



**Targeted Constituents**

<input checked="" type="radio"/> Significant Benefit		<input type="radio"/> Partial Benefit		<input type="radio"/> Low or Unknown Benefit	
<input type="radio"/> Sediment	<input type="radio"/> Heavy Metals	<input type="radio"/> Floatable Materials	<input checked="" type="radio"/> Oxygen Demanding Substances		
<input checked="" type="radio"/> Nutrients	<input checked="" type="radio"/> Toxic Materials	<input type="radio"/> Oil & Grease	<input type="radio"/> Bacteria & Viruses	<input type="radio"/> Construction Wastes	

**Description** Promote efficient and safe housekeeping practices (storage, use, and cleanup) when handling potentially harmful materials such as fertilizers, herbicides, and pesticides. This management practice will create a significant reduction in nutrients, toxic materials, and oxygen demanding substances.

**Approach** Fertilizer management involves control of the rate, timing, and method of application to minimize the chance of polluting surface water or groundwater. Pesticide and herbicide management involves eliminating excessive pesticide use, employment of proper application procedures, and the use of alternatives to chemical control to reduce the pesticide and herbicide load in stormwater runoff.

The use of fertilizers, herbicides, and pesticides contribute to pollution of stormwater runoff. All types of properties contribute to the problem: residential, commercial, industrial, institutional. Major users of these products, such as lawncare contractors or construction firms, should develop controls on the application of fertilizers, herbicides, and pesticides. Controls may include:

- Product and application information
- Equipment use and maintenance procedures
- Record keeping
- Public notice procedures

Carefully consider whether these products are essential. Selection of low-maintenance vegetation may reduce the need for fertilizers, pesticides, and herbicides. University of Tennessee Agricultural Extension Service has many brochures and pamphlets concerning fertilizers and pesticides, including various alternatives.

**Fertilizers**

- Avoid broadcast applications of fertilizers when immediate rainfall is expected. Apply fertilizer when there is already adequate soil moisture and little likelihood of immediate heavy rainfall, followed by sprinkling the lawn or garden. A soil test is recommended to assure the use of optimum lime and fertilizer application rates.
- Whenever fertilizer is used to establish vegetation on bare soil areas, erosion control is of primary importance in preventing fertilizer from leaving the site.

*Pesticides and Herbicides*

- Excessive application and misuse of pesticides and herbicides results in heavily polluted stormwater runoff. Avoid broadcast applications of pesticides and herbicides when immediate rainfall is expected. Apply pesticides and herbicides in a narrow rather than wide band; do not broadcast them over the entire lawn area. Spot-spray infested areas rather than applying excess amounts of pesticides and herbicides. Never apply over impervious surfaces.
- Examine all alternatives to pesticides and herbicides that, in the long term, may be much less costly than the use of a particular chemical. Use the least toxic chemical pesticide and herbicide that will accomplish the purpose.
- Pesticides and herbicides that degrade rapidly are less likely to become stormwater runoff pollutants. Use pesticides and herbicides with low water solubility. Granular formulations are generally preferable to liquids because application losses are lower.
- Pesticides and herbicides should be sprayed only when wind speeds are less than 7 mph. Spray in the early morning or at dusk when wind speeds are usually lowest. Air temperature should range between 40 degrees to 80 degrees Fahrenheit.

*Pesticide and Herbicide Types*

- Dusts: This type is highly susceptible to wind drift, not only when being applied but also after reaching target. The application should be performed during the early morning or late evening hours when there is little or no air movement. The distance between the application equipment and the target must also be considered.
- Sprays: This type may be in the form of solutions, emulsions, or suspensions. Droplet size is an important factor in determining susceptibility to wind drift. Large droplets fall faster and are less likely to contaminate non-target areas. Sprays should be applied during periods of low air movement. Ground sprays followed by soil incorporation are not likely to be sources of water pollution unless excessive erosion occurs.
- Granular formulations: This type is applied to either the ground surface or below the soil surface. Surface applications may or may not be followed by soil incorporation. Pollution of surface waters from granular formulations is unlikely unless heavy runoff or erosion occurs soon after treatment. However, groundwater pollution may result from excessive leaching due to rainfall after application, depending on the pesticide composition. Loss of granular formulations can be controlled for the most part with adequate soil conservation practices.
- Fumigants: This type must be kept in place for specific lengths of time in order to be effective. Containment methods include soil compaction, water seal, and sealing of the area with a plastic cover. Most fumigants act rapidly and degrade quickly. Consequently, water pollution is usually not a problem.
- Antimicrobial paints and other surface coatings: This type is designed to resist weathering and is therefore not a likely source of pollution. Empty containers

should be disposed in accordance with rules for all pesticide containers. Use extreme care when sanding or scraping surfaces that have been previously treated with these substances. Treat sanded and scraped residue as hazardous waste.

- Pre-plant treatments: Seed, roots, tubers, etc., are frequently treated with pesticides prior to planting. Treatment is usually by dust, slurry, or liquids. Little pollution hazard exists from this application. Care must be taken, however, in disposing of residual treatment materials and with unused plants.
- Organic pesticides: A wide variety of organic pesticides, produced from plants, bacteria, and other naturally-occurring substances, are available in quantities for both commercial and residential use. These substances usually present much less risk for contamination of groundwater and surface water, and much fewer problems for disposal of leftover product or containers.
- Beneficial insects: This management method involves the use of insects in bulk or in amounts suitable for residential use. It can be used alone or in combination with other pesticides to eliminate or minimize the use of toxic substances.

***Goodhousekeeping and Safety***

- Always use caution when handling any pesticide, herbicide, or fertilizer product. Many products contain toxic chemicals that can cause severe injury or death.
- Store pesticide or fertilizer products securely in containers protected from stormwater and away from children, pets, and sources of heat, sparks, and flames. Store products in their original containers and keep them well-labeled. Very importantly, do not store chemicals in food containers.
- Read and follow use instructions provided on packaging and in material safety data sheets (MSDS). Periodically review MSDS information and discuss precautions with employees or personnel using or handling pesticides, herbicides, or fertilizers.
- Work only in well-ventilated areas. Avoid contact with eyes and skin. Wear gloves and eye protection when using or handling hazardous substances. Do not wear contact lenses, which can absorb hazardous vapors.
- Use the entire product before disposing the container. Do not dispose of pesticide or fertilizer wastes in any of the following methods:
  - Into trash or waste containers
  - Into storm drains or into creeks
  - Onto the ground
  - By burning

**Requirements**

- Employees who handle potentially harmful materials should be trained in good housekeeping practices. Consult Table AM-01-1, presented in the Employee Training BMP fact sheet, for a quick reference on disposal alternatives.

**References**

**18, 32, 33, 34, 35, 52, 53, 92, 93, 96, 97, 166** (see BMP Manual Chapter 10 for list)