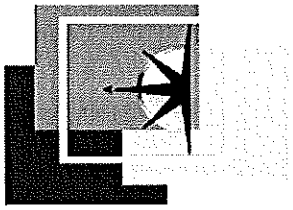

Viridis Advisors

Moving from Sustainability to Stewardship

February 25, 2013

RE: **Opposition to Upcoming Pesticide Legislation: HB 6440, SB 914, SB 916, SB 917**

My name is Kevin Dufour. I am an environmental scientist with over 24 years of experience. I became aware of this legislation while helping clients set and meet their sustainability benchmarks. I became concerned that this proposed legislation would take the Precautionary Principle too far and could actually endanger the community and weaken sustainability efforts.

The professional sports turf managers, school grounds superintendents, and parks/ recreation directors that I am fortunate to work with are dedicated and forward thinking individuals that go to great lengths to minimize their environmental impact while maintaining the highest standards of safety and functionality of their properties. All of them believe in, advocate for, and utilize the Best Management Practices exhibited in their IPM or Plant Health Care approach. However, there are situations, beyond their control, where a prompt and effective action is needed to preserve taxpayer property and protect children's health. It is important to understand that sports turf is not cosmetic turf. It is specialty functional turf. It serves an important purpose, game mechanics and player safety.

Yes, fields can be maintained organically, but only under near perfect conditions. If play is limited to prevent the loss of cover and a heavy regime of nutrient treatments and over seeding is used along with extensive cultural practices, it can be done. However, if the field is damaged by adverse weather, or excessive use, or cannot be taken out of service and rested; weeds and/or insects will take hold. Once pests establish themselves, it has been proven that surface hardness increases to levels that exceed acceptable standards resulting in a significantly increased risk of traumatic brain injury. Similarly, it has been scientifically established that with the loss of turf and an increase in weed density, surface traction is reduced and this increases the chance of bone, joint, and ligament injury.[1] 5.7% of high school football injuries were definitely related to field conditions. 15.2% were possibly related to field conditions. [2]That's 20% of all injuries likely related to field conditions. [3] In 2004 there were 186,000 youth football injuries and 116,000 youth baseball injuries. [4] 10% of all lawsuits related to sports injuries claim that the athletic field was inadequately maintained. [5]

That's a lot of injuries that could be avoided by insuring that fields are adequately maintained. When even the best organic field is hit by drought, or flooding, or infestation, or over use due to limited play space, or foraging animals, or even vandalism; you have a situation that is impossible to maintain under a solely organic approach.

The inclusion of an "emergency application" provision allowing for the use of pesticides when there is an imminent threat to human health is not a protection. By the time an imminent threat is detected it is often too late. In the case of ticks, by the time you notice a tick on a child, chances are that it is too late. You have 24 hours to remove a tick before the spirochete is injected and the child is infected. The signs of infection may not become apparent for several weeks. Over this time period the damage done to the child is ongoing and many other children could be infected. How many parents truly and properly inspect their children for ticks? How many even know what a deer tick looks like or how small it is. (It is about as big as the period at the end of this sentence or the size of a poppy seed). Fleas, ticks, and other biting or stinging insects can transmit a whole host of diseases. These are real and immediate threats, not theoretical ones. These are threats that can be dealt with preemptively based upon sound science and the threat can be proactively eliminated.

Also, there is no exemption for economic harm. We would never dream of building a multimillion-dollar artificial turf field and then banning the chemicals needed to maintain it. (Incidentally these chemicals are not covered under any of the proposed bans and they are often at least as powerful as those used on natural turf.) The natural turf fields represent a large investment of municipal funds. They have been cultivated and improved for years. That investment can be lost in a single season.

In Canada, where many provinces have been operating under such a ban for a number of years, sports turf managers have had to plan for a complete re-sodding of their fields every couple of years. There is no pesticide ban on the sod farms. Every few years the turf managers start fresh, with sod that is weed and pesticide free due to the use of conventional product, and then fight a losing battle that ultimately results in replacement.

