I am Candace Bartholomew I live in Suffield, CT and I have a few comments to make regarding Raised Bills 366 and 1063 about pesticides.

I have done some work on the impact of the pesticide ban on school grounds quality and maintenance expenses. Please access the link below to read the published article in HortScience:

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Factors Affecting School Grounds and Athletic Field Quality after Pesticide Bans: The Case of Connecticut: http://hortsci.ashspublications.org/content/50/1/99.full

In addition to this we have gathered data on management practices used by school grounds managers under three different management practices, these include; conventional (calendar scheduled pesticide applications), integrated pest management practices and pesticide free management. Basically what we have found is that historically and generally, there are no pesticides used on K-8 school grounds with the exception of herbicides used in parking lots sidewalks and fence lines. High schools are a different story. Due to strict athletic field quality requirements management of these fields is more intense.

I am a past officer of the American Association of Pesticide Safety Educators and a current member of the Board of Directors. I have been teaching pesticide safety for nearly 30 years. I have a strong knowledge of pesticides how they are regulated and the issues associated with their use.

Pesticides evoke deep responses from people, they are either negative and fearful or just not sure what to think, but pesticides must be bad. There is no middle ground when it comes to pesticides it is all bad to most people, Rachel Carson said so and we know DDT was bad. And so it is all these years later.

We can all thank Rachel Carson for making us aware of the problems associated with pesticide use and for the ensuing regulations placed on them. Pesticide chemistry has evolved since Rachel Carson and so as has the science of evaluating them, detecting them and determine their adverse effects. Pesticides are not all alike. Plant derived substances used as pesticides range from the slightly toxic like pyrethrums , neem and red quill to the highly toxic strychnine and nicotine. The same is true for synthetically manufactured pesticides. This range of toxicity is not generally understood by the public because of the perception that all pesticides are bad.

Pesticides come in all shapes and forms for all kinds of different uses. As animals humans are more likely to be poisoned by insecticides. Conversely, humans do not photosynthesize, we are not plants and herbicides are less likely to harm us.

The stories we hear about pesticide poisonings nearly always involve people obtaining and using products illegally or the improper storage of pesticides in food containers and

finally and unfortunately, improperly stored pesticides that unsuspecting people (children) encounter.

Most people don't realize that many of the household cleaners they use every day are also classified as pesticides. Look at a can of Lysol, there's an EPA registration number on it and the signal word is Warning which indicates it is a moderately toxic pesticide. Even the EPA unregistered substances used as pesticides, the 25(b)s, include acetic acid up to 8%. The vinegar you buy in the grocery store is only 3% acetic acid. An 8% concentration is very caustic and must be handled by knowledgeable applicators and yet is is unregulated.

Basic principle is risk is that risk is equal to toxicity times exposure: RISK = TOXICITY X EXPOSURE. As Paracelsus said the dose makes the poison and we can control exposure by being trained how to handle and use dangerous substances safely. Just as flying a jet or playing football you wouldn't do either without being properly prepared. We use hazardous things every day medications, electricity etc. and take risks which can be managed driving for instance. The same is true with pesticides. We can choose to use low toxicity pesticides and use them safely taking all the precautions necessary to protect humans, animals and the environment. It is by demonstrating a knowledge of the safe use and handling of pesticides through education and testing that we are assured that trained people are handling pesticides. We can limit exposure with re-entry intervals and posting treated areas as well, we do have options besides a complete ban.

The city of San Francisco has developed a model plan for regulating pesticides, it's worth taking a look at it below. Additionally, I have attached a recent article on colony collapse disorder of honeybees. There's a lot of misunderstanding about what is causing bee hive decline.

