

Delaware Cooperative Extension



This is a section from the

2024/2025

Mid-Atlantic Commercial Vegetable Production Recommendations

The recommendations are **NOT** for home gardener use.

The full recommendations are available online at:

<https://www.udel.edu/academics/colleges/canr/cooperative-extension/sustainable-production/commercial-crops/vegetable-crops/midatlantic-vegetable-recommendations/>

Printed copies of the recommendations are available for purchase at the New Castle, Kent and Sussex County Extension Offices in Delaware.

This publication will be revised biennially. In January 2025, a Critical Update with important updates for this publication will be communicated through the above website.

These recommendations were prepared and reviewed by individuals from Cornell University, University of Delaware, Delaware State University, University of Maryland, Penn State, Rutgers University, Virginia Tech, and West Virginia University with the purpose of providing up to date information for commercial vegetable growers in the Mid-Atlantic states of **Delaware, Maryland, New Jersey, Pennsylvania, Virginia, and West Virginia.**

Disclaimer

- The label is a legally-binding contract between the pesticide user and the manufacturer.
- The user **MUST** follow all rates and restrictions as per label directions.
- The use of any pesticide inconsistent with the label directions is a violation of Federal law.

D. Pesticide Safety

1. General Information

Pesticides are hazardous substances that can cause serious harm if used improperly. Federal and state pesticide laws and regulations control product sale and distribution, storage, transportation, use, and disposal of pesticides. For food and feed crops, EPA establishes legal amounts of pesticide residue allowed on a crop at harvest (or in processed foods). State pesticide laws and regulations may be more restrictive and would take legal precedence over federal.

1.1. Pesticide Registration

All pesticides sold or distributed in the United States are required to be registered by the United States Environmental Protection Agency (EPA) under the requirements of the **Federal Insecticide Fungicide Rodenticide Act As Amended (FIFRA)**, unless they qualify for an exemption. State product registration is also required and can be more restrictive. For example, some states require state registration of “minimum risk pesticides” which are exempt from federal registration. But, in no case can a State allow registration of a pesticide, or a use of it, without prior registration or exemption by federal EPA.

Pesticides have an inherent toxicity, or capacity to cause harm to living organisms. Under FIFRA, EPA may only register those pesticide uses that do not pose unreasonable risk of harm to human health and the environment. EPA’s determination of whether and how a pesticide is registered for sale is based on evaluation of scientific data and assessment of risks and benefits of a product’s use.

The process of registering a pesticide is a scientific, legal, and administrative procedure through which EPA examines: the ingredients of the pesticide; the particular site or crop where it is to be used; the amount, frequency, and timing of its use; and storage and disposal practices.

EPA requires extensive scientific data on the potential health and environmental effects of a pesticide before granting a registration. The process EPA uses for evaluating the potential for health and ecological effects of a pesticide is called **risk assessment**. This includes evaluating the potential for harm to humans, wildlife, fish, and plants, including non-target organisms and endangered species. It also includes evaluating contamination of surface water or ground water from runoff, leaching, or spray drift.

As a condition of registration, EPA must review and approve the label. EPA then assigns an **EPA Registration Number** which is a unique product number for regular registrations, distributor registrations, Special Local Needs registrations, and Experimental Use Permits.

In order to mitigate the risk of harm to human health and the environment, EPA will impose a set of conditions, directions, and precautions that define who may use a pesticide, as well as where, how, how much, and how often it may be used. These mandatory requirements for registration are incorporated into pesticide product label statements. Pesticide product labels are legal documents. In other words, the label is the law.

IMPORTANT

This statement is found on all registered pesticide product labels in the United States:

“It is a violation of Federal law to use this product in a manner inconsistent with its labeling.”

EPA Registration Review is required a minimum of every 15 years. EPA is legally authorized to initiate this process or other actions earlier, at any time in the product life cycle. EPA has the authority to suspend or cancel the registration of a pesticide if subsequent information shows that continued use would pose unreasonable risks. Pesticides (or particular pesticides uses) that no longer meet the safety standard of not posing unreasonable risk of harm to human health and the environment may be cancelled or reregistered only with strict limitations and changes in labeled uses.

1.2. Pesticides and Food Safety

For food and feed crops, EPA is required to establish maximum pesticide residue limits allowed on a crop at harvest called “tolerances” by commodity. Tolerances, or exemptions from the requirement of a tolerance, are published in the Code of Federal Regulations at 40 CFR 180.

The Food Quality Protection Act (FQPA) of 1996 required that all existing tolerances be re-evaluated by EPA so that pesticides used on food and feed would meet a legal safety standard of “a reasonable certainty of no harm” when used according to the pesticide label. Once registered, a Registration Review of a pesticide’s registration and tolerances are conducted by EPA a minimum of every 15 years to ensure that a pesticide’s FQPA safety standard is still being met.

Tolerances are legally enforceable by the United States Department of Agriculture and Food and Drug Administration. **Meeting established food safety standards requires strict adherence to the pesticide label. *It is illegal and unsafe when a grower exceeds the rate of application on the label, uses a product on a crop that is not on the label, or harvests a crop before the pre-harvest interval on the label.*** If the residue exceeds the set tolerance, the crop may not be marketed or sold. It is subject to condemnation and seizure by federal or state regulatory agencies. For example, EPA issued a Final Rule cancelling all tolerances for chlorpyrifos for all commodities effective February 2022; see section D 3.3.3 *Chlorpyrifos* for details.

2. Certification of Pesticide Applicators

EPA considers certain pesticides to have the potential to cause unreasonable adverse effects to the environment and injury to applicators or bystanders unless users are specially trained in handling and application. As a condition of registration, EPA may restrict use of a pesticide, (or certain of its’ uses) solely to certified applicators, or someone under that applicator’s direct supervision. A “**restricted use pesticide**” (RUP) is a pesticide that EPA requires may only be applied by or under the direct supervision of **trained and certified** users.

In 1972 under FIFRA, EPA required states to set up a program to train and certify applicators of RUPs to use them safely without endangering human health or the environment. Pesticide applicators become certified by demonstrating that they are competent to apply or supervise the use of RUPs, generally by examination. Certification requirements and processes may differ by state and may be more stringent than federal. **For example, some states require applicator certification to use ANY EPA-registered pesticide, not just restricted use pesticides.** New Jersey private and commercial applicators, including organic growers, in *addition to certification, must possess a valid applicator license* to make applications or supervise the use of ANY EPA-registered pesticide. **Certified users of pesticides are classified as either private or commercial applicators as follows:**

Private Applicator. Any person who uses, or supervises the use of, pesticides for the purpose of raising some type of agricultural commodity. The application can be done on land owned or rented by the applicator or the applicator's employer. However, any applications on a "for-hire" basis for the purpose of raising an agricultural commodity are considered commercial applications. Examples of private applicators are dairy farmers, vegetable or fruit growers, greenhouse growers, and ranchers that apply pesticides only within their own confines.

Commercial Applicator. Any person who uses, or supervises the use of, pesticides on a "for-hire" basis; any person who applies pesticides for non-agricultural purposes; or any person who applies pesticides as a part of their job. This includes employees using pesticides in the course of their job working with any governmental agency such as a County mosquito control commission. Examples of commercial applicators in agriculture are those individuals who work for a commercial pesticide handling establishment that provide handler services to growers or nurseries during the growing season.

IMPORTANT REVISED FEDERAL EPA REGULATION STANDARDIZES PESTICIDE CERTIFICATION & TRAINING

In 2017, the Federal EPA finalized a rule at 40 CFR Part 171 that increases the national standards for pesticide applicator competency in core knowledge; establishes a training program for commercial noncertified applicators; requires increased standards of competency for applicators using fumigants for soil and non-soil pest control, and changes to applicator and pesticide dealer recordkeeping. See <https://www.epa.gov/pesticide-worker-safety/certification-standards-pesticide-applicators> for complete details of the Federal EPA revision to the rule.

All state pesticide regulatory agencies will now be required to implement these changes for both Private and Commercial Applicators, *if not already in place by current State pesticide regulations*. Because these changes will require revision of state pesticide regulations in most cases, the dates of implementation will vary by individual state. For example, Delaware is looking to implement by 2024, while New Jersey by 2025.

Please contact your state’s applicator certification agency or your state Extension Pesticide Safety Education Program for State-specific regulatory changes to certification and training.

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When agricultural establishments hire commercial application services, they must first verify that the supervising applicator is certified as a commercial applicator in the State where the application is being made. Their certification *must include the corresponding category of use required by your State for the application being made* (for example, Agricultural Pest Control, Plant Agriculture Pest Control, Aerial Application).

3. The Pesticide Label

The correct, safe, and legal use of any pesticide is always found on the product label. Pesticide labels contain such important and pertinent information as the brand or trade name, the amount of active ingredient, directions for use, environmental hazards, what to do in the case of an accident, and storage and disposal directions.

Each product is required to have its EPA registration number and EPA establishment number as part of the container label. These numbers are valuable to pesticide applicators as unique identifiers in case of accidental poisoning; claims of misuse; faulty product (poor control or phytotoxicity, for example); or liability claims.



3.1. Labels and Labeling

A pesticide applicator is legally bound by the labeling found on and with the pesticide container in their possession. Labels are the written, printed, or graphic matter on, or attached to, the pesticide or device or any of its containers or wrappers. “Labeling” means the label and any technical bulletins, circulars, leaflets, or other printed or graphic material to which the label refers to, or which accompanies the product when distributed or sold. Advertising material not accompanying the product is not considered labeling.

Literature such as Safety Data Sheets legally become a part of the pesticide labeling, **but only when accompanying a pesticide (i.e., during distribution and sale)**. The SDS (formerly called a MSDS) is written or printed material concerning a hazardous chemical that is prepared by the manufacturer or the company importing the product describing the physical and chemical properties of the product according to specific guidelines.

Webpages cited in/on the label are legally considered labeling. This includes when a label has a Quick Response Code (QR Code) barcode that leads to consumer information. Another example is when a label requires the completion of EPA-approved training and provides its web link. A condition of legal use by the applicator of the pesticide product would be completion of the online training (*see example in section D 3.3.1 Soil Fumigants*).

“**Web-distributed labeling**” is a legally valid, enforceable labeling for a pesticide product that is accessible online. The product label provides a link that directs users to the website with the web-distributed labeling. The complete online label must be printed and in the possession of the applicator when using the product. Web-distributed labeling is **currently voluntary for pesticide manufacturers to adopt**, and not supported by the vast majority of pesticide manufacturers.

With the exception of “web-distributed labels” or specific links found directly on the product label, **pesticide labels downloaded from the web are NOT legal documents**. Sources of online labels include State regulatory agencies; EPA; and labeling services such as Kelly Solutions, CDMS, National Pesticide Information Retrieval System (NPIRS), Agrian, and others. Almost all provide disclaimers that they are only “specimens” of a label. Online labels may be helpful, but they should not be substituted for that distributed with and on the container itself. Product formulations and directions periodically change. Although a product container may appear the same, never assume that a replacement container has exactly the same contents and labeling as what you last purchased.

Labeling can include **Supplemental Labels** that are distributed with the product. These partial labels are EPA-approved new, not previously registered uses of the product. These new uses will typically be included in subsequent product labels. Supplemental labels must bear the product’s EPA registration number, and direct users to the product label for complete directions and precautions. Another example of a Supplemental Label is a “Section 24C Local Needs” label (Section 24C) where a State issues a Supplemental Label with an additional use of a federally registered pesticide product, or a new end use product to meet special local needs. Compliance with both the product label and supplemental labeling is required to use these products safely and effectively. **Important: Both the product label AND supplemental labeling must be in the possession of the user when using the product.**

3.2. Label Statements

FIFRA requires that each product label bears both hazard and precautionary statements for humans and domestic animals. Hazard statements describe the type of hazard that may occur, while precautionary statements will either direct or inform the user of actions to take to avoid the hazard or mitigate its effects. EPA's decision to register a product is based, in part, on the assumption that mandatory use directions, restrictions, and precautions of the pesticide label will be followed by the applicator. This section contains information on selected statements that will be found on a pesticide label.

3.2.1 Restricted Use Classification Statement

The “**Restricted Use Pesticide**” (RUP) classification, and the reason for RUP classification must appear at the very top of the label's front panel directly under the phrase “Directions for Use”. EPA may assign a restricted use classification when it has determined that the pesticide product, or its use, has a high acute toxicity; has a history of accidents; may cause oncogenic effects (tumors), teratogenic effects (birth defects), fetotoxic effects (harm to a developing fetus), or reproductive effects (such as a lowered sperm count); can leach into ground water; or can harm wildlife.

As a condition of product registration, a pesticide (or certain uses of it), that are classified as restricted use, must bear the statement: “For retail sale to and use only by Certified Applicators or persons under their direct supervision and only for those uses covered by the Certified Applicator’s certification”.

The RUP statement must also include the reason for restricting use. *The RUP statement for a particular pesticide product containing the active ingredient atrazine is depicted in the box directly below.* The label signal word for this product is “Caution” and would not warrant RUP classification by acute toxicity. However, in this instance, EPA restricted use to certified applicators and those under their direct supervision due to ground and surface water concerns.



On a case-by-case basis, some product-specific RUP statements may be more restrictive based on risk management decisions by EPA. Paraquat is a recent example; see section D 3.3.2 for details on its more restrictive RUP statement: “Restricted Use Pesticide Due to Acute Toxicity For Retail Sale To and Use By Certified Applicators Only – Not to Be Used by Uncertified Persons Working Under the Supervision of a Certified Applicator”.

Also, some states may impose further restrictions on a RUP, such as limiting sale to certified applicators only. For example, only certified applicators possessing a valid New Jersey applicator license may purchase restricted use pesticides. At no time can either licensed pesticide operators or unlicensed handlers purchase RUPs in NJ. **Please contact your state’s applicator certification agency or your state Extension Pesticide Safety Education Program for state-specific regulations.**

3.2.2 Signal Words

An important feature of pesticide labels is that they are required by law to carry certain “signal words” on the front panel of the label that indicate their **relative acute toxicity to humans**. The signal word on EPA pesticide products can be **DANGER**, **WARNING**, or **CAUTION**. Signal words help alert users to the **acute (short-term)** toxicity of the formulated pesticide product.

The signal words are typically determined by the results of the six acute toxicity studies performed with the product formulation: acute oral, acute dermal, acute inhalation, primary eye irritation, primary skin irritation, and sensitization. The acute toxicity studies measure systemic toxicity by route of exposure; while the primary eye and skin studies measure irritation or corrosion; and the dermal sensitization study evaluates the potential for allergic contact dermatitis. EPA signal words designated on a product label are based on the LD₅₀ acute toxicity data of the pesticide product as formulated. Data is collected from small mammal population studies where a common measure

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of acute toxicity is the lethal dose (LD₅₀) or lethal concentration (LC₅₀) that causes death (resulting from a single or limited exposure) in 50 percent of the treated animals.

EPA categorizes acute toxicity of pesticides into four toxicity categories (I - IV) using LD₅₀ data according to regulations at 40 CFR §156.62 and its draft revision in 1984. Chemicals are considered highly toxic when the LD₅₀/LC₅₀ is small (Toxicity Category 1) and practically non-toxic (Toxicity Category IV) when the value is large.



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EPA Toxicity Category I: DANGER POISON (in red). Highly toxic, causing acute systemic illness if eaten, absorbed through the skin, or inhaled. The approximate lethal dose to kill the average person by ingestion is a taste to a teaspoon. The product labels of any products with “Danger-Poison” must have: 1) the skull and crossbones; 2) the word "POISON" prominently printed in red on a background of distinctly contrasting color; and 3) A statement of an antidote or a practical treatment in case of poisoning by the pesticide.
- EPA Toxicity Category I: DANGER.** Highly toxic. through corrosivity causing irreversible damage to the skin or eyes. Poison should not be used for products Category I Toxicity when the determining effect is not systemic illness (by oral, respiratory, or skin absorption routes of exposure).
- EPA Toxicity Category II: WARNING.** Moderately toxic if eaten, absorbed through the skin, inhaled; or it causes moderate eye or skin irritation. The approximate lethal dose to kill an average person through ingestion is a teaspoon to an ounce.
- EPA Toxicity Category III: CAUTION.** Slightly toxic if eaten, absorbed through the skin, inhaled; or it causes slight eye or skin irritation. Ingestion of an ounce to more than a pint is the approximate amount needed to kill the average person.
- EPA Toxicity Category IV: None Required (or CAUTION as optional).** Lowest EPA toxicity category (IV) by all routes of exposure (oral, dermal, inhalation); and does produce the other effects of eye or skin irritation. They do not require a signal word. However, a manufacturer may voluntarily use the signal word “Caution” for Toxicity Category IV.