Virtually all organic products are less effective than synthetic ones. They are less selective, have to be applied more frequently and at higher rates, and they carry superfluous unwanted chemicals into the environment. Biocides such as milky spore and biologicals such as nematodes for grub control fare no better. Milky spore has proven very ineffective and nematodes, as a living organism, are fraught with uncertainty and have proven limited efficacy.

> "Use of milky disease in New England is somewhat controversial, because there are no data to indicate whether the disease actually suppresses grub populations"[6] "Nematodes are only marginally effective, expensive, alive, and need right conditions. To date, the level of control achieved by applying nematodes has varied, with some failures and some successes. The successes have occurred mostly in simplified, controlled systems such as nursery containers."[7]

The issue with an organic treatment regime, as these laws would mandate, is that there is absolutely no room for error, no accounting for the unforeseen. If weeds or insects establish themselves you will lose the battle. A single purslane, a common turf weed, will leave in excess of 52,000 seeds per plant. Hundreds of millions of seeds per acre will be waiting to germinate. [8] Buried weed seeds can remain viable for up to 80 years.[9] These seeds are highly opportunistic and will germinate in any exposed soil. Once they are established, their high rate of seed production and rapid growth will quickly overwhelm the turf grass. This is bad news for athletic turf where 78% of traffic is concentrated on just 7% of the football field with an average of 56 cleat marks per square foot.[10] In short order, bare soil will be exposed.

Subterranean insects will often establish themselves and do their damage before being noticed. They have a limited and shifting (depending upon climatic conditions) window of maximum vulnerability. These insects or their larvae are a desired food source for burrowing and digging animals. The physical damage these creatures cause to the stand of turf grass, allows for further infestation of weeds or insects. It does not take long before player safety becomes a major concern.

An exclusively organic regime that hamstrings the Best Management Practices of IPM by disallowing the most effective and least harmful option can also be financially and environmentally ruinous. The experiences in Canada are illustrative. The city of Oshwa was forced to use vinegar, otherwise know as acetic acid, instead of a common herbicide for control of weeds in hardscapes. Their costs went from $7,428 per year to $23,643 per year. [11] The reason for the increase in cost is that is that the conventional herbicide only has to be applied twice per year but the acetic acid needs to be reapplied every 10 days for effective control. This frequent dousing diverts resources, stretches budgets, and dumps excess product as runoff. Acetic acid is a pollutant. It has an LD_{50} and an MSDS despite the fact that is "organic". Most commercially produced acetic acid, is in fact, a petrochemical byproduct. This heavily used industrial chemical is utilized in plastic production. [12,13]

The idea that organic pesticides are safer alternatives has come under fire recently.

> "It has been assumed for years that pesticides that occur naturally are somehow better for us and the environment than those that have been created by man. As more research is done into their toxicity, however, this simply is not true, either. Many natural pesticides have been found to be potential-or serious – health risks"[14]

If you compare the most used synthetic pesticide and fungicide to the most used organic pesticide and fungicide you will find that the results are startling. The top used organic pesticide is 2.5 to 10 times **more** toxic than its man made alternative. The organic alternative is mutagenic and carcinogenic and it is strongly bio accumulated. As for the fungicides the synthetic version did not have a toxic dose even when tested at 10,000 mg/kg, the highest level tested. The organic fungicide has a toxic dose at 200 to 2000 mg/kg. It was also more harmful in the environment.[15] Recent research has been finding that organic pesticides might actually be worse for the environment than the synthetic versions they seek to replace.

> " Canadian scientists pitted 'reduced -risk' organic and synthetic pesticides against each other in controlling a problematic pest, the soybean aphid. They found that not only were the synthetic pesticides more effective means of control, the organic pesticides were *more ecologically damaging*, including causing higher mortality in other, non-target species like the aphid's predators."[16]

When drawing assumptions, for the basis of setting policy, about toxicity and environmental impact, care must be taken and a scientific approach utilized.

