

Pyrethroid Insecticides

Orchard Crops



Management Practices for Protecting Water

Pyrethroid Insecticides **Orchard Crops**

Stewardship Practices for Protecting Water

Whenever pyrethroid insecticide applications are made near waterways and other sensitive sites, growers and applicators should be aware of the potential for drift or runoff to these areas. Pyrethroid insecticides adhere strongly to soil particles and therefore have the potential to be carried off-site by sediment runoff rather than moving dissolved in water. By taking a stewardship approach through use of sound Best Management Practices (BMPs), the potential for drift or runoff can be minimized.

Stewardship practices are aimed at minimizing off-site movement to waterways and sensitive sites. These practices along with product label directions can provide growers and applicators with the tools necessary to complete a successful spray application while minimizing potential off-site impacts.

Severe Consequences For Mistakes

Consequences for application mistakes or ignoring good practices can have wide reaching impacts in the agricultural community. Product uses could be dramatically restricted or cancelled, hindering growers' ability to efficiently produce a profitable crop.

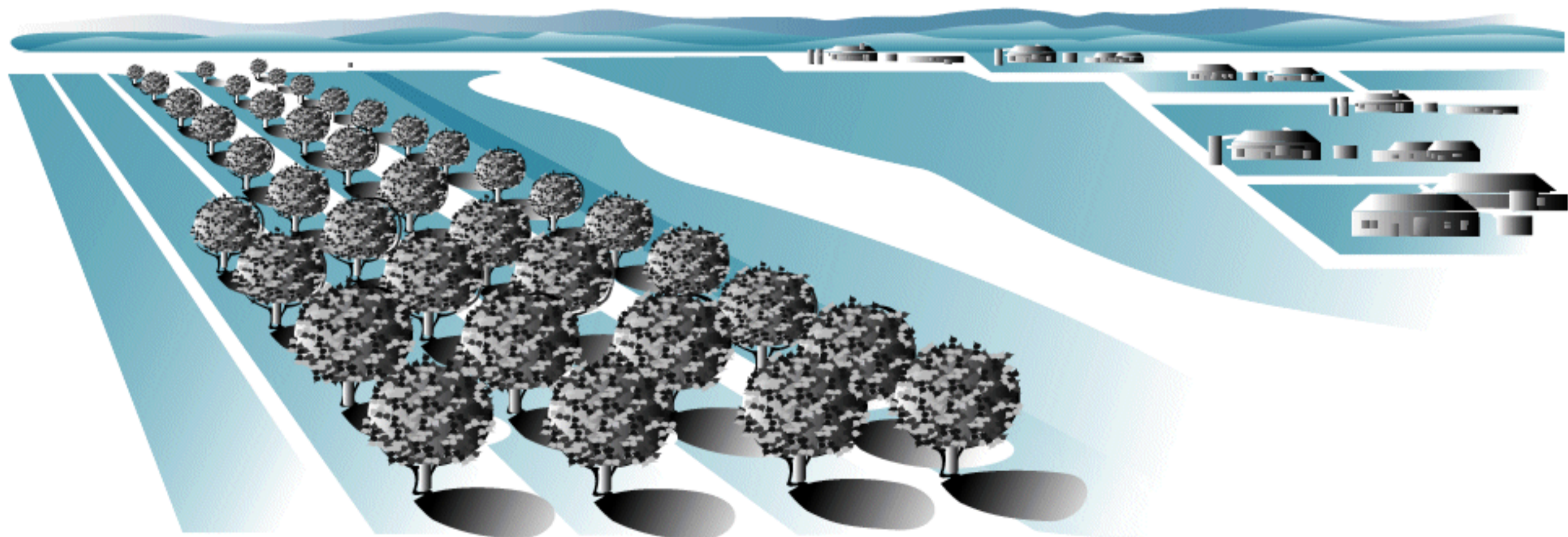
Each individual who handles or uses pesticides has the responsibility to take the proper precautions. Adhering to proper stewardship practices is good for the entire agricultural community!