Colony Collapse Disorder: http://onlinelibrary.wiley.com/doi/10.1002/etc.2527/full

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Guide to the City of San Francisco's Reduced-Risk Pesticide List

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Introduction

The City of San Francisco Department of the Environment's (SFE) Reduced-Risk Pesticide List is the result of a multi-step process. The first step is a hazard assessment by Dr. Philip Dickey, staff scientist at the Washington Toxics Coalition. The second step is a consideration of the potential human and environmental exposure that may result from product use. This exposure assessment is done by SFE staff in conjunction with the Integrated Pest Management Technical Advisory Committee (IPM-TAC). The third and final step combines the results of the hazard and exposure assessments into a decision by staff and the TAC as to whether a product should be added to the List, and if so, whether it requires an "allowed (A)," "limited use (L)," or "limited use-special concern (L*)" categorization.

FIRST STEP: Hazard Assessment

This first step is intended as a screening step to identify potential concerns with each product. Products and ingredients are evaluated against a list of criteria related to health and environmental hazards and are then placed into one of three tiers based on the result of that screening. The tiers and their meaning are shown in Table 1.

Table 1. Tier Rankings Derived from Hazard Screening

Tier	*Definition*
Tier 1	Highest concern. At least one criterion placed in highest hazard category.
Tier 2	Moderate concern. At least one criterion placed in middle hazard category.
Tier 3	Lowest concern. No criteria flagged for Tier 1 or Tier 2.

The specific hazards that are evaluated and the sources of information for each are shown in Table 2 below. More detail on each criterion and the range of results that trigger each tier ranking are explained in the text following Table 2. Except for acute toxicity, the evaluations are usually based on active ingredients only. This is because the so-called "inert" ingredients are usually claimed as confidential by product manufacturers.

Table 2. Hazards and Information Sources Evaluated

Hazard	*Source(s) of Information Used*
Acute toxicity	Product label: signal word Caution, Warning or Danger
Special hazards	Product label: use restricted to professional applicators
Cancer	gnation of ingredient by US EPA,[1] State of California,[2] National Toxicology Program, [3] or International Agency for Research on Cancer[4]
Reproductive toxicity	Designation of ingredient by the State of California[2]
Endocrine disruption	Designation of ingredient by the European Commission[5]
Water pollution	Ingredient listed under Clean Water Act Section 303(d)[6]
Hazard to birds	Product label: presence and wording of bird hazard statement
Hazard to fish	Product label: presence and wording of fish hazard statement
Hazard to bees	Product label: presence and wording of bee hazard statement
Hazard to wildlife	Product label: presence and wording of wildlife hazard statement
Persistence	OSU Pesticide Properties Database[7]: average soil half-life
Soil mobility	OSU Pesticide Properties Database[7]: soil mobility score
Persistent, Bioaccumulative, Toxic Substances (PBTs)	US EPA Waste Minimization Priority Chemicals[8]

Acute Toxicity

EPA assigns every pesticide product to a hazard category based on the results of acute toxicity testing of the full product including inert ingredients. The testing includes the single dose required to cause death in test animals via ingestion, inhalation, and skin absorption. The testing also considers the degree of skin and eye irritation or damage. Based on the results of these tests, EPA assigns the product to a hazard category and requires a signal word such as Caution, Warning, or Danger to be placed on the label. Danger indicates the highest hazard, Warning indicates moderate hazard, and Caution indicates a lower hazard.

Special Hazards

Some pesticides are restricted to use only by certified pesticide applicators and are not available to the general public because of high toxicity, particularly hazardous ingredients, or environmental hazards. Pesticides designed as restricted use are so indicated on the product label.

Cancer (known ingredients only)

Various state, federal, and international organizations evaluate or list chemicals for carcinogenicity, their potential to cause cancer.[1,2,3,4] Due to the expense and difficulty of such evaluations, not all agencies have reviewed the same chemicals and not all reach the same conclusions on a given chemical. For this reason, we use the ratings of several agencies whenever possible. These ratings indicate the strength of the scientific

evidence that a particular chemical can cause cancer in humans, but they do not consider the potency of the chemical, i.e. the number of cancers that will result from a standard level of exposure to a population. The various agencies use different words to describe the strength of evidence, such as possible, probable, likely, known, etc. The tier rating is based on the highest likelihood assigned by any agency that has evaluated the chemical.