The bottom line is that chemicals are chemicals. Everything is a chemical and everything is potentially toxic. Salt and sugar are regulated pollutants. Water can be toxic, consuming too much can disrupt blood chemistry and be fatal.[17] The difference between a chemical that is "organic" and a chemical that is "synthetic" is the means in which the chemical is presented. You can chew on a handful of willow bark or you can take an aspirin. Either way your getting salicylic acid, one is just a more efficient means of delivery.

What about safety? Pesticides are dangerous chemicals, like gasoline, propane, Tylenol, bleach, and ammonia. We handle dangerous chemicals everyday. The pesticides at issue in the proposed legislation will be used by trained and licensed applicators that have a personal, financial, professional, and ethical interest in using as little product as possible. The product costs them money, applying it costs them time, they are the first to be exposed, and, their children along with all the other children go to those schools, or parks, or ball fields. A chemical that affects fungi may have no effect on a weed, or on an insect, or on a mammal. A blanket ban on all types of chemicals ignores the fact the people are different from insects and plants.

Pesticides registered through the EPA pass a rigorous testing process. Once a maximum safe dose is established it is modified by several safety factors. An example would be, toxicity testing on animals found the maximum safe dose, however it was animals not people, lets reduce that dose by a safety factor 10. Furthermore, a safety factor should be applied to account for chronic versus acute exposure, the dose should be reduced by another factor of ten, the allowable dose is now 1/100th of the original dose. In addition, some within the population may need additional protection due to extra sensitivity such as children or pregnant women – a third safety factor of ten may be applied. This reduces the dose to 1/1000th of the original level. This can be further reduced by the application of a modification factor (1-10) to account for the scientific uncertainties of the study. This could result in a reference dose that is 1/1000 to 1/10,000 below the level where there was an observed adverse effect.[18] Only if the tested ingredient were effective on the target pest after being diluted to a safe level would the product make it to market.

If you look at the risk of pesticide exposure you must reach one simple conclusion. The vast majority of children's exposure to pesticides does not come from landscaping sources. The policy position by the American Academy of Pediatrics (AAP) points out, "Parental, household, and occupational exposures (maternal and paternal) appear to be the largest risks." [19] Very few, I believe 3 out of 195 of the scientific studies that the AAP used in its technical report, even addressed the issue of landscaping chemicals. Those three focused on homeowner applied products not the potential exposure from parks or athletic fields. The technical report relied most on studies investigating household exposure, worker exposure, and food exposure, the vast majority of sources of children's risk. Even when a homeowner applied a lawn chemical at rates exceeding 3 times the labels specified rate, the median exposure detected inside the home was 1.1% of the EPA reference dose. The median amount available for dermal penetration was 0.1%. If you use the World Health Organizations acceptable daily intake, the exposure from the homeowner-applied treatment was 0.08%. "The data presented here suggest that children are not exposed at levels exceeding the IRIS RfD". The USEPA Integrated Risk Information Service (IRIS) Reference dose (RfD) is 100 micrograms per day for a 10 kg child. The measured exposure from a lawn application by non-licensed, non-trained homeowners was 1.135 micrograms per day.[20]

There are numerous other studies that demonstrate that the risk of exposure from treated turf is minimal at best. ("A very limited amount of [pesticide] applied to turf is available for transfer and absorption during intensive human contact".[21] "To date, the [hazard quotient] determined for azoxystrobin as well as the previously studied pesticides, [list omitted] have all been below 1.0, indicating safe exposure levels".[22])

Another study involved 10 volunteers, 5 of who were clothed in long pants, a short sleeved shirt, socks and closed footwear, the remaining 5 wore shorts, as short sleeved shirt, and were bare foot. All spent an hour walking, lying down, or sitting on turf that was treated one hour earlier. One enthusiastic participant removed his shirt for 30 minutes of the study. The results were dramatic:

