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Preventing Water Contamination and Pesticide Drift

A Checklist for Pesticide Applicators



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A Checklist for Pesticide Applicators

T. Stock

Introduction

When applying pesticides it is important to avoid water contamination and pesticide drift as much as possible. This checklist can help. Three separate checklists (Before, During, After) make it easier to remember things to do before, during, and after an application to avoid contamination and drift.

The checklists can be modified and “customized” to fit your particular operation. If there is a decision or step that does not apply to you, cross it out. There also are blank spaces to add decisions or steps if necessary.

For some decisions or steps, if more than one person is involved, you can make checks in more than one column. Explain who is responsible for what in the “Comments” column.

The “When” column should include comments about the frequency of the decision or step, or in the case of a permanent change such as establishing a buffer zone, when it was done or will be done.

These first two pages give a more exhaustive list than what is in the checklists. You may find practices here that you want to add to your individualized checklists.

General

Every year, train applicators and decision makers to read and understand labels of pesticides used on the farm. Include these points in the training:

- Specifically train applicators (workers) to correctly identify and monitor for pests (weeds, diseases, insects, etc) and beneficial organisms (ladybugs, hoverflies, lacewings, etc.) to make sure that a pesticide application is even necessary (see “Farmscaping for Beneficials” link at ipmnet.org for more info on beneficials).
- Is the crop or site to be treated on the pesticide label?
- Is the pesticide you are going to use the least likely to leach, runoff or move with soil?
- Know your soil type and water-holding capacity. Some herbicides have different application rates depending on soil type and organic matter content, and this will be noted on the label.
- 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 Material Safety Data Sheet (MSDS).
- Are you using the proper application rate?
- Note the restricted-entry interval (REI), pre-harvest interval, and plantback restrictions.
- Are there endangered species (plant or animal) that may need protection from your application?
- Consider the information in the Precautionary Statement section of the pesticide label

to protect bees, beneficial organisms or other sensitive sites.

- Consider if the pesticide will harm beneficial organisms and cause possible secondary pest outbreaks.
- Consider weather conditions. Do not apply if wind is over 10 mph (use a wind gauge). If there is no wind you may have a temperature inversion; if so, do not apply. Stay within temperature range. Do not apply in rain or fog.
- 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 sensitive areas. Draw a map, and review it with applicators.
- * Note that pesticides should never be applied to water-saturated or frozen ground. No applications are legal on top of snow.
- Contact the Oregon Department of Environmental Quality (DEQ) to see if your application site is in a Groundwater Management Area. If yes, ask what you should do.
- Use cover crops and crop residues to minimize runoff from storms and irrigation.
- Use grassed waterways, sediment ponds, and filter strips to control sediments carried by runoff.
- Construct sumps to settle out sediment from irrigation or storm runoff. Combine these with sediment ponds.
- Ask your neighbors about activities (picnics, workers in fields, etc.) or events that may affect your pesticide application. Consider setting up a neighbor notification program.

Tim Stock, Instructor, Environmental and Molecular Toxicology, and Extension IPM Education Specialist, Integrated Plant Protection, Oregon State University.

Pre-application check of equipment

- 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 tank for damage. Make sure tank sits firmly in its mount. Make sure the agitator works properly.
- Check the control circuitry for correct operation.
- Check pump lubrication levels. Check to see that the pump rotates freely without friction or noise.
- Check for drive gearbox oil level.
- Check rotary atomizers for damage and lubrication.
- Check nozzle output and spray patterns and replace all nozzles at least once per season.
- If using an airblast sprayer, adjust nozzles to target the trees.
- Install and check deflector shield if using a tower sprayer.
- Make sure the application equipment is properly calibrated. Calibrate at least twice per season.

Mixing and loading

- Make sure you have proper Personal Protective Equipment (PPE).
- Make sure you have cleanup equipment for PPE, sprayer, etc.
- Obtain clean water for mixing. Test pH when applying pesticides that require a specific pH range.
- Make sure you have the necessary measuring and mixing equipment.
- Make sure you have suitable application equipment for this job (tank capacity, pressure range, volume of output, nozzle size, pump compatible with 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.
- Locate the mixing/loading site more than 100 feet from wells and surface water sources or as directed by the label.
- Construct a berm around low-lying wellheads to prevent surface water from contaminating the wells.
- Make sure the mixing/loading site has a non-porous surface.
- Have your emergency response plan ready and posted, including water and first aid supplies. Make sure applicators are trained to follow the plan.
- Make sure you have the necessary supplies to contain spills (absorbent materials, shovel and broom, cleaning supplies, holding containers).