Table D-1. EPA Signal Words According to Toxicity Categories (I, II, III, IV) of Pesticide Products¹

Study	Category I		Category II	Category III	Category IV
	 Danger Poison (in red)	Danger	Warning	Caution	None or Caution
Acute Oral	LD ₅₀ ≤ 50 mg/kg	—	LD ₅₀ > 50 - 500 mg/kg	LD ₅₀ > 500 - 5,000 mg/kg	LD ₅₀ > 5,000 mg/kg
Acute Dermal	LD ₅₀ ≤ 200 mg/kg	—	LD ₅₀ > 200 - 2,000 mg/kg	LD ₅₀ > 2,000 - 5,000 mg/kg	LD ₅₀ > 5,000 mg/kg
Acute Inhalation	LC ₅₀ < 0.05 mg/liter	—	LC ₅₀ > 0.05 - 0.5 mg/liter	LC ₅₀ > 0.5 thru 2 mg/liter	LC ₅₀ > 2 mg/liter
Primary Eye Irritation	—	Corrosive; irreversible destruction of ocular tissue; corneal involvement or irritation persisting more than 21 days	Corneal involvement or irritation clearing in 8-21 days.	Corneal involvement or irritation clearing in 7 days or less	Minimal effects clearing in less than 24 hours
Primary Skin Irritation	—	Corrosive (tissue destruction into the dermis and/or scarring)	Severe irritation at 72 hours (severe erythema or edema)	Moderate irritation at 72 hours (moderate erythema)	Mild or slight irritation (no irritation or slight erythema)
Dermal Sensitization	Positive		Negative		
	Product is a sensitizer or is positive for sensitization		Product is not a sensitizer or is negative for sensitization		

¹ Adapted from EPA Label Review Manual Chapter 7, rev March 2018.

Assignment of Signal Words

The signal word is determined by the most severe toxicity category assigned to the five acute toxicity studies (see Table D-1). Dermal sensitization is simply positive or negative and is not assigned a Toxicity Category. So, for example, if a pesticide product was assessed as Toxicity Category III for inhalation but as Toxicity Category II for oral, the Signal Word placed on the label would be WARNING corresponding to the more highly toxic Category II. A signal word is required for all registered pesticide products unless the pesticide product is classified as Toxicity Category IV for all routes of exposure and is negative for dermal sensitization.

Signal Words alert the applicator to the relative acute toxicity for short term exposure, during the application itself. It is important for applicators to understand that LD₅₀/LC₅₀ data has limited use for comparing pesticides (other than acute toxicity). They do not reflect what dose may lead to other less serious, acute systemic effects, or to other, possibly equally serious contact effects or delayed systemic effects.

- LD₅₀/LC₅₀ data does not reflect any effects from long-term exposure (*i.e.*, cancer, birth defects or reproductive toxicity) that may occur at levels below those that cause death.
- Also, they do not translate directly to humans because our body systems are slightly different from those of test animals (*e.g.*, rats, mice, etc.).
- Lastly, the LD₅₀ and LC₅₀ are measures of a single exposure, not the potential buildup of effects resulting from multiple exposures.

Most importantly, the results of the six acute toxicity studies determine the appropriate precautionary statements for the hazards to humans and domestic animals, personal protective equipment, and first aid statements. Hazards to Humans and Domestic Animals statements are required for products classified as toxicity categories I, II, or III, or positive for skin sensitization. Hazards to Humans and Domestic Animals statements may specify both mandatory actions and advisory information.

IMPORTANT

Hazard is a function of both toxicity as well as the amount and type of exposure.

The danger in handling pesticides does not depend *exclusively* on toxicity values. Relatively nontoxic pesticides can be hazardous if label instructions are not followed. Don't collapse the acute **HAZARD** that Signal Words signify with **RISK** of hazard! A compound may be highly toxic but presents little hazard to the applicator if the label precautions are followed carefully.

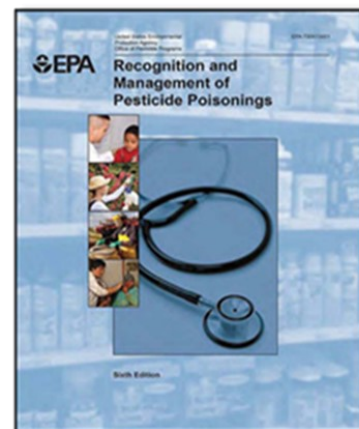
3.2.3 First Aid Statements

First Aid Statements of the pesticide label provide initial first steps to take when accidental exposure occurs and may inform physicians and emergency responders of appropriate medical procedures for victims of poisoning. Pesticide labels are required to have First Aid Statements if the product has systemic effects in EPA Toxicity Category I, II, or III, or skin or eye irritation effects in Category I or II. Some labels will have First Aid Statements for use dilutions specified by the label.

Using the information on the pesticide label First Aid Statements, be alert for the early symptoms of pesticide poisoning and contact effects in yourself and others. Recognizing symptoms early and providing an immediate first-aid response may save a life or prevent permanent injury.

The *Recognition and Management of Pesticide Poisonings: 6th Edition* manual gives healthcare providers a quick reference resource for the best toxicology and treatment information for patients with pesticide exposures. Downloadable in its entirety or by chapter at: <https://www.epa.gov/pesticide-worker-safety/recognition-and-management-pesticide-poisonings>. The fifth edition is available in Spanish. Free copies of the manual (EPA publication # 735K13001) are available from the National Service Center for Environmental Publications at: <https://www.epa.gov/nscep>.

Do not wait until you or someone else gets dangerously ill before calling a physician or going to a hospital. It is better to be too cautious than to act too late. **Any time after using pesticides, if you are having a medical emergency or require immediate medical attention, call 911 immediately.** Prompt action and treatment may save a life.



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Seek medical attention immediately if you or any of your fellow workers have unusual or unexplained symptoms that develop within 24 hours of a pesticide exposure. If you have any of the following symptoms during or shortly after using pesticides: headache, blurred vision, pinpoint pupils, weakness, nausea, cramps, diarrhea, and discomfort in the chest, call a physician and/or the National Poison Control Center hotline (1-800-222-1222). Anyone with a pesticide exposure or poisoning emergency can call the national toll-free Poison Control Center telephone number for help. Personnel at the Center will give you first-aid information and direct you to local treatment centers if necessary.

Take the pesticide label with you, either a duplicate copy or the one attached to the container (or at a minimum, the EPA registration number of the product). To avoid contamination and exposure, do not carry pesticides in the passenger space of the vehicle.

If you are having a medical emergency after using pesticides, always call 911 immediately.



In Case of an Accident

- Remove the person from exposure
- Get away from the treated or contaminated area immediately
- Remove contaminated clothing
- Wash with soap and clean water
- Call a physician and/or the National Poison Control Center (1-800-222-1222).
Your call will be routed to your State Poison Control Center.
- Have the pesticide label with you!
- Be prepared to give the EPA registration number to the responding center/agency

3.2.4 Other Label Statements

If risks of concern are identified in the risk assessment, EPA evaluates potential risk management measures. Precautionary statements that reduce risk will be included on the label, such as:

- reductions in application rates and changes to directions for use;
- extending the restricted entry interval;
- requiring engineering controls, such as use of closed systems for mixing and loading to reduce potential exposure to those who mix and load pesticides;
- safe handling procedures to avoid spills;
- not spraying the pesticide when a crop blooms to protect pollinators; or
- create buffers of unsprayed zones along water bodies to reduce exposure to surface water, etc.

In some cases, the use of a pesticide may only be acceptable if one or more risk mitigation measures are implemented. In other cases, pesticides will not be reregistered for certain use sites or for all uses because of unacceptable worker risk. When EPA determines that labeling cannot sufficiently mitigate the risk of pesticide harm, it may include special risk mitigation measures. See sections D 3.3.1 *Soil Fumigants* and D 3.3.2 *Paraquat Dichloride (Paraquat)* for recent label changes to allow continued registration.

3.3. Significant Labeling Changes

3.3.1 Soil Fumigants

EPA required specific safety measures to increase protections for handlers, re-entry workers, and bystanders from risk of exposure for use of the soil fumigants **chloropicrin, dazomet, metam sodium/potassium, dazomet, 1,3-dichloropropene, iodomethane, dimethyl disulfide, and methyl bromide**. As gases, fumigants move from the soil to the air at the application site and may move off site at concentrations that produce adverse health effects in people from hours to days after application. These health effects range from mild and reversible eye irritation to more severe and irreversible effects, depending on the fumigant and the level of exposure.

Revised safety measures were incorporated in the product labels. **Each of these fumigants** have been reclassified as restricted use pesticides due to acute toxicity and **can only be used by a certified applicator or persons under their direct supervision**.

IMPORTANT FEDERAL REGULATORY CHANGE FOR SOIL FUMIGATION

Based on revised federal pesticide applicator certification regulations, all state pesticide regulatory agencies will now be required to implement some method of separate method-specific soil fumigation certification for both Private and Commercial Applicators, *if not already in place by current State pesticide regulations*. Because these changes will require revision of state pesticide regulations in most cases, the dates of implementation will vary by individual state. For example, Delaware is looking to implement by 2024, while New Jersey by 2025. If you use commercial fumigators, be sure to verify their category license for your State.

Please contact your state's applicator certification agency or your state Extension Pesticide Safety Education Program for State-specific regulatory changes to certification and training.

Additionally, the labels of these pesticides were amended to require that **only trained handlers can assist with application and apply these soil fumigants**. The soil fumigants are one of the first groups of pesticides with product-specific training requirements to be specified on the pesticide label itself. This label-mandated **EPA-approved soil fumigant training** for certified applicators may be found at: <https://www.epa.gov/soil-fumigants/soil-fumigant-training-certified-applicators>. Training must be completed every 3 years.

Soil fumigant labels also require users to prepare a site-specific **fumigation management plan (FMP)** before the application begins. EPA has developed fumigant management plan templates listed by chemical that fulfill the elements required by the labels; see <https://www.epa.gov/soil-fumigants/fumigant-management-plan-templates-phase-2-files-listed-chemical>. Alternately, users may develop their own fumigant management plan or use one developed through an outside vendor to meet the label requirements rather than using these templates. Additionally, soil fumigant labels must also include language informing soil fumigant applicators that **some states and tribes require them to notify the state or tribe before making an application**. The label statement includes the URL www.epa.gov/fumigantstaternotice, linking to EPA's Web page on **Complying with Required State and Tribal Notification before Soil Fumigations**. This page identifies the states and tribes that require applicators to make the notifications and provides contact information. Mid-Atlantic states currently listed that require applicators to notify their state's licensing agency prior to use of these fumigants are Maryland and West Virginia.

A national manual/certification study guide, the "Soil Fumigation Manual" produced by the National Association of State Departments of Agriculture Research Foundation is downloadable from <https://www.epa.gov/system/files/documents/2023-11/soil-fumigation-manual-2012.pdf>.

3.3.2 Paraquat Dichloride (Paraquat)

Paraquat dichloride (also referred to as "paraquat") is highly toxic to humans. One small accidental sip can be fatal, and there is no antidote. Dermal or eye contact can also have serious lasting effects. A combination of public concern and EPA's evaluation of incident data prompted an in-depth statistical analysis of paraquat incidents ahead of the typical mitigation phase of Registration Review.

EPA's "Paraquat Dichloride Human Health Mitigation Decision" required changes in allowed uses of paraquat to mitigate risk to human health incidents involving paraquat. Risk mitigation measures that must be implemented to address accidental ingestion and worker exposure incidents were based on the high number and severity of human health incidents associated with the pesticide.

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Sample revised RUP statement on paraquat product label with “acute toxicity” reason for RUP status.



In order for pesticide products containing paraquat to meet the FIFRA standard for registration, EPA determined the following risk mitigation measures were necessary for continued registration:

1. Use of paraquat is restricted to certified pesticide applicators only (*see RUP statement graphic above*).
2. Noncertified persons working under the supervision of a certified applicator are prohibited from using paraquat (including mixing, loading, applying the pesticide, and other pesticide-related activities).
3. Applicators are required to take an EPA-approved paraquat training program every 3 years in order to mix, load, apply, or handle paraquat.
4. Changes to the pesticide label and warning materials (*see cap seal to right*) to highlight the toxicity and risks associated with paraquat; and
5. New closed-system packaging designed to make it impossible to transfer or remove the pesticide except directly into the proper application equipment.



Paraquat Cap Sticker

All persons handling paraquat are expected to take the training every 3 years and retain documentation of successful completion. The pesticide label provides the link www.usparaquattraining.com to access the training; this redirects to the Extension Foundation Online Campus site where the EPA-approved paraquat training is hosted at <https://campus.extension.org/enrol/index.php>. The one-hour training is available in both English “How To Safely Use and Handle Paraquat-Containing Products” and Spanish “Cómo Utilizar y Manejar con Seguridad los Productos que Contienen Paraquat.” After completion, a **training certificate is generated for applicators to keep in their records for three years.**

3.3.3 Chlorpyrifos

Chlorpyrifos is an organophosphate insecticide, first registered in 1965; labeled product names have included Lorsban, Dursban, and other trade names. It has been used for a **large variety of agricultural uses**, including **soybeans**, fruit and nut trees, **broccoli**, **cauliflower**, and **other row crops**, as well as non-food uses. Chlorpyrifos is a cholinesterase inhibitor, requiring medical monitoring (see section D 4.1. for requirements).

Currently, chlorpyrifos remains registered as it undergoes registration review, a program that re-evaluates all pesticides on a 15-year cycle. The chlorpyrifos registration review was scheduled to be completed in 2022.

As part of EPA’s ongoing process of review of chlorpyrifos during its life cycle, the pesticide registrants voluntarily entered into an agreement in 2000 changing labeled uses of chlorpyrifos. All uses of chlorpyrifos tomatoes in the United States were discontinued in 2000. Most homeowner uses and all termiticide uses were eliminated, and uses of chlorpyrifos on specific fruit were restricted and tolerances lowered. Additional label changes in 2002 required buffer zones to protect water quality, fish, and wildlife; increased PPE; and reduction of application rates on a number of crops including corn. Label changes in 2012 included a significant lowering of the aerial pesticide application rates and “no-spray” buffer zones for ground, airblast and aerial application methods around public spaces. EPA issued its Third Revised Human Health Risk Assessment in 2020 incorporating all use restrictions.

IMPORTANT

Growers are directed to verify the current legal status of chlorpyrifos with your state pesticide regulatory agency or Cooperative Extension Pesticide Safety Education Program prior to considering use. As of publication date (12/22/2023), chlorpyrifos should not be used on any food or feed crop that will be marketed in the United States until revoked tolerances for the use of chlorpyrifos are reinstated by a Court mandate. If the residue exceeds the set tolerance, the crop may not be marketed or sold. It is subject to condemnation and seizure by federal or state regulatory agencies. The tolerance revocation does NOT impact application to non-bearing fruit/nut trees. (*see detailed narrative below*)

Since 2007, there have been a series of petitions to the Courts either requesting EPA ban the use of chlorpyrifos on food and feed products or requesting reinstatement of its use. In 2007, petitioners requested EPA cancel all uses of chlorpyrifos; it included a request for revocation of all pesticide tolerances (maximum residue levels in food) for chlorpyrifos. In 2015 EPA proposed a rule to revoke all chlorpyrifos tolerances because it could not make a safety finding for continued registration of chlorpyrifos under the Federal Food and Drug and Cosmetic Act based on *available* data.

However, in March 2017, EPA did a reversal and denied the 2007 petition concluding that “despite several years of study, the science addressing neurodevelopmental effects remains unresolved and further evaluation of the science during the remaining time for completion of registration review (*i.e.*, 2022) is warranted.”

Environmental advocacy groups and several States challenged EPA’s denial orders in the U.S. Court of Appeals for the Ninth Circuit. In April 2021, the Ninth Circuit issued its decision, finding that EPA’s denial was arbitrary and capricious based on the record before the Court. The Ninth Court ruling directed EPA to grant the petition, issue a final rule revoking the tolerances or modifying the tolerances if EPA could determine the tolerances were safe, and to modify or cancel food-use registrations for chlorpyrifos under FIFRA.

EPA determined that the current aggregate exposures from use of chlorpyrifos do NOT meet the legally required safety standard that there is a reasonable certainty that no harm will result from such exposures. EPA complied with the Ninth Circuit’s order directing EPA to issue a final rule in response to the 2007 petition with its **August 30, 2021 release of the “Final Tolerance Rule for Chlorpyrifos”, which revoked all tolerances for chlorpyrifos published in the Code of Federal Regulations at 40 CFR 180 effective February 28, 2022.** The majority of registrants submitted cancellation requests and/or label amendments to reflect the tolerance revocation. This tolerance rule does NOT prohibit sale and distribution of registered pesticide products. However, sale and distribution of chlorpyrifos products *labeled for use on food crops* would be considered misbranded as long as the tolerances remain revoked; therefore, it would be a violation of FIFRA to sell and distribute those products.

HOWEVER, on November 3, 2023, the Eighth Circuit Court of Appeals issued a ruling that vacated EPA’s tolerance revocations, and once the Court issues a mandate to EPA, the tolerances will immediately be reinstated. UNTIL THE EIGHTH COURT OF APPEALS ISSUES A MANDATE TO EPA, the tolerances remain revoked, and any applications of chlorpyrifos made to food will render any food so treated adulterated and unable to be distributed in interstate commerce.

In conformance with the Eighth Circuit’s ruling and after issuance of the mandate, EPA intends to immediately issue a notice correcting the Code of Federal Regulations to reflect the court’s reinstatement of chlorpyrifos tolerances. Based on EPA’s December 19, 2023 update, growers can *anticipate* that tolerances will be reestablished for 11 crops, *i.e.*, alfalfa, apple, asparagus, cherry (tart), citrus, cotton, peach, soybean, strawberry, sugar beet, wheat (spring), and wheat (winter). Growers are advised of potential additional restrictions for geographic location, rate of application, farmworker and other vulnerable populations, and vulnerable species and their habitats that may be needed to address safety of the tolerances.

As of publication, the Eighth Court of Appeals has NOT issued its mandate, and the food tolerances for chlorpyrifos were checked and remain revoked; see <https://www.ecfr.gov/current/title-40/chapter-I/subchapter-E/part-180/subpart-C/section-180.342> (date accessed 12/22/2023). **Growers are directed to verify the current legal status of chlorpyrifos with your state pesticide regulatory agency or Cooperative Extension Pesticide Safety Education Program prior to considering use.**

4. Handling Pesticides

4.1. Prior to Pesticide Application

Use pesticides for only those crops specified on the label and use only those that have both state and federal registration. Using a pesticide for any other uses or in any other manner than specified on the label is against the law.

