

Preventing Water Contamination and Pesticide Drift: A Checklist for Pesticide Applicators

EM 8964 • November 2015

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Introduction

To prevent harm or damage to unintended targets when applying pesticides, it is important to avoid water contamination and pesticide drift. This checklist will help you remember what to do before, during, and after a pesticide application to prevent water contamination and pesticide drift.

You can modify the checklist to fit your operation. For example, if there is a decision or step that does not apply to you, check “No” in the column for “Does this apply to you?” and leave the rest of the row empty. There also are blank rows where you can add decisions or steps, if necessary.

If the answer to the “Does this apply to you?” column is “Yes,” describe when and how often the decision or step will be made in the “Comments” column. In the case of a permanent change, such as establishing a buffer zone, write when you did it or plan to do it.

In the “Who does it?” column check all the people involved in completing a decision or step. If more than one person is involved, explain who is responsible for doing what in the “Comments” column.

Note: Pages 1–3 describe the decisions and steps for avoiding water contamination and pesticide drift. These descriptions include more detail than the checklist on pages 4–13. You may want to use some of the details from the following descriptions to customize the checklist to fit your operation.

Prevent harm to people and organisms

- Follow the information on the pesticide label to protect pollinators and beneficial organisms, endangered species, and other plants and animals.
- If the pesticide can harm natural enemies of crop pests, leading to secondary pest outbreaks, consider selecting a pesticide with lower natural enemy impacts.
- Refer to the label and contact your local Extension agent or the Oregon Department of Agriculture (ODA) to see if there are endangered species (plant or animal) that require protection from your application.
- Train applicators (workers) to correctly identify and monitor for pests (such as weeds, diseases, and insects) and natural enemies (such as



ladybugs, hoverflies, and lacewings) to make sure that a pesticide application is even necessary. (For more information, see “Farmscaping for Beneficials” at http://ipmnet.org/BeetleBank/Farmscaping_for_Beneficials.html.)

- Ask your neighbors about activities (such as picnics and workers in fields) or events that may affect your pesticide application. Consider setting up a neighbor notification program.
- Provide notification of restricted-entry interval (REI) as required by the Worker Protection Standard and the Oregon Occupational Safety and Health Administration (OR-OSHA).
- Note the pre-harvest interval and plantback restrictions indicated on the pesticide label.
- Make sure you have proper Personal Protective Equipment (PPE) and decontamination supplies for mixing, loading, and applying pesticides, as well as post-application equipment for cleanup

and tank flush, as required on the label, the Worker Protection Standard, and OR-OSHA.

- Monitor treatment areas after application to see that target pests were controlled, and nontarget organisms (such as crops) were not affected.

Know your site, know your pesticides

- Identify dwellings, schools, buildings, commercial areas, parks, playgrounds, jogging/exercise trails, roads, crops, and waterways that are near the application site. Establish buffer zones for these and other sensitive areas. Make a map of these areas and review it with applicators.
- Know your soil type and texture. Some herbicides have different application rates depending on soil type and organic matter content. This information will be noted on the label.
- Contact the Oregon Department of Environmental Quality (DEQ) to see if your application site is in a Groundwater Management Area. If it is, ask DEQ what you should do.
- A National Pollutant Discharge Elimination System (NPDES) permit is required by DEQ for pesticide use in, over, or near surface water. Contact DEQ for more information.
- Choose pesticides labeled for the crop or site. Use the proper application rate.
- Choose pesticides that are least likely to leach, runoff, or move with soil.
- Know the product-specific information about particle drift, vapor drift, buffers, solubility, runoff prevention, soil type, toxicity, or other

hazards identified on the product label or Safety Data Sheet (SDS).

