



Targeted Constituents

● Significant Benefit		◐ Partial Benefit		○ Low or Unknown Benefit	
○ Sediment	◐ Heavy Metals	○ Floatable Materials	● Oxygen Demanding Substances		
● Nutrients	● Toxic Materials	○ Oil & Grease	○ Bacteria & Viruses	○ Construction Wastes	

Description Use efficient and safe housekeeping practices (storage, use, and cleanup) when handling potentially harmful materials such as fertilizers, herbicides, and pesticides. Misuse and overuse leads to stormwater pollution, poisons, and toxic substances in Knoxville creeks and streams. Only use fertilizers and pesticides when necessary, and consider alternative methods and treatments if available.

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, using proper application procedures, and considering alternatives to chemical control to reduce the amount of pesticides and herbicides in stormwater runoff.

The use of fertilizers, herbicides, and pesticides contribute to pollution of stormwater runoff. Residential users of these products tend to overapply by a factor of several times. Carefully read the instructions for application rates, recommended application equipment, and seasonal methods. See AM-13 (Pesticides, Herbicides, and Fertilizer Use) for additional considerations and application instructions for various types of materials such as dusts, sprays, granular formulations and fumigants.

In many cases, these products may not be essential for a productive lawn or garden. Selection of low-maintenance vegetation reduces the need for fertilizers, pesticides, and herbicides. University of Tennessee Agricultural Extension Service has many brochures and pamphlets concerning fertilizers and pesticides, including various environment-friendly alternatives. These pamphlets are available on the 5th floor of the City County Building or available online at:

<http://www.utextension.utk.edu/publications/>

More information on pesticides is available from the USEPA Office of Prevention, Pesticides & Toxic Substances: <http://www.epa.gov/opptsmnt/>

Fertilizers

- Do not apply fertilizer when immediate rainfall is expected. Apply fertilizer only when there is already adequate soil moisture and little likelihood of immediate heavy rainfall. After applying fertilizer, lightly sprinkle the lawn or garden. A soil test is

recommended to determine the optimum lime and fertilizer application rates.

Pesticides and Herbicides

- Excessive application and misuse of pesticides and herbicides results in heavily polluted stormwater runoff. Avoid using 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. Never apply pesticides and herbicides near streams, creeks, ditches, storm drains or on 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 or 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 should be minimized.
- 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 cause severe injury or death. Keep 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 well-labeled. Do not store chemicals in food containers.
- Read and follow use instructions provided on packaging, and in material safety data sheets (MSDS) if available. Periodically review for 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.

Disposal Options

- Consult Table AM-01-1 for a quick reference on disposal alternatives. Knoxville and Knox County residents may use the Household Hazardous Waste Collection Center (located on Elm Street) for free disposal of chemicals and poisons used in their homes. See the following website for additional information -
<http://www.cityofknoxville.org/solidwaste/>
- In general, use the entire product before disposing the container. However, do not overapply the product if it is not needed. 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

Related BMPs

These related BMPs also provide guidance on the correct use and disposal of fertilizers and pesticides:

Table AM-01-01	Quick Reference for Disposal Alternatives
AM-08	Waste Management and Recycling
AM-13	Pesticides, Herbicides, and Fertilizer Use

References

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