Talbot County law which required a land owner to record certain information in the County land records before applying sewage sludge to the land under a State permit. The Court concluded that the General Assembly “has enacted a very comprehensive scheme regulating all aspects of sewage sludge utilization in Maryland.” *Id.* at 481. It is important to note that the State sewage sludge utilization law at issue in *Skipper* had been recently amended in response to an earlier Court of Appeals upholding a local zoning law against a preemption challenge. In that case the Court found that the State law governing sewage sludge utilization operations was “far from comprehensive.” *Ad+Soil, supra*, 307 Md. at 328.

In *Allied Vending v. City of Bowie*, 332 Md. 279 (1993), the Court invalidated ordinances enacted by the City of Takoma Park and the City of Bowie that required State-licensed cigarette vending machines to also obtain a license (or permit) from the respective cities, and restricted the placement of the machines to locations not generally accessible to minors. The Court found that the General Assembly had enacted “comprehensive provisions governing the appropriate licenses necessary to sell cigarettes in Maryland at wholesale, retail, over-the-counter, and through cigarette vending machines.” *Id.* at 288-89. The Court noted that “[p]rior to the enactment of the ordinances, the licensing of cigarette vending machines was accomplished exclusively in accordance with [State law].” *Id.* at 288. Further, the Court found the city laws in question “would

⁹ Education in Maryland is governed via the Education Article.

¹⁰ Public utilities in Maryland are regulated via the Public Utilities Article.

be tantamount to a ban on cigarette vending machines in locations in which the State has granted vendors a license to operate those machines.” *Id.* at 303.

The most recent Maryland case in which a local law was invalidated on the basis of implied preemption is *Altadis U.S.A., Inc. v. Prince George's County*, 431 Md. 307 (2013). In striking down two Prince George’s County laws regulating the sale of certain cigars, the *Altadis* Court held that state law occupies the field of regulating the packaging and sale of tobacco products, including cigars, and thus impliedly preempts local regulation. The Court applied its holding in *Allied Vending*, and noted that particularly important was a provision in State law *expressly authorizing* a State-licensed seller to sell or distribute up to 20 single cigars. The invalidated County laws generally disallowed the sale of inexpensive single cigars, and the Court found this “tension” between state and local laws to reinforce the preemption conclusion. *Id.* at 318-19. Also, the Court found noteworthy the fact that the General Assembly had considered, but not enacted, bills banning the sale of single cigars, saying “[t]he General Assembly’s rejection of bills imposing the same requirements as the local legislation is significant in a preemption analysis.” *Id.*

In contrast to these cases, the Court has found concurrent authority in cases where it has not found a comprehensive State regulatory scheme within a particular field of legislation. *See, Ad+Soil, supra; Sitnick, supra; City of Annapolis v. Annapolis Waterfront Co.*, 284 Md. 383, (1979); *National Asphalt Pavement Assn. v. Prince George's County*, 292 Md. 75 (1981); *Board of Child Care of the Baltimore Annual Conference of the Methodist Church, Inc. et al. v. Harker*, 316 Md. 683 (1989). In these cases, the Court has upheld local regulation within a field also regulated by the State.

Preemption of Local Pesticide Regulation in Other States

In her letters to Delegates Reznik and Barve, Ms. Rowe cites a number of decisions from other jurisdictions in which local regulation of pesticides has been found to be preempted by State law. As previously noted, Ms. Rowe acknowledged the limitation on their utility, as the determinations are dependent on different standards for finding preemption, and differences in the State and local laws in question. To the extent that these decisions may be instructive, many are clearly distinguishable from the law and facts that are the subject of this analysis. Several of the cited cases have no bearing on any implied preemption analysis, as the State laws in question *expressly* preempt local pesticide regulation.¹¹ Others involve state laws more clearly directing a more comprehensive statewide, uniform system of regulation.¹²

¹¹ *See, Village of Lacona v. State, Dept. of Agriculture and Markets*, 858 N.Y.S.2d 833 (2008); *Ames v. Smoot*, 471 N.Y.S.2d 128 (1983); and *Long Is. Pest Control Assn v. Town of Huntington*, 341 N.Y.S.2d 93 (1973): all three of these cases held that local jurisdictions were preempted from regulating pesticides where New York State law provided that “jurisdiction in *all* matters pertaining to the distribution, sale, use and transportation of pesticides, is by this article vested *exclusively* in the commissioner.” (emphasis supplied). *See also, Minnesota Agr. Aircraft Assn v. Township of Mantrap*, 498 N.W.2d 40 (Minn. App. 1993) in which the court held a local law regulating aerial spraying of pesticides preempted by State law including the following provision: “Except as specifically provided in this chapter, the provisions of this chapter preempt ordinances by local governments that prohibit or regulate any matter relating to the registration, labeling, distribution, sale, handling, use, application, or disposal of pesticides. It is not the intent of this section to preempt local responsibilities for zoning, fire codes, or hazardous waste disposal.”

¹² The court in *Pesticide Public Policy Foundation v. Village of Wauconda, Ill.*, 622 F.Supp. 423 (N.D. Ill. 1985) found a comprehensive regulatory scheme in a State law with a clearly stated purpose “to regulate in the public interest the labeling, distribution, use and application of pesticides as herein defined,” *Id.* at 427, and in which “[t]hree different

Bill 52-14's Non-essential Pesticide Prohibition

Local regulation of pesticides generally, in a manner more stringent than federal or State law, is consistent with the *Mortier* decision and the concurrent powers doctrine outlined in *Baltimore v. Sitnick & Firey*. Bill 52-14 is intended to do just this: regulate the type and location of pesticide applications where the State has not done so at all. As drafted, the Bill would, among other things, generally¹³ prohibit the application of pesticides designated “non-essential” on lawns¹⁴ in the County. Non-essential pesticides would be so designated because they are: (1) designated as “carcinogenic or “likely to be carcinogenic” by the EPA; (2) classified as a “restricted use pesticide” by the EPA; (3) classified as a “Class 9” pesticide by the Ontario, Canada, Ministry of the Environment; or (4) classified as a “Category 1 Endocrine Disruptor” by the European Commission. Bill 52-14’s prohibition would apply to a large number of chemical pesticides used for lawn care, but would not prohibit the use of all pesticides on lawns, nor would it limit pesticide application *other than* on lawns.

While State pesticide law comprehensively regulates pesticide registration and labeling in the State, and establishes a scheme of required certifications and licenses, nothing in Subtitles 1 and 2 of the Agriculture Article *expressly* permits the application of any pesticides to lawns, as would be prohibited by Bill 52-14. None of Bill 52-14’s provisions relate to pesticide regulation and labeling. The Bill does not affect the licensing and certification of commercial pest control applicators in the State, nor does it establish a parallel County licensing program.

Three of the Maryland cases in which local laws were found to be impliedly preempted involved fields of regulation in which the applicable State law filled an entire Article of the Maryland Code: Elections,¹⁵ Education,¹⁶ and Public Utilities.¹⁷ In these fields, the regulation is unquestionably comprehensive, a fact demonstrated by the sheer volume of State law in the field. Ms. Rowe’s summary of the provisions of Maryland’s pesticide laws (Agriculture Article, Title 5, Subtitles 1 and 2) may support a conclusion that the registration and labeling of pesticides and the licensing of commercial pesticide applicators are the exclusive province of State regulation. However, they give no indication that the General Assembly has comprehensively regulated the field of pesticide regulation generally. While MD Agriculture Code, Section 5-204, does give the

State bodies are involved in pesticide regulation, each administering the statutory provisions within their own area of expertise . . .” *Id.* at 430. The holding also turned, in part, on the local jurisdiction’s status as a “non-home rule unit.” The decision of the Court in *Syngenta Seeds, Inc. v. County of Kauai*, 2014 WL 4216022 (D. Haw. Aug. 25, 2014) was rooted, at least in part in Hawaii’s “statewide constitutional concern for agriculture.” *Id.* at 8. Also, the comprehensive nature of the Hawaii law is evidenced in its mandate that State Board of Agriculture “establish a system of control over the distribution and use of certain pesticides and devices purchased by the consuming public.” *Id.*

¹³ The Bill includes a number of exceptions, including applications for the control of noxious weeds, invasive species, agricultural purposes, and maintenance of golf courses.

¹⁴ “Lawn” is defined in existing County law as Lawn means an area of land, except agricultural land, that is:

- (1) mostly covered by grass, other similar herbaceous plants, shrubs, or trees; and
- (2) kept trim by mowing or cutting.

Bill 52-14 would amend this definition to include playing fields and expressly exclude gardens.

¹⁵ *County Council for Montgomery County v. Montgomery Association*, 274 Md. 52 (1975).

¹⁶ *McCarthy v. Board of Education of Anne Arundel County*, 280 Md. 634, 639 (1977).

¹⁷ *Howard County v. Potomac Electric Power Company*, 319 Md. 511 (1990).

Secretary a number of duties related to regulating the use of pesticides, neither the law nor regulations establish a regulatory regime that can reasonably be considered comprehensive.¹⁸

The two most recent implied preemption cases¹⁹ involved local attempts to restrict the sale of tobacco products, where sellers are licensed by the State. In the first of these, *Allied Vending v. City of Bowie*, the Court of Appeals invalidated municipal ordinances in Bowie and Takoma Park that required municipal permits for cigarette vending machines, with extremely restrictive provisions governing eligibility for the permits. Sellers using cigarette vending machines are required to have a State-issued, *location-specific* license, and the Court found the duplicative, and more restrictive, municipal permitting regime amounted to a *de facto* ban on activity directly licensed by the State. Bill 52-14 would not have this effect; State-licensed commercial pesticide applicators would still be permitted to work in the County under authority of their license, but with public health-based limitations on which pesticides²⁰ they could use on lawns. Also, beyond lawn applications, Bill 52-14 does not restrict pesticide use at all.

The other tobacco case, *Altadis U.S.A., Inc. v. Prince George's County*, the Court extended its holding in *Allied Vending*, finding that the State preempted local regulation of the field of packaging, sale, and distribution of tobacco products. 431 Md. 307, 316. As in *Allied Vending*, the Court relied heavily on the “tension between State law and local law” in its holding. *Id.* at 318. In *Altadis*, the preempted local law had the effect of prohibiting an activity that the State law expressly authorized. *Id.* As already discussed, Bill 52-14 would not have this effect.

Of the Maryland cases finding implied preemption, *Talbot County v. Skipper*, 329 Md. 481 (1993) is probably the closest to being analogous to the current situation, in that the local law in question burdened the exercise of an activity permitted by the State under State law. A key distinction, however, is that the relevant State law in *Skipper*, MD Environmental Code § 9-237, expressly “authorizes the permit holder to utilize sewage sludge according to the terms of the permit.” *Id.* at 483. As noted above, there is no such corollary provision in the State pesticide law; nowhere does the law grant authority to apply particular pesticides. Also, the Court in *Skipper* found indications of intent to preempt local regulation of sewage sludge utilization in the fact that the General Assembly had expressly provided for local government action in certain aspects of sewage sludge utilization, but not others. The Court reasoned that when express local authority is provided in some, but not all areas of a law, in areas “where the state statute has not authorized local government involvement, the Legislature likely contemplated that the regulation would be exclusively at the state level.” 329 Md. at 492. In contrast, the State pesticide law makes no provision, one way or the other, for local regulation of pesticide use. Finally, and perhaps more importantly, the regulatory scheme that the *Skipper* Court found sufficiently comprehensive to preempt local legislation had been substantially amended in response to the finding in *Ad+Soil* that the law was “far from comprehensive . . .” *Ad+Soil, Supra* 307 Md. at 328.

¹⁸ MD Agriculture Code § 5-208.1 does require integrated pest management systems in public schools and school grounds, which, in combination with the Court’s prior holding that the State has fully occupied the field of education (see, *McCarthy v. Board of Education of Anne Arundel County, supra*) would likely preempt the County from regulating pesticide use in public schools and on public school grounds.

¹⁹ *Allied Vending v. City of Bowie*, 332 Md. 279 (1993) and *Altadis U.S.A., Inc. v. Prince George's County*, 431 Md. 307 (2013).

²⁰ The definition of pesticide under State law (MD Agriculture Code § 5-201) is very broad and, like the County definition, includes pesticides that would not be categorized as “non-essential” under Bill 52-14’s provisions.

Amendments to State law since the County enacted existing pesticide law.

Local regulation of pesticides in Maryland is not widespread, but it is not new. Montgomery County has had laws in place regulating pesticide application for nearly 30 years.²¹ A 1986 law requires commercial pesticide applicators (“custom applicators”) to provide certain information to new customers prior to applying pesticides, and to post signs indicating that a pesticide has been applied to the lawn.²² Also, since 2000, the County has imposed certain storage, handling, and display requirements on retail sellers of pesticides.²³ In fact, the ultimately enacted County notice and signage bill prompted a 1985 opinion of the Maryland Attorney General. 70 *Md. Op. Atty. Gen.* 161 (1985). In that opinion, then-Attorney General Stephen H. Sachs opined that proposed County bill was preempted by FIFRA,²⁴ but that the bill “would not conflict with, or be preempted by, State law.” *Id.* At 163. The Attorney General determined that “[a]lthough State law regulates some aspects of pesticide application, it neither addresses the matters covered by Bill No. 26-85 nor ousts local jurisdictions of authority to act in this field.” *Id.*

In her letters to Delegates Reznik and Barve, Ms. Rowe acknowledges the 1985 opinion, and asserts that it “does not settle the issue raised here.” Ms. Rowe points out that “[s]ince that time, Maryland law has changed significantly, and it now regulates signs and requires that information be supplied to customers.”²⁵ The fact that the State law has changed significantly since the Prince George’s and Montgomery Counties began regulating pesticides is in itself significant, because the lack of reference to preexisting local law is a factor to consider in deciding whether the General Assembly intended to preempt a particular field. Generally, when the legislature fails to mention preexisting local laws, the General Assembly has shown an intent *not* to preempt. *See, Ad+Soil, supra*, 307 Md. at 333; *Sitnick, supra*, 254 Md. at 322; *Annapolis Waterfront Co., supra* 284 Md. at 393; *National Asphalt, Supra*, 292 Md. at 79; *Harker, Supra*, 316 Md. at 698. Although it enacted provisions very similar to existing local laws in Prince George’s and Montgomery Counties, the General Assembly made no mention of these laws. While certainly not dispositive, the General Assembly’s silence with regard to existing local pesticide regulation strengthens an argument that the legislature has intended to leave discretion to local jurisdictions in the regulation of pesticide application.

Failed attempts to expressly preempt in 1992, 1993 and 1994.

As previously discussed, existing State law covers pesticide registration and labeling, the licensing and certification of pest control consultants and applicators, and IPM in schools, but is

²¹ Prince George’s County enacted notice and signage requirements for pesticide applicators in 1985, and the Town of Manchester, Maryland in Carroll County has, since 1979, had the following local ordinance:

§ 147-11. Pesticides, herbicides and fungicides.

It shall be unlawful to apply a pesticide, herbicide or fungicide within the Town limits of Manchester without receiving permission therefor from the Mayor and Council 30 days in advance of application. Notice of date of application shall be posted in areas to be sprayed 10 days in advance of actual application. Notices of application shall be posted less than 100 yards apart. Any person applying a pesticide on any area of 10,000 square feet or less shall be exempt from the provisions of this section.

²² 1986 L.M.C., ch. 38, § 1, codified as §§ 33B-1 through 33B-4.

²³ 2000 L.M.C., ch. 34, § 1, codified as § 33B-5.

²⁴ This position was, as previously discussed, rejected by the U.S. Supreme Court in *Mortier*.

²⁵ Chapter 302, 1987 Laws of Maryland, added MD Agriculture Code § 5-208, imposing notice and signage requirements very similar to those enacted by Montgomery County a year earlier.

far from comprehensive when it comes to the *use* of pesticides. The General Assembly must have been aware of this when it considered post-*Mortier* local preemption bills in 1992, 1993 and 1994. In implied preemption cases, courts have sought to divine the *intention* of the legislature in enacting the potentially preemptive law. *See, Ad+Soil, supra*, 307 Md. at 328. The consideration of these bills evidences the legislature's understanding that the State law was not so comprehensive as to impliedly preempt local regulation of pesticides, and their decision not to enact any of these bills supports a conclusion that the General Assembly intended *not to preempt* local regulation.

In 1992, House Bill (HB) 762 and Senate Bill (SB) 549 were considered by the General Assembly. The bills would have broadly preempted local pesticide regulation, and would have given the Secretary of Agriculture "sole authority over the regulation of pesticide application and notification" and would have required the Secretary to "by regulation, adopt uniform requirements to implement the purposes of this subtitle." The bills would have allowed local laws in effect on October 1, 1992 to remain in effect as written, and would have provided for locality-specific pesticide regulation in the Secretary's "sole discretion." HB 762 was adopted by the House of Delegates, but did not pass the Senate.

In 1993, the approach was refined somewhat, with the proposed legislation, SB 429, giving the Secretary of Agriculture "general authority over the regulation of pesticides." The bill still would have greatly curtailed local pesticide regulation, requiring any more stringent local regulation to be considered and approved by a "Review Board" consisting of the Secretaries of Agriculture, Environment, and Natural Resources. To approve such regulation, the Review Board would have to find that the "further [local] regulation is necessary for the protection of the public health, safety, and welfare." In 1993, SB 429 was adopted by the Senate, but failed in the House.

A final attempt at express preemption was made in 1994, with HB 948 and SB 429 including provisions similar to their immediate predecessors in 1993. The Review Board would have expanded to five members, with the addition of the Secretaries of Economic and Employment Development and Health and Mental Hygiene. The 1994 bills would also have required a showing of a "special local need for more stringent regulation" to be approved by the Review Board. HB 948 was adopted by the House, *but only after amendments that would have expressly excluded Montgomery County from the preemptive provisions*. The bill, however, did not pass the Senate and did not become law.

As these bills show, in the early 1990s, immediately post-*Mortier*, the General Assembly believed that local jurisdictions in the State were empowered to regulate pesticide *application and notification*. Three times, the General Assembly considered legislation to restrict this local authority, and three times it decided not to do so.²⁶ Considering that no substantial provisions have been added since that time to expand the authority of the Secretary of Agriculture over pesticide regulation or to limit local authority, the legislative history gives a solid indication that the legislature has viewed its law as not restrictive of more stringent local pesticide regulation, both before and after 1992-1994.

²⁶ Ironically, if the 1994 bill as adopted by the House had passed the Senate, this entire discussion would likely be unnecessary, because the resulting law would have, by expressly "un-preempting" Montgomery County from the limits on local authority, effectively granted the County the authority it is now considering asserting.

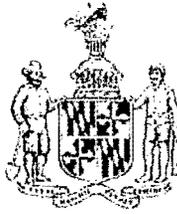
Conclusion

While true that such action *could* be found to be impliedly preempted, it is far from certain that a court would find the County preempted from banning the use of certain pesticides in certain places, with certain exceptions. Such a finding would go beyond what Maryland appellate courts have held in local preemption cases, and would mark a departure from the “concurrent power” doctrine articulated by the Court of Appeals in *Sitnick*, and adhered to since 1969. Further, the failed attempts at express preemption in the early 1990s seem to be evidence of the General Assembly’s understanding that the law was not preemptive, and an expression of intent not to preempt more restrictive local regulation of pesticides. While acknowledging the risk of an adverse determination, staff believes that the Council is on solid ground proceeding with the Bill’s current provisions.

BRIAN E. FROSH
ATTORNEY GENERAL

ELIZABETH F. HARRIS
CHIEF DEPUTY ATTORNEY GENERAL

THIRUVENDRAN VIGNARAJAH
DEPUTY ATTORNEY GENERAL



THE ATTORNEY GENERAL OF MARYLAND
OFFICE OF COUNSEL TO THE GENERAL ASSEMBLY

SANDRA BENSON BRANTLEY
COUNSEL TO THE GENERAL ASSEMBLY

KATHRYN M. ROWE
DEPUTY COUNSEL

JEREMY M. MCCOY
ASSISTANT ATTORNEY GENERAL

DAVID W. STAMPER
ASSISTANT ATTORNEY GENERAL

April 1, 2015

The Honorable Kirill Reznik
225 House Office Building
Annapolis, Maryland 21401-1991

Dear Delegate Reznik:

You have asked for advice concerning whether Agriculture Article ("AG"), Title 5, Subtitles 1 and 2 would preempt Montgomery County Bill 52-14. While the matter is not completely clear, it is my view that the general ban on application of non-essential pesticides may well be preempted, but that other parts most likely would not be.

Montgomery County Bill 52-14 makes numerous changes to existing Montgomery County ordinances governing pesticides, and adds some new provisions. It requires the County Executive to include a list of "non-essential pesticides" in regulations, which is to include all pesticides that receive certain ratings from the federal Environmental Protection Agency, the Ontario, Canada, Ministry of the Environment, and the European Commission. The regulations are also to contain a list of invasive species that may be detrimental to the environment in the County.