- Every year, train applicators and decision makers (such as farm managers and supervisors) to read and understand labels of the pesticides used on the farm.
- Keep records required by ODA, OR-OSHA, the Environmental Protection Agency (EPA), and the United States Department of Agriculture (USDA).
- For unusable pesticide wastes, follow DEQ's regulations (OAR 340-109, summarized in a fact sheet at <http://www.deq.state.or.us/lq/hw/pesticide.htm>) and deliver to an appropriate collection event or disposal facility. Check with ODA or DEQ for information on upcoming collection events.

Prepare your site to prevent pesticide runoff

- Use cover crops and crop residues to minimize runoff and erosion from storms and irrigation.
- Use grassed waterways, sediment ponds, and filter strips to control sediment carried by runoff.
- Use a tailwater recovery and re-use system.
- Construct sumps to settle out sediment from irrigation or storm runoff. Combine these with sediment ponds.

Pre-application check of equipment

- Follow the manufacturer's recommendations for routine equipment maintenance.
- Check pumps, hoses, hose connections, valves, and seals for splits, cracks, or leaks.

- Check for missing filter elements and seals.
- Check for blocked or damaged filters.
- Check the tank for damage. Make sure the tank sits firmly in its mount. Make sure the agitator works properly.
- Check the sprayer control for correct operation.
- Check pump lubrication levels. Check that the pump rotates freely without friction or noise.
- Check the oil level for the drive gearbox.
- Check fans for damage and lubrication.
- Check the sprayer calibration at the beginning of the season. In addition, check the nozzle output at least twice per season. Replace individual nozzles when output exceeds 10 percent of specified output.
- If using an airblast sprayer, adjust nozzles to target the trees, vines, or bushes.
- For boom sprayers, check the nozzle pattern to ensure proper overlap.

Mixing and loading

- Locate the mixing/loading site more than 100 feet from wells and surface water sources, or as directed on the label.
- Make sure the mixing/loading site has a nonporous surface.
- Construct a berm around low-lying wellheads to prevent surface water from contaminating the wells.
- Obtain the necessary supplies to contain spills (such as absorbent materials, shovel and broom, cleaning supplies, and holding containers). See the SDS for specifics related to each product you are using.

- Have your emergency response plan ready and posted, including water and first aid supplies. Make sure applicators are trained to follow the plan.
- Obtain proper materials and equipment for cleaning the sprayer and PPE.
- Obtain clean water for mixing. Test pH when applying pesticides that require a specific pH range.
- Obtain the necessary measuring and mixing equipment.
- Obtain suitable application equipment for the job. Consider things such as tank capacity, pressure range, volume of output, nozzle size, and whether the pump is compatible with the formulation type.
- When filling the tank, use a 6-inch air gap, closed system, or anti-siphon device to prevent backflow.
- Use a drift reduction agent, if appropriate.
- Carefully calculate the amount of spray solution needed. Mix only enough spray solution for the application.
- Triple rinse empty containers into the spray tank.

Application

- Consult the weather forecast when planning applications.
- Consider postponing application if heavy rains are in the forecast. (*Note: Pesticides should never be applied to water-saturated or frozen ground.*)
- Monitor weather conditions at the time of application. Stay within the temperature range indicated on the label.

- Use a wind gauge or windsock to monitor wind conditions during application. Stop spraying when wind conditions favor drift to sensitive areas.
- Turn off nozzles at the end of rows.
- When spraying orchards, vineyards, or other vine or bush crops with airblast sprayers, make all efforts to eliminate drift near the edge of the field adjacent to sensitive areas.
- When spraying rows parallel to sensitive areas, spray only the outside of the outer two to three rows. Spray inward at a lower speed for improved coverage.
- When spraying rows perpendicular to sensitive areas, turn off nozzles 10 to 20 feet from the end of each row. Return and spray the ends of the rows from the edge of the field, spraying inward at a lower speed.

Post-application equipment cleanup and tank flush

- Apply leftover spray solution to a site or crop permitted on the pesticide label.
- Locate the cleanup site far away from wells or other direct channels to water. Read the label for more specific information. If you are unsure, ask ODA for guidance.
- Use neutralizer, if needed, when rinsing the tank. Read the label for instructions.
- Apply rinsates (from the cleaned spray tank and from triple rinsing containers) to sites allowed on the label.
- Recycle or dispose of clean empty containers according to state and local regulations.