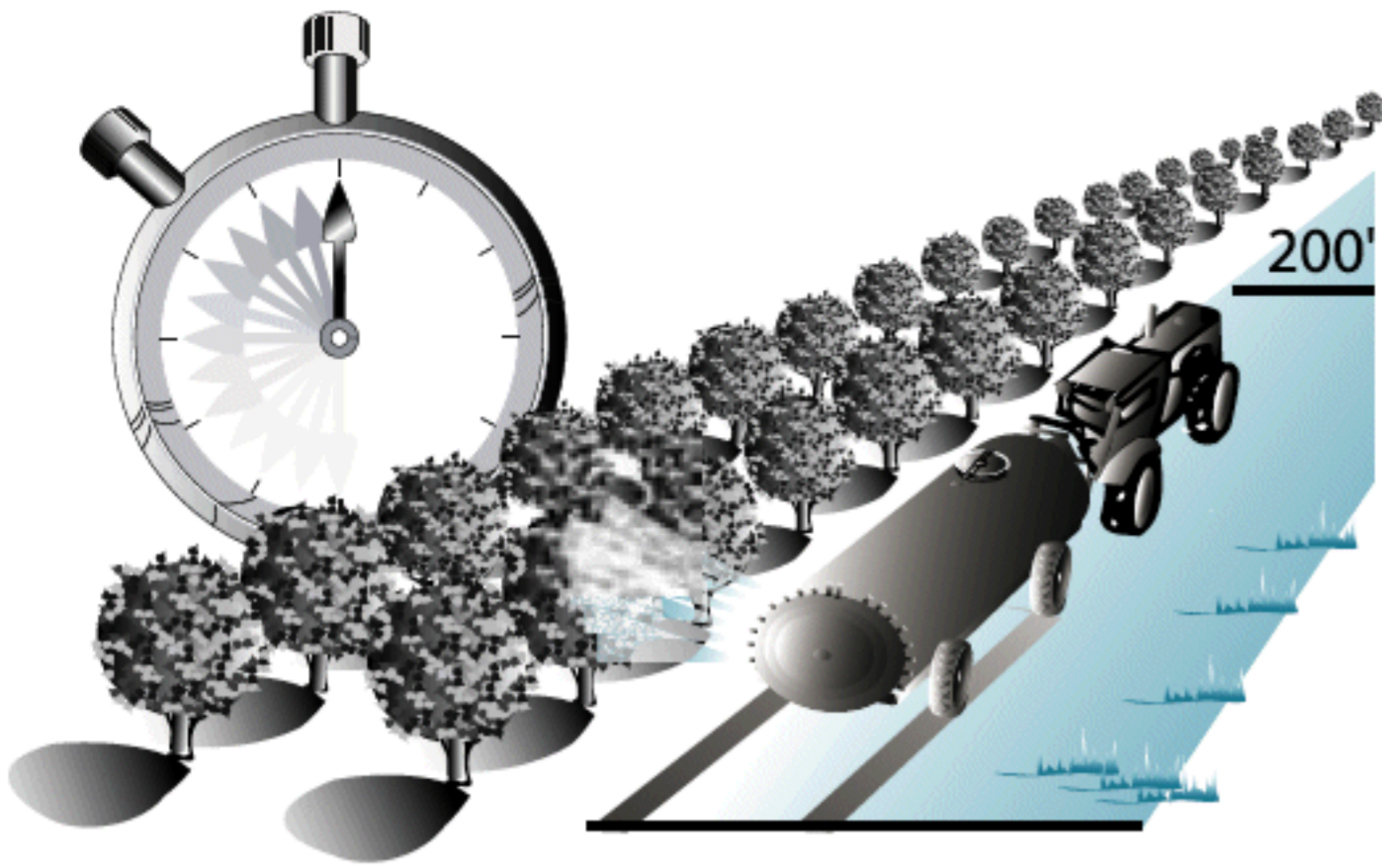
Evaluate Sensitive Sites

Evaluate the surrounding area to determine if waterways or other sensitive sites (schools, day-care centers and urban/commercial areas) are in close proximity or are connected via ditches to the application area. Check with your County Agricultural Commissioner for product-specific restrictions in your area.

Follow all Integrated Pest Management (IPM) practices prior to any pyrethroid insecticide application.

Visit the University of California IPM website (<http://www.ipm.ucdavis.edu>) for information on IPM practices for your specific crop.





These practices include but are not limited to:

- 1.** Having dense, well-established orchard floor vegetation during dormant season reduces runoff of farm inputs and sediment in several ways:
 - Reduction in runoff volume through increased water infiltration.
 - Reduction in sediment generation caused by rainfall impact on bare ground.
 - Reduction in pesticide mass carried by sediment.
 - Faster breakdown of pesticides on vegetation than soil.
 - Slows water movement and reduces sediment carried in surface flows.
 - Adsorption of pesticides to plant surfaces.
- 2.** Managing runoff water to minimize or eliminate the impact of off-site movement of sediment using:
 - Sediment basins
 - Tailwater return systems
 - Riser boards or dirt banks that retain winter rain runoff (after dormant sprays are applied) for a period of time to allow sediment to settle out.
- 3.** Vegetative buffers, vegetative filter strips and vegetative barriers:
 - Reduce sediment transport out of orchards.
 - Trap pesticides to allow for degradation
- 4.** Use vegetated ditches and holding ponds to enhance reduction of residues in tailwaters and to slow flow (thus reducing sediment transport potential)

