

The Pesticide Environmental Stewardship (PES) Web Site

Wayne Buhler, NC State University
Ron Gardner, Cornell University
Carol Ramsay, WA State University
Jim Wilson, SD State University

PES Web Site Purpose

- Summarize principles of pesticide stewardship;
- Direct users to resources (links) by stewardship topic; and,
- Provide educational modules and self-assessment tools.

Major Topics:

- Protection of Groundwater/Surface Water;
- Pesticide Resistance;
- Drift Management;
- Transportation;
- Storage;
- Calibration, Mixing and Application;
- Pesticide Disposal;
- Integrated Pest Management;
- Container Recycling;
- Recordkeeping;
- IPM and Pesticide Safety for the Homeowner
- More topics may be added later

Personnel and Partnerships

- Four coordinators representing the Midwest (J. Wilson), Northeast (R. Gardner), South (W. Buhler), and West (C. Ramsay) will work with Extension, government, industry, commodity associations, and environmental organizations to identify and/or develop the best resources for a holistic approach to PES.
- Dr. Norm Nesheim, Ret. Univ of FL, is project coordinator.
- Topics completed or nearing completion are protection of groundwater, recordkeeping, drift management, storage, and disposal.

Financial Support and Allocations

- Startup funds have been provided by Syngenta as part of their membership in the CIPM.
- The project has been approved by the Industry Advisory Board of CIPM as a core project.
- CIPM will administer the project funds.
- Financial support has been given to each Regional Coordinator and a part-time Grad student, whose names and affiliations will appear on the PES Web site homepage.

Web Site Construction and Maintenance

- The site is “under construction” using SharePoint with technical support and maintenance from R. Smith, Cornell Univ.
- <http://pesticidestewardship.org>

Web Site Recruitment and Use

- Email, brochures, and presentations at meetings will announce and promote the use of the Web site.
- CIPM will also advertise the site through the USDA Regional IPM Centers network, which currently receives in excess of 2 million hits per month.
- Organizations, businesses, and individuals answering PES questions or providing education and information will be able to direct individuals to this Web site.
- Extension and other educators will be able to use this tool as a part of their educational programs.
- Educational modules may be used to provide continuing education credits toward the recertification of licensed applicators or to prepare the user for state certification exams.
- Link to eXtension (extension.org)



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1 2 3 4 5 6 7 8 Next

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December 19, 2008
[Imported Fire Ant Learning Lessons](#)

February 20, 2009

In the News

Extension serving local communities.

February 19, 2009
[Plan Ahead to Trim Food Budget](#)

February 19, 2009
[Fuel Efficiency Begins with the Driver](#)

February 19, 2009
[Vegetable Gardening Among 2009's Trends](#)

February 19, 2009
[Urban Wildlife Management Conference Set](#)

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- Family Caregiving
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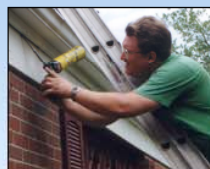
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Agriculture and Pest Management

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Wildlife Damage Management Community Page

What is Wildlife Damage Management?

More...

1 2 3 4 Next

In This Resource Area

Species Information:

- All Species Information
- Rodents
- Carnivores
- Other Mammals
- Birds
- Reptiles
- Amphibians

Training

- Best Practices for Nuisance Wildlife Control Operators
- Pesticide Tutorial

Additional Information:

- Glossary

Answers from our Experts

February 05, 2009

Deer mice are invading my buildings. Pest control companies just poison and trap and the...

January 20, 2009

What could be stripping the bark from the top branches of a mature American elm tree; if it's...

January 12, 2009

A bat was in my room, but now I don't know where he is. How can I find him so I can get it out...

More ...

This resource area was created by the: Wildlife Damage Management community



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February 19, 2009

Urban Wildlife Management Conference Set for March 4 in Dallas

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FAQ #27229

Deer mice are invading my buildings. Pest control companies just poison and trap and the problem goes on year after year. How do I locate and close entry points - exclusion - to solve the problem, not do an expensive ongoing maintenance problem?

