Communicating Recent Pesticide Research to Stakeholders 2010-2021

Pesticides & the Chesapeake Bay Watershed Project: Research & Data Gaps Working Group

Presented by Vicki Blazer, PhD
On behalf of Research & Data Gaps Working Group
A project of the Maryland Pesticide Education Network

July 11, 2025

Who We Are

- **Pesticides & the Chesapeake Bay Watershed Project** launched in May 2007 by the Maryland Pesticide Education Network

- **Collaborative effort of more than 100 stakeholders and technical experts that has grown today to over 300 participants**

- **Shared mission:** To reduce risk of adverse effects to living resources from pesticides in the Chesapeake Bay and its tributaries

- **The Research & Data Gaps Working Group** is comprised of stakeholders including scientists from federal, state, local agencies, academic and research institutions.


Pesticides and the Chesapeake Bay Watershed

- **The Research & Data Gaps Working Group** is co-lead by Greg Allen, PhD and Vicki Blazer, PhD

The Report

Scientific literature relevant to the Chesapeake Bay Watershed from 2010 – 2021 was reviewed and summarized

PURPOSE OF THE REPORT

To inform stakeholders, regulators, policymakers and the public about the current data and data gaps regarding the impact of pesticides and emerging contaminants on the watershed and to provide proposed actions to address this salient issue.

Pesticides and the Chesapeake Bay Watershed

COMMUNICATING RECENT PESTICIDE RESEARCH FINDINGS TO INFORM STAKEHOLDERS

2010-2021
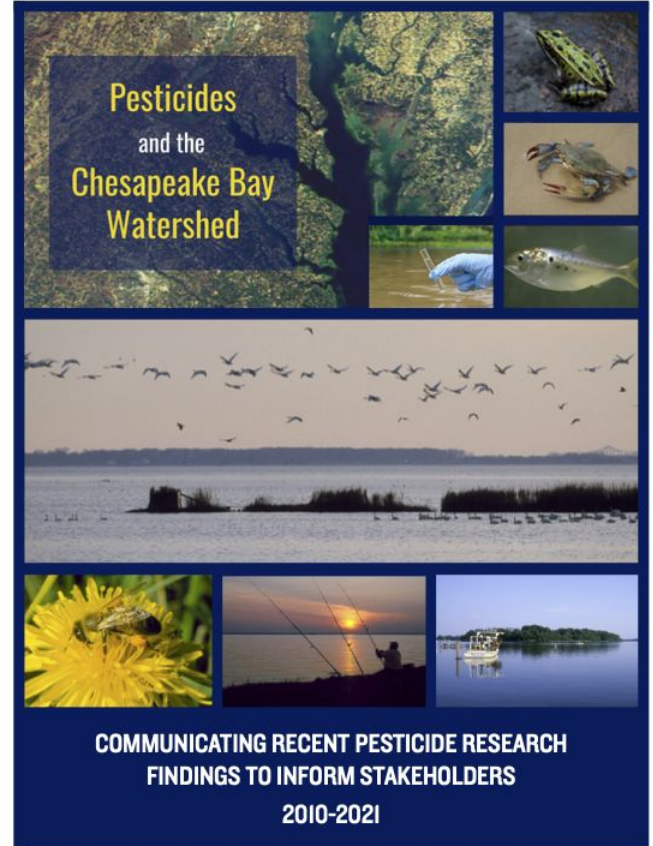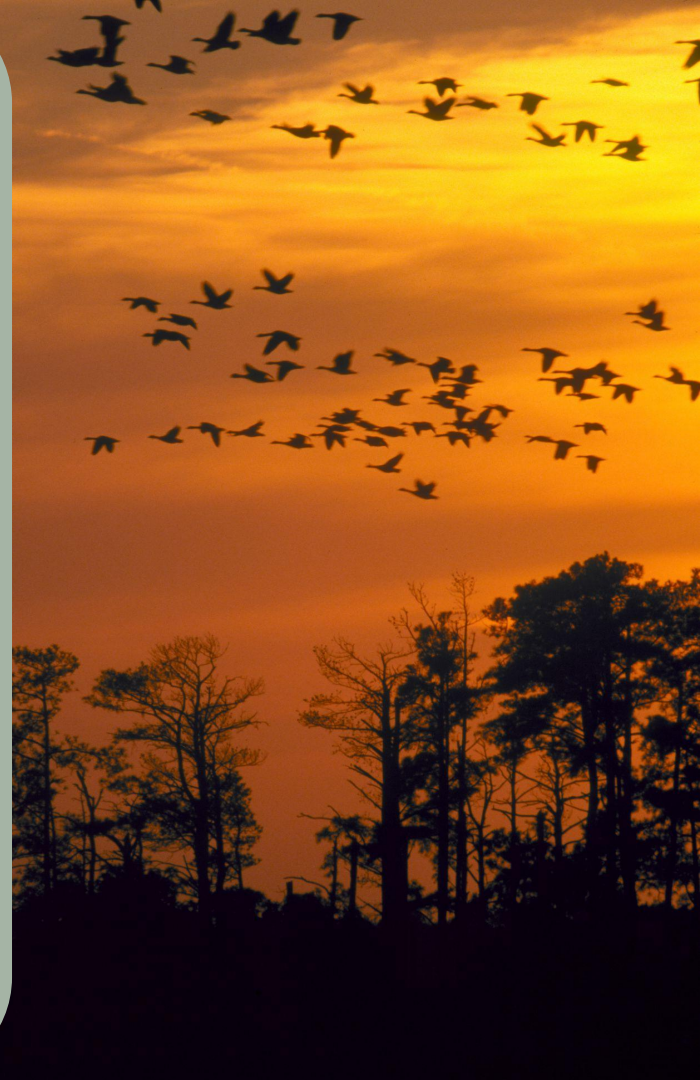
Atrazine: High Use Pesticide Frequently Detected