Application

- Before application, notify all workers and neighbors orally, if possible.
- Before application, post restricted-entry interval (REI) signs around the treated area as required by the Worker Protection Standard and OR-OSHA.
- Turn off fans and sprayers at corners and when making row turns.
- Use wind gauge and stop spraying if wind speed goes over 10 mph.
- For airblast sprayers, spray the outside rows of orchards from outside in, directing the spray into the orchard and shutting off nozzles on the side of the sprayer away from the orchard.
- For airblast sprayers, nozzles must be directed so spray is not projected above the canopies.
- Stop application if wind is blowing towards waterways.
- Have an extra person monitor the application in appropriate PPE.

Cleanup

- Any leftover mix? Spray it onto any legal site.
- Locate the cleanup site more than 100 feet from wells or other direct channels if possible.

- Use proper PPE according to label.
- Use proper equipment to clean up.
- * Use neutralizer when rinsing tank if needed (read the label).
- Triple rinse containers.
- Apply rinsates from cleaned mix/application tank and from triple rinsing containers to sites allowed by the label.

Post-application

- Ensure notification of REI. If label says “Must Post,” ensure that site is posted at all entry/exit points. If label does not require posting, employer may post or provide oral warnings.
- Keep all records required by ODA, the EPA, and the USDA. Make sure all employees know where the records are and that they understand them.
- Recycle clean empty containers.
- Monitor treatment areas after application to see that target pests were controlled, and non-target organisms, sensitive structures, crops, etc. were not affected.

Storage

- Order only enough pesticide for each season so no pesticides are stored during the winter.
- Do not store pesticides near fertilizer, animal feed, or livestock bedding.
- Do not store damaged containers.
- Make sure storage site is more than 300 feet from the nearest well.
- Make sure storage site has an impermeable 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 (all the containers at once) could be contained. Construct a berm around the outside perimeter of the floor and/or install a sump.
- Keep records (in office) of what is in storage facility. This will be useful in case of theft or fire.



BEFORE an Application

Decision/Steps

Who does it

Check ALL that apply

When

Will it be done?

How often and when?

Comments

Appli- cator	Super- visor	Fieldman
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General pre-application

Familiar with local weather patterns? Monitoring long-term forecasts when scheduling an application?					
Know soil types and soil's water-holding capacity? Using this knowledge in decision-making processes (especially about herbicide use)?					
Using cover crops, tailwater recovery and re-use system, and/or other methods to minimize runoff from storms and irrigation?					
Applicator trained annually in monitoring pests and diseases and made an integral part of the monitoring program?					
Applicator trained annually on all pesticides used on the farm, and records kept of this training?					
Established buffer zones for sensitive areas as required by your State Department of Agriculture and the EPA?					
Simple map of all structures, public areas, waterways, other crops, etc. presented and explained to applicators and fieldman? Drainage patterns included on map?					
Applicator knows wind characteristics at the application site?					
Sumps constructed at site drainage exit points to settle out sediment from irrigation and storm runoff?					
Berms established around low-lying wellheads to prevent surface water from contaminating the wells?					
Mixing/loading site has a non-porous surface?					
Mixing/loading site at least 100 feet from wells and other water sources? (Note: This is a recommendation, not a requirement.)					



BEFORE an Application

Decision/Steps

Who does it

Check ALL that apply

When

Will it be done?

How often and when?

Comments

Appli-
cator

Super-
visor

Fieldman

Considering people and other organisms

Checked if there are any farmworkers in nearby fields?					
Checked if there are neighbors or any other people within 1/4 mile?					
Checked if there are farm or domestic animals nearby?					
Checked if there is wildlife (deer, owls, etc.) nearby?					
Checked if there are bees near the area?					
Considered ways to protect beneficial plants or insects located within 1/4 mile of the application?					
Know all neighboring plants or crops?					



BEFORE an Application

Decision/Steps

Who does it

Check ALL that apply

When

Will it be done?
How often and when?

Comments

Appli-
cator Super-
visor Fieldman

Choosing pesticide and reviewing label

Decision/Steps	Appli- cator	Super- visor	Fieldman	When	Comments
Checked for special precautions indicated on label?					
Checked if pesticide is registered for use on the crop?					
Know if pesticide chosen is the least likely to leach or run off?					
Read label and MSDS to know what pesticide's specific hazards are?					
Label-required PPE ready?					
Determined proper rate of application?					
Noted restricted-entry interval?					
Noted pre-harvest interval?					
Noted plantback restrictions?					
Noted endangered species? (Ask your County Extension Agent.)					
Checked if pesticide could harm beneficial organisms or cause possible secondary pest outbreaks? (Check label and with your County Extension Agent, or see PNW Pest Management Handbooks.)					
Have suitable application equipment for this job (checked tank capacity, pressure range, volume of output, nozzle size, pump compatibility with formulation type)?					