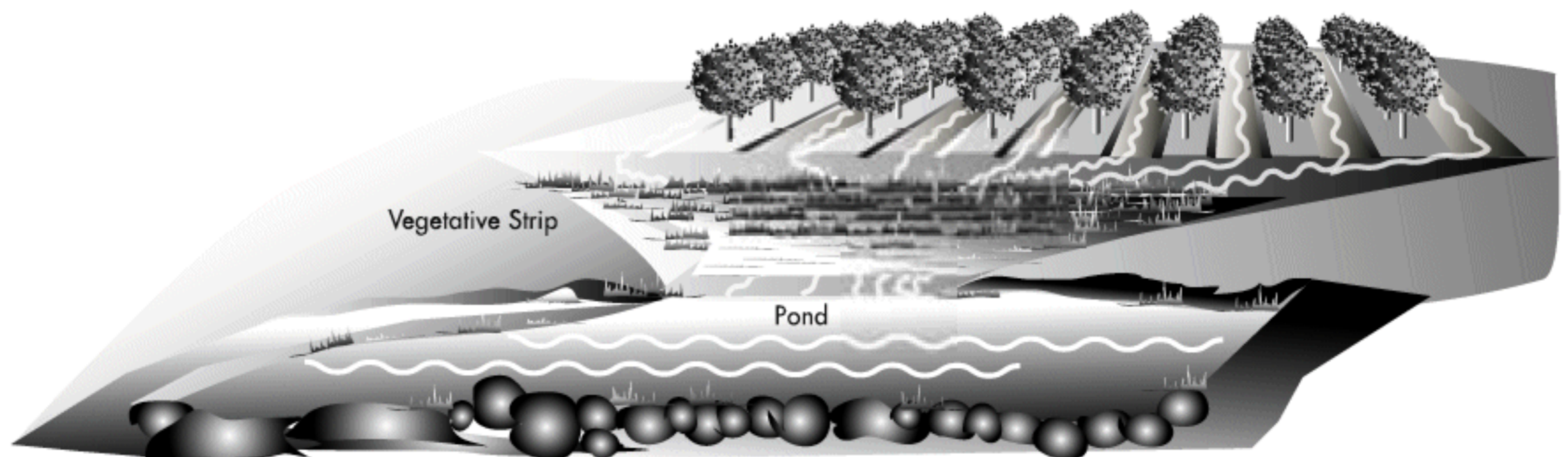
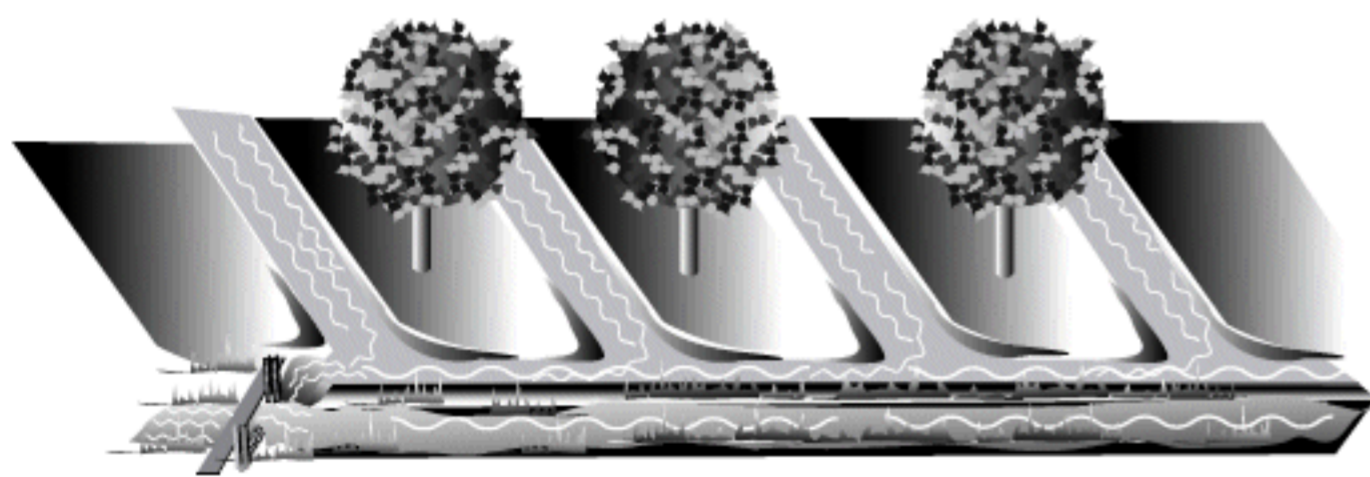
Adopt On-site Practices to Reduce Runoff