The bill also makes changes to the sign requirements for pesticide application with respect to placement and visibility of the signs. The existing requirements apply only to commercial applicators. In addition, the bill adds a similar sign requirement for property owners and tenants who apply pesticides on an area of more than 100 square feet.

The bill bars application of a non-essential pesticide to a lawn. The term lawn applies to mowed expanses generally, and includes athletic fields, but not golf courses. Exceptions are made for applications to control weeds listed in the County provision on weeds, to control invasive species, or pest control while engaged in agriculture, and for the maintenance of a golf course. In addition, it provides that an exception may be granted on request, if it is shown that there are no available alternatives, that the application will not violate federal or State law, and that the application is necessary to protect human health or prevent significant economic damage. An exception may also be granted on an emergency basis for pest outbreaks that pose a threat to human health or are likely to cause significant economic damage.

The bill also bars the use of a non-essential pesticide or neonicotinoid on County property, except larvicide or rodenticide as a public health measure to reduce the spread of disease vectors.

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This prohibition is subject to exceptions similar to those applicable to public use of non-essential pesticides. The prohibited pesticides can also be used if the Director of the County Department of Environmental Protection determines, after consultation with other officials that the use of the pesticide is necessary to protect human health or prevent imminent and significant economic damage and that no reasonable alternative is available. This determination must be reported to the County Council within 30 days.

Finally, the bill would require the Department of Environmental Protection to adopt an integrated pest management program for property owned by the County and would require the County Executive to implement a public outreach and education campaign before, during and after implementation of these provisions.

Montgomery County regulation of pesticides dates back to 1985, when the County adopted point of sale notification requirements and sign requirements related to commercial application of pesticides. In 1985, this office opined that this ordinance was preempted by the Federal Insecticide, Fungicide, and Rodenticide Act. 70 *Opinions of the Attorney General* 161 (1985).¹ The federal district court for Maryland and the Fourth Circuit followed suit. *Montgomery Pest Control v. Montgomery County*, 646 F. Supp. 109 (D. Md. 1986); *Maryland Pest Control Association v. Prince George's County*, 822 Md. 55 (4th Cir. 1987). Ultimately, the Supreme Court disagreed, holding that federal law permitted pesticide regulation by local jurisdictions as well as by the State itself. *Wisconsin Public Intervenor v. Mortier*, 501 US 597, 607-608 (1991).

In the 1985 Opinion, Attorney General Stephen H. Sachs also addressed whether State law would not preempt the Montgomery County ordinance and concluded that it would not. The Opinion stated that the objective of both State law and the ordinance was the safe use of pesticides. *Id.* at 5. Moreover, the Opinion found no express preemption and also found that the pesticide law did not so comprehensively regulate in the area that a court would be compelled to find preemption by implication. *Id.* Finally, the Opinion concluded that "there are no State regulations requiring lawn care businesses to post warning signs or to compel pesticide dealers to give customers safety information; hence there is no conflict between Bill No. 26-85 and State law." *Id.* Since that time, however, Maryland law has changed significantly, and it now regulates signs and requires that information be supplied to consumers. Chapter 302 of 1987, adding AG, § 5-208. Moreover, the proposed ordinance significantly expands County law. Thus, the 1985 Opinion does not settle the issue raised here.

As reflected in the 1985 Opinion, there are three ways in which State law may preempt a local law: 1) preemption by conflict; 2) express preemption; and 3) implied preemption. *Talbot*

¹ This opinion also concluded, however, that the regulation of the safe use of pesticides is plainly within the authority granted to Montgomery County under the Express Powers Act. 70 *Opinions of the Attorney General* at 163.

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County v. Skipper, 329 Md. 481, 487-488 (1993). Preemption by conflict arises when a local law prohibits an activity which is intended to be permitted by State law, or permits an activity which is intended to be prohibited by State law. *Id.* at 487 n. 4. With respect to either express or implied preemption, “the focus of the inquiry must be on whether the General Assembly has manifested a purpose to occupy exclusively a particular field.” *Ad+Soil, Inc. v. County Commissioners*, 307 Md. 307, 324 (1986). In this case it is clear that Maryland does not have express preemption in this area, though many states apparently do. See Memorandum from Josh Hamlin, Legislative Attorney, to the Montgomery County Council dated October 24, 2014, on Bill 52-14.

Most of the cases that have looked at State preemption in the context of the regulation of pesticides have found preemption. Most of these rely on field preemption. The cases are not as helpful as they could be, however, because different states apply different tests as to preemption, and, of course, the types of regulation that have been attempted at the local level vary greatly. See *Syngenta Seeds, Inc. v. County of Kauai*, 2014 WL 4216022 (D. Haw. Aug. 25, 2014) (local ordinance regulating application of restricted use pesticides held preempted by the “global or comprehensive mechanism for regulating pesticide licensing, sales, use, and enforcement within the State.”); *Pesticide Public Policy Foundation v. Village of Wauconda, Ill.*, 622 F.Supp. 423, 432 (N.D. Ill. 1985) (ordinance requiring user of pesticides to register and obtain local license preempted by statute setting out “an extensive, detailed, and comprehensive regulatory scheme for the use of pesticides within the State.”) *Village of Lacona v. State, Dept. of Agr. and Markets*, 858 N.Y.S.2d 833 (2008) (local regulation of field application of pesticides preempted where State official has been given exclusive jurisdiction “in all matters pertaining to the distribution, sale, use, and transportation of pesticides.”); *Minnesota Agr. Aircraft Ass'n v. Township of Mantrap*, 498 N.W.2d 40, 42 (Minn. App. 1993) (express preemption); *Town of Wendell v. Attorney General*, 476 N.E.2d 585 (1985) (local law requiring notice of proposed application and hearing to determine whether it presents a threat to health, the environment, or safety was preempted because it would “prevent the achievement of the identifiable statutory purpose of having a centralized, Statewide determination of the reasonableness of the use of a specific pesticide in particular circumstances.”); *Ames v. Smoot*, 471 N.Y.S.2d 128 (1983) (local regulation on aerial spraying of pesticides preempted by state law vesting “jurisdiction in all matters pertaining to the distribution, sale, use, and transportation of pesticides . . . exclusively in the Commissioner of Environmental Conservation.”); *Town of Salisbury v. New England Power Company*, 437 A.2d 281, 282 (N.H. 1981) (local restriction on the use of chemical defoliant preempted by comprehensive regulatory scheme); *Long Is. Pest Control Assn. v. Town of Huntington*, 341 N.Y.S.2d 93 (1973) (requirement that pesticides be registered with town before use or sale preempted by state law occupying the field of pesticide regulation). The only exception I have found is *Central Maine Power Co. v. Town of Lebanon*, 571 A.2d 1189 (Me. 1990). In that case, the court found that a local review process for certain types of pesticide use that was more stringent than state law did not frustrate the purposes of state law and thus was not preempted. *Id.* at 1195. That case, however, also involved a statute that expressly preserved some local authority.

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To start with the easy part, it is my view that the County, like any other property owner, has the right to determine how to deal with pests on its property, so long as the decision does not violate the law. I believe that this is the case even if it is found that the State has occupied the field of regulating pesticides, unless the State law expressly requires or prohibits certain actions on the part of local jurisdictions. Thus, the provisions of the proposed ordinance that prohibit the use of certain pesticides on county property except in certain circumstances, and the requirement that an integrated pest management program be developed for use on county property are not preempted.² It is also my view that it is within the power of a charter county to require the County Executive to implement a public education and outreach program on pretty much any subject. The other provisions of the bill raise more difficult problems.

Agriculture Article, Title 5, Subtitles 1 and 2 contain the State law on pesticides. Section 5-104(b) provides that the Secretary of Agriculture (“the Secretary”) may determine whether any pesticide is highly toxic to humans and may subject pesticides to the provisions of § 5-105 of the subtitle, which requires registration of each brand or product name of a pesticide before it is distributed in the State and allows the Secretary to require the submission of toxicological, environmental, or health effects data that he or she finds appropriate as well. Section 5-104(c) authorizes the Secretary to adopt, after public hearing, the rules and regulations of the appropriate agency of the United States government relating to pesticides, if the rules and regulations are applicable to and conform with the primary standards in the subtitle. The introductory language of this provision explains that “[u]niform pesticide requirements between the several states and the federal government are desirable to avoid confusion that endangers the public health and that results from diverse requirements, particularly relating to the labeling and coloring of pesticides.”³ Subtitle 1 also contains requirements about packaging and labeling, and permits the Secretary to issue a stop sale order if a violation is found to cause unreasonable adverse effects to humans, animals, or the environment, or is in violation of federal pesticide laws or regulations. AG §§ 5-106 and 5-108.

Agriculture Article, Subtitle 2 requires the Secretary to adopt regulations governing the storage, sale, distribution, exchange, use, and disposal of pesticides and containers, § 5-204(1),

² To the extent that the integrated pest management provision is applied to county property that is being used for a school, the program would also have to comply with the “uniform standards and criteria” developed by the State Department of Agriculture under AG § 5-208.1(c).

³ The court in *Ames v. Smoot*, 471 N.Y.S.2d 128 (1983) relied on a similar provision in New York law in finding that local regulations were preempted, saying “If the enhancement of national uniformity is a significant target of article 33, it would be a peculiar interpretation to view the statute as permitting New York's 62 counties, 929 towns, 556 villages and 62 cities (see NY St Legis Manual, 1980-1981, pp 956-1007) to adopt their own regulatory schemes concerning the use of pesticides within their geographical limits.” See also *Pesticide Public Policy Foundation v. Village of Wauconda, Ill.*, 622 F.Supp. 423, 430 (N.D. Ill. 1985).

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prescribe, when necessary, the time and conditions under which a pesticide may be sold, distributed, exchanged, or used in different areas of the State, § 5-204(2), provide that extremely hazardous pesticides may be sold, distributed, exchanged, or applied only when special permission first is obtained from the Secretary, § 5-204(3), define the formulations and establish the conditions and appropriate areas for application of any pesticide, § 5-204(4), and establish guidelines and regulations for the application of pesticides and require the keeping and submission of records, § 5-204(5) and (8). Subtitle 2 also regulates the information to be provided to customers when the pesticide is applied, § 5-208(a) and the placement and nature of signs to be posted when pesticides are applied, § 5-208(c). The law also classifies cyclodiene termiticides as restricted pesticides. AG § 5-210.5(b).

This law is in many ways similar to some of those that have been found to preempt local law by implication. It is not clear, however, that it should be read to have that result, at least not with all of the provisions of Bill 52-14.

A portion of Bill 52-14 requires the County Executive to make a list of non-essential pesticides and a list of invasive species. There is no similar requirement imposed on the Secretary or any other State official. Moreover, this provision is necessary to implement the prohibition of the use of non-essential pesticides on County property, which is not preempted. As a result, it is fair to conclude that this provision is not preempted.

The bill also adds a sign requirement for property owners and tenants who apply pesticides on an area of more than 100 square feet. The State law relating to signs applies only to licensees and public agency permittees. AG § 5-208(c)(1). Licenses are issued to places of business that engage in the business of pest control or pest control consulting. AG § 5-207(e). A public agency applicator is a person employed by a unit of federal, State, county or local government or any training institution which is engaged in pest control. AG § 5-201(p). Thus, it does not apply to property owners and tenants. As a result, this provision would not conflict with State law and does not regulate in an area that has clearly been occupied by State law.

Finally, the bill bars application of a non-essential pesticide to a lawn, subject to certain exceptions. This is, in my view, the provision that is most likely to be found to be preempted. As noted above, the Secretary has the power to regulate the sale, distribution, and use of pesticides, to set the time and conditions under which a pesticide may be sold or used in different areas of the State, to limit the sale and application of extremely hazardous pesticides, and establish the conditions and appropriate areas for application of any pesticide. The Secretary also may, “[f]or purposes of uniformity and in order to enter into cooperative agreements, adopt use classification and other pertinent pesticide regulation provisions that are established by the U.S. Environmental Protection Agency.” AG § 5-204(13). It is my view that a court could conclude that this provision would interfere with the purposes of these State provisions, as well as the goal of achieving uniformity.

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April 1, 2015
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Sincerely,

A handwritten signature in black ink, appearing to be 'KMR', with a long horizontal flourish extending to the right.

Kathryn M. Rowe
Assistant Attorney General

KMR/kmr
reznik09.wpd

BRIAN E. FROSH
ATTORNEY GENERAL

ELIZABETH F. HARRIS
CHIEF DEPUTY ATTORNEY GENERAL

THIRUVENDRAN VIGNARAJAH
DEPUTY ATTORNEY GENERAL



THE ATTORNEY GENERAL OF MARYLAND
OFFICE OF COUNSEL TO THE GENERAL ASSEMBLY

SANDRA BENSON BRANTLEY
COUNSEL TO THE GENERAL ASSEMBLY

KATHRYN M. ROWE
DEPUTY COUNSEL

JEREMY M. MCCOY
ASSISTANT ATTORNEY GENERAL

DAVID W. STAMPER
ASSISTANT ATTORNEY GENERAL

May 21, 2015

The Honorable Kumar P. Barve
251 House Office Building
Annapolis, Maryland 21401-1991

Dear Delegate Barve:

You have asked for advice concerning whether Agriculture Article, Title 5, Subtitles 1 and 2 would preempt Montgomery County Bill 52-14 and its proposal to ban the application of non-essential pesticides. While the matter is not completely free from doubt, it is my view that the general ban on the application of non-essential pesticides may well be preempted, but that the County would not be preempted from banning the use of non-essential pesticides on its own property.

Montgomery County Bill 52-14 makes numerous changes to existing Montgomery County ordinances governing pesticides, and adds some new provisions. Among these new provisions, is a requirement that the County Executive include a list of "non-essential pesticides" in regulations, which is to include all pesticides that receive certain ratings from the federal Environmental Protection Agency, the Ontario, Canada, Ministry of the Environment, and the European Commission. The bill would bar application of a non-essential pesticide on the list to a lawn, which is defined to include mowed expanses generally, including athletic fields, but not golf courses. Exceptions are made for applications of pesticide to control weeds listed in the County provision on weeds, to control invasive species, for pest control while engaged in agriculture, and for the maintenance of a golf course. In addition, an exception may be granted on request, if it is shown that there are no available alternatives, that the application will not violate federal or State law, and that the application is necessary to protect human health or prevent significant economic damage. An exception may also be granted on an emergency basis for pest outbreaks that pose a threat to human health or are likely to cause significant economic damage.

The bill also bars the use of a non-essential pesticide or neonicotinoid on County property, except larvicide or rodenticide as a public health measure to reduce the spread of disease vectors. This prohibition is subject to exceptions similar to those applicable to public use of non-essential pesticides. The prohibited pesticides can also be used if the Director of the County Department of Environmental Protection determines, after consultation with other officials that the use of the pesticide is necessary to protect human health or prevent imminent and significant economic damage and that no reasonable alternative is available. This determination must be reported to the County

The Honorable Kumar P. Barve
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Council within 30 days.

Montgomery County regulation of pesticides dates back to 1985, when the County adopted point of sale notification requirements and sign requirements related to commercial application of pesticides. In 1985, this office opined that this ordinance was preempted by the Federal Insecticide, Fungicide, and Rodenticide Act. 70 *Opinions of the Attorney General* 161 (1985).¹ The federal district court for Maryland and the Fourth Circuit followed suit. *Montgomery Pest Control v. Montgomery County*, 646 F. Supp. 109 (D. Md. 1986); *Maryland Pest Control Association v. Prince George's County*, 822 Md. 55 (4th Cir. 1987). Ultimately, the Supreme Court disagreed, holding that federal law permitted pesticide regulation by local jurisdictions as well as by the State itself. *Wisconsin Public Intervenor v. Mortier*, 501 US 597, 607-608 (1991).

In the 1985 Opinion, Attorney General Stephen H. Sachs also addressed whether State law would preempt the Montgomery County ordinance and concluded that it would not. The Opinion stated that the objective of both State law and the ordinance was the safe use of pesticides. *Id.* at 5. Moreover, the Opinion found no express preemption and also found that the pesticide law did not so comprehensively regulate in the area that a court would be compelled to find preemption by implication. *Id.* Finally, the Opinion concluded that “there are no State regulations requiring lawn care businesses to post warning signs or to compel pesticide dealers to give customers safety information; hence there is no conflict between Bill No. 26-85 and State law.” *Id.* The Opinion did not, however, address the ability of a County to ban or restrict the use of specific pesticides. Thus, the 1985 Opinion does not settle the issue raised here.

As reflected in the 1985 Opinion, there are three ways in which State law may preempt a local law: 1) preemption by conflict; 2) express preemption; and 3) implied preemption. *Talbot County v. Skipper*, 329 Md. 481, 487-488 (1993). Preemption by conflict arises when a local law prohibits an activity which is intended to be permitted by State law, or permits an activity which is intended to be prohibited by State law. *Id.* at 487 n. 4. With respect to either express or implied preemption, “the focus of the inquiry must be on whether the General Assembly has manifested a purpose to occupy exclusively a particular field.” *Ad+Soil, Inc. v. County Commissioners*, 307 Md. 307, 324 (1986). In this case it is clear that Maryland does not have express preemption in this area, though many states apparently do. See Memorandum from Josh Hamlin, Legislative Attorney, to the Montgomery County Council dated October 24, 2014, on Bill 52-14.

Most of the cases that have looked at State preemption in the context of the regulation of pesticides have found preemption. Most of these rely on field preemption. The cases are not as helpful as they could be, however, because different states apply different tests as to preemption, and,

¹ This opinion also concluded, however, that the regulation of the safe use of pesticides is plainly within the authority granted to Montgomery County under the Express Powers Act. 70 *Opinions of the Attorney General* at 163.

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of course, the types of regulation that have been attempted at the local level vary greatly. *See Syngenta Seeds, Inc. v. County of Kauai*, 2014 WL 4216022 (D. Haw. Aug. 25, 2014) (local ordinance regulating application of restricted use pesticides held preempted by the “global or comprehensive mechanism for regulating pesticide licensing, sales, use, and enforcement within the State.”); *Pesticide Public Policy Foundation v. Village of Wauconda, Ill.*, 622 F. Supp. 423, 432 (N.D. Ill. 1985) (ordinance requiring user of pesticides to register and obtain local license preempted by statute setting out “an extensive, detailed, and comprehensive regulatory scheme for the use of pesticides within the State.”); *Village of Lacona v. State, Dept. of Agr. and Markets*, 858 N.Y.S.2d 833 (2008) (local regulation of field application of pesticides preempted where State official has been given exclusive jurisdiction “in all matters pertaining to the distribution, sale, use, and transportation of pesticides.”); *Minnesota Agr. Aircraft Ass'n v. Township of Mantrap*, 498 N.W.2d 40, 42 (Minn. App. 1993) (express preemption); *Town of Wendell v. Attorney General*, 476 N.E.2d 585 (1985) (local law requiring notice of proposed application and hearing to determine whether it presents a threat to health, the environment, or safety was preempted because it would “prevent the achievement of the identifiable statutory purpose of having a centralized, Statewide determination of the reasonableness of the use of a specific pesticide in particular circumstances.”); *Ames v. Smoot*, 471 N.Y.S.2d 128 (1983) (local regulation on aerial spraying of pesticides preempted by state law vesting “jurisdiction in all matters pertaining to the distribution, sale, use, and transportation of pesticides . . . exclusively in the Commissioner of Environmental Conservation.”); *Town of Salisbury v. New England Power Company*, 437 A.2d 281, 282 (N.H. 1981) (local restriction on the use of chemical defoliants preempted by comprehensive regulatory scheme); *Long Is. Pest Control Assn. v. Town of Huntington*, 341 N.Y.S.2d 93 (1973) (requirement that pesticides be registered with town before use or sale preempted by state law occupying the field of pesticide regulation). The only exception I have found is *Central Maine Power Co. v. Town of Lebanon*, 571 A.2d 1189 (Me. 1990). In that case, the court found that a local review process for certain types of pesticide use that was more stringent than state law did not frustrate the purposes of state law and thus was not preempted. *Id.* at 1195. That case, however, also involved a statute that expressly preserved some local authority.

As a preliminary matter, it is my view that the County, like any other property owner, has the right to determine how to deal with pests on its property, so long as the decision does not violate the law. I believe that this is the case even if it is found that the State has occupied the field of regulating pesticides, unless the State law expressly requires or prohibits certain actions on the part of local jurisdictions. Thus, the provisions of the proposed ordinance that prohibit the use of certain pesticides on county property except in certain circumstances are not preempted. The extension of the restrictions on the use of non-essential pesticides to other properties, however, raises more difficult problems.