Have a question?
Try asking one of
our Experts



Related resource areas: [Wildlife Damage Management](#)

Inspection for mice problems:

Learn how to investigate a mouse problem in a structure at [Inspection Tips](#)

Exclusion:

Tighten the building. As long as openings aren't being used by insects or animals larger than mice, secure all of them $\frac{1}{4}$ " or larger with caulk, $\frac{1}{4}$ " sized hardware cloth or flashing. Use caution around weeping vents as they need to remain open to drain water. Use aluminum mosquito netting to stop entry but still allow air and water flow.

Additional info is found at [Prevention Tips](#)

Exclusion also includes removal of harborage (piles of stuff and long grass) as well as bird feeders. As food increases so does mouse population. See also [Rodent Exclusion](#) for more tips.

Have a specific question? [Try asking one of our Experts](#)

Unlike most other resources on the web, we have experts from Universities around the country ready to answer your questions.

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not useful very useful
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Species Information:

- [All Species Information](#)
- [Rodents](#)
- [Carnivores](#)
- [Other Mammals](#)
- [Birds](#)
- [Reptiles](#)
- [Amphibians](#)

Training

- [Best Practices for Nuisance Wildlife Control Operators](#)
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Additional Information:

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To the 'Net...

<http://pesticidestewardship.org>

Collaborators and input needed:

wayne_buhler@ncsu.edu

919-515-5369

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HELP!



Recordkeeping Disposal Drift Water Non-Target Storage Terms/Acronyms Homeowner

Search

Pesticide Environmental Stewardship

Recordkeeping

Private Applicator
Requirements
Requirements for Non-
Private Applicators
Smart Items to Record
Inspection of Records
Benefits of Recordkeeping
Fact Sheets and Web sites

Disposal

Pesticide Disposal Options
Federal Laws - Pesticide
Disposal
Treated Seed
How to Deal with Label
Changes
Transporting Wastes
Reduce the Need for
Disposal
Web links/Fact Sheets

Drift

Types of Drift
Evaluate the Site
Evaluate the Weather
Understanding Droplet Size
Managing Drift with Nozzles
and Boom Height
More Drift Reduction
Methods
Air Blast Sprayers
Aerial Application
Resources

Water

Water Terminology
Pesticide Fate after
Application
The Problem of Runoff
The Problem of Leaching
Prevent Water

Welcome to Pesticide Stewardship.org

The purpose for the Pesticide Stewardship Web site is to provide convenient access to information on proper pesticide handling. Each topic printed in the menu bar above presents an overview of subject matter that has been written or compiled by specialists within the Cooperative Extension Service. The content of this Web site is intended for a national audience with links to state-specific compliance information, where available.



Crop producers, pesticide dealers, and commercial/professional applicators will benefit from the information presented in each topic, or module. Links to resources available on other Web sites or in print are presented in each module.

Acknowledgements

[About this web site](#)

A page acknowledging the authors of this site and the organizations that support them.

Environmental Stewardship sites

[Kids Stuff](#)

Projects, art and experiments to involve kids and students with environmental protection.

[Home owner pest and pesticide information](#)

When pests are found around your home or apartment, how can they be controlled safely? When and how should pesticides be used?



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Pesticide Environmental Stewardship

Promoting Proper Pesticide Use and Handling

Center for Integrated Pest Management.

[Acronyms](#) | [Homeowner](#) | [Comments](#) | [Feedback](#)[Groundwater/Surface water](#)[Drift](#)[Resistance](#)[Non-Target Organisms](#)[Transport](#)[Storage](#)[Application Equipment](#)[Pesticide Handling](#)[Disposal](#)[Application Records](#)[Container Recycling](#)[Resources and Training](#)[IPM](#)[STORAGE](#) [[<-Back](#)]

Pesticide Storage - Introduction

Storing pesticides properly protects human and animal health, safeguards wells and surface waters, and prevents unauthorized access to hazardous chemicals. Proper pesticide storage and inventory practices will also prolong the shelf-life of pesticides and make it easier to track your pesticide usage so that you can plan purchases for future years.