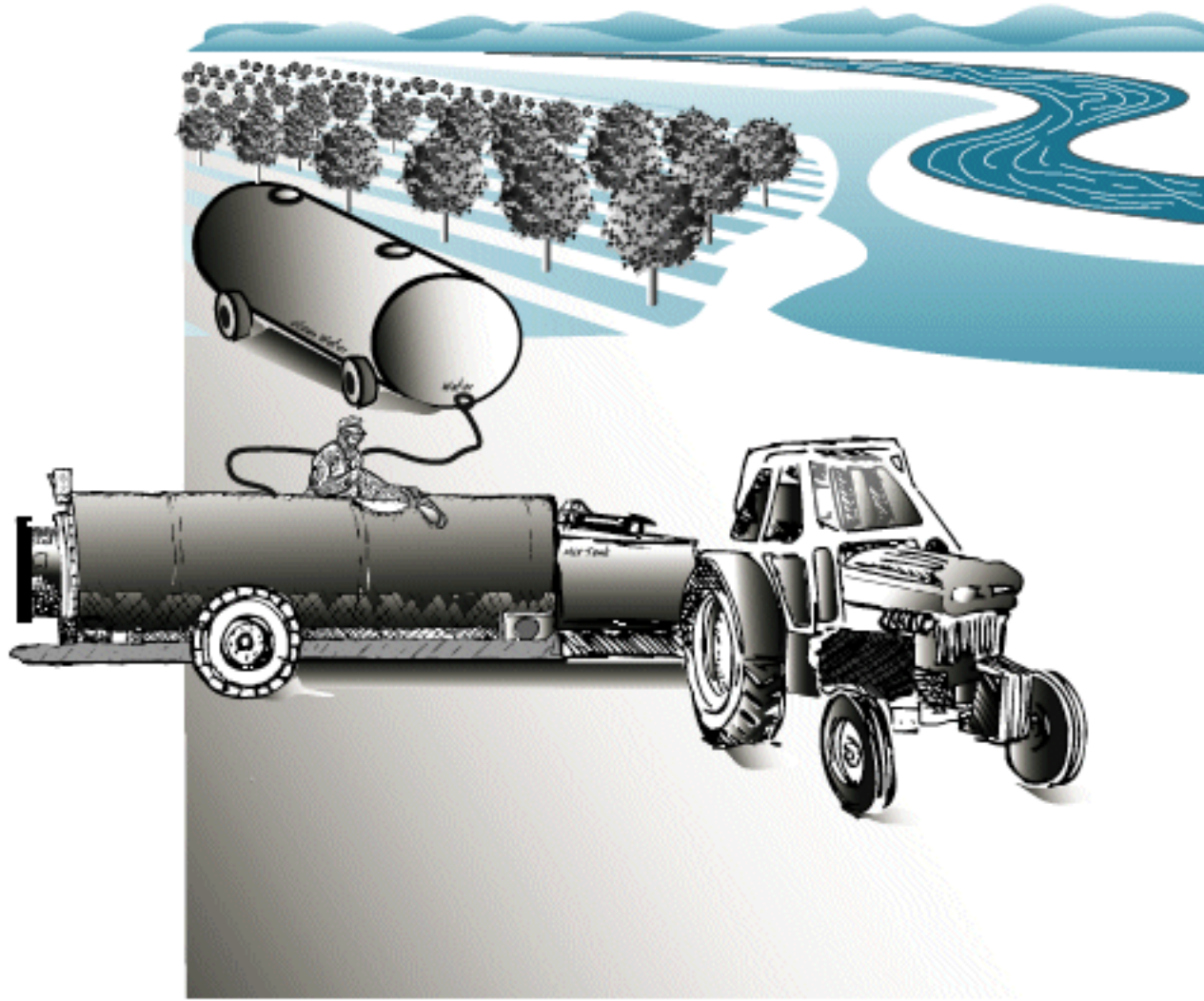
On-site practices are approaches for managing soil, water, pesticides and nutrients for sustainable agricultural production while minimizing environmental impacts.

The goal is to:

- A** Reduce or eliminate sediment movement off the orchard site.
- B** Reduce or eliminate flows of runoff water carrying dissolved pesticides and nutrients.

See the CURES booklet, *Orchard Practices for Protecting Surface Water* (<http://www.curesworks.org/publications/orchPrac.asp>)





Follow Proper Mixing and Loading Practices

1. Do not leave sprayer unattended while filling.
2. Partially fill tank (usually 1/3 to 1/2 full of water) prior to the addition of chemicals.
3. Make sure that the sprayer has sufficient agitation (mechanical or bypass) to keep chemical mixed. With bypass agitation, be sure to check if agitation will be sufficient when sprayer is actually spraying.
4. Make sure sprayer agitation system is running while mixing and loading pesticides.
5. Do not overfill tank. Spills can wash away to sensitive areas. Use air gap to prevent tank overfilling.
6. Use backflow valve on the fill tube.
7. Use a closed chemical transfer system whenever possible.
8. Open paper chemical packages with scissors or knife, rather than tearing.
9. Immediately triple rinse containers. Pour rinsate into tank prior to filling.
10. For returnable bulk containers, check with supplier for rinsing instructions.
11. Apply rinse water back to treated field. Never just drain out.
12. Check with county for proper disposal methods for empty pesticide containers.

Properly Calibrate Sprayer

- Calibrate equipment prior to each application.
- Use spray nozzles adjusted for tree canopy. Set nozzle pattern to match tree height and shape. Reduce the size of lower nozzles when lower canopy is thin or non-existent.
- Periodically check sprayer coverage by placing water-sensitive paper in a few areas of the tree canopy. Compare patterns to check uniformity.

Carefully Select Mixing and Loading Site

- If possible, use a concrete or asphalt pad that drains to a central sump. Otherwise, vary the location of mixing and loading site to prevent accumulation of accidentally spilled spray materials.
- Take precautions to ensure there is at least 100 feet between a mixing/loading area and any wells or ditches, canals or streams that feed into nearby rivers.
- Mix and load on a site not prone to runoff and where soil can be disked after mixing/loading is completed. Do not mix or load on hard-packed roads that could drain or run off into nearby areas or waterways.