Agriculture Article, Title 5, Subtitles 1 and 2 contain the State law on pesticides. Section 5-104(b) provides that the Secretary of Agriculture (“the Secretary”) may determine whether any pesticide is highly toxic to humans and may subject pesticides to the provisions of § 5-105 of the

subtitle, which requires registration of each brand or product name of a pesticide before it is distributed in the State and allows the Secretary to require the submission of toxicological, environmental, or health effects data that he or she finds appropriate as well. Section 5-104(c) authorizes the Secretary to adopt, after public hearing, the rules and regulations of the appropriate agency of the United States government relating to pesticides, if the rules and regulations are applicable to and conform with the primary standards in the subtitle. The introductory language of this provision explains that “[u]niform pesticide requirements between the several states and the federal government are desirable to avoid confusion that endangers the public health and that results from diverse requirements, particularly relating to the labeling and coloring of pesticides.”² Subtitle 1 also contains requirements about packaging and labeling, and permits the Secretary to issue a stop sale order if a violation is found to cause unreasonable adverse effects to humans, animals, or the environment, or is in violation of federal pesticide laws or regulations. AG §§ 5-106 and 5-108.

Agriculture Article, Subtitle 2 requires the Secretary to adopt regulations governing the storage, sale, distribution, exchange, use, and disposal of pesticides and containers, § 5-204(1), prescribe, when necessary, the time and conditions under which a pesticide may be sold, distributed, exchanged, or used in different areas of the State, § 5-204(2), provide that extremely hazardous pesticides may be sold, distributed, exchanged, or applied only when special permission first is obtained from the Secretary, § 5-204(3), define the formulations and establish the conditions and appropriate areas for application of any pesticide, § 5-204(4), and establish guidelines and regulations for the application of pesticides and require the keeping and submission of records, § 5-204(5) and (8). Subtitle 2 also regulates the information to be provided to customers when the pesticide is applied, § 5-208(a) and the placement and nature of signs to be posted when pesticides are applied, § 5-208(c). The law also classifies cyclodiene termiticides as restricted pesticides. AG § 5-210.5(b). This law is in many ways similar to some of those that have been found to preempt local law by implication.

It is my view that, to the extent that the bill bars application of a non-essential pesticide to a lawn, subject to certain exceptions, it is likely to be found to be preempted. As noted above, the Secretary has the power to regulate the sale, distribution, and use of pesticides, to set the time and conditions under which a pesticide may be sold or used in different areas of the State, to limit the sale and application of extremely hazardous pesticides, and establish the conditions and appropriate areas for application of any pesticide. The Secretary also may, “[f]or purposes of uniformity and in

² The court in *Ames v. Smoot*, 471 N.Y.S.2d 128 (1983) relied on a similar provision in New York law in finding that local regulations were preempted, saying “If the enhancement of national uniformity is a significant target of article 33, it would be a peculiar interpretation to view the statute as permitting New York’s 62 counties, 929 towns, 556 villages and 62 cities (see NY St Legis Manual, 1980-1981, pp 956-1007) to adopt their own regulatory schemes concerning the use of pesticides within their geographical limits.” See also *Pesticide Public Policy Foundation v. Village of Wauconda, Ill.*, 622 F. Supp. 423, 430 (N.D. Ill. 1985).

The Honorable Kumar P. Barve

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order to enter into cooperative agreements, adopt use classification and other pertinent pesticide regulation provisions that are established by the U.S. Environmental Protection Agency.” AG § 5-204(13). It is my view that a court could conclude that this provision would interfere with the purposes of these State provisions, as well as the goal of achieving uniformity.

Sincerely,

A handwritten signature in black ink, appearing to read 'K. Rowe', with a long horizontal line extending to the right.

Kathryn M. Rowe
Assistant Attorney General

KMR/kmr
barve01.wpd



MONTGOMERY COUNTY COUNCIL
ROCKVILLE, MARYLAND

ROGER BERLINER
COUNCILMEMBER
DISTRICT 1

CHAIRMAN
TRANSPORTATION, INFRASTRUCTURE
ENERGY & ENVIRONMENT COMMITTEE

May 28, 2015

Attorney General Brian Frosh
Office of Attorney General
200 St. Paul Place
Baltimore, MD 21202

Dear Attorney General Frosh:

As you are aware, on April 1, Assistant Attorney General Kathryn M. Rowe wrote an opinion to Delegate Kirill Reznik on Montgomery County Bill 52-14, introduced by Council President Leventhal and currently being reviewed by the T&E Committee that I chair. I am writing today to obtain further guidance in light of your office's legal conclusion.

Ms. Rowe states that the provision of the bill that "bars application of a non-essential pesticide to a lawn...[is] the provision that is *most likely* to be found to be preempted" (emphasis added). She reaches this conclusion on the basis that the Secretary of Agriculture "has the power to regulate the sale, distribution, and use of pesticides," among other powers.

Given this finding, I believe it is appropriate and proper for our Council to explore the full range of otherwise available legal options that could result in significantly reducing the use of pesticides. To that end, I would ask for your analysis of whether the following measures would *not* be preempted by state law:

- A requirement that applicators in Montgomery County report the amount of pesticide they apply yearly in the County, for the purposes of establishing a pesticide-reduction goal;
- A requirement that residents sign a document that identifies the reported health risks associated with pesticides, acknowledges that organic alternatives exist, and directs (or not) a lawn care provider to adhere to Integrated Pest Management practices that calls for the use of pesticides as a last resort;
- A requirement that condo associations or homeowners associations be required to have an affirmative vote of the membership in order to apply pesticides;
- A requirement for additional reporting specifically for properties where children are frequently present, such as playgrounds and daycare facilities.

As our Council considers this significant issue, it is obviously important to know the scope of our authority. Your guidance in this regard is tremendously appreciated.

Thank you for your attention to this matter. I look forward to your reply.

Sincerely,

A handwritten signature in black ink, appearing to read 'R. Berliner', with a stylized flourish at the end.

Roger Berliner
Councilmember, District 1
Chair, Transportation, Infrastructure, Energy, and
Environment Committee

CC: Marc Hansen, County Attorney
Josh Hamlin, Legislative Attorney, Montgomery County Council
Councilmembers

BRIAN E. FROSH
Attorney General



ELIZABETH HARRIS
Chief Deputy Attorney General

THIRUVENDRAN VIGNARAJAH
Deputy Attorney General

STATE OF MARYLAND
OFFICE OF THE ATTORNEY GENERAL

FACSIMILE No.
(410) 576-7036

WRITER'S DIRECT DIAL No.
(410) 576-6327
asnzyder@oag.state.md.us

June 5, 2015

Via First Class Mail and Electronic Mail

The Honorable Roger Berliner
Councilmember
Montgomery County Council
Stella B. Werner Office Building
100 Maryland Avenue, 6th Floor
Rockville, Maryland 20850

Dear Councilmember Berliner:

I am writing to acknowledge our receipt of your request for guidance on whether Maryland law would preempt certain measures that Montgomery County might consider as a means of reducing the use of pesticides. In a letter of advice to Del. Reznik dated April 1, 2015, Assistant Attorney General Kathryn M. Rowe evaluated a county proposal to ban the application of non-essential pesticides and concluded that certain aspects of the proposed bill might be preempted by State law. You ask whether other alternative proposals related to pesticides might be similarly be at risk of preemption.

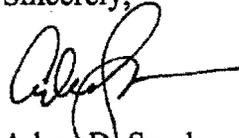
For reasons I will explain, we respectfully decline your request. Because our Office does not represent the County, we are unable to provide you with legal advice; that is the role of the County Attorney. And while we sometimes issue formal Opinions of the Attorney General to local governments, we do so only when resources allow and when the request raises significant questions of State law with potential ramifications beyond the local facts giving rise to the request. Although the preemption principles that your request involves are undoubtedly significant, they are not uncertain. Any uncertainty here arises from the application of those principles to the proposals that the County Council might consider. That, however, is an issue unique to Montgomery County and the specific legislative discussion that prompted your request.

Hon. Roger Berliner
June 5, 2015
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The principal purpose of providing formal Opinions of the Attorney General is to clarify uncertain issues of State law, not to review pending local legislation for constitutionality; again, that role is played by the County Attorney. And with several formal opinions already under review, we are not in a position to devote the resources necessary to take on the local issues you raise.

For all of these reasons, we must decline your request for a formal opinion of the Attorney General. Although I regret that we are unable to provide the guidance you seek, I nevertheless hope that you find this letter helpful.

Sincerely,



Adam D. Snyder
Chief Counsel, Opinions & Advice

cc: Marc Hansen, County Attorney (by email only)

MAKING SENSE OF LAWN CARE WITHOUT HERBICIDES

June 10, 2015

Weeds and other pests can make lawns hard to manage, unsightly and unsafe for play. Compost has been discussed as a tool for controlling weeds and other pests but the Maryland Lawn Fertilizer Law limits the rates and timing of fertilizers containing nitrogen and phosphorous.

Maryland Lawn Fertilizer Law

- No more than 0.9 pounds of nitrogen per 1,000 sq. ft. can be applied at a time.
- No more than 0.5 pounds of phosphorous per 1,000 sq. ft. can be applied per year.

Organic Lawn Care Industry Compost Recommendations Exceed Legal Limits

- SafeLawns.org recommends using two ¼-inch depth applications of compost per year to help control weeds as an alternative to herbicides.
- This level is in violation of Maryland law.

University of Maryland Analysis

- Dr. Mark Carroll, Associate Professor in the Plant Science and Architecture Department has done some analysis of commercially available compost.
- Based on his research, the maximum amount of compost that can be applied to remain compliant with Maryland law is less than a depth of 0.10 inches per application.
 - This is significantly lower than the organic lawn care industry recommends.
- These light rates of compost do not provide an alternative form of weed and pest management on lawns.
 - Compost applications exceeding these limits would be a violation of state law.

Compost applications can be an important part of lawn management but alone cannot replace other practices for weed and pest management.



Maryland Department of Agriculture

Office of Resource Conservation

Lawrence J. Hogan, Jr., Governor
Boyd K. Rutherford, Lt. Governor
Joseph Bartenfelder, Secretary
Mary Ellen Setting, Deputy Secretary

Nutrient Management Program

The Wayne A. Cawley, Jr. Building
50 Harry S. Truman Parkway
Annapolis, Maryland 21401
Internet: www.mda.maryland.gov

Agriculture | Maryland's Leading Industry

410.841.5959 Baltimore/Washington
410.841.5950 Fax
800.492.5590 Toll Free

Consumer Information Regarding COMMERCIAL FERTILIZER APPLICATIONS TO NON-AGRICULTURAL LAND

The *Fertilizer Use Act of 2011*—also known as *Maryland's Lawn Fertilizer Law*—authorizes the Maryland Department of Agriculture's (MDA) Nutrient Management Program to regulate the use of fertilizer on turf not used for agricultural purposes. All persons employed to apply nutrients to non-agricultural turf are required to be certified and licensed by MDA. The law applies to professionals for hire as well as individuals responsible for turf management at golf courses, public parks, airports, athletic fields, businesses, cemeteries and other non-agricultural properties. Maryland's *Lawn Fertilizer Law* went into effect October 1, 2013. The law only pertains to fertilizer products applied to turf—not gardens or landscaped areas. Following are some frequently asked questions concerning the new law.

Q. Why is there a new law for fertilizer?

A. Nutrients—primarily nitrogen and phosphorus—are key ingredients in lawn fertilizer. When it rains, excess nutrients can wash off the land and into the storm drains, streams and rivers that feed the Chesapeake Bay. Once in our waterways, excess fertilizers contribute to the growth of algae blooms that block sunlight from reaching Bay grasses, rob the water of oxygen and threaten underwater life. Maryland's Lawn Fertilizer Law is about protecting water quality in our streams, rivers and the Bay. If fertilizer products are applied to your lawn, this law affects you.

Q. I just want my lawn to be green and lush. Will the new law make it harder for me to have a nice lawn?

A. Most lawns benefit from annual fertilizer treatments to promote thick grass and improved pest and drought resistance. Healthy lawns absorb rainwater runoff and help keep soil and other pollutants from reaching waterways. Maryland's Lawn Fertilizer Law helps homeowners maintain healthy lawns without the use of unnecessary amounts of nutrients. The law spells out common sense practices that can reduce the risk of fertilizer runoff while promoting best management practices that support healthy lawns.

Q. What about farmers? Don't they use fertilizers too?

A. Lawn fertilizer now accounts for approximately 44 percent of the fertilizer sold in Maryland. While restrictions on fertilizer use have been in place for farmers since 2001, nutrient runoff from all major sources needs to be addressed if Maryland is to meet pollution caps established by the federal government and outlined in its "pollution diet" for the Chesapeake Bay.

Q. What is land not used for agricultural purposes?

A. A parcel of land that is not assessed for agricultural use under Tax-Property Article, § 8-209, Annotated Code of Maryland. This includes commercially managed home lawns, golf courses, athletic fields, cemeteries, and all state land.

Q. What is fertilizer?

A. A substance containing a recognized plant nutrient used for its plant nutrient content and designed for use, or claimed to have value in promoting plant growth. This may include substances that have not been registered with MDA as fertilizers. *Maryland's Lawn Fertilizer Law* addresses nitrogen and phosphorus content only. Potassium, lime and other nutrients are not considered a threat to water quality in the Chesapeake Bay at this time.

Q. What is the difference between a fertilizer and a pesticide?

A. Fertilizer products contain nutrients such as nitrogen, phosphorus and potassium that are used to help plants grow. Pesticides are used to control weed and insect pests and are regulated by MDA's Pesticide Regulation Section. Weed and Feed products contain fertilizers *and* pesticides and are regulated by both the Nutrient Management Program and MDA's Pesticide Regulation Section.

Q. How will these regulations affect the ability of my lawn service to maintain my lawn?

A. The amount and form of nitrogen fertilizer that may be applied in a single application to your lawn is limited. The annual total amount of fertilizer applied may not exceed the most recent University of Maryland Extension recommendations. Professionals may not apply fertilizer containing nitrogen or phosphorus to lawns between December 1 and March 1. Setbacks of 10-15 feet exist next to waterways, depending on the type of equipment used. Fertilizer containing phosphorus may not be applied to lawns unless a soil test indicates that it is needed or the lawn is being established, patched or renovated. In addition, if fertilizer lands on an impervious surface, it must be swept back onto the grass or cleaned up. For homeowners, the law encourages the use best management practices such as mowing the grass high to shade out weeds and leaving grass clippings on the lawn to provide free fertilizer.

Q. How can I tell if my lawn care professional is certified and licensed to fertilize my lawn?

A. MDA maintains a list of certified lawn care professionals on its website at www.mda.maryland.gov/fertilizer.

Q. If my lawn care provider is not permitted to apply certain fertilizer, can I do it myself instead?

A. No, except for the requirement to be certified and licensed, homeowners are subject to the same restrictions as professional lawn care providers. Specifically, the law requires both homeowners and lawn care professionals to obey fertilizer application restrictions, use best management practices when applying fertilizer, observe fertilizer blackout dates and follow University of Maryland recommendations when fertilizing lawns.

Q. My city/county already has a lawn fertilizer law. Which law do I follow?

A. Maryland's lawn fertilizer law is statewide and supersedes any existing local ordinances.

Q. Who can I contact for more information or if I have a question or problem?

A. Visit MDA's website at www.mda.maryland.gov/fertilizer or call the Nutrient Management Program directly at 410-841-5959.

###

Excess Fertilizer Harms the Chesapeake Bay

NUTRIENTS—primarily nitrogen and phosphorus—are key ingredients in lawn fertilizer. When it rains, excess nutrients can wash off the land and into the storm drains, streams and rivers that feed the Chesapeake Bay. Once in our waterways, excess fertilizers contribute to the growth of algae blooms that block sunlight from reaching Bay grasses, rob the water of oxygen and threaten underwater life.

Lawn fertilizer now accounts for approximately 44 percent of the fertilizer sold in Maryland. While certain restrictions on fertilizer use have been in place for farmers since 2001, everyone needs to do their part to help Maryland meet new pollution caps established by the federal government and outlined in its "pollution diet" for the Chesapeake Bay.

Maryland's Lawn Fertilizer Law helps protect the Chesapeake Bay from excess nutrients entering its waters from a wide range of non-agricultural sources, including golf courses, parks, recreation areas, athletic fields, businesses and hundreds of thousands of urban and suburban lawns.

Answers to FAQs about Maryland's Lawn Fertilizer Law

- Q Just want my lawn to be green and lush. Does the law make it harder for me to have a nice lawn?

A Maryland's Lawn Fertilizer Law helps homeowners maintain healthy lawns without using unnecessary amounts of nutrients. The law spells out common sense practices that can reduce the risk of fertilizer runoff while promoting best management practices that support healthy lawns.
- Q My city/county already had a lawn fertilizer law. Which law do I follow?

A Maryland's lawn fertilizer law is statewide and supersedes any existing local ordinances.
- Q If my lawn care provider is not permitted to apply the type and amount of fertilizer I want, can I do it myself instead?

A No. Homeowners are subject to the same fertilizer application restrictions as lawn care providers.

PROTECTING THE CHESAPEAKE BAY

Maryland's Lawn Fertilizer Law

What Lawn Care Professionals, Homeowners and Businesses Need to Know and Do



Maryland Department of Agriculture
Office of Resource Conservation
Nutrient Management Program - Turfgrass
50 Harry S. Truman Parkway
Annapolis, Maryland 21401
410-841-5959
mda.maryland.gov/fertilizer

HOME GARDEN
Information Center
UNIVERSITY OF MARYLAND EXTENSION
extension.umd.edu/hgic



Larry Hogan, Governor
Boyd Rutherford, Lt. Governor

Joseph Bartenfelder, Secretary
Mary Ellen Setting, Deputy Secretary

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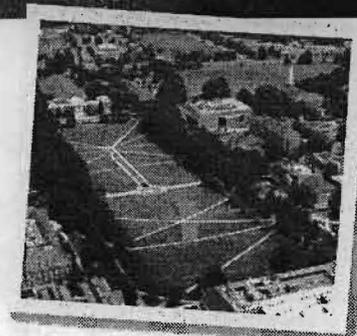
Requirements for Lawn Fertilizer Products Sold in Maryland

Maryland's Lawn Fertilizer Law limits the amount of nutrients that can be applied to lawns or turf and restricts phosphorus content in lawn fertilizer. The goal is to help homeowners and lawn care professionals maintain healthy lawns without applying unnecessary amounts of nitrogen and phosphorus.

Phosphorus-Free Lawn Fertilizer

Many Maryland soils provide all the phosphorus that established lawns need. Applying more phosphorus is unnecessary and will not benefit lawns. Maryland's Lawn Fertilizer Law prohibits lawn fertilizer products from containing phosphorus. Look for the middle number on a bag of fertilizer. It should be

zero. Specialty products containing phosphorus are still available and may be used when a soil test indicates the need for phosphorus or when a homeowner or business is establishing, repairing or patching a lawn. The law applies only to fertilizer products labeled for use on turf—not those used in gardens.



Nitrogen Content Reduced

To further reduce nutrient runoff, all lawn fertilizer products are now labeled to ensure that no more than 0.9 pound of total nitrogen is applied per 1,000 square feet, per application. At least 20 percent of the nitrogen must be slow release to help minimize losses to the environment. Nitrogen content is represented by the first number on the fertilizer bag. Annual nitrogen limits established by the University of Maryland apply. Homeowners should visit extension.umd.edu/hgic for seasonal and yearly fertilizer rates.

How to Read a Fertilizer Bag

All fertilizer products are labeled with three numbers indicating the percentage of nitrogen, phosphorus and potassium (N, P, and K), the three main plant nutrients. Nitrogen promotes grass shoot growth and leafy top growth, phosphorus encourages root, flower and fruit production and potassium fosters hardiness, disease resistance and durability. A bag of 15-0-5 fertilizer contains 15 percent nitrogen, 0 phosphorus (as required by Maryland law) and 5 percent potassium. In terms of weight, a 10 pound bag of 15-0-5 fertilizer contains 1.5 lbs. of nitrogen, zero phosphorus and .5 lb. of potassium. Maryland's Lawn Fertilizer Law addresses nitrogen and phosphorus content only. Potassium is not considered a threat to water quality in the Chesapeake Bay.





Lawn Care Professionals Must Be Certified

Lawn care professionals hired to apply fertilizer to turf must be certified by the Maryland Department of Agriculture or work under the direct supervision of an individual who is certified. The law applies to professionals for hire as well as individuals responsible for turf management at golf courses, public parks, airports, athletic fields, businesses, cemeteries and other non-agricultural properties.

Register for Training and Certification

MDA offers fertilizer applicator training sessions and certification exams throughout the year and publishes a list of certified professional fertilizer applicators on its website. Lawn care pros should visit mda.maryland.gov/fertilizer for an exam schedule and to download the training manual and study guide.

Renew Certificates Annually by June 30

Certificates are renewable yearly with a \$100 fee and verification of two hours of annual recertification training.

Apply for a Business License

Licenses are required for individuals or businesses engaged in fertilizing turf. Businesses are required to employ at least one certified professional fertilizer applicator. Licenses are valid for one year and license holders are required to file an annual activity report with MDA covering the previous year.

Avoid Penalties

Violators are subject to civil penalties of up to \$1,000 for the first violation and \$2,000 for each subsequent violation.

Homeowner Requirements and Tips



Homeowners and do-it-yourselfers are required to obey fertilizer application restrictions. (see below, left), observe fertilizer blackout dates and follow University of Maryland (UMD) recommendations when fertilizing lawns. Follow these best management practices for a healthy lawn and healthy waterways.