- **Commonly used herbicide in both residential and agricultural settings**
- **Seasonal application – spring/early summer; also in fall**
- **Is relatively mobile and can be found in the environment 4-22 years after application**
- **Atrazine and metolachlor most commonly detected pesticides in agricultural watershed**
- **Concentrations correlate with application and streamflow – most often peak in spring, with lower peaks in fall**
- **Parent compounds and degradates are detected year-round. Degradation products often higher than parent compounds**

Sub-Lethal Effects

- **Rarely are environmental levels of individual pesticides high enough to cause direct mortality**
- **Sublethal effects including reproductive effects, impaired development, altered behavior and increased susceptibility to infectious disease can all have population effects**
- **Atrazine has been associated with intersex in fish and amphibians through reproductive endocrine disruption; with fitness and survival of Chesapeake Bay oyster species due to effects of microbiomes**
- **Autoimmune diseases associated with glyphosate**
- **Organophosphates and pyrethroids with immunotoxicity**
- **Significant data gaps are understanding the sublethal effects of the complex mixtures organisms are exposed to and the effects of timing of exposure to high concentrations**
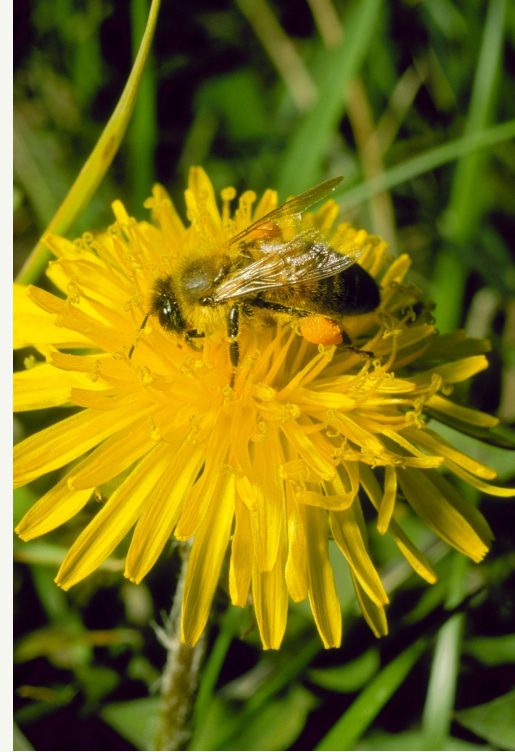
Data Gaps Related to Emerging Contaminants

- **Report focused on per- and polyfluoroalkyl substance (PFAS) in watersheds as a consequence of fluorination of agrochemicals, use as surfactants, and residues from fluorinated pesticide containers**
- **Only a small percentage of these compounds are analyzed for in water and tissues**
- **Numerous PFAS have been detected in water samples, fish tissue and other organisms**
- **Have been associated with health effects in humans and other organisms**