Sprayer Set Up And Good Application Techniques

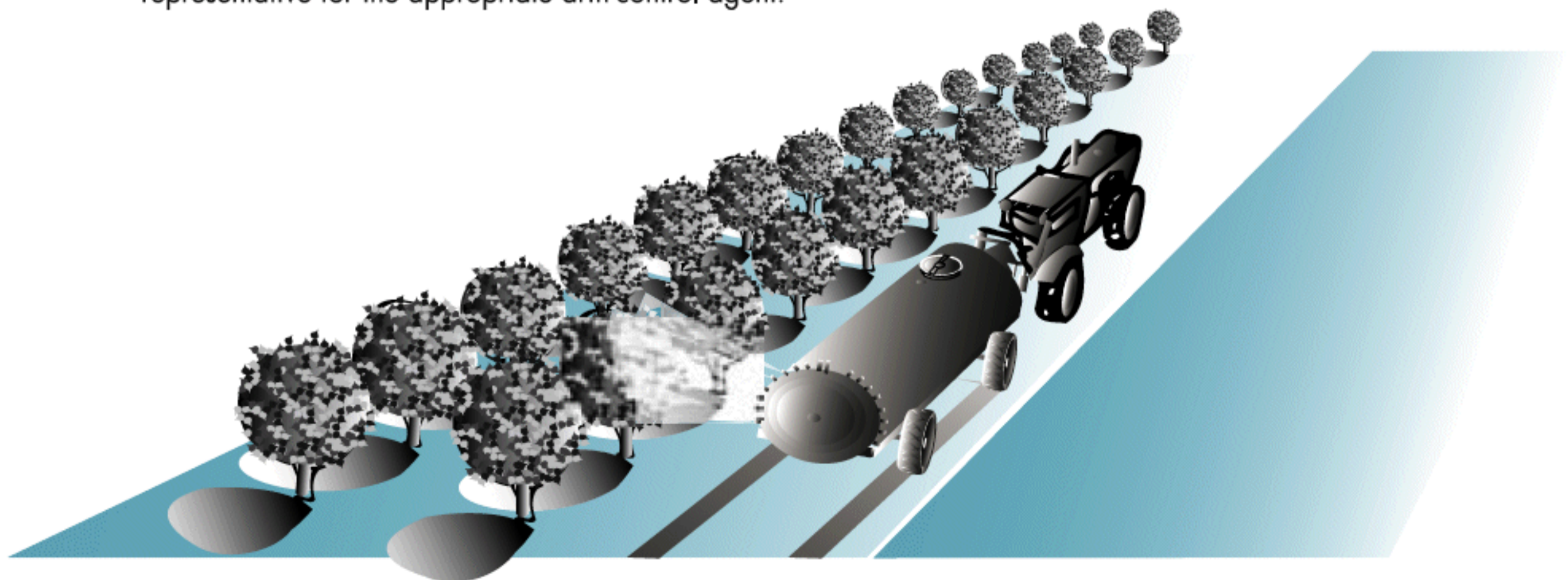
- Know the droplet spectrum of each nozzle (available from nozzle distributors).
- Use nozzles with volume median diameter (VMD) appropriate to the insecticide being applied (check with County Agricultural Commissioner for local requirements).
- Replace worn nozzles when necessary with newer, more effective nozzles.
- Use nozzles that provide adequate coverage at the largest possible droplet size and the recommended droplet size spectrum to reduce drift while maintaining efficacy.
- Consider spray controllers that adjust nozzle output based on ground speed. Be sure to understand the limitations of the controller and select the proper nozzle for use with the speed range you expect. Do not allow the pressure to get too low as to cause streaking or too high as to cause excessive fine droplets.

General Stewardship Recommendations

This publication outlines stewardship practice recommendations useful during the handling and application of pyrethroid insecticides. These recommendations are intended as guidance on good stewardship measures useful for both ground and aerial applications, especially near sensitive sites (see more details on these and other practices on following pages). Stewardship practices recommended for California conditions include:

- 1.** Applicator must be aware of and comply with county permit conditions and restrictions.
- 2.** Avoid applications just prior to a rainfall event or irrigation to minimize the potential for runoff. Check weather forecasts. These have improved in recent years with several companies offering predictions of upcoming rain events. (www.fieldwise.com and www.foxweather.com).
- 3.** Applications should be made only if wind is blowing at least 3 mph away from nearby waterways or other sensitive sites.
- 4.** Avoid spraying when wind is blowing toward nearby waterways or sensitive sites.
- 5.** Avoid aerial spraying when wind speed is less than 2 mph or greater than 7 mph.
- 6.** Avoid ground applications when wind speed is greater than 10 mph.
- 7.** Also use a registered, proven drift-control agent and/or proven drift-reducing application equipment. Check the pyrethroid label and with your farm-input supplier's representative for the appropriate drift-control agent.
- 8.** Choose the lowest chemical rate that provides efficacy when applied through your equipment.
- 9.** Check for compatibility of products used in tank mixes. Follow chemical label recommendations on testing for compatibility.
- 10.** Maintain an adequate buffer zone (untreated area from sprayed crop to sensitive area) to protect waterways and sensitive sites. Check with the product label and county agricultural commissioner for specific requirements.
- 11.** Always shut off nozzles when making row turns.
- 12.** Shut off outward facing nozzles when spraying the outside row, directing spray inward only.
- 13.** Start spraying only when nozzles are adjacent to the first trees in the row.
- 14.** Make sure applicator always has any required county permit(s) on hand during treatments.
- 15.** Attend annual pesticide training for growers and/or applicators. Check with your local agricultural commissioner or farm advisor for dates.
- 16.** Adopt on-site practices to reduce runoff (see page 6).