- Read and follow all label directions on the fertilizer bag.
- Mow the grass high to shade out weeds.
- Remove no more than 1/3 of the grass height at each mowing.
- Leave grass clippings on the lawn to provide free fertilizer.
- Sharpen lawnmower blades in the spring.
- Let established lawns go dormant during the hot, dry summer months.



If You Hire a Lawn Care Service

Individuals and businesses that hire lawn care providers should confirm that professionals are certified and licensed by the Maryland Department of Agriculture. MDA maintains a list of certified lawn care professionals on its website at mda.maryland.gov/fertilizer.

In addition, requests for bids, work orders, job specifications, and service contracts should be written to ensure that work performed does not conflict with Maryland's restrictions on fertilizer type, timing, amount and application. Contact MDA's Turfgrass Nutrient Management Program to determine whether specifications are within the law. When hiring a lawn care professional it is important to:

- Identify streams, gullies or other environmentally sensitive areas.
- Inspect the property after a lawn care application to confirm that fertilizer has not been applied to sidewalks, driveways or other impervious surfaces.
- Be aware of fertilizer blackout dates.

Fertilizer Restrictions

For Homeowners and Professionals

- Everyone must follow University of Maryland fertilizer recommendations.
- A single fertilizer application may not exceed 0.9 pound total nitrogen per 1,000 square feet and 0.7 pound of soluble nitrogen per 1,000 square feet except when using enhanced efficiency fertilizer.
- For additional guidance, homeowners should visit extension.umd.edu/hgic. For annual nitrogen recommendations, lawn care professionals should consult the *Maryland Professional Lawn Care Management Manual* at mda.maryland.gov/fertilizer.
- Phosphorus may only be applied to lawns when a soil test indicates that it is needed or when a lawn is being established, patched or renovated.
- Fertilizer may not be used to de-ice walkways and driveways.
- It is against the law to apply fertilizer to sidewalks, driveways or paved surfaces. Fertilizer that lands on these surfaces must be swept back onto lawns or cleaned up.
- Do not apply fertilizer if heavy rain is predicted.
- Do not apply fertilizer within 15 feet of waterways. This setback is reduced to 10 feet if a drop spreader, rotary spreader with deflector or targeted spray liquid is used to apply fertilizer.
- Lawn fertilizer may not be applied between November 15 and March 1.*
- Enhanced efficiency fertilizers may be applied at a rate of 2.5 pounds per 1,000 square feet or 80% of the annual UMD nitrogen recommendation, whichever is less. The product must be approved as an enhanced efficiency fertilizer by the Maryland State Chemist.

*For Lawn Care Professionals only:

- From November 16 through December 1 only water soluble nitrogen (no slow release) may be applied to lawns at a maximum rate of 0.5 pound per 1,000 square feet.
- Natural organic or organic products (animal, plant or mineral-based as opposed to synthetic) containing phosphorus may not exceed 0.25 pound of phosphorus per 1,000 square feet with an annual maximum of 0.5 pound of phosphorus per 1,000 square feet. These products may not be applied when soils test at "optimum to excessive" for phosphorus levels.

How To Fertilize Your Lawn Responsibly

It's All in the Bag

Maryland's Lawn Fertilizer Law in a Nutshell

Maryland's lawn fertilizer law helps protect the Chesapeake Bay from excess nutrients entering its waters from lawns and other managed grassy areas. If you fertilize your lawn yourself, here's what you need to know and do to prevent excess nutrients from washing off your property and into storm drains, streams, and rivers that feed the Bay.

- Do not over-fertilize. Follow University of Maryland fertilizer recommendations at extension.umd.edu/hgic.
- A single fertilizer application may not exceed 0.9 pound total nitrogen per 1,000 square feet which can include no more than 0.7 pound of soluble nitrogen per 1,000 square feet. For seasonal and yearly fertilizer rates, visit extension.umd.edu/hgic. Search for HG 112.
- Most Maryland lawns have sufficient phosphorus. Do not apply phosphorus to lawns unless a soil test shows that your soil is in the low to medium range or you are establishing or renovating your lawn.
- Keep fertilizer applications 10 to 15 feet from waterways.
- Fertilizer applications are prohibited between November 15 and March 1.
- Do not fertilize when the ground is frozen or if heavy rain is predicted.
- Do not use fertilizers to de-ice walkways and driveways.
- If fertilizer lands on an impervious surface, sweep it back onto the grass or clean it up.

How to Read a Fertilizer Label

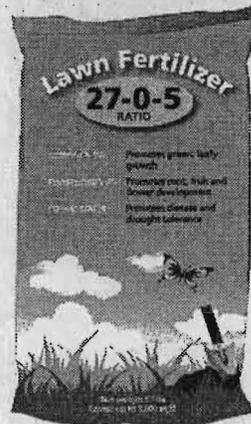
All fertilizer products are labeled with three numbers separated by dashes that represent the percent by weight of the three most important plant nutrients:

Nitrogen (N) — Promotes green, leafy growth

Phosphorus (P) — Promotes root, fruit and flower development

Potassium (K) — Promotes disease and drought tolerance

These numbers are always displayed in the same order. A 17 lb bag of 27-0-5 fertilizer contains 27 percent N, 0 percent P (as required by Maryland law) and 5 percent K. The weight of the fertilizer bag and the amount of area covered by the product are listed on the fertilizer label. Look for this information so that you will know how much fertilizer to buy.



Read the fertilizer label for important information about the contents of the bag.

Calculate Your Lawn's Square Footage

Calculate the area of your lawn to determine how much fertilizer to buy. Do not buy more fertilizer than you need and always read and follow label instructions.

To calculate your lawn's square footage, multiply your lawn's length by its width. Next, subtract the areas not to be fertilized such as the house, deck, driveway and garden. The remaining area is the square footage of your lawn.

Example

Total Lot Size:	130 ft x 50 ft = 6,500 sq ft
Subtract:	
House:	25 ft x 30 ft = 750 sq ft
Deck:	10 ft x 15 ft = 150 sq ft
Driveway:	40 ft x 10 ft = 400 sq ft
Garden:	10 ft x 20 ft = 200 sq ft
Total Area to Subtract:	1,500 sq ft
Total Lawn Area:	5,000 sq ft

Fertilize at the Right Time

To prevent runoff, fertilizer should only be applied to lawns when the grass is actively growing. Fertilize warm season grasses (Bermudagrass and Zoysiagrass) in late spring or summer and cool season grasses (fescues, bluegrass) in fall, based on soil test results. Do not exceed single and yearly application limits.

Grass	September	October	Late May	Early June	July	August	Maximum Yearly
Tall fescue	0.9 lb	0.9 lb	0.5-0.9 lb <i>if needed</i>	—	—	—	2.7 lbs
Kentucky bluegrass	0.9 lb	0.9 lb	0.5-0.9 lb <i>if needed</i>	—	—	—	2.7 lbs
Fine fescue	—	0.9 lb	0.5 lb	—	—	—	1.4 lbs
Bermudagrass	—	—	—	0.9 lb	0.5-0.9 lb <i>if needed</i>	—	2.7 lbs
Zoysiagrass	—	—	—	0.9 lb	0.5-0.9 lb <i>if needed</i>	—	1.8 lbs

Don't Over-Fertilize

Fertilizer products sold in Maryland are labeled to ensure that no more than 0.9 pound of total nitrogen is applied per 1,000 square feet in a single application. Simply follow the directions on the fertilizer bag to comply with Maryland's fertilizer limits. For quick reference, the chart on the right shows common lawn fertilizer formulations and the amount of fertilizer needed to supply an application rate of 0.9 pound of nitrogen per 1,000 square feet or a lighter application of 0.5 pound of nitrogen per 1,000 square feet.

Numbers on fertilizer bag	Amount of fertilizer needed to supply 0.9 lb of nitrogen per 1,000 sq ft	Amount of fertilizer needed to supply 0.5 lb of nitrogen per 1,000 sq ft
6-0-0	15 lbs	8.3 lbs
10-0-4	9 lbs	5 lbs
15-0-6	6 lbs	3.3 lbs
20-0-5	4.5 lbs	2.5 lbs
30-0-3	3 lbs	1.7 lbs
35-0-5	2.5 lbs	1.4 lbs

To manually calculate pounds of fertilizer to apply, use this formula:

$$\frac{\text{Desired rate of N in lbs (e.g., 0.9 lb)}}{\text{First number on fertilizer bag (expressed as a decimal)}} = \text{Lbs needed to fertilize 1,000 sq ft}$$

Apply Fertilizer Properly

Never apply fertilizer by hand. Use a drop or rotary spreader to apply fertilizer evenly to your lawn and always keep fertilizer applications 10 to 15 ft from waterways. To prevent striping, overlap wheel tracks of the drop spreader. Spread half of the fertilizer in a north-south direction and the other half in an east-west direction. Always check the fertilizer product for recommended spreader settings.

Mow to the Right Height

- Mow the grass high to shade out weeds and conserve moisture.
- Remove no more than 1/3 of the grass height each time you mow.
- Sharpen your lawnmower blade in spring.

Turf Type	Spring & Summer	Fall
Tall fescue	2½ - 3½ inches	2½ inches
Kentucky bluegrass	2½ - 3½ inches	2 - 2½ inches
Fine fescue	2½ - 3½ inches	2½ inches
Bermudagrass	1½ - 2 inches	1½ - 2 inches
Zoysiagrass	1½ - 2 inches	1½ - 2 inches

More Tips

- Leave grass clippings on the lawn. They provide free slow-release fertilizer.
- Let established lawns go dormant during the hot, dry summer months.
- If you must water (and watering is not prohibited due to drought conditions) do so in the early morning using a sprinkler.
- Footprints and a blue-grey appearance are signs that your lawn is thirsty.

- Water slowly; wet to a depth of 4 to 6 inches.
- Avoid water run-off from the lawn.
- Light, frequent watering or watering in the evening can damage your lawn.

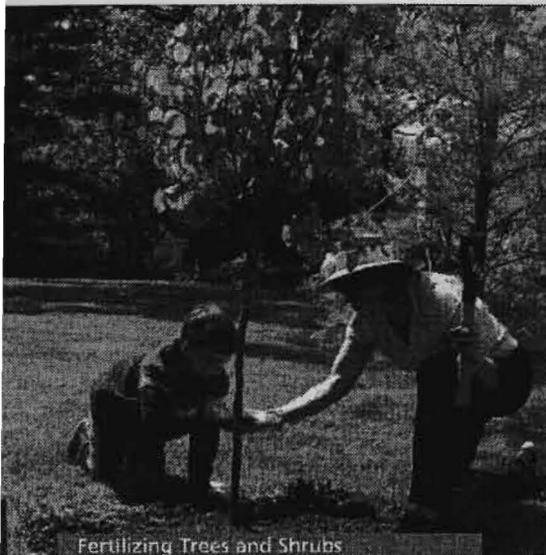
TIP: Place a container on the lawn during irrigation. When one inch of water is collected, you can turn off the sprinkler.



Maryland
Department of Agriculture
Office of Resource Conservation
mda.maryland.gov/fertilizer

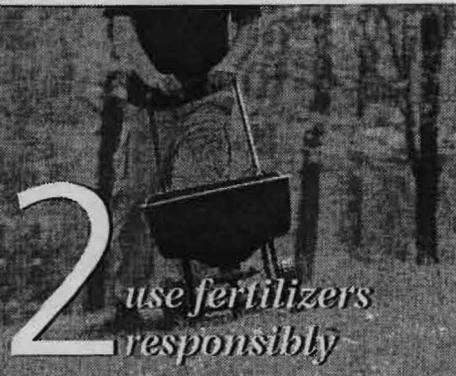
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Fertilizing Trees and Shrubs

- Try to use native plants that require less fertilizer and often have a better survival rate.
- Healthy trees do not need fertilizer. Undersized leaves and short new twig growth could indicate a need for fertilizer.
- Yellow leaves may indicate a need for fertilizer, although insects or disease can cause this symptom. Check out all possibilities before deciding to fertilize. If fertilizer is needed, apply in mid-fall after the leaves have fallen. Do not fertilize trees and shrubs in summer or early fall, since this interferes with plant preparations for winter dormancy.
- If a fertilizer is needed, choose one with a slow release form of nitrogen. Apply fertilizer to the area under the tree, beginning at the midpoint between the trunk and the drip line and extending approximately 8 feet beyond. The recommended rate is no more than 1 pound of nitrogen per 1,000 square feet.
- Do not use fertilizer spikes; they can burn tree roots.



Protect the Chesapeake Bay

Like farmers, homeowners play an important role in protecting our soil and water resources, especially the Chesapeake Bay. This series of fact sheets highlights various conservation measures—best management practices—that farmers use to produce healthy crops and protect water quality in the Chesapeake Bay and its tributaries. Homeowners can apply these same conservation measures to home, lawn, garden and landscape projects. Working together, we can make a difference for the Bay. For more information on ways to improve your lawn or garden and protect the Bay, contact the organizations on the back panel.

Fertilizers and the Chesapeake Bay

Over the years, we have learned that excess fertilizers from farm fields, public parks, golf courses, and hundreds of thousands of suburban lawns are washing off the land and finding their way into streams, rivers, and the Chesapeake Bay. Once in our waterways, fertilizers designed to make our crops healthy and our lawns lush and green, fuel the growth of harmful algae. As algae grow, they block sunlight from reaching Bay grasses, rob the water of oxygen, and threaten underwater life.

Nutrients—primarily nitrogen and phosphorus—are key ingredients in fertilizer. Since 2001, farmers have been required to use nutrient management plans to protect waterways from fertilizer runoff. In 2011, Maryland passed the *Fertilizer Use Act*. Its aim is to reduce the amount of nutrients washing into the Bay from non-agricultural sources—mainly lawns and other grassy areas.

The *Fertilizer Use Act* (Maryland's Lawn Fertilizer Law) requires both homeowners and lawn care professionals to obey fertilizer application restrictions, use best management practices when applying fertilizer, observe fertilizer blackout dates and follow University of Maryland recommendations when fertilizing lawns. Read on to learn more.

THE BASICS—Test Your Soil

Farmers test their soil to determine the precise amount and type of fertilizer needed for a healthy crop. A soil test will do the same for your lawn or garden. The basic test measures the soil's pH (acidity) as well as phosphorus, potassium and magnesium, three important plant nutrients. Special tests are available to help diagnose less common soil fertility problems.

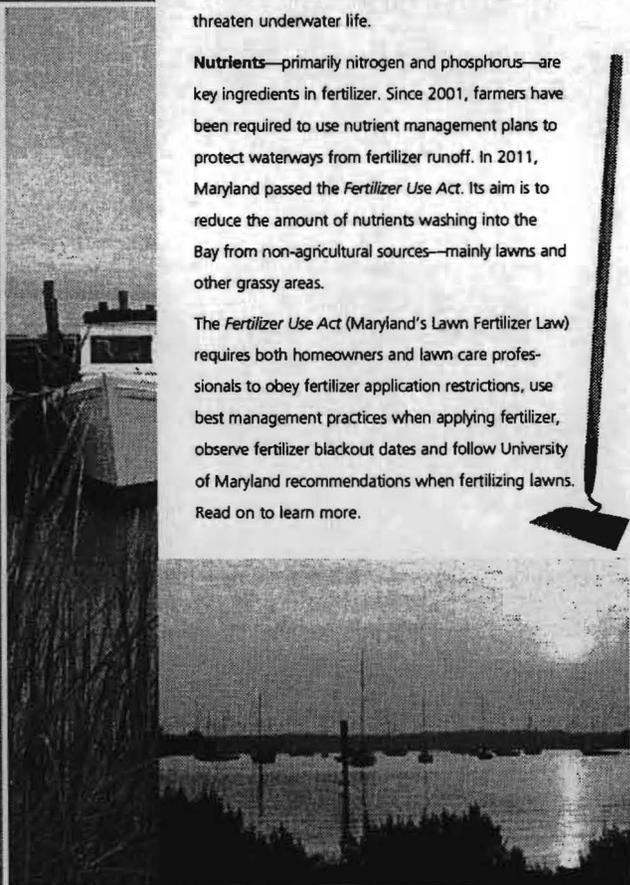


Visit the Home and Garden Information Center at extension.umd.edu/hgic for soil testing information and a video on how to take a soil sample. Ideally, soil samples should be taken well before the planting season using the following guidelines:

- New lawns: test after grading, but before seeding
- Vegetable gardens: test every three years
- Established lawns, landscape plants, and perennial gardens: test every three years

Understanding Fertilizers

- All fertilizer products are labeled with three numbers indicating the percentage of nitrogen, phosphorus and potassium (N, P, K), the three main plant nutrients. Nitrogen promotes grass shoot growth and leafy top growth, phosphorus encourages root, flower and fruit production, and potassium fosters hardness, disease resistance and durability.
- A fertilizer is referred to as "complete" when it contains all three plant nutrients. A bag of 15-10-10 fertilizer, for example, contains 15 percent nitrogen, 10 percent phosphorus and 10 percent potassium. In terms of weight, a 10 pound bag of 15-10-10 fertilizer contains 1.5 lbs. of nitrogen.
- Some plants require more of some nutrients than others. Root crops, such as carrots, garlic and radishes require less nitrogen than leafy crops such as lettuce or spinach.
- Fertilizer should always be applied according to soil test results. Remember, too much fertilizer may burn your lawn or landscape plants.
- Lime may be applied to acidic soils based on soil test results. Limestone does not pollute water if it is used and handled according to the manufacturer's instructions.
- Many soils in Maryland provide all the phosphorus that established lawns need. Lawn fertilizer products sold in Maryland do not contain phosphorus unless they are labeled for use in establishing lawns or patching a small area.
- In these instances, you may purchase specially labeled starter fertilizer for lawns that contains phosphorus. Starter fertilizer may also be purchased when a soil test indicates that it is needed.



Maryland Department of Agriculture
Office of Resource Conservation
50 Harry S. Truman Parkway
Annapolis, MD 21401
410-841-5863
mda.maryland.gov/fertilizer

HOME GARDEN INFORMATION CENTER
UNIVERSITY OF MARYLAND SYSTEM
12005 Homewood Road
Elkott City, MD 21042
extension.umd.edu/hgic



Larry Hogan
Governor

Boyd Rutherford
Lt. Governor

Joseph Bartenfelder
Secretary

Mary Ellen Setting
Deputy Secretary

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Excess nitrogen running off the land poses a major threat to the health of the Chesapeake Bay. To help minimize nitrogen losses to the environment, at least 20 percent of the nitrogen contained in lawn fertilizer products sold in Maryland is in a slow release form.

When fertilizing lawns or home landscapes, look for products that contain Water Insoluble Nitrogen, abbreviated "WIN." This means that the nitrogen will release slowly over time. Products labeled with the terms controlled release nitrogen, sulfur coated urea, IBDU, urea formaldehyde or resin coated urea also indicate slow release forms of nitrogen.

Cottonseed meal, blood meal, bone meal, fish emulsion, compost and manures are examples of natural fertilizers. Compost and manures also add valuable organic matter to the soil.

Fertilizing Lawns

Maryland's Lawn Fertilizer Law limits the amount of nutrients that can be applied to lawns or turf and restricts phosphorus content in lawn fertilizer. The goal is to help homeowners and lawn care professionals maintain healthy lawns without applying unnecessary amounts of nitrogen and phosphorus.

- Fertilizer products sold in Maryland are labeled to ensure that no more than 0.9 pound of total nitrogen is applied per 1,000 square feet in a single application. Follow the directions on the fertilizer bag to comply with the law. Visit extension.umd.edu/hgk for seasonal and yearly recommendations.
- Phosphorus may only be applied to lawns when a soil test indicates that it is needed or when the homeowner is establishing a lawn or patching a small area.
- It is against the law to apply fertilizer to sidewalks, driveways or other impervious surfaces. Any product that lands on these surfaces must be swept back onto lawns or cleaned up.
- Do not apply fertilizer within 15 feet of waterways. This setback is reduced to 10 feet if a drop spreader, rotary spreader with deflector or targeted spray liquid is used to apply fertilizer.
- Do not apply lawn fertilizer between November 15 and March 1, when the ground is frozen or if heavy rain is predicted.
- Fertilizers may not be used to de-ice walkways and driveways.

MOWING GUIDE

	Spring and Summer	Fall and Winter
Tall Fescue	2 1/2 - 3 1/2 inches	2 1/2 inches
Perennial Ryegrass	2 1/2 - 3	2 - 2 1/2
Kentucky Bluegrass	2 1/2 - 3 1/2	2 - 2 1/2
Fine Fescue	2 1/2 - 3 1/2	2 1/2
Bermudagrass	1 1/2 - 2	1 1/2 - 2
Zoysiagrass	1 1/2 - 2	1 1/2 - 2

Mow to the Right Height

- Mowing lawns to the proper height can reduce weeds by as much as 80 percent. Low and infrequent mowing can damage your lawn as well.
- Remove no more than 1/3 of the grass height each time you mow. For example, to maintain a 3-inch height, do not let the grass get much taller than 4 1/2 inches. Sharpen lawn mower blades in the spring. A dull blade can damage grass.