Verify, prior to application, that a commodity-specific tolerance or tolerance exemption exists for a particular pesticide prior to use on food or feed crops. For a list of pesticides that have tolerances or exemption from the requirements of an tolerance, see <https://www.epa.gov/pesticide-tolerances/how-search-tolerances-pesticide-ingredients-code-federal-regulations>). Contact your State Extension for assistance if in doubt.

D. Pesticide Safety

In advance of the application itself, applicators should **read and review the label carefully**, and prepare to be able to follow all directions and precautions specified by the label. Determine in advance the proper safety equipment, protective clothing, and measuring equipment you will need for the pesticide task that you will be performing. The protective equipment necessary may include socks, shoes, long pants, long-sleeve shirt, and a hat. Additional safety equipment may also be required by the label. Consult the Precautionary Statements of the pesticide label for the minimum Personal Protection Equipment (PPE) required by law. See sections D 5.2.1 *Body Protection for Early Entry Workers and Pesticide Handlers*, and D 5.2.2. *Respiratory Protection for Pesticide Handlers* for further direction on selection and use of the protective equipment according to the pesticide label.

Make sure that all application equipment that will be used has been **properly maintained and calibrated and is in good working order** prior to application.

Prior to application, be sure to **check the First Aid statements on the label**. Have any label-specified antidotes on hand in advance.

Your physician should be advised of the types of pesticides you use in your work. They may determine the need for medical monitoring for continued use; this includes certain uses of cholinesterase-inhibiting organophosphate and N-methyl carbamate pesticides (*see box below*). When a pesticide is a cholinesterase inhibitor, this is identified in the First Aid statements of the label.

When you will be using a pesticide that requires the use of a respirator, you will need to be medically evaluated and receive a medical clearance for your use of that respirator under its conditions of use. See section D 5.2.2 *Respiratory Protection for Pesticide Handlers* for details.

Prior to applying or otherwise handling pesticides, be sure to have a supply of clean water and liquid detergent available for drenching and washing in case of an accident. When the label requires eye protection, handler employers must provide at least one pint of water per handler in portable containers that are immediately available to each handler. Whenever a handler is mixing or loading a pesticide product whose labeling requires protective eyewear during handling (or is mixing or loading any pesticide using a closed system operating under pressure), the handler employer must provide at each mixing/loading site, at least one system that is capable of delivering gently running water at a rate of least 0.4 gallons per minute for at least 15 minutes; or at least six gallons of water in containers suitable for providing a gentle eye-flush for about 15 minutes.

Medical Monitoring Cholinesterase-Inhibiting Pesticides

*It is recommended that you advise your physician if: you will be using Class 1 and Class 2 organophosphates (OPs) and N-methyl carbamates; or simply OPs. Monitoring of blood cholinesterase level is recommended for those who will be using these pesticides for greater than a total of 30 hours in 30 consecutive days. **Before the start of the spray season**, each applicator should have a baseline blood cholinesterase level determination. The level of blood cholinesterase should be re-evaluated using the same lab during the spray season when 30 hours use within 30 days is reached or exceeded.

*The Migrant Clinicians Network website “Cholinesterase Testing Protocols for Healthcare Providers” outlines protocols, when medical removal from the job is necessary, and return to duty can be allowed.

See <https://www.migrantclinician.org/toolsource/resource/cholinesterase-che-testing-protocols-and-algorithm-healthcare-providers.html>.

4.2. Pesticide Application and Record Keeping

Always have the label readily available when applying a pesticide. The label MUST be in your possession.

- Do **not** handle or apply pesticides if you have a headache or are not feeling well.
- **Never** smoke, eat or drink (or use cell phones) while handling pesticides.
- **Avoid** inhaling pesticide sprays, dust, and vapors. If the pesticide is dangerous to your respiratory system, the label will tell you to wear a respirator and specify which type (see section D 5.2.2. *Respiratory Protection for Pesticide Handlers*).
- Thoroughly wash exposed areas of yourself before eating, drinking, using tobacco products, using the bathroom, or using your cell phone. Wash your gloves with soap and water before you take them off. Then wash your hands and face.
- If hands, skin, or other body parts become contaminated or exposed, wash the area immediately with clean water and a liquid detergent. If clothing becomes contaminated, remove it immediately. If you splash a

concentrate of a pesticide labeled with a “Danger” or “Warning” signal word, take your contaminated clothing off immediately. Dispose of garments drenched with concentrates of any pesticides labeled with Danger or Warning signal words; do not wash these items.

- After each spraying or dusting, bathe and change your clothing; always begin the day with clean clothing. Wash contaminated clothing separately from other garments and run an extra rinse cycle afterwards.
- Always have someone with you or close by if you are using highly toxic pesticides (those with the signal word **DANGER** plus skull and crossbones)

APPLICATION DIRECTIONS

Always follow the pesticide label ‘Directions for Use’ regarding who may use, where, how, how much, and how often the pesticide may be used. Never use higher than the labeled rate of application. In addition to those mandatory statements, pesticide manufacturers also provide additional advisory information on the label on how to use a pesticide most effectively.

APPLICATION RECORDS (PRIVATE APPLICATORS ONLY)

Records document proper application. Records are one of the first things that regulators review when they have received a complaint. **Consider treating each record as documentation of a lawsuit going forth in court.**

Federal law prohibits US EPA from requiring PRIVATE APPLICATORS to keep pesticide application records. United States Department of Agriculture (USDA) regulations at 7CFR § 110.3 establish records, retention, and access to records of **restricted use pesticide applications**. In accordance with the 1990 Farm Bill, all private applicators are required by law to keep record(s) of their federally restricted use pesticide (RUP) applications for a period of 2 years.

The nine USDA-required elements of a pesticide application record that must be recorded within 14 days of each RUP application are as follows:

1. brand or product name.
2. EPA registration number.
3. total amount applied.
4. month, day, and year.
5. location of the application.
6. crop, commodity, stored product, or site.
7. size of area treated.
8. name of the certified applicator; and the
9. certification number of the certified applicator.

The location of the application may be recorded using any of the following designations:

- (i) County, range, township, and section
- (ii) An identification system utilizing maps and/or written descriptions which accurately identify location
- (iii) An identification system established by a United States Department of Agriculture agency which utilizes maps and numbering system to identify field locations; or
- (iv) The legal property description.

State recordkeeping requirements for Private Applicators may differ from these federal USDA requirements. Federal and State pesticide regulations typically prescribe required pesticide application information and record retention times but do not require a particular record format for pesticide applicators to keep.

State-Specific Pesticide Application Records

In addition to the USDA-required information above, *some* state pesticide regulations require that Private applicators maintain application records for both restricted and general use pesticides; or may have different retention times; and/or may require WPS information. **Always keep a record of all pesticides used (dates, locations, quantities, etc.) as required by your state regulations. See templates below for individual states (current to date accessed);** these templates for agricultural users of pesticides are provided as a courtesy and are not regulatory documents. *Several states have incorporated WPS-required application information in these templates, and these could be used by agricultural establishment owners (see box below).*

IMPORTANT

APPLICATION RECORDS (AGRICULTURAL ESTABLISHMENT OWNERS* ONLY)

EPA's 2015 Revised Worker Protection Standard requires owners of agricultural establishments to retain records of posted pesticide application information, and Safety Data Sheets (SDS) for a *minimum* of two years. For more details, see section D 5.1. State Worker Protection regulations may be more stringent and require additional information and longer retention times.

Delaware developed a "Pesticide Recordkeeping Form" which provides compliance guidance for the keeping of pesticide application records in accordance with 40 CFR PART 170, Worker Protection Standard, 7 CFR PART 110 Recordkeeping for Application of Federally Restricted Use Pesticides, and Section 14, Records, Commercial Applicators, Delaware Pesticide Rules & Regulations. The form is posted at: https://agriculture.delaware.gov/wp-content/uploads/sites/108/2017/12/Pest_recordkeeping.pdf (date accessed 11/27/2023).

An excerpt of **Maryland** pesticide recordkeeping regulations (15.05.01.12 Records) is located at: https://mda.maryland.gov/Documents/Wkgp_Recordkeeping.pdf. See also the University of Maryland "Pesticide Information Leaflet No. 14: Pesticide Record Keeping Requirements in Maryland" for more details and a template recordkeeping form provided by the Maryland Department of Agriculture at: http://pesticide.umd.edu/uploads/1/3/5/6/13565116/pil14_recordkeeping_1991-2012.pdf (date accessed 11/27/2023).

New Jersey regulations (NJAC 7:30-8.8 Records) require private applicators to maintain records of all applications of pesticides (both general and restricted use) for 3 years. All records should be recorded in writing as soon as possible, but no later than 24 hours after the application. These records must be made available to the New Jersey Department of Environmental Protection (NJDEP) and medical personnel (for emergencies) upon request. Rutgers Pesticide Safety Education Program's website provides templates designed for private applicators, and operations covered by the WPS to keep records of all their pesticide applications; see <https://pestmanagement.rutgers.edu/pat/record-forms-2/> (date accessed 11/27/2023). The NJDEP published a new pesticide WPS posting template that can also be used a pesticide application record; see <https://www.nj.gov/dep/enforcement/pcp/pcp-wps.htm> (date accessed 11/29/2023).

Pennsylvania pesticide regulations require recordkeeping by pest management consultants (7 § 128.24), pesticide applicator businesses (7 § 128.35), pesticide application technicians (7 § 128.53), and Private applicators (7 § 128.65); see these regulations in the Pennsylvania Department of Agriculture's Legal Library webpage at: https://www.agriculture.pa.gov/Plants_Land_Water/PlantIndustry/health-safety/pesticide-programs/PesticideCART/Documents/007_0128.pdf (date accessed 11/27/2023).

Pennsylvania's template **Private Applicator Pesticide Application Record** incorporates WPS-required application information; see https://www.agriculture.pa.gov/Plants_Land_Water/PlantIndustry/health-safety/pesticide-programs/PesticideCART/Documents/Private%20Applicator%20Pesticide%20Application%20Record.pdf (date accessed 11/30/2023).

Virginia requires that USDA records of restricted-use pesticide applications be kept for two years. Virginia Cooperative Extension and Virginia Department of Agriculture and Consumer Services prepared a template Private/Grower Pesticide Application Record that meets the USDA requirements plus additional WPS-required information; it is posted at the Virginia Tech Pesticide Programs website at: <https://vtp.ento.vt.edu/content/dam/vtp.ento.vt.edu/applicators/Sample%20Private%20Recordkeeping%20Form%20.pdf> (date accessed 11/27/2023).

West Virginia pesticide regulations at § 61-12A-9 outline state requirements for recordkeeping; see <https://agriculture.wv.gov/wp-content/uploads/2020/07/61-12A.pdf> (date accessed 11/27/2023). Private applicator records of restricted use pesticide applications must include at a minimum: the pesticide used, including registration number; formulation, dilution rate, and quantity of pesticide applied; date and place of application and the pest against which the pesticide was used.

For additional information on pesticide application recordkeeping for either applicators or agricultural establishments, contact your state pesticide regulatory agency or Cooperative Extension Pesticide Safety Education Program.

4.3. Pesticide Transport

When pesticides are transported, containers must be well secured to prevent breakage or spillage. If pesticide containers are glass, pad and secure them to prevent breakage. When containers are larger than 5 gallons, tightly brace them to a structural part of the vehicle to prevent accidental spills. Carry a supply of absorbent material to soak up or contain any liquid spills. Keep a shovel and/or broom and pan in the transport vehicle to help quickly contain any spills. Carry a working fire extinguisher (10 - B: C dry chemical, or carbon dioxide) immediately accessible on board as well.

While under transport, pesticides must be stored in a separate compartment from the driver such as the bed of a pick-up truck or a van equipped with a partition. All pesticide containers and equipment must be secured to the vehicle to prevent removal by unauthorized person(s) when the vehicle is unattended. The door or hatch of any service vehicle tank containing a pesticide must be equipped with a cover that will prevent spillage when the vehicle is moving. The above requirements would not apply if the vehicle were being used to hold and/or transport pesticides within the boundaries of a private applicator's property.

For additional information on pesticide transport, contact your state pesticide regulatory agency or Cooperative Extension Pesticide Safety Education Program.

4.4. Pesticide Storage

Improper storage of pesticides can lead to accidental poisonings, contamination of the environment, and deterioration of the chemicals themselves. Pesticides should always be stored in their original containers and kept tightly closed. **NEVER** transfer pesticides to food or beverage containers. Store pesticides in a cool, dry, well-ventilated area that is not accessible to children and others who do not know and understand their safe and proper use. For the protection of others, and especially in case of fire, the storage area should be posted as *Pesticide Storage* regardless of the use classification and kept securely locked.

Minimize the amount of products you need to store. Plan pesticide purchases so that supplies are used by the end of the growing season and will not have to be overwintered. Write the purchase or delivery date of the product on the label with indelible ink on the product container. Check and record expiration dates listed on the product label. EPA regulations require that pesticide manufacturers must place the statement "**Not for sale or use after [date].**" on product labels where the formulation changes in chemical composition significantly in a prominent position on the label. The product must meet all label claims up to the expiration time indicated on the label.

Always read the label. Most, if not all, pesticide labels will contain a general statement such as "do not contaminate water, food, or feed by storage, disposal, or cleaning of equipment." Special storage recommendations or restrictions will often be included. Moisture is a critical concern with dry pesticides, including granular materials and wettable powders, which have a strong affinity for water. When this is the case, the label may have the statement, "store in a dry place."

In New Jersey, any restricted use pesticide (or empty containers still contaminated with their residues) must be stored in a secure, locked enclosure while unattended. That enclosure must bear a warning that pesticides are stored there. If any pesticide must be stored in other than its original container (for example if the original container is leaking), that container must be labeled with the brand or trade name; EPA registration number; name and percentage of the active ingredient(s); the signal word; and precautionary statements for the pesticide. If the pesticide in the new container has been diluted, also write the dilution of the mixture. Keep an inventory of all pesticides held in storage and locate the inventory list in an accessible place away from the storage site, so it may be referred to in case of an emergency at the storage site.

Keep your local fire department informed of the location of all pesticide storage locations. Fighting a fire that includes smoke from burning pesticides can be extremely hazardous. A fire with smoke from burning pesticides may also endanger the people of the immediate area or community. The people of an area or community may have to be evacuated if the smoke from a pesticide fire drifts in their direction. In **New Jersey**, applicators are required to maintain a list of pesticides in storage or likely to be stored during the license year. Applicators must **send this inventory to their local fire department by May 1st each year**. It must also include a written description or depiction of the exact location of the pesticide storage area. For inventory and cover letter templates, see Rutgers Pesticide Safety Education Program's website at: <https://pestmanagement.rutgers.edu/pat/record-forms-2/>.

D. Pesticide Safety

Inspect Product and Container Conditions

Inspect the condition of products and containers you have in storage routinely. During the registration of a pesticide, manufacturers are required to provide labels statements that describe where and how the pesticide is to be stored. In particular, maintain pesticides within the temperature range specified on the product label. Poor storage practices impact product efficacy and accelerates product deterioration.

General signs of product deterioration per formulation type are:

- EC - Evidence of separation of components, such as the formation of a sludge or sediment. Milky appearance does not occur when water is added.
- Oils - Milky appearance does not occur when water is added.
- WP, SP, WDG - Excessive lumping; powder does not suspend in water.
- D, G, WDG - Excessive lumping or caking

Cold Weather Storage:

Consult the “**Storage and Disposal**” statements listed on the label to determine whether a pesticide can freeze with no adverse effects. Some pesticide labels may indicate that if freezing occurs and crystals form, then the product may be reused if it is warmed up. Do not attempt to thaw frozen pesticide until after checking the pesticide container to make sure it is not ruptured or cracked from the expansion of the frozen liquid. To thaw a pesticide, place the container in warm storage, 50-80°F (10-27°C), and shake or roll the container every few hours to mix product or eliminate layering. If layering persists or if all crystals do not completely dissolve, do not use product. If in doubt, call the manufacturer for guidance.

Additional information can be obtained from manufacturers' websites or consult “Cold Weather Storage & Handling of Pesticides, January 2018” by the Montana State University Extension, available at (date accessed 11/27/2023): <https://store.msuextension.org/publications/AgandNaturalResources/MT201801AG.pdf>.

See section D 4.5. *Disposal of Pesticides* regarding disposal of deteriorated product.

4.5. Disposal of Pesticides

Pesticide waste may be hazardous. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal Law. Do not contaminate water, food, or feed by storage or disposal. Pesticides (and their empty containers still containing residues) should not be disposed of in sanitary landfills or by incineration unless disposal sites and equipment are specially designed and licensed for this purpose by your state.

The federal Resource Conservation and Recovery Act (RCRA) governs the management and disposal of hazardous wastes **Agricultural producers (or their commercial applicator contractor) may dispose of excess pesticide or rinsate by applying to a labeled site on the farm according to the label directions** (*see box to right*).

However, if for whatever reason, that is not feasible, farmers are subject to the hazardous waste provisions of RCRA. For a detailed guide to RCRA requirements, please refer to EPA’s “Managing Your Hazardous Waste: A Guide for Small Businesses” at <https://www.epa.gov/hwgenerators/managing-your-hazardous-waste-guide-small-businesses> (date accessed 02/28/2023).

