

Water is a vital resource for all life.

It is vulnerable to contamination by pesticides. This brochure provides information for pesticide applicators, who are responsible for protecting water quality through:

- Understanding the relationship between pesticides, soils, and water.
- Learning how to properly apply pesticides to protect water resources.
- Using best management practices at all times.



Clay



Loam



Sand



Silt

Soil Types and Water

- **Sandy soils** don't hold water very well, allowing pesticides and water to move more easily through the spaces between soil particles and reach groundwater.
- **Clay soils** can hold water longer and readily form surface puddles of pesticides, which can runoff to surface water.
- **Silty soils** are made of silt particles that are sized somewhere between sand and clay. Depending on the particle size, they can be a risk for either surface water runoff or groundwater contamination.
- **Loamy soils** are made of a mixture of sand, clay, and silt. For example, soil that has more sand than clay and silt is called sandy loam. These mixed soils behave differently depending on how much sand, clay, or silt is present.

Resources

- WSDA's Technical Services and Education Program provides comprehensive technical education on pesticide handling and application in English and Spanish. For more course information and the training calendar, go to agr.wa.gov and search for "pesticide technical assistance" through the "Let's Find It" box.
- The Technical Services and Education Program also collects unusable pesticides from residents, farmers, small businesses, and public agencies free of charge. Visit agr.wa.gov/WastePesticide to learn about waste pesticide collection events.
- WSDA's Natural Resources Assessment Section has been monitoring salmonid-bearing streams across the state to evaluate pesticide concentrations since 2003. Visit agr.wa.gov/AgScience and go to the publications page to view the online dashboard, fact sheets, and technical reports that present the pesticide and water quality data.
- The Washington State Department of Fish and Wildlife maintains an interactive mapping application that displays salmon distribution, status, and habitat data. Visit apps.wdfw.wa.gov/salmonscape/ to learn if a stream near your application site might provide habitat for salmon.



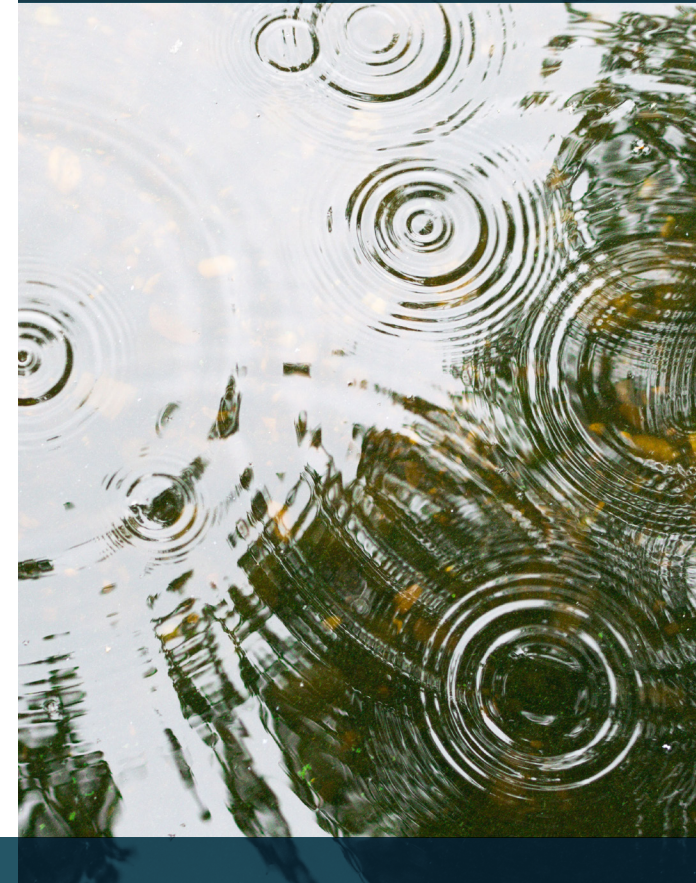
For information on pesticides found in Washington water bodies, visit the Natural Resources Assessment Section website: agr.wa.gov/AgScience

For information on pesticides and regulation, visit the Pesticide Management Division website: agr.wa.gov/departments/pesticides-and-fertilizers

Do you need this publication in an alternate format? Please call the WSDA Receptionist at 360-902-1976 or TTY 800-833-6388.

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Pesticide Application and Water Quality



Washington
State Department of
Agriculture

Natural Resources Assessment Section

Relationship between Pesticides, Soils, and Water

Pesticide properties, soil properties, and application site conditions affect how likely it is that water will carry pesticides away from the application site, either through the soil to groundwater or with runoff to surface water.