Select the Right Grass

- Select grasses that do not require substantial fertilizer applications. Check out new, improved varieties of tall fescue and bluegrass.
- Ask for certified seed—it's worth the extra effort and cost. If you don't see a tag indicating certification by the Maryland Department of Agriculture, you may be getting too many weeds with your seeds.

Fertilize at the Right Time

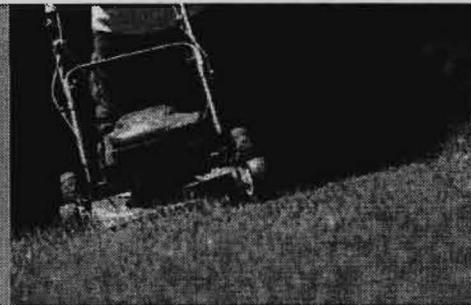
- Cool season grasses (fescue, bluegrass, ryegrass) should be fertilized in late summer or early fall to help the grass recover from summer stresses. Nitrogen uptake in the fall is at its peak for cool season grasses.
- Zoysiagrass and Bermudagrass are warm season grasses that should be fertilized in early summer when they are growing most actively.

Recycle Grass Clippings (Grasscycling)

- Grass clippings are a free source of nutrients and will not cause thatch problems. Grasscycling can reduce your lawn's nitrogen requirement by 50 percent.
- If clippings are too long, they may clump. Rake up excessive clippings for mulch or compost and mow more frequently.
- Sweep or blow grass clippings and other lawn debris away from street gutters.

Aerate the Soil

- Aerate the soil to reduce compaction. Lawn care professionals can provide this service or you can rent an aerator from a lawn and garden supplier.



Let Lawns Go Dormant

- Some grass species have natural dormancy periods and will turn brown. Applying fertilizer to force a lawn to turn green during its dormancy period can damage the grass. It is safe to let an established lawn go dormant in summer.
- Dormancy is a natural survival mechanism and lawns usually recover when the rains return. Dormant lawns continue to protect water quality by holding soil and nutrients in place.

Using A Lawn Care Service

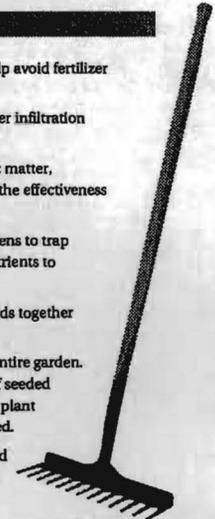
- A lawn care service is a popular alternative for homeowners who would rather have someone else care for their lawns. If you decide to use a lawn care service, follow these important guidelines to help ensure an attractive lawn and a healthy environment.
- Get recommendations from friends and neighbors. Research lawn care providers online. Call/email several firms and ask for information to be sent to you.
 - Make sure that the firm and its personnel are licensed and certified by the Maryland Department of Agriculture's (MDA) Pesticide Regulation Section. Trained personnel are issued identification cards from MDA and the business

license number must be painted on the service vehicle. Call 410-841-5710, if you are unsure.

- Lawn care professionals who apply fertilizers must also be licensed and certified by MDA's Nutrient Management Program. Visit mda.maryland.gov/fertilizer for a list of licensed and certified fertilizer applicators.
- Soil tests must be taken if phosphorus will be applied to the lawn. Ask for a copy of the soil test results.
- Make certain the company provides you with health, safety, or precautionary information taken from the labels of the products it plans to apply to your lawn.

Fertilizing Gardens

- Choose a level site for a garden to help avoid fertilizer runoff after heavy rains.
- Use organic mulches to improve water infiltration and keep rainwater from splashing.
- Use compost to add valuable organic matter, improve soil structure, and enhance the effectiveness of fertilizers.
- Maintain a grassed area around gardens to trap sediment runoff, which can carry nutrients to nearby waterways.
- Plant crops with similar fertilizer needs together to help prevent over-fertilization.
- Do not broadcast fertilizer over the entire garden. Instead, apply fertilizer along rows of seeded vegetables or in a circle around each plant to reduce the amount of fertilizer used.
- Substitute local sources of composted manure for manufactured fertilizers.





Biochar

Soil Improvement

The benefits of biochar application to soil

The application of activated **biochar** to soils improves the water (including dissolved nutrients) reception and water holding capacity. As **biochar** is able to retain moisture, it helps plants to survive droughts more easily and encourages smooth, continuous growth. The application of activated **biochar** fosters the micro-bacterial activity and biodiversity wherever it is used as well as increasing the level of humus in soils and improving fertility year after year. **Biochar** stores nutrients, which can then be taken up by the roots, as and when the plants need them. Activated **biochar** can be used to improve agricultural soils, vineyards as well as in gardening.

Advantages

- Improved water holding capacity
- Increased soil aeration
- Stimulated nutrient dynamic
- Increased soil fertility by building up the humus layer
- Stops nutrient leaching

Basic information on the use of biochar

- **Biochar** is not a fertilizer and should not be applied pure to soils
- Before applying **biochar** to soils it should be activated with organic nutrients
- The activation with nitrogen can be done by mixing the **biochar** with dung, dreck or liquid manure. It is also possible to activate **biochar** with mineral fertilizer
- **Biochar** should be activated with at least 1 % of nitrogen otherwise the flow of nutrients or plant growth can be disrupted in the first year of application

The application of activated **biochar** promises the biggest potential in low humus and sandy soils with regard to increasing soil fertility, water holding capacity and soil activity. In heavy soils activated **biochar** supports the soil aeration as well as preventing compaction and sealing of the soil. In humus rich and highly active soils the potential of **biochar** to increase fertility is very limited. Here, activated **biochar** could be applied in small amounts to support the process of composting.

For more information on **biochar** activation, please click here: [Ways of Making Terra Preta](#)

If you want to buy our biochar, please use our orderform directly for your purchase request.

BIOCHAR, a soil amendment that offers carbon in its most stable form, either as a replacement for compost or in addition to.

1. Enhanced plant growth.
2. Suppressed methane emissions.
3. Reduced nitrous oxide emissions
4. Reduced fertilizer requirements
5. Reduced leaching of nutrients
6. Stored carbon in a long term stable form.
7. Reduces soil acidity.
8. Reduces aluminum toxicity.
9. Increased soil aggregation due to increased fungal hyphae.
10. Improved soil water handling.
11. Increased available Ca, Mg, P, & K.
12. Increased soil microbial respiration.
13. Increased soil microbial biomass.
14. Stimulated symbiotic nitrogen fixation in legumes.
15. Increased arbuscular mycorrhizal fungi.
16. Increased soil Cationic Exchange Capacity (CEC).
17. Does not contain any soluble phosphorus.



Compost

Compost and composting is a complex subject. It is far more than just creating a pile of organic matter and watching it turn into a soil like material. Composting is an exacting science when we want to produce a finished product of high quality. The discussion here is intended to give an overview of product and process, and in no way should be thought of to impart all of the information necessary to fully understand the subject.

Compost is the product of an aerobic process, whereby microorganisms break down and decompose various forms of organic matter. The organic matter is referred to as a feedstock or substrate, and this can be made up from a wide range of materials. The feedstock can be random materials or they can be chosen to meet a particular recipe. When composting is done by recipe, the starting point in choosing material inputs is generally to follow a 20:1 to 30:1 carbon to nitrogen ratio. The end result of the composting process should ideally give us a material that has a carbon to nitrogen ratio of 12:1 to 20:1.

Microorganisms use the feedstock material as a food source throughout the decomposition process. Composting is a four phased process; mesophyllic, thermophyllic, second mesophyllic, and maturity. During this process, heat rises and then declines. Different organisms populate the compost windrow at each of these four phases. They produce heat, carbon dioxide, water vapor, and humus as a result of their activity. Humus is the highly stable byproduct of the decomposition process. It can make up to 60% of finished compost. The process also stabilizes nutrients and pH giving us a finished material rich in nutrients and microbial life, a high percentage of humus and organic matter, and close to neutral pH. This becomes an ideal soil amendment and topdress material for established turfgrass in some situations.

Composting is done at the municipal level in many areas as well as in the private sector. Composters are generally required in most states to conform to guidelines that deal with health issues, as in the case of E. coli bacteria. Neither the US EPA nor the US Composting Council currently regulate compost, but they do have programs in place that suggest compost testing as part of the process. At the present time there are no national standards that deal with compost quality. One must have a good understanding of the criteria that define compost quality and rely on one's own assessment. That assessment should include testing whenever possible. Information should be obtained from the supplier to support the quality of the compost. If no testing data is provided by a supplier, we then

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781-631-2468 co@osborneorganics.com

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take it upon ourselves to perform the necessary testing to determine the quality and safety of the material.

Compost quality can be determined by several criteria. The finished material should have no offensive odor, there should be no recognizable remnants of the original feedstocks, and it should be finished or mature. There should be no heat escaping from the pile when turned. An offensive odor would be one that has a strong smell of ammonia, turpentine, or bark mulch. A fully mature compost, ready to use, should look, smell, and feel like a high quality topsoil. It should be:

- Between 30% and 45% organic matter,
- pH of 7.0,
- Moisture content between 30% and 50%
- Exhibit retained nutrients on a compost chemistry test
- Have minimal ash content
- Secure a biological assay to determine maturity

Immature compost would be considered to be a product of inferior quality. It can, in fact, be very detrimental to a turf system and can cause turf damage. Once the composting process has begun, it naturally wants to complete itself. Immature compost will pull nitrogen from the soil to try and complete the composting process. This nitrogen depletion in the soil will have an end result of causing a chlorosis, or yellowing, of the turf. As the nitrogen levels drop, chlorophyll production in the grass plant decreases, resulting in a plant that no longer has the resources necessary to undergo photosynthesis at a satisfactory level. As photosynthesis decreases, carbohydrate production drops off, and the turf weakens.

Application rates are generally in the range of one half to three quarters of a cubic yard to 1000 ft.² of turf area. Older texts talk about rates as high as 1 yd.³ per 1000, but that is on the heavy side and generally not used at the current time. The depth of the topdressed material should be between 1/4 inch and 3/8 inch. If the depth approaches 1/2 inch, it is too heavy for an individual application.

Compost does have a nutrient analysis. It has definite fertility properties. Compost can be mistakenly thought of as being an organic matter supplement and an infusion of soil microorganisms only, but nutrients are definitely introduced into the system. An average nutrient analysis of compost is 1% to 1.5% nitrogen, .5% to 2% phosphorus, and 1% potassium. These nutrients vary in concentration depending upon the source of the feedstocks in the initial

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compost process. Manures tend to have higher levels than leaves or grass.

Compost as a topdress in a turf system does five things for us.

1. It helps to increase soil organic matter. When we are dealing with low organic matter percentages, topdressing is the preferred practice for addressing the deficiency. This practice in itself gives good results, but when we can combine topdressing with cultivation, the benefit is magnified as the compost is able to fall into the core holes and reach the root zone.
1. When a compost application is combined with over seeding, it enhances germination and establishment. Think of it as creating a seedbed to receive the grass seed, not unlike a seed starting mix one might use to grow a tray of tomato seedlings for transplant.
1. Compost by virtue of its neutral pH has the ability to help buffer the soil and counteract acidic soils without the use of lime.
1. As compost continues to decompose, we experience nutrient release and get good greening of the turf in much the same way we do with a fertilizer application. When compost is used as a topdress, it is important that we adjust fertilizer applications accordingly. We can get a substantial nitrogen and phosphorus influx to the system with in compost, particularly one that is manure-based. Up to 60% of the nutrients in compost can be readily available with the balance mineralized at a future time.
1. A compost application infuses a substantial amount of both active and passive biology. The bacteria are decomposers, mineralizers, and nitrifiers. There are particular fungal organisms in compost that will give the grass what is often referred to as acquired immune resistance. They are beneficial fungal organisms that have the ability to fight and suppress some fungal pathogens. Ultimately disease issues in turf become much easier to deal with as the fungal community is improved.

Topdressing with sand, or a blend of primarily sand, will not give the same benefits as a high quality compost. The conventional industry uses sand-based materials, but natural programs can, but do not have to be based on compost applications. Sand is used at times in our program for very specific purposes but not as a general topdress. Many times we will create a material that is 50% compost and 50% sand and use it as a topdress. The introduction of the sand

11 Laurel Street, Marblehead, MA 01945
781-631-2468 co@osborneorganics.com

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helps to loosen the compost and make it spread more easily. It also helps to break up heavy clay soils.

Topdressing with compost can be done at any time during the growing season. The most opportune times are mid-June, late August, and mid to late November at the end of the season. The two early applications can coincide with over seeding applications. We do not always dormant seed late in the season because success rates are generally not as high as seeding during the active growing season. After application, the material breaks down as and is assimilated into the turf within a matter of days. We do need a window of opportunity when the field is not being used. We would generally not topdress when the field is actively in play. The reason being the compost might be somewhat sloppy after a rain event or an irrigation.

It is important to understand that even though we refer to compost as a soil conditioner it does have significant nutrient input to a turf system. As previously mentioned it is not a fertilizer, but it does have fertility capability. Even with a low nitrogen and phosphorus analysis (eg. 1-1-1), top dressing one-quarter inch over a turf system can deliver more nutrient than fertilizer.

Top dressing with compost is an application that in certain situations assists in the transition to an organic system. It is not necessary that we use compost in order to establish a healthy, successful organic turf system. It can be done without compost by using organic fertilizer and microbial inoculants. There are many examples of healthy, vigorously growing natural grass systems that have been established and maintained without the use of compost.

Chip Osborne
Osborne Organics

11 Laurel Street, Marblehead, MA 01945
781-631-2468 co@osborneorganics.com



Fertility and Turfgrass Nutrition, An Organic Perspective

When we address fertility issues, it is important to look at the needs of the grass itself. Of the three major nutrients used by turfgrass, nitrogen is used in the largest amount. It is followed by potassium and then phosphorus. There are other nutrients, of course, but our primary focus is with these three. When we set nutrient budgets, we are basing them on nitrogen to be delivered in one form or another to the turfgrass system. Our nutrient analysis soil tests point out any deficiencies in the other macro nutrients or micronutrients. We then take the opportunity during the initial years of transition to balance soil chemistry with the appropriate amendments. There is no real need to include phosphorus in organic fertilizers. Because the uptake of phosphorus is relatively limited in most aspects of the plant any fertility program should be zero phosphorus. Many states have enacted, or are in the process of enacting legislation to restrict the use of phosphorus when growing grass.

When a turf area is used, as opposed to just “viewed”, the turf is generally under some stress. Grass plants get damaged and often cannot reproduce at a rapid enough rate to maintain maximum turf density. The recuperative capacity of the grass plant is governed by the genetic capabilities of individual species as well as nutrient availability. For example, some sport’s turf grasses do not wear well under athletic play and can be easily damaged, but they repair themselves from that injury more effectively, efficiently, and faster than the other grasses. We need more available nutrient, specifically nitrogen, to sustain this type of turf system as opposed to what we might need for a homeowner’s lawn. It is available nitrogen that directly stimulates growth. That is not to say that we need excessive amounts of nitrogen, but rather nitrogen delivered in an appropriate form and in a manner that will allow the capabilities of the grass to do what we need them to do. We now begin to think in terms of the concept “less is more”. Introduction of nitrogen to a turfgrass system in organic program can be done at rates as low as .1 lb to .2 lb of actual nitrogen.

We establish nutrient budgets based on nitrogen for turf systems. Prior to the establishment of the nutrient budget the turf professional needs to be aware of state and local restrictions on the way that nitrogen and other nutrients can legally be used. The nutrient budget has a direct relationship to the expectations that we have for that grass system. If our expectations are on the lower side, then we can satisfy that system with a lower total annual nitrogen input. If we have high use or high profile playing fields, our expectations are high, and therefore

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the nutrient budget needs to be set at a higher level so that that system can reproduce and maintain itself.

One of the basic differences between a natural program and a conventional one is that we do not expect to get all of the nitrogen from natural, organic, granular fertilizer product alone. Nitrogen from that product is certainly important, but it is only a part of a balanced approach. We acknowledge the contributory nitrogen from liquid fertilizers, compost tea, humic acids, and clippings returned to the system. Some of these products contain actual nitrogen, while others, although they contain no nitrogen, stimulate the soil system to the point that nitrogen availability through the biomass can be improved. When we use product to initially improve soil health, we are building a system that will make nitrogen readily available naturally to the grass plant in the future. It is this concept that allows us to have a healthy turf at a lower cost three or four years down the road.

In a conventional program, when primarily water-soluble nitrogen is delivered at the customary rate of one pound of nitrogen to 1000 ft.² (less in states with restrictions), much of that material does not make a beneficial impact on the grass. This type of fertility product works in such a way that it is readily available upon contact with moisture. The nitrogen begins to become available within 48 hours of application. Maximum nitrogen release occurs in the 7 to 10 day range. By the end of a 4 to 5 week period the nitrogen is no longer available, because it has been either used by the grass plant, or it has moved through the soil profile. This type of fertility can potentially pose negative issues for bodies of water in close proximity to the grass area or to groundwater. This is the type of fertilizer that most homeowners and many municipalities use .

Depending upon a variety of factors, much of this nitrogen can have the ability to move below the root zone and potentially become a problem, especially if we experience heavy rain events within a few days of application. University research has produced trials that indicate that almost all of the nitrogen applied in this manner is used by the grass and poses no adverse threat. It is important to remember that in this work, we are generally looking at a relatively perfect turf system that exhibits maximum turf density with little or no voids in the surface area. The fact is that in the real world those perfect conditions do not always exist and a turf system with less than 100% turf density will not process all of the nitrogen in the same way the research plots do. This is especially true when we have regular irrigation or heavy rains after an application. Because all of the nitrogen may not be used by the grass plant, we can have problems. There are different ways that synthetic, water-soluble nitrogen can leave this system

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including leaching below the root zone, runoff, and volatilization. As this material leeches, it can become a groundwater contaminant as well as runoff into fresh or salt water bodies.

Natural, organic fertilizers can be either granular or liquid. Granular fertility product is generally a source of nitrogen that is water insoluble. The liquid fertilizers can be water-soluble, but not in the same sense as synthetic fertilizers. The nitrogen is from protein in organic fertilizers. Nitrogen is a building block of proteins and amino acids. Along with nitrogen, these fertilizers can deliver enzymes, amino acids, and proteins to the grass plant. With organic fertilizers, the nitrogen reaches its target goal, the grass plant. They are not soluble in the same way as their synthetic counterparts because moisture has very little to do with the actual release of nitrogen to the plant. It is the natural process of mineralization (microbial conversion of nitrogen) that makes nitrogen available. Nitrogen can be delivered in an organic form, but we must realize that the plant can only process it in the inorganic form. It is this process of mineralization that makes that conversion first to ammonium nitrogen and then secondarily to nitrate nitrogen. Because the bacterial organisms make this conversion, the nitrogen is now held within the biomass.

The difference between natural, organic fertilizers and conventional or synthetic fertilizers is simple. Synthetic fertilizer is inorganic. It is manufactured during a chemical process that produces a highly water soluble fertilizer. Anhydrous ammonia is reacted under great pressure and high temperatures. Urea is formed. It takes five ton of petroleum to produce one ton of urea. It breaks down on contact with soil moisture and is taken up by the grass plant very rapidly. This is why you see a quick green up or burst of growth with these products. There is a way to coat or encapsulate the fertilizer to delay the breakdown. Urea can also be secondarily reacted with formaldehyde or other compounds to produce a slow release material. It is synthetic slow release and needs microbial action to break it down. Generally speaking with urea, it is taken up rapidly, works quickly, and then leaves the root zone. This process is directly feeding the grass plant. Most synthetic fertilizer programs call for numerous applications annually.

Natural, organic fertilizer products work in a completely different way. Nature has put in place a system that makes nutrients available to the grass plant. A good example of this is a mature forest. No one fertilizes a forest, yet plant material grows and is healthy and adequately nourished. Other plant material functions in basically the same way, but because in a turfgrass area it is a closed system, we add fertilizer or other nutrients to meet the needs of the grass in the same way

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that the fallen leaves meet the needs of the tree. Grass as a horticultural crop needs more nitrogen than nature can provide if we are seeking to achieve higher expectations. Grass can obtain nutrients it needs from soil organic matter, the biomass, and minerals in the soil, but not enough nitrogen can be made available to produce a high quality turf system. If our expectations are on the lower side, then we can be satisfied with nitrogen made available by nature only. Given that we are managing sports fields and public parks with a high set of expectations, it is necessary for us to provide supplemental nitrogen to drive this process.