- **Major data gaps are identifying nonpoint sources (pesticide usage, biosolid application) and understanding bioaccumulation and effects of individual compounds and mixtures at environmental concentrations**

Data Gaps in Wildlife Studies

- **Few studies addressing wildlife and pesticides**
- **Two aquatic-dependent wildlife studies focused on osprey**
- **Organochlorine pesticide concentrations such as DDE, DDT in tissues continue to decline**
- **Osprey populations are thriving in much of the Chesapeake**
- **Example of positive effect of banning of pesticides that have been shown to have adverse ecological effects**

Best Management Practices

- **Structural or non-structural methods to prevent movement of nutrients, sediment, and chemicals from entering surface or groundwater**

- **In urban settings, one paper estimated 25% of pesticides were reduced by BMPs**

- **Riparian buffer zones in agricultural settings may mitigate pesticide presence by as much as 70-94%, however erosion can reduce effectiveness**

- **An inverse relationship between agricultural BMPs and average concentrations of atrazine and metolachlor was observed in some watersheds**
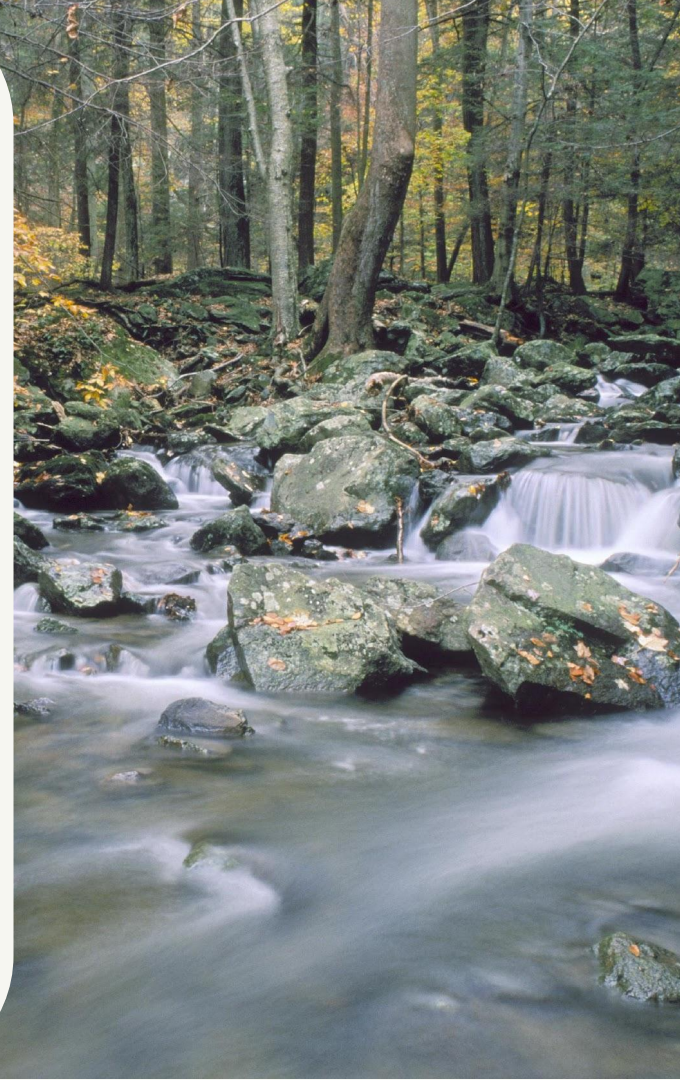
Potential Actions
for Bay Cabinets & Others

1. **Support/encourage collaborative efforts in pesticide monitoring**

2. **Support collection of scientifically-relevant pesticide use data reporting**

3. **Support/encourage collaborative public outreach and education on pesticide issues**

4. **Promote organic land and lawn care on state/county lands as examples**

5. **Encourage BMPs throughout watershed**

6. **Encourage transition to sustainable regenerative agriculture**

Next Steps
for Research Working Group

- **Producing annual updates to the report highlighting new key studies**

- **Next update at 2025 Pesticides & Chesapeake Bay Watershed Project Conference**