See your county guidelines for product-specific restrictions and recommendations



Before You Start Spraying

Any field treated with a pyrethroid by ground or aerial equipment should be evaluated and supervised prior to, during and after the application. This requires the person on-site to have a thorough understanding of the field being sprayed, the expected weather conditions and the location of sensitive sites and waterways in the vicinity of the treated field. The individual responsible for the application must be aware of:

- Wind conditions (speed and direction - current and forecast) and whether rainfall is forecast for the next 48 hours.
- Air temperature (current and forecast).
- Presence/absence of a temperature inversion layer.
- Presence/absence of waterways and sensitive sites in the area, especially downwind of the application site or connected to the site by drainage ditches, canals or sloughs.
- The application equipment setup and calibration; proper use of any drift-reducing application equipment.
- All chemicals and rates used to complete the application.

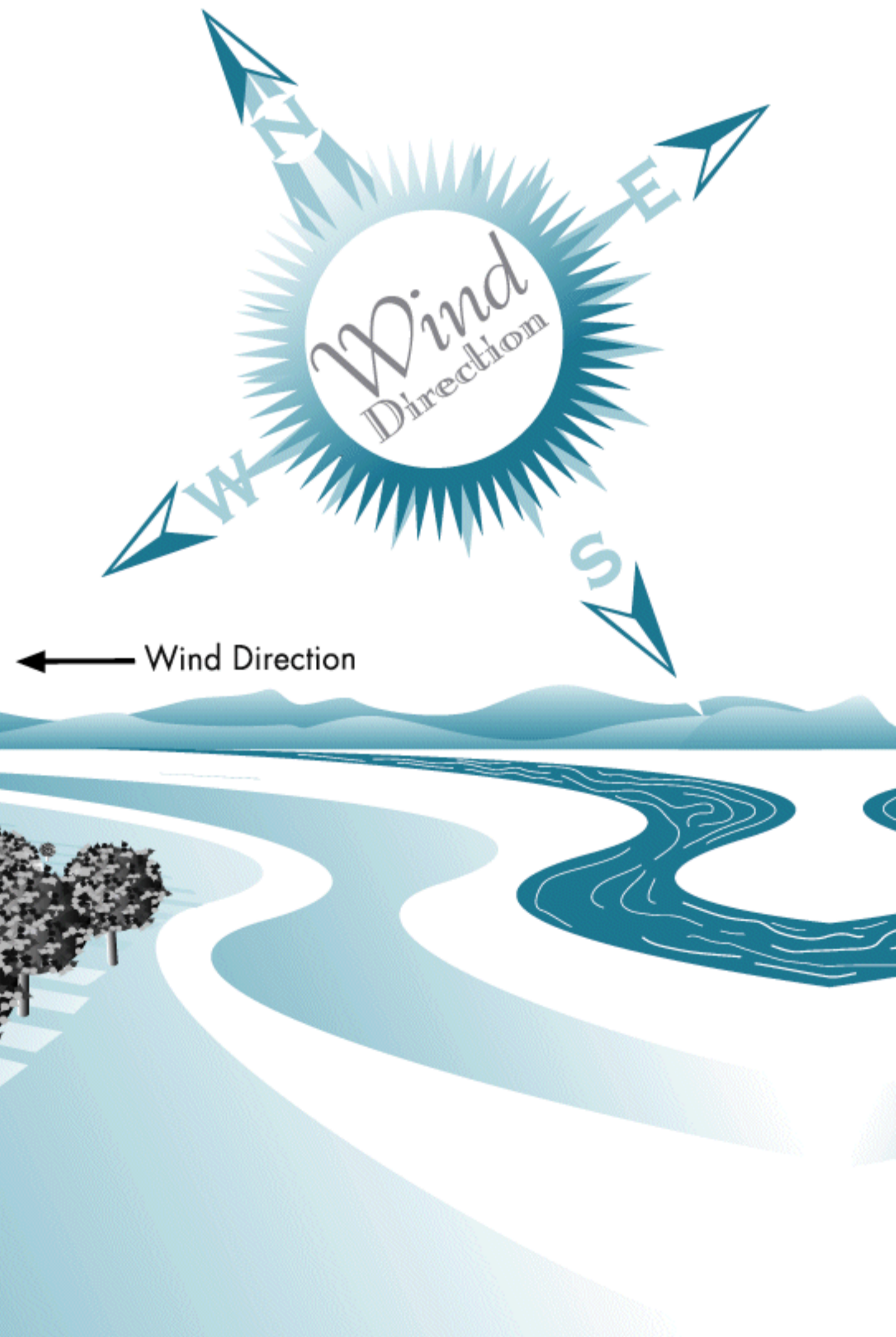
Evaluate Each Orchard Site

Evaluate each orchard to pinpoint areas that are erodible where sediment might move offsite to waterways. Also, identify points where surface water runs off onto waterways or other sensitive areas. Get help with identifying these sites through local Natural Resource Conservation District offices.

- Sketch your orchard and note location of: wells, sinkholes, highly erodible land, drainage ditches, streams and rivers.
- Flag or stake no treatment buffer zones.
- Provide the orchard sketch to new sprayer operators or commercial applicators.