The two inorganic forms of nitrogen that are plant available within the soil are ammonium and nitrate. Synthetics work rapidly because laboratory derived nitrogen, in a synthetic form, is designed to mimic what the plant can actually use. Natural fertilizers supply organic nitrogen to the microbes as a food source, and then the microbes break it down and in turn release it to the plant in the inorganic form. It is in the process of mineralization where that organic nitrogen is converted to ammonium nitrogen which can be found in soil solution as well as held onto on the cation exchange sites. Bacteria in the soil then further convert the ammonium to nitrate. The nitrate is soluble, is not attracted to exchange sites, and is immediately in the soil solution. Nitrogen fixing bacteria can then further convert ammonium from the exchange sites to nitrate to meet the needs of the plant. The grass plant prefers its nitrogen in equal parts, nitrate and ammonium.

It is the microbial life in the soil that makes nutrients available to the grass plants in a natural program. If we think back to a basic biology course, we learned that a handful of soil contains billions of mostly beneficial living organisms that nature put in place for the sole purpose of growing plants. It is these organisms that in fact make the nutrients available. This is the foundation for our "feed the soil" approach as outlined in the biomass section.

Nutrients in organic fertilizers can be derived from either plant, animal, or mineral sources. Nitrogen is derived from plants (grains like corn, soy, alfalfa) or animal byproducts (manure, feathers, bones, blood). It is important to note that these nutrients that make up fertilizer products, either synthetic or natural, are not plant food.

These materials are simply catalysts in the process of photosynthesis. When nitrogen is introduced to a turfgrass system the plant responds in multiple ways. One of the responses is a greening of the plant. This greening is the intensification of chlorophyll in the blades. As the grass gets greener, chlorophyll is becoming more dense. During the process of photosynthesis, chlorophyll

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reacts with energy from the sun in the presence of carbon dioxide and moisture. There are microscopic openings on the underside of the leaf blades called stomates. These stomates open and close at the times of the day when the air is generally the calmest; dawn and dusk. Carbon dioxide enters the grass plant through these openings and a reaction takes place between the carbon dioxide, the sun's energy, and the chlorophyll. The end result is the production of carbohydrates and sugars. It is these carbohydrates and sugars that are plant food. These materials provide energy for the plant to grow and reproduce. Respiration is the opposite of photosynthesis, or the function that releases this stored energy that facilitates the actual growth of the plant. Our job as turf managers is to maximize the growing conditions of the grass plant that will enable it to photosynthesize at its maximum rate. As photosynthesis improves, more carbohydrate is produced for the plant.

The grass plant uses these carbohydrates for its immediate growth, stores a portion of the carbohydrates in the crown for future growth, and then the balance of the carbohydrates are exuded through the root system into the rhizosphere. These exudates provide nourishment for microbes that colonize and live in this region and help support the turfgrass plant in the soil.

Fertilizer Summary

Synthetic and natural fertilizers work in completely different ways, but can produce similar results.

Synthetic can be harsh to the biomass and can be counterproductive to building a healthy microbial soil population because of the generally high salt content. Because synthetics work rapidly and organics work more slowly, we must set our expectations appropriately.

We do have organic liquids that will produce more results in the short term and sustain it for the long term.

The timing of the applications becomes critical.

With a granular urea we get reaction in 48 hours and then it is done in a month or so

With a granular organic that reaction will take 10 or 12 days and it lasts for 8 to 10 weeks.

The organic liquid will give us the results in about four or five days and then sustain it for several weeks.

Because the liquids are in a soluble form, the organic nitrogen is more rapidly processed by the biomass.

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With so many different fertilizers and formulations on the market, it can be confusing to determine the difference between the products. As a rule, we can get an idea about the type of fertilizer in the bag from the percentage of nitrogen in the product. The three numbers on the bag represents nitrogen, phosphorus, and potassium in that order. It is stated as a percentage of each nutrient in 100 pounds of fertilizer. The reason that nitrogen is our benchmark is because the nutrient is used in the largest amount by the turfgrass. If the nitrogen number is less than 10, the product is most likely a natural, organic product. If the number is between 11 and 16 it can be a bridge product. Bridge products are those that contain both synthetic and natural sources of nitrogen. Bridge products often contain biosolids (sewerage sludge) because it is relatively inexpensive. One must be aware that there are potential problems with this material. When the nitrogen percentage is greater than 17 or 18 (there are synthetics in the 13-16 range) the product is probably synthetic.

Healthy, organic turf systems are being maintained with programs that focus on lower levels of actual nitrogen. We are finding that other components of a program like kelp, humic acid, molasses, microbial stimulants, amino acids, vitamins, plant steroids, and microbial inoculants themselves are replacing the need for high levels of nitrogen. All of these inputs work in a synergistic way to allow us to produce high quality turf at lower levels of applied nitrogen, which in the long run reduce fertilizer applications.

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International Agency for Research on Cancer



20 March 2015

IARC Monographs Volume 112: evaluation of five organophosphate insecticides and herbicides

Lyon, France, 20 March 2015 – The International Agency for Research on Cancer (IARC), the specialized cancer agency of the World Health Organization, has assessed the carcinogenicity of **five organophosphate pesticides**. A summary of the final evaluations together with a short rationale have now been published online in *The Lancet Oncology*, and the detailed assessments will be published as Volume 112 of the IARC Monographs.

What were the results of the IARC evaluations?

The herbicide **glyphosate** and the insecticides **malathion** and **diazinon** were classified as *probably carcinogenic to humans* (Group 2A).

The insecticides **tetrachlorvinphos** and **parathion** were classified as *possibly carcinogenic to humans* (Group 2B).

What was the scientific basis of the IARC evaluations?

The pesticides **tetrachlorvinphos** and **parathion** were classified as *possibly carcinogenic to humans* (Group 2B) based on convincing evidence that these agents cause cancer in laboratory animals.

For the insecticide **malathion**, there is *limited evidence of carcinogenicity* in humans for non-Hodgkin lymphoma and prostate cancer. The evidence in humans is from studies of exposures, mostly agricultural, in the USA, Canada, and Sweden published since 2001. Malathion also caused tumours in rodent studies. Malathion caused DNA and chromosomal damage and also disrupted hormone pathways.

For the insecticide **diazinon**, there was *limited evidence of carcinogenicity* in humans for non-Hodgkin lymphoma and lung cancer. The evidence in humans is from studies of agricultural exposures in the USA and Canada published since 2001. The classification of diazinon in Group 2A was also based on strong evidence that diazinon induced DNA or chromosomal damage.

For the herbicide **glyphosate**, there was *limited evidence of carcinogenicity* in humans for non-Hodgkin lymphoma. The evidence in humans is from studies of exposures, mostly agricultural, in the USA, Canada, and Sweden published since 2001. In addition, there is convincing evidence that glyphosate also can cause cancer in laboratory animals. On the basis of tumours in mice, the United States Environmental Protection Agency (US EPA) originally classified glyphosate as *possibly carcinogenic to humans* (Group C) in 1985. After a re-evaluation of that mouse study, the US EPA changed its classification to *evidence of non-carcinogenicity in humans* (Group E) in 1991. The US EPA Scientific Advisory Panel noted that the re-evaluated glyphosate results were still significant using two statistical tests recommended in the IARC Preamble. The IARC Working Group that conducted the evaluation considered the significant findings from the US EPA report and several more recent positive results in concluding that there is *sufficient evidence of carcinogenicity* in experimental animals. Glyphosate also caused DNA and chromosomal damage in human cells, although it gave negative results in tests using bacteria. One study in community residents reported increases in blood markers of chromosomal damage (micronuclei) after glyphosate formulations were sprayed nearby.

How are people exposed to these pesticides?

Tetrachlorvinphos is banned in the European Union. In the USA, it continues to be used on livestock and companion animals, including in pet flea collars. No information was available on use in other countries.

Parathion use has been severely restricted since the 1980s. All authorized uses were cancelled in the European Union and the USA by 2003.

IARC Monographs Volume 112: evaluation of five organophosphate insecticides and herbicides

Malathion is currently used in agriculture, public health, and residential insect control. It continues to be produced in substantial volumes throughout the world. Workers may be exposed during the use and production of malathion. Exposure to the general population is low and occurs primarily through residence near sprayed areas, home use, and diet.

Diazinon has been applied in agriculture and for control of home and garden insects. Production volumes have been relatively low and decreased further after 2006 due to restrictions in the USA and the European Union. Only limited information was available on the use of these pesticides in other countries.

Glyphosate currently has the highest global production volume of all herbicides. The largest use worldwide is in agriculture. The agricultural use of glyphosate has increased sharply since the development of crops that have been genetically modified to make them resistant to glyphosate. Glyphosate is also used in forestry, urban, and home applications. Glyphosate has been detected in the air during spraying, in water, and in food. The general population is exposed primarily through residence near sprayed areas, home use, and diet, and the level that has been observed is generally low.

What do Groups 2A and 2B mean?

Group 2A means that the agent is *probably carcinogenic to humans*. This category is used when there is limited evidence of carcinogenicity in humans and sufficient evidence of carcinogenicity in experimental animals. *Limited evidence* means that a positive association has been observed between exposure to the agent and cancer but that other explanations for the observations (called chance, bias, or confounding) could not be ruled out. This category is also used when there is limited evidence of carcinogenicity in humans and strong data on how the agent causes cancer.

Group 2B means that the agent is *possibly carcinogenic to humans*. A categorization in Group 2B often means that there is convincing evidence that the agent causes cancer in experimental animals but little or no information about whether it causes cancer in humans.

Why did IARC evaluate these pesticides?

The IARC Monographs Programme has evaluated numerous pesticides, some as recently as 2012 (anthraquinone, arsenic and arsenic compounds). However, substantial new data are available on many pesticides that have widespread exposures. In 2014, an international Advisory Group of senior scientists and government officials recommended dozens of pesticides for evaluation. Consistent with the advice of the Advisory Group, the recent IARC meeting provided new or updated evaluations on five organophosphate pesticides.

How were the evaluations conducted?

The established procedure for Monographs evaluations is described in the Programme's Preamble. Evaluations are performed by panels of international experts, selected on the basis of their expertise and the absence of real or apparent conflicts of interest. For Volume 112, a Working Group of 17 experts from 11 countries met at IARC on 3–10 March 2015 to assess the carcinogenicity of **tetrachlorvinphos**, **parathion**, **malathion**, **diazinon**, and **glyphosate**. The in-person meeting followed nearly a year of review and preparation by the IARC secretariat and the Working Group, including a comprehensive review of the latest available scientific evidence. According to published procedures, the Working Group considered "reports that have been published or accepted for publication in the openly available scientific literature" as well as "data from governmental reports that are publicly available". The Working Group did not consider summary tables in online supplements to published articles, which did not provide enough detail for independent assessment.

What are the implications of the IARC evaluations?

The Monographs Programme provides scientific evaluations based on a comprehensive review of the scientific literature, but it remains the responsibility of individual governments and other international organizations to recommend regulations, legislation, or public health intervention.

Media inquiries: please write to com@iarc.fr. Thank you.

Carcinogenicity of tetrachlorvinphos, parathion, malathion, diazinon, and glyphosate



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For more on the IARC
Monographs see <http://monographs.iarc.fr>

Upcoming meetings
June 2-9, 2015, Volume 113:
Some organochlorine
insecticides and some
chlorophenoxy herbicides
Oct 6-13, 2015, Volume 114:
Red meat and processed meat

Monograph Working Group
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[unable to attend] (Nicaragua);
P Egeghy [unable to attend]; G D
Jahnke; C W Jameson; M T Martin;
M K Ross; I Rusyn; L Zeise (USA)

In March, 2015, 17 experts from 11 countries met at the International Agency for Research on Cancer (IARC; Lyon, France) to assess the carcinogenicity of the organophosphate pesticides tetrachlorvinphos, parathion, malathion, diazinon, and glyphosate (table). These assessments will be published as volume 112 of the IARC Monographs.¹

The insecticides tetrachlorvinphos and parathion were classified as “possibly carcinogenic to humans” (Group 2B). The evidence from human studies was scarce and considered inadequate. Tetrachlorvinphos induced hepatocellular tumours (benign or malignant) in mice, renal tubule tumours (benign or malignant) in male mice,² and spleen haemangioma in male rats. Tetrachlorvinphos is a reactive oxon with affinity for esterases. In experimental animals, tetrachlorvinphos is systemically distributed, metabolised, and eliminated in urine. Although bacterial mutagenesis tests were negative, tetrachlorvinphos induced genotoxicity in some assays (chromosomal damage in rats and in vitro) and increased

cell proliferation (hyperplasia in rodents). Tetrachlorvinphos is banned in the European Union. In the USA, it continues to be used on animals, including in pet flea collars.

For parathion, associations with cancers in several tissues were observed in occupational studies, but the evidence in humans remains sparse. In mice, parathion increased bronchioloalveolar adenoma and/or carcinoma in males, and lymphoma in females. In rats, parathion induced adrenal cortical adenoma or carcinoma (combined),³ malignant pancreatic tumours, and thyroid follicular cell adenoma in males, and mammary gland adenocarcinoma (after subcutaneous injection in females).⁴ Parathion is rapidly absorbed and distributed. Parathion metabolism to the bioactive metabolite, paraoxon, is similar across species. Although bacterial mutagenesis tests were negative, parathion induced DNA and chromosomal damage in human cells in vitro. Parathion markedly increased rat mammary gland terminal end bud density.⁴ Parathion use has been severely restricted since the 1980s.

The insecticides malathion and diazinon were classified as “probably carcinogenic to humans” (Group 2A). Malathion is used in agriculture, public health, and residential insect control. It continues to be produced in substantial volumes throughout the world. There is limited evidence in humans for the carcinogenicity of malathion. Case-control analyses of occupational exposures reported positive associations with non-Hodgkin lymphoma in the USA,⁵ Canada,⁶ and Sweden,⁷ although no increased risk of non-Hodgkin lymphoma was observed in the large Agricultural Health Study cohort (AHS). Occupational use was associated with an increased risk of prostate cancer in a Canadian case-control study⁸ and in the AHS, which reported a significant trend for aggressive cancers after adjustment for other pesticides.⁹ In mice, malathion increased hepatocellular adenoma or carcinoma (combined).¹⁰ In rats, it increased thyroid carcinoma in males, hepatocellular adenoma or carcinoma (combined) in females, and mammary gland adenocarcinoma after subcutaneous injection in females.⁴ Malathion is rapidly absorbed and distributed. Metabolism to the bioactive metabolite, malaaxon, is similar across species. Malaaxon strongly inhibits esterases; atropine reduced carcinogenesis-related effects in one study.⁴ Malathion induced DNA and chromosomal damage in humans, corroborated by studies in animals and in vitro. Bacterial mutagenesis tests were negative. Compelling evidence supported disruption of hormone pathways. Hormonal effects probably mediate rodent thyroid and mammary gland proliferation.

Diazinon has been applied in agriculture and for control of home and garden insects. There was limited evidence for diazinon carcinogenicity

	Activity (current status)	Evidence in humans (cancer sites)	Evidence in animals	Mechanistic evidence	Classification*
Tetrachlorvinphos	Insecticide (restricted in the EU and for most uses in the USA)	Inadequate	Sufficient	..	2B
Parathion	Insecticide (restricted in the USA and EU)	Inadequate	Sufficient	..	2B
Malathion	Insecticide (currently used; high production volume chemical)	Limited (non-Hodgkin lymphoma, prostate)	Sufficient	Genotoxicity, oxidative stress, inflammation, receptor-mediated effects, and cell proliferation or death	2A†
Diazinon	Insecticide (restricted in the USA and EU)	Limited (non-Hodgkin lymphoma, leukaemia, lung)	Limited	Genotoxicity and oxidative stress	2A†
Glyphosate	Herbicide (currently used; highest global production volume herbicide)	Limited (non-Hodgkin lymphoma)	Sufficient	Genotoxicity and oxidative stress	2A†

EU=European Union. *See the International Agency for Research on Cancer (IARC) preamble for explanation of classification system (amended January, 2006). †The 2A classification of diazinon was based on limited evidence of carcinogenicity in humans and experimental animals, and strong mechanistic evidence; for malathion and glyphosate, the mechanistic evidence provided independent support of the 2A classification based on evidence of carcinogenicity in humans and experimental animals.

Table: IARC classification of some organophosphate pesticides

in humans. Positive associations for non-Hodgkin lymphoma, with indications of exposure-response trends, were reported by two large multicentre case-control studies of occupational exposures.^{5,6} The AHS reported positive associations with specific subtypes, which persisted after adjustment for other pesticides, but no overall increased risk of non-Hodgkin lymphoma.¹¹ Support for an increased risk of leukaemia in the AHS was strengthened by a monotonic increase in risk with cumulative diazinon exposure after adjustment for other pesticides. Multiple updates from the AHS consistently showed an increased risk of lung cancer with an exposure-response association that was not explained by confounding by other pesticides, smoking, or other established lung cancer risk factors.¹² Nonetheless, this finding was not replicated in other populations. In rodents, diazinon increased hepatocellular carcinoma in mice and leukaemia or lymphoma (combined) in rats, but only in males receiving the low dose in each study. Diazinon induced DNA or chromosomal damage in rodents and in human and mammalian cells in vitro. Some additional support for human relevance was provided by a positive study of a small number of volunteers exposed to a diazinon formulation.¹³

Glyphosate is a broad-spectrum herbicide, currently with the highest production volumes of all herbicides. It is used in more than 750 different products for agriculture, forestry, urban, and home applications. Its use has increased sharply with the development of genetically modified glyphosate-resistant crop varieties. Glyphosate has been detected in air during spraying, in water, and in food. There was limited evidence in humans for the carcinogenicity of glyphosate. Case-control studies of occupational exposure in the USA,¹⁴ Canada,⁶ and Sweden⁷ reported increased risks for non-Hodgkin lymphoma that persisted after adjustment for other

pesticides. The AHS cohort did not show a significantly increased risk of non-Hodgkin lymphoma. In male CD-1 mice, glyphosate induced a positive trend in the incidence of a rare tumour, renal tubule carcinoma. A second study reported a positive trend for haemangiosarcoma in male mice.¹⁵ Glyphosate increased pancreatic islet-cell adenoma in male rats in two studies. A glyphosate formulation promoted skin tumours in an initiation-promotion study in mice.

Glyphosate has been detected in the blood and urine of agricultural workers, indicating absorption. Soil microbes degrade glyphosate to aminomethylphosphoric acid (AMPA). Blood AMPA detection after poisonings suggests intestinal microbial metabolism in humans. Glyphosate and glyphosate formulations induced DNA and chromosomal damage in mammals, and in human and animal cells in vitro. One study reported increases in blood markers of chromosomal damage (micronuclei) in residents of several communities after spraying of glyphosate formulations.¹⁶ Bacterial mutagenesis tests were negative. Glyphosate, glyphosate formulations, and AMPA induced oxidative stress in rodents and in vitro. The Working Group classified glyphosate as "probably carcinogenic to humans" (Group 2A).

We declare no competing interests.

Kathryn Z Guyton, Dana Loomis, Yann Grosse, Fatima El Ghissassi, Lamia Benbrahim-Tallaa, Neela Guha, Chiara Scoccianti, Heidi Mattock, Kurt Straif, on behalf of the International Agency for Research on Cancer Monograph Working Group, IARC, Lyon, France

International Agency for Research on Cancer, Lyon, France

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Invited Specialists
C Portier (Switzerland)

Representatives
M E Gouze, for the French Agency for Food, Environment and Occupational Health and Safety (France); J Rowland, for the US Environmental Protection Agency (USA)

Observers
M K Boye Jensen, for Cheminova (Denmark); B Fervers, for the Léon Bérard Centre (France); E Giroux, for University Jean-Moulin Lyon 3 (France); T Sorahan, for Monsanto Company (USA); C Strupp, for the European Crop Protection Association (Belgium); P Sutton, for the University of California, San Francisco (USA)

IARC/WHO Secretariat
L Benbrahim-Tallaa; R Carel; F El Ghissassi; Sonia El-Zaeem; Y Grosse; N Guha; K Z Guyton; C Le Comet; M Leon; D Loomis; H Mattock; C Scoccianti; A Shapiro; K Straif; J Zavadi

For the Preamble to the IARC Monographs see <http://monographs.iarc.fr/ENG/Preamble/index.php>

For declarations of interests see <http://monographs.iarc.fr/ENG/Meetings/vol112-participants.pdf>

PAUL C. CHROSTOWSKI, Ph.D., QEP

CPF Associates, Inc.
7708 Takoma Ave.
Takoma Park, MD 20912
301-585-8062
pc@cpfassociates.com
www.cpfassociates.com

EDUCATION

Ph.D. Environmental Engineering and Science, Drexel University
Philadelphia, PA (1981).

M.S. Environmental Science, Drexel University,
Philadelphia, PA (Environmental Chemistry and Health Specializations, USPHS
Traineeship) (1979).

B.S. Chemistry, University of California,
Berkeley, California (American Chemical Society Certified, Honors) (1976).

Continuing professional education in environmental engineering, fate and transport
modeling, toxicology, and environmental forensics.

PROFESSIONAL CERTIFICATION

Dr. Chrostowski is a registered Qualified Environmental Professional (QEP) (#02970014)

AWARDS/RECOGNITION

Recipient of 2003 Linn Enslow Memorial Award by NYWEA. Recognized for 30 years of
service to ACS Environmental Division.