BEFORE an Application

Decision/Steps

Who does it

Check ALL that apply

When

Will it be done?
How often and when?

Comments

Appli-
cator Super-
visor Fieldman

Considering weather conditions

Checked to make sure wind speed is between 3 and 10 mph?					
Checked if there are application temperature restrictions on the label?					
Checked if fog is predicted for next 48 hours? (if so, avoid spraying if possible)					
Checked if storm is predicted in the next 48 hours? (if so, no spraying except oils)					

Pre-application check of equipment

Checked all hoses and hose connections for splits, cracks, and leaks?					
Checked for missing filter elements and seals? Checked for blocked or damaged filters?					
Checked tank for damage? Checked to make sure tank sits firmly in its mount?					
Checked to make sure agitator is working properly?					
Checked valves for leaks?					
Checked pump lubrication levels? Checked pump for leakage? Checked to make sure pump rotates freely without friction or noise?					
Checked fan drive gearbox oil level?					
Replaced nozzles at least once per season?					
For airblast sprayers: nozzles adjusted to target the trees?					



BEFORE an Application

Decision/Steps

Who does it

Check ALL that apply

When

Will it be done?
How often and when?

Comments

Appli- cator	Super- visor	Fieldman
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Mixing/loading

Emergency response plan ready and posted? Water and first aid supplies available? Applicators trained to follow the plan?					
Necessary supplies to contain spills or leaks (absorbent materials, cleaning supplies, holding containers) available and nearby?					
Mixer/loader using the proper PPE?					
Obtained source of clean water for mixing?					
Tested pH of water? (effectiveness of some pesticides is affected by pH)					
Using a 6-inch air gap or closed system when filling the spray tank?					
Have necessary measuring and mixing equipment?					
Application equipment properly calibrated?					
Monitoring nozzle output and spray pattern twice per season?					
Using drift reduction agents?					
Triple rinsing empty containers?					

Notification and posting

All workers and neighbors notified ORALLY?					
REI signs posted as required by the label and local agencies?					



DURING an Application

Decision/Steps

Who does it

Check ALL that apply

Appli-
cator Super-
visor Fieldman

When

Will it be done?
How often and when?

Comments

Application

Extra person monitoring application for drift and to ensure that no vehicles or people come close?					
Using a wind gauge? (Application should be stopped if wind speed exceeds the 3-10 mph range.)					
Spraying inward on the edges of orchards?					
Turning off sprayers at the corners of orchards?					
In orchards, when spraying last three rows upwind of water bodies, roads, or buildings: using nozzles on one side only, with spray directed away from these sensitive areas?					
When spraying orchards, leaving buffer between application site and any body of water that may drain into a river or tributary?					
Any other sensitive site? (Find out required buffer width from ODA.)					



AFTER an Application

Decision/Steps

Who does it

Check ALL that apply

When

Will it be done?
How often and when?

Comments

Appli- Super-
cator visor Fieldman

Cleanup

At least 100 feet from wells, ponds, creeks, etc.?					
PPE designated by the label being used?					
Leftover pesticide mix sprayed out on any legal site (or stored for next application)?					
Tank rinse water applied back to the treated area?					
Used containers triple-rinsed and disposed properly?					

Post-application

Application records kept where employees know to find them? Employees know from records what pesticides were applied where, and when restricted-entry intervals end?					
Empty containers triple-rinsed or pressure-rinsed and recycled or disposed of according to state and local regulations?					
Treatment areas inspected after application to make sure target pest was controlled, and if non-target organisms were affected?					

Storage

Ordering only enough pesticides for each season so pesticides do not need to be stored during winter?					
Storage located at least 300 feet from nearest well?					
Storage area has an impermeable floor?					
Storage area securely locked?					
Sump located next to or connected to the storage area to contain leaks?					
Any leaking containers? DO NOT STORE THEM! Contact DEQ or ODA about what to do with them.					
Empty containers stored in a locked area?					

Decision/Steps

Who does it
Check ALL that apply

When
Will it be done?
How often and when?

Comments

Appli-
cator Super-
visor Fieldman

	Appli- cator	Super- visor	Fieldman		

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