Reducing the amount of pesticide you store lowers the risk of chemical fires, explosions, or spills that contaminate well water, surface water or the soil. Make every effort to limit storage by buying only the amount of pesticide that you need for a specific job or for the current growing season. Purchase pesticides in refillable containers that can be returned if this can be arranged with your pesticide dealership.



The pesticide label is the best guide to storage requirements for every product. Some products should not be stored together. Some products have temperature or humidity restrictions. The Material Safety Data Sheet (MSDS) will give you additional information on normal appearance and odor as well as flash point, fire control recommendations, boiling point, and solubility. Labels and Material Safety Data Sheets for most pesticides are available on-line at <http://www.cdms.net> and <http://www.greenbook.net>

REFERENCES CITED:

Store Pesticides Safely, Pesticide Information Program Information Sheet, PIP-37. R.G. Bellinger. Sept. 2001. Clemson University Cooperative Extension Service.
<http://entweb.clemson.edu/pesticid/saftyed/PIP37sto.pdf>.

Pesticide Storage Facilities, FS603. G. M. Ghidui and G. C. Hamilton. Aug. 2001. Rutgers Cooperative Research & Extension.
<http://www.rcrc.rutgers.edu/pubs/publication.asp?pid=FS603>

Date Posted: 11/09/06



STORAGE [[<-Back](#)]

Storage Building and Location

Several options can be explored for storing pesticides. Large quantities of pesticides should be stored in a building designed specifically for that purpose. If you have moderate amounts of pesticides, you may store them in their own room or storage cabinet within a building, but not in a basement or other area likely to flood. The room should have a door that opens to the outside. Storage facility construction or the renovation of an existing building for storing pesticides requires considerable planning. When choosing a storage site, check on local building, zoning, and fire codes and environmental regulations before construction. Plans for construction should be reviewed by the local Fire Marshall or Fire Prevention Inspector.



Storage building designs, construction details and requirements, and engineering specifications for ventilation, heating, secondary containment, and site preparation can be found in the following sources:

On-Farm Agrichemical Handling Facilities, NRAES-78, 1995. David S. Ross and John W. Bartok, Jr. Natural Resource, Agriculture, and Engineering Service (NRAES). Cooperative Extension, Ithaca, NY. 24 pp. Order on-line: www.nraes.org ISBN 1-933395-09-5

Designing Facilities for Pesticide and Fertilizer Containment, MWPS-37, 1995. David W. Kammel, Ronald T. Noyes, Gerald L. Riskowski, and Vernon L. Hofman. MidWest Plan Service, Iowa State University, Ames, IA. 124 pp. Order on-line: www.mwps.org ISBN 0-89373-092-0

Building Plans and Management Practices for a Permanently-Sited Pesticide Storage Facility in Florida, SM 057, 1997. Thomas Dean and Ray Bucklin. University of Florida Cooperative Extension Service. 52 pp. Order on-line: www.ifasbooks.com (click on IFAS Extension Bookstore; 'Pesticides'; then 'Books') or call 1-800-226-1764.

Pesticide Storage & Mixing Facilities, 2002. Paul E. Sumner and Michael Bader. The University of Georgia, Cooperative Extension, Bulletin 1095, 16 pp. <http://pubs.caes.uga.edu/caespubs/pubcd/B1095.htm>

Pesticide Storage and Mixing Building, Midwest Plan Service, http://www.public.iastate.edu/~mwps_dis/mwps_web/ms_plans.html 5pp.



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[Acronyms](#) | [Homeowner](#) | [Comments](#) | [Feedback](#)

Groundwater/Surface water

Drift

[Resistance](#)

[Non-Target Organisms](#)

[Transport](#)

Storage

[Application Equipment](#)

[Pesticide Handling](#)

Disposal

Application Records

[Container Recycling](#)

[Resources and Training](#)

[IPM](#)

STORAGE [[<-Back](#)]

Storage Conditions

Most pesticide labels call for storage in a "cool, dry" place. For your safety, you should also provide adequate ventilation and light.