OVERVIEW OF EXPERIENCE

Dr. Chrostowski is a founding member of Chrostowski, Pearsall, & Foster (CPF Associates, Inc). He is an environmental chemist, health scientist, and engineer with over 40 years experience in environmental work on behalf of both government and private clients. Currently, Dr. Chrostowski's practice is focused on environmental chemistry, environmental engineering, and risk analysis. Previously, he was Director of Environment, Health & Safety programs at The Weinberg Group, Vice President and Senior Science Advisor at ICF/Clement, Senior Scientist at EA Engineering, Science & Technology, Assistant Professor at Vassar College, a consultant in private practice and a pollution control/industrial hygiene technician in industry. Dr. Chrostowski performed pioneering work in the fields of chemical environmental forensics and risk assessment. He has specialized experience in the scientific and technical aspects of federal, state, and international regulatory programs including the environmental impacts of residuals management technologies and environmental impact assessment methodologies. In addition to EPA and OSHA programs, Dr. Chrostowski has developed expertise in human, ecological, and probabilistic risk

assessment, life cycle analysis, application of multivariate statistics, and failure analysis. Dr. Chrostowski's research interests include the environmental behavior of complex mixtures, application of quantitative management tools to environmental strategy development and evaluation, chemometrics, quantitative ecology, biomonitoring, and environmental modeling. Dr. Chrostowski is active in numerous professional societies and expert panels and has authored or co-authored over 130 publications or presentations in the environmental field. In addition to his technical work, Dr. Chrostowski has taught university-level environmental sciences and has presented expert testimony in litigation cases, regulatory, legislative, and permitting hearings and public meetings.

EMPLOYMENT HISTORY

1999-present	President, CPF Associates, Inc.
1993-1999	Director, Environment, Safety & Health practice, The Weinberg Group Inc.
1985-1993	Vice President and Senior Science Advisor, Clement Division of ICF/Kaiser
1984-1985	Senior Scientist, EA Engineering, Science & Technology
1981-1984	Assistant Professor, Vassar College
1979-1984	Consulting scientist in private practice
1976	Information Analyst, Solar Energy Information Center
1974-1976	Research technician, University of California
1970-1972	Laboratory/industrial hygiene technician, C&D Batteries
1968-1970	Laboratory/pollution control technician, Jack Frost Sugar
1964-1968	Petty Officer, 2 nd Class, U.S. Navy

SELECTED PROFESSIONAL SOCIETY MEMBERSHIPS

Air and Waste Management Association
American Council of Governmental Industrial Hygienists
American Chemical Society
American Chemical Society Environmental Division
International Society for Environmental Forensics
International Society for Exposure Analysis

PUBLICATIONS

Dr. Chrostowski is the author or co-author of over 130 publications or presentations. A full bibliography and copies of publications are available on request. Selected publications/presentations include:

Durda, J. and Chrostowski, P .C. 1991. Integration of ecological risk assessment and biological assessment in risk management: The Aberdeen experience. Paper presented at 12th Annual Meeting of the Society of Environmental Toxicology & Chemistry, November 3-7, Seattle, Washington.

Chrostowski, P .C. and Durda, J. 1991. Effects of air pollution on the desert tortoise: An ecological risk assessment. Paper presented at 12th Annual Meeting of the Society of Environmental Toxicology & Chemistry, November 3-7, Seattle, Washington.

Chrostowski, P.C., Foster, S.A., Durda, J.L., Preziosi, D. V. 1998. Good Ecological Risk Assessment Practices. SETAC Annual Meeting, Charlotte, NC, November 1998.

Preziosi, D., Durda, J., Chrostowski, P. 2000. Conceptual approaches for addressing

temporal and spatial scales of wading bird populations and contaminant distribution. SETAC Annual Meeting.

Foster, S.A., Chrostowski, P.C., Preziosi, D.V. 2003. A Comparison of Two Mercury Environmental Fate and Transport Models in Evaluating Incinerator Emissions. 2003 Incineration Conference. Orlando, FL May 12-16.

Chrostowski, P.C. & Foster, S.A. 2004. Swimming Pool Shock Treatment. Environ Health 66:26-27.

Langmuir, D., Chrostowski, P., Vigneault, B., and Chaney, R. 2004. Issue Paper on the Environmental Chemistry of Metals. Prepared for USEPA Risk Assessment Forum,

Foster, S. Chrostowski, P.C., Pirages, S., Nealley M. 2006. Applications of the IEM-2M Mercury Fate and Transport Model in Hazardous Waste Combustion Facility Risk Assessment. 2006 Waste Management Meeting. AWMA and USEPA, Arlington, VA.

Chrostowski, P.C. & Foster, S.A. 2006. Modeling exposure and risk from chemical weapons releases. Society for Risk Analysis Annual Meeting, Baltimore, MD.

Foster, S.A., Chrostowski, P.C. & Wilsey, S. 2006. The role of landfill gas emission rate calculation methods in solid waste landfill risk assessments. SRA Annual Meeting,

Foster, S.A. & Chrostowski, P.C. 2008. Comprehensive human health and ecological risk assessment of a carbon reactivation facility. SRA Annual Meeting, Boston MA.

Chrostowski, P.C. 2008. Hill's Postulates. In Jorgensen, SE & Fath, BD (Eds) Ecotoxicology. Vol 3 of Encyclopedia of Ecology, pp. 1858-1863. Oxford: Elsevier

Foster, C., Richer, P., Lynch, G., Chrostowski, P., Hoffman, B. and Militana, L. 2008. PM2.5 Ambient Air Monitoring at a Regional Solid Waste Processing and Transfer Facility. Global Waste Management Symposium, Copper Mountain, CO. September 2008.

Foster, S.A., Chrostowski, P.C., and Porter, T.J. 2011. Ultrafine Particles in Combustion Source Emissions. 2011 Annual Society of Risk Analysis Meeting, Charleston, SC (December).

Foster, S. and Chrostowski, P.C. 2012. Human Health and Ecological Impact Analysis for a New Renewable Energy Facility in Florida. WTERT 2012 Bi-Annual Conference. October 18-19, 2012. Columbia University, NY.

Chrostowski, P.C. and Foster, S. 2014. Resolution of a Controversy – Do Waste-to-Energy Plants Cause Public Health Impacts. 29th ISWA Conference.

COMMUNITY PROFESSIONAL SERVICE

Montgomery County MD Energy and Air Quality Advisory Committee
Takoma Park - Montgomery College Neighbors Advisory Committee
Science Fair judge for environmental science projects, Montgomery County, MD
Takoma Park Community Center Citizen's Advisory Committee
Takoma Park Committee on the Environment

Paul C. Chrostowski, Ph.D., QEP
Consulting Environmental Engineering & Science
7708 Takoma Avenue
Takoma Park, MD 20912
paul.chrostowski@gmail.com

September 13, 2014

Councilmember Roger Berliner
Chair, T&E Committee
Montgomery County Council
Rockville MD

RE: Proposed Pesticide Legislation

Dear Councilmember Berliner:

I am writing to you in your capacity as chair of the T&E Committee to offer support to Councilmember Leventhal's call for council education on pesticide science. I am an environmental professional with over 40 years' experience in the evaluation and management of chemicals in the environment using tools such as human health and ecological risk assessments and life cycle analyses. These tools are used by regulatory agencies such as the US Environmental Protection Agency (EPA) and Food and Drug Administration (FDA) to regulate human and environmental exposure to potentially toxic substances including pesticides. In order to understand the scientific basis of pesticide hazards and regulation, it is useful to have a firm grounding in these scientific techniques. In particular, knowledge of the science underlying pesticide regulation is necessary for identifying data gaps and understanding where additional regulation may be needed.

The objective of a risk assessment is to determine the nature and probability of health effects under specified conditions of exposure to a chemical substance. The results of a risk assessment dictate the conditions of use for a pesticide including mitigative measures to prevent adverse health and environmental effects. EPA performs both human health and ecological risk assessments for pesticides. A good primer on EPA's methodology may be found at <http://www.epa.gov/pesticides/factsheets/riskassess.htm>. An alternative to a risk-based regulatory process is imposition of the precautionary principle, which was the basis for Canadian local and provincial pesticide bans (<http://www.sehn.org/pdf/ppep.pdf>). In essence the precautionary principle supplements the risk assessment process by invoking bans or other controls on pesticides where there is too much scientific uncertainty to answer critical human health and environmental impact questions using risk assessment.

As defined by the National Research Council, risk assessment has four main components: hazard identification, dose-response quantification, exposure assessment, and risk characterization.

Hazard identification is the process whereby we identify the toxicological properties of a chemical. Can it cause cancer, birth defects, neurological problems, and other health effects? Many currently registered pesticides lack adequate hazard identification. For example, the commonly used herbicide 2,4-D has not had a comprehensive toxicological review for some 15 years, during which time numerous studies have been conducted that could lead to a more accurate hazard identification. Dose-response quantification links the amount of the chemical one is exposed to the probability of a toxic effect. Continuing the example of 2,4-D, EPA has determined that the dose below which no toxic effects are anticipated is 0.01 mg 2,4-D per kilogram of body weight per day. If a calculated exposure is higher than this level, there is the potential for health effects such as liver or kidney toxicity. This dose, however, is based on a 1983 study and could potentially underestimate the toxic potential of this exposure based on more recent information. Exposure assessment calculates or physically measures the amounts of a chemical that an individual can be exposed to. Exposures are typically calculated with mathematical models using numerous assumptions. These assumptions are called the "conditions of exposure". If the appropriate conditions of exposure have not been included in a risk assessment, it is not possible to tell if the exposure exceeds the safe dose. In the 2,4-D risk assessment, EPA has assumed that a toddler plays outside for two hours per day. This is associated with the safe dose. However, if the toddler were to play outside for a longer period (say 3 hours per day), it could exceed the safe dose. The last step of the process, the risk characterization pulls together all the information from the previous steps into an overall statement of risk. When EPA regulates pesticides, much of this information is required on the pesticide label.

Some of the questions in Councilman Leventhal's bullet points in his memorandum to you have not been asked in typical pesticide risk assessments. For example, exposure in the elderly and effects on seniors and effects of pesticides on household pets are not routinely addressed in regulatory risk assessments. Exposure in children has only been addressed under a limited set of circumstances. Effects of pesticides on local and regional water quality require site-specific risk assessments that have not been performed.

The Council needs to come to grips with the issue of adequacy of current risk assessments and whether the precautionary principle should be invoked or if additional regulation is required if existing risk assessments are deemed inadequate given the current state of knowledge. As can be seen from the above discussion, this is a highly technical area of scientific practice and I strongly encourage the Council to become familiar with the underlying science such that defensible regulations result. Please feel free to contact me if you have any questions or require additional information.

Very truly yours,



Paul Chrostowski, Ph.D., QEP

cc: Councilman Leventhal

TECHNICAL SUPPORT DOCUMENT
ANSWERS TO QUESTIONS FROM CITY COUNCIL AND CITY ATTORNEY

Paul C. Chrostowski, Ph.D., QEP¹

July 5, 2013

1) What gaps are there between EPA & Maryland pesticide regulations and the protections envisioned by the Safe Grow Zone ordinance?

EPA regulates pesticides through the Federal Insecticide Fungicide and Rodenticide Act (FIFRA)². It focuses on registration (approving for use), use restrictions, labeling, and disposal of un-used pesticides. Maryland Department of Agriculture (MDA) regulates pesticides at the state level. MDA focuses on schools, applicator training and education in addition to state level enforcement of EPA regulations. Both EPA and MDA are very strong on product approval and labeling, agricultural and commercial use (golf courses, nurseries etc), but fairly weak on residential use. Montgomery County Public Schools has an integrated pest management program that is approved by the MDA. This program is substantially more stringent than what is being proposed for this ordinance. Whenever EPA approves a pesticide it conducts a human health and ecological risk assessment that assesses the health risks to people or the environment that could be exposed to the pesticide. The approval is based on the behavior that is assessed. For example, EPA will conduct a detailed analysis of how a pesticide applicator will be exposed to the material throughout the workday. They will then limit the use based on this assessment. Again with the worker, if the risk assessment shows that he or she can absorb the pesticide through the skin, EPA could require the use of nitrile gloves which would be on the label and the material safety data sheet (MSDS). It would then be a FIFRA violation if the worker did not use these gloves.

It should be noted that EPA decisions regarding pesticides are often controversial and under attack by environmental activists or the pesticide industry. The classic example of this regards DDT which was only banned in 1972 after the Environmental Defense Fund (EDF) sued the federal government and several states. This was a full 10 years after Rachel Carson exposed the dangers of DDT in *Silent Spring*. In the present day, the Natural Resources Defense Council (NRDC) has recently petitioned EPA to strengthen the regulation of 2,4-D which is a subject of this proposed ordinance.

One potential problem is that not every exposure scenario can be assessed. For example, a toddler repeatedly crawling through the lawn and putting things in his or her mouth; a dog on a walk stopping and chewing on a bunch of grass; repeated applications of a pesticide by different parties; applications

¹ A brief professional biography of the author may be found after page 11 of this report.

² EPA is not the only agency that regulates pesticides in the United States. FDA has partial authority over pesticides in food and personal care products, NOAA has partial authority over pesticides in the marine environment. USDA conducts research on pesticides in agriculture. OSHA regulates pesticide exposure by workers. ATSDR and the National Toxicology Program conduct research regarding health effects of pesticides.

of more than one pesticide with synergistic effects in the same area; using more than specified on the label, etc. All of these could result in un-anticipated adverse impacts. Uncertainty is common in risk assessment. The identification and mitigation of uncertainty in risk assessment is well known and has been the subject of several reports by federal agencies including the EPA, Office of Science and Technology Policy and National Academy of Sciences.

2, 4-D can be used as an example³. 2,4-D is associated with hematologic (blood), hepatic (liver), and renal (kidney) toxicity in humans and a wide range of toxic responses in aquatic life. EPA last assessed 2,4-D in 2005⁴ in a document called a reregistration eligibility decision (“RED”) and in separate risk assessment documents⁵. A re-assessment of this type is conducted every 15 years. One uncertainty surrounding 2,4-D is that a substantial amount of relevant research has been published since this assessment which could impact our understanding of the environmental effects and behavior of 2,4-D. This chemical is the subject of a significant amount of research since it was a component of the military defoliant known as Agent Orange used in Vietnam. Since EPA closed its RED, over 17,000 potentially relevant scientific articles have been published according to the National Library of Medicine’s TOXNET data base. Even a casual perusal of the abstracts of these publications reveals a large amount of toxicological information that is relevant to human health and ecological risk assessments for 2,4-D⁶. Thus, one uncertainty in the current status of 2,4-D is the inability to incorporate recent science. The dependence of risk assessment on scientific research reflects many other uncertainties. For example, 2,4-D, dicamba, and triclopyr are awaiting completion of sufficient research to determine if they have carcinogenic potential. Dicamba and fluoroxypyr have no chronic toxicity data for honeybees. This may be critical given the fact that chronic exposure to pesticides has been associated with honeybee colony collapse disorder⁷. This discussion of these uncertainties should not be considered to be comprehensive. The uncertainties associated with all the pesticides discussed herein would fill several volumes.

EPA uses a metric called the “margin of exposure” or MOE to evaluate the safety of a pesticide. If the MOE for a particular combination of receptor (worker, resident, child, fish) and exposure scenario (inadvertent ingestion, dermal contact, inhalation) exceeds the value of 1,000, then the situation is thought to have an acceptable level of risk. In the RED, EPA has assessed a toddler playing outdoors for 2 hours following an application of 2,4-D according to the label with an MOE of 1,100, thus this situation is considered to be safe. If the toddler plays in this area for 3 hours rather than 2, the MOE will be approximately 730 and the situation will be considered to be unsafe. According to EPA’s Exposure Factors Handbook, two hours (120 minutes) per day of outdoor play is between the 50th percentile (54

³ 2,4-D is used here because it is first in the list in the proposed ordinance. Similar issues can be raised with all the pesticides on the list, but a detailed analysis is beyond the scope of these questions. 2,4-D is far from the most toxic chemical on the list. That designation goes to bifenthrin which EPA has designated as a possible human carcinogen.

⁴ EPA 2005. Reregistration Eligibility Decision for 2,4-D. EPA 738-R-5-002.

⁵ EPA. 2005. 2,4-D. HED’s Revised Human Health Risk Assessment for the RED Revised to reflect public comments.

⁶ For example: Tayeb, W. et al. 2012. Biochemical and histological evaluation of kidney damage after sub-acute exposure to 2,4-D in rats: involvement of oxidative stress. *Toxicol. Mech. Meth.* 22:696-704.

⁷ Johnson, Renee. 7 January 2010. Honeybee Colony Collapse Disorder. Congressional Research Service.

minutes per day) and the 75th percentile (147 minutes per day) for children ages 1-4. This exposure assumption is at best protective of somewhat less than 75% of the population of children in that age group. EPA's Exposure Factors Handbook⁸ also notes that on average, people identified as Hispanic and Asian by the US Census play outdoors more than people identified as White or Black. This raises an uncertainty regarding environmental justice. Similar considerations apply to most exposure scenario-receptor combinations evaluated by EPA. If any of the assumptions (for example 2 hours, more than 2 applications per year) are exceeded, the MOE can change substantially. Thus exposure assessment is a second area of uncertainty.

Taking a second exposure factor – the amount of soil inadvertently ingested by a young child while outdoors, the 2,4-D risk assessment assumes 100 mg/day. The Exposure Factors Handbook recommends 200 mg/day (95th percentile) for normal children and 1,000 mg/day for children with pica. The ingestion rate of 200 mg/day is the standard default exposure factor used in Superfund residential scenario risk assessment which makes it twice as conservative for this parameter as the risk assessment for 2,4-D. If the Superfund ingestion rate were to be used in the 2,4-D risk assessment, the MOE would be in the unsafe zone. Further, if a child exhibited mouthing behavior, pica, or geophagia⁹ the use of 100 mg/day would be even less conservative.

A third exposure factor is body weight. Toxicological principles are based on the fact that the dose (and risk) decreases as the body weight increases. In the 2,4-D risk assessment, EPA assumed that a toddler weighs 15 kg (33 lbs). The Exposure Factors Handbook notes that the average weight for a child 6-12 months is 9,2 kg (20 lbs); for a child 1-<2 years is 11.4 kg (25 lbs) and for 2-<3 years is 13.8 kg (30 lbs). Looking at the underlying data distributions, we see that the assumption of 15 kg is protective of <5% of the population from 6 months to 2 years and 25% of the population from 2-<3 years. Thus the assumption of 15 kg is not conservative for any age group that would conventionally encompass the definition of a toddler.

One could go down the entire list of exposure factors used in the 2,4-D risk assessment and perform a similar analysis. When several exposure factors are combined the uncertainty and degree of conservatism is propagated through probabilistic principles. The conclusion would be that most of the exposure factors used are closer to the central tendency than the high end¹⁰ and that this risk assessment is not especially conservative.

A person doesn't need to be a professional risk assessor to evaluate some of these assumptions. Many Council members either have had or currently have young children. You could ask yourself if any of the children in your experience up to the age of 3 ever play outside for more than 2 hours per day, ever have explored the world by putting objects in their mouths, or have weighed less than 33 pounds. If the answer is yes, than these children might not be protected by the assumptions in the 2,4-D risk assessment.

⁸ EPA 2011. Exposure Factors Handbook. 2011 Edition. EPA/800/R-080/062F.

⁹ Geophagia is habitual eating of dirt or clay. It may be cultural or due to poor nutrition or illness.

¹⁰ See EPA 1992. Guidelines for Exposure Assessment. EPA/600/Z-92/001 for definitions of these terms.

Perhaps the biggest gap in this assessment is that it does not evaluate chronic (log-term) exposure. Thus, one must believe that a child will have only short-term contact with the residues and not play outside in treated areas for the long term. This may be acceptable for pesticides that break down rapidly, however, 2,4-D has a field dissipation half-life of 59.3¹¹ days and there is a potential for longer term exposure, especially with multiple applications. Other EPA-run programs like Superfund and the Resource Conservation and Recovery Act are more conservative in that risk assessments under these programs include sub-chronic and chronic exposures. The degree of risk acceptance is a decision for risk managers rather than risk assessors. I find it unlikely that many parents would accept a degree of conservatism that would not protect as many children as possible.

The third example considered here is that EPA has not evaluated all potential receptors or scenarios. According to a discussion in the RED, 2,4-D is highly toxic to dogs. However, dogs were not evaluated quantitatively in the assessment. Thus, one has no way of knowing if the instructions on the approved label are safe for dogs or other pets. Additionally, EPA declined to require a chronic toxicity study for the impacts of 2,4-D on estuarine/marine invertebrates. Since Takoma Park is part of the vulnerable Chesapeake Bay watershed, such a study would have been highly relevant to our understanding of the potential impact of 2,4-D application to local critical environments¹². In the 2,4-D risk assessment, EPA did not consider the possibility of chronic exposure for any receptor. Thus, receptor selection is a third source of uncertainty.