Always refer to the current pesticide label “Storage and Disposal” requirements because there may be product-specific requirements on the disposal of pesticides themselves or unrinsed containers or rinsate.

Pesticide labels now have specific directions on disposal for non-refillable and refillable containers. For non-refillable bags

FARMER EXCLUSION

The federal Resource Conservation and Recovery Act (RCRA) governs the management and disposal of hazardous wastes, including pesticides.

“...Although a farmer may be a generator of hazardous waste, waste pesticides disposed of on a farmer’s own property in compliance with specified waste management requirements, including the disposal instructions on the pesticide label, are not subject to the generator requirements. This exclusion is intended to prevent the double regulation of farmers under both RCRA and the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)...”

(*policy interpretation excerpted from RCRA Orientation Manual. 2014.*

USEPA.

<https://www.epa.gov/sites/default/files/2015-07/documents/rom.pdf>)

of granulars and powders, completely empty bag into application equipment by shaking and tapping sides and bottom to loosen clinging particles. If not emptied in this manner, the bag may be considered an acute hazardous waste and must be disposed of in accordance with local, state, and federal regulations.

After emptying a product container, triple rinse container (or equivalent) promptly. The **triple rinse-and-drain** procedure or the **pressure-rinse** procedure are recommended methods to prepare pesticide containers for recycling or (see section D 4.6. “*Disposal of Pesticide Containers*”).

State-Specific Pesticide Disposal Programs

The **Delaware Department of Agriculture** (DDA) sponsors the Environmental Sweep Program (ESP), a new initiative that offers to all three counties easy and environmentally responsible disposal of unwanted, outdated or cancelled pesticides for free to qualifying individuals and businesses. Farmers, commercial applicators, nurseries, green houses, golf courses and pest control businesses can qualify for the free on-site removal of up to 500 pounds or 50 gallons of pesticides through this program. For convenience and safety, pesticides will be picked up directly from your site by a waste disposal contractor. For more information see <https://agriculture.delaware.gov/pesticide-management/environmental-sweep-program/>. Please contact Jimmy Hughes at (302) 698.4569 or Chris Wade at (302) 698.4570.

The **Maryland Department of Agriculture** (MDA) sponsors a **free pesticide disposal program for service for all current or retired farmers and producers**, including orchardists, nurserymen, greenhouse operators, and Xmas tree growers; see <https://mda.maryland.gov/plants-pests/Pages/Pesticide-Disposal-Program.aspx>. MDA provides that although there is currently (November 2023) no funding for the program, registrants will be put on a wait list for when funding becomes available. For growers seeking to participate in the MDA program, they must complete and return to MDA a **Disposal Program Registration Form** obtained from MDA or from the participating county office of the Maryland Cooperative Extension Service (MCES).

New Jersey has no state-sponsored waste pesticide disposal program. All RCRA requirements for disposal must be followed by those farmers that qualify as Small Quantity Generators (SQG) and Large Quantity Generators (LQG), or those Very Small Quantity Generators (VQSG) that have liquid hazardous waste. The requirements for hazardous waste generators are specifically found at N.J.A.C. 7:26G-6 et seq., which references 40 CFR Part 262 of the Federal regulations (with some exceptions and/or changes). Please refer to the New Jersey Department of Environmental Protection (NJDEP) **Compliance Assistance Packet for Hazardous Waste Generators** at <https://www.nj.gov/dep/enforcement/docs/-compliance-assistance-packet-2020-v20-3.pdf> (date accessed 02/28/2023). For regulatory assistance related to hazardous waste disposal in New Jersey, please contact the NJDEP Bureau of Hazardous Waste Compliance & Enforcement at your closest regional office listed below:

- **Northern Regional Office:** Phone: (973) 656-4470
Serving Bergen, Essex, Hudson, Hunterdon, Morris, Passaic, Somerset, Sussex & Warren Counties,
- **Central Regional Office:** Phone: (609) 943-3019
Serving Mercer, Middlesex, Monmouth, Ocean & Union Counties,
- **Southern Regional Office:** Phone: (856) 614-3658
Serving Atlantic, Camden, Cape May, Cumberland, Gloucester, Salem & Burlington Counties.

The **Pennsylvania Department of Agriculture** CHEMSWEEP provides Pennsylvania farmers and other licensed pesticide applicators with a means to dispose of canceled, suspended, or unwanted pesticide products. Through CHEMSWEEP, applicators can legally dispose of unwanted pesticides, generally at little or no cost, covering the cost of the first 2,000 pounds per participant. Only pesticide products that are or have been registered for sale or use in the Commonwealth will be accepted in this program. CHEMSWEEP operates in a selected number of counties each year. Licensed farmers, professional pesticide applicators and pesticide businesses in the counties selected for that year are eligible to participate.

- **For 2024**, CHEMSWEEP will be conducted in Armstrong, Blair, Cambria, Chester, Clarion, Delaware, Forest, Indiana, Lackawanna, Lancaster, Lebanon, Luzerne, Snyder, Somerset, Union, Venango, Wyoming counties. Registration forms are online and due by March 31, 2024; *see third bullet below*.
- **For 2025**, CHEMSWEEP will be conducted in Bedford, Berks, Bradford, Butler, Columbia, Cumberland, Fulton, Lawrence, McKean, Montour, Northumberland, Schuylkill, Sullivan, York, and Warren counties.

D. Pesticide Safety

- For more details, see

https://www.agriculture.pa.gov/Plants_Land_Water/PlantIndustry/health-safety/environmental-programs/Pages/CHEMSWEEP%20Waste%20Pesticide%20Disposal%20Program.aspx.

Virginia's Pesticide Collection Program assists agricultural producers, licensed pesticide dealers, pest control firms, golf courses and homeowners with the proper disposal of unwanted and outdated pesticides. The program is an effort by the Virginia Department of Agriculture and Consumer Services (VDACS), with participation from Virginia Cooperative Extension and the Division of Consolidated Laboratory Services. Scheduled events are held at predetermined sites. Participants bring pesticide material to the collection event. Pre-registration is required; see <https://www.vdacs.virginia.gov/pesticide-collection.shtml> online for form and details. The program is available at no cost to eligible participants.

The **West Virginia Department of Agriculture** (WVDA) sponsors free disposal of waste pesticide. In order to be considered, individuals complete the WVDA "APPLICATION FOR WASTE PESTICIDE DISPOSAL" located at <https://agriculture.wv.gov/wp-content/uploads/2020/07/Application-for-Waste-Pesticide-Disposal.pdf>. Pickup is arranged depending upon the volume. For more information on the West Virginia Waste Pesticide Disposal Program, contact Program Manager Devin Johnston; 1900 Kanawha Blvd East Charleston, WV 25305-0190; Office Phone: 304-558-2209; email: djohnston@wvda.us.

4.6 Disposal of Pesticide Containers

Disposal options for empty pesticide containers may be limited by local regulations and ordinances (and recycling program availability). Crushed/punctured containers may be accepted by sanitary landfills or landfills that accept industrial waste; check with landfill operators prior to taking empty containers for disposal.

Always refer to the current pesticide label "Storage and Disposal" requirements. EPA's pesticide container regulations [40 CFR 156] establish standards for pesticide containers and repackaging. They also now provide standards for label instructions to ensure the safe use, reuse, disposal, and adequate cleaning of the containers. **Cleaning the container before final disposal is the responsibility of the person disposing of the container. Applicators must follow the label instructions for cleaning and handling empty containers prior to disposal.**

Container handling statements will also be found in the **Storage & Disposal Statements** of the pesticide label state whether: 1) is it refillable or non-refillable; 2) can the container be reused, recycled, or reconditioned; 3) how to dispose of the container if recycling or reconditioning are not an option; and 4) how to clean the container if cleaning is required.

For non-refillable bags of granulars and powders, completely empty bag into application equipment by shaking and tapping sides and bottom to loosen clinging particles. If not emptied in this manner, the bag may be considered an acute hazardous waste and must be disposed of in accordance with local, state, and federal regulations. Other similar dry pesticides that have not been combined with liquids include dusts, wettable powders, dry flowables, water-soluble powders, granules, and dry baits.

After emptying a non-refillable or refillable product container containing a dilutable pesticide, triple rinse container (or equivalent) *promptly* (see below). **Empty the rinsate into application equipment or a mix tank or store rinsate for later use or disposal according to label directions** (see section D 4.5 *Disposal of Pesticides*). Rinsate may be disposed of when applied to a labeled site in accordance with the pesticide label.

To prepare pesticide containers for recycling or reconditioning, either the **triple rinse-and-drain** procedure or the **pressure-rinse** procedure are acceptable methods. Unless the applicator rinses in the field (preferred method), cleaning should be done on a mixing and loading pad, or other containment structure that ensures collection of rinse water. Thoroughly clean both the interior and exterior of container. NO residues are acceptable.

Acceptable methods to prepare non-refillable containers that contained dilutable pesticides for recycling and/or disposal are **triple rinsing-and-draining** or **pressure-rinsing**, as follows:

Triple Rinse-and-Drain Method (for refillable containers larger than 5 gallons):

To empty a pesticide container for disposal, drain the container into application equipment or mix tank by holding container in a vertical position for 30 seconds. Add a solvent, capable of removing the pesticide, to the pesticide container, so that it is approximately one-fourth full. Only use solvents as specified on the label, such as water.

Agitate the container thoroughly, and then drain the liquid (rinsate) into the application equipment or mix tank by holding the pesticide container in a vertical position for 30 seconds. Repeat two more times. Empty the rinsate into application equipment or a mix tank, or store rinsate for later use or disposal.

Pressure Rinse Method:

An optional method to rinse small pesticide containers is to use a special rinsing device on the end of a standard water hose. The rinsing device has a sharp probe (called a “stinger”) to puncture the container and several orifices to provide multiple spray jets of water. After the container has been drained into the sprayer tank (container is upside down), jab the pointed pressure rinser through the bottom of the inverted container. Rinse for at least 30 seconds. The spray jets of water rinse the inside of the container and the pesticide residue is washed down into the sprayer tank for proper use. Thirty seconds of rinse time is equivalent to triple rinsing. An added benefit is the container is rendered unusable.

When either of these methods is used, a farmer can consider the container ‘empty’ legally; but it cannot be reused for other purposes. If a container cannot be cleaned, contact the pesticide manufacturer for disposal guidance. If the container has visible residue not removable via normal cleaning, then it is outside the scope of most recycling programs. Contact the product manufacturer for disposal guidance. Pesticide manufacturers, formulators, producers, and registrants can provide you with valuable information about their pesticide products. See the National Pesticide Information Center’s online directory of pesticide manufacturers, formulators, producers, and registrants at <http://npic.orst.edu/ingred/manuf.html> for information on your pesticide product.

State-Specific Pesticide Container Recycling Programs



The status of services provided by several Mid-Atlantic states for the recycling of pesticide containers that have been rendered empty by either triple or pressure rinsing is provided below. Delaware, Maryland, and West Virginia have all indefinitely paused their pesticide container recycling programs due to Contractor issues (inconsistencies with reliability and rejection/acceptance of containers). Information about state-specific pesticide container recycling for referral for 2024 through 2025 follows.

The **Delaware Department of Agriculture (DDA) Pesticide Section** last provided an empty pesticide container recycling program in 2021 in cooperation with the Ag Container Recycling Council (ACRC). It directs pesticide applicators seeking recycling of empty pesticide containers to contact the current vendor, Ag Plastic Solutions (Justin Geisinger, 717-658-9660), to arrange pickups and discuss individual recycling needs. DDA has postponed the Container Recycling Program for 2023 and hopes to re-instate the program in the future. **For annual updates on the status of the DDA empty pesticide container recycling program**, check <https://agriculture.delaware.gov/pesticide-management/calendar/>.

The **Maryland Department of Agriculture (MDA) Pesticide Container Recycling Program** has collected more than a million pounds of plastic in its empty pesticide container collection program for 30 years. The Agricultural Recycling Container Council (ACRC) provides a contractor to pick up and/or grind the collected plastic free of charge. MDA has postponed the Container Recycling Program for 2023 and hopes to re-instate the program in 2024. **For further information please contact the Pesticide Regulation Section** at 410-841-5710 or via email at pest.reg@maryland.gov.

The **New Jersey Department of Agriculture (NJDA)** promotes the New Jersey Agricultural Recycling Programs. Pesticide container disposal is offered to agricultural, professional, and commercial pesticide applicators who hold a NJDEP pesticide license as well as state, county, and municipal government agencies. One core credit will be given to pesticide license holders who follow required processing steps and bring their license with them at time of collection. The program **accepts non-refillable, high-density polyethylene #2 (HDPE) containers that are no larger than 55 gallons and that have been triple rinsed**. For more details on recycling requirements, scheduling, and locations, see the NJDA webpage at <https://www.nj.gov/agriculture/divisions/anr/nrc/recycling.html>. Year-

D. Pesticide Safety

round collection sites are located at the Rutgers Fruit and Ornamental Research Extension Center at Cream Ridge in Monmouth County and Allied Recycling in Mt. Holly in Burlington County. Contact the NJDA Recycling Program Manager at (609) 913-6490 for additional information on New Jersey's various agricultural recycling programs.

The **Pennsylvania Department of Agriculture** Plastic Pesticide Plastic Container Recycling Program provides licensed pesticide applicators a means to dispose of triple-rinsed #2 HDPE plastic containers that are free of all pesticide residue inside and outside. An online map search for recycling locations statewide an online map search for recycling locations statewide with contact information at <https://padeptag.maps.arcgis.com/apps/webappviewer/index.html?id=1f206187d68d413a8214afa8a565d6f7>. For additional assistance with the recycling program, please call 717-705-5858.

The **Virginia Department of Agriculture and Consumer Services (VDACS)** Plastic Pesticide Container Recycling Program is a free service that assists with the disposal of *properly rinsed* plastic pesticide containers. The program is available to any pesticide applicator or dealer in Virginia. Many agricultural pesticide dealers, private producers of agricultural commodities, and commercial applicators such as golf courses, aerial applicators, and management companies participate by simply storing their empty, properly rinsed containers for annual or biannual collection. For a collection site near you, visit: vdacs.virginia.gov/pesticides/r-localities.shtml. Onsite pickups are available for locations with at least 500 properly rinsed plastic pesticide containers. Contact VDACS' Office of Pesticide Services Program Coordinator at 804.371.6561 or email marlene.larios@vdacs.virginia.gov.

Always refer to the label's "Storage and Disposal" requirements. For additional information on the disposal of pesticides themselves or *unrinsed* containers or rinsate, call your State pesticide regulatory agency.

4.7 Pesticide Spills

Keep a supply of an absorbent agent on hand to contain liquid spills in the area that you store pesticides, as well as transport pesticide products. Industrial sorbents rated by sorption capacity and type of liquid are commercially available for absorbing the liquids in a cleanup. Use label-prescribed PPE including chemical resistant gloves to clean up spills. Barrier laminate gloves have a broad range of chemical resistance and are a good choice to keep in a spill kit. Rubber gloves might break down depending on the pesticide. Let it soak a couple of hours to absorb the spilled pesticide from the floor. This procedure is also recommended for cleaning truck beds that are contaminated.

Specific information concerning pesticide cleanup can be obtained by calling the manufacturer directly or consulting the product Safety Data Sheet (SDS). **EPA encourages, but does not require, registrants to include a company telephone number or toll-free hotline number for emergency information in the first aid section.**

Reporting of Pesticide Spills

Follow your state spill reporting protocol.

Be prepared to report:

1. Date and time
2. Name/address/phone of the pesticide applicator
3. Name /address/phone of the applicator or dealer business if any
4. Name/phone of the property owner or operator
5. Location of the incident
6. Name and EPA registration number of the pesticide(s)
7. Estimated amount and dilution rate of pesticide(s) involved
8. Corrective action(s) taken

For Delaware, Maryland, Pennsylvania, Virginia, and West Virginia, pesticide spills may be reported using the 8 elements listed above to the US EPA Region 3 Office (1-800-438-2474). These states may have additional reporting requirements; see below for contacts. Check with your state pesticide agency to verify if there are additional regulatory requirements.

New Jersey licensed dealers, dealer businesses, commercial pesticide operators, applicators, or applicator businesses, shall ***immediately*** notify the NJDEP at 1-877-927-6337 of any ‘**reportable**’ pesticide spills occurring under their direct supervision and/or direct observation. The report should include the 8 elements listed above.

New Jersey “**reportable spills**” of pesticides include: 1) Outside a structure – only if more than 1 pound active ingredient; 2) Inside a structure – only if more than 1 pound active of dry pesticides; or 1 gallon of liquid (pesticide and/or diluent); and 3) Indoor spill of termiticide – only if more than 50 in² organochlorine termiticide contamination at one injection point; or greater than 1 yd² aggregate contaminated by organochlorine termiticide on/at interior wall base; and/or when heating duct/system is contaminated.

Within ten days of the spill, a written report must be submitted to the NJDEP Pesticide Control Program, PO Box 411, Trenton, NJ 08625-0411 outlining the eight elements listed above. You may download a template “Spill Report Card” from the Rutgers NJAES PSEP website at <https://pestmanagement.rutgers.edu/pat/record-forms-2/>.

In **Pennsylvania**, any oil or petroleum product, chemical or waste that is released in any unauthorized manner constitutes a spill. The Emergency Planning and Community Right to Know Act establishes procedures for emergency planning preparedness and reporting of specific quantities of stored and spilled hazardous chemicals, including pesticides. This act is administered by the U.S. EPA and the Pennsylvania Emergency Management Agency. All spills and releases should be reported the PA Department of Environmental Protection (DEP) by calling the statewide toll-free number, 1-800-541-2050. If the Waters of the Commonwealth is threatened, the DEP must be notified *immediately*. Contact one of the seven Pennsylvania Department of Agriculture (PDA) Regional Office if the chemical is a pesticide or other agricultural chemical; for phone numbers, go to: <https://extension.psu.edu/navigating-the-paplants-website>.