Temperature. The temperature inside the storage area should not get below 40 F or over 100 F. Some pesticides will freeze when they get too cold and the container may crack and leak. Freezing temperatures may cause some formulations to separate. Some pesticides expand when they get very hot. High temperatures also cause plastic to melt or become brittle and may cause a build up of pressure that may break glass containers or cause the chemicals to volatilize or spill out when the container is opened. Excessive heat may cause explosion or fire. Exhaust fans will help to reduce temperatures. Minimize fire hazards if you provide supplemental heating to the storage area.



Humidity. The storage area should be dry. High humidity causes some dry formulations to cake, clump, breakdown, or dissolve, and release pesticide, making them unusable and dangerous. Humidity also weakens paper and cardboard containers, and will eventually rust metal containers. It may cause labels to peel off or become unreadable.

Ventilation. The storage building needs constant ventilation to prevent the buildup of toxic fumes and to reduce humidity. Install louvered air **intake** vents low on the wall with the entrance door or in the lower part of the door and an exhaust fan or louvered air vents high on the opposite wall. This allows vapors to flow away from anyone entering or inside the storage unit and provides a continuous flow of air when the door is open. An exhaust fan will remove fumes, excess heat, and humidity better than passive airflow. Exhaust air from the storage room should be vented directly to the outside. Do not exhaust the air from a storage area into other rooms. Ventilation may be reduced in the winter so heat can be added to maintain 40oF in the storage facility.

Light. The storage area should be bright enough so that pesticide labels can be read easily. Do not store pesticides in direct sunlight because exposure to sunlight may cause pesticides to break down and become unusable.

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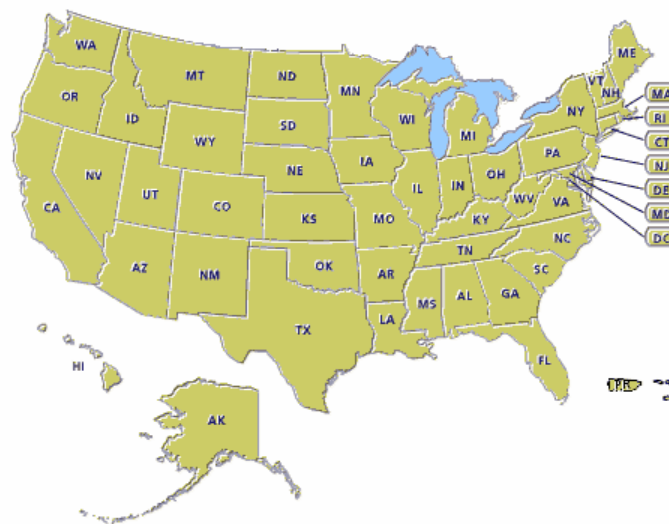
- Ground Water
- Surface Water
- Drift
- Resistance
- Non-Target Organisms
- Transport
- Storage**
- Application Equipment
- Pesticide Handling
- Disposal**
- Record-Keeping**
- Container Recycling
- Resources and Training
- IPM

Glossary | [Acronyms](#) | Homeowner | Comments | [Feedback](#)

STORAGE [[<-Back](#)]

Storage Laws and Regulations

For information about storage regulations in your state, contact your state's department of agriculture, natural resources, pesticide regulation, or environmental protection. A web link to the proper regulatory agency can be found by clicking on your state below.



