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BOARD OF PESTICIDES CONTROL
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<u>Memorandum</u>

To: Board of Pesticides Control

From: Pamela J. Bryer, Ph.D. | Pesticides Toxicologist | Maine Board of Pesticides Control

Subject: School Herbicide Use Project Update

Date: December 2, 2022

In 2021, the Maine Legislature passed LD 519 An Act To Protect Children from Exposure to Toxic Chemicals. Section two of the bill was direction to the Board of Pesticides Control to convene its Medical Advisory Committee (MAC) to "further evaluate the potential impact of herbicides used on school grounds on human health". The Board directed the MAC to take up the legislative request and the MAC convened three meetings. In 2021, staff prepared a draft report on school herbicide use which included the MAC recommendations to the Board (link to report: https://www.maine.gov/dacf/php/pesticides/documents2/bd_mtgs/Jan22/Draft%20MAC%20Report%201-11-2022%20-%20fixed%20.pdf). The Board reviewed this report and directed staff to conduct the recommended research. This memo is an update to the MAC's recommendation for a risk assessment of the active ingredients available for use on school grounds.

Current Use Patterns

One of the first items discussed by the MAC was the issue of how much herbicide is currently being used on school grounds here in Maine. Risk from pesticide use is a construct of both the potential hazard of the pesticide and exposure to that pesticide. Understanding the patterns of use in Maine on school grounds is fundamental to understanding how to assess actual risk and understand what improvements can be made. In late summer 2021, BPC reached out to pesticide applicators likely to perform school herbicide applications and called in records from the 2020 and 2021 years.

The application records data patterns were presented in the report submitted to the legislature in 2022 (see link above). The records call-in produced application logs of variable quality. The reported data required significant cleanup and retained many data gaps. In early 2022, staff reached out again with a follow-up records call-in to applicators in order to compile a better and more complete version of the dataset covering 2020 and 2021 (the initial call-in truncated the 2021 application year). Currently, the improved dataset has been entered into a spreadsheet and basic patterns have been compiled. Additional time needs to be spent teasing apart chemical-specific patterns. It is of note that this second request still did not create a perfect data set. The recall improved the records call-in but it still produced files with missing data and incorrectly entered details.

Number of blank entries from the 2020 & 2021 school herbicide use records data sets	
Date of Application	0
Timing	155
Location (Address)	0
Size of Treated Area (sq ft)	43
Site or Crop	44
Target Pest	44
Brand Name	3
Active Ingredient	45
EPA Registration Number	51
Rate	281
Undiluted Volume	357
Mix Volume	125
Mix Ratio	145
Total Amount Applied	78
Application Method	127

Exposure Assessment

Risk assessments hinge on understanding potential exposure. Given that we cannot realistically always measure exposure we are often left to estimate it. Each chemical's final risk management decision should integrate exposure with hazard to develop guidelines around future lawful use. The applicator records call-in was one approach to understanding realistic exposures, however, they alone cannot explain total potential exposure. When confronted with uncertainty about the true exposure, it is standard in risk assessment to be as conservative as possible in exposure estimates. Pesticide application instructions taken from the label most often list a range of rates. Applicator records can describe what is being applied but not the potential of what could be applied if applications are not being made at the maximum application rate. In mathematical representations of exposure, the maximum use rate and the maximum number of uses are assumed to occur.

Staff started with the mathematical models established by EPA for assessing exposure. The models were used to specifically reflect exposures for children on school grounds. This work deviates from the EPA's use of the models since they do not frequently focus on only one portion of a child's life. In some instances, this use makes this exposure assessment more conservative in others less so. For example, children are often said to have a higher surface area to weight ratio. While this is true, they also have less total surface area and less total lung volume. Smaller sizes equal smaller total exposures. This exposure assessment complements the work already done by EPA by expanding the total exposure scenario to look more closely at this one specific exposure pathway.

The exposure assessment is currently underway and is taking more time due to the high volume of chemicals for review (44). Data mining from EPA and other risk assessment documents to populate the exposure models takes time, especially if abnormalities are found. Missing data pieces needed for the models are the most common challenge. Typically, missing data is more common in biological and reduced-risk pesticides. When no data are available it is standard to use the most extreme value in its place. For each active ingredient, a summary of the exposure assessment is summarized into an information-at-a-glance card format an example of which is available at the end of this memo.

Literature Review

The committee was also interested in a better understanding of up-to-date hazard information for each of the herbicides and expressed interest in a literature review. Pesticide registrations undergo a full review process every 15 years with EPA. Significant new information can appear anytime between registrations. Most of the information used in risk assessment development comes from manufacturers and is meant to fit the data requirements of EPA, however, the scientific literature can also be an important source of information. Up-to-date information from both sources is required in order to make decisions on the best available science.

Staff has attempted to hire a contractor to perform this significant task. We have identified 44 herbicide active ingredients allowed for use on school grounds for this review. This task represents a significant amount of specialized work. Contracting issues have prevented the successful completion of this work on the previously intended schedule.

Staff are now seeking the Board’s guidance on how to proceed with this work.

Example of the gathered exposure data and exposure modeling results:

Mecoprop-p, MCPP-p

Basic chemical profile

	Soil half-life (lab)	Soil half-life (field)	On plant half-life	On/In plant half-life
Units	days	days	days	days
Value	5.24	21	NA	NA
Rating	Non persistant	Non persistant		

	Bioconcentration factor	Solubility	Oil-water partioning factor
Units	*unitless*	mg/L	*as LogP*
Value	3	250,000	-0.19
Rating	Low	Low	Low

	Vapor Pressure	Henry's Law Constant
Units	units here	units here
Value	0.23	0.000057
Rating	Low	Non-volatile

Hazard profile

	Incidental Oral	Acute Dietary	Dermal
	mg/kg/day	mg/kg/day	mg/kg/day
POD	35	175	1,000
LOC	100	100	100
MOE *unitless*	450	11	240

Cancer rating

"Suggestive Evidence of Carcinogenicity, but Not Sufficient to Assess Human Carcinogenic Potential"

POD= Point of Departure, the highest concentration known with no effect based on animal test data
LOC= Level of Concern, a multiplier used to buffer unknown variation. The LOC times the POD is the level exposure is not allowed to exceed.
MOE= Margin of Exposure, the estimated environmental concentration divided by (POD x LOC). If the environmental concentration exceeds the estimated concentration to cause harm the cell highlights in red and predicts exposures of concern.