Storage

- Review OR-OSHA's storage rules for agricultural chemicals. (*Note: They are more detailed than what is listed below.*)
- Always store pesticides according to the label.
- Consider purchasing only the amount of pesticide to be used in the near future to minimize the amount in storage and avoid the possibility of obsolete stocks.
- Do not store pesticides near fertilizer, animal feed, or livestock bedding.
- Do not store damaged containers.
- Store liquid products below dry products.
- Locate the storage site far away from the nearest well.
- Make sure the storage site has a nonpourous floor, adequate lighting, proper ventilation, and temperature controls.
- Make sure storage facilities are securely locked and posted with correct hazard signs.
- Make sure a major leak (for example, if all the containers leak at once) could be contained.
- Keep records of what is in the storage facility. Records are useful in case of theft or fire. Store records in an office or a location away from the storage facility.

BEFORE an application: General pre-application

| Decision/Step | Does this apply to you? <i>(If yes, describe when and how often the decision/step will be done in "Comments.")</i> | | Who will do it? <i>(Check all that apply. If more than one person is involved, describe who does what in "Comments.")</i> A=Applicator S=Supervisor F=Fieldman | | | Comments |
|---|---|----|--|---|---|----------|
| | YES | NO | A | S | F | |
| Know soil types and soil texture. Use this knowledge in making decisions, especially about herbicide use. | | | | | | |
| Use cover crops, tailwater recovery and re-use system, and/or other methods to minimize runoff from storms and irrigation. | | | | | | |
| Establish buffer zones for sensitive areas as required on the label, and by the Department of Environmental Quality (DEQ) and other regulations. | | | | | | |
| If you are unsure about sensitive sites, pollinators, endangered species, and/or other plants and animals, contact your local Extension agent or Oregon Department of Agriculture (ODA) for help. | | | | | | |
| Make a simple map of all structures, public areas, waterways, and other crops and land features. Include drainage patterns. Share and explain the map to applicators. | | | | | | |
| Construct sumps at site drainage exit points to settle out sediment from irrigation and storm runoff. | | | | | | |
| Establish berms around low-lying wellheads to prevent surface water from contaminating the wells. | | | | | | |
| Make sure the mixing/loading site has a nonporous surface. | | | | | | |

(General pre-application, continued on next page)

BEFORE an application: General pre-application (cont.)

| Decision/Step | Does this apply to you? <i>(If yes, describe when and how often the decision/step will be done in "Comments.")</i> | | Who will do it? <i>(Check all that apply. If more than one person is involved, describe who does what in "Comments.")</i> A=Applicator S=Supervisor F=Fieldman | | | Comments |
|--|---|----|--|---|---|----------|
| | YES | NO | A | S | F | |
| Make sure the mixing/loading site is at least 100 feet from wells and other water sources. <i>(Note: This is a recommendation, not a requirement.)</i> | | | | | | |
| Make sure the applicator is trained annually on all pesticides used on the farm, and that records are kept of this training. | | | | | | |
| Make sure the applicator knows wind characteristics at the application site. | | | | | | |
| Obtain suitable application equipment for the job (for example, check tank capacity, pressure range, volume of output, nozzle size, and whether the pump is compatible with the formulation type). | | | | | | |
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BEFORE an application: Choose pesticide and review the label

| Decision/Step | Does this apply to you? <i>(If yes, describe when and how often the decision/step will be done in "Comments.")</i> | | Who will do it? <i>(Check all that apply. If more than one person is involved, describe who does what in "Comments.")</i> A=Applicator S=Supervisor F=Fieldman | | | Comments |
|---|---|----|--|---|---|----------|
| | YES | NO | A | S | F | |
| Check if the pesticide is registered for use on the crop. | | | | | | |
| Check for special precautions indicated on the label and Safety Data Sheet (SDS). | | | | | | |
| Choose pesticides with a low likelihood of leaching or runoff. | | | | | | |
| Determine the proper application rate. | | | | | | |
| Note restricted-entry interval. | | | | | | |
| Note pre-harvest interval. | | | | | | |
| Note plantback restrictions. | | | | | | |
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BEFORE an application: Consider weather conditions

