

STATE OF MAINE DEPARTMENT OF AGRICULTURE, CONSERVATION & FORESTRY BOARD OF PESTICIDES CONTROL 28 STATE HOUSE STATION AUGUSTA, MAINE 04333

> AMANDA E. BEAL COMMISSIONER

JANET T. MILLS GOVERNOR

#### **Memorandum**

To: Maine Board of Pesticides Control

From: Julia Vacchiano, Pesticides Registrar and Water Quality Specialist

Re: Proposed 2025 Water Quality Assessment: Tracking Herbicide Impacts from Invasive Plant Control

May 30, 2025

Under 7 M.R.S. §607-A. REVIEW OR REREGISTRATION 2-A, "The board shall conduct a water residue survey at least once every 6 years to establish a representative sample of a number of wells or bodies of water, selected at random, in areas of possible contamination or at other locations to be described by the board, for the purpose of testing these waters and preparing a profile of the kinds and amounts of pesticides present. [ 2005, c. 620, §7 (NEW) .]"

Invasive plant species pose a significant and escalating threat to Maine's ecological health and economic vitality. Maine faces substantial pressure from aggressive invasive plant species, leading to habitat degradation and biodiversity loss. Licensed pesticide applicators manage these species near waterways, adhering to best practices for herbicide application, they have expressed interest in data to confirm they are doing so effectively and responsibly.

Effective control of invasive species along waterways often requires targeted herbicide applications, even when adhering to IPM principles. In some cases, this necessitates obtaining variance permits from the Board of Pesticides Control when treatments occur within regulated buffer zones. A significant number of these variances have been granted for invasive species management. The BPC has the opportunity to utilize its water quality program and available funding to ensure that these essential control measures are implemented without negatively impacting adjacent waterbodies. Simultaneously, this presents a valuable chance to enhance our understanding of best management practices for applicators. To address these considerations, we propose a focused water quality study to be conducted during the summer of 2025. This study

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will investigate potential contamination resulting from permitted herbicide treatments for invasive species management near waterways, leveraging data from past variance requests.

Currently, it is unknown whether pesticides are detectable in sediment and surface water after they are applied to invasive plants near water bodies in Maine. Our proposal seeks to address this knowledge gap. This novel project seeks to use the allocated 2025 lab funds from the EPA to evaluate the mitigation measures required by variances, specifically those involving herbicide applications for invasive plant control near waterways, on water quality. The study will involve collecting environmental samples from selected water bodies and adjacent areas to characterize the presence and concentration of relevant substances. If this proposal is fundedand upon completion of the project- the Board of Pesticide Control will present a report that contributes to a broader understanding of the environmental implications of current management practices.

## **Research Questions**

Are herbicides used to control invasive plant species within the required buffer zone of waters of the state detectable in the waters post-treatment?

#### **Research Design and Methodology**

#### **Study Objectives**

This study aims to:

- 1. Inform the board and applicators about the potential negative effects of forgoing buffer zones when applying pesticides for invasive species.
- 2. Provide data on specific active ingredients to help applicators understand risks near water.
- 3. Improve the variance permitting process.
- 4. Gather broader data on the presence of various pesticides in Maine's surface water by testing for a wide range of active ingredients.

We will answer the research questions by collecting quantitative data on active ingredients and concentrations alongside qualitative insights into application methods gained through applicator collaboration and BPC record review.

## Sample Size

94 samples – 2 grab samples and one sediment sample will be taken from 38 locations granted Chapter 29 variances between 2019 and 2024

13 Control Samples - Sediment and grab sample duplicates and field blanks

# Timing

Planning: June – July 2025, exact sampling locations will be selected and access points located, dates and staffing can be coordinated during this time

July – September 2025 – Sampling begins immediately following the planning stage and will conclude before September 30, 2025

## Sampling Plan

- All sites of unique variances granted for invasive species, and one granted for total vegetation elimination between 2019-2024 will be tested, a total of 38 sites.
- Some variances encompass multiple water bodies, all sources will be sampled separately
- 2 grab samples will be taken at all freshwater sites, while single sediment samples will be taken at all sites.
- 5 surface water duplicates, 5 surface water field blanks, and 3 sediment field duplicates will be collected for quality control and quality assurance.
- Water and sediment samples will be shipped to Montana Analytical Laboratory for pesticide analysis. The laboratory is accredited and has a current Quality Assurance Project Plan (QAPP), which is required by the Environmental Protection Agency (EPA) as part of the Cooperative Agreement between the EPA and Maine.
- The analysis method employed for sediment samples will be the Montana Department of Agriculture "Universal Method for the Determination of Polar Pesticides in Water Using Solid Phase Extraction and Liquid Chromatography/Mass Spectrometry/ Mass Spectrometry" and analyzes for 102 pesticides.
- The analysis method employed for sediment samples will be the Montana Department of Agriculture, PYR\_SI, Revision 2: January, 2014"Determination of Pyrethroids in Sediment Using Solid Phase Extraction and GC/MS/NCI and /or GC/MS/MS E1.

## **Ethics and Privacy Concerns**

- All sites of variance are being sampled, and sampling will occur if we can obtain access to the area
- Results will be posted without street addresses or current resident personal information
- Detailed naming convention outlined in SOP for sampling will be implemented to develop sample identification numbers
- BPC will create a process for obtaining written land access consent for samples taken on private property.

### **Data Collection Methods**

- Operating Procedure for Collecting Surface Water Samples for Pesticides Analysis Adapted for 2025 Water Quality Assessment: Tracking Herbicide Impacts from Invasive Plant Control
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### **Chemical analysis**

Consistent with BPC practice, the collected samples will be transported, on ice, to the office and stored at 4°C until ready to ship. Samples are packed on ice and shipped to the Montana Agricultural Laboratory for analysis. The water samples are processed through a pesticide analysis panel that can identify up to 102 unique analytes (roughly 80 parent compounds plus their degradation products).

### **Data Analysis**

Raw data received from the Montana Analytical Laboratory will be organized into a comprehensive report and presented by BPC staff to the board and the public in the Fall of 2026. At a minimum, this report will include data analysis (summary statistics). Additionally, we can mine the data to explore possible relationships between pesticide concentrations in samples and distance from the waterbody to the pesticide application; this linear regression will report the Pearson correlation coefficient between the two variables. We can also explore whether or not there are statistical differences between groups (*e.g.* application methods) using Student's t-test and ANOVA. All data analysis will be conducted in Excel or R, and saved on the Board of Pesticide Control internal drive.

#### **Estimated Project Budget**

Analysis

Grab and Sediment Sample Analysis - \$36,100 Equipment and Materials – \$150 (Gloves, safety glasses) Shipping - \$1,815 Total - \$38,065

The BPC has been granted \$40,000 by our EPA cooperative agreement to facilitate laboratory testing in 2025. Many of the supplies being used are already being kept in storage such as jars, packing materials, and PPE outlined in the standard operating procedure.