What we call "off-label" use is an additional particular problem. All of the discussion above is based on an assumption that the labels will be strictly followed. The labels are highly detailed (2,4-D and Speed Zone labels available on request) and people often do not take the time to adequately understand everything on the label (language is also a problem -- note that one of these labels has only one sentence in Spanish and nothing in any language but English; the other label is entirely in English). In addition, anyone handling a potentially hazardous chemical should also read the MSDS which is even more detailed (available on request). Failure to thoroughly read and understand these documents can result in over-application, inappropriate application, hazardous exposure, and inappropriate disposal of unused material.

The label restricts the amount and number of applications of the pesticidal ingredient. For example, in the RED, 2,4-D is limited to an application rate of 1.5 lb ae¹³/acre twice a year. If, inadvertently or intentionally, 2,4-D is applied at a greater rate or more frequently, the assumptions in EPA's risk assessment will be invalidated. Also, if 2,4-D applications are too close together, these conditions could be exceeded. The field dissipation half-life of 2,4-D is 59.3 days. An initial application at 1.5 lb ae/acre

¹¹ Walters, J. Environmental Fate of 2,4-D. California Department of Pesticide Regulation.

¹² NOAA, rather than EPA typically assesses impacts to invertebrates in marine and estuarine sediments. Of all the pesticides discussed here, NOAA has only published toxicological criteria for carbaryl and MCPA.

¹³ "ae" stands for acid equivalent. Since 2,4-D is a derivative of a phenoxy acid that can take many forms, EPA has based this limit on the parent acid compound. Understanding this concept would be a good test for any applicator. Looking at the Speed Kill label, it contains 28.57% 2,4-D, 2-ethylhexyl ester with a 2,4-dichlorophenoxyacetic acid equivalent (a.e.) of 18.95%. How much should be diluted into a gallon of water to not exceed EPA's 1.5 lb ae/acre?

will yield a soil concentration of 26 ppm using standard EPA default risk assessment assumptions of 1 cm depth and 0.65 g/mL soil density. After 6 months, this will degrade to less than 1 ppm so a second application would not increase the concentration. If a second application is conducted after only one month, however, the cumulative concentration would be 44 ppm which could result in an unacceptable level of risk. The product Speed Zone (containing 2,4-D) allows application every 2-6 weeks. This gives very little time for dissipation by biodegradation and will facilitate rapid accumulation to the point where not only would the risk assessment assumptions be exceeded but that there would likely be toxicity to non-target plant species especially woody shrubs and trees.

EPA's risk assessments are based on individual pesticide ingredients not materials of commerce which often contain mixtures. In practice, the material purchased in a garden or hardware store may contain numerous ingredients. For example, Gordon's Speed Zone Lawn Weed Killer contains:

2,4-D-ethylhexyl ester
Mecoprop-p acid
Dicamba acid
Carfentrazone-ethyl
Petroleum distillates
Xylene

Although the individual ingredients may be present at a safe level, this specific mixture has its own human and ecological toxicity which would have to be assessed through an extremely complex process. The last two ingredients on this list are considered to be "inert" because they lack pesticidal activity. This does not mean that they are non-toxic to humans or ecological receptors. It is a statutory definition in FIFRA and not a scientific one. As such these chemicals are not risk assessed by EPA in the pesticides program. The ingredient xylene, for example, is listed in PA's Integrated Risk Information System as being toxic to the nervous system. Researchers in the environmental health community have raised serious questions about the toxicity of so-called inert ingredients¹⁴.

Current law requires neither reporting lawn care pesticide applications nor posting detailed information at application sites. A recent lawn application in Ward 1 posted a single small sign containing only the name of the company doing the application, the date, and a phone number. The name of the pesticide, amount applied, and re-entry period were not posted. Another recent application found that the worker was not using appropriate protective clothing and was also not aware of the name or nature of the pesticides he was applying.

One way to overcome these uncertainties would be for the City to support the Safe-Grow initiative. By restricting the cosmetic use of these materials, the opportunities for creating an inadvertent hazard would also be reduced. Safe Grow would not place any limits on the use of pesticides for public

¹⁴ Cox, C & Sorgan, M. 2006. Unidentified inert ingredients in pesticides: Implications for human and environmental health. *Environ Health Perspect* 114:1803.

or environmental health purposes. For example, it would not restrict proper application to a tree for borers or use of pest control materials for invasive species or pests, but would only affect cosmetic applications to lawns. As a final point, many people in Takoma Park grow fruits and vegetables at home and many are interested in organic gardening both for food and ornamental crops. Limiting lawn (especially spray/powder broadcast) use of pesticides will certainly help these folks stay "organic" and not be subject to drift or runoff from places where the pesticides are being applied.

2) Should the draft Safe Grow ordinance include pesticides other than those listed in the May 20, 2013 draft, and are there included pesticides that should be removed? Keep in mind that the application focus is lawns.

Probably the most sweeping cosmetic ban is in Ontario where 108 cosmetic pesticidal ingredients and many hundreds of products containing cosmetic pesticides have been banned. Note that Ontario also has a list of 64 approved cosmetic biopesticides. This list is similar to EPA's minimum risk pesticides¹⁵.

Some jurisdictions have banned all lawn-care pesticides from places where children might be present. For example, the State of Connecticut has banned all EPA registered pesticides from laws or ornamental sites in day-care centers and K-8 schools (policy document available on request). This is a *de facto* ban of thousands of products. Connecticut allows the use of EPA's minimum risk pesticides for cosmetic purposes.

In contrast, the proposed ordinance only calls for the ban of 11 pesticide ingredients (increased to 18 in this report) and does not include a list of approved safe pesticides. There are several common cosmetic lawn care pesticides that were not included. Mecoprop-p (MCP), MCPA, pendimethalin, carbaryl, and permethrin are good examples. 2,4-D, glyphosate, dicamba, and MCP are by far the most common pesticides for cosmetic lawn-care use.

The list presented below includes the list in the draft ordinance plus several additional materials based on usage. This group represents the most commonly used cosmetic lawn pesticides sold on the unrestricted market or used by landscape firms. Many of them are also detected in urban streams and are relatively persistent. Inclusion on this list should not be construed to have toxicological significance¹⁶. Many chemicals, pesticides included, have several names. This list includes the most common name, some alternate names and the Chemical Abstracts Service (CAS) registry number. The CAS registry number is an unambiguous designator assigned to every chemical to avoid problems with alternate and multiple names. Many of these products, marked by an asterisk (*) occur as derivatives, esters, salts or related forms. Thus, 2,4-D, 2,4-D amine, 2,4-D ethylhexyl ester etc. The un-derivatized parent compound (any name containing 2,4-dichlorophenoxy acetic acid) should be used to identify the material. The last column is far from comprehensive. There are probably thousands of products containing these substances.

Common Name	Alternate Name	CAS Registry No.	Selected Products
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¹⁵ http://www.epa.gov/opppbd1/biopesticides/regtools/25b_list.htm

¹⁶ See householdproducts.nlm.nih.gov/index.htm for toxicology, environmental effects

2,4-D*	2,4-dichlorophenoxy acetic acid	94-75-7	Weed B Gon Killex, Scotts Turf Builder Weed & Feed
2,4-DD-p*	Dichlorprop-p	15165-67-0	Corasil
Bifenthrin		82657-04-3	Bifen, Masterline
Carbaryl	Naphthylmethyl carbamate	63-25-2	Sevin
Diazinon	Dimpylate	333-41-5	Scott's Turf Builder with insect control
Dicamba	Dichloromethoxybenzoic acid	1918-00-9	Oracle, Vanquish
Diquat*	Diquat bromide	85-00-7	Weedplex Pro Aquacide
Fenoxycarb		72490-01-8	Insegar, Varikill
Fluoroxypyr*	(4-amino-3,5-dichloro-6-fluoro-2-pyridinyl)oxyacetic acid	69377-81-7	Starane, Vista
Fluzifop-butyl	Fluzifop-p	7921-46-6	Fusilade, Tornado
Glyphosate*	Phosphonomethyl glycine	1071-83-6	Roundup
Imazethapyr		81335-77-5	Pursuit, Pivot
Imazipic*		104098-48-8	Plateau, Cadre
Imazipyr		81334-34-1	Polaris
MCPA*	Methylchlorophenoxy acetic acid	94-74-6	Weed'n'Feed
MCPP*	Mecoprop-p	93-65-2	Scotts Weed & feed
Pendimethalin		40487-42-1	Pendulum, Scotts Halts Crabgrass Prevention
Trichlopyr*	3,5,6-trichloro-2-pyridinyloxy acetic acid	55335-06-3	Weed B Gon Brush B Gon

Note that many products contain multiple pesticides.

It seems that Takoma Park has a great deal of flexibility here. On one end of the spectrum, it could ban all pesticides in child-contact areas like Connecticut has done. Moving further down the spectrum would be the Ontario list. It would have to be cross-checked to make sure that it is consistent with EPA registration and to eliminate cosmetic uses on plants other than lawns. A third option would be to include the other common cosmetic lawn use pesticides mentioned above or the ordinance could be left to include only the 11 chemicals that are listed in the current draft.

Another attractive alternative is to provide a list of approved pesticides rather than a list of those that would be restricted. One such list is EPA's minimum risk pesticide list (available on request). This list represents materials that are considered efficacious yet sufficiently benign as to not require formal registration. The pesticides on this list are generally recognized as safe under all conditions of use by experts in the field. EPA also categorizes pesticides as "biopesticides". These are defined as pesticidal

materials derived from natural products such as plants, animals, bacteria and minerals. Unlike the minimum risk pesticides, these materials do require a formal approval process. As of 2013, there are hundreds of biopesticides representing thousands of products. Although the lists are too long for this report, they may be found at EPA's website (<http://www.epa.gov/pesticides/biopesticides/>). Some of these materials are associated with some degree of risk to human health or the environment so they should be used with caution. A final alternative is Ontario's Class 11 pesticide list (available on request) which includes biopesticides and lower risk pesticides. The Ontario list contains most of EPA's minimum risk pesticides plus several of EPA's biopesticides. Entries on this list should be checked periodically to make sure that the listed biopesticides are currently registered with EPA. If this option was adopted, all pesticides not considered to be safe (EPA minimum risk, biopesticide, Ontario Class 11) would be banned for cosmetic use on lawns. Homeowners, merchants, professional applicators and lawn companies would only need to be educated regarding safe and approved pesticides.

2a) How should new pesticides be added to the list?

The original list was based on usage in Takoma Park as reflected by sales at Ace Hardware in Old Town. Many Takomans buy lawn care products at Strosniders in Silver Spring, Home Depot in Silver Spring and Brentwood, Behnke's in Beltsville, and elsewhere. Commercial applicators and lawn services have many other sources. The revised list presented above reflects more general usage patterns to accommodate broader access to lawn care products. Since the list is based on usage, it seems reasonable to add to the list any pesticides that are found to be used in Takoma Park and not on EPA's lists of minimum use pesticides or biopesticides or Ontario's Class 11. Similarly, the list of safer alternatives could be updated as EPA and Ontario update their lists.

3) Are there means of testing lawns for any of the listed pesticides that can be conducted by a trained non-scientist and provide results sufficiently accurate for municipal-enforcement purposes? If there are, which pesticides, and please provide a brief testing description.

All EPA registered pesticides (which includes all on the list of the proposed ordinance) are required to have testing methods. These are listed in EPA's "Residue Analytical Methods Index" (www.epa.gov/pesticides/methods/ramindex.htm). City employees could readily be trained to obtain the appropriate samples (soil, vegetation), but the analysis needs to be conducted at an accredited analytical lab. Three standard screens would be applicable (standard herbicide, phenoxy herbicide and termiticide, the latter because bifenthrin is registered as a termiticide). Each analysis for each sample would cost somewhere in the neighborhood of \$100 (these costs are very variable and highly negotiable. There are no reliable simple field tests for these pesticides.

4) If the City of Takoma Park were to look to the work of governmental entities with pesticide bans or restrictions similar to Safe Grow's, to guide the inclusion/exclusion of pesticides in/from the city's registry, would that be a justifiable and acceptable approach?

Reliance on the work of other entities would allow Takoma Park to learn from the experiences of others and probably assist with educational efforts. There are literally hundreds of state and municipal

pesticide bans throughout the world, however, and one would have to ensure that the regulatory situation there is compatible with that in the US. Since most of the bans are in Canada and Europe, this could take a bit of effort. Canada's federal pesticide regulations are harmonized with those in the US as a consequence of NAFTA thus Canada is probably the most fertile ground for this. The EU is quite different. For example, the EU has recently banned a large group of pesticides that affects bees. EPA has declined to follow suit creating a major divergence in policy.

5) What pesticides are banned for residential-area lawn-care use, possibly with exceptions similar to those envisioned for Safe Grow, by the Provinces of Ontario and Quebec?

There are about 150 jurisdictions in Canada that have banned cosmetic lawn or ornamental use of pesticides (some 80% of Canada's population is covered by a local, municipal, or provincial ban or restriction). The Ontario, Nova Scotia, and Quebec bans are far more inclusive than the proposed ordinance¹⁷. Possibly the best model for Takoma Park is the City of Toronto. Not because Toronto and Takoma Park are in anyway similar demographically or geographically, but Toronto has a very well-thought out program of education and communications that has helped make their ban a success and has become widely relied upon in the professional environmental health community. An article from the peer-reviewed environmental health literature detailing the Toronto experience (available on request) is highly informative and underscores the necessity for both enforcement and education to ensure a successful program.

6) Does the invocation of the Precautionary Principle as a justification for Safe Grow impose a duty on the City of Takoma Park to take further protective steps in areas unrelated to Safe Grow? Should the precautionary principle be invoked as the policy basis for this ordinance?

This is a highly complex area of regulatory policy. There is no consensus definition of the precautionary principle. The ordinance proponents have included one commonly used definition; however, it has not been universally adopted. In general, the precautionary principle as applied to environmental toxicants holds that uncertainty in toxicology or risk assessment is justifiable ground for preventing exposure entirely until the uncertainty can be resolved through scientific analysis. Thus, a pesticide could be banned on the basis of scientific uncertainty.

EPA is constrained by other considerations, many of which are imposed by specific statutes. In the US, we have a variety of regulatory policies. Some of these are quite similar to the precautionary principle while others are quite different. The Clean Air Act (CAA) comes close to the precautionary principle in

¹⁷A good summary of the various Canadian Provincial bans can be found at:
http://www.davidsuzuki.org/publications/downloads/2011/Bilan_reglementations_pesticides_2011_EN_VF.pdf

that standard setting under the CAA is based solely on human health and the environment¹⁸. Some regulatory programs (e.g., radiation standards promulgated by the NRC) utilize a policy known as ALARA or “as low as reasonably achievable”. CDC’s acceptable blood lead level is also similar to this. In setting this criterion, CDC has concluded that an acceptable blood lead level is that which occurs naturally in the absence of overt contamination. Like Superfund, FIFRA is a risk/benefit balancing statute. EPA is required to take into account economic, social and environmental costs and benefits¹⁹. In essence, EPA is required to balance risks of exposure to pesticides against the societal benefits of using pesticides.

Governmental entities in the US have banned hazardous substances without invoking the precautionary principle. These include PCBs (banned by Congress), DDT (banned by EPA), Saccharin (banned by FDA), and chemical warfare agents (banned by international treaty).

In the case of the proposed ordinance, the proponents appear to be moving closer to the CAA by invoking the precautionary principle. There is definitely some degree of risk associated with the use of these pesticides. Although there may not be demonstrated health or environmental effects, the ordinance is intended to be preventative in nature. The proponents believe that cosmetic non-essential uses do not convey enough of a benefit to justify the risks. As discussed in Question 1, for example, there is a finite probability of an adverse health effect from a toddler playing in an area that has been treated with 2,4-D for a period of 3 hours. If there is no perceived benefit from the cosmetic use of 2,4-D this could be considered to be unacceptable. If there is a benefit from an alternative use, such as poison ivy control, it could be considered acceptable.

The APHA definition of the precautionary principle appears to be relevant to this ordinance as it is a preventative environmental health policy. A second policy underpinning of this ordinance is sustainability, which is an objective that has been advanced many times by City government. The mitigation of toxic and/or hazardous anthropogenic substances into the environment is a commonly cited metric for sustainability (Worldwatch 2012, Rockstrom et al. 2009). Another linkage between pesticides, sustainability, and the precautionary principle has been advanced by Hernke & Podein (2011). This publication specifically deals with lawn pesticide use and concludes that application of both sustainability perspectives and the precautionary principle are useful for environmental health protection.

7) Can we create a list that would ban carcinogens and/or endocrine disruptors?

Probably the biggest drawback to this approach is that few of the chemicals under consideration have undergone the degree of testing to be classified as either potential carcinogens or endocrine disruptors. Many of the pesticides we are looking at are problematic for reasons other than carcinogenicity or endocrine disruption. For example, 2,4-D exhibits hematologic, hepatic and renal toxicity; dicamba shows maternal and fetal toxicity, diquat causes cataracts and lens opacity; glyphosate is associated

¹⁸ See Goldstein, BD & Carruth, RS. 2003. Implications of the precautionary principle for environmental regulation in the United States. *Law & Contemporary Problems* 66:246.

¹⁹ A good overview of this may be found at Cornell’s Pesticide Safety Education Program. <http://psep.cce.cornell.edu/issues/eisk-benefit-fifra.aspx>.

with reproductive and developmental toxicity, etc. Many of the pesticides are also toxic to species other than the pests they are targeted against. For example, bifenthrin has not been assessed by EPA, but has been assessed by the European Community (EFSA 2011). This assessment concluded that bifenthrin bioaccumulated and biomagnified in aquatic food chains, had a potential high acute and long-term risk to fish and aquatic invertebrates, and a particular high risk to bees. The report concluded that there was a high risk to non-target arthropods²⁰ within the treated area for representative outdoor use. Considering the link between the Takoma Park watershed and the endangered Anacostia River and ultimately Chesapeake Bay, this environmental toxicity is certainly relevant. None of these forms of toxicity are identified in any convenient list.

This approach could also have the unintended consequence of creating an inequity between cosmetic lawn pesticides and other products. For example, 2,4-D, carbaryl, diazinon, bifenthrin, pendimethalin and glyphosate have been found to be endocrine disruptors²¹ and would fall under this category²². However, numerous other chemicals including components of plastics, flame retardants, pharmaceuticals etc. are also endocrine disruptors. Using this specific toxicological endpoint could open up a Pandora's box of requests to regulate many broad classes of chemicals.

A similar comment would apply to carcinogens. Bifenthrin and pendimethalin are listed as possible human carcinogens, but so are many other perfectly legal chemicals in commerce. There are also many ambiguities regarding classifications of carcinogenic due to several shifts in EPA cancer risk assessment methods over the years²³. Bifenthrin and pendimethalin are listed as possible human carcinogens (Category C), MCPP has "suggestive evidence" of carcinogenicity, carbaryl is "likely to be" a human carcinogen. This use of terminology may be confusing at best. Finally, as with other forms of toxicity, adequate study is not always available. Dicamba, 2,4-D and triclopyr, for example, are listed by EPA as not having sufficient evidence to be classifiable as a human carcinogen (Category D).

8. Is the COE aware of any circumstances where the benefits of utilizing restricted pesticides might outweigh the risks/harms caused by the pesticides not already covered by the exceptions.

This is a policy question that is beyond the scope of this research. COE may address this.

²⁰ Arthropods include insects, arachnids, crustaceans, and related organisms.

²¹ Additionally, here is no single authoritative list of endocrine disruptors. I typically consult six different lists for this information.

²² Mnif, W. et al. 2011. Effect of endocrine disruptor pesticides: a review. *Int J Environ Res Public Health* 8:2265-2303.

²³ EPA 2012. OPP Annual Carcinogen Report.

TAKOMA PARK

Category 1 Endocrine Disruptors as Categorized by the European Union. Date: May, 2015

Cas No.	Name	EPA Registration Status
94-82-6	2,4-dichlorophenoxybutyric acid (2,4-DB)	Active
34256-82-1	Acetochlor	Active
15972-60-8	Alachlor	Active
61-82-5	Amitrole	Not Active
1912-24-9	Atrazine	Active
82657-04-3	Bifenthrin	Active
10043-35-3	Boric acid	Active
63-25-2	Carbaryl	Active
91465-08-6	Lamda-Cyhalothrin	Active
52918-63-5	Deltamethrin	Active
122-14-5	Fenitrothion	Active
58-89-9	Lindane	Not Active
330-55-2	Linuron	Active
8018-01-7	Mancozeb	Active
12427-38-2	Maneb	Not Active
137-42-8	Metam sodium	Active
9006-42-2	Metiram	Active
21087-64-9	Metribuzin	Active
87-86-5	Pentachlorophenol	Active
1918-02-1	Picloram	Active
10453-86-8	Resmethrin	Active
886-50-0	Terbutryn	Active
137-26-8	Thiram	Active
1582-09-8	Trifluralin	Active
50471-44-8	Vinclozolin	Not Active
12122-67-7	Zineb	Not Active