Monitor Weather Conditions

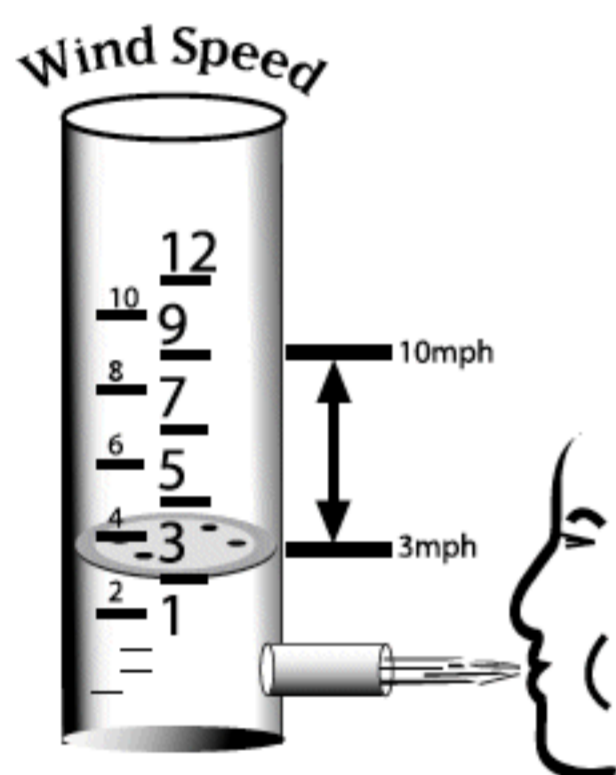
1. Always monitor and record weather conditions prior to, during and after an application.
2. Check with the County Agricultural Commissioner about application restrictions in adverse or questionable weather conditions.
3. If other approaches have not provided sufficient information concerning weather conditions, create a smoke column to determine wind direction and the presence or absence of an inversion layer (check with the county agricultural commissioner for agricultural burning restrictions).



Record Application Conditions

Should a pyrethroid application result in a complaint, the best way to resolve the conflict is with accurate and complete records of the application conditions. Recording a few simple facts could prove valuable in the event of an incident or complaint.

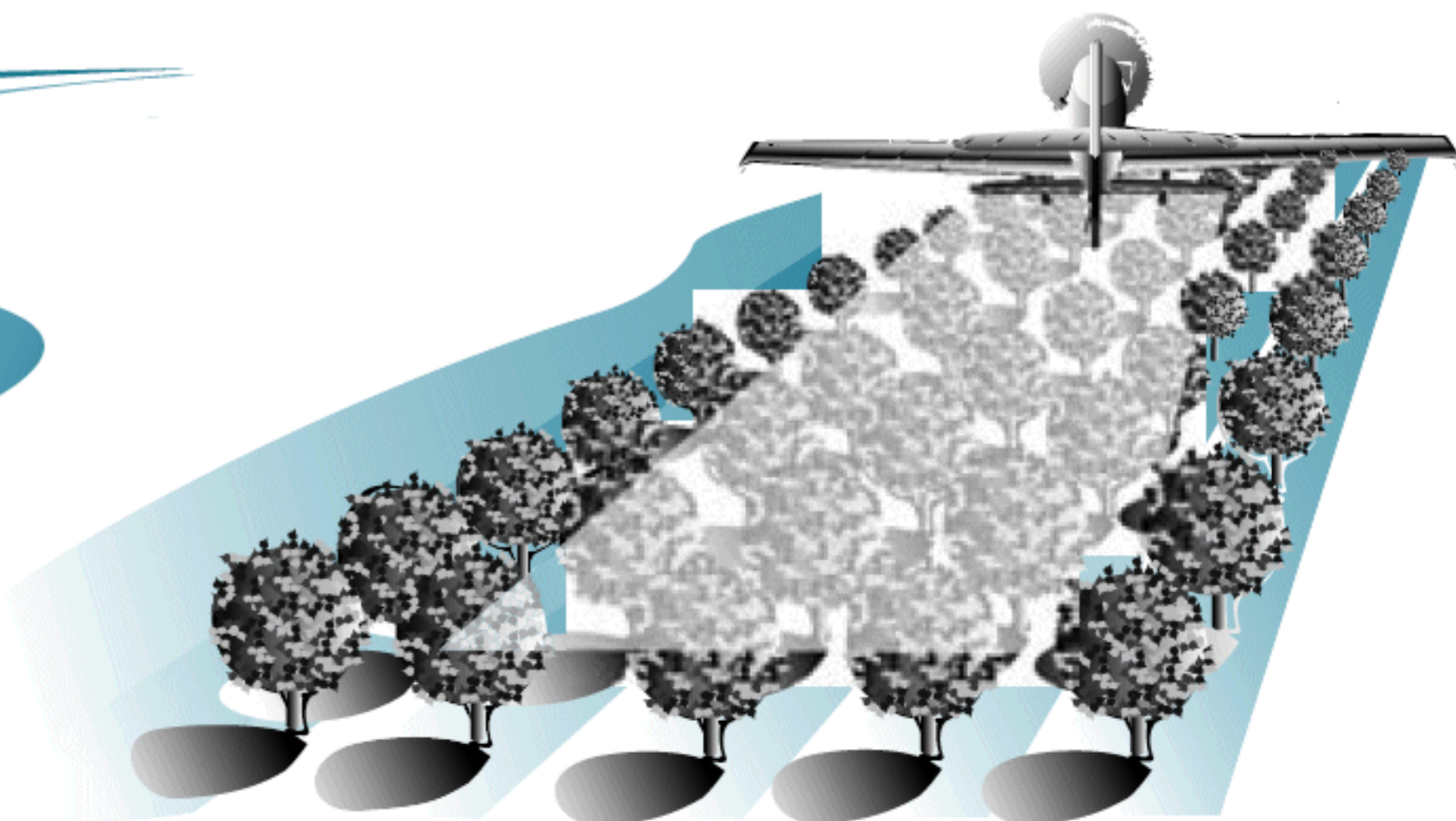
1. Compile and maintain a summary report on weather conditions prior to, during and after the application. Also note changes in conditions when stopping to refill or adjust equipment.
2. Consider using a proven and accurate hand-held wind speed and temperature indicator to record on-site field conditions. Be sure to note wind direction.
3. Local weather services, Internet services (government and private providers) and weather stations at local airports can be sources of current and forecasted weather information.