| Decision/Step | Does this apply to you? <i>(If yes, describe when and how often the decision/step will be done in "Comments.")</i> | | Who will do it? <i>(Check all that apply. If more than one person is involved, describe who does what in "Comments.")</i> A=Applicator S=Supervisor F=Fieldman | | | Comments |
|---|---|----|--|---|---|----------|
| | YES | NO | A | S | F | |
| Look at the weather forecast when scheduling an application. | | | | | | |
| Consider postponing application if heavy rains are likely. | | | | | | |
| Check the label for application temperature restrictions. | | | | | | |
| Check the wind speed with a wind gauge. Consider postponing if winds favor drift to sensitive areas or if there is no wind (temperature inversion). | | | | | | |
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BEFORE an application: Pre-application check of equipment

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| Check all hoses and hose connections for splits, cracks, and leaks. | | | | | | |
| Check for missing filter elements and seals. Check for blocked or damaged filters. | | | | | | |
| Check the tank for damage. Check to make sure the tank sits firmly in its mount. | | | | | | |

(Pre-application check of equipment, continued on next page)

BEFORE an application: Pre-application check of equipment (cont.)

| Decision/Step | Does this apply to you? <i>(If yes, describe when and how often the decision/step will be done in "Comments.")</i> | | Who will do it? <i>(Check all that apply. If more than one person is involved, describe who does what in "Comments.")</i> A=Applicator S=Supervisor F=Fieldman | | | Comments |
|---|---|----|--|---|---|----------|
| | YES | NO | A | S | F | |
| Check to make sure the agitator is working properly. | | | | | | |
| Check valves for leaks. | | | | | | |
| Check pump lubrication levels. Check the pump for leakage. Check to make sure the pump rotates freely without friction or noise. | | | | | | |
| Check the oil level for the fan drive gearbox. | | | | | | |
| Calibrate the sprayer at the beginning of the season. | | | | | | |
| Check the nozzle output at least twice per season. Replace individual nozzles when output exceeds 10 percent of specified output. | | | | | | |
| For airblast sprayers, adjust nozzles to target the trees. | | | | | | |
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BEFORE an application: Mixing/loading

| Decision/Step | Does this apply to you? <i>(If yes, describe when and how often the decision/step will be done in "Comments.")</i> | | Who will do it? <i>(Check all that apply. If more than one person is involved, describe who does what in "Comments.")</i> A=Applicator S=Supervisor F=Fieldman | | | Comments |
|--|---|----|--|---|---|----------|
| | YES | NO | A | S | F | |
| Make sure your emergency response plan is ready and posted; water and first aid supplies are available; and applicators are trained to follow the plan. | | | | | | |
| Make sure necessary supplies to contain spills or leaks (such as absorbent materials, cleaning supplies, and holding containers) are available and nearby. | | | | | | |
| Obtain a source of clean water for mixing. | | | | | | |
| Test the pH of water. <i>(Note: The effectiveness of some pesticides is affected by pH.)</i> | | | | | | |
| Use a 6-inch air gap, anti-siphon device, or closed system when filling the spray tank. | | | | | | |
| Obtain the necessary measuring and mixing equipment. | | | | | | |
| Use drift reduction agents when possible. | | | | | | |
| Triple rinse empty containers into spray tank. | | | | | | |
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DURING an application