Virginia pesticide regulations (2VAC5-685-170) require reporting to the Virginia Dept. of Agriculture & Consumer Services (VDACS) when there is a threat to any person, to public health or safety, or to the environment as a result of the use or presence of any pesticide. Report to VDACS is required within 48 hours by calling (804) 371-6560. A written report is required within 10 days to: VDACS-OPS Field Operations Office of Pesticide Services; PO Box 1163; Richmond, VA 23218. Report the 8 elements plus: the name (or description if unnamed) and location of nearby bodies of water nearby that could be contaminated.

If the accident or incident involves a spill, the applicator should **contact VDACS/OPS for help in determining whether the release is governed under SARA Title III (the Community Right-to Know Law). Reporting under SARA Title III is determined by the chemical hazard and the volume of the released chemical. If so, the applicator must also notify the: National Response Center at 1-800-424-8802.** In the event of an emergency release which would impact other individuals or other property, notify the: Virginia Department of Emergency Services (DES) at 1-800-468-8892.

IMPORTANT

In the event of a **fire, explosion, or other release** that could threaten human health **outside the facility,**

OR,

if you know that the **spill has reached surface water:**

Call the **National Response Center** at its **24-hour number:**

(1-800-424-8802)

5. Reducing Risks to Handlers and Workers

5.1. EPA's Worker Protection Standard

EPA first implemented the Federal Worker Protection Standard – CFR Title 40, Part 170 regulations in 1994 to provide specific safety requirements for both **pesticide handlers** and general **agricultural workers**. EPA revised the 1992 **Agricultural Worker Protection Standard (WPS) regulation** on November 2, 2015, to increase protection from pesticide exposure for the nation's two million agricultural workers and their families. **State regulations may differ, and when more stringent take precedence over federal regulations.**

“Handlers” are those persons who are employed by an agricultural establishment or commercial pesticide application company who mix, load, or apply pesticides; who handle opened pesticide containers; who act as flaggers; who clean, maintain, or repair application equipment; who assist with the application of a pesticide; who enter a treated greenhouse to operate ventilation equipment; who adjust or remove coverings or check air levels; who enter an outdoor area that has been fumigated to adjust or remove soil coverings; who perform tasks as a crop advisor; or who dispose of pesticides or their containers. The Revised WPS requires that handlers, except for immediate family, be **at least 18 years old**. New Jersey labor laws are more stringent, and minors under 18 years old cannot be employed as applicators of pesticides or be permitted in any area where pesticides are applied.

“Agricultural Workers” are those persons who are employed by the agricultural establishment to perform tasks such as harvesting, weeding, or watering, relating to the production of agricultural plants on a farm, forest, nursery, or greenhouse.



The WPS regulations are applicable to any agricultural establishment that employs either pesticide handlers or agricultural workers where **any EPA-registered pesticides** are used in the production of agricultural commodity(ies). The WPS also applies to custom pesticide applicators and labor contractors supplying employees or independent crop consultants who are hired by these establishments.

Only “WPS-labeled” pesticides may be used in the production of an agricultural commodity. These pesticides are identified by a box on the product label with the title **“AGRICULTURAL USE REQUIREMENTS”**. The first

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. Refer to supplemental labeling under “Agricultural Use Requirements” in the Directions for Use section for information about this standard.

paragraph within the box **invokes by reference a requirement for compliance with all of the WPS regulations**. Specifically, the paragraph reads: “Use this product **only in accordance with labeling and with the Worker Protection Standard 40 CFR part 170**. The Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and

handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to statements on the label about personal protective equipment (PPE) and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered under the Worker Protection Standard...”

This section provides a brief overview of some of these regulations. Compliance resources for regulation specifics and other information are provided at the end of this section. The WPS reduces risks of occupational illness and injury from exposure to pesticides in three ways:

- **Inform** workers and handlers about potential exposures to pesticides.
- **Protect** worker, handlers, and others from exposure to pesticide(s); and
- **Mitigate** any pesticide exposures that workers or handlers receive.

INFORM

To ensure that employees are informed about exposure to pesticides, employers must provide certain information to their farmworkers. This includes providing **annual pesticide safety training** to **both** pesticide handlers and agricultural workers. Grace period for worker training is eliminated. Workers must be trained before they work in an area where a pesticide has been used or a restricted-entry interval has been in effect in the past 30 days.

Training content under the 2015 Revised WPS has expanded and is freely available (*see “Compliance Assistance” at the end of this section for free training resources, including videos*). Worker training topics have been expanded to 23 items, and handler training has been expanded to 36 items. Resources developed for the training of workers and handlers per the requirements of the 1992 Worker Protection Standard (as amended) can no longer be used, effective December 2018. Training of employees using the old materials does NOT have the new content required under the 2015 Revised WPS and would be invalid. Do not use training materials unless they are approved for use with the 2015 Revised Worker Protection Standard.

IMPORTANT

Make sure to replace your old 1992 WPS training videos or booklets with 2015 Revised WPS training materials!

Trainers must be either: certified applicators; designated as a qualified trainer by EPA or their state pesticide regulatory agency; or have completed an EPA-approved “Train the Trainer” course. Approved trainers must use EPA-approved training materials. Employers are required by **federal regulations to retain records of WPS training for two years**. **State WPS training recordkeeping regulations may be more stringent**; the 2020 Revised NJDEP Worker Protection regulations require that worker and handler training records be maintained on file by BOTH ag employers and trainers on file for three years; *see <http://www.nj.gov/dep/enforcement/pcp/pcp-wps.htm>* for forms and retention times and responsible parties.

Other requirements for providing information include **displaying WPS-required pesticide safety information** at a central location (and certain decontamination sites). Safety information may be displayed in any format, including a poster that meets the requirements (*see the PERC WPS safety information poster at: <http://pesticideresources.org/wps/cp.html>*).

Agricultural employers must also provide workers and handlers access to both Safety Data Sheet (SDS) and **pesticide application information** for applications at the establishment. An SDS is required to have specific information set forth by the OSHA Hazard Communication Standard, but they are not reviewed or approved by government officials like pesticide labels.

EPA Revised WPS requires that the following pesticide application information be displayed in a centrally located area:

- 1. Pesticide product name, EPA registration #, and active ingredients(s):**
- 2. Crop or site treated, & location and description of treated area.:**
- 3. Date(s), times application started and ended; and**
- 4. Duration of REI.**

EPA requires that employers maintain SDS and pesticide application information **on file for two years** and provide access/copies of records to workers, handlers, treating medical personnel, or a “designated representative”. **State regulations for display and retention of pesticide application information may differ; where more stringent, they take legal precedence over federal requirements.**

New Jersey has additional display requirements for agricultural employers including posting a map of the farm for designation of treated areas. NJDEP column headings for posted pesticide application information include: 1) Crop; 2) Pesticide name; 3) Safe Reentry Time; 4) Application Date; 5) Application start and finish times; and 6) Application Location. This application information must be displayed either before workers enter treated fields or prior to workers entering fields at the beginning of the next workday, whichever occurs first. Once posted, this information must remain posted for 30 days following the date for safe reentry.

PROTECT

Employers are required to ensure that employees will be protected from exposure to pesticides. Employers must take measures so that applications do not expose unprotected workers during applications. The Revised WPS has requirements for restricting access around application equipment in a defined area called the “**Application Exclusion Zone**” surrounding applications in progress. Employers must also provide personal protective equipment (PPE) to handlers, *and early entry workers* per the pesticide label (see section D 5.2).

Employers must notify early-entry workers of application specifics, tasks to be performed, conditions of the early-entry exception, and hazard information from the pesticide label.

All WPS-labeled pesticide products are required to have a prescribed REI. These range from 4 to 48 hours or longer. Check your pesticide's label for the reentry time in effect. Some pesticides have one REI, such as 12 hours, for all crops and uses. Other products have different REIs depending on the crop or method of application. When two (or more) pesticides are applied at the same time, and have different REIs, you must follow the longer interval.



To protect farmworkers, employers are required to **post warning signs** (*see left*) around treated areas when the **product applied outdoors has an REI greater than 48 hours**; and when the **product applied indoors has an REI greater than 4 hours**. When a product applied outdoors has an REI of 48 hours or less; or a product applied indoors has an REI of 4 hours or less, the employer may choose either to post the treated area or give oral notification, unless the labeling requires both types of notification.

However, there are situations where the WPS allows workers to enter treated areas before the end of an REI to do non-hand labor tasks and is limited to a maximum of one hour per day. Early entry cannot be made until four full hours have passed since the completion of the application. The Revised WPS requires that “early-entry workers”, except for immediate family, be at least 18 years old. Note: New Jersey regulations require that both handlers and early entry workers be at least 18 years old. Early-entry workers must be given label-prescribed PPE for early entry prior to entry if they will contact treated surfaces.

MITIGATE

To mitigate or lessen the impact of pesticide exposures that employees do receive, employers must provide decontamination sites and emergency assistance. Employers must provide supplies for emergency eye flush at all pesticide mixing and loading sites when handlers use products that require eye protection. Decontamination sites must contain a supply of water, soap, and towels for both routine washing and emergency decontamination. Employers must provide emergency assistance which includes transportation to medical care facilities in the event of a pesticide-related injury and providing information about the pesticide(s) involved to the medical staff.

Immediate Family Exemptions: The Revised WPS has expanded the definition of immediate family to include spouse, parents, stepparents, foster parents, father-in-law, mother-in-law, children, stepchildren, foster children, sons-in-law, daughters-in-law, grandparents, grandchildren, brothers, sisters, brothers-in-law, sisters-in-law, aunts, uncles, nieces, nephews, and first cousins.

Owners of agricultural establishments and their immediate family members are exempt from most WPS requirements.

If only immediate family members are employed by the agricultural establishment, owners are exempt from providing themselves and their family members:

- pesticide safety training and information
- providing, cleaning, and maintaining PPE
- information at a central location
- decontamination facilities
- emergency assistance requirements
- notifications of pesticide applications; and
- handler monitoring.

Note: EPA's WPS does NOT exempt owners of agricultural establishments from providing themselves or their family members WPS-required respiratory protections, i.e., *the Revised WPS requires that when a WPS-covered pesticide label requires a handler to wear a respirator, the handler's employer must provide them with a medical evaluation, fit test, and respirator training.* (see section D 5.2.2. *Respiratory Protection for Pesticide Handlers* for details).

Federal Compliance Assistance EPA provides resources to agricultural employers and handler employers to assist with compliance with the Revised WPS in conjunction with the **Pesticide Educational Resources Collaborative (PERC)**.



Key resources developed and posted at the PERC website (<http://pesticideresources.org>) are:

- “Quick Reference Guide to the Worker Protection Standard (WPS) as Revised in 2015”; see <http://pesticideresources.org/wps/hosted/quickrefguide.pdf>. This one-page double-sided chart outlines requirements with direct hyperlinks to the text of the regulation for each item being cited in the chart.
- “How to Comply With the 2015 Revised Worker Protection Standard For Agricultural Pesticides/Cómo cumplir con la Norma de protección del trabajador revisada de 2015 para pesticidas agrícolas Lo que los propietarios y empleadores deben saber”; see <http://pesticideresources.org/wps/hwc/index.html>. The purpose of this online guide is to help users of agricultural pesticides comply with the requirements of the revised federal Worker Protection Standard.
- Frequently Asked Questions (FAQs) on EPA’s Revised Worker Protection Standard for Agricultural Pesticides (WPS) 40 CFR Part 170 (PDF). 4/14/2016. EPA. See <https://www.epa.gov/sites/production/files/2016-04/documents/wps-faq.pdf>. The Revised WPS requires that specific pesticide safety information with newly expanded content be accessible to workers at any time during normal work hours. EPA does not require a specific format. PERC has produced an updated “WPS Safety Poster” for “Central Posting” areas and certain decontamination sites. These may be downloaded in English, Spanish, Russian, Ilocano, Tagalog, Karen, Haitian-Creole, and Vietnamese from <http://pesticideresources.org/wps/cp.html>, or purchased from the National Pesticide Safety Education Center’s online store at <https://npsecstore.com/collections/posters>.

PERC will use email distribution lists to keep interested parties informed about new publications. PERC has developed lists for several target groups, including “Agricultural Employers and Handler Employers” to distribute notices relevant to agricultural employers and commercial pesticide handler employers, as defined by the WPS. See <http://pesticideresources.org/lists.html> to enroll in the email list(s) of your choice.

PERC is collaborating with the National Pesticide Safety Education Center (NPSEC) as its distributor for printed resources and posters. You can purchase printed copies of PERC’s resources, including laminated WPS Safety Posters, at the NPSEC Store at <https://npsecstore.com/>.

Please refer to your State pesticide regulatory agency for state-specific regulations and policy on the Revised WPS. In cases where state rules are more stringent than federal, the state rules will take primacy. Some state PSEP Programs, such as Rutgers New Jersey PSEP, will be providing WPS outreach to agricultural producers at conferences, meetings, the Rutgers NJAES Plant and Pest Advisory Commercial Agriculture blog, and its Worker Protection webpages at <https://pestmanagement.rutgers.edu/worker-protection/>.

Final Revised New Jersey Pesticide Regulations (NJAC 7:30) were amended April 6, 2020.

See NJDEP website at <https://www.nj.gov/dep/enforcement/pcp/pcp-regs.htm>.

The revisions to N.J.A.C. 7:30 Subchapter 12 incorporate new federal Worker Protection Standard requirements not previously addressed by New Jersey regulations. Additionally, the revisions addressed conflicts between the State and federal rules. In some instances, New Jersey’s Agricultural Worker Protection regulations are more stringent than EPA’s 2015 Revised WPS regulations. For specific questions or concerns about NJDEP’s implementation of the revised WPS, please contact the NJDEP Worker Protection Unit by email at pcp@dep.nj.gov.

5.2. Personal Protective Equipment (PPE) for Pesticides

Personal Protective Equipment (PPE) refers to apparel and devices worn to protect your body from contact with hazardous materials, including pesticides or pesticide residues. PPE includes such items as coveralls or protective suits, aprons, gloves, footwear, headgear, eyewear, and respirators. *More details follow in subsequent sections about Body Protection for Early Entry Workers and Pesticide Handlers (section D 5.2.1) and Respiratory Protection for Pesticide Handlers (section D 5.2.2).*

Wearing PPE can greatly reduce the potential for dermal, eye, oral, and inhalation exposure; and thereby significantly reduce the chances of pesticide poisoning or injury. Employers have a responsibility to make available any necessary or appropriate safety equipment required by the pesticide label to employees who use, apply, transport, or otherwise handle pesticides. It has to be clean and in good working order. Under EPA's Worker Protection Standard, **employers of handlers of pesticides used in the production of agricultural plants are legally required to provide and train users in the use of label-required PPE.**

Selection of PPE

The **pesticide label** lists the minimum PPE that a person must wear to be **adequately protective while performing any handling or early-entry activities**. Wearing any less than this is **illegal** and **dangerous**. Applicator PPE requirements are listed in the "Precautionary Statements" section of the pesticide label (*see example to right*). Look for additional specific PPE requirements in the "Agricultural Use Requirements" box on the label. This might include, for example, PPE for early-entry workers.

PPE label requirements vary, depending upon the toxicity, formulation, dilution, and route of exposure of the pesticide product and activity. For example, a single label may have one set of PPE requirements for applicators and a different set for agricultural early-entry workers going into areas during the restricted-entry interval. Even very low hazard pesticides require a long-sleeved shirt, long pants, shoes, and socks.

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For pesticides that are hazardous when inhaled, the pesticide label "Precautionary Statements" will include the type of respiratory protection (respirator type including filters or chemical cartridges, if needed) required to minimize your exposure to an acceptable level (See section D.5.2.2 *Respiratory Protection for Pesticide Handlers*).

PRECAUTIONARY STATEMENTS
Hazards to Humans and Domestic Animals

CAUTION: Causes moderate eye irritation. Avoid contact with eyes. Wear protective eyewear. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco or using the toilet. Prolonged or frequently repeated skin contact may cause allergic reaction in some individuals.

PERSONAL PROTECTIVE EQUIPMENT (PPE):
 Some of the materials that are chemical-resistant to this product are listed below.

Applicators and handlers must wear:

- Long-sleeved shirt and long pants
- Chemical resistant gloves such as barrier laminate, butyl rubber >14mils, nitrile rubber > 14mils, neoprene rubber > 14 mils, viton > 14 mils
- Shoes plus socks
- Protective eyewear

5.2.1 Body Protection for Early Entry Workers and Pesticide Handlers

Different types of clothing, protective coveralls or suits, aprons, hats, boots, and gloves are not equally protective against all pesticides and under all conditions. To be protective, they must:

- Keep pesticides **away from your body** (head, face, neck, trunk, arms, legs, and feet) throughout the pesticide handling activity.
- Be **resistant** to punctures and tears during normal use.
- Be **comfortable** enough without restricting your movement so you will wear it.

To protect your skin, your normal work clothing must cover most of your body. Depending upon the product's toxicity and use, other PPE (such as coveralls or chemical resistant suits, aprons, hats, boots, and gloves) may also be required. Protective clothing, gloves, and boots must provide a barrier to pesticide for the duration of the task.