Date Posted: 02/19/07



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Ground Water
Surface Water
Drift
Resistance
Non-Target Organisms
Transport
Storage
Application Equipment
Pesticide Handling
Disposal
Record-Keeping
Container Recycling
Resources and Training
IPM

[Glossary](#) | [Acronyms](#) | [Homeowner](#) | [Comments](#) | [Feedback](#)**STORAGE** [[<-Back](#)]**Pesticide Storage:**

- You usually store:**
 - ☐ no more than 1 gallon or 10 pounds of each pesticide.
 - ☐ more than 1 gallon or 10 pounds, but less than 55 gallons or 50 pounds of each pesticide.
 - ☐ more than 55 gallons or 50 pounds of each of several pesticides.
- Your pesticide storage area:**
 - ☐ is a roofed building with a waterproof (sealed or coated) concrete floor and curb to contain leaks and spills.
 - ☐ is roofed with a concrete floor and no curb
 - ☐ has a gravel or dirt floor or it is in the open.
- Your pesticide storage area:**
 - ☐ has an active (electrical) ventilation system.
 - ☐ has a passive ventilation system (holes or vents to provide cross ventilation).
 - ☐ has no ventilation.
- Your pesticide storage area:**
 - ☐ is more than 100 feet (horizontally) from a public water supply or surface waters and more than 50 feet from a private water supply well.
 - ☐ is within 100 feet of a public water supply or surface waters or within 50 feet of a well.
(1)
 - ☐ is in your well house or in a facility containing an unsealed well. (0)
- Your pesticide storage area:**
 - ☐ is locked or secured and separated from other activities
 - ☐ is secured, but sometimes open to activities that could damage containers or spill pesticides.
 - ☐ is not secure and is open to theft, vandalism, and children or other unauthorized persons.
- Your pesticide storage area:**
 - ☐ is used for pesticides only.
 - ☐ is sometimes also used for seed, fertilizer or other nonfood/nonfeed products.
 - ☐ is used to store human food or animal feed products.
- Unusable or cancelled pesticides:**
 - ☐ are kept separately in the pesticide storage area until safe disposal through your state's

- ☐ in plastic or metal containers. Containers in poor condition are placed inside another liquid-proof container.
- ☐ in some metal container that are deteriorating.
- ☒ in metal containers with holes or weak seams that may leak or are stored in containers that have previously been used for food, feed, beverages, or medicine

- ☐ stored in clearly labeled original containers.
- ☐ that have been transferred to another container with the following labeling information: common chemical name, percentage of each active ingredient, EPA registration number, signal word (Caution, Warning or Danger), and use classification (restricted-use or general-use).

- ☐ store with liquids on lower shelves below dry pesticides and herbicides separated from insecticides and fungicides.
- ☐ store with liquids below dry pesticides, but there is no separation of herbicides from insecticides and fungicides.
- ☐ store without sorting for liquids or type of pesticide.

- ☐ warning signs posted on all entrances to the storage area which read "Danger - Pesticide - Keep Out - No Smoking" (or similar wording).
- ☐ warning signs posted, but they have become weathered and are difficult to read.
- ☐ no warning signs.

- ☐ have a copy of your pre-fire plan for handling agricultural chemical fires at your storage area.
- ☐ are aware of your pesticide storage facility.
- ☐ do not know about your pesticide storage facility and have not visited your site.

- ☐ is up-to-date, has Material Safety Data Sheets (MSDS) for each product, and is kept at a central location.
- ☐ is not kept up-to-date (pesticides placed in storage in the last 6 mos. to a year are not recorded).
- ☐ is out-of-date or does not exist.

Reset

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Ground Water
Surface Water
Drift
Resistance
Non-Target Organisms
Transport
Storage
Application Equipment
Pesticide Handling
Disposal
Record-Keeping
Container Recycling
Resources and Training
IPM

[Glossary](#) | [Acronyms](#) | [Homeowner](#) | [Comments](#) | [Feedback](#)**STORAGE** [[<-Back](#)]**Storage - multiple choice questions and answers**