> "These results indicate that at the doses measured, exposure to sprayed turf should present little risk in humans. However, people can reduce exposure to non detectable levels by remaining off treated turf for a period of 24 hours or until after rainfall or irrigation so that dislodgeable residues and therefore potential exposure are essentially zero."[23]

Bans of this sort are often an extreme interpretation of the Precautionary Principle. In short this principle states that, if an activity poses a threat to human health or the environment, precautionary measures should be taken even when the cause and effect relationship is not fully established scientifically.

> "Simply put, the precautionary principle is not a sound basis for public policy. At the broadest level of generality, the principle is unobjectionable, but it provides no meaningful guidance to pressing policy questions. In a public policy context, 'better safe than sorry' is a fairly vacuous instruction. Taken literally, the precautionary principle is either wholly arbitrary or incoherent. In its stronger formulations, the principle actually has the potential to do harm."[24]

The problem with this idea is that it is one-sided. It does not promote a balanced empirical approach. Dismantling state preemption of pesticide regulation magnifies this lack of critical thinking and scientific scrutiny. This subject is highly complex and constantly evolving. This flawed risk analysis based upon emotion will only lead to unintentional consequences and a mosaic of well-intentioned yet ill-conceived local laws.

Every risk avoided trades against another risk that is promoted. The very small risk of using pesticides must be balanced against the harms that they ameliorate. In the case at hand we have very limited and thoroughly studied risk for which adequate protective measure exist that should only be used as a last resort, balanced against a very real and proven risk of childhood injury and disease, including a demonstrable risk traumatic brain injury, as well as other socioeconomic costs. "The empirical question is whether the health and environmental gains from the regulation of the substances involved are greater or lesser than the health or environmental costs of the regulation."[25] The idea that if reduction is good, a ban must be better, is not so. We would be swapping a theoretical threat and discarding a known benefit that reduces actual harm.

IPM is the gold standard for harm reduction related to pesticides. It is adopted world wide and in a variety of venues from buildings, to homes, to hospitals, to schools. The USGBC LEED green rating system awards credits for schools that have adopted comprehensive IPM Programs under their LEED for Schools system. The EPA promotes IPM. The American Academy of Pediatricians promotes IPM. Reasonable organizations that wish to minimize or even eliminate pesticide exposure, yet retain the benefits that pest elimination affords human kind, endorse an IPM based approach. Canada has had the most experience with a pesticide ban and we can learn from their experience. The Parliament of British Columbia was wrestling with the idea of instituting a wide-ranging ban. They commissioned a major study to learn from the experiences of their sister provinces that had such a ban for a number of years.

> *"Over the course of its inquiry the Committee studied the existing federal-provincial regulatory framework, heard varied opinions from over 8,600 e-consultation participants, and examined bans in other jurisdictions. The Committee concluded that despite the intensity of arguments in favor of a ban on the cosmetic use of pesticides and a general misunderstanding of the risks associated with chemicals, there is insufficient scientific evidence to support a province wide ban on pesticides for cosmetic use. The majority of the Committee supports using science-based evidence and will not reduce access to products that are approved for safe use in Canada."* [26]

We, who are fortunate to live in relative comfort, forget the horrors of pest infestation. These types of bans impact those communities that cannot afford to adopt an organic approach. Those children would be more likely to face unsafe play areas, closed fields or parks, and pest infested schools. Roaches, bedbugs, ticks, fleas, flies, mosquitos, mice, and rats are already problems. Dangerous play areas and a lack of adequate and safe athletic fields are already problems. We need a balanced and reasoned approach, an approach that minimizes harm from all fronts. We need public policy that is developed in a careful and reflective manner that takes into account the state of the art. We need to make use of the experts that have studied this subject and consider their opinion before setting policy. We need to minimize children's exposure to all forms of chemicals yet still be able to keep them safe from all other hazards while they are in our charge. We need IPM for the parks, for the schools, for the communities and their children.