How You Can Help:

- **Give us feedback on the report**

- **Send us pesticide studies relevant to Bay**

- **Join the Research & Data Gaps Working Group**

- **Send us your PERSONAL email for an invitation to the next Pesticides & Chesapeake Bay Conference: November 2025 - date TBD**
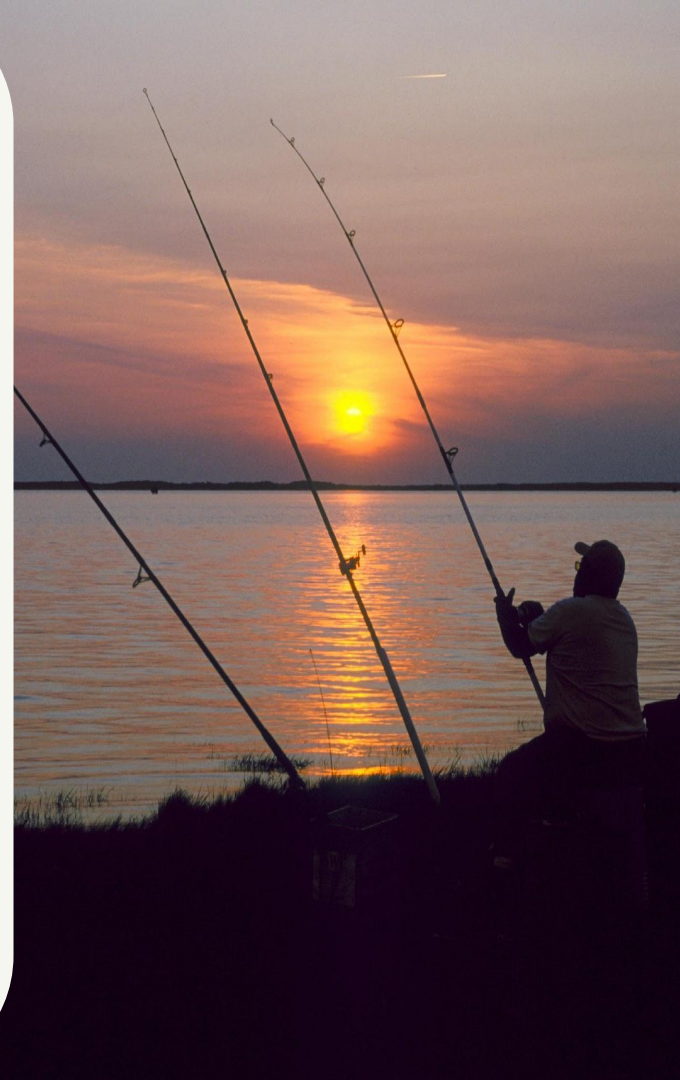
Communicating Recent Pesticide Research to Stakeholders 2010-2021

For more information on
Pesticides & the Chesapeake Bay Watershed Project:
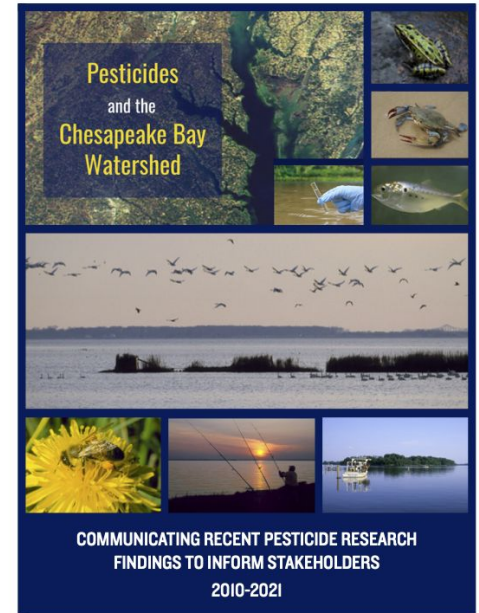Research & Data Gaps Working Group, and
To download the report:
bit.ly/pesticides-bay-report

Bonnie Raindrop, Program Director
raindrop@MdPestNet.org or 410-404-3808

Vicki Blazer, PhD, Co-Facilitator, Research & Data Gaps Working Group
vblazer@usgs.org

www.MdPestNet.org

Maryland Pesticide Education Network

Questions?
Thank you