1. **A practical temperature range to maintain inside pesticide storage facilities is:**
 - a. ☐ 60 to 80o F
 - b. ☐ 40 to 100o F
 - c. ☐ 30 to 90o F
 - d. ☐ 50 to 110o F
2. **The best way to store pesticides is in:**
 - a. ☐ any empty pesticide container
 - b. ☐ glass bottles
 - c. ☐ any unbreakable container
 - d. ☐ the original, labeled container
3. **Which of the following is the LEAST important reason for proper ventilation of pesticides in storage:**
 - a. ☐ it prevents pests from entering the facility
 - b. ☐ it prevents the buildup of vapors
 - c. ☐ it helps reduce temperature and humidity in warm months
 - d. ☐ it helps to preserve labels on pesticide containers
4. **A pesticide storage facility should be**
 - a. ☐ at least 50 feet from a wellhead.
 - b. ☐ always located at the top of a hill to prevent flooding.
 - c. ☐ always in the basement.
 - d. ☐ located upwind from animal feeding stations.
5. **The floor of a pesticide storage facility should be**
 - a. ☐ unfinished wood because it is easier to sweep up spills.
 - b. ☐ compacted soil
 - c. ☐ concrete, plastic, or epoxy covered metal.
 - d. ☐ made of any material since pesticides are stored on pallets and not directly on the floor.
6. **Pesticide storage buildings should be well-ventilated, lighted, and protected from _____ extremes.**
 - a. ☐ pH
 - b. ☐ solar

Pages

Attachments

Comments

Pesticide Storage Checklist

Inspect your pesticide storage area regularly. If you answer “no” to any statements below, take immediate steps to correct the situation.

Date of Inspection: _____

	Yes	No	Yes	No	Yes	No
Safety						
Storage room locked.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Storage area signs posted with emergency contact information.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No Smoking signs posted.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Personal protective equipment stored nearby.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clean up supplies stored nearby.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Inventory is up to date and stored separately.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Labels and MSDS on file.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fire extinguisher in good working order.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

1 of 1

Done

Area is clean with no debris or combustibles.

☐ ☐ ☐ ☐ ☐ ☐

Floor is clear of spills or leaks.

☐ ☐ ☐ ☐ ☐ ☐

Pesticides stored off floor

☐ ☐ ☐ ☐ ☐ ☐

Storage area contains pesticides only--no feed, fertilizer or other materials.

☐ ☐ ☐ ☐ ☐ ☐

Container Inspection

Labels readable and attached to containers.

☐ ☐ ☐ ☐ ☐ ☐

Containers marked with purchase date.

☐ ☐ ☐ ☐ ☐ ☐

Insecticides, herbicides, and fungicides stored separately.

☐ ☐ ☐ ☐ ☐ ☐

Dry formulations stored separately or above liquid containers.

☐ ☐ ☐ ☐ ☐ ☐

Container caps are tightly closed.

☐ ☐ ☐ ☐ ☐ ☐

Used containers are rinsed and punctured.

☐ ☐ ☐ ☐ ☐ ☐

Adapted from "Pesticides and Their Proper Storage", Purdue Pesticide Programs, PPP-26



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Ground Water
Surface Water
Drift
Resistance
Non-Target Organisms
Transport
Storage
Application Equipment
Pesticide Handling
Disposal
Record-Keeping
Container Recycling
Resources and Training
IPM

[Glossary](#) | [Acronyms](#) | [Homeowner](#) | [Comments](#) | [Feedback](#)**DISPOSAL** [[<-Back](#)]**Introduction**

[Homeowners may participate in Household Hazardous Waste programs as described in the Homeowner section of this web site. The following information is intended for farmers and commercial applicators.]

If you use pesticides, at some point you are likely to need to dispose of unwanted pesticide, excess spray mixture, pesticide-treated products, or waste materials containing pesticides or their residues. Excess pesticide and rinsates that cannot be used must be disposed of as hazardous waste. Other pesticide wastes include contaminated soil, spill cleanup materials, and personal protective equipment (PPE) that cannot be cleaned and reused.


The pesticide user is responsible for the proper care of pesticides or pesticide-containing items until they can be properly disposed of. Failure to store such materials safely and dispose of them properly may result in serious harm to people, animals, and the environment. It may also result in legal action and penalties.

Any pesticide intended for disposal or collection must be in a correctly labeled container in good condition. Always wear proper protective clothing and equipment when handling pesticides or pesticide wastes.