Reproductive/Developmental Toxicants (known ingredients only):
Known ingredients in the products are screened against the State of California lists of known reproductive and developmental toxicants.[2]

Endocrine Disruptors (known ingredients only)

Under the Food Quality Protection Act, the EPA is required to screen pesticide ingredients for endocrine system effects. Until that screening is done, a comprehensive list of endocrine disruptors will not be available. For purposes of this screening, we used the list of endocrine disruptors compiled by the European Commission.[5] Chemicals on this list are classified for both humans and wildlife as Category 1: evidence for endocrine disruption in living organisms, Category 2: evidence of potential to cause endocrine disruption, or Category 3: no evident scientific basis.

Water Pollution (active ingredients only)

Section 303(d) of the federal Clean Water Act requires states to compile a list of waterbodies with excessive contamination. The list of impaired California waterbodies[6] within the City and County San Francisco was searched for pesticide active ingredients. Based on a site-specific analysis of the waterbodies, products containing copper, chlorpyrifos, or diazinon were indicated as containing priority 303(d) pollutants in the San Francisco urban area.

Hazard to Birds, Aquatic Life, Bees, and Other Wildlife

The US EPA requires particular hazard warning statements on pesticide product labels depending on the toxicity of the active ingredients to particular off-target species, evidence that adverse effects have occurred, and the use for which the product is intended. The hazard assessment is based on whether such warnings appears on the specific product label and how strongly the warning is stated, e.g. toxic, extremely toxic, etc.

Persistence (active ingredients only)

The environmental persistence of compounds varies widely depending on many factors. In addition to the inherent degradability of the compound itself, persistence is affected by where the compound is found (soil, water, air, leaf surface), temperature, moisture, amount of organic matter present, etc. The standard measure of persistence used in the hazard assessment is the aerobic half-life in average soil. Pesticides are classified as non-persistent, moderately persistent, or persistent based on their soil half-lives. For minerals, the notation NA indicates not applicable.

Mobility in Soil (active ingredients only)

The potential for ground-water or surface-water pollution by pesticides is dependent on many factors, including persistence of the ingredients, water solubility, soil binding, amount of rainfall or irrigation, soil properties, amount and frequency of applications, soil slope, vegetation present, proximity to ground- or surface-water, etc. The hazard assessment only considers that relate strictly to the pesticide itself. The Ground-water Ubiquity Score (GUS) is an empirically derived index that relates pesticide persistence and soil binding to mobility. The GUS index is defined mathematically as:

$$GUS = \log_{10}(halflife) \times [4 - \log_{10}(Koc)]$$

where Koc is the soil sorption coefficient and halflife is the soil halflife in days. A pesticide movement rating ranging from “extremely low” to “very high” has been assigned to the numerical values by the researchers in the OSU Extension Pesticide Properties Database.[7] The values are as follows:

GUS value	Pesticide Movement Rating
<0.1	extremely low
0.1 - 1.0	very low
1.0 - 2.0	low
2.0 - 3.0	moderate
3.0 - 4.0	high
> 4.0	very high

In addition to the GUS index, information on pesticide movement potential was noted from product label warnings. EPA requires two levels of warnings for products with characteristics determined to result in likely contamination of ground-water from use as labeled. A lower level of warning is required if no actual detections have occurred or no field studies have been done. A higher level of warning is required if detections have occurred or field studies have shown that the chemical leaches. For purposes of the initial screening, the presence of either warning was considered an indication that the chemical has high mobility. In rare cases where a label groundwater advisory occurs but the GUS index did not indicate high mobility, the label advisory was given priority.

Persistent, Bioaccumulative, Toxic Chemicals (PBTs)

In recent years much attention has been paid to toxic chemicals that persist in the environment and bioaccumulate. PBTs pose a serious threat because they can build up in ecosystems, wildlife, and humans even when deposited slowly. Many organizations including the United Nations, International Joint Commission on the Great Lakes, U.S. EPA, and Washington State Department of Ecology have proposed strategies to reduce or eliminate them. The list used for this evaluation is EPA's Waste Minimization Priority Chemicals[8] list, which now includes 31 substances.