Grower Responsibilities with Aerial Applicators

When hiring a commercial aerial applicator to apply a pyrethroid insecticide, the grower is responsible for ensuring that the following steps are followed:

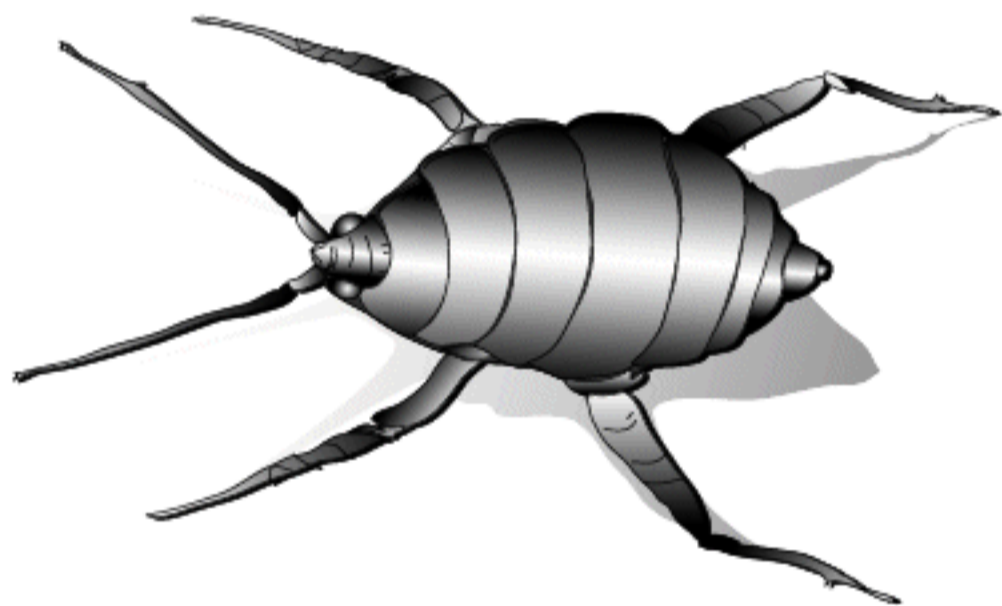
1. Positively identify and confirm the targeted pest(s) before ordering the application.
2. Make sure the product is labeled for the targeted pest(s).
3. Hire only responsible, reputable applicators.
4. Confirm that the aerial applicator has a written recommendation from the Pest Control Advisor (PCA).
5. Positively identify the proper site for application. Use GPS coordinates if applicator has this capability. Provide the applicator with a sketch of your orchard layout.
6. Check to ensure weather conditions are appropriate for aerial applications by reviewing the 1-6 hour forecast prior to initiating treatments.
7. Don't pressure applicators to make treatments when conditions are marginal. This can jeopardize their licenses as well as the industry image.
8. Make sure aerial treatments are applied properly, avoiding direct overspray or off-site movement toward waterways and other sensitive sites.
9. Growers should consider Chemical Drift Insurance Coverage as an addition to a Comprehensive General Liability Insurance Policy.



Follow Integrated Pest Management (IPM) Approaches

The University of California Cooperative Extension has developed IPM guide books for a number of orchard crops that detail numerous pest management options. Commodity organizations also can provide current information on IPM. Basic principles of an IPM approach include:

1. Thoroughly scouting an orchard to monitor and assess the pest situation.
2. Consider all reasonable options to mitigate a pest problem when making decisions concerning pest management.
3. Rotate chemical classes to avoid pest resistance.



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Application Equipment Checklist

Before filling the tank, adding pesticides and beginning an application, closely perform a visual inspection of the equipment. Always wear personal protective equipment when checking application machinery.

Check and Make Sure:

- Hose connections are sealed and tightened.
- Regulator connections are sealed and tightened.
- Sight gauges are clear and working.
- Clean filters and screens on a daily basis.
- Fix leaking gaskets immediately.
- Pressure gauges are located at the proper points with proper scales and are sealed and working.
- All nozzles and metering devices are of correct size, sealed and unobstructed.
- All sprayer shields are in place (where appropriate).
- Tank drain plug is in place.
- There is no damage to hoses or piping.