References

1. How to Store, Handle, and Dispose of Agrichemical Pesticides. 1999. Paul Guillebeau and Mark Risse. University of Georgia Cooperative Extension Service. Circular 846.
2. Pesticide Disposal. Illinois Pesticide Safety Education Facts and Updates.
<http://www.pesticidesafety.uiuc.edu/facts/disposal.html>
3. 2007 North Carolina Agricultural Chemicals Manual. NC State University.
<http://ipm.ncsu.edu/agchem/agchem.html>

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Pesticide Environmental Stewardship
Promoting Proper Pesticide Use and Handling
Nationwide Poison Control Center
1-800-222-1222

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Glossary | [Acronyms](#) | Homeowner | Comments | [Feedback](#)

[Ground Water](#)
[Surface Water](#)
[Drift](#)
[Resistance](#)
[Non-Target Organisms](#)
[Transport](#)
[Storage](#)
[Application Equipment](#)
[Pesticide Handling](#)
[Disposal](#)
[Record-Keeping](#)
[Container Recycling](#)
[Resources and Training](#)
[IPM](#)

DISPOSAL [[<-Back](#)]

State Programs

State Program Contacts for Collection of Unusable Agricultural Pesticides (Clean Sweep Programs):
http://tpsalliance.org/state_programs.html

Date Posted: 02/22/07



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[Acronyms](#) | [Homeowner](#) | [Comments](#) | [Feedback](#)

Groundwater/Surface water

- Drift**
- Resistance*
- Non-Target Organisms*
- Transport*
- Storage**
- Application Equipment*
- Pesticide Handling*
- Disposal**
- Application Records**
- Container Recycling*
- Resources and Training*
- IPM*

GROUNDWATER/SURFACE WATER

- Introduction**
- Common groundwater and surface water terms**
- Understanding the Fate of Pesticides after Application**
- The Problem of Runoff**
- The Problem of Leaching**
- How to Prevent Water Contamination**
- Wells and Groundwater Contamination**
- References**

Compiled by *Ronald D. Gardner*



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[Acronyms](#) | [Homeowner](#) | [Comments](#) | [Feedback](#)

Groundwater/Surface water

Drift

[Resistance](#)

[Non-Target Organisms](#)

[Transport](#)

Storage

[Application Equipment](#)

[Pesticide Handling](#)

Disposal

[Application Records](#)

[Container Recycling](#)

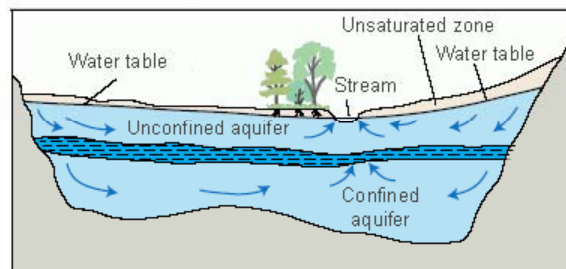
[Resources and Training](#)

[IPM](#)

GROUNDWATER/SURFACE WATER [[<-Back](#)]

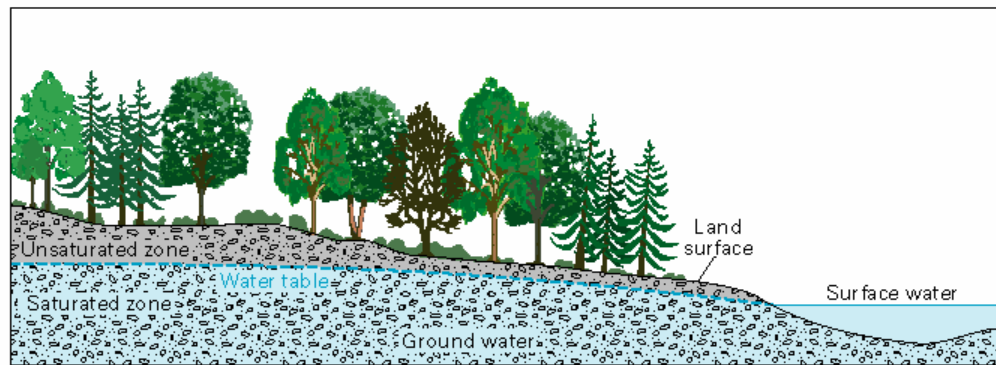
Common groundwater and surface water terms