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[1] See study, Dr. J. Sorochan Univeristy of Tennesee Center for Athletic Field Safety. Excerpts available at www.turfnetsports.com/page/webinar_archives.html

[2] See Harper et al, 1984

[3] "On the basis of these data, it can be estimated that as many as 20% of the reported injuries could have been prevented or perhaps rendered less severe by more favorable field conditions. Safety conditions should thus be an incentive for the construction and maintenance of high quality playing surface, for practice as well as games." Http://archive.lib.msu/tic/stnew/article/1994sep6.pdf

[4] See AAP, US CPSC, & national Youth Sports Sagfety Foundation

[5] Dougherty, 1988-Cockerham, S. T., V. A. Gibeault, and R. A. Khan. "Alteration of sports field characteristics using management." *International Turfgrass Society Research Journal* 7 (1993): 182-191.

[6] http://www.uri.edu/ce/factsheets/sheets/biocontrolturf.html

[7] http://www.cefs.nesu.edu/resources/organicproductionguide/insectmgmtfinaljan09.pdf

[8] http://pubs.cas.psu.edu/freepubs/pdfs/uc175.pdf

[9] http://www/cefs.ncsu.edu/resources/organicproductionguide/weedmgmtjan808accessible.pdf

[10] Cockerham, S.T., et al., California-turfgrass-culture-California-University,-Berkeley,-Cooperative-Extension-Service (USA). (1989). v. 39(3/4) p. 11-12.

[11] http://sturf.lib.msu.edu/article/2011jan18a.pdf

[12] http://pubchem.ncbi.nlm.nih.gov/summary/summary.cgi?cid=176

[13] http://www.chemicalland21.com/petrochemical/ACETIC%20ACID.htm

[14] Gold,L.,Slone,T.,Stern,B.,Manley,N.,&Ames, B. (1992) Rodent carcinogens: setting priorities *Science, 258* (5080), 261-265

[15] http//blogs.discovermagazine.com/science-sushi/?p=167 - .USLw_aV8zHg

[16] Bahlai,C.,Xue, Y.,McCreary, C., Schaafsma, A., & Hallett, R. (2010). Choosing Organic Pesticides over Synthetic Pesticides may Not Effectively Mitigate Environmental Risk in Soybeans *PLoS ONE*, 5 (6)

[17] http://www.mayoclinic.com/health/hyponatremia/DS00974

[18] http://www.tera.org/Publications/RefDose1993.pdf

[19] http://www.pediatrics.org/cgi/doi/10.1542/peds.2012-2758.

[20] http://ehpnet1.niehs.nih.gov/docs/2001/109p1185-1191nishioka/abstract.html

[21] Bernatd CE et al, Arch Environ Contam Toxicol, 2001 Aug;41(2):237-40

[22] http://www.nertf.org/25Final.pdf

[23] *Journal of Environmental Science and Health*, part B: Pesticides Food Contaminants, and Agricultural Wastes Volume 27, Issue 1 (1992) Human exposure to 2,4-dfollowing controlled activities on recently sprayed turf.

[24] See Cockerham, S.T 1989 (Hendersen et al (2005), at UCONN confirmed this with a study that showed 667 cleat marks per square meter)
http://www.american.com/archive/2011/may/the-problems-with-precaution-a-principle-without-principle

[25] Aaron Wildavsky, But Is It True? (Cambridge, MA: Harvard University Press, 1995), 428.

[26] Special Committee on Cosmetic Pesticides Report, May 2012 presented to the third and fourth sessions of the 39th Parliament of British Columbia. http://www.leg.bc.ca/cmt/39thparl/session-4/cp/reports/PDF/Rpt-CP-39-4-Report-2012-MAY-17.pdf