In some instances, the pesticide label requires that you wear gloves and other PPE that is "chemical resistant." Generally speaking, this is required when you need protection from highly toxic (label signal word: "Danger") or moderately toxic (signal word "Warning") pesticides. When a pesticide label lists chemical-resistant PPE, it means that you need a barrier to that pesticide for the duration of the task.

PPE materials ("barriers") perform differently when exposed to different pesticides. Some **degrade** the PPE material; it essentially starts to break down. In some instances, degradation of protective fabric is easy for applicators to recognize. PPE may swell, discolor, shrink, soften, become brittle, or change texture. So, be alert for

these signs and replace compromised clothing immediately to minimize your exposure to pesticides.

Some PPE materials restrict pesticide entry for a long time, while others allow the pesticide to pass through quickly. Pesticides can move through by the **process of permeation until the chemical actually “breaks through”** to the inside. If a PPE garment material is not very chemical resistant to a particular pesticide, passage to the inside can occur very quickly, in just minutes. Once “breakthrough” takes place your bare skin is directly exposed to the pesticide.

Permeation into a PPE material may begin as soon as it gets on the surface. Once a pesticide is absorbed on the surface of PPE, it continues to move into and through the PPE, molecule by molecule. In these cases, the pesticide is difficult to detect or decontaminate. And pesticide residues that contact PPE are likely to continue to permeate through the material. So, washing gloves and other PPE does not necessarily make them safe for reuse. Things that can affect the extent of permeation are contact time, concentration, temperature, and the physical state of the product itself. **When selected correctly, protective clothing reduces the risk of dermal exposure but does not eliminate it.**

Work Clothing: Your work clothes provide a basic barrier to minimize pesticide contact with your skin. Always wear - at a minimum - a long-sleeved shirt, long pants, closed-toed shoes, and socks whenever you handle pesticides or work around pesticide residues. Select work clothes made of tightly woven fabrics to reduce pesticide penetration. Make sure they are free of holes and tears. Fasten the shirt collar completely to protect the lower part of your neck.

Do not use these work clothes for anything other than handling pesticides. Store and launder fabric work clothing separately from all other clothing after each day's use.

Coveralls: Some pesticide labels require coveralls (a second layer of clothing) over work clothes. A coverall can be made of woven (like cotton or twill) or nonwoven fabrics. It should be sturdy enough for laundering and repeated use. According to regulations, coveralls must be loose-fitting, one- or two-piece garments that cover the entire body except head, hands, and feet.

In rare instances, a pesticide label may require wearing a chemical-resistant coverall or suit. Using one that is disposable reduces decontamination time and lowers the risk of contaminating yourself, your application equipment, and your vehicle. Most importantly, wearing coveralls lessens the chance that you will take pesticides home. Handle disposable coveralls carefully so as to not contaminate other people.

Apron for Mixing: Some pesticide labels require you to wear a chemical-resistant apron when mixing or loading a pesticide, or when cleaning application equipment. Select aprons that cover the front of your body from the middle of the chest to the knees.

Gloves: Pesticide handlers get by far the most exposure from pesticides on their hands and forearms. Research has shown that workers mixing pesticides received 85 percent of the total exposure to the hands and 13 percent to their forearms. The same study showed that wearing chemical-resistant gloves reduced exposure by 99 percent (Source: The Farm Family Exposure Study, John Acquavella). Protective gloves are essential to dermal protection. Wear the type of chemical-resistant glove specified by the product labeling. For gloves, labels will often specify materials that are highly chemical resistant for that product. Older pesticide labels may add another statement that you can consult an EPA chemical resistance category chart for more options. In these cases, the glove type that provides highest protection is listed. Use only those listed.

There are many types of gloves on the market including nitrile, butyl, natural rubber, polyethylene, neoprene, and barrier laminates. Each has different chemical resistance properties. Each type of glove has to be considered on a case-by-case basis. Read the label carefully to make sure you have the correct protective glove material. Explain to your supplier which glove types you need.

When the pesticide label specifies waterproof or chemical-resistant gloves, do not use those constructed with any kind of absorbent material, lining, or flocking. This includes leather or cloth. These all absorb pesticide and trap it closely against your bare skin, greatly increasing skin absorption.

Some pesticide labels specify both the glove material and its thickness. As a general rule, the thicker the glove (of the same material under identical conditions), the longer the breakthrough time. A pesticide label's specification of glove type is generally based upon a thickness of 14 mils, except for polyethylene and barrier laminate gloves. Use the 14 mils thickness as a rule of thumb when selecting glove materials that appear on the pesticide label.

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Glove durability is another important consideration. Select a glove that is protective, does not tear or puncture easily, and protects you for the duration of the task. A glove that is rated highly chemical-resistant, but tears or punctures easily, will likely not protect you for the duration of the task. Discard the gloves if there is any sign of wear or if the gloves leak.

Also choose a glove size that fits you comfortably. Gloves that fit well give you increased dexterity for equipment maintenance or calibration. Gloves that are too tight stretch the material and pesticide can directly penetrate through enlarged pore spaces. And too tight gloves restrict movement of your fingers and can cause hand fatigue. Gloves that are too large can get caught in equipment. If a glove is too loose, pesticides can run down the inside and be directly absorbed by your skin.

Select gloves designed to give you extra protection when needed for the job, such as elbow length gloves when mixing and loading. Do not use a glove beyond the breakthrough time provided by the PPE manufacturer. Lastly, gloves should be disposed of frequently because absorbed pesticides will continue to permeate through the material.

When using reusable gloves rinse them at each break and wash them thoroughly at the end of the workday. Make sure your gloves are in top condition. Replace your gloves immediately if they get cut, torn, or damaged. Throw out any gloves showing wear. Check glove integrity before each use. Rinse and slash all gloves before discarding them.

Footwear: If the product labeling specifies “chemical-resistant footwear”, EPA regulations prescribe use of any chemical-resistant shoes; boots; or shoe coverings worn over shoes or boots. Do not wear leather boots or canvas shoes in these cases. Leather and canvas absorb pesticides and cannot be decontaminated.

Regulations allow you to substitute leather for chemical-resistant boots only when the chemical-resistant footwear required by the pesticide label is not durable enough for use in rough terrain. Consult manufacturers or suppliers of footwear for guidance in selecting chemical resistant footwear that has the durability you need. Do not use these boots for other purposes.

Headgear: When a pesticide product label specifies ‘chemical-resistant headgear’, you may use either a chemical-resistant hat with a wide brim that goes all around your head, or a chemical-resistant hood. Chemical-resistant hoods attached to jackets or coveralls protect your neck and back from pesticides sprays that would otherwise run down your back. When handling pesticides, do not use headgear made of any absorbent material such as cotton, leather, or straw. These absorb pesticides and cannot be decontaminated.

Eye Protection: Eyes readily absorb pesticides. When a label simply says to “wear protective eyewear”, you may use any of the following: goggles; face shield; safety glasses with shields at front, brow, and temple; or a full-face respirator. Use common sense and select eyewear that protects you for the task at hand. Eyewear made of impact-resistant material, such as polycarbonate, can protect you from flying objects, such as granular pesticides. However, safety glasses will not protect your eyes from pesticide splashes.

Labels may be more specific and require that a particular type of eyewear be worn. For example, goggles may be specified when there is a concern about protecting your eyes from liquids or particulates for that application or use. Goggles that have covered air baffles reduce lens fogging while keeping liquids out.

Under the agricultural Worker Protection Standard, if the label requires eye protection, then the handler must have immediate access to eyewash of 1 pint of water at all times.

Maintenance and Disposal of PPE

All PPE should either be disposable, OR easy to clean and sturdy enough for repeated use. Gloves, non-woven (including coated non-woven) coveralls and hoods, such as Tyvek®, usually are designed to be disposed of after use. Most are intended to be worn for only one workday. For example, you might use disposable gloves, shoe covers, and an apron while pouring pesticide into a hopper or tank, cleaning or adjusting a nozzle, or making minor equipment adjustments. If using “reusable” PPE, pay close attention and be ready to change and dispose of them whenever the inside surface is contaminated. And be sure to clean all reusable PPE items between uses, even if worn for only a brief period of exposure.

Pesticide residues that remain on PPE are likely to continue to permeate through the material once contaminated. Even if you do not see any signs of wear, replace reusable chemical-resistant items regularly - the ability of a chemical-resistant material to resist the pesticide decreases each time an item is worn.

In addition, PPE worn several times between launderings may build up pesticide residues. The residues can reach a level that can harm you, even if you are handling pesticides that are not highly toxic. So, disposable PPE is a preferred option to reusable PPE. They are low-cost, and their use minimizes clean-up and spread of contamination. **Rinse and slash used/unusable PPE prior to disposal.**

5.2.2 Respiratory Protection for Pesticide Handlers

Occupational users of pesticides can be exposed to toxic gases and vapors, particulates, or both. Various pesticide formulations, environments, and application methods require different types of respiratory protection devices (respirators).

EPA requires that pesticide manufacturers determine and specify respiratory protection according to the anticipated hazards and risk of inhalation. Manufacturers provide requirements for respiratory protection on the pesticide label that are product- and task-specific. **It would potentially be life-threatening to assume that all products with the same active ingredient have the same respiratory protection requirements. Read and follow each individual product's label for respirator requirements since pesticides may have different formulations and use directions.**

The pesticide label states whether you must use a respirator and, if so, which type. Atmosphere-supplying respirators provide clean, breathable air from an uncontaminated source, while air-purifying respirators remove contaminants from the air that you breathe. Both may be configured with either tight- or loose-fitting face pieces. When a tight-fitting respirator is used, fit testing is required to select the correct size, model, and manufacturer. Occupational users of pesticides must understand the capabilities and limitations of each respirator they will use.

The pesticide label specifies use of “**NIOSH-approved**” respirators. The NIOSH-approval certificate that accompanies the respirator indicates the approved configuration, protection, and cautions and limitations of the respirator. For example, air purifying respirators do not supply oxygen, and must not be used in an environment containing less than 19.5% oxygen.

When air-purifying respirators are required, the label will specify the type of particulate filter and/or chemical cartridge or canister. For example, non-powered particulate filters differ according to their oil resistance. When a pesticide contains oil or an oil-like substance, an N-series (not oil proof) cannot be used; and the pesticide label will specify R-series (oil-resistant) or P-series (oil-proof) filters. Powered air purifying respirators only have a single type of particulate filter, HE. EPA regulations [40 CFR 170.507(d)] require replacement of particulate filters when damaged, torn, soiled, or it becomes uncomfortable for the wearer to breathe. Additionally, particulate filters should be replaced according to respirator manufacturer recommendations or pesticide labeling (whichever is more frequent).

Always use the type of purifying element required by the pesticide label. The most typical chemical cartridge or canister specified by the label for pesticide use is an organic vapor (OV) cartridge or canister. They contain activated carbon that absorbs organic vapor gas or vapor molecules from the air being drawn in through the container. A chemical cartridge/canister is effective until the sorbent bed is filled and the gas or vapor “breaks through.” Breakthrough is the penetration of a gas or vapor through a chemical air-purifying element to inside the wearer’s mask. Any taste, smell, or irritation is a warning that breakthrough of the pesticide through the sorbent may have occurred, and that you should exit the area. Respirator manufacturers recommend that OV cartridges/canisters should not be used beyond one day. Change cartridges/canisters earlier if contaminant odor, taste, or irritation is detected inside the face piece.

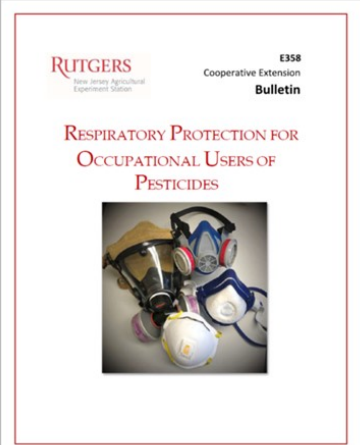
The Revised WPS requires that when a WPS-covered pesticide label requires a handler to wear a respirator, the handler’s employer must provide them with a medical evaluation, fit test, and respirator training.

Prior to use of respirators, users must be **medically evaluated** to determine that they can safely use the respirator under the conditions of use. When use of a respirator is required by the pesticide label, both commercial applicator and agricultural employers must provide pesticide handlers a medical evaluation per OSHA 29 CFR 1910.134(e) to determine their ability to safely use the respirator specified.

Annual respirator training is required. Employers of occupational users of pesticides must provide effective respirator training per OSHA 29 CFR 1910.134(k) to those employees required to wear respiratory protection by the product label. Respirator users must know how to properly inspect, recognize danger signals during use and what to do; don and doff (put on and remove). After use, proper care, maintenance, and storage of their respirator can prolong the life of the respirator.

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Contact your Cooperative Extension Pesticide Safety Education Program for assistance in selecting the correct respirator and any component parts from the pesticide label. **Call your state's Extension office to refer you to the Pesticide Safety Education Program Coordinator or Program if you have any questions about pesticide safety equipment.**



Consult **Rutgers Bulletin E0358 “Respiratory Protection for Occupational Users of Pesticides”** for detailed guidance on the different types of respirators; their limitations, use, care, maintenance, and storage; as well as requirements for the medical evaluation, fit testing, and training of respirator users. It outlines regulatory requirements of EPA and OSHA that apply to commercial users and agricultural operations that use pesticides.

The publication may be downloaded at:
<https://njaes.rutgers.edu/pubs/publication.php?pid=E358>.
Hardcopies are available at the NPSEC online store at:
<https://npsecstore.com/collections/respiratory-guides>.

6. Protection of the Environment

Generally speaking, to protect the environment from pesticide exposure:

- **Avoid off-target drift** by proper selection of application methods, droplet size, nozzle types, and tank mix partners.
- **Avoid using excess quantities of pesticides.** Calibrate your sprayer to make sure the output is within the label rate.
- **Always read the pesticide label** prior to selection of a pesticide and check for environmental concerns and restrictions. The “Environmental Hazard” section of the label addresses concerns for surface water and groundwater contamination, non-targets, and endangered species protection requirements.

6.1 Minimize Off-Target Drift

Agricultural chemicals applied through spraying have the potential to drift away from the intended target areas. **Drift is defined as “the movement of spray particles and vapors off-target causing less effective control and possible entry to susceptible wildlife vegetation and people.”** Spray drift has the potential to cause injury or damage to plants, animals, environment, or property, and can affect human health.

- **Particle drift** is the movement of spray particles during or soon after the spray application. ‘Particle’ means the active ingredient of a pesticide as a liquid (spray droplet), granule, pellet, dust, fumigant, etc. The four factors which impact particle drift are: 1) wind speed; 2) boom height; 3) distance from susceptible vegetation; and 4) spray particle size.
- **Vapor drift** is associated with the volatilization of a pesticide spray into a gas or fume. Off-target drift increases with pesticides with higher vapor pressures, and with higher ambient air temperatures. For pesticides that are quite volatile and pose harm when the vapor moves off target, the pesticide label may state a cut-off temperature for application, or the label may require soil incorporation after application.

Surveys indicate that approximately 65% of the drift complaints involved application procedures in violation of the label (Sumner 1997). ALWAYS READ AND FOLLOW THE PESTICIDE LABEL.

Related to spray particle size, the larger the droplet size the greater the deposition rate or the less drift. **Pesticide labels will have mandatory drift requirements, as well as manufacturer’s advisory statements for best management practices to control drift.** This may include application methods, droplet size, nozzle types, and tank mix partners.

Always assess weather conditions before and DURING application. Use a wind gauge and **avoid spraying in winds above 10 mph**. Drift potential is lowest at wind speeds between 3 and 10 mph blowing in a direction away from sensitive non-targets. **“Dead calm” (0 to 3 mph winds) are NEVER recommended** because temperature inversions can cause long distance drift. Maintain boom heights as low as possible within manufacturer guidelines; the shorter the distance a droplet has to travel, the less chance for drift.

Generally speaking, to minimize off-target drift:

- Select low or nonvolatile pesticides.
- Choose days with better weather. Avoid spraying when windy, high temperature without low humidity, or inversion conditions. Spray when soil is coolest and relative humidity is highest.
- Use lowest spray pressure and largest droplets that provide sufficient coverage and control.
- Do not use nozzles or nozzle configurations that produce small droplets; consider use of “low drift” nozzles.
- Adjust boom height as low as is recommended by manufacturer or is practical.
- Adjust equipment to keep spray on target.
- Use lower travel speeds.
- Use drift control additives when permitted by the pesticide label.

Sample Drift Mitigation Label Language:

Controlling Droplet Size. *The most effective way to reduce drift potential is to apply the largest droplets that provide sufficient coverage and control.*

Volume. *Use high flow rate nozzles to apply the highest practical spray volume. Nozzles with higher rated flows produce larger droplets.*

Pressure. *DO NOT exceed the nozzle manufacturer’s recommended pressures. For many nozzle types, lower pressure produces larger droplets. When higher flow rates are needed, use higher flow rate nozzles instead of increasing pressure.*

6.2 Protect Surface and Ground Water

Pesticides can be transported from the atmosphere to streams and ground water with rainfall or by the deposition of particles from off-target drift. Streams are particularly vulnerable to pesticide contamination because surface water runoff from agricultural and urban areas flows directly into streams as both dissolved and particle-associated (sediment) pesticides. The timing of pesticide application relative to precipitation occurrence and intensity controls, for the most part, transport to streams and surface water, and ultimately groundwater.

Pesticides are transported to ground water mostly by recharge, resulting from rainfall or irrigation within agricultural and urban areas where they are used. Other locally important sources include transport down leaky well casings and contaminated streams that lose water to ground water. Alternately, ground water can be a major portion of streamflow during low-flow periods and if contaminated, could be a source of pesticides to some streams.