Aquifer: the water-saturated mass of gravel, rocks, or earth that transmits water freely. This subsurface zone has enough water stored in it to be tapped with a well. Its water content may be great enough to supply fresh drinking water. Most rural homes depend on well water. Some cities also depend on aquifers for their water supplies.



The **saturated zone**: where all the subsurface spaces or pores in the soil are filled with water. The bottom of the saturated zone may be dense bedrock that allows little water to penetrate further downward.

The **water table**: the top of the saturated zone. The water table moves up and down with the seasons and with water usage.





Pesticide Environmental Stewardship

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[Acronyms](#) | [Homeowner](#) | [Comments](#) | [Feedback](#)

Groundwater/Surface water
Drift
<i>Resistance</i>
<i>Non-Target Organisms</i>
<i>Transport</i>
Storage
<i>Application Equipment</i>
<i>Pesticide Handling</i>
Disposal
Application Records
<i>Container Recycling</i>
<i>Resources and Training</i>
<i>IPM</i>

DRIFT
Introduction
Types of Drift
Evaluate the Site
Evaluate the Weather Conditions
Managing Spray Drift: Boom Height and Spray Nozzles
Other Drift Reduction Technologies
Air Blast (orchard) sprayers
Aerial Application
Resources
References

Compiled by *Jim Wilson, PhD*



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[Acronyms](#) | [Homeowner](#) | [Comments](#) | [Feedback](#)

[Groundwater/Surface water](#)

[Drift](#)

[Resistance](#)

[Non-Target Organisms](#)

[Transport](#)

[Storage](#)

[Application Equipment](#)

[Pesticide Handling](#)

[Disposal](#)

[Application Records](#)

[Container Recycling](#)

[Resources and Training](#)

[IPM](#)

APPLICATION RECORDS

Pesticide Application Recordkeeping - Introduction

Private Applicator Record Requirements

Learn how USDA Agricultural Marketing Service regulates private applicator recordkeeping for restricted-use pesticide applications and how some states have modified the USDA requirements. Access USDA or your own state's recordkeeping form(s).

All Other Certified Applicator Record Requirements

Most states have implemented their own recordkeeping requirements for all other certified pesticide applicators (excluding private applicators); requirements are based on EPA requirements for restricted-use pesticide applications.

Beyond the Requirements: Smart Items that Should Be Recorded

Consider adding to your records many of the "smart items" that some states require or professional applicators have found to be very useful.

Records Inspections by Regulators and Health Professionals

Discover the reasons for inspections and the procedures used by USDA, EPA, state, and tribal compliance monitoring staff and medical personnel.

Benefits of Recordkeeping

Explore the benefits from recording detailed information about your pesticide application and your pest management system.

Application Record Self Assessment Tool

Test Your Knowledge about Pesticide Recordkeeping

Recordkeeping Fact Sheets and Web Sites

Compiled by *Carol Ramsay*

Introducing...

The Pesticide Environmental Stewardship (PES) Web Site

A central repository for detailed, up-to-date information, educational modules, and self-assessment tools.

PES Web Site Goals:

- **Summarize principles of pesticide stewardship;**
- **Provide category-, pesticide-, and geography-specific stewardship principles where appropriate (e.g., minimizing drift with aerial application, avoiding resistance to specific fungicides, protection of water bodies near highly erodible lands);**
- **Identify and review key state bulletins and other resources;**
- **Direct users to resources (links), by stewardship topic, category of use, pesticide, and location (including state-specific regulations); and,**
- **Develop educational modules (with pre- and post-testing analysis) and self-assessment tools to improve critical thinking and decision-making skills regarding pesticide/non-pesticide options and potential impacts.**