Tier Ranking Process

After all of the hazard indices described above have been evaluated, the tier table assignment is made. The product is assigned a plus, zero, or minus for each characteristic based on the ranges or values shown in Table 3 below. If any minuses are assigned, the product is placed in Tier 1. In no minuses are assigned but any zeroes are assigned, the product is placed in Tier 2. Products with only plusses are placed in Tier 3.

Table 3. Comparison Against Criteria

Criterion	-	0	+
Signal word	danger		warning or caution
Restricted use	yes		no
Cancer	known, likely, probable	possible	no evidence, not likely, not listed
Reproductive	listed		not listed
Endocrine	EC category 1 or 2		EC category 3 or not listed
Water pollution	listed		not listed
Bird hazard	extremely/highly toxic	toxic	may be toxic or no warning
Aquatic hazard	extremely/highly toxic	toxic	may be toxic or no warning
Bee hazard	extremely/highly toxic	toxic	may be toxic or no warning
Wildlife hazard	extremely/highly toxic	toxic	may be toxic or no warning
Persistence	> 99 days	30-99 days	<30 days
Soil mobility	high or very high	moderate	low to extremely low
PBT	listed		not listed

SECOND STEP: Exposure Assessment

The hazard review and tier ranking process is only the first step toward placing a pesticide on the
Reduced-Risk Pesticide List. A critical second step is review by the San Francisco IPM Technical Advisory Committee (IPM TAC), which is composed of IPM Coordinators from

the largest City departments (SF Public Utilities Commission, SF Dept. of Recreation and Parks, SF Dept. of Public Works, SF Port, SF MUNI, SF International Airport, SF Dept. of Public Health). The Committee discusses each proposed addition/deletion to the list and reviews:

- *The potential for human exposure or environmental release for each proposed product.* Products such as containerized baits, for example, use very small amounts of active ingredient encased in a protective covering. These would therefore pose less exposure potential than, say, aerosol spray products.
- *The effectiveness of each proposed product*. Does the product work as intended?
- *The need for the product.* Is this kind of pest management action truly necessary? If so, is this the least-hazardous product available for the task?

THIRD STEP: Placement on Allowed or Limited-Use Lists

The IPM TAC makes recommendations for additions/deletions to the list. These recommendations are then reviewed by SFE. If the decision is made to list a product, it is categorized in one of three ways:

A = **allowed for use** (but always as a last resort, when nonchemical alternatives have been exhausted). "A" list products are generally the least hazardous pesticides on the list.

L = imited use, with specific restrictions on allowable situations.

L* = limited use, special concern. These are pesticide products that pose the greatest health or environmental concerns, but which are nevertheless considered the leasthazardous chemical alternative for a particular purpose. Use of L* products must be justified at an annual public hearing.

The SFE proposes a new Reduced-Risk Pesticide List annually, and holds a public hearing (generally in November) to obtain public comments and suggestions. The list is then submitted for final approval by the SF Commission on the Environment.

References

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4. International Agency for Research on Cancer, IARC Monographs Programme on the Evaluation of Carcinogenic Risks to Humans, Complete List of Agents, Mixtures and Exposures Evaluated and their Classification, http://www.iarc.fr/
5. European Commission (2007) Towards the establishment of a priority list of substances for further evaluation of their role in endocrine disruption, Annex 13 (List of 146 substances with endocrine

disruption classifications prepared in the Expert meeting. Final Report, November 2000, with annexed reports up to 2007.) European Union - Endocrine Disruptors Website http://ec.europa.eu/environment/endocrine/strategy/substances_en.htm
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7. Oregon State University Extension Pesticide Properties Database, http://ace.orst.edu/info/nptn/ppdmove.htm
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