Factors That Affect Movement of Water and Contaminants

The depth of aquifers, in conjunction with soil types, influences how much surface water reaches the aquifer. Their depth also affects how quickly water and contaminants reach an aquifer. Thus, shallow water tables tend to be more vulnerable to contamination than deeper ones. This tendency, however, depends on the soil type. Soils with high clay or organic matter content may hold water longer and retard its movement to the aquifer. Conversely, sandy soils allow water to move downward at a fast rate. High levels of clay and/or organic content in soils also provide a large surface area for binding contaminants that can slow their movement into groundwater. Soil texture also influences downward water movement. Finer textured soils have fewer spaces between particles than coarser ones, thus decreasing movement of water and contaminants.

Pesticide Characteristics

The characteristics of an individual pesticide affect whether it remains adsorbed to surface soil or sediment; is dissolved and transported in surface runoff; or is leached to groundwater. The most important characteristics are solubility in water, adsorption to soils, and persistence in the environment.

Pesticides that are highly soluble in water have a higher potential for contaminating groundwater than those which are less soluble. The water solubility of a chemical indicates how much chemical will dissolve in water and is measured in parts per million (ppm). Those chemicals with a water solubility greater than 30 ppm may create

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problems. A chemical's ability to adhere to soil particles plays an important role. Chemicals with a high affinity for soil adsorption are less likely to reach the aquifer. Adsorption is also affected by the amount of organic matter in the soil. Soils with high organic matter content are less vulnerable than those with low organic matter content.

Finally, how persistent a chemical is in the environment may affect its ability to reach groundwater. Persistence is measured by the time it takes *half* of a given pesticide to degrade (*half-life*). Half-life is a measure of how quickly a chemical breaks down in soil (soil half-life) or water (hydrolysis half-life). US Geological Survey National Water-Quality assessment (NAWQA) data from agricultural areas across the Nation indicate that pesticides with greater persistence in soil are more likely to be detected in shallow ground water than compounds that are less persistent (1999). The longer a chemical remains in water or soil without breaking down, the more likely it is to leach through the soil. Pesticides are less likely to leach when their hydrolysis half-life is less than six months, and their soil half-life is less than three weeks.

Transformations or degradation of pesticides proceed at widely varying rates, depending on the structure of the compound and environmental conditions. Half-lives vary widely from hours to decades. Generally, persistent pesticides or degradates (what they degrade into) may accumulate in soils, sediment, or biota; or be transported for long distances. In some cases, such as several of the historically used organochlorine pesticides (*e.g.*, DDT), both long-distance transport and accumulation have been observed.

How to Prevent Contamination of Your Ground Water

Apply pesticides only when needed:

The use of extraneous pesticides can increase the threat of contamination. Check your irrigation practices as well. Do not irrigate immediately after a pesticide application, unless required by a pesticide's label. The increased water content in the soil might speed up the movement of a pesticide into ground water.

Examine the chemical properties of the pesticides that you use:

If you are using materials which persist for long periods of time, are very water soluble, or are not tightly held by the soil, then you may be contaminating your groundwater. You may wish to select another material that has a shorter persistence, lower water solubility or higher potential for soil adsorption.

To compare product leachability, refer to the OSU Extension Pesticide Properties Database at: <http://npic.orst.edu/ingred/ppdmove.htm> (date accessed 11/30/2023). This database provides a qualitative Pesticide Movement Rating (*i.e.*, low, moderate, high) for each pesticide listed, as well as individual values or ranges for soil half-life (days), water solubility (mg/l), and the Sorption Coefficient (soil K_{oc}).

Determine your local soil and geologic circumstances:

If you are in an area with a shallow water table or your soil is low in organic matter or sandy in nature, you have a greater risk of contaminating your groundwater. In these cases, choose a pesticide that has a low water solubility and is not persistent (has a short half-life).

Evaluate your management practices:

They may be the most important factor in determining your risk of contaminating your groundwater. If you use the same materials year after year, or many times a season, you can increase the potential for contamination due to the amount of pesticide in your soil.

The timing of pesticide applications has an effect on groundwater contamination:

If you make applications during periods of high rainfall or heavy irrigation, it is more likely that contamination may occur. Also, the water table in the spring may be higher than at other times. Early season applications, therefore, may pose a greater chance for groundwater contamination. Finally, the method of application may have an effect on ground water contamination. Direct injection, incorporation, and chemigation all increase the chance of contamination. If you use these techniques, be sure to follow the procedures listed on the material's label.

The location of your wells can be important:

The ground surrounding the wellhead should be sloping away from the well to divert surface runoff. If your sprayer loading area or pesticide storage building is too close to your well, the risk of contamination may be greater. **Wells used for drinking water or other purposes should be at least 50 feet away** from pesticide storage buildings and

loading areas. In the event of an accident, this distance should prevent contamination. This minimum distance should also be followed for field irrigation wells. If they are too close to application areas, contamination might occur.

Check the condition of all wells in the vicinity of sprayer loading areas, pesticide storage areas, or field applications:

The National Ground Water Association recommends routine annual maintenance checks to ensure the proper operation of the well and prolong its years of service, as well as monitor the water quality. Periodically check the well cover or well cap on top of the casing (well) to ensure it is in good repair and securely attached. Its seal should keep out insects and rodents. Cracks in a well casing provide a direct point of entry for pesticide-contaminated water in the soil around the well. Always replace cracked casings before the growing season.

Incorporate an anti-backflow device in any system used for chemigation or to fill your sprayer with water:

In the event of a pump shutoff or other failure, if any backflow into the water system occurs, these devices will prevent pesticides from entering your well. **New Jersey pesticide regulations at 7:30-10.2** require that “whenever any water is being added to any pesticide handling, storage, or application equipment via a hose, pump, or other equipment, the hose, pump, or other equipment is fitted with an effective valve or device to prevent backflow of pesticides or liquids containing pesticides into water supply systems, streams, lakes, other sources of water or other areas”. The NJDEP has provided Rutgers with a policy interpretation that an “air gap” between the water source and pesticide which is sufficient to prevent backflow is acceptable to the Department.

The care and maintenance of your equipment is also an important consideration:

If your equipment does not function properly, you may be applying more than is needed and increasing the chance of groundwater contamination.

- Prior to the season, inspect all of the working parts of your sprayer or chemigation system. Check the pump to see if it is working properly.
- For both sprayers and chemigation systems, check the water lines for clogs and leaks. For sprayers, check the nozzles for wear and clogs. Clogged, leaking, or worn lines and nozzles can cause pesticides to be delivered excessively or in unwanted areas.
- Be sure to calibrate your equipment. Uncalibrated equipment can cause over delivery as well. Calibrate your equipment at the beginning of the season, periodically during the remainder of the season, and any time you make changes or adjustment to the equipment.

6.3. Protect Non-Target Organisms

Based upon the results of required ecological risk assessment or incident reports, the Environmental Hazards statements on the pesticide label for foliar application to agricultural crops must include use precautions and/or restrictions for **all identified non-target** birds, mammals, fish, aquatic invertebrates, and bees.

6.3.1 Protection of Pollinators

Pollinators are vulnerable to many chemicals used to control insects, pathogens, and weeds. Insecticides applied at bloom can be toxic to pollinators, including honeybees and wild bees. This would include **foliar applications to alfalfa, peas, or beans if the crop or weeds in treatment area are in bloom; or to corn during pollen shed.** In addition, **systemic seed treatments may result in residues in nectar and pollen.** However, residues tend to be much lower from seed treatments compared to foliar treatments.

ALWAYS READ AND FOLLOW THE PESTICIDE LABEL

If a pesticide is used outdoors as a foliar application, and is toxic to pollinating insects, a “bee hazard” warning has generally been required to be included in the **Environmental Hazards** of the pesticide label.

Generally speaking, pesticide applicators must take measures that will minimize the risk of pollinators contacting a

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“bee-toxic” pesticide. **“Bee-toxic” pesticides** are those pesticides that have information on the label indicating that the pesticide is highly or moderately toxic to bees, and precautionary statements for the protection of pollinators on the product labeling (*see box to the right*).

Whenever insecticides are applied, select those that give effective control but pose the least danger to bees (see **Chapter F Insect Control tables** in this guide). Regardless, **do not apply any insecticides during bloom, unless they are completely non-toxic to bees, and avoid applications of all pesticides during active foraging by pollinators in the crop, or adjacent flowering crops and weeds.** Do not apply or allow drift of bee-toxic pesticides until all flowering of crop, cover crops, or weeds is complete/petal fall, unless you take necessary precautions to minimize exposure to foraging bees or and their hives. Precautions may include making applications after sunset when the temperature has dropped below 55°F and notifying beekeepers in advance.

Notification of beekeepers allows them to move, cover, or otherwise be protected prior to spraying. This protects a valuable agricultural resource and avoids conflicts and possible lawsuits. Some states, such as New Jersey, have mandatory beekeeper notification regulations. Many Mid-Atlantic states have State Pollinator Protection Plans (MP3) that may include recommendations for written agreements between beekeepers and agricultural operations. For more details on this and how applicators can register for the FieldWatch® online mapping of managed bees, see next section ***State-Specific Pollinator Protection***. See also **Section A 12 Pollination in this guide for information on pollinators**.

Bees will forage on all flowers found within the farm. Do not apply bee-toxic pesticides when bees are foraging in cover crops or weeds. Managing row middles by removing wild flowering plants (such as dandelion and clover) will reduce bee mortality. This can be helped by maintaining pure turf aisles and using a mix of 2,4-D and clopyralid (Stinger, Spur, and other generics).

Many fungicides are known to interact antagonistically with insecticides, which can lead to higher toxicity to bees. Recent data show that combinations of DMI FRAC group 3 (DMI fungicides including: Indar, Rally, Orbit, Bumper, Quash, Procure and Vintage) and neonicotinoid insecticides (IRAC code 4 including: Assail, Actara, Admire Pro, Belay, Calypso, Scorpion, Venom, including combinations and generics) cause increased bee mortality. Furthermore, DMI fungicide applications are not recommended during bloom for resistance management. Other recent research continues to show that certain combinations of fungicides mixed with insecticides increases the toxicity of those insecticides to both adult and larval forms of honeybees and some wild bees. In some cases, the fungicides themselves or in combination with other fungicides have shown negative impacts on pollinators. **Avoid fungicide application on flowering crops when bees are present.**

Product-Specific Pollinator Protection – Neonicotinoid Pesticides

In some cases, EPA may require **product-specific labeling** to protect non-targets, such as pollinators. Due to concerns regarding pollinator health, in 2014, EPA required that all manufacturers of pesticide products containing active ingredients from the **neonicotinoid group of insecticides** (*i.e.*, clothianidin, dinotefuran, imidacloprid and thiamethoxam) relabel these products with an **advisory “pollinator protection box”** (Figure 1.1) and **mandatory “Directions for Use”** (Figure 1.2). Both of these label statements are marked with the following “bee icon”:



*Neonicotinoid Pesticide Labels:
EPA Pollinator Protection*

Example Label Precautionary Statement for Bee Toxic Pesticides

“...This product is highly toxic to bees and other pollinating insects exposed to direct treatment or residues on blooming crops or weeds. Do not apply this product or allow it to drift to blooming crops or weeds if bees or other pollinating insects are visiting the treatment area....”

Mandatory Product-Specific pollinator protection language is **required** in the “**Directions for Use**” of the product label **for all neonicotinoid products**. Each of these statements are also flagged with the “bee icon”. See Figure 1.2 for an excerpt of the current (February 2023) pollinator protection label language contained in the “Directions for Use” for these neonicotinoids. Notice specific use precautions for 1) contracted pollination services; 2) food crops and commercially grown ornamentals attractive to pollinators, without contracted pollination services; and 3) non-agricultural products. All of this information could be applied to the use of any “bee-toxic” pesticide.

Figure 1.1 EPA Pesticide Label Pollinator Protection Box for Neonicotinoid Pesticides

Sample pollinator protection box with “bee icons” and *advisory* language to alert the applicator that there are additional application restrictions for pollinator protection to follow on the label.




Figure 1.2 EPA Pesticide Label Excerpt of “Directions for Use” for Neonicotinoid Pesticides

An example of mandatory label language now found on the neonicotinoids.

DIRECTIONS FOR USE


1. FOR CROPS UNDER CONTRACTED POLLINATION SERVICES



Do not apply this product while bees are foraging. Do not apply this product until flowering is complete and all petals have fallen unless the following condition has been met.

If an application must be made when managed bees are at the treatment site, the beekeeper providing the pollination services must be notified no less than 48-hours prior to the time of the planned application so that the bees can be removed, covered or otherwise protected prior to spraying.


2. FOR FOOD CROPS AND COMMERCIALY GROWN ORNAMENTALS NOT UNDER CONTRACT FOR POLLINATION SERVICES BUT ARE ATTRACTIVE TO POLLINATORS



Do not apply this product while bees are foraging. Do not apply this product until flowering is complete and all petals have fallen unless one of the following conditions is met:

- The application is made to the target site after sunset
- The application is made to the target site when temperatures are below 55°F
- The application is made in accordance with a government-initiated public health response
- The application is made in accordance with an active state-administered apiary registry program where beekeepers are notified no less than 48-hours prior to the time of the planned application so that the bees can be removed, covered or otherwise protected prior to spraying
- The application is made due to an imminent threat of significant crop loss, and a documented determination consistent with an IPM plan or predetermined economic threshold is met. Every effort should be made to notify beekeepers no less than 48-hours prior to the time of the planned application so that the bees can be removed, covered or otherwise protected prior to spraying.

3. FOR NON-AGRICULTURAL PRODUCTS



Do not apply [insert name of product] while bees are foraging. Do not apply [insert name of product] to plants that are flowering. Only apply after all flower petals have fallen off.

State-Specific Pollinator Protection

Some states have completed or are in the process of implementing State Managed Pollinator Protection Programs (MP3s). MP3s are typically voluntary. Consult your State Apiarist (see section A12. Pollination, **Table A-6. State Apiarist Contact Information**) or the Department of Agriculture for your State requirements.

Delaware published its **State Pollinator Protection Plan** in September 2016 at <https://agriculture.delaware.gov/wp-content/uploads/sites/108/2017/12/DelawarePollinatorPlan2016.pdf>. Senate Bill 264 was proposed in 2022 to amend the Delaware Pesticide Code to classify neonicotinoid pesticides for outdoor use as restricted use and ban the retail sale of neonicotinoid pesticides to the public for outdoor applications; the Bill was tabled in Committee.

The **Maryland** Department of Agriculture has released its **Maryland Pollinator Protection Plan** in 2017; see http://mda.maryland.gov/plants-pests/Pages/pollinator_protection_plan.aspx. Maryland's **Pollinator Protection Act of 2016** limits the use and sale of neonicotinoid pesticides within the state. Neonicotinoid pesticides were defined as pesticides with active ingredients including: Imidacloprid, Nithiazine, Acetamiprid, Clothianidin, Dinotefuran, Thiacloprid, and Thiamethoxam. This law went into effect on January 1, 2018; see. <https://mda.maryland.gov/plants-pests/Documents/PollinatorProtectionActFactSheet.pdf>. The Pollinator Protection Act **prohibits the use of neonicotinoid pesticides outdoors by home by gardeners. Only farmers and certified pesticide applicators (or people working under their supervision) can apply neonicotinoid pesticides outdoors.** So, while neonicotinoid products may appear on store shelves in Maryland, they cannot be applied outdoors by gardeners.

New Jersey does not have a Pollinator Protection Plan. However, the **New Jersey Department of Environmental Protection (NJDEP)** does have **Beekeeper Notification Regulations** at NJAC 7:30-9.11. Beekeepers that have hives overwintering in New Jersey are allowed to voluntarily register their bee yards with the NJDEP. A list of registered beekeepers is provided on the NJDEP's Beekeeper Notification webpage at <https://www.nj.gov/dep/enforcement/pcp/bpo-bee.htm>. Pesticide applicators are required to notify each of those beekeepers (that have registered) within a 3-mile radius of a planned application at least 24 hours prior to the application of any pesticide labeled as toxic to bees. Once notified, it is the responsibility of the beekeeper to take action to protect their hives.

Beekeeper notification is mandatory for growers using "bee-toxic" pesticides within three miles of the target site at least 24 hours prior to the date of application on crops listed under NJAC 7:30-9.11(i), either within the dates stated below or when in the flowering stage (*i.e.*, both). "Flowering stage" specifically means when plants bear any portion of a blossom as part of the blooming process associated with pollen and nectar production. New Jersey agricultural applications are exempt from the notification requirements, unless specifically listed as follows:

- Apples, pears, strawberries, peaches, and blueberries:
April 15th to May 15th
- Holly: June 1st to June 30th
- Cranberries: June 15th to August 15th
- Vine Crops (Cucurbits): June 1st to August 31st
- Sweet corn (during flowering stage)
- Fields where flowering weeds are present

Notification must include intended date and approximate time of application; location of the application, brand name and active ingredients of the pesticide to be applied; and the name and license number of the pesticide applicator. Notification to the apiarist can be made in person, by phone, by fax, by email, or regular or certified mail (as long as it is received 24 hours before the application). The detailed regulations are located at:

<https://www.nj.gov/dep/enforcement/pcp/regulations/Subchapter%209%20Changes%20in%20Red%202020.pdf>.