| Decision/Step | Does this apply to you? <i>(If yes, describe when and how often the decision/step will be done in "Comments.")</i> | | Who will do it? <i>(Check all that apply. If more than one person is involved, describe who does what in "Comments.") A=Applicator S=Supervisor F=Fieldman</i> | | | Comments |
|---|---|----|---|---|---|----------|
| | YES | NO | A | S | F | |
| Have another person monitor the application for drift and make sure that no vehicles or people come close to the application site. | | | | | | |
| Stay within the temperature range indicated on the label. | | | | | | |
| Use a wind gauge or windsock to monitor wind speeds. <i>(Note: Application should be stopped if wind speed and direction favor drift onto sensitive site.)</i> | | | | | | |
| When spraying orchards, vineyards, or other vine or bush crops with airblast sprayers, make all efforts to eliminate drift near the edge of the field adjacent to sensitive areas. (See next steps below.) | | | | | | |
| Adjust nozzles to target the trees, vines, or bushes. | | | | | | |
| Turn off nozzles at end of rows | | | | | | |
| When spraying rows parallel to sensitive areas, spray only the outside of the outer two to three rows. Spray inward at a lower speed for improved coverage. | | | | | | |
| When spraying rows perpendicular to sensitive areas, turn off nozzles 10 to 20 feet from the end of each row. Return and spray the ends of the rows from the edge of the field, spraying inward at a lower speed. | | | | | | |
| Leave an unsprayed buffer between application site and any body of water that might drain into a river or tributary. | | | | | | |
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AFTER an application: Post-application equipment cleanup and tank flush

| Decision/Step | Does this apply to you? <i>(If yes, describe when and how often the decision/step will be done in "Comments.")</i> | | Who will do it? <i>(Check all that apply. If more than one person is involved, describe who does what in "Comments.")</i> A=Applicator S=Supervisor F=Fieldman | | | Comments |
|--|---|----|--|---|---|----------|
| | YES | NO | A | S | F | |
| Locate cleanup site far away from wells, ponds, creeks, and other sources of water, as required on the label and by state regulations. | | | | | | |
| Apply the leftover spray solution to a site or crop permitted on the pesticide label. | | | | | | |
| Apply rinsates (from cleaned spray tank and from triple rinsing containers) to sites allowed on the label. | | | | | | |
| Make sure empty containers are triple-rinsed, and recycle or dispose of them according to state and local regulations. | | | | | | |
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AFTER an application: Storage

| Decision/Step | Does this apply to you? <i>(If yes, describe when and how often the decision/step will be done in "Comments.")</i> | | Who will do it? <i>(Check all that apply. If more than one person is involved, describe who does what in "Comments.")</i> A=Applicator S=Supervisor F=Fieldman | | | Comments |
|--|---|----|--|---|---|----------|
| | YES | NO | A | S | F | |
| Review OR-OSHA's storage rules for agricultural chemicals. | | | | | | |
| Follow label requirements for product storage. | | | | | | |
| Make sure the storage site is securely locked, ventilated, and adequately lighted. | | | | | | |
| Store liquid products below dry products. | | | | | | |
| If you have leaky containers, DO NOT STORE THEM! Contact DEQ for help. | | | | | | |
| Store empty containers in a locked area. | | | | | | |
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ADDITIONAL decisions/steps specific to your operation

| Decision/Step | Does this apply to you? <i>(If yes, describe when and how often the decision/step will be done in "Comments.")</i> | | Who will do it? <i>(Check all that apply. If more than one person is involved, describe who does what in "Comments.")</i> A=Applicator S=Supervisor F=Fieldman | | | Comments |
|---------------|---|----|--|---|---|----------|
| | YES | NO | A | S | F | |
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Use pesticides safely!

- Wear protective clothing and safety devices as recommended on the label. Bathe or shower after each use.
- Read the pesticide label—even if you've used the pesticide before. Follow closely the instructions on the label (and any other directions you have).
- Be cautious when you apply pesticides. Know your legal responsibility as a pesticide applicator. You may be liable for injury or damage resulting from pesticide use.

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Published May 2008. Revised November 2015.