Important Pesticide Properties

- **Solubility** is how easily a pesticide dissolves in water. Soluble pesticides are more likely to dissolve and contaminate surface water and groundwater.
- **Adsorption** is how strongly a pesticide sticks to soil particles. Pesticides that strongly stick to soil are more likely to stay on the application site if the soil is not eroded by wind or rain.
- **Volatility** is how quickly a pesticide evaporates after application. Volatile pesticides evaporate quickly and are less likely to contaminate surface water and groundwater.
- **Degradation** is how quickly a pesticide is broken down by microorganisms or chemical reactions. Pesticides that degrade quickly become less available to contaminate surface water and groundwater.

Important Soil Properties

- **Texture** refers to the proportion of small (clay), medium (silt), and large (sand) particles in the soil. Runoff to surface water is more likely from soils with more clay. Leaching to groundwater is more likely from soils with more sand.
- **Organic matter content** is how much organic matter is in the soil. Soil with a lot of organic matter can hold water and pesticides better, reducing off-target movement.
- **Permeability** is how quickly water can flow downward through soil. Highly permeable soils are more likely to allow pesticides to leach to groundwater.
- **Structure** is how loosely or tightly packed soil particles are. Loosely packed soils are more likely to allow pesticides to leach to groundwater.

Practices to Protect Water Resources

Understand Important Site Conditions

- Locate nearby water bodies and wells.
- Learn the depth to the water table.
- Learn the soil type and slope of the land.
- Look up current and predicted weather conditions.
- Learn about the subsurface geology.

Carefully Choose and Apply Pesticides

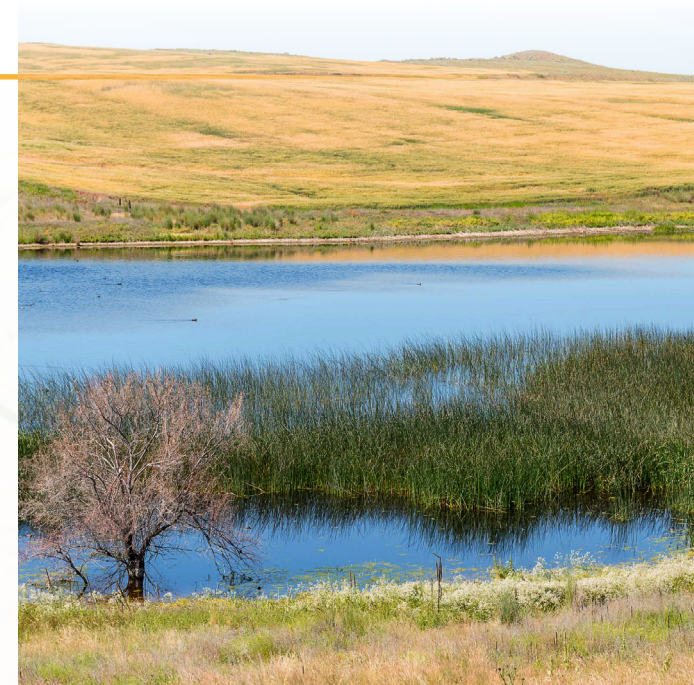
- Read the product label to choose the:
 - Pesticide that best controls the target pest.
 - Pesticide that is least harmful to aquatic life.
 - Application method that keeps the pesticide within the target area.
- Check the product label for advisories or restrictions for water resource protection.
- Follow all directions on the product label.

Prevent or Minimize Drift, Runoff, and Leaching

- Don't apply pesticides in windy or rainy conditions.
- Set the boom height as close as possible to the target.
- Select the correct pesticide formulation for the type of application, given site and soil conditions.
- Be aware of applications next to impervious surfaces, such as sidewalks and roads.
- Use buffers - which can intercept drift and runoff - between field crops and surface water bodies.
- Apply the pesticide at the rate required by the label.
- Use spot applications rather than broadcast applications when possible.
- Avoid irrigating saturated soils before applying pesticides.

Calibrate Often and Use Correct Nozzles

- Calibrate application equipment before making pesticide applications.
- Check calibration frequently to make sure pesticides are delivered at the proper rate.
- Use the right nozzle for the job and replace nozzles that are too small, too large or worn.
- Operate nozzles at the right pressure.
- Be aware that unnecessarily high pressure increases nozzle wear and the possibility of pesticide drift.



Prevent Spills and Back-Siphoning

- Avoid mixing and loading pesticides near wells and other water sources.
- Clean up pesticide spills immediately.
- Use approved anti-pollution devices on all chemigation equipment. Device requirements are listed on the product label and in the state Chemigation Rule (Washington Administrative Code 16-202).

Dispose of Pesticides and Containers Properly

- Remember it is illegal to dispose of pesticides improperly.
- Follow the product label instructions for pesticide and container disposal.
- Triple-rinse liquid containers, then puncture the top and bottom, and crush flat.
- Recycle pesticide containers when possible. Check your local resources for pesticide container recycling, or visit agriplasinc.com to learn about Agri-Plas, Inc's program for collecting, sorting, and processing triple-rinsed pesticide containers.
- Do not bury pesticide containers.