New Jersey P.L. 2021, c.386 amends the New Jersey Pesticide Control Act to make the neonicotinoid class of pesticides "restricted use" (meaning any person using these pesticides must have a valid New Jersey pesticide applicator license). **This amendment further prohibits any use of neonicotinoids except agricultural use.** The intent of this law is to reduce pollinator exposure to these pesticides, and the practical affect is to prohibit use of these pesticides in home gardens and landscapes, golf courses and other non-agricultural settings. **The law provides a specific deadline that beginning October 31, 2023, no sale of neonicotinoid pesticide can occur unless to a licensed applicator and for use only on agricultural plants.** Specific narrow exemptions are given for uses such as domestic pet and indoor applications, structural pest control, invasive pest emergencies, and use within a structural "band treatment" around a structure that does not involve application to plants.

The **Pennsylvania** Pollinator Protection Plan (P4) is a living document that information on the status of pollinators in Pennsylvania, and also provides recommendations for best practices and resources to support and expand pollinator populations; see <https://ento.psu.edu/pollinators/pollin-spotlight-items/the-pennsylvania-pollinator-protection-plan-p4>.

Important

EPA neonicotinoid pesticide "Directions for Use" have a more stringent (protective) beekeeper notification requirement of 48 hours versus the New Jersey 24-hour notification; the more stringent 48-hour notice must be given to beekeepers per the pesticide labeling for the use of neonicotinoids in New Jersey.

D. Pesticide Safety

The **Virginia** Department of Agriculture and Consumer Services has a State Pollinator Protection Plan at <https://www.vdacs.virginia.gov/plant-industry-services-pollinator-protection-plan.shtml> which includes best management practices for beekeepers, agricultural producers, agricultural commercial applicators, structural pest management and the horticultural industry. This plan to mitigate the risk of pesticides to managed pollinators was published in May 2017.

West Virginia Pollinator Protection Plan was published March 2016; see <https://agriculture.wv.gov/wp-content/uploads/2020/07/WV-Managed-Pollinator-MP3-Final-Draft.pdf>.



Mid-Atlantic State Departments of Agriculture (Delaware, Maryland, New Jersey, Pennsylvania, Virginia, and West Virginia) have partnered with FieldWatch® to help protect honeybees and other specialty crops. <https://fieldwatch.com/>.

FieldWatch® is a non-profit company whose mission is to develop and provide free mapping tools intended to enhance communications that promote awareness and environmental stewardship activities between crop growers, beekeepers, seed companies and pesticide applicators. **FieldWatch® allows beekeepers and specialty crop producers to map out where their hives or crops are located with an easy-to-use mapping tool.** Beekeepers have the option to set their locations to "private", allowing only registered users access to their information.

Apiarists register and map hive locations via BeeCheck® and commercial specialty crop growers map those crops via DriftWatch® so that pesticide applicators can review FieldCheck® for locations mapped by growers and beekeepers before spraying to improve decision making. FieldCheck® also provides contact information to support communication between applicators and beekeepers. The partnership will help beekeepers, producers and applicators better communicate as part of ongoing stewardship activities.

Applicators are encouraged to register in FieldCheck® at <https://driftwatch.org/signup#applicator>. With registration, FieldWatch® will notify any registered applicators using either an online or mobile portal when new beehives or fields are added. FieldWatch® encourages all users who find value in the tools they provide to consider joining as dues-paying members. By registering, producers and beekeepers can record their sites and purchase signs, and applicators can receive email notifications about newly added sites in their defined areas. However, growers, beekeepers, seed companies and applicators can access our registries and free mapping tools, without becoming dues-paying members.

FieldWatch® is a national crop and apiary registry that is voluntary and free. As such, *be aware that all registered users of the FieldWatch® platform, including DriftWatch®, BeeCheck®, CropCheck®, FieldCheck®, and the SeedFieldCheck pilot program are bound by its following disclaimer posted at <https://mkvf33.p3cdn1.secureserver.net/wp-content/uploads/2020/05/FieldWatch-Site-Disclaimer-03.25.20-.pdf>.*

Pesticide Bee Incident Reporting

Immediately report pesticide incidents (e.g., bee kills) to your State pesticide regulatory agency. Pesticide incidents should also be reported to the National Pesticide Information Center at: www.npic.orst.edu or directly to EPA at: beekill@epa.gov.

Information on protecting bees and other insect pollinators may be found at the Pesticide Environmental Stewardship website at: <https://pesticidestewardship.org/pollinator-protection/>.

Information about toxicity of organic pesticides to bees can be found at: <http://www.xerces.org/publications/guidelines/organic-pesticides>.

6.3.2 Protection of Endangered Species

EPA's Endangered Species Protection Program is designed to determine whether pesticide use may affect any threatened or endangered species or cause harmful modification of designated critical habitat under the Endangered Species Act. This includes protections for the 1,300 different species in the United States that are listed as endangered or threatened. EPA's goal is to protect threatened and endangered species and their habitats, without placing unnecessary burden on agriculture and pesticide users. Pesticide limitations are developed to ensure safe use of pesticides in order to meet this goal and will be communicated to applicators on the pesticide label. **EPA may require changes to a pesticide's registration, label, or use instructions to protect endangered or threatened species.**

When those changes are needed only in specific regions, rather than nationwide, EPA may implement the changes through geographically specific **Endangered Species Protection Bulletins**. The goal of Bulletins is to protect listed species and/or their critical habitat in specific locations and, *in some cases, during certain times of the year.*

If a geographically specific "pesticide use limitation" is necessary to protect a listed species or its designated critical habitat, the Environmental Hazards section of the pesticide label will direct the pesticide user to *an Endangered Species Protection Bulletin* (see *example label right*). The label directs the applicator to obtain a Bulletin for the area they are applying that product by either consulting <http://www.epa.gov/espp> or <https://www.epa.gov/endangered-species/bulletins-live-two-view-bulletins>; or by calling 1-844-447-3813.

Of the two options, applicators will obtain instantaneous results by going directly online to the weblink provided on the pesticide product label. **"Bulletins Live! Two" (BLT) is EPA's current online endangered species bulletins system.** It is accessible through your computer or using your cell phone browser. The webpage (see *below*) opens to a map of the United States for applicators to enter in the blue box the exact location and month they are planning to make an application of that particular product.

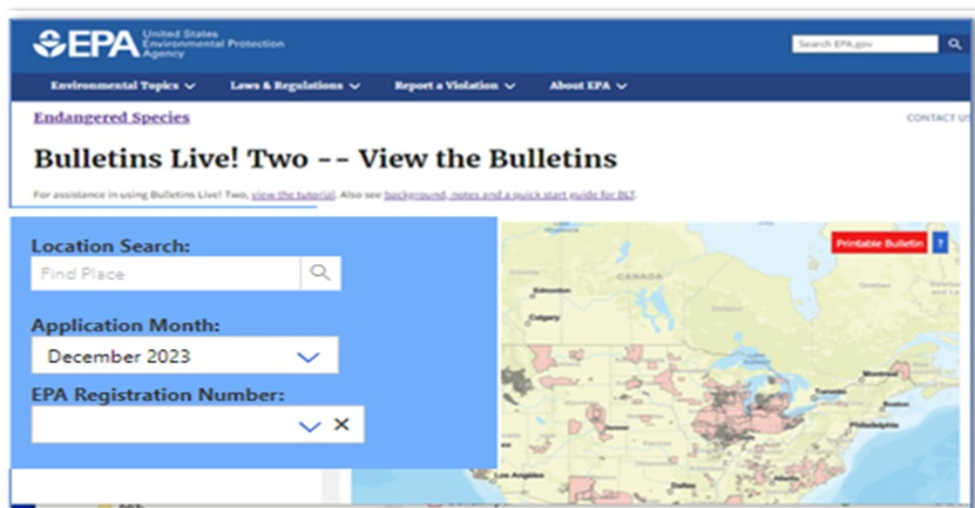
PROTECTING ENDANGERED SPECIES / PESTICIDE USE LIMITATION AREAS

The use of any pesticide in a manner that may kill or otherwise harm an endangered species or adversely modify their habitat is a violation of federal law. Use of this product in a manner inconsistent with its labeling may pose a hazard to endangered or threatened species. When using this product, you must follow the measures contained in the Endangered Species Protection Bulletin for the area in which you are applying the product. To obtain Bulletins, no more than six months before using this product, consult

<https://www.epa.gov/endangered-species/bulletins-live-two-view-bulletins> or call 1-844-447-3813.

You must use the Bulletin valid for the month in which you will apply the product.


It is a Federal offense to use any pesticide in a manner that results in the death of an endangered species.



Endangered Species Protection Bulletin

Application Month: December 2023
Product: XtendMax® With VaporGrip® Technology (264-1210) : "M1768 Herbicide"

1 Areas where pesticide use must be limited are identified on the map. A legend is located beside the map to help pinpoint these locations.



2 Look below at the Pesticide Use Limitation Summary Table. This table lists the user selected Active Ingredient(s) (AIs) or Product(s) with pesticide use limitations on the printed map. Locate the Active Ingredient (AI) or Product you intend to apply in this table and identify the code in the last column. This code indicates the specific limitation associated with that AI or Product. A limitation description for each code can be found below in the Codes and Limitations Table. If multiple Pesticide Use Limitation Areas (PULAs) are visible on the map, these tables provide information for the highlighted PULA.

If you are applying a pesticide that contains more than one Active Ingredient, or multiple Products, then multiple codes may apply. Follow the limitations for all codes when using this pesticide.

Endangered Species Protection Bulletin

Pesticide Use Limitation Summary Table

Product	AI	Use	Method	Form	Code
XTENDIMAX WITH VAPORGRIP TECHNOLOGY (264-1210) Alternate: M1768 Herbicide	Dicamba, diglycolamine salt	Dicamba-Tolerant Soybean	Ground spray	Liquid	D120
XTENDIMAX WITH VAPORGRIP TECHNOLOGY (264-1210) Alternate: M1768 Herbicide	Dicamba, diglycolamine salt	Dicamba-Tolerant Cotton	Ground spray	Liquid	D120

Codes and Limitations Table

Code	Limitation
D120	To protect federally listed threatened and endangered species, both a 310-foot in-field wind-directional spray drift buffer and a 57-foot omnidirectional in-field buffer are required. If applying to dicamba-tolerant soybeans with a qualified hooded sprayer, both a 240-foot in-field wind-directional spray drift buffer and a 57-foot omnidirectional in-field buffer are required to protect federally listed threatened and endangered species. Please see the label for a link to the website(s) with your product's qualified hooded sprayers. The following areas may be included in the buffer distance composition when directly adjacent to the treated field edges: 1. Roads, paved or gravel surfaces, mowed grassy areas adjacent to field, and areas of bare ground from recent plowing or grading that are contiguous with the treated field. 2. Planted agricultural fields containing dicamba-resistant plantings of cotton and soybeans. 3. Areas covered by the footprint of a building, silo, or other man made structure with walls and or roof.

This document contains legal requirements for the use of certain pesticides. Do not modify any text, graphics or coloration or otherwise alter this document. ESPP Contact: ESPP@epa.gov Phone: 1-844-447-3813

Always follow the labeling instructions. If directed by the product label to check for Bulletins for your application site and month, these Bulletins contain enforceable “**pesticide use limitations**” that are necessary to ensure a pesticide's use will not harm a species listed as threatened or endangered (listed) under the Endangered Species Act or their designated critical habitat.

When you log onto the site, you will be able to generate a Bulletin specific to the location of where you intend to make an application, the pesticide product you plan to use, and by application month (see left for sample *two-page Bulletin* generated for Salem County, New Jersey for December 2023 for pesticide product containing active ingredient dicamba with the EPA Registration Number 264-1210).

The PDF from the Bulletins Live! Two (BLT) application provides you with the specific “**pesticide use limitation**” or PULA information for your application site and month.

Specifically, each Bulletin will have a “**Pesticide Use Limitation Summary Table**” (see bottom left for the *second page of the sample Bulletin cited above*). The Table lists product name, active ingredient, method of application, and physical form of the pesticide use queried. **The last column in the table contains a code for the pesticide use limitation that will be required for any application of the product on the date and location queried in BLT.**

Underneath the Pesticide Use Limitation Summary Table is a “**Codes and Limitations Table**” which is a key that lists each PULA Code with a corresponding detailed explanation of the pesticide use limitations that must be followed by the applicator to protect the threatened and endangered species at that location in the month queried. Please **consult Cooperative Extension Specialists and Agents for technical assistance** in understanding and implementing any and all pesticide use limitations that are listed in the Endangered Species Protection Bulletin.

Remember, when users are directed to check the Bulletins website on a pesticide label, Bulletins are enforceable mitigations under FIFRA.

EPA currently provides that if you would like to save the Bulletin, for your own records, you can. **Check with your State pesticide regulatory agency for any state-specific recordkeeping requirements of Bulletins** for pesticide applications with Endangered Species Precautionary Statements directing the applicator to consult Bulletins Live! Two. If your application location changes or the application timing is to occur later than the intended application month that you originally checked, make sure to check BLT again and generate a new Bulletin.

Resources to get started with Bulletins Live! Two:

- **Bulletins Quick Start Guide:**
<https://www.epa.gov/endangered-species/endangered-species-protection-bulletins#quick>
- **BLT Tutorial (February 2022):**
<https://www.epa.gov/system/files/documents/2022-02/blt-tutorial-updated-feb2022.pdf>.
- **Bulletins Live! Two Webinar (November 2023):**
<https://www.epa.gov/endangered-species/materials-november-2023-bulletins-live-two-webinar>

Please refer to your State pesticide regulatory agency for state-specific regulations and policy on the pesticide use limitations for protection of endangered species. In cases where state rules are more stringent than federal, the state rules will take primacy.

**IMPORTANT
THE LABEL IS THE LAW!**

1. When users are directed on a pesticide label to check for Endangered Species Protection Bulletins, *Bulletins Live! Two* provides Bulletins that are enforceable mitigations under FIFRA.
2. **Not following the limitation on your Bulletin is a misuse of the pesticide and enforceable under FIFRA.**
3. If this misuse results in “take” of listed species, the action is also enforceable under the Endangered Species Act by the US Fish and Wildlife Service and National Marines Fisheries Service.

7. Mid-Atlantic Region Pesticide Program Contacts

Delaware

- **Delaware Department of Agriculture; Pesticides Management Section**
<https://agriculture.delaware.gov/pesticide-management/>
Christopher Wade, Pesticides Administrator
302-698-4570; christopher.wade@state.de.us
Amanda Strouse, Pesticide Certification & Training Specialist (Agricultural Specialist)
302-698-4575; amanda.strouse@delaware.gov
- **University of Delaware**
<https://www.udel.edu/academics/colleges/canr/cooperative-extension/sustainable-production/psep/>
John Emerson, Pesticide Safety Education Program Coordinator for Delaware
859-621-0500; jremer@udel.edu

Maryland

- **Maryland Department of Agriculture Pesticide Regulation Section**
https://mda.maryland.gov/plants-pests/pages/pesticide_regulation.aspx
Alexander T Lehmann, PhD, Entomologist Advanced, Certification and Training Coordinator
(410)-841-5710; Alexander.Lehmann1@maryland.gov
- **University of Maryland**
<http://pesticide.umd.edu/pesticide-safety-education.html>
Niranjana Krishnan, PhD, Pesticide Safety Education Program Coordinator for Maryland
(301) 405-3928; nkrish@umd.edu

D. Pesticide Safety

New Jersey

- **New Jersey Department of Environmental Protection**
Division of Compliance Operations and Coordination Bureau of Licensing and Registrations
<https://www.nj.gov/dep/enforcement/pcp/bpo.htm>
Michael McConville, Chief
609-984-6507; Mike.McConville@dep.nj.gov
- **Rutgers University New Jersey Agricultural Experiment Station**
<https://pestmanagement.rutgers.edu/rutgers-pesticide-safety-education-program/>
Patrica D. Hastings, Extension Pesticide Safety Education Program Coordinator for New Jersey
(848) 932-0176; hastings@njaes.rutgers.edu

Pennsylvania

- **Pennsylvania Dept. of Agriculture, Bureau of Plant Industry**
https://www.agriculture.pa.gov/Plants_Land_Water/PlantIndustry/health-safety/pesticide-programs/PesticideCART/Pages/default.aspx
Jessica L. Lenker, Chief
717-772-5212; jeslenker@pa.gov
Matthew Kohan, Pesticide Certification and Education Specialist
717-772-5217; mattkohan@pa.gov
- **Penn State University Pesticide Education Program**
<https://extension.psu.edu/about-the-pesticide-education-program>
Jon M. Johnson, Director Pesticide Education Program
(814) 863-0263; jmj5@psu.edu

Virginia

- **Virginia Department of Agriculture and Consumer Services**
<https://www.vdacs.virginia.gov/pesticides.shtml>
Liza Fleeson-Trossbach, Program Manager
804.371.6559; Liza.Fleeson@vdacs.virginia.gov
- **Virginia Tech Pesticide Program**
<https://vtpp.ento.vt.edu/>
Daniel L. Frank PhD, Director of Pesticide Programs
(540) 231-6543; dlfrank@vt.edu

West Virginia

- **West Virginia Dept. of Agriculture**
<https://agriculture.wv.gov/divisions/regulatory-and-environmental-affairs-2/pesticides/>
Jennifer Shivley, Certification Supervisor
304-558-2209; jshivley@wvda.us
- **West Virginia University Extension Service**
<https://extension.wvu.edu/agriculture/farm-management/pesticide-education>
Carlos Quesada, Pesticide Safety Education Program Coordinator for West Virginia
(304) 293-9464; Carlos.Quesada@mail.wvu.edu

